

# **The Effects of Auditing Quality and of Independent Directors & Supervisors on the Interest Cost of Newly Issued Corporate Bonds**

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## **ABSTRACT**

We use non-convertible corporate bonds issued by Taiwan's listed and OTC companies from 2000 to 2004 as sample. Quality of audit is measured by the auditing firm's market share ratio divided by its client concentration with regard to various individual industries. Market share ratio is also employed as proxy for auditing industry expertise. Results show that companies audited by high quality auditing firm and by auditing industry expertise enjoy lower cost of debt. Our paper also examines the impact of independent directors & supervisors on cost of debt. Results show that the existence of independent directors & supervisors does effective reduce cost of debt.

**Key words: auditing quality, industry auditing expert.**

**Data Availability: Contact authors**

## 1. Introduction

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 adverse 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 credibility 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 purpose of this paper 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 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' audit 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 and financing cost of issuing new corporate bonds would be cut down, as a result of better quality of auditing.

Corporate governance mechanism is an action to properly govern the corporate management, in order to ensure a reasonable investment return for interest providers and to avoid the possible losses incurred from 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 uphold an audit judgment (SEC 2000). The corporate governance organization for maintaining the independence of American CPA's is called audit committee, which is mainly responsible for resolving possible conflicts between management and CPA's, while protecting those CPA's who ensure the credibility of their financial reports. Therefore, they shall be made free from concerns about being dismissed by the management once their reports are not in the best of the corporation's interests (Carcello & Neal, 2003). Compared to that in the United States, Taiwan's corporate governance mechanism is still very much in the early stage, with most companies yet to set up audit committees. The only relevant regulation published in February, 2002, is that which mandates the establishment of independent directors and supervisors<sup>1</sup> for newly listed (OTC) companies, 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 being independent is still not sufficient to ensure the independence of the committee; it is necessary that every and all committee members are independent on order to meet the minimum independence requirement.

Independent directors are regarded as the utmost superintendents. As they do not financially rely on the management, nor are they concerned with job lose or pay cut, they are less constrained when making decisions. While most Taiwan's firms are family business (Yeh, Lee, and Woidtke, 2001)<sup>2</sup>, whether the existence of an independent director can necessarily save agency cost and gain trust from external investors and creditors, becomes a relevant issue for the present research. Thus this study will also 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 incurred by the management's self-interest behavior, it can be expected that creditors have more confidence in the corporate management and thus lower their demand for risk premium.

Our study analyzes factors that have impacts on the interest cost of newly issued corporate bonds, such factors as quality of auditing (CPA's professionalism and independence), auditing by industry experts, and the establishment of independent directors and supervisors. Evidence showed that cost could be significantly reduced

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<sup>1</sup> 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.

<sup>2</sup> 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.

by improved quality of auditing, industry experts' work, and the set-up of independent directors and supervisors.

The reminder of this paper is organized as follows: section 2, literature review; section 3, research hypotheses; section 4, data and methodology; section 5, results analyses; and section 6, conclusion and suggestion.

## **2. Literature Reviews**

### **2.1 Measurement of Auditing Quality**

As the quality of auditing cannot be directly observed, 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<sup>3</sup>. Various proxy variables for measuring audit quality include audit fees, number of partners, number of clients (DeAngelo 1981a, Francis, Wilson 1988), reputation of CPA's (Healy, Lys 1986, Francis, Wilson 1988, Beatty 1989), CPAs' legal litigation (Palmrose 1987), and market share by the industry (Palmrose 1987). Our research adopts measurement variables of such ratios as market share and concentration of audited clients as well as hiring of industry auditing experts, as proposed by Wen-Jing Chang, Ling-Tai Chou, and Hsiou-Wei Lin (2003).

DeAngelo (1981b) suggests that quality of auditing be defined as the common possibilities between the CPA's detection of a fault in clients' accounting system and the CPA's disclosure of such fault. A high-quality audit can always be expected to capture a defect in the accounting practice. Watts and Zimmerman(1986) believe CPA's professional capability is exactly what DeAngelo(1981b) calls the CPA's ability to identify defective accounting system. The ability to disclose a real problem in an accounting system is deemed as the CPA's professional detached independence. With 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 auditing can locate and disclose any fault in the financial reports, faulty accounting information would be significantly reduced, and the financial reports would be deemed reliable 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, through which their clients can get a better understanding of the company's financial status and

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<sup>3</sup> See Kinney et al.(2004)

business results through the audited reports.

The professional ability of a CPA can be developed by training or accumulative experience. 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 that field. Though on-the-job training and experience accumulation, a CPA professional be equipped with effective knowledge and strengthen in his/her auditing ability to correct inappropriate disclosure in the financial reports. Each business has its own *accounting techniques*. CPA's gain more knowledge after they have more auditing experience in a certain business. (Velury, Reisch, and O'Reilly, 2003). Hogan's and Jeter's (1999) research indicates a trend of significant increase in concentration of auditing people within a certain industry. This could result in a professionalized industry capability and enhanced professional ability, promising a better quality of auditing<sup>4</sup>. Hence, our research utilize market share by various individual industry as a proxy measure for professional capability of auditors.

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

Where:

$MS_{ik}$  = the market share of CPA firm (k) in the industry (i)

$i = 1, 2, \dots, I$ , represents the type of industry where the listed company client belongs

$j = 1, 2, \dots, J$ , represents the listed company client

$k = 1, 2, \dots, K$ , represents 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)

Auditing fees 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 (2001) also pointed out that the degree of CPAs' independence varied when facing different clients.

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<sup>4</sup> 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 procedure, 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). Following Wen-Ching Chang et al. (2001), our research 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 the 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 techniques 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 Big 8 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.

## 2.2 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 are not concerned with job lose and pay 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 their reputation as a professional supervisor. Subsequently, they can retain high degree of independence when dealing with the management (Fama, 1980, Fama and Jensen, 1983) ◦

Rosenstein and Wyatt (1990) indicate that market always reacts positively after an announcement of external director appointment posted on the *Wall Street Journal*. Hermalin and Weisbach (1988) establishe that there is a connection between the change of top management and business performance. The board of directors dominated by external directors will be more sensitive than the one mostly by internal directors. Cotter et al. (1997) find that a company with more external directors on its board can take on higher earning targets. Beasley (1996) and Dechow and Sloan (1996) discover that a board of directors containing more external directors proves to effectively reduce the chance of erroneous disclosure of its financial reports. Finally, Klein (2002) finds that a company having independent directors is less likely to use unusual accrued items to manipulate their earning figures.

The monitoring effect theory seems to be vindicated in some evidence, but is not evidenced in some cases. Many researches question the connection between the independence of board members and business performance (Hermalin et al. 1991, Bhagat et at. 2002). A study by Wu-Chun Chi et al. (2004) also notes that occurrence of abnormal accrues in Taiwan should not be linked to its system of independent directors and supervisors. However, Chi's research period covers only the year of 2002 when Taiwan just launched the mechanism of corporate governance and established requirement guidelines for independent directors and supervisors.

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) study the likelihood of a CPA to be retained after he or she expresse 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. If autonomy is mere formality, it can hardly generate any expected function.

### **3. Research Hypotheses**

In a study of a connection between the quality of information disclosure and interest cost of newly issued corporate bonds, Sengupta (1998) finds 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 creditors and bondholders. In addition, as there is always an asymmetry of information between the management and investors/creditors, the needs for auditing is thereby brought up, aiming to remove moral hazards caused by the management's self-interest intention, as well as the agency cost resulted from the adverse selection by investors and creditors. The connection between the quality of auditing and cost is explained by the degree of information inconsistency. Less asymmetry of information among the three parties indicates a better quality of auditing and higher autonomy of CPA's, thereby reducing the requirement of credit risk premium as bondholders expect a lower default risk from the company.

Our research adopts the ratio of market share against client concentration, 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. A high-scored quality of auditing would be able to reduce interest cost of newly issued corporate bonds.

**H1: The interest 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 market share to client concentration as a proxy variable to determine the quality of auditing, our research adopts market share by industry type as proxy measures to determine the degree of industry specialization (Palmorse 1986; Craswell et al. 1995). As the demand for industry auditing expert surfaces, CPA firms would invest more in building professional industry expertise and bring in more industry specialized clients. Since specific industry has its own particular type of

contracts and accounting principles, it is natural that industry auditing experts can always generate higher quality of auditing than the non-industry auditing experts. Once investors have more confidence in the company, they are likely to reduce the risk premium required on the interest rate charge for the newly issued corporate bonds.

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

According to of Bushman and Smith (2001), the mechanism of corporate governance can be divided into internal and external mechanisms. Taiwan's system of independent directors and supervisors belongs to the internal category. As Taiwan's companies are still in the early stage of corporate governance and audit committees, are still non-existent, related functions and duties are assumed by independent directors and supervisors. The relevant regulations here only govern their qualification. Some researches indicate that external directors could effectively monitor the business performance of a company (Fama 1980, Fama & Jensen 1983, Hermalin et al. 1988). Therefore, the interest cost of newly issued corporate bonds will be expected lower following the establishment of external directors and supervisors.

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

## 4. Data and Methodology

### 4.1 Data source and research period

Our research sampled the non-convertible corporate bonds<sup>5</sup> issued by Taiwan's listed and OTC companies from 2000 to 2004. Data regarding corporate bond issuing, CPA's audit reports, and the issuers' financial information are obtained from *Taiwan Economic Journal (TEJ) Data Bank*. Data regarding external directors and supervisors are obtained from the Market Observation Post System (MOPS) under Taiwan Stock Exchange Co<sup>6</sup>.

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

<sup>6</sup> Website: <http://newmops.tse.com.tw>

## 4.2 Sample selection

- (i) There are 3,352 samples of convertible and non-convertible corporate bonds issued in NT\$ dollar from the year 2000 to 2004. We select 1,769 cases out of 3,352 of non-convertible bonds issued by the listed and OTC companies. We exclude 53 banking and security houses and 8 OTC firms of totally different commercial and financial type, and additional 9 companies that lack complete financial data. We then have 1,699 samples left for our research.
- (ii) The requirement of establishing independent directors and supervisors is launched in Taiwan not until 2002. From 2002 to 2004, there are 1,114 companies that issued corporate bond, which are included in our sample.
- (iii) Our research only covers the CPA firms that are still in business during research period and does not take consideration of mergers or acquisitions, if any, beyond the period. Table 1 is an analysis of the samples.

Insert Table 1 about here

## 4.3 Research model

Following Reiter(1991); Ziebart and Reiter(1992); Shi(2003), we adopts the effective interest rate of newly issued corporate bonds, deducting the Treasury Bond rate (representing a risk-free interest rate), as an agency variable of interest cost. We aim to show the impacts of the quality of auditing, and of independent directors & supervisors, on the interest cost of newly issued corporate bonds. We also examine the correlation of the above two factors, noted by previous 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. These studies have identified several factors that affect interest cost for issuing bonds; such factors include company strength (default risk), corporate bond features (issuer's size, tenor, bond), and economic cycle. Our model is as follows:

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

YTDIFF(interest premium) represents the effective rate for issuing corporate bonds, minus the 364-day Treasury Bond rate (risk-free rate). AUD represents three experimental variables, i.e., ADUITQ (scores of auditing quality), PROF (industry auditing experts), and SUPER (the establishment of independent directors and supervisors).  $\beta_1$  coefficient is expected significantly less than zero, indicating a higher score of auditing quality, the hiring of industry auditing experts, and the existence of independent directors and supervisors, which (these three factors) could reduce the interest premium for issuing new corporate bonds. The definitions of other variables are detailed in the Table 2.

#### 4.3.1 Research variables

AUDITO<sub>it</sub> stands for the score of auditing quality by CPA firms for the company (i) in the year (t), which is calculated on the basis of the ratios of industry market share and industry concentration of those listed and OTC firms audited by CPA firms.

PROF<sub>it</sub> represents a dummy variable determining if a CPA firm is a industry auditing expert. Indicator variable equals “1” for industry auditing expert and “0” otherwise. 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 with more industry related knowledge will be widely seen as an expert (Velury et al., 2003). Accordingly, we vindicate an expert (MS) by calculating market share of each industry based on the asset size of listed and OTC firms. However, among researchers there are different views regarding standard of industry market share. For example, Palmrose (1986) and Ferguson & Stokes (2002) regarded the firm that occupies the most market share in a industry as an industry expert, while Hogan & Jeter (1999) and Defond et al. (2000) include the largest firms in terms of market share. Craswell et al. (1995) and Ferguson & Stokes (2002) select the firms that have a market share over 10% (or 20%) and make the number of samples over 30 in a industry. In this research adopt the standard of having a market share over 20% and of company number over 30 in an industry.

SUPER<sub>it</sub> is a dummy variable representing if the company (i) has independent directors and supervisors in the year (t), with the value “1” indicating “yes” and “0” otherwise. Some researchers believe that since independent directors do not financially rely on the companies and intend to promote their own publicity so as to be hired by other firms, they likely to uphold their autonomy when monitoring the

business performance of the company. However, others argue that independent directors are not necessarily able to manage the business performance of the company (Cotter et al., 1997). Our research suggests that the establishment of independent directors and supervisors in Taiwan should have provided favorable influence on the interest cost of newly issued bond. Taiwan has implemented regulation requiring the establishment of independent directors and supervisors since 2002 and this would have drawn interest providers' attention.

#### 4.3.2 Control variables

Various control variables of factors that affect interest costs for issuing corporate bonds, are quoted from a few researches such as by 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; and 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 interest cost. As higher default risk is derived from more bonds issuing, which in turn results in higher interest cost for issuing debts. The correlation sign, therefore, is expected to be positive.

Interest coverage ratio (INCOV), measured as the ratio of firm's operating income after over interest expense. This captures the ability of the borrowing firm to make regular interest payment. We thus expect higher interest coverage ratio will enjoy lower debt interest rate or interest cost. The sign is therefore expected be negative.

Leverage ratio (LEV) measure as the ratio of initial total liabilities divided by total initial assets. Leverage ratio is an essential indicator of the firm's overall financial burden. We expect higher leverage ratio is deemed to increase the default risk, so the sign is expected to be positive.

Return on asset (ROA) measure as the ratio 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 interest cost and so have a negative sign.

Bond rate (RATE) is “1” when the corporate bond is carrying a floating rate, and is “0” when otherwise. When the bond is issued on 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 interest cost.

Maturity of bonds (MATU) is a natural logarithm taken from the tenor of corporate bonds. Ziebart & Reiter (1992) point out that bond maturity is positively correlated to interest 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” when 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-size issuers tend to own more resources to repay their debts, the default risk faced by the creditors is reduced, and thereby the interest rate of corporate bonds is also reduced. The sign is expected to be negative (Carey et al., 1993).

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

Insert Table 2 about here.

## **5. Results**

### **5.1 Analysis of empirical findings**

#### **5.1.1 Descriptive analysis**

Table 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 in 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 in between. The average quality of auditing by CPA firms is 6.315, with the highest 38.123 and the lowest 0.018, implying an obvious difference in quality among CPA firms. 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% in average, with the highest 76.96% and the median 5.448%. The average interest coverage is 11.1 times, with the lowest -50.18 times. Average leverage ratio is 43.80%, with the highest 81.54%, indicating a huge difference among issuers' financial status. Average ROA is 7.65%, with the highest 40.33% and the lowest -21.90%, also indicating a huge difference among issuers' profitability. Floating-rate corporate bonds account for 16.95% of total, and guaranteed corporate bonds stand at 43.44% of total.

Insert Table 3 about here

Table 4 shows the results of each variable on Pearson and Spearman correlated 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.

Insert Table 4 about here.

### 5.1.2 Quality of auditing and interest premium

Table 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, our research thus replaces regular t-test by White-adjusted t-statistic (White, 1980).

In the measurement of Model 1, the AUDITQ coefficient appears significantly negative ( $p < 0.01$ ), thus supporting 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 is 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 deviates from our expectation. Leverage ratio turns significant at a level  $\alpha = 10\%$ . 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 is raised. Model 1 shows an adjusted  $R^2$  of 18.2%, meaning that 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 Table 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 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 lesser 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 other control variable coefficients show 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%, meaning 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 Table 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 that industry auditing experts do contribute to lower 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 expectation. 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, with the exception of the coefficient sign for company size.

Insert Table 5 about here.

### 5.1.3 Existence of independent directors and supervisors and interest premium

As Taiwan has established 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 with independent directors and supervisors out of the 1,114. Model 3 of Table 5 displays the results of regression. SUPER coefficient turns significantly negative, supporting Hypothesis 3, indicating that the existence of independent directors and supervisors reduces the interest premium of corporate bonds by 0.0063. 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%, meaning 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 Table 5. The coefficients of hiring industry auditing experts and employing independent directors and supervisors both turn negative ( $P<0.01$ ), with an adjusted  $R^2$  of 13.74%, implying that 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, results show 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 interest cost of issuing corporate bonds, all are supported by our findings.

## **5.2 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 Table 6. The score of auditing quality (MAUDIT) is significantly negative ( $P<0.01$ ), with a coefficient -0.00001. The industry auditing expert coefficient likewise shows a negative -0.0041 ( $P<0.01$ ). The result of a simultaneous test on the above two variables is also significantly negative ( $P<0.01$ ), same as previously mentioned, implying that higher quality of auditing and having industry auditing experts can reduce the interest premium for issuing corporate bonds.

Insert Table 6 about here.

## 6. Conclusions and Suggestions

Unlike some past researches which place their focus on term of CPA's, on the retaining of five major CPA's firms, and on the turnover of CPAs during bond issuing to determine the impact of auditing quality on interest cost, our study puts a closer eye on other 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.). We hope to fill in a void in the area of current researches.

External audit has its potential value, i.e., of 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 hidden flaws 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 do significantly reduce interest cost for issuing corporate bonds. Beasley (1996) and Dechow & Sloan (1996) find that a board of directors with more external members will be less likely to manipulate earning figures by unusual accrued items. Our research proves that the existence of independent directors and supervisors contributes to corporate governance and thus reduces the interest 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.

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**Table 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 lacking 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

**Table 2 Variable Definitions**

<b>Variable</b>	<b>Definition</b>	<b>Expected sign</b>
<b>Research variables</b>		
AUDITQ	Score of auditing quality, measured as the ratio of industry market share to industry concentration.	—
PROF	A dummy variable for representing an auditing experts, with 1 meaning yes and 0 meaning no, 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 no.	—
<b>Control variables</b>		
BONDA	Issue size of corporate bond, measured as the ratio of total corporate bonds issued during the period divided by total initial assets.	+
INCOV	Interest coverage, measured as the ratio of firm's operating income after depreciation over interest expense.	—
LEV	Firm leverage, measured as the ratio of initial total debts divided by total initial assets	+
ROA	Profitability, measured as the ratio of recurring operating income after depreciation during certain period divided by total initial assets.	—
RATE	1 for floating rate, and 0 for 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 0 when otherwise.	—
FSIZE	Firm size, measured as a natural logarithm taken from total initial assets	—
ELEC	1 for electronic firms and 0 for non-electronic firms.	?
YEAR	A dummy variable for year, with 2000 as benchmark.	?

**Table 3 Descriptive Statistics**

Variables	Sample size	Mean	Standard deviation	Max.	Median	Min.
YTDIFF	1699	0.0151	0.0108	0.054	0.0108	0.00027
AUDITQ	1699	6.3146	8.306	38.1229	1.3881	0.01818
PROF	1699	0.4956	0.5001	1	0	0
SUPER	1114	0.1831	0.3869	1	0	0
BONDA(%)	1699	7.9	9.858	76.959	5.448	0.4635
INCOV	1699	11.0973	14.9092	263.57	6.09	-50.18
LEV(%)	1699	43.8029	12.37	81.54	43.74	20.04
ROA	1699	0.0765	0.0842	0.4033	0.0603	-0.219
RATE	1699	0.1695	0.3753	1	0	0
MATU	1699	1.6386	0.2320	2.4849	1.6094	1.0986
INSU	1699	0.4344	0.4958	1	0	0
FSIZE	1699	18.3023	1.1923	19.6318	18.4734	13.5517

Variables:

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 no.

SUPER: dummy variable representing existence of independent director and supervisor, with “1” meaning yes and “0” meaning otherwise.

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

INCOV: EBIT / interest expense.

LEV: initial total liability / initial total assets.

ROA: recurring net income / initial total assets.

RATE: floating rate is “1”, otherwise, “0”.

MATU: a natural logarithm taken from the bond tenor.

INSU: guarantee offered is “1”, otherwise, “0”.

FSIZE: a natural logarithm taken from initial assets

ELEC: electronic companies are “1”, otherwise, “0”.

**Table 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; the lower-left area, is Spearman correlated.

Table 5 OLS Regression test

Dependent Variable - YTDIFF						
Independent Variable	Sign expected	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5
Constant		-0.0311 (-6.572)***	-0.03005 (-6.553)***	-0.05842 (-6.632)***	-0.0306 (-6.72)***	-0.05273 (-6.0914)
AUDITQ	-	-0.0001 (-2.813)***			0.00009 (1.994)**	0.00007 (1.223)
PROF	-		-0.0049 (-8.361)***		-0.0053 (-8.171)***	-0.0031 (-3.595)***
SUPER	-			-0.0063 (-7.542)***		-0.0051 (-5.881)***
BONDA	+	0.0143 (7.115)***	0.0185 (9.42)***	0.0519 (5.877)***	0.0186 (9.454)***	0.0518 (-5.881)***
INCOV	-	-0.00002 (-0.948)	-0.00003 (-1.322)	-0.00005 (-1.202)	-0.00004 (-1.528)	-0.00005 (-1.325)
LEV	+	0.00004 (1.791)*	0.00002 (1.057)	-0.00003 (-1.08)	0.00001 (0.644)	(-0.00005) (-1.500)
ROA	-	0.0018 (0.451)	0.0085 (2.241)**	0.01304 (1.298)	0.0104 (2.487)**	0.01728 (1.690)
RATE	?	0.00288 (4.603)***	0.0037 (5.819)***	0.0023 (3.265)***	0.0037 (5.800)***	0.0029 (4.059)***
MATU	+	0.00324 (3.583)***	0.0024 (5.819)***	0.0018 (0.940)	0.0024 (2.724)**	0.0005 (0.265)
INSU	-	0.0004 (0.590)	-0.0011 (-1.815)*	0.0020 (2.113)**	-0.0012 (-1.997)**	0.0009 (0.901)
FSIZE	-	0.0016 (6.042)***	0.0017 (6.853)***	0.0037 (7.533)***	0.0018 (7.110)	0.0036 (7.476)***
ELEC	?	0.0013 (1.426)	-0.0008 (-1.289)	0.00044 (0.538)	-0.0021 (-2.232)**	-0.0009 (-0.693)
N		1699	1699	1114	1699	1114
F		27.98	34.03	14.64	31.98	13.66
Adjusted R <sup>2</sup>		0.182	0.214	0.1282	0.2149	0.1374

All definitions of variables are listed in Table 3.

( ) represents 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.

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

All regressions have included the year-control variable, though which is not displayed in the table.

**Table 6 Sensitivity Analysis****Dependent Variable-YTDIFF**

<b>Independent Variable</b>	<b>Sign expected</b>	<b>Quality of auditing</b>	<b>Industry Expert</b>	<b>Both</b>
<b>Constant</b>		<b>-0.0316</b> (-6.675)***	<b>-0.0359</b> (-7.416)***	<b>-0.0356</b> (-7.347)***
<b>MAUDIT</b>	-	<b>-0.00001</b> (-15.279)***		<b>-0.00001</b> (-16.262)***
<b>RPROF</b>	-		<b>-0.00411</b> (-7.362)***	<b>-0.0041</b> (-7.381)***
<b>BONDA</b>	+	<b>0.01375</b> (6.819)***	<b>0.0168</b> (8.564)***	<b>0.0167</b> (8.538)***
<b>INCOV</b>	-	<b>-0.00003</b> (-1.272)	<b>-0.00002</b> (-0.751)	<b>-0.00002</b> (-0.766)
<b>LEV</b>	+	<b>0.00003</b> (1.432)	<b>0.00004</b> (2.094)**	<b>0.00004</b> (2.098)**
<b>ROA</b>	-	<b>0.0035</b> (0.884)	<b>0.0062</b> (1.635)	<b>0.0063</b> (1.651)*
<b>RATE</b>	?	<b>0.0027</b> (4.316)***	<b>0.003732</b> (5.792)***	<b>0.0037</b> (5.770)***
<b>MATU</b>	+	<b>0.00329</b> (3.624)***	<b>0.0032</b> (3.679)***	<b>0.0033</b> (3.699)***
<b>INSU</b>	-	<b>0.0004</b> (0.634)	<b>-0.0002</b> (-0.279)	<b>-0.0002</b> (-0.291)
<b>FSIZE</b>	-	<b>0.0016</b> (6.288)***	<b>0.0019</b> (7.281)***	<b>0.0019</b> (7.207)***
<b>ELEC</b>	?	<b>-0.0003</b> (-0.579)	<b>-0.0004</b> (-0.743)	<b>-0.0004</b> (-0.753)
<b>N</b>		<b>1699</b>	<b>1699</b>	<b>1699</b>
<b>F</b>		<b>27.65</b>	<b>32.87</b>	<b>30.81</b>
<b>Adjusted R<sup>2</sup></b>		<b>0.180</b>	<b>0.208</b>	<b>0.208</b>

MAUDIT is defined as industry market share / degree of industry concentration (by the summarized date from listed companies).

All other definitions of variables are listed in Table 3.

( ) 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

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

All regressions have included year-control variable, though not displayed in the table