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資訊競爭，資訊不對稱與債券殖利率利差

Information Competition, Information Asymmetry and Bond Yield Spreads

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摘要

本研究以結構型信用風險模型的角度，探討資訊交易者之間的資訊競爭程度對於因資訊不對稱導致之債券殖利率利差的影響。本研究的實證分析驗證了在固定的資訊不對稱水準之下，越激烈的資訊交易者競爭，將顯著降低由資訊不對稱所引起的債券殖利率利差。而且此效果對於到期期間較短的債券尤其明顯。本研究的結果意味著，藉由增強其投資人之間的資訊競爭程度（例如引進更多機構投資人，或是分散化公司股權結構），公司不止能夠如同現有文獻指出的降低權益成本，更能同時降低債務成本。

關鍵字：資訊不對稱，資訊交易者，資訊競爭，債券殖利率利差，ADJPIN，機構投資人

Abstract

This study investigates how the competition over information affects the information asymmetry effects on bond yield spreads from structural credit model perspectives. Empirical examinations show that for a given level of information asymmetry, information competition weakens the effects of information asymmetry on bond yield spreads, especially on those of short-term bonds. The results implying that with more intensive competition among informed investors (e.g. by introducing more institutional investors or diversifying the ownership), companies can not only reduce the cost of equity as suggested by existing studies, but also reduce the cost of deb.

Key words: Information asymmetry, information competition, bond yield spread, information premium, ADJPIN, institutional investor

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I. Introduction

The exiting studies mention that incomplete information causes information premiums and therefore is positively associated with bond yield spreads. Duffie and Lando (2001) first provided a Merton-type structural form credit model with the consideration of incomplete information of bond investors. Different from the original setting by Merton (1974), they assume that firm value follows a diffusion process with an additional random term which captures the incompleteness of information and causes an information premium. Empirical studies have confirmed the existences of this information premium (Yu, 2005; Lu et al., 2010).

Given the existence of information premiums, some studies started to focus on whether the information premium is affected by the competition over information which is defined as the rivalry among informed traders to exploit their private information and for trading profits. Information-based models (Holden and Subrahmanyam, 1992) suggest that information competition among informed investors in equity market accelerates the speed of a firm's stock price converging to its fundamental value. Akins et al. (2012) finds that the pricing of a firm's information asymmetry in equity market decreases when the information competition is more intensive among informed investors.

However, there is few studies address this issue from the aspect of the information premiums in bond yield spreads. Theoretically, as the market price of a firm's stock converges to its fundamental value, the ambiguity of "true firm value" would decrease to all uninformed traders in both equity and bond market. Since the distribution of the value of a firm's total asset mainly determines firm credit risk from the perspectives of structural-form credit model, this information competition help reduce the

incompleteness of information and therefore dwindle the effects of information asymmetry on bond yield spreads according Duffie and Lando (2001). Therefore, this study hypothesizes that information competition negatively affects the effects of information asymmetry on bond yield spreads and uses the number and the concentration of institutional investors as the main proxy in the empirical examinations This study also investigates how the term structure of bonds may affect this premium-reducing effect which we expect to be larger for bonds with shorter time to maturity.

II. Theories and Literatures Review

This section first gives a briefly review of information-based models considering the existence of information premium, summarizes some empirical studies, and then outlines the concept why the information competition among informed traders reduces information premium. The discussion will first focus on the information premium on equity, and then on bond.

Information asymmetry exists when market participants have different information sets. Comparing with uninformed traders, informed traders have more knowledge about a firm's fundamental value since they have private information. Kyle (1985) provides a dynamic model to explain how informed traders play roles in affecting investors' require rate of return on the equity of a firm. In this model, a single informed trader trades against uninformed traders and market makers. The informed trader profits through concealing his trading from others and trades in small quantities over time. By the end of trading, all private information will be incorporated into market prices. Easley and O'Hara (2004) also developes a model which informed investors are better able to shift their portfolio weights to incorporate new information than uninformed investors. To hold stocks of a firm with more private information, uninformed traders ask for a higher required rate of return, increasing the cost of equity of the firm.

Empirical studies try to exanimate the existence of information premium. Easley et al. (1996) extract the probability of information-based trading (PIN) from stocks' bid and ask trading prices. Easley et al. (2002) use PIN as a proxy of information asymmetry and empirically show that 10% increase in PINs result in a 2.5% increase in the annual expected return of stock.

However, Duarte and Young (2009) further decompose PIN into two components

called ADJPIN and Probability of Symmetric Order flow Shock (PSOS). ADJPIN can measure the degree of information asymmetry more precisely than the original PIN, and PSOS is related to illiquidity. Their empirical results show that though PSOS is priced, ADJPIN is not, raising a question that whether information asymmetry really be priced in the market.

One possible answer is to consider the effects of the competition over information among informed traders. Holden and Subrahmanyam (1992) give a multi-period model in which multiple privately informed agents strategically exploit their information. In contrast to Kyle's (1985) model, the competition causes most of informed traders' common private information to be revealed very rapidly and reduces their profit from informed trading. The competition becomes more severe as the number of informed traders increases.

Akins et al. (2012) empirically show that, for a given level of information asymmetry, companies with higher competition among informed investors tend to have lower cost of equity. Their interpretation is that information competition accelerates the speed private information to be incorporated into market prices and reduces the need for uninformed trader to price protect. Thus, the information competition weakens the effects of information asymmetry on the cost of equity.

We now change our focus to bond market. Duffie and Lando (2001) provide a well-known structural-form credit model with the consideration of incomplete information of bond investors. In contrast to the perfect information assumption, they assume that bond holders can't observe fundamental values of firms directly. By adding another random term in the firm value process and used it's volatility to capture the precision of accounting information, they show that lower precision leads to higher bond yield spread and this transparency spread would be especially large for bonds with

relatively short time to maturity.

Yu (2005) empirically confirmed the model's result. Using AIMR Corporate Disclosure Rankings as the proxy variable of information disclosure, firms with higher information disclosure rankings tend to have lower spreads.

Duffie and Lando (2001) originally attribute the source of incomplete information to only accounting noise. Lu et al. (2010) further clarify that both information asymmetry and information uncertainty cause significant bond premium, and the non-accounting-related proxies of information asymmetry and information uncertainty are more important determinants for yield spreads. They also empirically show that information asymmetry and information uncertainty had higher economically significant effects on short-maturity bonds, which is consistent with the results of Duffie and Lando (2001) and Yu (2005).

Then, inspired by the phenomenon in equity market that the pricing of a firm's information asymmetry decreases when the information competition is more intensive, this study hypotheses that the information competition could also affect the information premiums in bond yield spreads.

III. Hypothesis

This section proposes hypotheses about how the information competition may affect bond yield spreads based on the literature review in the previous section.

III.1 Effects of Information Competition on Information Premium

Hypothesis 1. The competition over information among informed traders would reduce the effects of information asymmetry on bond yield spreads.

Information-base models (Holden and Subrahmanyam, 1992) show that the competition over information among informed traders accelerates the process their private information gets incorporated into an asset's price and hence the speed that price converges to the fundamental value, reducing the ambiguity of true firm value to all uninformed traders in both equity and bond market.

Since the distribution of the value of a firm's total asset mainly determines firm credit risk from the perspectives of structural-form credit model, this information competition weakens the effects of information asymmetry on bond yield spreads according Duffie and Lando (2001).

III.2 Effects of Information Competition on Term Structure of Information Premium

Hypothesis 2. The premium-reducing effect of information competition would be more prominent for bonds with relatively short time to maturity.

According to Duffie and Lando (2001), the information premium would gradually

die out as the maturity date becomes longer. The intuitive explanation is that, under the setting of structural form credit model which assumes a firm's total asset value follows a diffusion process, as the maturity date become longer the growth effect of the drift term will dominate the risk that asset value may go below the default threshold caused by the diffusion term. Empirical studies also confirm this phenomenon (Yu, 2005; Wang and Zhang, 2009; Lu et al., 2010). This study hypothesizes that the reduction in information premium due to information competition would be more prominent for bonds with relatively short time to maturity, since the effect of incomplete information on bond yield spreads would be weaker as maturity date become longer.

IV. Data and Methodology

This section describes the data used for empirical analyses and provides summary statistics. The sample is restricted to straight corporate bonds with fixed coupon payment and collateralized by firm assets. Bonds issued by financial and utility companies whose default risks are highly affected by laws or regulations are excluded, and bonds with the following characteristics are also excluded from the sample: floating rate coupons, secured, issued by banks, government guaranteed, with special clauses, and embedded options (e.g. convertible or callable). To avoid the possibility that observations from a single firm may too dominantly affect examination results, this study also excludes any firm-year observation if there are more than twenty different bonds of the firm outstanding that year.

The sample period is from 1997 to 2008 since there were unreasonable fluctuations and structural changes in financial markets after the financial tsunami. After deleting observations with invalid and missing data and extreme value[1], the sample includes 2807 firm-year data, and a total of 8561 annual observations. Approximately 65% of the bonds were Baa rated or above and approximately 26% were investment-grade bonds. Generally, the sample size increases each year and is large enough to provide

[1] After deleting invalid and missing data, the sample originally includes 2877 firm-year data, and a total of 9137 annual bond observations during the sample period. Since the median yield spread is 193.7 bps but the maximum of yield spread is up to 21464.8 bps and the minimum of yield spread is 0.2, this study sets the criteria for deleting the yield spread when the spread is higher than 2138.1 bps or lower than 46.10 that corresponding to the top and the bottom 1.5% of the original sample. This study also deletes observations with life to final date (LFFL) longer than 30 years or with leverage (LEV) larger than 1. Therefore, the final sample includes 2807 firm-year data, and a total of 8561 annual observations.

statistically convincing results. Table 1 shows the distribution of observations.

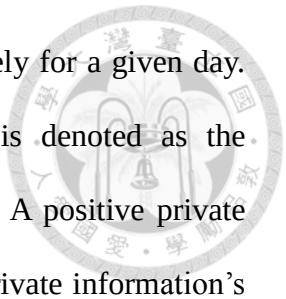
[Insert Table 1 here]

This study acquires institutional investor data from Thomson Reuters Institutional (13f) Holdings-s34 database. Bond data including yield spreads, issued amount, coupon rate, issue date, and Moody's bond rating for each bond are collected from Datastream (Bond and Convertible Database). Return volatility is obtained from the Center for Research in Security Prices (CRSP) database, R&D expenditure and leverage ratio are obtained from COMPUSTAT database, and ADJPIN is computed using data from TAQ database. The data of annual GDP percent change based on chained 2005 dollars is obtained from U.S. Bureau of Economic Analysis.

IV.1 Proxy for Information Asymmetry

Following literatures that study the topics about information asymmetry (Lu et al., 2010; Akins et al., 2012), this study uses ADJPIN as the proxy of information asymmetry, which is not directly observable.

PIN model is developed by Easley et al. (1996). Under the assumption that there are only two possible motives for trades, which are information and exogenous liquidity needs, Easley et al. (1996) measure information asymmetry by the probability of information-based trading (PIN) extracted from bid and ask trading prices. Duarte and Young (2009) extend PIN model by decomposing PIN into two components: the one that measures the degree of information asymmetry more precisely (ADJPIN) and another one which relates to illiquidity (PSOS).



B and *S* are denoted as the number of buys and sells respectively for a given day. $\Psi = (a, d, \varepsilon_b, \varepsilon_s, \theta)$ is denoted as the parameter vector, and a is denoted as the probability that a private information event occurs on a given day. A positive private information event occurs with the conditional probability *d* under private information's arrival. The numbers of buyer-initiated and seller-initiated informed trades are denoted by u_b and u_s respectively and follow different Poisson distribution. Eq. (1) is the likelihood function of the trade process for a single trading day in Duarte and Young (2009). To extend the original PIN model, they added Δ_b and Δ_s to represent the additional arrival rate for buys and sells respectively due to symmetric order flow shocks. These shock days happen with probability θ' when private information arrives and with probability θ in the absence of private information.

$$
\begin{aligned}
L(\Psi|B,S) = {} & (1-a)(1-\theta)e^{-\varepsilon_b}\frac{{\varepsilon_b}^B}{B!}e^{-\varepsilon_s}\frac{{\varepsilon_s}^S}{S!} \\
& + (1-a)\theta e^{-(\varepsilon_b+\Delta_b)}\frac{(\varepsilon_b+\Delta_b)^B}{B!}e^{-(\varepsilon_s+\Delta_s)}\frac{(\varepsilon_s+\Delta_s)^S}{S!} \\
& + a(1-\theta')(1-d)e^{-\varepsilon_b}\frac{{\varepsilon_b}^B}{B!}e^{-(u_s+\varepsilon_s)}\frac{(u_s+\varepsilon_s)^S}{S!} \\
& + a\theta'(1-d)e^{-(\varepsilon_b+\Delta_b)}\frac{(u_b+\varepsilon_b)^B}{B!}e^{-(u_s+\varepsilon_s+\Delta_s)}\frac{(u_s+\varepsilon_s+\Delta_s)^S}{S!} \\
& + a(1-\theta')de^{-(u_b+\varepsilon_b)}\frac{(u_b+\varepsilon_b)^B}{B!}e^{-\varepsilon_s}\frac{{\varepsilon_s}^S}{S!} \\
& + a\theta' de^{-(u_b+\varepsilon_b)}\frac{(u_b+\varepsilon_b+\Delta_b)^B}{B!}e^{-(\varepsilon_s+\Delta_s)}\frac{(\varepsilon_s+\Delta_s)^S}{S!} \qquad (1)
\end{aligned}
$$

ADJPIN in Eq. (2) is the probability of informed trade in the model, which equals to the ratio of the number of expected informed order to the total expected order flows. *PSOS* in Eq. (3) is the unconditional probability that a given trade will come from a shock to both buy and the sell order flows. Firms with high PSOS tend to have low

trading volume on most days and very high volume on a few days, indicating that they are relatively illiquid.

Table 2 provides the summary statistics of *ADJPIN* and *PSOS*. For each year, *ADJPIN* and *PSOS* are computed using data for December.

$$ADJPIN = \frac{a(du_b + (1-d)u_s)}{a(du_b + (1-d)u_s) + (\Delta_b + \Delta_s)(a\theta' + (1-a)\theta) + \varepsilon_s + \varepsilon_b} \quad (2)$$

$$PSOS = \frac{(\Delta_b + \Delta_s)(a\theta' + (1-a)\theta)}{a(du_b + (1-d)u_s) + (\Delta_b + \Delta_s)(a\theta' + (1-a)\theta) + \varepsilon_s + \varepsilon_b} \quad (3)$$

[Insert Table 2 here]

IV.2 Proxies for Information Competition

Following Akins et al. (2012), this study uses the number of institutional investors and the distribution of information among these investors as proxies for information competition amount informed traders. There are two main assumptions of using institutional investors as proxies of informed traders. First, institutional investors are relatively more informed as opposed to individual retail investors. Second, the competition among informed investors captures the competition among informed traders which should also include any potential investor not currently holds shares.

First proxy of the competition is the number of institutional investors holding a firm's stocks. Following directly from theory models discussed before (Holden and Subrahmanyam, 1992), a greater number of informed traders indicates more intensive competition which accelerates the process that private information to be incorporated into market price and hence the speed that price converges to fundamental value.

The distribution of private information is also considered as another proxy for information competition under the belief that more equal distribution should result in greater competition. Because the distribution of information among institutional investors is not directly observable or measurable, Akins et al. (2012) use the distribution of shares as the proxy. The underlying assumption is that investors with higher holdings should have more private information due to the greater access to the firm (e.g. by appointing directors) and greater incentives to generate private information. Akins et al. (2012) use Herfindahl index to measure the concentration of shares holdings by institutional investors for a given firm

$$HerfInst_i = -1 \times \sum_{j=1}^{N} \left(\frac{investor_{i,j}}{Investor_i} \right)^2 \quad (4)$$

where $investor_{i,j}$ is the number of shares held by institutional investor *j* in firm *i*, $Investor_i$ is the total shares held by all institutional investors of firm *i*, and *N* is the total number of institutional investors in firm *i*. The typical index is multiplied by *-1* so that $HerfInst_i$ is positively correlative with the degree of competition of firm *i*.

[Insert Table 3 here]

For each year, proxies of the competition are computed using the data for the last quarter. Table 3 provides the summary statistics of the number of institutional investors (*#Inst*) and the Herfindahl index among institutional investors (*HerfInst*). Table 4 exhibits the cross-sectional distributions of these variables. The number of institutional investors is volatile. The mean of *#Inst* is about 407 and the maximum equals to 1680. For most of the observations, their Herfindahl indexes are very close to zero (the 5th percentile *HerfInst* has already equaled to -0.10). To strengthen the contrary between

high and low competition firms and ease exposition in cross-sectional regressions, this study ranks firms each year according to their competition and define the dummy variable *NumTO* as 1 if the number of institutional investors (*#Inst*) of the firm-year observation is higher than the upper quartile among all firms in that year, and define *NumTO* as 0 otherwise. Similarly, firms are also ranked according to the Herfindahl index of shares hold by institutional investors (*HerfInst*) each year. The dummy variable *HerfTO* is defined as 1 if *HerfInst* of the firm-year observation is higher than the upper quartile among all firms in that year, and *HerfTO* is defined as 0 otherwise. Table 3 presents the summary statistics of these dummy variables.

[Insert Table 4 here]

IV.3 Other Control Variables

Control variables related to bond characteristics include coupon rate (*Coupon*), life to final date (*LFFL*), amount issued (*Lnamt*), bond age (*Bage*) and credit rating (*Rating*). Coupon rate (*Coupon*) is the annual percentage rate payable on a bond. Since the corporate bond investors must pay more tax on coupon income if they hold bonds with higher coupon rate than those with lower coupon rate, bonds with a higher coupon will be less attractive to investors, and may require higher premiums (Qi et al., 2010). However, some studies also indicate that coupon rate may have other effects on bond yield spreads such as liquidity, so the net effect of coupon rate to bond yield spread would depend on their relative strength. Life to final date (*LFFL)* is the remaining years from time *t* to the bond maturity date, capturing the term structure of bond yield spread. Time to maturity is expected to be positively related with default risk and hence bond

yield spread. Amount issued (*Lnamt*) and bond age (*Bage*) are used as proxies for external liquidity (Yu, 2005; Lu et al., 2010). *Lnamt* refers to the logarithm of the dollar amount originally issued which should indicate more liquidity as increasing. *Bage* is the difference between the settlement date and the issuing date. Younger bonds typically trade more frequently than older bonds in practices. For bonds with lower liquidity, investors may ask more returns. Credit rating (*Rating*) is the Moody's issuer rating for each bond. Rating is set to 1 for any bond with Aaa rating, 2 for Aa1, 3 for Aa2, 4 is Aa3, 5 is A1, and so on.

Control variables related to firm characteristics include leverage (*LEV*), equity volatility (*VOL*), and R&D expenditure (*RD*). This study defines the leverage ratio (*LEV*) of a firm as the book value of total debt (which equals to debt in current liability plus long term debt) divided by total asset. Leverage ratio is a proxy for the distance to default in structural-form credit models. Larger leverage ratio should indicate wider yield spreads. Equity volatility (*VOL*) is defined as the annualized standard deviation of daily stock returns over the preceding 150 days. Larger volatility indicates greater default risk for a firm under the perspectives of structural-form credit model, hence leading to wider bond yield spreads. R&D expenditure (*RD*) is defined as R&D expenditure divided by total asset. High R&D expenditure represents greater growth potential. Although growth may increase the value of a firm, it would also increase volatility and hence increase bond yield spreads under the perspective of structure form models.

This study also uses real GDP growth rate (*GDP*) for each year to control the effects of economic cycle. Considering the possibility that effects of information competition on firm's bond yield spreads may change under different economic states, this study incorporates real GDP growth rate (*GDP*) and the interaction terms between

GDP growth rate and competition proxies (*GDP*× *NumTO*, *GDP*× *HerfTO*) into the cross-sectional regressions. The data is obtained from U.S. Bureau of Economic Analysis and is defined as the annual GDP percent change based on chained 2005 dollars

IV.4 Yield Spreads

Yield spread (*SP*) is the dependent variable in this study, which is defined as the difference between the corporate bond yield and the yield of a comparable maturity Treasury bond based upon secondary market transactions calculated in the end of month of year. Literatures regarded bond yield spreads as extra premiums for investors to bear the bond risks such as default risk, liquidity risk, and so on. In this study, the yield of corporate bond is matched to the Treasury yield calculated using linear interpolation from constant maturity yields published from the Financial Times, consisting with the definition of Yu (2005) and Lu et al. (2010).

Table 5 provides the summary statistics of yield spreads and the control variables mentioned before.

[Insert Table 5 here]

V. Empirical Analyses

This section employs cross-sectional regressions to empirically examine how the competition over information affects the effects of information asymmetry on bond yield spreads. The heteroscedasticity standard errors are adjusted according to White (1980).

Following paragraphs first examine that information competition would significantly reduce the information premiums. Then, this study investigates the effects of information competition on term structure of information premiums. Some robustness tests are also provided in this section.

V.1 Main Results

V.1.1 Effects of the Information Competition on Information Spreads

To examine hypothesis 1, this study first estimates the following cross-sectional regression shown as Eq. (5)

$$\mathrm{SP}_i = \alpha + \beta_1 ADJPIN_i + \beta_2 Competition_i + \beta_3 ADJPIN_i \times Competition_i + \beta_4 GDP_i + \beta_5 GDP_i \times Competition_i + \varepsilon_i. \quad (5)$$

Competition in Eq. (5) represents the number of institution investors (*NumTO*) or the Herfindahl index among these institutional investors (*HerfTO*), depending on which proxy variable is chosen as the measurement of information competition.

Table 6 provides the results of the cross-sectional regressions. Model (1) and (2) control only the economic cycle, and model (3) and (4) include also other bond and firm characteristics variables as Eq. (6):

$$\mathrm{SP}_i = \alpha + \beta_1 ADJPIN_i + \beta_2 Competition_i + \beta_3 ADJPIN_i \times Competition_i + \beta_4 GDP_i + \beta_5 GDP_i \times Competition_i + \beta_6 PSOS + \beta_7 Coupon_i + \beta_8 Bage_i + \beta_9 LFFL_i + \beta_{10} Lnamt_i + \beta_{11} Rating_i + \beta_{12} LEV_i + \beta_{13} VOL_i + \beta_{14} RD_i + \varepsilon_i. \quad (6)$$

All interaction terms of competition proxy and ADJPIN (*ADJPIN*× *Competition*) are significantly negative related to bond yield spreads, indicating that compared with firms with competition level below the upper quartile, the average information premiums of firms with high information competition is significantly lower. This provides preliminary evidence that for a given level of information asymmetry, high competition among informed traders would decrease the effect of information asymmetry on bond yield spreads. The level of the information competition also negative relate to bond yield spreads directly, and this relationship will become less prominent as the economic environment become better (i.e. as *GDP* become higher). The result that the information asymmetry proxy ADJPIN positively relates to bond yield spreads significantly is consistent to Lu et al. (2010).

[Insert Table 6 here]

To examine robustness of the above results, this study also classifies competition proxies by different percentile. Table 7 provides the empirical results of Eq. (6) when the number of institutional investors (*#Inst*) and the Herfindahl index among institutional investors (*HerfInst*) are ranked and classified according to their 80th percentile each year (*NumTO_80pct* and *HerfTO_80pct* respectively) and by their median each year (*NumTO_50pct* and *HerfTO_50pct* respectively). The regression coefficients of the interaction terms *Competition*× *ADJPIN* are all economically and

statistically significance as before, confirming the hypothesis that more intensive information competition among informed traders would decrease the information asymmetry premiums in bond yield spreads.

[Insert Table 7 here]

V.1.2 Effects of Information Competition on Term Structure of Information Premiums

Based on the result of Duffie and Lando (2001), Yu (2005), Wang and Zhang (2009) and Lu et al. (2010), this study hypothesizes that the reduction in information premiums due to information competition would be more prominent for bonds with short maturity date. This study examines the effects of information competition on different maturity groups (maturities less than 5 years, 5-10 years, 10-20 years and 20-30 years) with controlling other related variables. Table 8 shows that the standard deviations of competition proxies among different-maturity bonds do not have much difference.

[Insert Table 8 here]

Table 9 provides the results of cross-sectional regressions. As expected, the economic significance of the interaction terms of *ADJPIN* and *Competition* is highest in the less than 5 year maturity group. Although the standard deviations of *NumTO* (*HerfTO*) are close among different maturity groups, the coefficient of *ADJPIN*× *NumTO* (*ADJPIN*× *HerfTO*) equals -1445.32 (-1898.39) in the less than 5 year maturity group, which is higher than the coefficients of *ADJPIN*× *NumTO*

(*ADJPIN*× *HerfTO*) in all the other maturity groups. The results provide preliminary evidences that the premium-reducing effect of information competition would be more prominent for bonds with relatively short time to maturity.

[Insert Table 9 here]

V.2 Robustness Test

V.2.1 Cluster the Standard Errors at Firm Level

In financial panel data sets, the residuals may be correlated across firms or across time and the estimated standard errors of regression can be biased even after the adjustment following White (1980). To deal with this problem, Peterson (2009) provides a different method to estimate the standard errors by clustering the standard errors at firm level. The examinations will be done following this approach in this section.

Table 10 presents the cross-section regressions of Eq. (6) with firm-level cluster standard errors (Petersen, 2009). Although the significance of *Competition*× *ADJPIN* is not so strong (the interaction term is significant at 5% if the Herfindahl index of shares held by institutional investors is used as competition proxy, and at10% if the number of institutional investors is used as competition proxy), the results still show that high information competition reduces the effect of information asymmetry on bond yield spreads.

[Insert Table 10 here]

V.2.2 Transient Type Institutional Investors

Bushee (1998) classifies institution investors into different types according to their trading strategies and defines the type of investors holding portfolio with high turnover and high diversified as transient investors. Wang and Zhang (2009) use this algorithm to analyze how institutional investors play roles in determining bond yield spreads. Akins et al. (2012) also use transient institutional investors as one of their proxies of informed traders.

This study identifies transient type institutional investors according to the algorithm developed by Bushee (1998) and exams the empirical tests using the number of transient institutional investors and the Herfindahl index of shares held by transient institutional investors. As before, the number of transient institutional investors (*#InstTR*) and the Herfindahl index of transient institutional investors (*HerfInstTR*) are ranked and divided into two groups according to their 75th percentiles each year. The dummy variable *NumTR* or *HerfTR* will be defined as 1 if the firm-year observation belongs to the high competition group, and be defined as 0 otherwise. Table 3 provides the summary statistics of these variables.

Table 11 presents the empirical examination of hypothesis 1 using these new competition proxies. Model (1) and (2) are cross-sectional regressions of yield spreads against *ADJPIN* and competition proxies, controlling only economic cycle. The results show that both the number of transient institutional investors (*NumTR*) and the Herfindahl index (*HerfTR*) can significantly reduce the premiums due to information asymmetry. Same as the empirical results provided before, the competition proxies also negatively relate to bond yield spreads directly and the scales of their reduction in yield spread will become smaller as GDP become higher. Model (3) and (4) incorporate other firm and bond characteristic control variables. The effect of *NumTR* is even more

significant, but the coefficient of *HerfTR*× *ADJPIN* is insignificant after these control variables are added into the regression model. Generally speaking, the reduction effect of information competition on information premiums still exists if considering only the transient type institutional investors.

[Insert Table 11 here]

As the main examinations, bonds are divided into four groups according to their time to maturity. This study then investigates the effect of information competition among transient institutional investors on bond yield spreads within each group. Table 8 presents the standard deviations of competition proxies considering only the transient institutional investors on different-maturity bonds. The differences of standard deviations are not very large among these groups. Table 12 provides the results of regressions. The empirical results still show that the effect of information competition on information premium is most prominent for bonds with short maturity date if the Herfindahl index of transient institutional investors (*HerfTR*) is used as the competition proxy, although the term structure become unclear if the number of transient institutional investors (*NumTR*) is used as the competition proxy.

[Insert Table 12 here]

V.2.3 Corporate Governance Effects

This study uses institutional investors as proxies of informed traders, and analyzes the effects of information competition on information premium of bond. On the other hand, literatures also interpret the effects of institutional ownership on bond yield

spread from the aspect of corporate governance. This section provides the empirical examinations of the information hypothesis after controlling governance effects.

From the aspect of monitoring effects, corporate governance mechanisms can mitigate management-equity agency costs, leading to the maximization of firm value. Thus, firms with better corporate governance tend to have lower bond yield spreads (Bhojraj and Sengupta, 2003; Klock et al., 2004; Ashbaugh-Skaife et al., 2006). However, other literatures also point out that the existence of debt-equity agency problem (i.e. equity holders may maximize equity value at the expense of debt value) implies that improving corporate governance may not necessarily reduce the cost of debt (Cremers et al., 2007).

This study uses the G-index[2] (Gompers et al., 2003), E-index[3] (Bebchuk, 2009) and the institutional ownership (Bhojraj and Sengupta, 2003), which is defined as the number of shares held by institutional investors divided by the number of outstanding shares of a firm, as the proxies of corporate governance. The data of G-index and E-index are from RiskMetrics (IRRC) database, and the data of institutional ownership is from Thomson Reuters Institutional (13f) Holdings-s34 database and COMPUSTAT

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[2] The twenty-four provisions of G-index include staggered board, limitation on amending bylaws, limitation on amending the charter, supermajority to approve a merger, golden parachute, poison pill, limitation on special meeting, limitation on written consent, elimination of cumulative voting, secret ballot, director indemnification, director indemnification contract, limited director liability, compensation plan, severance agreement, unequal voting rights, blank check preferred stock, fair price requirements, cash-out law, director duties, business combination law, antigreenmail provision, pension parachute, and silver parachute.

[3] The six provisions of E-index include staggered board, limitation on amending bylaws, limitation on amending the charter, supermajority to approve a merger, golden parachute and poison pill.

database.

[Insert Table 13 here]

Table 13 provides the empirical examinations after controlling institutional ownership. The regression coefficients of the interaction terms *Competition*× *ADJPIN* are still significance in most models, confirming that the reduction of information premium due to the information competition among informed investors still exist after controlling institutional ownership, which is the proxy of governance effects.

[Insert Table 14 here]

Table 14 presents the empirical results with G-index (Gompers et al., 2003) or E-index (Bebchuk, 2009) is used as the proxy of corporate governance effects, and Table 15 presents the results of the cross-sectional regressions with both institutional ownership and G-index (or E-index) are added. Except for the model which Herfindahl index of shares held by transient institutional investors (*HerfTR*) is used as the competition proxy, all regression coefficients of the interaction terms *Competition*× *ADJPIN* are significantly negative.

[Insert Table 15 here]

Generally, the effect that information competition among informed investors reduces information premium is robust even after considering the governance effects.

VI. Conclusion

The competition over information helps informed traders' private information to be rapidly incorporated into asset prices and accelerates the process an asset's market price converges to its fundamental value. Therefore, information competition may reduce the information premium from the perspectives of Duffie and Lando (2001). Using the number of institutional investors and the Herfindahl index of shares held by institutional investors as proxies to measure the level of information competition among informed traders, this study empirically examines the effect of this information competition on the information component of bond yield spreads. The empirical results show that for a given level of information asymmetry, the effect of information asymmetry on bond yield spread is negatively associated with information competition. The results also show that this reduction of information premiums would be more prominent for short-term bonds. The explanation is that the effect of incomplete information on bond yield spread would gradually die out as the maturity date becomes longer. Generally, this study confirms that with competition among informed investors a firm can effectively reduce its cost of debts.

Reference

[1] Akins, B. K., Ng, J. and Verdi, R. S., 2012, “Investor Competition over Information and the Pricing of Information Asymmetry”, The Accounting Review 87, 35-58.

[2] Ashbaugh-Skaifea, H., Collins, D. W. and LaFond, R., 2006, “The effects of corporate governance on firms’ credit ratings”, The Journal of Accounting & Economics 42, 203-243.

[3] Bebchuk, L., Cohen, A. and Ferrell, A., 2009, “What Matters in Corporate Governance?”, Review of Financial Studies 22, 783-827.

[4] Bhojraj, S. and Sengupta, P., 2003, “Effect of Corporate Governance on Bond Ratings and Yields: The Role of Institutional Investors and Outside Directors”, Journal of Business 76, 455-475.

[5] Bushee, B., 1998, “The influence of institutional investors on myopic R&D investment behavior”, The Accounting Review 73, 305-333.

[6] Cremers, K. J. Martijn, Nair, V. B. and Wei, C., 2007, “Governance Mechanisms and Bond Prices”, Review of Financial Studies 20, 1359-1388.

[7] Duarte, J. and Young, L., 2009, ‘Why is PIN priced?”, Journal of Financial Economics 91, 119-138.

[8] Duffie, D. and Lando, D., 2001, “Term structure of credit spreads with incomplete accounting information”, Econometrica 69, 633-664.

[9] Easley, D. and O’Hara M., 2004, “Information and the Cost of Capital”, Journal of Finance 59, 1553-1583.

[10] Easley, D., Hvidkjaer, S. and O'Hara, M., 2002, “Is Information Risk a Determinant of Asset Returns?“, Journal of Finance 57, p2185-2221.

[11] Easley, D., Kiefer, N. M., O'Hara, M. and Paperman, J. B., 1996, “Liquidity, Information, and Infrequently Traded Stocks”, Journal of Finance 51, 1405-1436.

[12] Gompers, P. A., Ishii J. L. and Metrick A., 2003, “Corporate Governance and Equity Prices”, Quarterly Journal of Economics 118, 107-155.

[13] Holden, C. W. and Subrahmanyam, A., 1992, “Long-Lived Private Information and Imperfect Competition”, Journal of Finance 47, 247-270.

[14] Klock, M. S., Mansi, S. A. and Maxwell, W. F., 2005, “Does Corporate Governance Matter to Bondholders?”, Journal of Financial & Quantitative Analysis 40, 693-719.

[15] Kyle, A. S., 1985, “Continuous Auctions and Insider Trading”, Econometrica 53, 1315-1335.

[16] Lu, C. W., Chen T. K. and Liao H. H., 2010, “Information uncertainty, information asymmetry and corporate bond yield spreads”, Journal of Banking & Finance 34, 2265-2279.

[17] Merton, R. C., 1974, “On the Pricing of Corporate Debt: The Risk Structure of Interest Rates”, Journal of Finance 29, 449-470.

[18] Petersen, M. A., 2009, “Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches”, Review of Financial Studies 22, 435-480.

[19] Qi, H., Liu, S. and Wu, C., 2010, “Structural models of corporate bond pricing with personal taxes”, Journal of Banking and Finance 34, 1700-1718.

[20] Wang, A. W. and Zhang, G., 2009, “Institutional ownership and credit spreads: An information asymmetry perspective”, Journal of Empirical Finance 16, 597-612.

[21] Yu, F., 2005, “Accounting transparency and the term structure of credit spreads”, Journal of Financial Economics 75, 53-84.

Tables

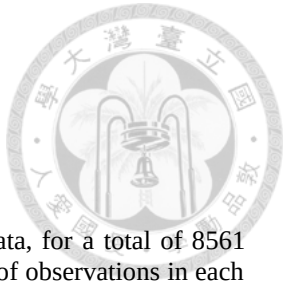

Table 1 Sample size

The sample period is from 1997 to 2008. The sample includes 2807 firm-year data, for a total of 8561 annual bond observations during the sample period. This table reports the number of observations in each year. The ratings indicate Moody's ratings and are obtained from the Datastream.

	Aa or above	A	Baa	Ba or below	Total
1997	3	22	44	36	105
1998	19	21	63	35	138
1999	3	23	63	28	117
2000	6	51	95	54	206
2001	29	110	217	137	493
2002	30	141	257	174	602
2003	32	183	294	224	733
2004	29	175	346	339	889
2005	37	199	392	439	1067
2006	36	204	406	510	1156
2007	55	315	540	579	1489
2008	72	394	619	481	1566
Total	351	1838	3336	3036	8561

Table 2 Summary statistics of ADJPIN and PSOS

The table summarizes the basic statistics of ADJPIN and PSOS (Duarte and Young, 2009) in the current study. The sample includes 2807 firm-year data, for a total of 8561 annual bond observations during the sample period. For each year, ADJPIN and PSOS are computed using data for December.

Variable	Mean	Median	Std Dev	Minimum	Maximum
ADJPIN	0.04	0.02	0.05	0.00	0.31
PSOS	0.18	0.17	0.06	0.03	0.63

Table 3 Summary statistics of information competition variables

The table summarizes the basic statistics of the information competition variables. #Inst is the number of institutional investors. HerfInst is the Herfindahl index among institutional investors. Firms are ranked according to #Inst each year and the dummy variable NumTO is defined as 1 if #Inst of a firm-year observation is higher than the upper quartile among all firms in that year, and defined as 0 otherwise. Similarly, firms are also ranked according to HerfInst each year and the dummy variable HerfTO is defined as 1 if HerfInst of the firm-year observation is higher than the upper quartile among all firms in that year, and defined as 0 otherwise. #InstTR is the number of transient institutional investors. HerfInstTR is the Herfindahl index among transient institutional investors. Firms are ranked according to #InstTR each year and the dummy variable NumTR is defined as 1 if #InstTR of a firm-year observation is higher than the upper quartile among all firms in that year, and defined as 0 otherwise. Similarly, firms are also ranked according to HerfInstTR each year and the dummy variable HerfTR is defined as 1 if HerfInstTR of the firm-year observation is higher than the upper quartile among all firms in that year, and defined as 0 otherwise. The sample includes 2807 firm-year data, for a total of 8561 annual bond observations during the sample period. For each year, #Inst, HerfInst, #InstTR and HerfInstTR are computed using data for the end of fourth quarter.

Variable	Mean	Median	Std Dev	Minimum	Maximum
#Inst	406.50	335.00	289.72	1.00	1680.00
HerfInst	-0.05	-0.04	0.06	-1.00	-0.01
NumTO	0.24	0.00	0.43	0.00	1.00
HerfTO	0.24	0.00	0.42	0.00	1.00
#InstTR	105.44	93.00	63.00	0.00	397.00
HerfInstTR	-0.11	-0.08	0.10	-1.00	-0.02
NumTR	0.24	0.00	0.43	0.00	1.00
HerfTR	0.24	0.00	0.43	0.00	1.00

Table 4 Cross-sectional distribution of information competition variables

This table presents the cross-sectional distribution of the number of institutional investors (#Inst), the Herfindahl index among institutional investors (HerfInst), the number of transient institutional investors (#InstTR), and the Herfindahl index among transient institutional investors (HerfInstTR). The sample includes 2807 firm-year data, for a total of 8561 annual bond observations during the sample period.

Variable	5th Percentile	25th Percentile	Median	75th Percentile	95th Percentile
#Inst	85	193	335	524	1009
HerfInst	-0.10	-0.05	-0.04	-0.03	-0.02
#InstTR	24	60	93	137	226
HerfInstTR	-0.28	-0.13	-0.08	-0.06	-0.04

Table 5 Summary statistics of major variables

This table presents the summary statistics of major variables used in empirical analyses. Yield spread (SP) is the difference in yield to maturity between a corporate bond and a comparable maturity Treasury bond. LFFL is the time to maturity. Lnamt is defined as the natural log of amount issued. Bond age (Bage) is defined as the difference between the settlement date and the issuing date. Bond rating (Rating) is the numerical scores bond rating from Datastream system, where Aaa is 1, Aa1 is 2, Aa2 is 3, etc. Coupon is the annual coupon rate. LEV refers to firm leverage ratio. The equity volatility (VOL) measures the annualized daily volatility of previous 150 day stock returns. R&D expenditure (RD) is defined as R&D expenditure divided by total asset. Annual real GDP growth rate (GDP) is obtained from U.S. Bureau of Economic Analysis. The sample includes 2807 firm-year data, for a total of 8561 annual bond observations during the sample period.

Variable	Mean	Median	Std Dev	Minimum	Maximum
SP	302.41	194.00	305.48	46.10	2138.10
LFFL	12.36	9.25	7.86	0.54	29.99
Lnamt	5.08	5.30	0.77	-3.00	6.70
Bage	5.33	4.16	4.35	0.03	26.18
Rating	10.56	9.00	4.76	1.00	23.00
Coupon	7.02	7.00	1.36	0.00	13.00
LEV	0.31	0.29	0.13	0.00	0.96
VOL	0.30	0.25	0.18	0.08	1.50
RD	0.01	0.00	0.02	0.00	0.44
GDP	0.02	0.03	0.01	0.00	0.05

Table 6 Regressions of yield spreads against ADJPIN and information competition

This table shows the results of four different regressions with the yield spreads (SP) as the dependent variable against various explanatory variable combinations using data of all 8561 observations in the sample period (1997–2008). Models (1) and (2) control only the real GDP growth (GDP), and the competition proxies (NumTO and HerfTO defined in previous section) are interact with both information asymmetry level (ADJPIN) and the real GDP growth (GDP). Models (3) and (4) include other firm and bond characteristics control variables: PSOS, annualized coupon rate (Coupon), bond age (Bage), time to maturity (LFFL), the natural log of amount issued (Lnamt), bond rating (Rating), leverage ratio (LEV), equity volatility (VOL), and R&D expenditure (RD). This table presents the regression coefficients and R-square. The t-statistics for each coefficient appears immediately underneath.
* Significant at 10%, ** Significant at 5%, *** Significant at 1%.

	Competition Proxy			
	NumTO	HerfTO	NumTO	HerfTO
	(1)	(2)	(3)	(4)
Competition	-246.0114***	-165.1845***	-172.9863***	-100.5837***
	(-25.25)	(-17.68)	(-17.67)	(-11.66)
Competition×ADJPIN	-564.0729***	-719.3108***	-686.2655***	-572.1432***
	(-3.38)	(-5.24)	(-4.96)	(-4.82)
Competition×GDP	9224.7968***	6154.0394***	6396.4104***	3790.9600***
	(28.60)	(16.53)	(22.16)	(11.56)
ADJPIN	716.2589***	588.6848***	611.5852***	530.8219***
	(8.08)	(6.61)	(7.49)	(6.32)
GDP	0.0000	0.0000	0.0000	0.0000
	.	.	.	.
PSOS			-129.1613***	-117.5053***
			(-3.23)	(-2.91)
Coupon			10.9725***	10.8850***
			(5.06)	(4.93)
Bage			0.6348	0.8786
			(1.01)	(1.39)
LFFL			0.3108	0.3341
			(1.49)	(1.57)
Lnamt			19.6298***	18.9726***
			(5.97)	(5.71)
Rating			2.3211***	2.0965***
			(3.75)	(3.36)
LEV			394.7308***	396.2957***
			(10.11)	(9.96)
VOL			761.4324***	811.7749***
			(17.88)	(19.14)
RD			126.9087	-44.1710
			(0.80)	(-0.23)
Constant	24.8058	67.3157***	-471.7900***	-451.8754***
	(1.28)	(3.57)	(-13.94)	(-13.31)
Observations	8561	8561	8561	8561
R-square	0.6230	0.6031	0.6976	0.6870

Table 7 Regressions of yield spreads against ADJPIN and information competition grouped by different percentile

This table shows the results of regressions with the yield spreads (SP) as the dependent variable against various explanatory variable combinations using data of all 8561 observations in the sample period (1997–2008). The number of institutional investors and the Herfindahl index among institutional investors are ranked and classified according to their 80th percentile each year (NumTO_80pct and HerfTO_80pct respectively) in models (1) and (2), and by their median each year (NumTO_50pct and HerfTO_50pct respectively) in models (3) and (4). Explanatory variables include the competition proxies (NumTO and HerfTO), information asymmetry level (ADJPIN), real GDP growth (GDP), and other control variables: PSOS, annualized coupon rate (Coupon), bond age (Bage), time to maturity (LFFL), the natural log of amount issued (Lnamt), bond rating (Rating), leverage ratio (LEV), equity volatility (VOL), and R&D expenditure (RD). This table presents the regression coefficients and R-square. The t-statistics for each coefficient appears immediately underneath.
* Significant at 10%, ** Significant at 5%, *** Significant at 1%.

	Competition Proxy			
	NumTO_80pct	HerfTO_80pct	NumTO_50pct	HerfTO_50pct
	(1)	(2)	(3)	(4)
Competition	-159.3131***	-96.1918***	-196.0677***	-129.7928***
	(-16.68)	(-10.38)	(-17.85)	(-12.76)
Competition×ADJPIN	-269.4874*	-424.1226***	-485.0472***	-291.2645**
	(-1.73)	(-2.99)	(-3.30)	(-2.49)
Competition×GDP	6312.2004***	3694.5697***	5963.3639***	4307.9446***
	(23.27)	(10.73)	(16.85)	(11.74)
ADJPIN	569.5950***	499.6564***	719.5587***	561.7435***
	(6.99)	(6.02)	(8.19)	(6.30)
GDP	0.0000	0.0000	0.0000	0.0000
	.	.	.	.
PSOS	-118.8807***	-118.0441***	-106.4121***	-125.2216***
	(-2.97)	(-2.92)	(-2.73)	(-3.10)
Coupon	11.1577***	10.8809***	10.8096***	10.4299***
	(5.05)	(4.90)	(5.06)	(4.83)
Bage	0.6242	0.8822	0.4406	0.8128
	(0.99)	(1.39)	(0.71)	(1.32)
LFFL	0.3461*	0.3293	0.4089**	0.3327
	(1.66)	(1.55)	(2.04)	(1.59)
Lnamt	19.4873***	18.9355***	19.3180***	19.0546***
	(5.90)	(5.70)	(5.82)	(5.67)
Rating	2.1988***	2.1935***	2.3656***	2.0963***
	(3.56)	(3.50)	(3.87)	(3.44)
LEV	424.4996***	399.8309***	380.7627***	395.0449***
	(10.78)	(10.07)	(9.90)	(10.02)
VOL	770.6841***	817.7907***	753.3336***	784.4103***
	(18.06)	(19.23)	(18.36)	(18.49)
RD	139.4921	-79.5019	-77.0458	-174.2357
	(0.89)	(-0.42)	(-0.42)	(-0.85)
Constant	-478.9001***	-453.1121***	-479.7279***	-461.4077***
	(-14.12)	(-13.34)	(-13.88)	(-13.58)
Observations	8561	8561	8561	8561
R-square	0.6941	0.6854	0.7042	0.6939

Table 8 Standard deviations of competition proxies on different-maturity bonds

This table presents the standard deviations of competition proxies on different-maturity bonds. The maturity of bonds is divided into four groups: Maturity<5 years, 5 years≦Maturity<10 years, 10 years ≦Maturity<20 years, and 20 years≦Maturity<30 years.

Maturity	< 5 yrs	5 - 10 yrs	10 -20 yrs	20 - 30 yrs
Std. Dev of NumTO	.4208	.3911	.4255	.4705
Std. Dev of HerfTO	.4321	.4209	.4255	.4414
Std. Dev of NumTR	.4183	.3934	.4285	.4640
Std. Dev of HerfTR	.4321	.4155	.4285	.4460

Table 9 The effects of information competition on different-maturity bond yield spreads

This table divides 8561 annual observations into four groups by time to maturity: bond observations with maturity less than 5 years, 5–10 years, 10–20 years and 20-30 years. Bond observations with maturity more than 30 years are excluded. In each group, the yield spreads (SP) are regressed against the proxies of information competition (NumTO, HerfTO), the level of information asymmetry (ADJPIN), real GDP growth (GDP), and other firm and bond characteristics control variables: PSOS, annualized coupon rate (Coupon), bond age (Bage), time to maturity (LFFL), the natural log of amount issued (Lnamt), bond rating (Rating), leverage ratio (LEV), equity volatility (VOL), and R&D expenditure (RD). This table presents the regression coefficients and R-square. The t-statistics for each coefficient appears immediately underneath.
* Significant at 10%, ** Significant at 5%, *** Significant at 1%.

	Competition Proxy							
	NumTO				HerfTO			
Maturity	< 5 yrs	5 - 10 yrs	10 -20 yrs	20 - 30 yrs	< 5 yrs	5 - 10 yrs	10 -20 yrs	20 - 30 yrs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Competition	-102.0548**	-200.0933***	-100.7240***	-122.8837***	-95.2758***	-139.1668***	-58.5675***	-53.4407***
	(-2.35)	(-12.02)	(-5.06)	(-10.36)	(-3.87)	(-9.37)	(-3.47)	(-4.30)
Competition×ADJPIN	-1445.3242	-143.9798	-541.6619*	-286.9597	-1898.3885**	-242.8733	-518.7271**	-133.0385
	(-1.12)	(-0.57)	(-1.71)	(-1.39)	(-2.15)	(-1.24)	(-2.55)	(-0.88)
Competition×GDP	8889.9836***	8033.8644***	2260.0392***	3255.6978***	6699.9925***	5791.1363***	853.6203	1777.0561***
	(10.46)	(16.23)	(3.28)	(8.67)	(7.15)	(10.26)	(1.46)	(4.32)
ADJPIN	274.2907	473.1762***	749.7908***	258.5562***	143.3794	435.3112***	711.2613***	224.1654***
	(0.55)	(3.60)	(5.08)	(3.18)	(0.28)	(3.17)	(4.67)	(2.60)
GDP	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	.	.	.	.	.	.	.	.
PSOS	-188.2945	-71.8981	-182.6111**	28.0191	-214.7473	-54.9819	-148.5229*	59.6442
	(-1.19)	(-1.10)	(-2.37)	(0.67)	(-1.35)	(-0.83)	(-1.94)	(1.43)
Coupon	4.3399	1.8402	15.2937***	21.2085***	5.4960	0.7677	14.8992***	22.3400***
	(0.53)	(0.52)	(3.34)	(4.90)	(0.66)	(0.22)	(3.19)	(4.89)
Bage	4.9148	0.8737	-0.9966	-0.2617	5.3812	1.3802	-0.9497	-0.2592
	(1.50)	(0.76)	(-0.80)	(-0.18)	(1.64)	(1.19)	(-0.76)	(-0.17)
LFFL	10.3452	-10.1207***	4.3404***	-2.5749	9.7518	-10.4046***	4.5898***	-2.6825
	(1.47)	(-4.63)	(3.44)	(-1.63)	(1.35)	(-4.73)	(3.61)	(-1.58)
Lnamt	53.1465***	21.0341***	10.1509*	3.3382	51.9654***	21.4360***	9.8770*	2.4759
	(3.05)	(4.04)	(1.76)	(0.72)	(2.95)	(4.11)	(1.75)	(0.53)
Rating	-0.6827	5.4466***	2.1314*	5.2151***	-1.8380	5.2847***	2.0086*	4.8850***
	(-0.28)	(5.10)	(1.92)	(3.77)	(-0.76)	(4.76)	(1.82)	(3.69)
LEV	454.0814***	309.9104***	478.9084***	220.7171***	444.7301***	319.6140***	452.7087***	230.3559***

	(2.74)	(4.85)	(5.96)	(4.73)	(2.65)	(4.98)	(5.64)	(5.00)
VOL	894.2529***	798.0706***	724.7344***	388.4460***	943.8718***	835.5595***	746.9732***	424.0485***
	(8.05)	(12.64)	(5.91)	(9.28)	(8.52)	(13.32)	(6.15)	(10.59)
RD	-520.0946	153.8059	1278.0048*	-70.8037	-802.5475	78.6454	1317.1503*	-261.2989
	(-0.88)	(0.70)	(1.77)	(-0.28)	(-1.27)	(0.33)	(1.84)	(-0.94)
Constant	-575.0340***	-216.3353***	-555.5406***	-224.9685***	-532.2380***	-214.8723***	-550.2186***	-226.0428***
	(-4.57)	(-3.55)	(-7.93)	(-3.42)	(-4.22)	(-3.54)	(-8.03)	(-3.29)
Observations	1300	3521	1821	1919	1300	3521	1821	1919
R-square	0.7370	0.7617	0.6069	0.7763	0.7266	0.7546	0.6075	0.7589

Table 10 Regressions of yield spreads against ADJPIN and information competition with firm-level cluster standard errors

This table shows the results of regressions that use firm-level cluster standard errors (Peterson, 2009). Yield spreads (SP) are regressed against information competition (NumTO, HerfTO), the level of information asymmetry (ADJPIN), real GDP growth (GDP), and other firm and bond characteristics control variables: PSOS, annualized coupon rate (Coupon), bond age (Bage), time to maturity (LFFL), the natural log of amount issued (Lnamt), bond rating (Rating), leverage ratio (LEV), equity volatility (VOL), and R&D expenditure (RD). This table presents the regression coefficients and R-square. The t-statistics for each coefficient appears immediately underneath.
* Significant at 10%, ** Significant at 5%, *** Significant at 1%.

	Competition Proxy	
	NumTO	HerfTO
	(1)	(2)
Competition	-172.9863***	-100.5837***
	(-6.11)	(-4.06)
Competition×ADJPIN	-686.2655*	-572.1432***
	(-1.92)	(-2.73)
Competition×GDP	6396.4104***	3790.9600***
	(9.15)	(3.93)
ADJPIN	611.5852***	530.8219***
	(3.66)	(3.07)
GDP	0.0000	0.0000
	.	.
PSOS	-129.1613	-117.5053
	(-1.43)	(-1.28)
Coupon	10.9725***	10.8850***
	(4.11)	(4.03)
Bage	0.6348	0.8786
	(0.90)	(1.25)
LFFL	0.3108	0.3341
	(0.91)	(0.98)
Lnamt	19.6298***	18.9726***
	(4.82)	(4.55)
Rating	2.3211**	2.0965**
	(2.47)	(2.22)
LEV	394.7308***	396.2957***
	(3.14)	(3.10)
VOL	761.4324***	811.7749***
	(6.04)	(6.13)
RD	126.9087	-44.1710
	(0.43)	(-0.14)
Constant	-471.7900***	-451.8754***
	(-4.37)	(-4.29)
Observations	8561	8561
R-square	0.6934	0.6820

Table 11 Regressions of yield spreads against ADJPIN and information competition of transient institutional investors

This table shows the results of four different regressions with the yield spreads (SP) as the dependent variable against various explanatory variable combinations using data of all 8561 observations in the sample period (1997–2008). Models (1) and (2) control only the real GDP growth (GDP), and the competition proxies (NumTR, HerfTR) are interact with both information asymmetry level (ADJPIN) and the real GDP growth (GDP). Models (3) and (4) include other firm and bond characteristics control variables: PSOS, annualized coupon rate (Coupon), bond age (Bage), time to maturity (LFFL), the natural log of amount issued (Lnamt), bond rating (Rating), leverage ratio (LEV), equity volatility (VOL), and R&D expenditure (RD). This table presents the regression coefficients and R-square. The t-statistics for each coefficient appears immediately underneath.
* Significant at 10%, ** Significant at 5%, *** Significant at 1%.

	Competition Proxy			
	NumTR	HerfTR	NumTR	HerfTR
	(1)	(2)	(3)	(4)
Competition	-230.5337***	-89.9274***	-154.5356***	-69.6948***
	(-25.66)	(-8.55)	(-18.15)	(-7.31)
Competition×ADJPIN	-869.2719***	-323.1079***	-888.8232***	13.9844
	(-3.65)	(-2.94)	(-5.19)	(0.13)
Competition×GDP	7873.6833***	3560.0597***	5582.2055***	2453.8850***
	(22.89)	(8.72)	(18.35)	(6.82)
ADJPIN	675.1470***	512.1494***	597.7015***	444.0605**
	(7.58)	(5.48)	(3.65)	(2.56)
GDP	0.0000	0.0000	0.0000	0.0000
	.	.	.	.
PSOS			-136.1432***	-141.6773***
			(-3.39)	(-3.49)
Coupon			11.2283***	10.6255***
			(5.14)	(4.74)
Bage			0.7490	1.0394
			(1.19)	(1.63)
LFFL			0.3485*	0.2950
			(1.68)	(1.38)
Lnamt			19.5135***	19.0938***
			(5.94)	(5.70)
Rating			2.2790***	2.0933***
			(3.66)	(3.34)
LEV			388.2156***	406.7997***
			(9.83)	(10.21)
VOL			785.1887***	845.2322***
			(18.49)	(20.15)
RD			160.6136	-36.2242
			(1.01)	(-0.19)
Constant	50.5416***	76.2833***	-464.5891***	-453.9678***
	(2.66)	(3.91)	(-13.75)	(-13.22)
Observations	8561	8561	8561	8561
R-square	0.6152	0.5901	0.6945	0.6830

Table 12 The effects of information competition of transient institutional investors on different-maturity bond yield spreads

This table divides 8561 annual observations into four groups by time to maturity: bond observations with maturity less than 5 years, 5–10 years, 10–20 years and 20-30 years. Bond observations with maturity more than 30 years are excluded. In each group, the yield spreads (SP) are regressed against the proxies of information competition (NumTR, HerfTR), the level of information asymmetry (ADJPIN), real GDP growth (GDP), and other firm and bond characteristics control variables: PSOS, annualized coupon rate (Coupon), bond age (Bage), time to maturity (LFFL), the natural log of amount issued (Lnamt), bond rating (Rating), leverage ratio (LEV), equity volatility (VOL), and R&D expenditure (RD). This table presents the regression coefficients and R-square. The t-statistics for each coefficient appears immediately underneath.
* Significant at 10%, ** Significant at 5%, *** Significant at 1%.

	Competition Proxy							
	NumTR				HerfTR			
Maturity	< 5 yrs	5 - 10 yrs	10 -20 yrs	20 - 30 yrs	< 5 yrs	5 - 10 yrs	10 -20 yrs	20 - 30 yrs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Competition	-105.4346***	-199.0928***	-58.5343***	-111.7745***	-83.2450***	-61.7615***	-59.0745***	-50.8347***
	(-3.63)	(-12.28)	(-3.11)	(-10.54)	(-3.31)	(-3.52)	(-3.42)	(-4.19)
Competition× ADJPIN	-518.4410	243.5336	-775.8269**	-69.7280	-2571.4488***	-255.4899	501.8551***	92.1465
	(-0.43)	(0.93)	(-2.56)	(-0.36)	(-2.71)	(-0.80)	(4.02)	(0.81)
Competition× GDP	9435.4326***	7452.2688***	697.2300	3154.1434***	6331.9221***	2631.4285***	605.8510	1384.2755***
	(10.96)	(14.75)	(1.03)	(8.72)	(5.86)	(3.96)	(0.94)	(3.34)
ADJPIN	260.1902	468.3092***	670.9801***	246.9787***	32.6700	393.5605***	633.3515***	175.3858**
	(0.53)	(3.54)	(4.50)	(2.96)	(0.07)	(2.84)	(4.20)	(2.06)
GDP	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	.	.	.	.	.	.	.	.
PSOS	-204.9373	-76.6449	-158.1615**	34.7806	-223.8891	-93.5006	-155.9372*	29.0461
	(-1.30)	(-1.17)	(-2.07)	(0.83)	(-1.39)	(-1.42)	(-1.96)	(0.68)
Coupon	3.8630	1.3385	14.3432***	21.9249***	4.7168	-0.3277	14.0321***	22.8331***
	(0.48)	(0.38)	(3.02)	(4.97)	(0.56)	(-0.09)	(2.97)	(4.96)
Bage	5.0131	0.9439	-0.6886	0.0732	5.4551*	1.6123	-0.7930	-0.2243
	(1.54)	(0.82)	(-0.54)	(0.05)	(1.67)	(1.36)	(-0.63)	(-0.14)
LFFL	10.6475	-10.5038***	4.3817***	-2.0016	9.7033	-10.6463***	4.4845***	-2.8911*
	(1.53)	(-4.80)	(3.46)	(-1.22)	(1.33)	(-4.75)	(3.56)	(-1.70)
Lnamt	52.2313***	21.3439***	9.8387*	2.5109	51.7095***	21.2177***	9.0266	1.9591
	(3.00)	(4.14)	(1.71)	(0.54)	(2.94)	(4.06)	(1.57)	(0.41)
Rating	-0.7135	5.3927***	1.7737	5.0622***	-2.4428	5.2850***	2.0895*	4.5895***
	(-0.29)	(5.04)	(1.60)	(3.81)	(-1.03)	(4.74)	(1.93)	(3.49)
LEV	375.1945**	292.5714***	482.9214***	215.0186***	469.2369***	310.8277***	498.4930***	242.0531***

	(2.28)	(4.56)	(6.18)	(4.63)	(2.79)	(4.85)	(6.26)	(5.12)
VOL	920.5871***	815.9997***	727.7717***	393.4417***	993.9978***	900.2007***	750.6305***	433.3417***
	(8.45)	(13.00)	(5.98)	(9.92)	(9.17)	(14.30)	(6.28)	(10.77)
RD	-689.8986	158.3922	1309.4591*	-14.4627	-732.2881	107.8972	1054.6408	-203.3032
	(-1.16)	(0.72)	(1.82)	(-0.06)	(-1.17)	(0.47)	(1.45)	(-0.71)
Constant	-538.3646***	-202.0833***	-526.0076***	-244.3904***	-520.8160***	-200.0072***	-553.9286***	-218.9992***
	(-4.31)	(-3.33)	(-7.71)	(-3.69)	(-4.18)	(-3.24)	(-7.94)	(-3.16)
Observations	1300	3521	1821	1919	1300	3521	1821	1919
R-square	0.7388	0.7601	0.6057	0.7748	0.7254	0.7465	0.6052	0.7578

Table 13 Regressions of yield spreads against ADJPIN, information competition of institutional investors and institution ownership

This table shows the results of four different regressions of yield spreads against ADJPIN, information competition of institutional investors and institution ownership using data of 8080 observations in the sample period (1997–2008). The yield spreads (SP) are regressed against the proxies of information competition (NumTO and HerfTO consider all institutional investors. NumTR and HerfTR consider only transient institutional investors), the level of information asymmetry (ADJPIN), real GDP growth (GDP), and other firm and bond characteristics control variables: PSOS, annualized coupon rate (Coupon), bond age (Bage), time to maturity (LFFL), the natural log of amount issued (Lnamt), bond rating (Rating), leverage ratio (LEV), equity volatility (VOL), R&D expenditure (RD) and institution ownership (INST).This table presents the regression coefficients and R-square. The t-statistics for each coefficient appears immediately underneath.
* Significant at 10%, ** Significant at 5%, *** Significant at 1%.

	Competition Proxy			
	NumTO	HerfTO	NumTR	HerfTR
	(1)	(2)	(3)	(4)
Competition	-161.7267***	-98.5532***	-140.7768***	-66.1382***
	(-5.90)	(-4.25)	(-6.49)	(-2.84)
Competition×ADJPIN	-783.6068**	-610.3310***	-957.6190**	-52.0745
	(-2.30)	(-2.91)	(-2.58)	(-0.25)
Competition×GDP	5996.8259***	3778.3828***	5290.5774***	2478.5476***
	(8.82)	(4.31)	(6.31)	(3.01)
INST	24.0450	17.3566	17.1459	23.2856
	(0.40)	(0.29)	(0.28)	(0.37)
ADJPIN	581.0783***	504.3520***	567.9740***	422.9796**
	(3.59)	(3.00)	(3.56)	(2.51)
GDP	0.0000	0.0000	0.0000	0.0000
	.	.	.	.
PSOS	-167.5271*	-156.8583*	-176.2524*	-185.4266**
	(-1.85)	(-1.70)	(-1.92)	(-2.01)
Coupon	10.8472***	10.7781***	11.1847***	10.5033***
	(4.13)	(4.05)	(4.25)	(3.91)
Bage	0.4056	0.6046	0.4931	0.7757
	(0.57)	(0.85)	(0.69)	(1.06)
LFFL	0.3804	0.4032	0.4093	0.3629
	(1.10)	(1.16)	(1.18)	(1.05)
Lnamt	17.7746***	17.1780***	17.6781***	17.2984***
	(4.62)	(4.39)	(4.62)	(4.42)
Rating	2.3754**	2.1479**	2.3481**	2.1571**
	(2.47)	(2.22)	(2.48)	(2.24)
LEV	284.7839***	283.0598***	278.4516***	298.9926***
	(2.82)	(2.76)	(2.70)	(2.96)
VOL	750.5823***	799.3003***	773.6018***	831.7170***
	(5.49)	(5.60)	(5.49)	(6.03)
RD	103.0208	-69.4236	127.4418	-58.9152
	(0.37)	(-0.24)	(0.47)	(-0.19)
Constant	-436.7238***	-416.8881***	-429.0747***	-418.5303***
	(-4.67)	(-4.39)	(-4.72)	(-4.40)
Observations	8080	8080	8080	8080
R-square	0.6961	0.6862	0.6930	0.6816

Table 14 Regressions of yield spreads against ADJPIN, information competition of institutional investors and governance index

This table shows the results of four different regressions of yield spreads against ADJPIN, information competition of institutional investors and governance index (G-index or E-index) using data of 7356 observations in the sample period (1997–2008). The yield spreads (SP) are regressed against the proxies of information competition (NumTO and HerfTO consider all institutional investors. NumTR and HerfTR consider only transient institutional investors), the level of information asymmetry (ADJPIN), real GDP growth (GDP), and other firm and bond characteristics control variables: PSOS, annualized coupon rate (Coupon), bond age (Bage), time to maturity (LFFL), the natural log of amount issued (Lnamt), bond rating (Rating), leverage ratio (LEV), equity volatility (VOL), R&D expenditure (RD) and G-index (G-index) (or E-index (E-index)).This table presents the regression coefficients and R-square. The t-statistics for each coefficient appears immediately underneath.
* Significant at 10%, ** Significant at 5%, *** Significant at 1%.

	Competition Proxy							
	NumTO		HerfTO		NumTR		HerfTR	
	G-index	E-index	G-index	E-index	G-index	E-index	G-index	E-index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Competition	-161.5836***	-161.6396***	-91.2734***	-90.8875***	-142.7742***	-143.2409***	-60.8516**	-60.4435**
	(-5.62)	(-5.56)	(-3.58)	(-3.58)	(-6.25)	(-6.27)	(-2.46)	(-2.45)
Competition×ADJPIN	-670.1991*	-685.6909*	-543.7961**	-562.2200**	-834.9150**	-847.8554**	59.9261	68.2649
	(-1.88)	(-1.89)	(-2.20)	(-2.37)	(-2.24)	(-2.39)	(0.25)	(0.29)
Competition×GDP	5982.5795***	5993.2760***	3517.1866***	3510.1796***	5142.5965***	5169.8031***	2086.3619**	2077.6408**
	(8.27)	(8.26)	(3.61)	(3.61)	(5.30)	(5.37)	(2.40)	(2.38)
G-index	-5.6497		-7.2371		-5.9535		-7.5525	
	(-0.94)		(-1.04)		(-0.90)		(-1.19)	
E-index		-8.4119		-8.4885		-11.0677		-8.1083
		(-0.82)		(-0.80)		(-1.12)		(-0.76)
ADJPIN	573.8669***	580.9939***	467.7751**	479.1826**	554.5240**	560.9044***	341.5057	350.7270
	(2.62)	(2.70)	(2.02)	(2.12)	(2.56)	(2.63)	(1.52)	(1.58)
GDP	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	.	.	.	.	.	.	.	.
PSOS	-81.1044	-80.4786	-65.5663	-65.2265	-86.1897	-85.2735	-90.4634	-89.7496
	(-0.79)	(-0.79)	(-0.64)	(-0.64)	(-0.83)	(-0.83)	(-0.87)	(-0.87)
Coupon	12.0598***	12.0834***	11.9846***	12.0270***	12.3412***	12.3547***	11.6705***	11.7194***
	(4.16)	(4.18)	(4.09)	(4.12)	(4.28)	(4.30)	(3.94)	(3.97)
Bage	0.5269	0.5251	0.7521	0.7526	0.6379	0.6327	0.9150	0.9158
	(0.74)	(0.74)	(1.06)	(1.06)	(0.90)	(0.89)	(1.25)	(1.25)
LFFL	0.3953	0.3955	0.4215	0.4221	0.4356	0.4356	0.3818	0.3826
	(1.06)	(1.06)	(1.14)	(1.14)	(1.18)	(1.18)	(1.03)	(1.03)

Lnamt	15.9764***	15.9516***	15.3190***	15.2846***	15.8831***	15.8531***	15.4146***	15.4029***
	(3.72)	(3.71)	(3.50)	(3.49)	(3.72)	(3.70)	(3.52)	(3.51)
Rating	2.5724***	2.5739***	2.3149**	2.3149**	2.5193***	2.5214***	2.3251**	2.3269**
	(2.64)	(2.62)	(2.36)	(2.35)	(2.63)	(2.62)	(2.39)	(2.38)
LEV	494.3746***	490.6842***	501.5924***	496.2296***	489.1563***	485.6804***	515.9394***	510.6305***
	(3.98)	(3.90)	(3.98)	(3.90)	(3.88)	(3.82)	(4.30)	(4.25)
VOL	803.0418***	802.9985***	856.9405***	856.3404***	826.8971***	827.3696***	891.3118***	890.4883***
	(5.36)	(5.29)	(5.51)	(5.42)	(5.38)	(5.31)	(5.92)	(5.83)
RD	141.1242	143.5419	-37.1833	-30.0570	135.8039	133.5145	-16.8221	-10.2968
	(0.40)	(0.41)	(-0.10)	(-0.08)	(0.40)	(0.40)	(-0.04)	(-0.03)
Constant	-457.8860***	-494.6908***	-425.5756***	-478.0114***	-448.0849***	-481.6208***	-421.9476***	-478.9776***
	(-3.31)	(-5.02)	(-2.98)	(-4.93)	(-3.34)	(-5.27)	(-3.22)	(-5.05)
Observations	7356	7356	7356	7356	7356	7356	7356	7356
R-square	0.7003	0.7003	0.6891	0.6891	0.6967	0.6968	0.6848	0.6847

Table 15 Regressions of yield spreads against ADJPIN, information competition of institutional investors and corporate governance variables

This table shows the results of four different regressions of yield spreads against ADJPIN, information competition of institutional investors and corporate governance variables using data of 7356 observations in the sample period (1997–2008). The yield spreads (SP) are regressed against the proxies of information competition (NumTO and HerfTO consider all institutional investors. NumTR and HerfTR consider only transient institutional investors), the level of information asymmetry (ADJPIN), real GDP growth (GDP), and other firm and bond characteristics control variables: PSOS, annualized coupon rate (Coupon), bond age (Bage), time to maturity (LFFL), the natural log of amount issued (Lnamt), bond rating (Rating), leverage ratio (LEV), equity volatility (VOL), R&D expenditure (RD), institution ownership (INST) and G-index (G-index) (or E-index (E-index)).This table presents the regression coefficients and R-square. The t-statistics for each coefficient appears immediately underneath.
* Significant at 10%, ** Significant at 5%, *** Significant at 1%.

	Competition Proxy							
	NumTO		HerfTO		NumTR		HerfTR	
	G-index	E-index	G-index	E-index	G-index	E-index	G-index	E-index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Competition	-151.6932***	-151.8942***	-86.7477***	-86.1572***	-130.4630***	-130.8549***	-53.4390**	-53.0314**
	(-5.56)	(-5.51)	(-3.67)	(-3.65)	(-5.93)	(-5.96)	(-2.21)	(-2.20)
Competition×ADJPIN	-740.0642**	-756.6778**	-544.3639**	-569.7989**	-883.0598**	-902.3737**	29.4171	37.8212
	(-2.18)	(-2.18)	(-2.28)	(-2.49)	(-2.42)	(-2.58)	(0.13)	(0.17)
Competition×GDP	5578.9139***	5589.7536***	3324.8153***	3314.5442***	4830.1432***	4852.8709***	1904.5797**	1896.2683**
	(8.00)	(8.00)	(3.76)	(3.74)	(5.60)	(5.65)	(2.26)	(2.25)
G-index	-5.8104		-7.6175		-6.3988		-7.9708	
	(-1.04)		(-1.19)		(-1.04)		(-1.34)	
E-index		-6.0869		-6.3264		-9.0445		-6.3253
		(-0.64)		(-0.64)		(-0.97)		(-0.63)
INST	6.0084	8.5456	-2.5754	0.7246	-0.4768	2.5707	7.3672	10.4582
	(0.08)	(0.12)	(-0.03)	(0.01)	(-0.01)	(0.03)	(0.10)	(0.14)
ADJPIN	521.5139**	532.7004**	415.6399*	432.5909**	502.7809**	513.9875**	296.0570	309.9328
	(2.50)	(2.58)	(1.90)	(2.01)	(2.43)	(2.51)	(1.39)	(1.46)
GDP	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	.	.	.	.	.	.	.	.
PSOS	-133.2987	-133.1709	-118.1112	-118.4240	-139.9708	-139.4443	-148.0670	-147.8464
	(-1.32)	(-1.33)	(-1.16)	(-1.18)	(-1.38)	(-1.38)	(-1.46)	(-1.47)
Coupon	11.7185***	11.7460***	11.6575***	11.7047***	12.0867***	12.1030***	11.3225***	11.3742***
	(4.13)	(4.15)	(4.07)	(4.09)	(4.27)	(4.28)	(3.90)	(3.93)

Bage	0.3962	0.4004	0.5870	0.5947	0.4805	0.4829	0.7636	0.7708
	(0.55)	(0.55)	(0.83)	(0.83)	(0.67)	(0.67)	(1.04)	(1.04)
LFFL	0.4762	0.4780	0.4994	0.5018	0.5073	0.5093	0.4605	0.4631
	(1.25)	(1.26)	(1.32)	(1.33)	(1.34)	(1.35)	(1.22)	(1.23)
Lnamt	15.3124***	15.2864***	14.7253***	14.6838***	15.2402***	15.2044***	14.8286***	14.8123***
	(3.85)	(3.84)	(3.65)	(3.64)	(3.87)	(3.86)	(3.70)	(3.69)
Rating	2.5775***	2.5811***	2.3284**	2.3296**	2.5349***	2.5396***	2.3401**	2.3441**
	(2.61)	(2.60)	(2.35)	(2.34)	(2.62)	(2.61)	(2.38)	(2.37)
LEV	376.3636***	372.1251***	381.1558***	375.1246***	371.6115***	367.5290***	402.4791***	396.5345***
	(3.84)	(3.77)	(3.83)	(3.75)	(3.68)	(3.63)	(4.05)	(4.00)
VOL	767.6815***	766.7296***	819.4799***	817.9456***	790.3463***	789.8563***	852.4533***	850.8134***
	(4.76)	(4.70)	(4.91)	(4.85)	(4.79)	(4.75)	(5.25)	(5.19)
RD	111.3347	119.8410	-67.8080	-53.9262	100.0000	103.7770	-51.7691	-39.4394
	(0.34)	(0.36)	(-0.20)	(-0.16)	(0.31)	(0.33)	(-0.14)	(-0.11)
Constant	-387.5475***	-433.5783***	-348.6100***	-412.6734***	-372.9370***	-418.2722***	-353.6151***	-421.6774***
	(-3.62)	(-5.05)	(-3.17)	(-4.68)	(-3.59)	(-4.95)	(-3.45)	(-4.78)
Observations	6948	6948	6948	6948	6948	6948	6948	6948
R-square	0.6980	0.6979	0.6868	0.6866	0.6942	0.6942	0.6818	0.6816