What Determines Gross Spreads for Convertible Security Issues?

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What Determines Gross Spreads of Issuing Convertible Securities?

Abstract

In this paper we extend the developing literature on gross spreads to convertible securities. We analyses of gross spreads of convertible debt and convertible preferred stocks issues in the USA public market from 1990 through 2002. In contrast to the case of IPOs, the evidence shows that gross spreads of both convertible debt and preferred stocks vary across issue size and over time. Underwriters systematically price their services based on issuer specific, underwriter specific, and market state variables. We find that underwriter, issuer, and market characteristics explain around 80% of the variation in gross spreads of convertible securities. The addition of financial ratios, that is agency cost relation variables, significantly improves the fit. But the effects of mitigating the agency costs for agency cost relation variables such as Tobin's q, debt ratio, firm size, and volatility of earnings are not significant. The role of financial ratios when using convertibles is more important for investment bankers and non-bulge brackets. Underwriter characteristics are essential determinants for gross spreads of convertible securities. Prestigious underwriters charge significantly lower gross spreads than non-prestigious bankers. We also find that higher market concentrations translate into less competition and show significant higher gross spreads for convertible securities. But the average gross spreads decline as the market share of commercial banks increases. Issuer characteristics, too, are substantial determinants for gross spreads of convertibles. We find that the gross spreads of convertible securities have significant cost and risk compensation functions. Convertible preferred stock, which carries more risk than convertible debt, entails higher gross spreads. Higher credit quality issuers offer lower gross spreads. And there are substantial economies of scale. Our empirical results indicate that financial ratios of proxy agency cost are essential determinants for yield spreads of convertible securities. We suggest that the effect of the agency cost of using convertibles on yield spreads for convertible securities is dominant.

Keywords: Gross Spread, Convertible Securities

1. Introduction

Convertible securities have been used by corporations as a major financial vehicle for more than a century. In particular, growth firms rely heavily on convertibles for new capital. But research on gross spreads using convertible securities data is very limited.

Lee, Lochhead, Ritter, and Zhao (1996) report that the average gross spreads of convertible bonds from 1990 to 1994 was 3.8 percent and exhibited economies of scale and risk compensation for credit rating and industry (utility versus non-utility). Bajaj, Mazumdar and Sarin (2002) compare the costs of issuing preferred stocks and convertible preferred stocks issued between 1980 and 1999. They found that convertible issues, which are riskier than straight issues, entail higher gross spreads. Scale, credit rating, and industry effects influence gross spreads. The prior studies of gross spreads of convertible securities simply focused on cost and risk of issuer characteristics analyses.

The costs of raising capital have attracted much attention in both the academic and the business worlds. Recently a number of studies have examined not only issuer characteristics but also the impact of underwriter and market characteristics on gross spreads. However, they have all focused on IPOs, SEOs, and debt.

In this paper we extend the developing literature on this issue to convertible securities. Jen, Choi and Lee (1997) suggest that using convertibles financing may mitigate the asset substitution problem and underinvestment problem. Stein (1992) argues that convertible securities may be used as an indirect method of equity financing when adverse-selection problems make a conventional stock issue unattractive. Brennan and Schwartz (1988) suggest that convertibles financing also helps resolve disagreements between managers and debtholders regarding estimations of the risk of a firm's activities.

We proxy agency cost variables such as Tobin's q, debt ratio, volatility of earnings, firm size and relative size of issue. And propose that these financial ratios have two effects on gross spreads and yield spreads. One is the direct effect that the financial ratio has on gross spreads and yield spreads. The other is the effect of the cost to the agency of using convertible debt financing. Therefore we try to examine the impact of these mitigatigating agency costs on gross spreads and yield spreads for convertible securities, adding underwriter characteristics and market condition variables to our test.

This article provides analyses of gross spreads of convertible debt and convertible

preferred stocks issues in the USA public market from 1990 through 2002. First, we will determine if the cluster in underwriting gross spreads observed by Chen and Ritter (2000) is present in convertible securities gross spreads. In contrast to the case of IPOs, the evidence shows that gross spreads of both convertible debt and preferred stocks vary across issue size and over time.

Conducting regression analysis on the gross spreads of convertible securities, we find that underwriter, issuer, and market characteristics explain around 80% of the variation in gross spreads of convertible securities. The addition of financial ratios, that is agency cost relation variables, significantly improves the fit. But the effects of mitigating the agency costs for agency cost relation variables such as Tobin's q, debt ratio, firm size, and volatility of earnings are not significant. The role of financial ratios when using convertibles is more important for investment bankers and non-bulge brackets.

Underwriter characteristics are essential determinants for gross spreads of convertible securities. Prestigious underwriters charge significantly lower gross spreads than non-prestigious bankers.

We also find that higher market concentrations translate into less competition and show significant higher gross spreads for convertible securities. But the average gross spreads decline as the market share of commercial banks increases.

Issuer characteristics, too, are substantial determinants for gross spreads of convertibles. We find that the gross spreads of convertible securities have significant cost and risk compensation functions. Convertible preferred stock, which carries more risk than convertible debt, entails higher gross spreads. Higher credit quality issuers offer lower gross spreads. And there are substantial economies of scale.

Our empirical results indicate that financial ratios of proxy agency cost are essential determinants for yield spreads of convertible securities. We suggest that the effect of the agency cost of using convertibles on yield spreads for convertible securities is dominant.

The rest of this article will be proceed as follows: Section 2 provides a review of the previous literature. Section 3 describes the data. Methodology is discussed in Section 4. Section 5 presents empirical results. Section 6 concludes the paper

2. Literature review

Lee, Lochhead, Ritter and Zhao (1996) reported the average cost of raising external

debt and equity capital for U.S. corporations from 1990 to 1994. They found that all classes of securities exhibited economies of scale; for convertible bonds, the direct costs averaged 3.8 percent. Bajaj Mazumdar and Sarin (2002) analyzed a sample of 3,042 U.S. preferred stocks issued between 1980 and 1999; they found that convertible issues, which are riskier than straight issues, entail higher gross spreads and other direct expenses. Scale, credit rating, and industry effects influence gross spreads and issuance costs.

As noted, research on the convertible is rather limited. Most previous studies have focused on IPOs, SEOs, and debt. A number of studies have examined the determinants of gross spreads (e.g. Lee, et al (1996), How and Yeo (2000), Bajaj et al. (2002), Melnik and Nissim (2003)). They document that gross spreads are compensation to the underwriter for marketing issues and taking risks. Basically, one would assume that issuer risk increases flotation costs, for several reasons. First, the underwriter bears a greater placement risk. High quality securities are cheaper to sell due to the existence of a larger and more liquid market. The primary reason is that many regulated institutions, such as pension funds, are constrained to hold only high quality securities. Moreover, after market price stabilization, if there is a commitment to provide for them, they may become very expensive. Second, if the issuer defaults, the underwriter may suffer damage to reputation and be left open to legal suits by investors. Third, in order to deal with these problem, the underwriter may decide to undertake greater information-gathering efforts in the pre-issue period. This would again raise underwriting costs. Thus, underwriter fees should be expected increase in step with securities risks to compensate for additional effort.

DeAngelo (1981) refers to “low-balling” in a situation where the supplier of services, due to competition, provides a discount in the initial fee with the expectation of earning quasi-rents in subsequent dealings with the recipient of services. James (1992) attempts to test low-balling effects on gross spreads. He proposes that the underwriter must first acquire relationship-specific information in setting the issue price. This process often involves costly set-up expenses.

Are underwriting spreads influenced by the competitive environment governing the underwriting business? Chen and Ritter (2000) found a strong clustering of underwriter spreads at 7 %, particularly for “moderate size” IPOs (defined as those with proceeds of $20 million up to $80 million) issued over the period 1995 to 1998. This may indicate that

either there is collusion among investment banks or that this “7 percent-contract” is an efficient solution for informational problems arising in underwriting contracts. Hansen (2001) asserts that the empirical evidence in favor of collusion among U.S. investment banks is weak, while empirical findings are consistent with the presumption that underwriters compete on the basis of reputation, placement services, and underpricing to complement the fixed 7 percent spread.

Livingston and Miller (2000) examine the impact of investment banker prestige on underwriter spreads and yields for nonconvertible industrial debt issues offered during the period 1990 to 1997. They found that higher prestige underwriters charge significantly lower underwriting fees. Offered yields are also lower and offering prices are higher for prestigious underwriters. In line with Logue and Lindvall (1974) and Stoll (1976), they advance the competitive hypothesis. They argue that an issuer capable of attracting the service of a lead underwriter has the advantage of obtaining a lower underwriting spread than an issuer whose issue is underwritten by a small, local underwriting firm.

Benveniste and Spindt (1989) argue that as prestigious underwriters tend to bring more reputational assets to the issuance process, they should be compensated more. They document the notion that prestigious underwriters tend to extract a higher fee from issuers in order to maintain their investment in reputational capital. How and Yeu (2000) suggest that prestigious underwriters tend to charge a premium to reflect the higher quality services they provide. Fang (2004) studies the relation between investment bank reputation and the price and quality of bond underwriting services. After controlling for endogeneity in issuer-underwriter matching, she finds that reputable banks obtain lower yields and charge higher fees.

Gandes, Puri, Saunders and Walter (1997) test differences in debt pricing between investment banks and commercial banks. They find that commercial bank affiliates’ underwritings involve lower yields. They suggest that information flows between underwriting and bank affiliates exist despite the “Chinese walls” between them. Gandes, Puri and Saunders (1999) examine the competitive impact of commercial bank entry into debt underwriting on gross underwriter spreads. They find that underwriter spreads are lower, on average, than the share of commercial banks. Roten and Mullineaux (2002) find that gross spreads are lower in the case of Section 20 underwritings, but that yield spreads

are not. Fields, Fraser and Bhargava (2003) find that gross spreads of IPOs generally do not differ between commercial bank and investment bank issues.

3. Data and Sample Selection

The primary source for our data is the Securities Data Company's New Issues database (SDC). Our sample contains domestic convertible debt and convertible preferred stock issues in the public market from January 1990 through December 2002. We exclude ADRs, closed-end fund (SIC 6726), and real estate investment trust (REIT) (SIC 6798). Our sample includes only issues that are convertible into shares of the issuing company. Exchangeable bonds, where the securities are convertible into shares of a different company, are not in our sample.

<< Insert Table 1 Here >>

Gross spreads are the commissions paid to investment bankers, including management fee, underwriter fee, selling concession, and reallowance fee. A gross spread is measured as a percentage of total proceeds. The average gross spread of all convertible securities is 3.36%. The average gross spread of convertible debt is 2.62%, less than convertible preferred stock's 4.24 %. All proceeds are measured in average 1995 dollars using the Consumers Price Index as a deflator. Table 2 gives the sample characteristics. The average size of a convertible debt is $ 204.73 million; the average size of a convertible preferred stock issue is $ 201.48 million. The average offered yield at maturity for a convertible debt is 6.26 %, lower than the convertible preferred stock's 7.97 %. Issue frequency is the number of issues of convertible debt or convertible preferred stock that each firm made over the period 1990 to 2002. The average issues frequency of a convertible securities is 1.30.

We proxy lead-underwriters' reputations with the Carter-Manaster prestige ratings found in Loughran and Ritter (2003). Two convertible debt issues and one convertible preferred stock issues were underwritten by investment banks that did not have a reputation value reported in Loughran and Ritter (2004). The average Carter-Manaster prestige rating is 7.96, and its median is 9.1.

We supplemented the SDC database with financial variables drawn from Compustat.

Table 2 also reports Tobin's q, debt ratio, volatility of earnings, firm size, taxes payable ratio, and relative size of issue for our sample firms.

Tobin's q has been widely used to distinguish firms with good investment opportunities from those with poor investment opportunities. We estimate q as the ratio of the market value of the firm's assets to the book value of the firm's assets, where the market value of assets equals the book value of assets minus the book value of common equity plus the market value of common equity. The mean (median) q of our sample firms is 1.77 (1.36).

The debt ratio is measured by long-term debt divided by the book value of total assets for the year preceding the offering. Volatility of earnings is the standard deviation of the offering firm's earnings before interest and tax, divided by total assets over the five years preceding the offering. Firm size is the offering firm's total assets for the year preceding the offering. The relative size of issue is the proceeds divided by the market capitalization of the issuing firm for the year preceding the offering. The taxes payable ratio is the ratio of taxes payable to total assets for the year preceding security issue.

4. Methodology

We use OLS regressions to analyze the gross spreads (**GRSP**) and the yield of maturity (**YIELD**). The independent variables are placed into four categories which include issuer or offering characteristics, market characteristics, underwriter characteristics, and variables related to agency cost.

4.1. Issuer or offering characteristics

1). Log of Proceeds（**ln(PROCEEDS)**）

2). Convertible preferred dummy（**CPD**）

3). Credit rating（**CR**）

4). Log of issue frequency（**ln(IFQ)**）

5).Call protection dummy（**CALLD**）

4.2. Market characteristics

1). Herfindahl-Hirschman index（**HHI**）

2).Market share of Section 20 subsidiary（**S20MS**）

4.3. Underwriter characteristics

1). Carter-Manaster rating (**CM**)

2).Section 20 dummy (**S20D**)

4.4. Agency cost relation variables

1).**Tobin's q**

2).**Debt ratio**

3).**Firm size**

4).**Volatility of earnings**

5).**Relative offer size**

4.1 Issuer or offering characteristics

In the literature, several issuer characteristics have been used as proxies for risk and have been shown to affect gross spreads. These factors include size of proceeds, credit rating, and call protection. Much empirical research indicates that there are economies of scale in gross spreads. That is, the percentage gross spreads falls as the size of an issue increases. Following Fisher (1959), the size of the issue is defined as the natural logarithm of gross proceeds（**ln(PROCEEDS)**）. Hence, we expect the sign of the coefficient in the gross spreads' log of proceeds to be negative.

Credit rating (**CR**) is used to capture default risk. Following Barclay and Smith (1995), let the credit rating be equal to one if the security's Standard & Poor (S&P) credit rating is AAA, two if the credit rating is AA, three if the credit rating is A, four if the credit rating is BBB, five if the credit rating is BB, six if the credit rating is B, seven if the bond credit rating is CCC, eight if the bond credit rating is CC, nine if the bond credit rating is C, and ten if the S&P bond credit rating is NR. As default risks increase, the selling of issues becomes more difficult and the gross spreads should increase, making positive the expected signs on the coefficient of CR. Previous studies find that credit ratings are significant determinants of both yield and gross spreads.

CPD is the convertible preferred stocks dummy. It equals one if the security is a convertible preferred stock, and zero otherwise. Because convertible preferred stocks include an equity-like claim, their average risk exceeds that of convertible debt, *cet. par*.

CALLD is the call protection dummy. It equals one if security is callable, and zero

otherwise. The call feature adds risk for the security buyer because of the uncertainty of the yield, and makes issues less risky. Hence, we expect the sign of the coefficient on the call protection dummy to be positive.

The log of issue frequency is the natural logarithm of the number of convertible security issues that a particular issuer sells through the same leader manager during the sample period. Frequency issuers may experience not only lower gross spreads, but also lower yields since underwriters are established players in the capital market and have a natural clientele. On the other hand, convertible security frequency issues might convey a signal of financial trouble, add to a firm's debt level, and increase the yields on frequent issuers. The net effect of issue frequency on yield is therefore unclear.

4.2 Market characteristics

The Herfindahl- Hirschman index（**HHI**） is the sum of squares of the market share of firms in the convertible securities underwriting. It measures the market concentration ratio. Higher Herfindahl- Hirschman index scores indicate less competition in the market and will show more markup, *cet. par*. Hence, we expect the sign of the coefficient on HHI on the gross spreads to be positive.

In the late 1980s, the U.S. Federal Reserve Board allowed commercial banks through separately incorporated subsidiaries to re-enter the securities underwriting market. The bank holding company subsidiaries that engage in such activities are commonly referred to as "Section 20 subsidiaries." **S20MS** is the percentage market share of all Section 20 underwriters in the year of issue. Gandes, Puri and Saunders (1999) find that gross spreads are lower, on average, than the share of commercial banks.

4.3 Underwriter characteristics

A number of studies suggest that reputation is positively related to the offering price of securities, and that the firm that is issuing securities should be willing to pay a premium to high reputation intermediaries（e.g. How and Yeo (2000), Simth (1986), Beven and Spindt (1989) , Chemmanur and Fulghieri (1994), and Puri (1999)）. But the competitive hypothesis argues that an issuer capable of attracting the service of a lead underwriter has the advantage of obtaining a lower underwriting spread than an issuer whose issue is underwritten by small, local underwriting firm. Hence, the sign of the coefficient on CM in

the gross spreads regression is not clear.

We proxy lead-underwriter reputations with the Carter-Manaster prestige ratings (**CM**) found in Loughran and Ritter (2003) and correct for Carter et al. (1998).

Puri (1996) documents that commercial banks in their role as underwriters may have an informational advantage over investment banks because of prior lending and other business relationships with issuers. Being better informed, commercial banks may thus provide stronger certification of value for their client firms. In contrast, commercial banks may exploit their informational advantage by bringing to market poor-quality issues. Thus the two possible uses of their lending-generated proprietary information leads to two opposing effects when it comes to their underwriting activities, effects that arise either from "certification" or from "conflicts of interest."

Much of the available evidence suggests a dominant certification effect. Ang and Richardson (1994) and Puri (1996) find bank-underwritten issues priced higher than similar investment bank-underwritten issues. Gande and Puri show that bank entry into the corporate debt market has reduced underwriter spreads and market concentration. Narayanan, Rangan, and Rangan (2004) provide evidence that relative to investment bank issues, lending bank issues have lower spreads.

S20D is the Section 20 subsidiary dummy variable, equal to one if the lead manager is a Section 20 subsidiary, and zero otherwise.

4.4 Agency cost relation variable

Using convertible debt financing may mitigate the Jensen and Mecking (1976) asset substitution problem and the Myers (1977) underinvestment problem, or help resolve the disagreement between managers and debtholders regarding estimations of the risk of a firm's activities; or it may be used as an indirect way of equity financing when adverse-selection problems make a conventional stock issue unattractive. For all these reasons, using convertible debt financing may reduce corporation agency costs or increase firm value, affecting gross spreads and yield spreads.

We propose that these financial ratios have two effects on gross spreads and yield spreads. One is the direct effect that the financial ratio has on gross spreads and yield spreads. The other is the effect of the cost to the agency of using convertible debt financing.

We proxy agency cost variables such as Tobin's q, debt ratio, volatility of earnings,

firm size and relative size of issue.

Tobin's q has been widely used to distinguish firms with good investment opportunities from those with poor ones. We measure **q** as the ratio of the market value of the firm's assets to the book value of the firm's assets. Jung, Kim, and Stulz (1996) hypothesize that an increase in the profitability of investment opportunities has two effects: 1) it increases the marginal agency costs of debt because the firm has more to lose from financial distress, and 2) it decreases the marginal agency costs of managerial discretion because better investment opportunities serve to align the objectives of management and shareholders. High Tobin's q firms are also often characterized as especially vulnerable to asymmetric information problems. This might suggest that issues convertibles have a higher effect of mitigating agency costs when firms have higher Tobin's q. We expect that the sign of the direct effect of Tobin's q is positive (negative); and the sign of agency cost of using convertibles is negative (positive) for gross (yield) spreads.

An increase in either business risk or financial risk increases the expected cost of financial distress or bankruptcy. We use the **debt ratio**, measured by long-term debt divided by total assets for the year preceding the issue, as a proxy for financial risk. To measure business risk, we use the **volatility of earnings,** i.e. the standard deviation of the firm's earnings before interest and tax, divided by total assets over the five years preceding the issue. Hence, the sign of the direct effect of debt ratio and volatility of earnings is positive (negative), while the sign of the agency cost of using convertibles is negative (positive) for gross (yield) spreads.

The **relative size of issue** is the total proceeds of a convertibles issue divided by the market capitalization of the issuing firm for the year preceding the issue. Krasker (1986) suggests that the cost of adverse selection may be directly related to the relative size of issue. Larger security offers increase the potential for wealth loss by existing shareholders. Hence, the sign of the direct effect of relative size of issue is positive (negative), and the sign of agency cost of using convertibles is negative (positive) for gross (yield) spreads.

Firm size is the firm's market value of assets for the year preceding the issue. Firm size serves as an additional proxy for potential adverse selection costs or the magnitude of financial distress and bankruptcy costs. Hence, the sign of the direct effect of firm size is negative (positive), and the sign of agency cost of using convertibles is positive (negative)

for gross (yield) spreads.

5. Empirical results

5.1 Gross spreads

5.1.1 Is there clustering?

In Figures 1 and 2, we show in a scattergram the relation between gross spreads and the logarithm of proceeds for convertible debt and convertible preferred stocks, respectively. Figures 3 and 4 plot scattergrams of the relation between gross spreads and the issue year for convertible debt and convertible preferred stocks, respectively. In sharp contrast to the evidence of IPOs, the plots show that underwriting gross spreads for convertible securities varies across issue size and over time. The underwriters' gross spreads for convertible debt and convertible preferred stocks are not fixed at one particular percentage.

<< Insert Figure 1 Here >>

<< Insert Figure 2 Here >>

<< Insert Figure 3 Here >>

<< Insert Figure 4 Here >>

5.1.2 The determinants of gross spreads

Table 3 reports the OLS estimates for the gross spreads of convertible securities. Equations 1 and 2 are estimated for the full samples. The adjusted R^2 shows that our gross spreads model explains about 79 %－81 % of the variation in gross spreads of convertible securities.

The log of proceeds (**ln(PROCEEDS**)) coefficient estimate is negative and statistically significant for each of the two models presented in Table 3. This agrees with the conclusion that there are scale economies in the gross spread of both convertible debt and convertible preferred stocks, and is consistent with Baiai et al. (2002) and Lee et al. (1996).

The convertible preferred stock dummy variable (**CPD**) is significantly positive. This is consistent with the hypothesis that riskier securities involve higher gross spreads. Because convertible preferred stocks include an equity-like claim, their average risk exceeds that of convertible debt. Credit rating (**CR**) is also significantly positive. The higher credit rating has bad credit quality and higher default risk. This is consistent with expectations that as default risk increases, selling issues becomes more difficult and will pad premium gross spreads.

The yield of maturity (**YIELD**) is positive and significant, that indicate that yield and gross spreads are not substitution for underwriter. The nature log of issue frequency (**ln(IFQ)**) is significantly -0.21, reveal that there have "low-balling" effect. This consistent with James (1992), Livingston and zhou (2002). But when addition financial ratio variable they become not significant.

The Herfindahl-Hirschman index (**HHI**) is a positive 4.49 and significant. This is consistent with expectations that a higher market concentration translates into less competition and higher spreads. The Section 20 subsidiaries' market share (**S20MS**) is negative, which is consistent with the Gande, Puri, and Saunders (1999) finding that gross spreads are lower than the share of commercial banks.

The Carter-Manaster rating (**CM**) is significantly negative, indicating that prestigious underwriters charge significantly lower gross spreads than non-prestigious bankers. That is consistent with the competition hypothesis and the client hypothesis of Carter and Manaster (1990). Livingston and Miller (2000) also find that higher prestige underwriters charge significantly lower underwriter fees for non-convertible debt. They documented the fact that prestigious investment bankers have bargaining power in persuading the underwriting syndicate to accept lower fees in order to increase market share.

The coefficient of Section 20 subsidiaries dummy (**S20D**) is negative but statistically insignificant. This indicates that Section 20 subsidiaries charge less than investment banks, on average.

If using convertible securities will mitigate agency cost of issuer, due to competition, provides a negative effect in the gross spreads. In Model 1 we include agency cost relation variables, such as Tobin's q, debt ratio, firm size, volatility of earnings, and relative issue size. The addition of agency cost relation variables significantly improves the model fit.

The coefficient for all agency cost relation variables, such as Tobin's q, debt ratio, firm size, volatility of earnings, and relative issue size, are all positive but not significant, and firm size coefficient approaches zero. This indicted that there is a dominate effect on gross spreads for convertible securities of the original impact of financial ratio.

5.1.3 Control Variables

A. Section 20 subsidiary

We classify samples by the investment banking lead manager employed. Equations 3 and 4 are calculated only with samples in which lead management does not include Section 20 subsidiaries; equations 5 and 6 are calculated only with samples including Section 20 subsidiaries in lead management. In investment banking, these models explain about 79 % －91 % of the variation in gross spreads of convertible securities. But the variations are more than a question of the presence or absence of Section 20 subsidiaries: these models just explain about 46%－52% of the variation in gross spreads of convertibles.

The role of agency costs when using convertibles is more important for investment bankers. Table 3 shows that the adjusted R^2 increases 79% to 91% when we add agency cost relation variables. But agency cost related variables are not essential determinants of gross spreads of convertible securities for Section 20 subsidiaries. The adjusted R^2 decreases 52% to 46% when we add agency cost related variables.

In Model 4, the coefficient of Section 20 market share is negative and significant. This indicates that investment banks will charge lower gross spreads when Section 20 subsidiaries' market shares increase. With the addition of agency cost relative variables, the Section 20 market share coefficient estimate became positive but not significant. The coefficients of debt ratio and volatility of earnings are significantly positive. This indicates that the agency cost of using convertibles effect is not remarkable for gross spreads.

B. Underwriter reputation

In line with Carter et al. (1997), banks with a Carter-Manaster ranking of 8.88 are used as the "bulge bracket." As mentioned, we classify samples by the Carter-Manaster ranking of the lead manager. Equations 7 and 8 are estimated only by the samples in which the lead manager is not the bulge bracket; equations 9 and 10 are estimated only by samples in which the lead manager is the bulge bracket. In non-bulge brackets, these models explain

about 71 %－83 % of the variation in gross spreads of convertible securities. It's more than the bulge bracket s, these models just explains about 47%－48% of the variation in gross spreads of convertibles.

The role of the agency cost of using convertibles is more important for non-bulge brackets. Table 3 shows that the adjusted R^2 form increases 71% to 83% when we add the agency cost relation variables. But the agency cost related variables are not the essential determinant of gross spreads of convertible securities for bulge brackets. The adjusted R^2 form 48% decreases to 47%, when we add agency cost related variables.

5.2 Yield spreads

Table 4 reports the OLS estimates for the yield spreads of convertible securities where the yield spreads offers yields to maturity. Equations 1 and 2 are estimated for the full samples. The coefficient of convertible preferred stock dummy variable (**CPD**) is significantly positive. The positive coefficients indicate that, cet. par., convertible preferred stocks yield higher spreads than convertible debts. The coefficient of gross spreads is significantly positive, also. The Herfindahl-Hirschman index (**HHI**) is a positive and significant. This is consistent with that less competition market has more markups.

Financial ratios are essential determinants for yield spreads of convertible securities. Contrast to model 2, model 1's adjusted R^2 is 0.34 higher than model 1. The Tobin's q is significantly negative. The coefficients of debt ratio and relative issue size are negative. This indicated that the agency cost of using convertibles is a dominant effect on yield spreads for convertible securities.

Equations 3 and 4 are estimated only for the samples where the lead management does not include Section 20 subsidiaries; equations 5 and 6 are estimated only with samples where the lead manager includes Section 20 subsidiaries. Equations 7 and 8 are estimated only by the samples in which the lead manager is not the bulge bracket; equations 9 and 10 are estimated only by samples in which the lead manager is the bulge bracket. The adjusted R^2 shows that these models explain about 10 %－52 % of the variation in yield spreads of convertible securities. The addition of financial ratios--that is, agency cost relation variables-- significantly improves the fit.

6. Conclusion

This study examines the impact of issuer, underwriter, and market characteristics on the gross spreads for both convertible preferred stocks and convertible debts. In particular, we test the effect on the gross spreads of the mitigation of agency costs when issuing convertible securities, and we suggest that the effect of the agency cost of using convertibles on gross spreads for convertible securities is not notable.

In contrast to IPOs, underwriter gross spreads for both convertible debt and convertible preferred stock vary across issue size and over time. They are not clustered at one particular percentage.

We find that the underwriter, issuer, and market characteristics significantly explain the variance in gross spreads of convertible securities. Overall, our results support the idea that gross spreads of convertible securities show cost and risk compensation functions. Convertible securities that issue a larger offer pay a significantly lower gross spread than those that issue a smaller offer. Firms that issue more frequently in the sample period pay a significantly lower gross spread than firms that issue less frequently in the sample period. Moreover, securities with a higher credit quality pay significantly lower fees and convertible preferred stocks pay a higher gross spread than convertible debt. These results support the notion that underwriting gross spreads compensates underwriters for their difficulties in selling riskier issues.

Considering underwriter characteristics such as underwriter reputation, Section 20 or non-Section 20 categorization, and subsidiaries' dummy variables in the gross spreads model, we find that prestigious underwriters charge significantly lower gross spreads than non-prestigious underwriters when underwriting convertible securities. This is not surprising since non-prestigious underwriters only have lower credit rating clientele. Evidence supports the competition hypothesis. Livingston and Miller (2000) also find that prestigious underwriters charge significantly lower gross spreads than non-prestigious underwriters for non-convertible debt. They conclude that prestigious investment bankers' have bargaining power in persuading the underwriting syndicate to accept lower fees in order to increase market share.

Roten and Mullineaux (2002) find that gross spreads of debt are lower in the case of Section 20 underwritings. Field et al. (2003) find that gross spreads of IPOs generally do not differ between commercial bank and investment bank issues. Our results suggest that

Section 20 subsidiaries charge less than investment banks, on average.

Market states also influence the gross spreads of convertible securities. The underwriter market has a higher concentration with less competition, and underwriters will charge higher spreads. On average, as Section 20 subsidiaries' market share increases, gross spreads will be reduced, consistent with the findings of Gande, Puri, and Saunders (1999).

When we classify samples by the investment banking lead manager employed. The role of financial ratios when using convertibles is more important for investment bankers. And the role of the agency cost of using convertibles is more important for non-bulge brackets.

Our empirical results indicate that financial ratios of proxy agency cost are essential determinants for yield spreads of convertible securities. We suggest that the effect of the agency cost of using convertibles on yield spreads for convertible securities is dominant.

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Table I
Sample Distribution

The sample is obtained from the New Issues database of Securities Data Company (SDC) and consists of convertible debt and convertible preferred stock issues in the public market from January 1990 through December 2002. ADRs, closed-end funds, REITs, and exchangeable bonds are excluded. Credit rating is rated by S&P.

By Year	%	Total	Number of Convertible Debt	Number of Convertible Preferred Stock
1990	5.37	47	33	14
1991	9.82	86	46	40
1992	12.67	111	62	49
1993	16.89	148	82	66
1994	7.19	63	27	36
1995	4.91	43	23	20
1996	7.88	69	42	27
1997	6.96	61	37	24
1998	5.94	52	23	29
1999	4.91	43	19	24
2000	5.02	44	28	16
2001	7.31	64	43	21
2002	5.14	45	10	35
Total	100.00	876	475	401
By Credit Rating				
A- and above	10.27	90	49	41
BBB+, BBB, and BBB-	16.21	142	77	65
BB+, BB, and BB-	10.73	94	45	49
B+, B, and B-	22.49	197	139	58
CCC+ - C-	3.54	31	23	8
NR	35.73	313	137	176
Na	1.03	9	5	4
Total	100.00	876	475	401

Table II
Sample characteristics

The sample is obtained from the New Issues database of Securities Data Company (SDC) and consists of convertible debt and convertible preferred stock issues in the public market from January 1990 through December 2002. ADRs, closed-end funds, REITs, and exchangeable bonds are excluded. Credit rating is rated by S&P. Gross spreads is paid to investment bankers, including management fee, underwriter fee, selling concession, and reallowance fee, and measured as a percentage of total proceeds. All proceeds are measured in average 1995 dollars using the Consumers Price Index as a deflator. Lead underwriter reputation is based on the Carter-Manaster ranking and obtained from Loughran and Ritter (2004). Tobin's q is measured as the ratio of the market value of the firm's assets to the book value of the firm's assets to the book value of the firm's assets, where the market value of assets equals the book value of assets minus the book value of common equity plus the market value of common equity. The debt ratio is measured by long-term debt divided by the book value of total assets for the year preceding the offering. Volatility of earnings is the standard deviation of the offering firm's earnings before interest and tax divided by total assets over the 5 years preceding the offering. Firm size is the offering firm's total assets for the year preceding the offering. The relative size of issue is the proceeds divided by the market capitalization of the issuing firm for the year preceding the offering. Taxes payable ratio is the ratio of taxes payable to total assets for the year preceding the offering.

Variables	Number	Mean	Median	Standard Deviation
Panel A: Total				
Gross spreads	876	3.36	3.00	2.22
Proceeds	876	203.24	110.85	303.19
Offer yield of maturity	823	7.02	6.75	4.36
Issues frequency	876	1.295662	1	0.599451
C-M	873	7.957045	9.1	2.049166
Tobin's q	306	1.77	1.36	1.45
Debt ratio	504	29.27	28.69	17.99
Volatility of earnings	507	6.30	2.80	13.96
Firm size	507	12846.07	1580.58	45550.02
Taxes Payable ratio	447	0.55	0.00	1.09
Relative Offer Size	507	0.15	0.09	0.35

Panel B: Convertible debt				
Gross spreads	475	2.62	2.50	1.65
Proceeds	475	204.73	111.89	279.84
Offer yield of maturity	455	6.26	6.25	2.90
Issues frequency	475	1.34	1.00	0.64
C-M	473	8.22	9.10	1.57
Tobin's q	179	2.01	1.63	1.71
Debt ratio	263	29.02	28.86	18.65
Volatility of earnings	310	6.13	3.07	10.22
Firm size	266	13327.23	1319.82	48805.60
Taxes Payable ratio	233	0.53	0.00	1.13
Relative Size	266	0.15	0.09	0.17
Panel C: Convertible preferred stocks				
Gross spreads	401	4.24	3.00	2.48
Proceeds	401	201.48	108.62	329.07
Offer yield of maturity	368	7.97	7.42	5.52
Issues frequency	401	1.25	1.00	0.54
C-M	400	7.64	9.10	2.47
Tobin's q	127	1.44	1.14	0.88
Debt ratio	241	29.54	28.60	17.27
Volatility of earnings	197	6.56	2.45	18.39
Firm size	241	12314.99	1845.50	41757.97
Taxes Payable ratio	214	0.58	0.00	1.04
Relative Size	241	0.16	0.08	0.48

Table III

Multiple OLS regressions with gross spreads as the dependent variable for a sample of convertible debt and convertible preferred stocks, 1990-2002

The dependent variable is the gross spread stated as a percentage of total proceeds. **ln(PROCEEDS)** is the natural logarithm of gross proceeds in million of 1995 dollars. **CPD** is convertible preferred stocks dummy, equal one if security is convertible preferred stocks, and zero otherwise. **CR** is credit rating which equals to one if the security's S&P credit rating is AAA, two if the credit rating is AA, three if credit rating is A, four if credit rating is BBB, five if credit rating is BB, six if credit rating is B, seven if bond credit rating is CCC, eight if bond credit rating is CC, nine if the bond credit rating is C, and ten if S&P bond credit rating is NR. **YIELD** is the offer yield to maturity. **ln(IFQ)** is the natural logarithm of the number of convertible securities issues that a particular issuer sells through the same leader manager during the sample period. **CALLD** is call protection dummy which equals one if security is callable, and zero otherwise. **HHI** (Herfindahl- Hirschman index) is the sum of squares of the market share of underwriters in convertible securities underwriting. **S20MS** is the percentage market share of all Section 20 underwriters in the year of issue. **CM** is Carter-Manaster underwriter ranking obtained from Loughran and Ritter (2004). **S20D** is the Section 20 subsidiary dummy variable which equals one if the lead underwriter is Section 20 subsidiaries, and zero otherwise. **Tobin's q** is the ratio of the market value of the firm's assets to the book value of the firm's assets. **Debt ratio** is measured by long-term debt divided by the total assets for the year preceding the offering. **Volatility of earnings** is the standard deviation of the firm's earnings before interest and tax divided by total assets over the 5 years preceding the offering. **Relative size of issue** is the total proceeds of a convertibles issue divided by the market capitalization of the issuing firm for the year preceding the offering. Firm size is the firm's market value of assets for the year preceding the offering. P-value is reported in parentheses. * and ** denote significance at the 5% and 1% level, respectively.

Variable	1	2	3	4	5	6
Constant	8.18	9.19	7.39	9.56	3.45	6.76
	(9.89)**	(22.11)**	(3.80)**	(10.89)**	(2.77)**	(11.21)**
ln(PROCEEDS)	-0.35	-0.45	-0.54	-0.57	-0.18	-0.28
	(-4.20)**	(-10.29)**	(-2.78)**	(-6.67)**	(-1.97)	(-6.52)**
CPD	0.99	0.97	0.94	0.99	1.00	0.91
	(6.47)**	(12.63)**	(2.91)**	(5.67)**	(6.12)**	(13.74)**
CR	0.09	0.10	-0.004	0.11	0.09	0.11
	(2.77)**	(6.20)**	(-0.05)	(2.66)**	(2.69)**	(7.88)**
YIELD	0.06	0.02	0.11	0.01	0.02	0.02
	（1.60）	(2.09)*	(1.20)	（1.04）	（0.56）	(1.93)
ln(IFQ)	0.19	-0.21	0.52	-0.49	0.03	-0.17
	(0.93)	(-2.06)*	(0.88)	(-1.93)	(0.13)	(-2.02)*
CALLD	-0.04	-0.13	-0.47	-0.22	0.00	-0.01
	（-0.22）	(-1.38)	(-1.14)	（-1.10）	（0.01）	（-0.16）
HHI	4.49	1.94	3.91	5.60	2.33	-1.12
	(2.53)*	(1.87)	(0.86)	(2.31)*	(1.24)	(-1.25)

S20MS	-0.01	-0.01	0.01	-0.02	-0.01	-0.00
	(-1.73)	(-2.39)*	(0.44)	(-2.51)**	(-1.68)	(-0.12)
CM	-0.58	-0.57	-0.58	-0.52	-0.07	-0.41
	(-9.42)**	(-19.18)**	(-5.73)**	(-10.66)**	(-0.54)	(-7.14)**
S20D	-0.18	0.12				
	(-1.03)	(1.33)				
Tobin's q	0.11		0.18		-0.07	
	(1.36)		（1.06）		（-0.81）	
Debt ratio	0.00		0.02		0.00	
	(1.16)		（2.26）*		（0.46）	
Firm size	0.00		0.00		0.00	
	(1.47)		（0.43）		（1.49）	
Volatility of earnings	0.02		0.05		0.01	
	(1.55)		（2.08）*		（0.87）	
Relative size (%)	0.07		-2.11		0.29	
	（0.12）		（-1.78）		（0.80）	
Number of issues	153	811	43	318	110	493
Adjusted R^2	0.81	0.79	0.91	0.79	0.46	0.52
F-statistic	40.29**	284.77**	28.31**	119.92**	7.17**	54.43**

Table III
Multiple OLS regressions with gross spreads as the dependent variable for a sample of convertible debt and convertible preferred stocks, 1990-2002 (continued)

Variable	7	8	9	10
Constant	4.16	7.84	2.85	3.19
	(1.32)	(6.86)**	(3.90)**	(8.93)**
ln(PROCEEDS)	-1.08	-1.27	-0.10	-0.29
	(-4.12)**	(-13.19)**	(-1.22)	(-7.26)**
CPD	0.92	1.08	0.85	0.94
	(1.89)	(5.54)**	(5.64)**	(13.78)**
CR	0.04	0.14	0.08	0.10
	(0.31)	(2.61)**	(2.69)**	(7.86)**
YIELD	0.12	0.03	0.06	0.02
	(0.75)	(1.62)	(1.79)	(1.57)
ln(IFQ)	-0.09	-0.77	0.17	-0.12
	(-0.12)	(-2.44)*	(0.86)	(-1.45)
CALLD	-0.7	-0.56	0.03	-0.04
	(-1.27)	(-2.19)*	(0.16)	(-0.46)
HHI	14.13	0.68	0.95	0.62
	(2.17)*	(0.25)	(0.55)	(0.67)
S20MS	0.01	-0.00	-0.02	-0.00
	(0.36)	(-0.02)	(-2.29)*	(--0.95)
CM				
S20D	-0.68	-0.17	-0.06	-0.08
	(-1.29)	(-0.74)	(-0.31)	(-0.87)
Tobin's q	-0.00		-0.12	
	(-0.01)		(-1.42)	
Debt ratio	0.01		0.00	
	(0.46)		(0.69)	
Firm size	0.00		0.00	
	(0.69)		(1.93)	
Volatility of earnings	0.09		0.03	
	(2.45)*		(2.30)*	
Relative size (%)	-1.63		0.33	
	(-0.81)		(0.94)	
Number of issues	40	310	113	504
Adjusted R^2	0.83	0.71	0.47	0.48
F-statistic	14.06**	76.72**	7.6**	46.50**

Table IV

Multiple OLS regressions with yield to maturity as the dependent variable for a sample of convertible debt and convertible preferred stocks, 1990-2002

The dependent variable is the offer yield to maturity. **ln(PROCEEDS)** is the natural logarithm of gross proceeds in million of 1995 dollars. **CPD** is convertible preferred stocks dummy, equal one if security is convertible preferred stocks, and zero otherwise. **CR** is credit rating, let credit rating equal to one if the security's S&P credit rating is AAA, two if the credit rating is AA, three if credit rating is A, four if credit rating is BBB, five if credit rating is BB, six if credit rating is B, seven if bond credit rating is CCC, eight if bond credit rating is CC, nine if the bond credit rating is C, and ten if S&P bond credit rating is NR. **CRSP** is underwriter gross spreads stated as a percentage of total proceeds. **ln(IFQ)** is the natural logarithm of the number of convertible securities issues that a particular issuer sells through the same leader manager during the sample period. **CALLD** is call protection dummy equal one if security is callable, and zero otherwise. **HHI** (Herfindahl- Hirschman index) is the sum of squares of the market share of firms in the convertible securities underwriting. It measures the market concentration ratio. **S20MS** is the percentage market share of all Section 20 underwriters in the tear of issue. **CM** is Carter-Manaster prestige ratings found in Loughran and Ritter (2003) correct for Carter et al. (1998). **S20D** is the Section 20 subsidiary dummy variable, equal one if lead manager is Section 20 subsidiaries, and zero otherwise. **Tobin's q** is the ratio of the market value of the firm's assets to the book value of the firm's assets. **Debt ratio** is measured by long-term debt divided by the total assets for the year preceding the issue. **Volatility of earnings** is the standard deviation of the firm's earnings before interest and tax divided by total assets over the 5 years preceding the issue. **Relative size of issue** is the total proceeds of a convertibles issue divided by the market capitalization of the issuing firm for the year preceding the issue. Firm size is the firm's market value of assets for the year preceding the issue. P-value is reported in parentheses. * and ** denote significance at the 5% and 1% level, respectively.

Variable	1	2	3	4	5	6
Constant	4.63	3.74	9.04	1.36	0.59	2.77
	(1.86)	(1.72)	(1.98)	(0.32)	(0.16)	(0.94)
ln(PROCEEDS)	-0.14	-0.33	-0.51	-0.18	-0.16	-0.40
	(-0.69)	(-1.71)	(-1.18)	(-0.48)	(-0.59)	(-2.08)*
CPD	1.26	0.87	-0.02	0.89	1.80	0.71
	(3.24)**	(2.49)*	(-0.03)	(1.18)	(3.60)**	(2.09)*
CR	-0.03	-0.02	-0.20	0.05	-0.01	-0.05
	(-0.38)	(-0.30)	(-1.20)	(0.28)	(-0.15)	(-0.73)
CRSP	0.32	0.31	0.46	0.25	0.16	0.38
	（1.60）	(2.09)*	(1.20)	（1.04）	（0.56）	(1.93)
ln(IFQ)	-0.43	-0.42	-0.75	-0.51	-0.34	-0.48
	(0.89)	(-0.99)	(-0.62)	(-0.48)	(-0.59)	(-1.28)
CALLD	-0.06	-0.32	-0.76	0.65	0.18	-0.88
	（-0.15）	(-0.85)	(-0.90)	（0.77）	（0.36）	（-2.56）*
HI	6.04	17.65	-4.83	29.68	11.76	12.3
	(1.45)	(4.15)**	(-0.52)	(2.96)**	(2.33)*	(3.17)**

S20MS	0.02	0.02	0.02	0.01	0.01	0.02
	(0.92)	(0.94)	(0.50)	(0.27)	(0.66)	(1.41)
CM	0.07	-0.05	0.15	-0.17	0.39	0.21
	(0.41)	(-0.37)	(0.48)	(-0.70)	(1.15)	(0.79)
S20D	0.06	0.23				
	(0.15)	(0.59)				
Tobin's q	-0.68		-1.04		-0.51	
	(-3.84)**		(-3.58)**		(-2.04)*	
Debt ratio	-0.01		-0.01		-0.01	
	(-1.44)		（-0.29）		（-0.99）	
Firm size	-0.00		0.00		-0.00	
	(-1.68)		（1.03）		（-1.49）	
Volatility of earnings	0.00		0.01		0.01	
	(0.13)		（0.12）		（0.22）	
Relative size (%)	-0.04		-0.42		-0.16	
	（-0.45）		（-0.16）		（-0.16）	
Number of issues	153	811	43	318	110	493
Adjusted R^2	0.34	0.11	0.42	0.10	0.33	0.10
F-statistic	5.90**	9.94**	3.02**	4.44**	4.53**	6.20**

Table IV
Multiple OLS regressions with yield to maturity is the dependent variable for a sample of convertible debt and convertible preferred stocks, 1990-2002 (continued)

Variable	7	8	9	10
Constant	10.80	0.39	3.18	3.69
	(3.09)**	(0.09)	(1.38)	(2.14)*
ln(PROCEEDS)	-0.58	-0.34	-0.10	-0.28
	(-1.38)	(-0.78)	(-0.41)	(-1.44)
CPD	0.43	0.43	1.39	1.00
	(0.65)	(0.59)	(2.82)**	(2.79)**
CR	-0.11	0.06	-0.05	-0.03
	(-0.70)	(0.30)	(-0.59)	(-0.52)
CRSP	0.19	0.34	0.53	0.32
	(0.75)	(1.62)	(1.79)	(1.57)
ln(IFQ)	1.34	-0.23	-0.99	-0.63
	(1.47)	(-0.20)	(-1.70)	(-1.66)
CALLD	0.17	0.91	-0.08	-0.74
	(0.24)	(0.99)	(-0.16)	(-2.16)*
HI	-15.30	25.85	7.73	14.56
	(-1.81)	(2.62)**	(1.53)	(3.59)**
S20MS	0.03	0.02	0.03	0.02
	(1.05)	(0.45)	(1.13)	(0.98)
CM				
S20D	-0.17	0.10	0.29	0.35
	(-0.25)	(0.12)	(0.53)	(0.81)
Tobin's q	-1.16		-0.35	
	(-4.93)**		(-1.38)	
Debt ratio	0.00		-0.01	
	(0.08)		(-1.18)	
Firm size	-0.00		-0.00	
	(-1.22)		(-1.85)	
Volatility of earnings	0.04		-0.01	
	(0.77)		(-0.26)	
Relative size (%)	-2.61		-0.47	
	(-1.04)		(-0.46)	
Number of issues	40	310	113	504
Adjusted R^2	0.52	0.08	0.34	0.11
F-statistic	3.77**	3.50**	4.80**	7.28**

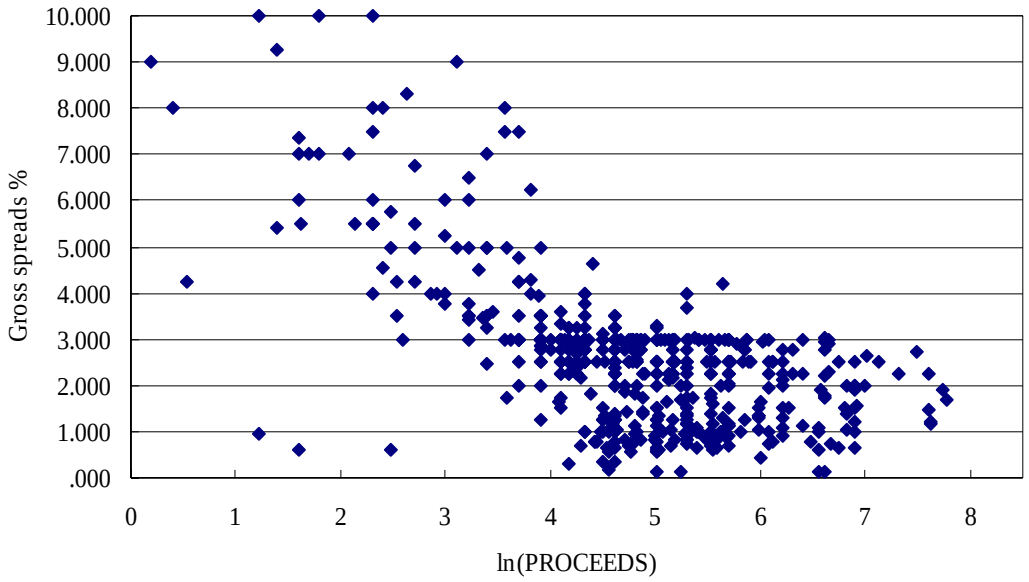

Figure 1. Scatter diagram for convertible debt relating proceed and gross spreads

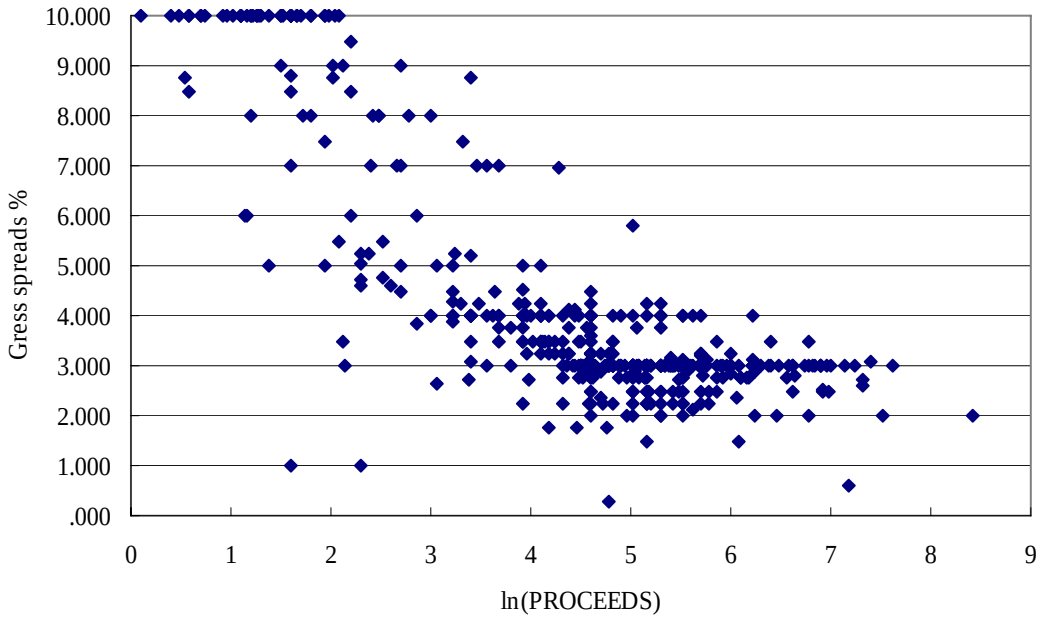

Figure 2. Scatter diagram for convertible preferred stocks relating proceed and gross spreads

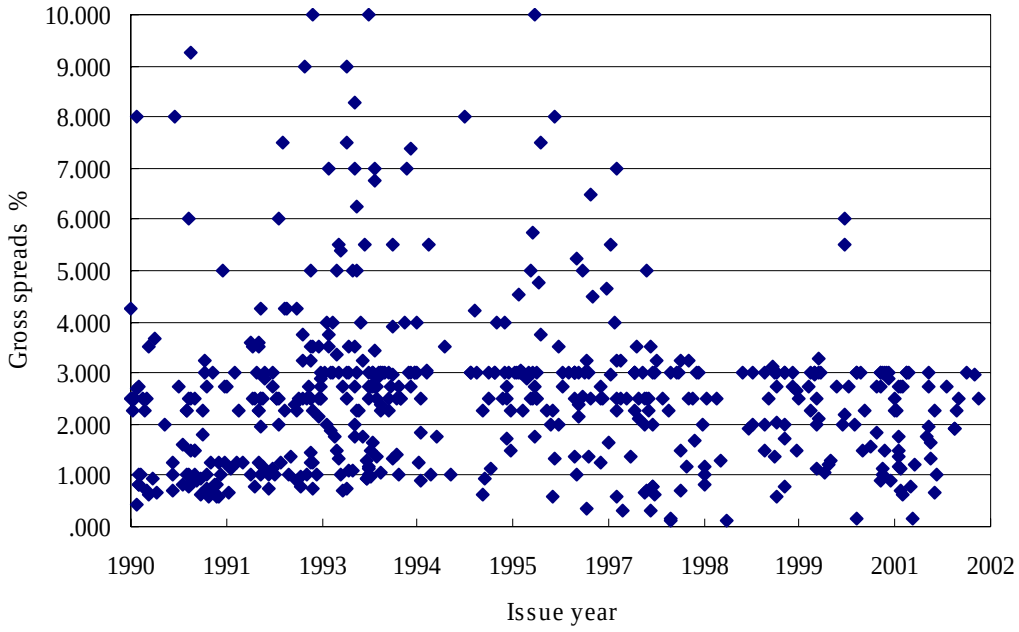

Figure 3. Scatter diagram for convertible debt relating issue years and gross spreads

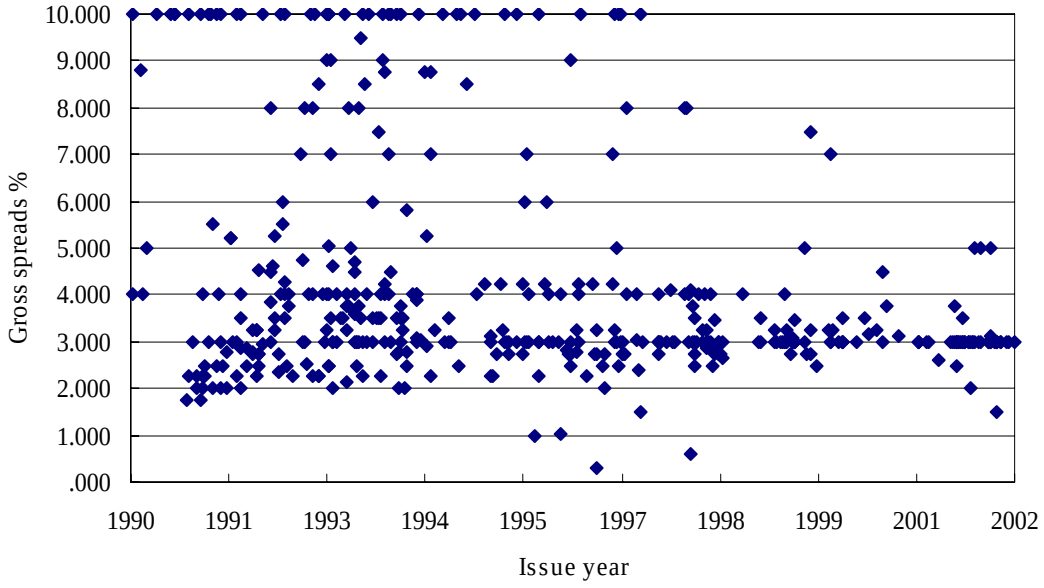

Figure 4. Scatter diagram for convertible preferred stocks relating issue years and gross spreads