Master's Thesis of Business Administration

Incentives for being in business group: by yield spread and bond rating changes

기업집단에 소속됨으로써 얻는 이득: 채권 수익률과 채권 등급 변동을 통해

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Abstract

Incentives for being in business group: by yield spread and bond rating changes

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This paper measures hidden benefit that firms take by being in included in the business group and observe market's perception of it. Hidden benefit is measured by the difference between real yield spread and predicted yield spread of each bond issued by firms in large business groups. Perception of a market is assessed by the market reaction to bond rating change events. This paper finds that there exists hidden benefit which cannot be detected by explicit factors of bonds, firms and market among firms in large business groups. The market perceives the fact and reacts accordingly, as it shows significantly negative reaction after downgrades of bond ratings for bonds issued by firms without hidden benefit but not for those by firms with it.

Keywords: hidden benefit, business group, bond rating changes

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Contents

Tables

I. Introduction

Why do individual firms stay in business groups? This is the main question that I try to answer through this paper. To answer the question, I measure hidden benefits of affiliates to be a business group member. To decide whether a firm receives a hidden benefit as a business group member or not, I build up benchmark of yield spread from bonds issued by stand-alone firms. The theoretical background and factors that I utilize to calculate benchmark yield spread will be discussed later in section 2. And then, I compare it with the real yield spread of bonds which firms issued. I define a firm gets benefits by being included in a business group when real yield spread is lower than the benchmark and vice versa. I expect that yield spread is low when such bonds are issued by firms with benefits from being a business group member. After then, I try to investigate the market's perspective on such benefit. For that reason, I observe market reactions after bond rating changes in firms with benefits and those without them. I find that the market shows significantly negative returns after downgrade events occur in firms without benefits and, on the other hand, reacts not significantly to the same events that occur in firms with benefits. The contribution of the paper is quite simple; it introduces another indicator of benefits of affiliates to be included in a business group and proves that the market reacts correspondingly.

The main question of this paper falls in line with double-sidedness of business groups. Many studies have been done to

choose stand for one of two sides: whether business groups beneficial or not. Some papers argue that business group plays an adverse role. According to Berger and Ofek (1995), Comment and Jarrell (1994), Shin and Stulz (1998), businesses affiliated with diversified U.S firms underperform their focused competitor. Also, a La Porta, Lopez-de-Silanes, and Shleifer (1999) argue, a business group does not work positively to firm value in countries with weak shareholder protection. They say that in most business groups, ownership is highly concentrated, and controlling shareholders have power over firms exceeding their cash flow rights. This concentrated ownership provides controlling shareholders opportunities of wealth transfer from the member firm for their own benefit. (La Porta, et al. (2000b);Bertrand Mehta, and Mullainathan (2002);Bae, Kang, and Kim (2002);Baek, Kang, and Lee (2006)).

On the other hand, some others prove positive role of business groups. Khanna and Palepu (1997, 2000), for example, show affiliates of the most diversified business groups outperform unaffiliated firms. They say that business groups in developing countries mimic the beneficial functions of market mechanisms that are present only in advanced economies. Specifically, in emerging markets, business groups organize their own "internal capital market" as financial intermediaries make external capital market and share risks and smooth income by reallocating money from one affiliate to another in times of distress (Gopalan, Nanda, Seru (2006)). This is beneficial not only for individual firms but also

for the entire group. For individual group members, they may face bankruptcy situation on which they cannot borrow money from external capital market. In such situation, they can finance from other affiliates who are not in distress time. On the side of the whole group, groups are unwilling to let a member firm go bankrupt, because bankruptcy probability spreads out from one to another or group insiders want to save their equity stake in the firm or to obtain private benefits (Gopal, Nanda, Seru (2006), Bertrand et al. (2002) and others).

Internal transaction also takes a place in external capital market: by cross-holding of external debt. Sometimes referred to as cross-payment guarantees or mutual debt guarantees, these imply that if a member firm is on the way of defaulting on an external loan, the other group firms will each pay off a fraction of the defaulting firm's external debt provided they are in a position to do so. This kind of cross-guarantees was prevalent within business groups in several emerging economies, including Korea. In their study of financing constraints of Korean chaebols, Shin and Park (1999) emphasize the role played by intragroup cross-guarantees in supporting external bank lending.

The findings of the fear against domino-effect of financial distress in business groups is similar to 'too big to fail' story of giant financial institutions in 2008 global financial crisis. In the public sector, there have been several studies to prove the existence of implicit guarantee. Besides of inside transaction and internal capital market, a concept of implicit guarantee has been an issue in

financial institutions and government-held firms. Implicit guarantee is a guarantee to a bond or a bond issuer that is not explicitly stated in bond indentures, including cross-payment guarantees or mutual debt guarantees. By allowing certain banks to go insolvent during the crisis, it would have imposed unacceptable high economics costs. Therefore, these financial institutions become 'too big to fail', and the government implicitly guarantees their survival. This guarantee is a distortion of the financial system since it can increase banks or government-held firms' incentives to take the risk (Alessandri and Haldane (2009)).

As I mentioned before, the similar story is applicable to publicly held firms, not government-held firms. In the business group, affiliates would like to avoid a group firm default and consequent negative spillovers to the group. On the side of whole group, groups do not want a member firm to go bankrupt, because bankruptcy probability spreads out from one to another or group insiders that want to save their equity stake in the firm or to obtain private benefits (Gopalan, Nanda, Seru (2006), Bertrand et al. (2002)). Unlike stand-alone firms, holders of certain affiliates' debt do not face the corresponding risk of loss. Therefore, the implicit guarantee may exist among affiliates of a business group which can be a new reason for the business group.

In Korea, the possibility of implicit guarantees inside business groups is quite high, as cross-guarantees in large business groups are no longer legal. Legal restriction on cross-guarantees makes it much more difficult to observe the magnitude of financing support

from a business group in external market. However, it is hard to say that there is no role of business groups anymore in Korea, especially for large groups. Korean large business groups are full of family-owned conglomerates, or *chaebol*. Korean government has supported their growth after World War II and Korean War. With a long history of government support, *chaebols* were instrumental in pulling South Korea out of its poverty-stricken state after subsequent wars. Still nowadays, they constitute an inconsiderable portion of the Korean economy. Studies of intra-group transaction of *chaebols* have been done in various ways. Bae, Cheon and Kang (2008) found intra-group propping in a chaebol where announcements of increased (decreased) earnings by a chaebol-affiliated firm have positive (negative) effects on market value of other non-announcing affiliates. According to Beak, Kang and Lee (2006), chaebol issuers involved in intragroup deals set the offering prices to benefit their controlling shareholder in equity-linked private securities offerings proving tunneling. Based on such studies, it is unreasonable to set aside the possibility of group effects in external capital market despite illegal cross-guarantees which gives a reason to study implicit guarantee among affiliates of business groups.

Therefore, in this paper, I measure implicit or hidden benefit that business group members receive by estimating theoretical yield spread and see whether the stock market is aware of it by observing market reaction after bond rating change events. The reasons why I observe the events of rating change will be discussed

in section 2. From now on, to make it different from implicit guarantee in public sector, let me substitute the word to 'hidden benefit'. 'Hidden' corresponds to 'implicit' and 'benefit 'corresponds to 'guarantee'. The reason that I change 'guarantee' to 'benefit' is that unlike obvious direction of guarantee in public sector, from the government to financial institutions or public firms, it is hard to affirm the direction of guarantee in business groups. The previous papers about adverse role of business groups can expect that the guarantee comes from controlling shareholders or parental firms. In contrast, the preceding studies about positive effects of business groups might predict the affiliates help each other not to fall in financial difficulties, which makes no-specific direction. There are two main reasons for investigating implicit guarantee in the business group. The first is that it supports the positive role of business group for affiliates, which can answer the question about why the business group exists. The second is that it must be illuminated to prevent information asymmetry between manager and investors. This is because the implicit guarantee is not explicitly nominated in the bond indenture. Information asymmetry gives an opportunity for managers to exploit profits of both bond and stock investors.

The paper proceeds as follows. Section 2 provides literature background of study method: what indicators I use to measure implicit guarantee and why I observe bond rating change events. In section 3, I measure hidden benefit that business group members have. In section 4, I see whether the market is aware of such benefit

and reacts correspondingly. Section 5 summarizes and concludes the paper.

II. Data and Estimation Method

For the estimation of hidden benefit and the observation of market awareness, I need both bond and stock market information. To figure out the existence and the amount of [G1]hidden benefit in large business groups, I set the sample following policies for large business groups in Korea and compare differences between affiliates and stand-alone (Non-*chaebol*) firms. For stock market reaction according to hidden benefit, I see cumulative abnormal returns and holding-period-returns after bond rating change events. Rating changes can both be down and upwards. After then, I observe whether the cumulative abnormal returns are different between two sub-groups, [G2]with hidden benefit or without. For stock market information, I included listed and delisted firms both in KSE and KOSDAQ (Korea Stock Exchange and Korea Securities Dealers Automated Quotations).

A. Sample selection: Why Korea?

In sample selection, I focused on Korean bond and stock market. Korea is one of the best markets to study hidden benefit because of its legal system. As I said before, the alliance of government and businesses after World War 2 and Korean War has been strong and, still, a high portion of Korean economy is managed by business

groups. However, as the importance of transparency in both politics and businesses, the government has tried to disclose firm information especially strictly on large business groups (*Chaebol).* *Chaebol* is the unique concept of corporate governance only existing in Korea. There are similar concepts of business groups in Japan called Keiretsu and Zaibatsu, however, they are relatively far from family-owned groups as many of them are run by professional managers rather than founder family members. Even though business groups are pyramidal form in both countries, Japan allows cross-shareholdings in business groups which make it hard to study hidden benefit. For that reason, it is much better to focus on the Korean market. To ease the confusion between *chaebol* and large business group, *chaebol* firms are not legally defined but large business groups are. *Chaebol* is a word that has been used for a long time without any exact definition but with an only vague criterion. In 1986, for administrative work, Korean government, specifically Korean Fair Trade Commission, defined "large business group" based on its total asset. Though the definition has changed several times since the enactment, as the time passes by, the restriction has become more and more powerful thanks to social interest on the protection of minority shareholders. I would introduce currently valid restrictions of large business groups. From them, I can decide what kinds of firms should be included in the sample that is expected to have the hidden benefit:

1) Restriction on cross investment: Firms in business groups with total asset larger than 2 trillion Korean won cannot

commit cross investment with affiliates.

2) Restriction on debt guarantee: Firms in business groups with total asset larger than 2 trillion Korean won cannot guarantee bank loans of their national affiliates.

In these policies, total asset is the sum of total assets of every affiliate of each business group. Therefore, it is easy to notice that large business groups are defined as business groups with total asset more than 2 trillion Korean won. Finally, my sample focuses on firms in business groups with such amount of total asset. As these large business groups are usually called as *Chaebol* in Korea, I treat those groups same as *Chaebol* group.

However, it can possibly be naïve to divide sample based on regulation because of two reasons: First, the only standard of ceilings on the total amount of shareholding and cross-shareholding is a group's aggregate amount of asset. Second, big enough business groups which are not defined as 'large' are also possible to have hidden benefit among affiliates. Unfortunately, there is a lack of alternatives. Therefore, t[G3][G4][G5][G6][G7][G8][G9][G10] o minimize the error from this problem, I rather cumulate the data[G11] from 2001 to 2014. The sample[G12] includes a firm if it was included in a large business group at least once from 2001 to 2014. [G13]For example, if a firm was in *Chaebol* group once since 2001, a firm keeps being included in *Chaebol* group by then. Then I can avoid problems that occur because of an ambiguous standard. I cumulated data throughout a wider expansion of time than my

sample which is from 2008 to 2015 (from January to May), since market custom on *chaebol* firm stacks for a long period of time. Such market custom can be observed easily from [G14]a famous Korean cant phrase that “Once *chaebol* then *chaebol* eternally." This tendency can be observed in real. For example, Samyang and Teayoung were in the list at the end of the 1990s but kicked out in early 2000s when Korea was working out to get over IMF crisis. However, at the end of the 2000s, they came up on the list again which shows the entire bankruptcy seldom occurs in *chaebol* groups. The reason I start from 2001 is that Korean Fair Trade Commission defined a large business group if it is on of top 30 groups based on aggregate asset till that year. After several steps of filtering, I finally have 363 firms as affiliates of large business groups and 2326 of non-*Chaebol* firms among all listed and delisted firms.

B. Bond data

Since every issued bond is assessed every day, it is not only burdensome but also inefficient to handle all. Therefore, I randomly selected 100,000 bonds every year from 2008 to 2015 (In thecase of 2015, the randomization is done only from January to May because of data restriction). The data includes bond assessed date, bond rating, maturity, remained amount of money to pay, and an amount of money borrowed written in the indenture, to just name a few. It is important to notice that a firm issues several bonds with[G15][G16] different options and bond ratings. This is why I conduct the study based on bonds, not firms. For example, as I will

explain later, firm-specific data is one of the regressors to predict yield spreads of each bond which can be same among a number of bonds. From 800,000 bonds, only corporate bonds, except financial firms, are in consideration. Furthermore, to measure hidden benefits that are hard to be witnessed considering explicit terms of bond indentures, I excluded bonds with an explicit guarantee from any other subject. Also, since bonds related to stock can obscure the market's perception, I precluded those with a call-put option as Elton (2004) does. Similarly, sample data does not include subordinated bonds as risks of them are explicit so that they should have been considered in bond [G17][G18]rating[하헌준19].

Among 800,000 bonds, only bonds issued by listed and delisted firms are included in the sample. [G20]As bond issuer code and stock code are different each other, I hand-match every bond codes to stock codes of bond issuers. Finally, I divide data by [G21]*Chaebol* and stand-alone (non-*Chaebol*) firms. I refer to the lists of firms in large business groups disclosed in Online Provision of Enterprise Information (OPNI) every sample year. OPNI discloses information of large business groups that are restricted to cross investment between affiliates. This restriction only is enough since firms with such ceilings are also restricted by limitation on debt guarantee between affiliates and compelled to disclose information of not only listed affiliates but also private ones. As previously mentioned, I treat large business groups same as *chaebol* group.

C. Stock data

Stock market information is mainly to investigate market reaction after bond-rating-changes. The purpose of investigation is to observe market's awareness of hidden benefit. The reason that I specifically follow bond-rating-changes will be explained later. For analysis, this paper observes both short-term and long-term market reaction. Most of analysis follows Dichev and Piotroski (2001), yet with some differences which make my result more interesting and reliable. The market reactions are calculated by Cumulative Abnormal Return and Holding Period Return. Therefore, the main stock information in need includes index return and stock return of sample firms. To be specific, daily for short-term investigation and monthly for long-term investigation are in need. Stock return data is obtained from DataGuide[1]. Yet there is some more market information in need for regression, such as market return volatility and beta; however those are easily obtained using mere individual stock and index return.

In Table 1, I provide descriptive statistics of bond data of whole bond data and comparison between *chaebol* and non- *chaebol*. The variables in comparison are those I will utilize in an estimation of implicit support to affiliates. The reason that I used them will be discussed in next sub-chapter. [G22][G23][G24][G25]According to table 1, it is easy to recognize that there is the significant difference between [G26]*chaebol* and non-*chaebol* firms in almost all of the variables which support the fact that they are used for

[1] www.dataguide.co.kr

measurement of implicit support for large business group affiliates. To be specific, *chaebol* firms are significantly high relative to non-*chaebol* firms in yield spread, total debt size, ROA, market-to-book ratio, beta of stock returns, borrowed amount in each bond, coupon rates for bonds, and proportion of shares belong to the largest shareholder. On the other hand, they are significantly low relative to non- *chaebol* in bond ratings and mean-squared error of past stock returns. Some of the descriptive results are simply understandable in variables of total debt size, coupon rate, amount of bond issued, ROA, portion of shares owned by the largest shareholder, and mean squared error of stock returns which shows a market risk of the firm. Considering total asset size of [G27]*chaebol* firms, the big amount of debt and bond issuance is quite reasonable. However some other results are puzzling: with a bigger amount of debt, [G28]*chaebol* firms have higher yield spread. Is it from the fact that they pay high coupon rates which offset the risk comes from the amount of debt and bond issuance? It is hard to say yes to this question because of significantly lower bond ratings of [G29]*chaebol* firms[하헌준30]. Therefore, puzzling results of this table supports the reason for the study in this paper.

D. Estimate benefits[하헌준31]

As I mentioned before, I measure affiliates' benefit by taking the difference between real yield spread and theoretical yield spread. To measure theoretical yield spread[G32], I benchmark yield spread of non-*chaebol* firms. I regress real yield spread of non-*chaebol* firms on explanatory factors and get coefficients of variables. And

then, with coefficients I put variables of Chaebol firms into independent variables, then I can get estimated amount of yield spread. Finally, I get the difference between real yield spread and estimated yield spread. This difference would show whether firms get an advantage by being included in a large business group or not.[G33]

In the public sector, there have been several studies to measure implicit guarantee which giant financial institutions receive from the government. The first try was conducted by Baker and McArthur (2009). The authors assume that all banks with assets in excess of $100 billion would receive governmental support in the event of their failure. They use the difference in funding costs among banks above and below threshold as an estimate of the subsidy. However, the threshold lacks rationality to be applied worldwide. Next, Ueda and di Mauro (2012), and Schich and Lindh (2012) measure implicit guarantee as a difference between stand-alone creditworthiness and all-in credit rating assessed by credit rating companies. Unfortunately, for non-public companies, they do not provide two different ratings. In addition, Noss and Sowerbutts (2012) introduce two contingent-claims approaches to estimate implicit subsidy on banks by the government with equity option price and historical approach. Both of them estimate statistical distribution of firm's equity to estimate the expected amount of contingency which the banks would claim to the government. On the other hand, when it comes to business group, the implicit guarantee is not a form of the contingent claim. When a subsidy is

in a severe condition, the only thing that a group will do is abandonment. Therefore, I would like to introduce another research method to estimate the existence of hidden benefit.

[G34] Yield spread is for estimation for the support that inevitably exists throughout affiliates of large business groups. It is reasonable estimator because it is not only affected by bond-, firm-, and market specific information but also market's perception on the issuer. As bond is traded by individual investors like stock, it perceives investors' judgment whatever the criterion is. In addition, the relationship between market return and bond was already detected by Fama and French (1993). They find that term spread and default risk do explain excess market returns. In the paper, default risk was calculated as a difference between the return on corporate bonds and long-term government bond return. Some might ask why not mere bond ratings. However, Elton et al. (2004) prove that bond rating is not a proper factor for the valuation of bond as it is discrete so that considers different bonds homogeneous. Therefore, my hypothesis that there would be the stock market perception on bond issuer reflected in yield spread is supported.

Explanatory variables for yield spread are widely considered the structural model of Merton (1974), models that outweigh liquidity influence (Elton et al. (2001)) to studies restricted to Korean bond market ([G35]Shin (2004), Choi (2014), Park (2011)). And finally I've got an equation to estimate yield spreads as below:

$$\text{Yield Spread}_{t,i} = \alpha_0 + \beta_1 DEBT_{t-1,i} + \beta_2 ROA_{t-1,i} + \beta_3 LEV_{t-1,i} + \beta_4 CFO_{t-1,i} + \beta_5 MB_{t-1,i} + \beta_6 Beta_{t,i} + \beta_7 MSE_{t,i} + \beta_8 LSH_{t,i} + \beta_9 PIC_{t,i} + \gamma_1 RATE_{t,i} + \gamma_2 DUR_{t,i} + \gamma_3 Amount_{t,i} + \gamma_4 Coupon_{t,i} + \delta_2 KOSPI_{t,i} + \delta_3 TS_{t,i} + e_t$$

1) The dependent variable is Yield spread that is yield to maturity of bond minus treasury rate that has most similar maturity. Time *t* is the date on which a bond is assessed. 2) Firm-specific data are as follows: DEBT is logarithm of total debt size of each firm, ROA is the ratio of earnings on total asset of previous quarter, LEV is ratio of long-term debt on book equity of previous quarter, OCF is cash flow from operation divide by total asset of previous quarter, MB is market value of time *t* divided by book equity of previous quarter, Beta is systematic risk of individual firm during past 5 years of time t, MSE is standard deviation of daily returns from 120 days to 21 days before assessment date, LSH is percentage of shares held by the largest shareholder, PIC is pretax coverage following(Blume, Lim, and MacKinlay (1998)), 3) Bond-specific data are: Rate is bond rating of each bond, DUR is number of remained dates from time *t* to maturity, Amount is issued amount of each bond, Coupon is coupon rate of each bond, 4) Market-specific data are: KOSPI (Korean Composite Stock Price Index) is index of Korean stock market at time *t*, and TS is difference between 10-year maturity government bond yield and 3-month maturity government bond yield.

Discussion about explaining yield spread has long taken to be an issue. Both structural models and reduced form models have had

limited success. Therefore, I try to include as many variables as possible for the estimation of (unseen) benefits of affiliates. Basically, within reduced form model, a value of a bond is from coupon rate, maturity, yield spread and total amount borrowed by a bond, and frequency of coupon payment. [G36][G37]The literature backgrounds for explanatory variables and expected coefficients (in parenthesis) are as following:

1) Pierre, Robert, J. Spencer (2001) yield spread change is affected by a slope of the yield curve as a decrease in yield curve slope may imply a weakening economy. They calculate[G38][G39] a slope of the yield curve as a difference between 10-year and 2-year treasury rate.[G40][G41][G42] Similarly, I subtract 10-year treasury rate from 2-year treasury rate and call it **term spread (TS) (**-). In addition, within the structural framework, the default is triggered[G43] when the leverage ratio approaches unity. Hence, it is clear that credit spreads are expected to increase with **leverage ratio (+)** and **total debt size (+)**.

2) Moreover, according to Bhojraj and Sengupta (2003), firms with higher profit margin are expected to enjoy lower yield spread. This might be because profit attracts market's perspective positively and let the market require less cost of default. Therefore, same with Bhojraj and Sengupta (2003), I calculate margin as income divided by total assets which is **ROA (-)**. In contrast, Sengupta (1998) shows that long of years to maturity has positive correlation with yield spread because of higher risk exposure. For the higher accuracy, I calculate the remained days to the maturity and expect

its coefficient to be positive (**DUR (+)**)

3) Elliot et al. (2010) study the relationship between sustained growth and bond value. They say that consequent increasing operating cash flow per share is rewarded by bond holders. For simplicity, I utilize **CFO (-)** (Cash Flow of Operating) and expect it to be negatively related to yield spread.

4) Elton et al. (2001) prove that yield spread is mainly explained by the loss of expected defaults, tax premium, and risk premium. Therefore, I estimate yield spread with [G44][G45]**bond ratings (-), market-to-book ratio (+) and beta (+) and mean-squared error (+) of stock return.** According to Elton et al. (2004), they prove that finer classification of ratings is good alternatives. As rating agencies provide a plus, zero, or minus rating within each risk letter classification, I use finer breakdown of ratings for the estimation. [G46] [G47] For study easiness, I numbered each breakdown of ratings where the higher the rating, the higher the number. For risk premium, I considered both systematic and stock-specific risk. Following Elton et al. (2001), I measure systematic risk with Fama and French (1993) factor which is market-to-book. Firms with higher book-to-market ratio represent high-growth firms that could be associated with greater risk. This suggests that MB will be positively correlated to yield spread (Bhojraj and Sengupta (2003)). Also, I include beta and mean-squared error of stock returns for stock-specific return.

5) Relationship between corporate governance quality and yield

spread has been studied in several papers (Sengupta (1998), Bhojraj and Sengupta (2003), Shin (2011), Choi et al. (2014)). To reflect such correlation, this paper includes the percentage of shares owned by the largest shareholder **(LSH) (+)**.[하헌준48]

6) Productivity of a firm is important to be tested considering its ability to pay interests. Blume, Lim, and MacKinlay (1998) point out the fact and see the relationship between yield spread and credit rating. They calculate pretax interest coverage as the ratio of (operating income before depreciation + interest expense) divided by interest expense. Utilizing the same concept, Chen, Lesmond and Wei (2007) show that pretax interest coverage is negatively related to yield spread. (**PIC (-)**)

7) Elton et al. (2004) say that liquidity and tax treatment explains corporate bonds and it differentiates bonds in same letter ratings. However, liquidity measures, such as trading volume or bid-ask spread of bonds, are not available in the Korean market. So that I used [G49]**amount money issued by each bond (AMT) (+)** as liquidity measure as Ha and Lee (2005) do. For bond age, I calculate a remained number of dates until the maturity. As tax treatment happens by different **coupon rates (?)**, coupon rates of each bond are also explanatory variable for yield spread.

8) Even if the probability of default remains constant for a firm, changes in credit spreads can occur due to changes in the expected recovery rate. The expected recovery rate, in turn, should be a function of the overall business climate. [G50][G51]Therefore, like

Pierre, Robert, J. Spencer (2001), I use a market[G52] index[하헌준53] for a variable to explain yield spread. Korean market index is [G54]**KOSPI** (+).

[G55] **Table 2**[하헌준56] supports the validity of variables to explain yield spread. In pooled regression on yield spread of whole bonds throughout sample period, almost every variable that is significantly different from zero is with expected coefficients, except DEBT and LSH. Negative coefficients of LSH can be explained by investors' reliance on big investors for their choices. Coefficients in non-*chaebol* firms have much more significance and most of them are same with expected except LSH. On the other hand, in *chaebol* firms, explanation power of variables is less than that in non-*chaebol* group. It is interesting to notice that AMT negatively explains yield spread in *chaebol* firms unlike non- *chaebol*s in opposite direction even controlling leverage factors and coupon rate. From here, we can slightly witness the benefit that large business group members hold. Also, coefficients of coupon are different between two groups. This might happen because of larger size of debt and amount of money issued by each bond are significantly large in *chaebol* firms. To avoid bias from year effect, I do regression each year in the sample period, get slopes and apply them to *chaebol* firms to estimate implicit guarantee hiding in the large business group.

E. Market reaction after bond rating changes

After I divide *chaebol* firms into groups with and without hidden

benefit of their business group, I observe the market's awareness of such benefit via bond rating change events. The reasons that I observe the events of rating change are that bond rating is one of the important factors to yield spread (Merton (1974), Pierre, Robert, J.Spencer (2001), Huang and Huang (2003)). Bond rating as an explicit estimator of default risk shows an ability of a firm to pay back written in a bond indenture. Following the first line of Merton (1974)'s paper, the possibility that firm will be unable to satisfy some or all of the indenture requirement affects the value of corporate bond. Therefore, bond rating does have effect on yield spread. Bonds issued by firms with high bond rating have yields that move similarly to treasury rate (Pierre, Robert, J.Spencer (2001)), one the other hand, credit risk accounts for big fraction of yield spread for junk bonds (Huang and Huang (2003)). Hence, I can expect insignificant market reaction to downgrade events for affiliates with benefit measured as low yield spread and, on the other hand, significantly negative reaction to that for affiliates without it measured as high yield spread. In this paper, only grade changes across-class are considered to avoid lack of sample size.

In table 3, there are numbers of downgrades and upgrades of both across rating intervals and individual ratings in full sample, firms with benefits and those without. Same with previous studies on bond rating changes (Holthausen and Leftwich (1986), Dichev and Piotroski (2001), Ju (2001)), there are much more numbers of bonds without rating changes and downgrade events are more than upgrades. This happens mainly because of stability of rating

agencies. As explained by Cantor and Mann (2003) rating agencies have stability as one of their objectives. They try and avoid getting into a position where a rating change is made and has to be reversed a short time later. Also, rating agencies are conservative so that they don't upgrade bonds easily and more likely to downgrade them on which bond rating is reliable estimator. Moreover, the absolute number of bonds with junk ratings is low. This happens because issuers with such bonds cannot maintain its business and disappear from industry. With these pictures of bond rating change events, I would continue my study.

To see the market reaction, I utilize two kinds of measurements. The first one is abnormal return. Throughout the paper I define abnormal returns as below:

$$\text{Abnormal Return} = r_{i,t} - (\alpha + \beta r_{mkt,t})$$

To estimate beta for equation, I first calculate parameters for market model from 120 days to 20 days before the event. I use Kospi index return as market return and regress it to individual return. (Every return data is from FnGuide.) Cumulative abnormal return is cumulative sum of abnormal returns. To be specific, for stock i in period [t,T] where t and T are different number of dates from event date:

$$\text{Cumulative Abnormal Return} = \sum_t^T Abnormal\ Return.$$

For simplicity, I will state abnormal return as AR and cumulative abnormal return as CAR from now on. I observe CAR for both short- and long-term effects of rating change events.

Also, I see the market reaction through holding period return (HPR), which is the total return received from holding an asset or portfolio of assets over a period of time. HPR can be expressed as the following formula.

$$\text{HPR} = [(1 + \text{r}_{-1})(1 + r_0)(1 + r_1)(1 + r_2) - 1]$$

According to Conrad and Kaul (1993), the long-term cumulative performance measure suffers from a conceptual drawback which comes from rebalancing issue. They say that buy and hold return is the appropriate measure of performance over long intervals. Therefore, I observe HPR for long-term effects of bond rating changes in each group. Also, I included HPR over period of (-1,2) according to Dichev and Piotroski (2001) who studied long-term market reaction on bond rating changes. The result will be explained in section 4 and accordant table is number 7.

After then, I do regression to see explanatory power of (implicit) guarantees on market return after revisions of bond ratings. This regression will be discussed in section 4. [하헌준57]

III. Hidden benefit[하헌준58]

In this section, I statistically show that hidden benefits exist throughout affiliates in large business groups. Previously mentioned, I start from regressing real yield spread of non-*chaebol* firms on explanatory factors and get coefficients of variables. And then, with coefficients I put variables of Chaebol firms into

independent variables, then I can get estimated amount of yield spread. Finally, I get a difference between real yield spread and estimated yield spread. For comfortability, let me call a firm 'with hidden benefit' when real yield spread is less then estimated one and otherwise 'without hidden benefit'.

Table 4 shows the result of estimation of hidden benefits that affiliates get by being included in a large business group. Panel A of Table 4 shows the differences between subgroups (firms with and without hidden benefit) in bond level. Throughout sample years, the spread of two groups is not stable which proves that benefits do exist behind explicit factors. The number of bonds issued by firms with benefits is 1106 and by those without is 1039. Almost all of the explanatory variables are different between two groups except pre-tax coverage that are statistically significant. Overall, firms with hidden benefit on average have less yield spread, debt, leverage ratio, cash-flow from operating, bond ratings, duration, amount issued by a bond, and the largest shareholder's portion of total share and higher ROA, market-to-book ratio, bond ratings, risk in individual stock returns (MSE and BETA) and coupon rate. Therefore, hidden benefits are not from certain explicit factors but from complex effects of various factors that reflect bond, firm and market characteristics. In particular, yield spreads are different between the groups almost every year and as expected, bonds with benefits have lower yields spread which seemingly represents less requirement of risk premium by debt holders. Rates show the similar tendency where, on the other hand, bonds with benefits

have higher bond ratings. Through 2008 to 2010, almost all of the sample bonds seem to receive hidden benefit. This tendency proves that during and after financial crisis (In 2008, there was big financial crisis in Korea), affiliates of business groups issued bonds with abnormally low yield spread which supports that they are afraid of domino-effects of default risk. Moreover, from 2011 to 2015, the number of bonds without hidden benefit steeply increases and it seems to be because of recovery after the financial crisis.

Panel B of table 4 provides the comparison between two groups per business groups. As 40 business groups are in the sample (with listed firms and issued bonds), only limited samples are provided Upper three groups are the largest and most stable reported firms and lower three groups are the smallest and the least number of times reported on the list. To be specific, Samsung, Hyundai Motors and SK are the largest three groups on the list throughout 2008 to 2014 without exception. Yujin appears on the list only in 2008 and 2011 and is the smallest group in 2011. Taeyoung is on the list 2006 to 2008 and 2012 to 2014 and is one of 10 smallest groups across listed year. Finally, Samyang is on the list from only from 2004 to 2007 which means it was not *chaebol* group during samples years. (As I stated before, I stacked the information of *chaebol* for reliability.)

Among sample groups, total debt size, cash flow from operation, and coupon are significantly different between groups of firms with and without hidden benefit. Especially, there are significant differences of variables between subgroups of bonds issued by firms

in SK, Hyundai Motors, Samsung groups that are largest and most frequently posted on the list. Also in those groups, the distributions of bonds in subgroups are quite even, to be specific, in SK group, there are 179 of bonds without hidden benefit and 180 of bonds with it. However, profit aspect does not show stable inclination; in some groups, firms with bonds with hidden benefits incline to have higher cash flow from operation and some others show opposite tendency. It is interesting to recognize that bond rating and yield spread themselves are not variables with significant differences between subgroups. Even more, for example, in Hyundai Motors, bonds those are not seem to receive hidden benefit are with less yield spread than that of those seem to be with it. All those puzzling facts described stand for the existence of hidden benefit behind widely believed explicit factors of bond valuation. In[하헌준59] conclusion, the result of the hidden benefit estimation is quite reliable since, as expected, it cannot be detected by explicit factors and influences of factors are mixed.

IV. Market awareness on hidden benefit

In this section, I observe market's recognition of hidden benefits by monitoring market reaction after bond rating change events. It is rational to see such events because groups are divided based on the yield spread which has a close relationship with bond rating as I discussed in section 2. For analysis, this paper observes both short-term and long-term market reaction. Most parts of the analysis

follow Dichev and Piotroski (2001), yet with some differences which make my result more interesting and reliable. At last, I find

Before I start the main analysis, I have to check whether the sample size is big enough to do further research. After estimation hidden benefit, the sample has a number of bond rating change events as represented in table 5. Total 143 of downgrade events and 215 of upgrade events. The smaller number of downgrade events fall in the same line of previous studies on credit rating changes events (Holthausen and Leftwich (1986), Dichev and Piotroski (2001)) Even though there are a small number of downgrade events in bonds with benefit, this would make my result more robust if there are significant differences of market reaction from bonds without benefit which have the twice bigger number. For upgrade events, I have enough number to continue my research.

A. Short-term market reaction

For short-term market reaction, this paper conducts two main analyzes: comparison of market reaction between bonds with and without hidden benefit and regression of HPR on rating change events and the existence of hidden benefit.

First, event window is one day before and 2 days after event days. As panel A of table 6 shows, there are significant differences of market reaction on both downgrade and upgrade changes. It is important to notice that downgrade events for bonds with hidden benefits are followed by significantly negative market return. In contrast, in opposite groups, there are indifferent market reactions

to the events. To see negative market return in bonds without benefit, it might because such bonds do not receive positive market perception regardless of market influence, such as bond rating changes. Moreover, I can think about bond rating anomaly. Existing literature document that the market anomalies concentrate in high credit risk stocks. This story starts from Fama and French (1993), which introduces market return, size, BE/ME ratio, term structure and bond rating as explanatory for stock return, where the stock portfolio of low-grade firms hardly explains stock returns. In 2007, Avramov et al. (2007) highlight that price momentum prevails only among firms with low bond ratings. Following this anomaly, it might not be reliable to analyze upgrade events in short-term. This is why this paper does long-term event study in next subsection.

Panel B of table 6 shows the result of regression of HPR which shows the significant difference between subgroups of hidden benefits in downgrade events. Following Dichev and Piotroski (2001), the control variables include size and market-to-book ratio. Size is market capitalization of month that events occur, book equity for MB is the most recently reported book equity and market equity for MB is same with Size variable. I include more variables then Dichev and Piotroski (2001), since size and MB are not only representative but also naïve. One of control variables is ROA which shows profitability of a bond issuer, LSH to catch effect of corporate governance on market reaction, and bond rating which is

the most widely studied factor to affect market reaction especially when it changes.

According to the result of regression, hidden benefits have explaining power over downgrade and upgrade events. Interaction term of rating change dummy and hidden benefit dummy make the significances of grade change events disappear. So that, positive market reaction to downgrade events are possibly from hidden benefits. Also, it is interesting to notice that explanatory power of bond rating, which is the rating after the events, disappear as interaction term is introduced. Therefore, downgrade events in bonds with hidden benefits have positive market reaction regardless of bond rating. However, as I stated before, it is unreliable to investigate upgrade events in short-term, so I rather do a long-term analysis. In addition, unlike Dichev and Piotroski (2001), size and MB are not statistically ignificant variables to explain market reaction.

In the appendix, I do daily market reaction analysis by average prediction error following Holthausen and Leftwich (1986). Average prediction error follows Holthausen and Leftwith (1986),

$$\mathrm{PE_{it}} = R_{it} - (\alpha_i + \beta_i R_{mt})$$

where R_{it} = rate of return on the common stock of firm i on event day t; R_{mt}= rate of return on equally weighted Korea Stock Exchange and Korea Securities Dealers Automated Quotations index on event day t; and α_i, β_i= ordinary least squares estimates of market model parameters. Parameters are estimated over 100

days from day -120 to day -21. The prediction errors, PE_{it} are averaged across the firms in the subsample on each event day t to form an average prediction error,

$$APE_t = \frac{1}{N_t}\sum_{i=1}^{N_t} PE_{it}$$

The statistics testing is whether abnormal performance is significantly different from zero in each event day. Event day is from day -10 to day +10 and PE from day -11 to day -20 and from day 11 to day 20 are averaged. Subsamples are one with firms with hidden benefit and another one with firms without it. In both downgrade and upgrade events, from one day before to three days after the event days, there are significant market reactions of firms who issued bond without hidden benefit.

B. Long-term market reaction

There are two types of evidence about the long-run returns following bond rating changes. First, I group upgrade firms and downgrade firms into portfolios and track mean portfolio abnormal returns following rating changes for different time horizons. This relatively simple evidence illustrates the magnitude and the duration of potential abnormal returns. However, simple statistical tests of portfolio means might be misleading due to possible cross-sectional dependencies in returns. Therefore, I also implement two variations of Fama-MacBeth regressions to formally test the significance of abnormal returns following bond rating changes.

Several previous studies show that size and book-to-market are

important determinants of the cross-section of stock returns (e.g., Fama and French (1992)). Following this evidence, I calculate abnormal returns for both the CAR and the BHAR specification after controlling for size and book-to-market. Specifically, CAR methodology is similar to the one in Brav and Gompers (1997). Each calendar month starting in January 2008, I form 16 (4 x 4) value-weighted portfolios of all KSE and KOSDAQ stocks based on their size and book-to-market. First, I divide the monthly cross sections into size quintiles. Size is measured as closing prices from the previous month times the most recent number of shares outstanding[하헌준60]. Within each size quintile, I form four book-to-market portfolios. Book values equal the last reported book value prior to the ratings change. Based on the size and the book-to-market quintile cutoffs, each month I assign all firms with no rating changes into one of the 16 portfolios and calculate value-weighted returns. At the end, for each month of the sample period, I have 16 portfolio returns stratified by size and book-to-market characteristics. I call firms with no rating changes of the 5 x 5 size and book-to-market matrix as benchmark portfolio returns. A monthly abnormal return equals the firm-specific return for that month minus the return on the matched size and book-to-market benchmark portfolio for that firm and month. Firm-specific returns include delisting returns (for both CARs and BHARs). Monthly firm-specific abnormal returns are added to form three-month, six-month, first-year, second-year, and third-year firm-specific CARs. The reported returns in Table 6 represent the means of the firm-

specific CARs for the appropriate time horizon. Table 7 also reports t-statistics for whether the mean CARs are significantly different from zero.

BHARs are measured as firm-specific buy-and-hold returns minus the buy-and-hold return from the corresponding size and book-to-market benchmark portfolio (from the 4 x 4 matrix explained above). BHARs reported in Table 7 are means of firm-specific BHARs for the appropriate sample and time horizon. We use simple t-statistics to test reported BHARs for significance. We do not attempt any explicit adjustment for the problems in long-run returns identified by Kothari and Warner (1997) and Barber and Lyon (1997). The reason is that Kothari and Warner (1997) and Barber and Lyon (1997) reveal that problems associated with long-run BHARs appear in the three- to five-year horizons. In this paper, none of the return windows is longer than two years.

Panel A in table 7 shows in the event month,[하헌준61] there are the significant different market reactions on downgrade events in both CAR and HPR. Such tendency keeps until time horizon of month 18 with an exception in month 12 especially when I calculate abnormal return with HPR. On the other hand, there are no significant differences between bonds with and without hidden benefit in upgrade events without in time horizon month 24. This support supports previously studies the concept of bond rating anomaly which shows there is no significant market reaction to upgrades of bond ratings.

To see influence of hidden benefit on market reaction in long-term, I do regression of monthly return on variables: dummy of downgrade and upgrade events, dummy whether a bond has hidden benefit or not, interaction term to represent both downgrade and upgrade event with hidden benefit, size, market-to-book ratio, ROA, portions of shared owned by the largest shareholder and bond ratings. First, like regression results from short-term analysis, effects of downgrade events are mostly from bonds with hidden benefit. This tendency keeps until times horizon of month 3. I see overall explanatory power of models decreases as time horizon increases. In time horizon of 6, already every model has significant intercept and factors of size, MB, and LSH gets power to explain monthly stock return. Therefore, I exclude further regression on time horizon of month 12 and month 24.

V. Conclusion

This paper tries to explain why individual firms stay in a business group. To investigate reason, this paper measures hidden benefit that firms take by being in included in the business group and observe market's perception of it. Hidden benefit is measured by the difference between real yield spread and theoretical yield spread of each bond issued by firms in large business groups. Predicted yield spread is estimated by bond ratings, market-to-book ratio and beta and mean-squared error of stock return, leverage ratio and total debt size, amount money issued by each bond, coupon rate, Kospi and portion of shares held by the largest

shareholder. This paper finds that there exists hidden benefit which cannot be detected by explicit factors of bonds, firms and market among firms in large business groups. The differences between firms with and without hidden benefits are not stable across business groups, year and variables which prove that there are benefits that cannot be detected by explicit factors of bond-, firm-, and market specific information. This paper provisionally expects the differences are mainly from market's perception on the issuer.

Perception of a market is assessed by the market reaction to bond rating change events. The market perceives the fact and reacts accordingly as it shows the significantly negative reaction after downgrades of bond ratings for bonds issued by firms without hidden benefit. But there is no significant market reaction to downgrade events of bonds by firms with hidden benefit both in short and long-term. In short-term only bonds issued by firms without hidden benefits show significantly negative market reaction. Also, the difference of reaction from firms without it is statistically significant. Moreover, hidden benefit takes all explanatory power of downgrade events in market reaction. The same results are repeated in long-term except more than 12-month time horizon. After then, hidden benefit loses its explanatory power and common variables, including size, ROA, market-to-book ratio and portion of shared belonging to the largest shareholder, explain almost every part of market reaction. Finally, the contribution of the paper is quite simple. It introduces another indicator of benefits

for affiliates of business group and proves that the market reacts correspondingly.

References

Bae, Gil S., Youngsoon S. Cheon, and Jun-Koo Kang. "Intragroup propping: Evidence from the stock-price effects of earnings announcements by Korean business groups." Review of Financial Studies 21.5 (2008): 2015-2060.

Bae, Kee-Hong, Jun-Koo Kang, and Jin-Mo Kim. "Tunneling or value added? Evidence from mergers by Korean business groups." Journal of Finance (2002): 2695-2740.

Baek, Jae-Seung, Jun-Koo Kang, and Inmoo Lee. "Business groups and tunneling: Evidence from private securities offerings by Korean chaebols." The journal of finance 61.5 (2006): 2415-2449.

Baker, D and McArthur, T (2009), 'The value of the 'too big to fail' big bank subsidy,' CEPR Reports and Issue Briefs 2009-36, Center for Economic and Policy Research

Berger, Philip and Eli Ofek, 1995, Diversification's effect on firm value. Journal of Financial Economics. 37. 39-65.

Bhojraj, Sanjeev, and Partha Sengupta. "Effect of corporate governance on bond ratings and yields: The role of institutional investors and outside directors*." The Journal of Business 76.3 (2003): 455-475.

Blume, Marshall E., Felix Lim, and A. Craig MacKinlay. "The declining credit quality of US corporate debt: Myth or reality?." Journal of Finance (1998): 1389-1413.

Comment, Robert, and Gregg Jarrell. 1994. Corporate focus and stock returns, Journal of Financial Economics. 37. 67-87.

Chen, Long, David A. Lesmond, and Jason Wei. "Corporate yield spreads

and bond liquidity." The Journal of Finance 62.1 (2007): 119-149.

Choi, H.J., Byun, J.Y., Moon, D.C., Choi, W.D., The Impact of Foreign Ownership on Bond Yield Spreads, Accounting Journal, 23, 5, p. 379~413.

Das, S., Tufano, P., 1996. Pricing credit sensitive debt when interest rates and credit spreads are stochastic. Journal of Financial Engineering 5, 161–198.

Dichev, I. D. and Piotroski, J.D., 2001, The Long-Run Stock Returns Following Bond Ratings Changes, The Journal of Finance, Vol. 56, No. 1, pp. 173-203.

Duffee, G.R., 1999. Estimating the price of default risk. Review of Financial Studies 12, 197–226.

Duffie, D., Singleton, K.J., 1997. Modeling term structures of default-able bonds. Review of Financial Studies 12 (4), 687–720

Elliott, John A., Aloke Ghosh, and Doocheol Moon. "Asymmetric valuation of sustained growth by bond-and equity-holders." Review of Accounting Studies 15.4 (2010): 833-878.

Elton, E.J., Gruber, M., Agrawal, D., Mann, C., 2004. Factors affecting the valuation of corporate bonds. Journal of Banking & Finance 56 (1), 247–261.

Elton, E.J., Gruber, M., Agrawal, D., Mann, C., 2001. Explaining the rate spread on corporate bonds. Journal of Finance 56 (1), 247–261.

Fama and French, 1993, Common risk factors in the returns on stocks and bonds, Journal of Financial Economics, 33, 3-56

Ha, Hyunjo, Lee, Seung-guk, 2005, An Empirical Study on the Determinants of Credit Spread, Korean Institute of Finance, Vol. 11, No.1,

Holthausen, R.W. and Leftwich, R.W., 1986, The effect of bond rating changes on common stock prices, Journal of Financial Economics, 17, 57-89.

Huang and Huang, 2003, How much of corporate treasury yield spread is due to credit risk, Review of Asset Pricing Studies.[하헌준62]

Kaniel, Ron, et al. "Individual investor trading and return patterns around earnings announcements." The Journal of Finance 67.2 (2012): 639-680.

Jarrow, R., Lando, D., Turnbull, S., 1997. A Markov model for the term structure of credit spreads. Review of Financial Studies 10, 481–523.

Jones, E., Mason, S., Rosenfeld, E., 1984. Contingent claims analysis of corporate capital structures: An empirical investigation. The Journal of Finance 39, 611–625.

Khanna, Tarun, and Krishna Palepu. "Is group affiliation profitable in emerging markets? An analysis of diversified Indian business groups." Journal of finance (2000): 867-891.

La Porta, Rafael, et al. "The quality of government." Journal of Law, Economics, and organization 15.1 (1999): 222-279.

La Porta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer. "Corporate ownership around the world." The journal of finance 54.2 (1999): 471-517.

López de Silanes, Florencio, et al. "Tunneling." American Economic Review Papers and Proceedings. Vol. 90. No. 2. 2000.

Lando, D., 1997. Modeling bonds and derivatives with default risk. In: Dempster, M., Pliska, S. (Eds.), Mathematics of Derivative Securities. Cambridge University Press, pp. 369–393.

Merton, R., 1974. On the pricing of corporate debt: The risk structure of interest rates. The Journal of Finance 29, 449–470.

Noss, Joseph, and Rhiannon Sowerbutts. "The implicit subsidy of banks." Bank of England Financial Stability Paper 15 (2012).

Park, Yeonhee, Choi, Hyosoon, Kim, Hansoo, 2011, The association between discretionary accruals and bond yields, Accounting Journal, Vol. 20, No. 4, 3-56.

Pierre, Robert, J.Spencer, 2001, The determinants of credit spread changes[하헌준63], Journal of Finance, Vol.56, No. 6, 2177-2207.

Sengupta, Partha. "Corporate disclosure quality and the cost of debt." Accounting review (1998): 459-474.

Shin, J.Y., Suh, C.W., Park, J.I., 2011. The Effect of Corporate Governance on the Association between Earnings and Bond ratings. Korean Accounting Association.

Schich, Sebastian, and Sofia Lindh. "Implicit guarantees for bank debt." OECD Journal: Financial Market Trends 2012.1 (2012): 45-63.

Ueda, K and di Mauro, B (2012), 'Quantifying structural subsidy values for systemically important financial institutions', IMF Working Paper No. 128.

Abstract

본 논문은 기업이 기업집단 내에 소속됨으로써 얻는 보이지 않는 이득을 측정해보고 그것에 대해 시장이 어떻게 반응하는지를 연구하였다. 보이지 않는 이득은 기업집단 내에 소속된 기업들이 발행한 채권의 실제 채권 수익률**(Yield-To-Maturity)**와 추정 채권 수익률의 차이로 책정하였다. 이에 대한 시장의 인식은 채권 등급 변경에 따른 시장 반응으로 관찰하고자 하였다. 본 논문은 기업집단 내 기업들이 채권 발행 시, 계약서에 명시되어 있지 않은 보이지 않는 보증 형태의 이득을 얻고 있을 수 있다는 가능성을 발견하였다. 덧붙여, 채권 등급 변동에 따른 시장의 반응을 관찰 한 결과, 보이지 않는 이득을 얻고 있다고 보여지는 채권의 등급이 하락하면 해당 채권 발행사의 주식 수익률이 유의미하게 하락하였다. 반대로, 그러한 채권을 발행하지 않은 발행사의 경우 등급 하락에 대하여 유의미한 반응을 보이지 않았다.

주요어: 암묵적 보증, 기업집단, 채권수익률 스프레드, 채권등급 변경, 사건연구

학 번: 2014-20479

Table1

Descriptive table on bonds

The data is issued bonds in Korea. 100,000 bonds were randomly selected every year from 2008 to 2015[하헌준64] and among them, only corporate bonds are in consideration. The numbers are mean of each variable of bonds or issuer firms. Sample bonds exclude those with explicit guarantee from any other subject, those with call-put option and those subordinated. Data is divided by Chaebol and stand-alone (non-Chaebol) firms. Chaebol firms are defined as firms with ceiling on total amount of shareholding in Korea. This is because firms with such ceiling are the biggest restriction so that firms with it are also restricted by other limitations on cross-shareholding, debt guarantee and so on. I refer to the lists of chaebol firms in Online Provision of Enterprise Information (OPNI) every sample year. Yield spread is yield to maturity of bond minus treasury rate that has most similar maturity. ROA is the ratio of earnings on total asset of previous quarter, LEV is ratio of long-term debt on book equity of previous quarter, OCF is cash flow from operation divide by total asset of previous quarter, MB is market value of time *t* divided by book equity of previous quarter, Beta is systematic risk of individual firm during past 5 years of time t, MSE is standard deviation of daily returns from 120 days to 21 days before assessment date, LSH is percentage of shares held by the largest shareholder, PIC is pretax coverage following(Blume, Lim, and MacKinlay (1998)), Rate is bond rating of each bonds, DUR is number of remained dates from time *t* to maturity, Amount is issued amount of each bonds, and Coupon is coupon rate of each bonds. Parenthesis is t-statistics.

	Total	Non-chaebol	Chaebol	Difference	(t-statistics)
N	17695	7589	10106		
Yield Spread	2.040	1.610	2.370	-0.757	**-(2.730)**
DEBT	21.020	19.860	21.430	-1.569	**-(44.160)**
ROA	4.820	3.590	5.250	-1.664	**-(9.530)**
LEV	2.070	2.190	2.030	0.165	**(1.780)**
OCF	0.010	0.010	0.010	0.000	-(0.390)
MB	0.110	0.105	0.110	-0.006	**-(2.220)**
RATE	20.050	20.530	19.680	0.849	**(15.260)**
DUR	1.780	1.760	1.790	-0.028	-(1.110)
MSE	2.900	2.998	2.862	0.137	**(4.640)**
BETA	1.090	0.950	1.140	-0.193	**-(6.360)**
AMT	24.060	23.320	24.620	-1.293	**-(53.160)**
Coupon	5.971	5.853	6.059	-0.206	**-(5.620)**
LSH	37.870	31.600	40.270	-8.671	**-(21.250)**
PIC	5.511	5.602	5.441	0.161	(0.240)

Table 2

Regression: yield spread on related variables

The sample consists of firms with issued bonds which are assessed by Korea Security Assessment (KSA) from 2008 to 2015. Since KSA assesses every issued bonds every day, 100,000 bonds are randomly selected every year during sample period. Among 800,000 bonds, only corporate bonds issued by listed firms are included in sample. The following shows coefficients of given regression:

$$\text{Yield Spread}_{t,i} = \alpha_0 + \beta_1 DEBT_{t-1,i} + \beta_2 ROA_{t-1,i} + \beta_3 LEV_{t-1,i} + \beta_4 CFO_{t-1,i} + \beta_5 MB_{t-1,i} + \beta_6 Beta_{t,i} + \beta_7 MSE_{t,i} + \beta_8 LSH_{t,i} + \beta_9 PIC_{t,i} + \gamma_1 RATE_{t,i} + \gamma_2 DUR_{t,i} + \gamma_3 Amount_{t,i} + \gamma_4 Coupon_{t,i} + \delta_2 KOSPI_{t,i} + \delta_3 TS_{t,i} + e_t$$

In panel A, I did regression for whole sample firms, non-*chaebol* firms and *chaebol* firms. In panel B, I did regression for only non-*chaebol* firms that are listed during sample period by year. Yield spread is yield to maturity of bond minus treasury rate that has most similar maturity. Time *t* is the date on which a bond is assessed. ROA is the ratio of earnings on total asset of previous quarter, LEV is ratio of long-term debt on book equity of previous quarter, OCF is cash flow from operation divide by total asset of previous quarter, MB is market value of time *t* divided by book equity of previous quarter, Beta is systematic risk of individual firm during past 5 years of time t, MSE is standard deviation of daily returns from 120 days to 21 days before assessment date, LSH is percentage of shares held by the largest shareholder, PIC is pretax coverage following(Blume, Lim, and MacKinlay (1998)), Rate is bond rating of each bonds, DUR is number of remained dates from time *t* to maturity, Amount is issued amount of each bonds, Coupon is coupon rate of each bonds, KOSPI is Kospi at time *t*, and TS is difference between 10-year maturity government bond yield and 3-month maturity government bond yield. The firms in *Chaebol* groups are collected from Online Provision of Enterprise Information (OPNI). Parenthesis is t-statistics.

Panel A: Yield spread regression on whole, non-*chaebol* and *chaebol* firms

	Whole		Non-chaebol Firms		Chaebol Firms	
	Parameter	T-stat	Parameter	T-stat	Parameter	T-stat
DEBT	-0.088	**-(3.25)**	0.013	(0.48)	0.029	(0.63)
ROA	-0.018	**-(2.67)**	-0.002	-(0.26)	-0.011	-(1.28)
LEV	0.236	**(17.68)**	0.082	**(2.89)**	0.224	**(14.49)**
OCF	0.106	(0.11)	0.188	(0.24)	-0.787	-(0.55)
MB	-0.650	-(1.60)	-1.211	**-(1.96)**	-0.018	-(0.04)
RATE	-0.416	**-(20.48)**	-0.542	**-(21.43)**	-0.496	**-(17.24)**
DUR	0.000	**(11.24)**	0.000	**(6.82)**	0.000	**(9.76)**
TS	-0.350	**-(8.41)**	-0.160	**-(3.19)**	-0.401	**-(7.96)**
MSE	-0.002	-(0.06)	0.114	**(2.29)**	-0.057	-(1.13)
BETA	-0.029	-(0.47)	0.262	**(2.64)**	-0.090	-(1.24)
Amount	-0.027	-(0.67)	0.139	**(3.31)**	-0.109	**-(2.03)**
Kospi	-0.004	**-(2.81)**	-0.004	**-(2.24)**	-0.005	**-(2.97)**
Coupon	0.184	**(6.41)**	-0.103	**-(2.73)**	0.169	**(4.76)**
LSH	-0.008	**-(3.74)**	-0.041	**-(11.88)**	0.003	(0.98)
PIC	0.000	(0.23)	-0.006	-(1.01)	0.002	(0.86)
Intercept	11.873	**(11.18)**	10.499	**(9.53)**	13.090	**(9.06)**
Adj. R-squre	0.476		0.688		0.474	

Panel B: Yield spread regression of non-*chaebol* firms per year

year	2008		2009		2010		2011		2012		2013		2014		2015	
	Parameter	T-stat	Parameter	T-stat	Parameter	T-stat	Parameter	T-stat	Parameter	T-stat	Parameter	T-stat	Parameter	T-stat	Parameter	T-stat
DEBT	0.14	(1.09)	0.26	(0.88)	0.39	(1.42)	0.04	(0.38)	**0.47**	(3.52)	-0.02	-(0.46)	**-0.07**	-(1.79)	-0.06	-(1.08)
ROA	0.02	(1.46)	0.04	(1.29)	**-0.05**	-(1.84)	**0.07**	(2.39)	**-0.04**	-(3.05)	-0.03	-(1.80)	-0.01	-(0.45)	-0.01	-(0.81)
LEV	**0.15**	(5.43)	0.08	(0.51)	-0.05	-(0.19)	**0.51**	(2.01)	**-0.80**	-(3.91)	-0.01	-(0.16)	0.05	(0.63)	**0.22**	(3.08)
OCF	**-5.79**	-(1.74)	3.61	(1.03)	**-11.70**	-(2.34)	3.64	(0.69)	1.29	(0.73)	-1.23	-(0.75)	0.84	(0.99)	**6.12**	(1.91)
MB	-1.64	-(0.89)	**-13.46**	-(3.11)	1.49	(0.51)	-2.62	-(1.07)	0.09	(0.12)	0.18	(0.27)	-0.63	-(0.60)	-0.38	-(0.34)
RATE	**-0.33**	-(4.22)	**-0.73**	-(4.09)	**-0.65**	-(7.79)	**-0.76**	-(12.06)	**-0.41**	-(4.88)	**-0.12**	-(3.16)	**-0.25**	-(6.72)	**-0.10**	-(1.97)
DUR	**0.00**	(3.56)	**0.00**	(3.99)	**0.00**	(3.76)	**0.00**	(2.32)	**0.00**	(3.83)	**0.00**	(7.75)	**0.00**	(5.71)	**0.00**	(4.05)
TS	**-0.72**	-(4.33)	-0.32	-(0.73)	-0.14	-(0.19)	0.50	(1.20)	**-0.47**	-(2.40)	**-0.49**	-(5.40)	**-0.54**	-(2.44)	-0.67	-(0.76)
MSE	0.03	(0.42)	**0.46**	(2.32)	0.16	(0.47)	0.07	(0.34)	0.02	(0.28)	0.06	(1.26)	0.01	(0.15)	-0.05	-(0.47)
BETA	0.05	(0.20)	-0.94	-(1.49)	0.38	(0.90)	**1.45**	(3.24)	**-0.78**	-(4.55)	-0.02	-(0.23)	0.11	(1.34)	0.16	(1.36)
Amount	**-0.01**	-(2.42)	0.01	(0.96)	0.02	(1.31)	0.00	(0.02)	0.00	-(0.96)	0.01	(1.52)	-0.01	-(0.81)	**-0.04**	-(2.67)
Kospi	**0.22**	(3.37)	0.02	(0.15)	-0.25	-(1.63)	**-0.34**	-(2.84)	-0.04	-(0.88)	**0.13**	(2.87)	**0.20**	(3.35)	**0.09**	(2.00)
Coupon	-0.01	-(1.55)	-0.02	-(1.01)	-0.02	-(1.10)	**-0.08**	-(7.16)	**0.02**	(2.88)	0.00	(0.69)	**-0.02**	-(3.84)	0.00	-(0.46)
LSH	**0.29**	(2.40)	0.54	(1.61)	0.36	(1.31)	0.08	(0.67)	-0.03	-(0.38)	0.00	(0.02)	0.01	(0.21)	0.00	-(0.09)
PIC	0.04	(1.31)	**0.17**	(2.37)	0.04	(0.76)	-0.02	-(0.85)	**0.02**	(2.80)	-0.02	-(1.57)	0.00	-(0.33)	0.01	(0.85)
Intercept	-1.72	-(0.58)	-4.70	-(0.79)	-7.33	-(0.86)	**15.72**	(3.53)	2.00	(1.17)	1.09	(0.80)	**8.23**	(3.85)	**13.30**	(3.50)
Adj. R-squre	0.86		0.80		0.84		0.86		0.85		0.70		0.74		0.73	

Table 3

Distribution of Bond Ratings Changes

The numbers are changes of bond rating from 2008 to 2015. Panel A shows the changes in bond rating between bond rating groups. Bond rating groups include AA, A, BBB, BB, B, CCC, CC, and C. AA group has only AA degree, A group includes A+, A0 and A-, BBB group includes BBB+, BBB0 and BBB-, BB group includes BB+, BB0 and BB-, B group includes B+, B0 and B-, CCC group includes CCC+, CCC0 and CCC-, CC group includes CC+, CC0 and CC-, and C group includes C+, C0 and C-. Total change is sum of numbers in downgrade and upgrade each year. % of Change is portion of number of changes to number of total bonds each sample year. Panel B is bond rating changes matrix between rating groups. Old Bonds Ratings are located in left-axis and new bond ratings are in the right-axis.

Panel A: Bond rating changes

Year	Downgrade	Upgrade	Total Changes	% of Change
2008	8	17	25	4.65%
2009	14	18	32	5.69%
2010	4	13	17	3.11%
2011	4	20	24	2.17%
2012	3	7	10	0.80%
2013	8	7	15	1.17%
2014	13	2	15	1.18%
2015	8	2	10	0.93%
Total	62	86	148	19.70%

Panel B: Bond rating change matrix between rating groups (2000 – 2015)

	New Bond Rating								
Old Bond Rating	AAA	AA	A	BBB	BB	B	CCC	CC	C
AAA	2238	21	0	0	0	0	0	0	0
AA	23	4876	40	0	0	0	0	0	0
A	0	81	4076	39	0	0	2	0	0
BBB	0	3	92	4431	31	2	1	0	
BB	0	0	3	49	1319	26	1	0	1
B	0	0	0	0	8	220	2	1	4
CCC	0	0	0	0	0	0	24	0	0
CC	0	0	0	0	0	0	0	10	0
C	0	0	0	0	2	4	0	0	10

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Table 4

Comparison between affiliates with hidden benefits and without

Data if bond issued by *chaebol* firms only. Benefit 0 group includes firms without benefit and Benefit 1 is consisted of *chaebol* firms with hidden benefit. Criteria in estimating benefits are same with compared variables in the table. The numbers in Panel A are average of variables in each year and each estimation criterion. The numbers in Panel B are average of variables in each business group throughout sample years. First three groups are the most frequently and stably enter the "large business group list" of Online Provision of Enterprise Information (OPNI) and next three groups are the most rarely and unstably enter the list from 2008 to 2015. Difference is difference between number in Benefit 0 and that in Benefit 1. Yield spread is yield to maturity of bond minus treasury rate that has most similar maturity. Time t is the date on which a bond is assessed. ROA is the ratio of earnings on total asset of previous quarter, LEV is ratio of long-term debt on book equity of previous quarter, OCF is cash flow from operation divide by total asset of previous quarter, MB is market value of time t divided by book equity of previous quarter, Beta is systematic risk of individual firm during past 5 years of time t, MSE is standard deviation of daily returns from 120 days to 21 days before assessment date, LSH is percentage of shares held by the largest shareholder, PIC is pretax coverage following(Blume, Lim, and MacKinlay (1998)), Rate is bond rating of each bonds, DUR is number of remained dates from time t to maturity, Amount is issued amount of each bonds, Coupon is coupon rate of each bonds, KOSPI is Kospi at time t, and TS is difference between 10-year maturity government bond yield and 3-month maturity government bond yield.

Panel A: Comparison between affiliates with benefit and those without per year

	Benefit	N	Yield Spread	DEBT	ROA	LEV	OCF	MB	RATE	DUR	TS	MSE	BETA	Amount	Kospi	Coupon	LSH	PIC
Total	0	1039	0.99	22.12	2.80	2.67	0.01	0.11	20.98	2.25	0.61	2.24	1.11	25.08	256.30	5.04	41.61	5.88
	1	1106	0.48	21.74	4.88	1.82	0.01	0.13	20.76	2.00	1.12	2.77	1.13	25.05	224.60	5.54	39.34	4.79
	Diff (1-2)	_	**0.51**	**0.38**	**-2.08**	**0.85**	**0.00**	**-0.02**	**0.23**	**0.25**	**-0.51**	**-0.53**	**-0.02**	**0.04**	**31.72**	**-0.49**	**2.28**	1.09
	T-stat		(4.42)	(6.79)	-(7.96)	(5.83)	(2.04)	-(4.08)	(2.15)	(3.08)	-(13.08)	-(10.89)	-(0.57)	(0.84)	(28.63)	-(6.74)	(3.35)	(1.17)
2008	1	181	1.52	21.37	6.23	1.91	0.01	0.17	19.54	1.65	-0.65	3.73	1.33	24.84	5.71	36.61	5.01	199.05
2009	0	1	-0.08	20.14	21.70	0.94	0.01	0.70	23.00	3.00	2.53	1.94	0.69	24.64	206.80	5.41	34.35	8.68
	1	236	0.73	21.54	5.08	1.85	0.01	0.12	20.05	1.67	2.38	3.65	1.31	24.89	186.20	6.36	37.11	5.06
	Diff (1-2)		-0.81	-1.40	**16.62**	-0.91	0.01	**0.58**	2.95	1.33	0.15	-1.70	-0.62	-0.25	20.67	-0.95	-2.76	3.62
	T-stat		-(0.49)	-(1.33)	(2.19)	-(0.72)	(0.15)	(6.34)	(1.39)	(1.00)	(0.35)	-(1.05)	-(1.18)	-(0.29)	(0.74)	-(0.66)	-(0.20)	(0.64)
2010	0	2	46.32	20.25	4.11	3.92	0.03	0.03	8.00	0.50	2.34	2.00	1.84	24.47	220.50	6.28	50.37	2.77
	1	283	0.09	21.53	6.07	1.73	0.01	0.15	20.55	1.64	2.13	2.31	1.07	25.07	228.40	6.36	42.01	4.24
	Diff (1-2)		**46.23**	-1.28	-1.96	2.20	0.02	-0.12	**-12.55**	-1.14	0.22	-0.31	0.77	-0.60	-7.97	-0.09	8.36	-1.47
	T-stat		(37.01)	-(1.60)	-(0.43)	(2.71)	(0.92)	-(1.45)	-(8.27)	-(1.22)	(0.97)	-(0.71)	(1.30)	-(1.04)	-(0.73)	-(0.08)	(0.74)	-(0.33)
2011	0	290	0.59	21.81	3.81	2.02	0.01	0.13	20.79	1.83	0.82	2.67	1.12	25.10	5.84	43.19	5.39	262.76
2012	0	139	1.44	22.33	1.95	3.64	0.01	0.09	20.14	1.99	0.17	2.19	1.36	25.16	255.00	5.88	42.53	2.87
	1	138	0.20	22.42	3.66	1.50	0.02	0.12	22.20	2.45	0.20	2.54	0.92	25.39	255.80	4.64	39.01	7.01
	Diff (1-2)	_	**1.23**	-0.10	**-1.72**	**2.14**	-0.01	**-0.03**	**-2.06**	**-0.46**	**-0.03**	**-0.36**	**0.44**	**-0.24**	-0.75	**1.24**	**3.52**	**-4.14**
	T-stat		(8.55)	-(0.70)	-(3.18)	(7.18)	-(1.54)	-(3.14)	-(8.98)	-(2.27)	-(1.87)	-(3.98)	(7.42)	-(2.20)	-(0.68)	(7.66)	(1.87)	-(4.18)
2013	0	61	2.50	22.26	0.44	2.84	0.00	0.07	19.36	1.57	0.57	2.09	1.37	25.13	255.00	6.17	43.83	28.78
	1	268	0.11	22.02	3.18	1.98	0.01	0.11	21.68	2.68	0.63	1.94	1.02	25.12	255.60	4.29	40.49	3.84
	Diff (1-2)	_	**2.39**	0.24	**-2.73**	**0.86**	-0.01	**-0.04**	**-2.31**	**-1.10**	-0.06	0.15	0.35	0.00	-0.64	**1.88**	3.35	**24.94**
	T-stat		(13.80)	(1.18)	-(3.51)	(2.79)	-(1.54)	-(3.04)	-(7.49)	-(3.56)	-(1.17)	(1.50)	(4.21)	(0.03)	-(0.52)	(11.24)	(1.35)	(3.38)
2014	0	369	0.50	22.12	2.90	2.47	0.01	0.11	21.63	2.80	0.78	1.87	1.03	25.01	256.15	4.28	40.93	4.58
2015	0	177	1.32	22.43	2.31	3.31	0.02	0.11	21.31	2.23	0.23	2.40	0.99	25.16	248.34	4.27	38.91	3.90

Panel B: Comparison between affiliates with benefit and those without per business group

Group		N	Yield Spread	DEBT	ROA	LEV	OCF	MB	RATE	DUR	TS	MSE	BETA	AMT	Coupon	LSH	PIC
Samsung	0	36	-0.204	21.814	1.628	0.883	0.002	0.122	22.500	2.083	0.601	2.280	0.768	25.604	4.090	24.603	53.888
	1	30	-0.045	21.460	4.798	0.703	0.015	0.164	22.733	2.200	0.745	2.235	0.940	25.476	4.924	19.816	14.808
	Differnce		-0.158	0.354	-3.170	0.180	-0.014	-0.042	-0.233	-0.117	-0.144	0.045	-0.172	0.129	-0.834	4.787	39.080
	(T-stat)		-(0.980)	**(1.830)**	**-(4.090)**	(1.290)	**-(2.260)**	**-(1.960)**	-(1.210)	-(0.350)	-(0.750)	(0.180)	-(0.470)	(0.760)	**-(2.680)**	**(2.060)**	(1.380)
Hyndai Motors	0	16	-0.169	21.701	8.176	1.014	0.030	0.130	21.438	1.688	0.843	2.292	1.363	24.924	4.683	40.142	15.448
	1	36	0.439	22.117	6.112	1.320	0.029	0.109	21.333	1.694	1.069	3.157	1.261	25.163	5.729	39.830	5.665
	Differnce		-0.608	-0.415	2.064	-0.306	0.001	0.021	0.104	-0.007	-0.225	-0.865	0.102	-0.240	-1.046	0.312	9.784
	(T-stat)		**-(1.940)**	-(0.800)	**(1.890)**	**-(3.830)**	**(0.180)**	(1.410)	(0.170)	-(0.020)	-(0.630)	**-(2.230)**	(0.900)	-(0.850)	**-(2.000)**	(0.220)	**(3.260)**
SK	0	179	-0.043	22.786	4.154	1.380	0.020	0.164	23.028	3.346	0.621	2.100	0.830	25.375	4.237	35.194	3.887
	1	180	0.093	22.236	4.975	1.303	0.011	0.145	22.228	2.756	1.052	2.488	0.729	25.256	5.192	33.668	3.995
	Differnce		-0.136	0.550	-0.821	0.077	0.009	0.019	0.800	0.591	-0.431	-0.389	0.101	0.120	-0.955	1.527	-0.109
	(T-stat)		-(1.560)	**(4.750)**	-(1.400)	(1.410)	**(3.010)**	(1.470)	**(4.050)**	**(2.140)**	**-(4.750)**	**-(3.710)**	(1.130)	**(1.820)**	**-(7.480)**	(1.010)	-(0.300)
Yujin	0	1	3.540	20.801	0.450	1.961	-0.049	0.027	16.000	1.000	0.370	4.374	1.316	23.942	8.500	43.690	1.608
	1	4	1.750	20.501	0.203	1.995	-0.001	0.072	16.000	0.500	0.485	4.882	1.379	23.372	7.128	53.520	0.704
	Differnce		1.790	0.300	0.248	-0.034	-0.049	-0.046	0.000	0.500	-0.115	-0.508	-0.063	0.570	1.373	-9.830	0.904
	(T-stat)		**(3.690)**	(0.610)	(0.190)	-(0.040)	**-(2.900)**	-(1.070)	-	(0.770)	-(0.080)	-(0.570)	-(0.320)	(0.740)	**(2.030)**	**-(3.860)**	(1.110)
Teayoung	0	4	1.082	21.192	2.260	1.462	0.009	0.040	20.000	2.250	0.670	1.993	0.976	24.223	5.284	38.200	2.895
	1	7	0.433	20.819	3.479	1.620	-0.023	0.085	20.000	1.000	1.077	3.151	1.402	24.461	6.494	38.196	2.868
	Differnce		0.649	0.373	-1.219	-0.158	0.032	-0.045	0.000	1.250	-0.407	-1.158	-0.426	-0.238	-1.211	0.004	0.027
	(T-stat)		(1.540)	**(6.170)**	-(1.140)	-(1.270)	**(2.100)**	**-(2.010)**	-	**(2.020)**	-(0.540)	-(1.550)	**-(2.210)**	-(0.530)	**-(2.430)**	(1.570)	(0.060)
Samyang	0	5	-0.321	20.911	0.730	0.869	0.026	0.052	22.000	1.400	0.591	2.181	0.834	24.672	4.285	42.168	4.290
	1	1	-0.840	20.043	4.790	0.573	-0.006	0.072	21.000	2.000	2.250	1.446	0.798	24.635	6.050	37.660	5.705
	Differnce		0.519	0.868	-4.060	0.295	0.032	-0.020	1.000	-0.600	-1.659	0.734	0.036	0.037	-1.765	4.508	-1.415
	(T-stat)		(1.070)	**(3.820)**	**-(1.840)**	(0.810)	(1.300)	-(1.300)	**(4.050)**	-(0.480)	**-(3.950)**	(0.950)	(0.360)	(0.410)	-(1.470)	(0.960)	-(0.430)

Table 5

Bond rating changes in affiliates

with and without unseen benefit from business group

Numbers are the number of bond rating changes in certain sub-groups throughout sample years 2008 – 2015. Sample firms are divided first in, downgrade and upgrade events, then *chaebol* and non- *chaebol* firms, and final, with and without benefit firms in *chaebol* groups. Downgrade and Upgrade events are changes of bond ratings issued by firms in a corresponding group and the changes are between letter ratings not +, 0 or -.

			Number of Changes
Downgrade	Chaebol	With benefit	8
		Without benefit	15
	Non-Chaebol		120
	Total		143
Upgrade	Chaebol	With benefit	25
		Without benefit	13
	Non-Chaebol		177
	Total		215

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Table 6

Market reaction after bond rating changes

Panel A of this table shows market reaction after bond rating change event from 2008 to 2015 in groups of firms with and without benefit. Bond ratings can change in both up and down. N shows the number of events in each group, CAAR is cumulative average abnormal returns and HPR is holding period return. Event window is one day before and 2 days after events. Benefit 0 means group of firms without hidden benefit and benefit 1 means groups of firms with hidden benefit. Difference means amount of difference between two groups in down or up events. Panel B shows the result of regression of HPR. DOWN is 1 if bond rating moves downward, otherwise 0. UP is 1 if bond rating moves upward, otherwise 0. BENEFIT is 1 if a bond is from a firm with hidden benefit which means its real yield spread is lower than theoretical yield spread. RATE is bond rating, ROA is return on asset of bond issuer, SIZE is total market capitalization of bond issuer a month before assessment date, MB is market to book ratio of bond issuer where market capitalization is from a month before the assessment date and book equity is from the most recent financial report from the assessment date. LSH is portion of shared held by the largest shareholder and this is from the most recent financial report from the assessment date. Parenthesis are t-statistics.

Panel A: CAR and HPR after bond rating change events

Change	Benefit	N	CAAR	HPR
DOWN	0	17	-3.186	-4.475
			-(1.366)	**-(1.824)**
	1	6	-1.409	4.872
			-(0.328)	(0.539)
	Difference		-1.777	-9.347
			-(1.310)	**-(2.160)**
UP	0	15	-3.518	-1.184
			-(1.758)	-(0.552)
	1	23	1.598	1.870
			(2.054)	**(1.736)**
	Difference		-5.115	-3.054
			-(1.640)	-(0.550)

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Panel B: Regression of HPR

	(1)	(2)
Intercept	-23.431	-21.434
	-(0.697)	-(0.652)
DOWN	6.622**	0.554
	(1.828)	(0.115)
BENEFIT	2.766	-1.092
	(0.997)	-(0.320)
DOWN * BENEFIT		10.272**
		(1.855)
RATE	1.220**	0.811
	(2.039)	(1.297)
ROA	0.474***	0.499***
	(2.391)	(2.565)
SIZE	-0.372	-0.018
	-(0.224)	-(0.011)
MB	3.068	7.096
	(0.228)	(0.533)
LSH	0.056	0.071
	(0.739)	(0.960)
Adj. R-squared	0.168	0.205

Table 7

Long term market reaction after bond rating change events

Panel A of this table shows market reaction after bond rating change event from 2008 to 2015 in groups of firms with and without benefit. Bond ratings can change in both up and down. Month 0, 3, 6, 12, 18, and 24 is number of month after event month. Benefit 0 means group of firms without hidden benefit and benefit 1 means groups of firms with hidden benefit. N shows the number of events in each group. Abnormal return is difference between monthly return and benchmark return in each month. Abnormal returns are cumulated for the number of given months and this is Cumulative Abnormal Return (CAR). Holding Period Return (HPR) is difference between monthly holding period return and holding period return of benchmark portfolio. Holding period return is calculated as$[(1+r_0)(1+r_1)(1+r_2)\cdots(1+r_N)-1]$ where N is the number of given months after event month. Benchmark return is average return of firms without bond rating changes that are in same size and book-to-market ratio group with a firm with an event. Size and BTM groups are made by dividing total sample firms with size in four and divide each group by BTM in four groups again. Therefore, there are 16 benchmark groups. Difference means amount of difference between two groups in down or up events. Panel B shows the result of regression of monthly return in each given month after event month. DOWN is 1 if bond rating moves downward, otherwise 0. UP is 1 if bond rating moves upward, otherwise 0. BENEFIT is 1 if a bond is from a firm with hidden benefit which means its real yield spread is lower than theoretical yield spread. RATE is bond rating, ROA is return on asset of bond issuer, SIZE is total market capitalization of bond issuer a month before assessment date, MB is market to book ratio of bond issuer where market capitalization is from a month before the assessment date and book equity is from the most recent financial report from the assessment date. LSH is portion of shared held by the largest shareholder and this is from the most recent financial report from the assessment date. Parenthesis are t-statistics.

Panel A: Long-term market reaction after bond rating change events

		DOWN						UP					
	Month	0	3	6	12	18	24	0	3	6	12	18	24
Without benefit	CAR	-12.9551	-9.7541	18.1266	5.5585	-16.1042	-61.2862	-1.097	-6.8976	-2.7804	3.3725	-10.929	-14.8254
	(t-statistics)	**-(3.10)**	-(0.55)	(0.97)	(0.38)	-(0.76)	**-(3.18)**	-(0.40)	-(0.91)	-(0.30)	(0.39)	-(0.99)	-(0.84)
	HPR	-12.955	-13.831	-2.526	-23.183	-44.439	-55.694	-1.097	-8.096	-6.58	-1.299	-14.714	-19.089
	(t-statistics)	**-(3.10)**	-(1.38)	-(0.23)	**-(1.84)**	**-(2.92)**	**-(3.21)**	-(0.40)	-(1.12)	-(0.74)	-(0.19)	-(1.45)	-(1.17)
With benefit	CAR	13.4148	26.254	33.807	13.8163	18.3864	23.8718	-4.5949	-2.8172	-1.2219	6.7911	8.9996	22.0494
	(t-statistics)	**(2.44)**	**(2.04)**	**(3.02)**	(0.54)	(0.61)	(0.56)	-(2.18)	-(0.65)	-(0.23)	(0.94)	(0.98)	**(2.59)**
	HPR	13.415	30.165	34.472	31.53	35.566	66.437	-4.595	-3.119	-1.689	4.377	-0.175	10.365
	(t-statistics)	**(2.44)**	(2.00)	**(1.70)**	(0.98)	(1.05)	(1.24)	**-(2.18)**	-(0.74)	-(0.34)	(0.56)	-(0.02)	(1.52)
	CAR Difference	-26.3699	-36.0082	-15.6804	-8.2578	-34.4906	-85.158	3.4979	-4.0804	-1.5585	-3.4186	-19.9286	-36.8748
	(t-statistics)	**-(3.89)**	-(1.67)	-(0.72)	-(0.26)	-(0.91)	-(1.45)	(0.97)	-(0.50)	-(0.15)	-(0.28)	-(1.29)	**-(2.14)**
	HPR Difference	-26.5043	-55.2144	-58.0598	-74.5237	-83.9821	-114.8	4.3082	-0.2532	-2.5109	0.7501	2.4235	-0.9504
	(t-statistics)	**-(3.31)**	**-(2.46)**	**-(2.14)**	-(1.69)	**-(1.86)**	-(1.43)	(0.91)	-(0.03)	-(0.25)	(0.05)	(0.26)	-(0.08)

Panel B: Regression on monthly market return

	0		3		6	
	(1)	(2)	(1)	(2)	(1)	(2)
DOWN	16.673***	-0.22	2.393	-12.749	1.517	-2.547
	(2.637)	-(0.024)	(0.369)	-(1.317)	(0.189)	-(0.201)
BENEFIT	7.703*	-2.749	2.212	-6.09	4.564	2.316
	(1.619)	-(0.450)	(0.447)	-(0.974)	(0.739)	(0.281)
DOWN * BENEFIT		24.022**		20.9**		5.876
		(2.499)		(2.039)		(0.420)
SIZE	0.879	1.647	-3.053	-3.061	-9.303**	-9.313**
	(0.281)	(0.558)	-(0.928)	-(0.972)	-(2.282)	-(2.258)
MB	0.895	4.085	-29.129	-24.134	-94.007***	-92.769***
	(0.033)	(0.161)	-(1.201)	-(1.034)	-(3.139)	-(3.046)
ROA	-0.431	-0.38	0.465	0.501*	-0.38	-0.369
	-(1.214)	-(1.141)	(1.297)	(1.457)	-(0.854)	-(0.817)
LSH	0.117	0.18	-0.154	-0.111	-0.433**	-0.418**
	(0.839)	(1.346)	-(1.062)	-(0.789)	-(2.398)	-(2.238)
RATE	3.739***	2.411**	-0.143	-1.35	-0.8	-1.13
	(3.034)	(1.896)	-(0.099)	-(0.899)	-(0.449)	-(0.575)
Intercept	-110.997*	-96.227*	79.574	108.113*	254.74***	262.551***
	-(1.673)	-(1.541)	(1.081)	(1.504)	(2.783)	(2.779)
Adj. R-squared	0.204	0.301	-0.076	0.013	0.257	0.239

Appendix A.

Average prediction errors for various windows

Average prediction error follows Holthausen and Leftwith (1986),

$$\mathrm{PE_{it}} = R_{it} - (\alpha_i + \beta_i R_{mt})$$

where R_{it} = rate of return on the common stock of firm i on event day t; R_{mt}= rate of return on equally weighted Korea Stock Exchange and Korea Securities Dealers Automated Quotations index on event day t; and α_i, β_i= ordinary least squares estimates of market model parameters. Parameters are estimated over 100 days from day -120 to day -21. The prediction errors, $\mathrm{PE_{it}}$ are averaged across the firms in the subsample on each event day *t* to form an average prediction error,

$$\mathrm{APE_t} = \frac{1}{N_t}\sum_{i=1}^{N_t} PE_{it}$$

The statistics testing is whether abnormal performance is significantly different from zero in each event day. Event day is from day -10 to day +10 and PE from day -11 to day -20 and from day 11 to day 20 are averaged. Subsamples are one with firms with hidden benefit and another one with firms without it. Difference is amount of difference of APE between two subsamples. Parenthesis are t-statistics.

Panel A: APE of down grade events

Event Day	Without benefit		With benefit		Difference	(t-statistics)
	APE	(t-statistics)	APE	(t-statistics)		
(-11,-20)	0.700	(0.724)	-0.042	-(0.106)	0.742	(0.420)
-10	0.758	(0.478)	1.638	(0.886)	-0.880	-(0.340)
-9	-0.060	-(0.031)	-0.289	-(0.398)	0.229	(0.080)
-8	-0.361	-(0.199)	0.018	(0.026)	-0.379	-(0.150)
-7	2.089	(1.528)	0.183	(0.227)	1.906	(0.960)
-6	2.096	(1.495)	-0.375	-(0.398)	2.471	(1.200)
-5	-0.774	-(0.696)	-0.978	-(0.997)	0.204	(0.120)
-4	-0.183	-(0.161)	-1.937	**-(1.931)**	1.754	(1.020)
-3	-1.134	-(1.170)	-0.302	-(0.338)	-0.833	-(0.560)
-2	-1.486	**-(1.981)**	2.971	(1.596)	-4.456	**-(2.640)**
-1	-0.890	-(1.296)	-0.754	-(0.725)	-0.136	-(0.110)
0	-1.004	-(1.265)	1.790	(1.265)	-2.794	**-(1.870)**
1	-1.784	**-(1.976)**	-0.183	-(0.178)	-1.601	-(1.100)
2	-1.207	**-(1.780)**	0.313	(0.223)	-1.520	-(1.110)
3	-1.206	**-(1.769)**	1.727	(1.254)	-2.933	**-(2.150)**
4	0.598	(0.622)	-0.028	-(0.021)	0.626	(0.380)
5	0.624	(0.413)	1.976	(1.613)	-1.351	-(0.600)
6	-0.094	-(0.200)	1.592	(1.439)	-1.686	-(1.640)
7	-0.528	-(1.032)	1.710	**(1.953)**	-2.239	**-(2.370)**
8	0.562	(1.032)	0.995	(0.991)	-0.433	-(0.420)
9	0.125	(0.276)	0.823	(0.439)	-0.698	-(0.470)
10	-0.056	-(0.044)	1.285	(1.603)	-1.341	-(0.730)
(11,20)	-0.861	-(1.151)	0.057	-(0.002)	-0.919	-(0.697)

Panel B: APE of upgrade events

Event Day	Without benefit		With benefit		Difference	(t-statistics)
	APE	(t-statistics)	APE	(t-statistics)		
(-11,-20)	-0.043	-(0.129)	-0.172	-(0.515)	0.130	(0.238)
-10	-0.693	-(1.225)	-0.450	-(0.932)	-0.243	-(0.310)
-9	0.283	(0.505)	-0.258	-(0.543)	0.542	(0.700)
-8	-0.284	-(0.672)	-0.224	-(0.435)	-0.061	-(0.080)
-7	-0.079	-(0.116)	-0.390	-(0.908)	0.311	(0.400)
-6	-0.216	-(0.507)	-0.300	-(0.674)	0.084	(0.120)
-5	-0.389	-(0.686)	-0.508	-(1.141)	0.119	(0.160)
-4	-0.626	-(1.200)	-0.086	**-(0.199)**	-0.540	-(0.760)
-3	0.297	(0.730)	-1.228	-(2.386)	1.525	(1.970)
-2	0.249	**(0.152)**	-1.051	-(1.733)	1.300	**(0.900)**
-1	-1.136	-(1.222)	-0.256	-(0.602)	-0.880	-(0.990)
0	-0.556	-(0.690)	0.399	(0.717)	-0.954	**-(0.990)**
1	-0.137	**-(0.242)**	0.174	(0.439)	-0.311	-(0.450)
2	-0.795	**-(1.669)**	0.491	(1.253)	-1.286	-(2.000)
3	-0.637	**-(1.579)**	-0.486	-(0.961)	-0.150	**-(0.200)**
4	-0.372	-(0.898)	0.225	(0.578)	-0.597	-(0.970)
5	1.371	(2.743)	-1.156	-(1.460)	2.527	(2.180)
6	-0.223	-(0.275)	-0.162	-(0.210)	-0.061	-(0.050)
7	-0.073	-(0.099)	-0.753	**-(0.949)**	0.681	**(0.560)**
8	0.162	(0.184)	0.233	(0.498)	-0.072	-(0.080)
9	-0.105	-(0.254)	0.270	(0.540)	-0.375	-(0.490)
10	0.044	(0.118)	0.325	(0.640)	-0.281	-(0.370)
(11,20)	-0.030	-(0.203)	-0.224	-(0.568)	0.194	(0.254)