세무와회계저널 ISSN 1738－3323
제19권 제5호 2018년 10월 pp.55～79
한국세무학회

The Effect of Managerial Overconfidence on the Corporate Bond Ratings

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〈Abstract〉

This study set up a hypothesis that the corporate with the higher managerial overconfidence would have lower corporate bond rating than the corporate with the less managerial overconfidence, and an empirical analysis was performed with an ordered logistic model. The hypothesis of this study was based on the study result by Na and Kim(2016), which reported that the higher managerial overconfidence, the more fraud could intervene.

Between 2001 and 2011, after analyzing of 902 companies, the regression coefficient of the managerial overconfidence was shown to have a significantly negative(－) value. This result could mean that the companies with high managerial overconfidence would have lower ratings of the corporate bonds than the companies with low managerial overconfidence. Also this suggested the managerial overconfidence could act negatively on the calculation of corporate bond rating.

In the previous studies, empirical studies were conducted on the relation between the bond rating and the various corporate business variables, but there had been hardly any study about the relation between the managerial characteristics and the corporate bond rating. In this regard, there was some implication of the result of this study, which suggested the managerial overconfidence significantly affected the corporate bond rating and the managerial characteristics could be a factor of capital cost.

〈Key words〉 Managerial Overconfidence, Corporate Bond Ratings, Fraud

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논문접수일 2018년 4월 7일 1차수정일 2018년 8월 6일 게재확정일 2018년 9월 6일

Ⅰ. Introduction

This study had a purpose to empirically study the effect of the managerial overconfidence on the corporate bond rating, targeting publicly traded corporate bodies excluding financial businesses from 2001 to 2011. According to Foster(1986), the corporate bond rating was not calculated automatically through the rate of finance. This way, the previous studies analyzed the relation between various corporate business variables and corporate bond rating.

Concretely, in the previous studies on the corporate bond rating, corporate governance, audit quality, disclosure, abnormal audit fees, abnormal audit hours, social responsibility, tax subsidy, human resource characteristics of internal control over financial reporting, level of competition in the industry, earning management, information asymmetry, quality of earnings and so on were measured as the business variables(Bhojraj and Sengupta 2003 ; Ashbaugh－Skaife et al. 2006 ; Kim et al. 2006 ; Park and Park 2011 ; Park et al. 2012 ; Shin et al. 2012 ; Park and Park 2012 ; Chun and Cha 2013 ; Park et al. 2014 ; Jung 2015a ; Jung 2015b ; Jung 2015c ; Jung and Byun 2016). However there was no study that analyzed the effect of the managerial confidence on rating of the corporate bond.

The previous study related to the managerial overconfidence were only limited to the effect on M&A decisions, financial decisions, investment decisions (Heaton 2002 ; Malmendier and Tate 2005 ; Malmendier and Tate 2008). Recently, more studies that focused on the relation between the financial information and the managerial overconfidence were conducted more actively, however the results were only minor. According to these results, the high managerial overconfidence would weaken conservatism and create optimistic bias, which would cause higher tendency of misreporting the net income(Schrand and Zechman 2012 ; Ahmed and Duellman 2013 ; Ryu and Kim 2015 ; Na and Kim 2016).

Also managerial overconfidence could increase the cost stickiness(Kim and Ryu 2014). Therefore Na and Kim(2016) reported that there were higher tendency of fraud to be committed to the financial statement as the managerial overconfidence was higher.

Increase in fraud in the financial statement mean that the financial statements potentially reflect the manager's opportunistic earnings management, and the quality of earnings might be low. In this case, the high managerial overconfidence would work negatively toward the rating of corporate bond. In this regard, this study set up a hypothesis, that suggested the corporate bond rating with higher managerial overconfidence would be lower than the corporate bond rating with lower managerial overconfidence, and performed empirical analysis on the hypothesis.

The managerial overconfidence studied by the empirical analysis were measured based on the study method by Na and Kim(2016) and Ryu and Kim(2015). The corporate bond ratings that were collected from the data of Korea Investors Service Inc. were scaled(from the highest 20 points to the lowest 1 point). In an ordered logistic model with the corporate bond rating as dependent variable and the managerial overconfidence as the independent variable, and after reflecting the controlled variables suggested from previous studies, the regression coefficient of the managerial overconfidence was shown to be a significantly negative value. This result could be interpreted as the corporate bonds with high managerial overconfidence have lower rating than the corporate bonds with low managerial overconfidence. In other words, the managerial overconfidence could be a negative factor toward the bond rating.

Forster(1986) reports that the credit rating of corporate bonds is not mechanically determined by financial ratios. Besides the financial ratios, Forster(1986) reports that various factors including the provisions of indenture, collateral and managerial qualities affect the credit rating of corporate bonds. In this respect, the previous empirical studies were conducted to find the relation between the bond rating and the different factors of the corporation, but there was hardly any study regarding the relation between the managerial qualities and the corporate bond rating.

Managers can signal to outside that there is nothing to hide by using the corporate bond rating. In this case, the rating agencies can play a role in monitor of the action of manager. In this regard, there was an implication on the result of this study, which suggested the managerial overconfidence significantly affects the corporate bond rating and the managerial characteristics could be a factor of debt cost. Also, this study has contributed in that it provides data that rating agencies monitor the action of manager.

This study was structured as following. In Chapter 2, the previous studies were reviewed, and a study hypothesis was suggested. In Chapter 3, study methodology, study model, variable measurement, and selection of samples were described, and in Chapter 4, the result of empirical study was presented. Lastly in Chapter 5, the result of the study and the implication were presented.

Ⅱ. Review of Previous Studies and Establishing a Hypothesis

1. Factors that Affect the Rating of Corporate Bonds

According to the study that researched the factors that affect the rating of the corporate bonds, the corporate bond rating had relation with financial ratio as well as different variables (governance, audit quality, disclosure, earnings management, information asymmetry level, and quality of earnings) of the individual companies(Kim et al. 2006 ; Park and Park 2012 ; Park et al. 2012 ; Park et al. 2014 ; Jung 2015a ; Jung 2015b). First of all, the study that analyzed the corporate governance measured the corporate governance variables with major shareholder ratio, institutional investor ratio, nonexecutive directors ratio, independency of the board, expertise of the board and corporate governance assessment score(provided by Korea Corporate Governance Service)(Bhojraj and Sengupta 2003 ; Ashbaugh－Skaife et al. 2006 ; Shin et al. 2012).

According to the analysis, the corporate bond rating decreased as the major shareholder ratio increased. However when institutional investor ratio, nonexecutive directors ratio, independency (and expertise) of the board and corporate governance assessment score increased, the bond rating increased. This result showed that good governance worked as a positive factor for the rating of corporate bond.

Park and Nam(2013) analyzed the effect of the audit quality from major audit firms(Big 4) on the cost of debt. According to the result, the companies hired a major audit corporation spent less cost of debt than the companies did not hire a major audit corporation. In a similar context, Park and Park(2012) analyzed the effect of the size of the auditors on the corporate bond rating. As the result, the size of the auditors and the corporate bond rating showed positive relation. This could be interpreted as the audit quality of the auditors was one of the factors that determine the rating of the corporate bonds.

The study that analyzed the relation between the managerial earning management level and the corporate bond rating, measured the managerial earning management with discretionary accruals, real earnings management and book－tax differences, then analyzed the relation between these variables and the corporate bond rating(Kim et al. 2006 ; Park et al. 2012 ; Park et al. 2014). As the result, discretionary accruals, real earnings management and book－tax differences had negative relation with the corporate bond rating. According to the result, the managerial earning management had negative effect on rating of the corporate bonds.

Meanwhile, Jeon and Park(2009), Kim and Ko(2011) reported that as the managerial earning

management increase, the earnings quality decreased. In this case, the earnings quality had positive relation with corporate bond rating. Based on this logic, Ashbaugh－Skaife et al.(2006), Park and Park(2012) studied the effect of earnings on the corporate bond rating by measuring the earnings quality with the quality of accruals and the earning smoothing. The results suggested that as the quality of accruals and the earning smoothing index increased, the corporate bond rating also increased. This meant that if the earnings quality was improved, the corporate bond rating could be improved as well.

Bhattacharya et al.(2012) explained that high earnings quality(the quality of accruals) reduces information risks and after all reduces the information asymmetry level as well. In this regard, Jung(2015a) studied the effect of the trading volume on the corporate bond rating by measuring the information asymmetry level with trading volume. As the result, as the trading volume increased, the corporate bond rating decreased. Jung(2015a) interpreted the result as the level of the information asymmetry was the negative factor for rating the corporate bonds.

Additionally, the previous studies related to the corporate bond rating reported that when rating the corporate bonds, the level of voluntary disclosure and excess audit fee were the negative factors(Park and Park 2011 ; Jung 2015b). However social responsibility activity(Chun and Cha 2013), abnormal audit hours(Jeon and Park 2014), tax subsidy(Jung and Byun 2016), human resource characteristics of internal control over financial reporting(Chae et al. 2012) and level of competition in the industry(Jung 2015c) were reported as a positive factors for the rating of corporate bonds.

2. Previous Studies about Managerial Overconfidence and Establishment of Hypothesis

In the past, previous studies about the managerial overconfidence were conducted focusing only on the effect of the managerial overconfidence on making the M&A decisions, financial decisions, investment decisions(Heaton 2002 ; Malmendier and Tate 2005 ; Malmendier and Tate 2008 ; Schrand and Zechman 2012 ; Ahmed and Duellman 2013). According to these previous studies, the companies with higher managerial overconfidence have more possibility to pay excessive price to the target companies during the acquisition, and to decide to make investment on the projects with negative NPV(Net Present Value).

Recently, previous studies about the managerial overconfidence were conducting empirical analysis on the relation between the managerial overconfidence and financial information. Ryu

and Kim(2015) analyzed the effect of the managerial overconfidence on the conservatism in the company, and as the result, the higher managerial overconfidence was, the less conservatism in the company. This analysis was connected to the study of Ahmed and Duellman(2013) which measured the conservatism with conditional conservatism and unconditional conservatism. Also with the empirical study result, Ahmed and Duellman(2013) proposed that the external monitoring had no effect on the negative relation between the managerial overconfidence and the conservatism.

Decrease in conservatism might imply the net income could be appropriated highly. In this point, Schrand and Zechman(2012) reported that the companies with higher managerial overconfidence created more optimistic bias, which lead to intentional misreports. In this context, Na and Kim(2016) suggested that high managerial overconfidence could increase the incentive to commit fraud on financial statements.

Kim and Ryu(2014) analyzed what effect the managerial overconfidence could make on the cost stickiness. According to the result, the managerial overconfidence and cost stickiness were shown to have a positive relation. Especially this result suggested that less transparent the earnings, more positive relation between the managerial overconfidence and the cost stickiness.

Meanwhile, from the previous studies about the corporate bond rating, as the managerial earnings management increased and the quality of earnings decreased, the corporate bond ratings decreased. In this case, high managerial overconfidence could act as a negative factor in rating the corporate bond. Based on these expectations, this study established the following hypothesis.

Hypothesis : *The bond rating of the corporate with high managerial overconfidence will be lower than the bond rating of the corporate with low managerial overconfidence.*

Ⅲ. Methodology

1. Research Model

In this study, in order to verify the relation between the managerial overconfidence and the corporate bond rating, below empirical study model was set.

$$CRA_{i,t+1} = \beta_1 MOC_{i,t} + \beta_2 EQ_{i,t} + \beta_3 BIG_{i,t} + \beta_4 FOR_{i,t} + \beta_5 BOD_{i,t} + \beta_6 SIZE_{i,t} + \beta_7 ROE_{i,t} + \beta_8 LEV_{i,t} + \beta_9 GRW_{i,t} + \beta_{10}\sigma(CFO)_{i,t} + \beta_{11} VOL_{i,t} + \beta_{12} VD_{i,t} + \beta_{13} TS_{i,t} + \beta_{14} YD_{i,t} + \beta_{15} IND_{i,t} + \epsilon_{i,t}$$ equation (1)

CRA : Corporate Bond Rating
MOC : Managerial Overconfidence
MOC1 : Managerial Overconfidence1
MOC2 : Managerial Overconfidence2
EQ : Earnings Quality
EQ_DD : Earnings Quality1
(absolute residual value measured by Dechow and Dichev(2002)($|\epsilon_{i,t}|$)×(−1))
EQ_F : Earnings Quality2
(absolute residual value measured by Francis et al.(2005)($|\epsilon_{i,t}|$)×(−1))
BIG : Size of Auditors(1 if the auditor is big 4, 0 for others)
FOR : Foreigner Ownership Ratio(average common stock foreigner ownership)
BOD : Percentage of abnormal outside directors
(number of outside directors−(number of registered directors×legal minimum outside directors∗ratio)/number of outside directors)
∗ legal minimum outside directors=50% if the asset size is more than 2 trillion won, 25% for less than 2 trillion won
SIZE : (ln(total assets))
ROE : Return on Equity(operation profit/equity)
LEV : Debt Ratio(total liability/total assets)
GRW : Growth Rate of Sales
σ(CFO) : Variability of Cash Flow of Operation
(operating cash flow(operating cash flow/total assets) standard deviation over the past five years)
VOL : Standard deviation of daily stock returns
VD : Voluntary Disclosure(number of voluntary disclosure/ln(t−1 total assets))
TS : Tax Subsidy
YD : Year dummy
ICODE : Industry dummy

Equation (1)'s was a coefficient of hypothetical testing, and the sign of must be negative to be consistent with the hypothesis. This meant that if proposes a significantly negative value, the corporate bond rating of high managerial overconfidence should be lower than the corporate bond rating with low managerial overconfidence.

This study controlled the variables that might affect the corporate bond rating by including the next variable in the model. Ashbaugh−Skaife et al.(2006), Jung(2015a), and Jung and Byun (2016) reported that the earnings quality and the corporate bond rating have positive relation. In

this study, the quality of accrual was measured by the methodology of Dechow and Dichev(2002) and Francis et al.(2005), and added to the model.

To control the effect of audit quality on the rating of corporate bonds, the size of auditors(BIG) was added to the model. Park and Nam(2013) reported that when major audit corporations conduct audit, the audit qualities increase, which lead to the reduction of cost of debt. This meant that if major audit corporation conduct the audit, the corporate bond rating might improve. In this context, the size of the auditors(BIG) was added to the model, and the size of the auditors(BIG) was expected to have a positive relation.

Bhojraj and Sengupta(2003), Kim et al.(2006), Shin et al.(2012), Jung and Byun (2016) reported that the corporate governance and the characteristic of the board had relation with the corporate bond rating. In this regard, this study added the corporate governance and the characteristic of the board to the model by measuring them with foreigner ownership ratio(FOR) and abnormal outside director ratio(BOD). Foreigner ownership ratio(FOR) and abnormal outside director(BOD) were expected to have positive(+) relation with the corporate bond rating.

Corporate size(SIZE) and return on equity(ROE) were added to the model in order to control the effect of the corporate size and profitability on the corporate bond rating. Concretely the corporate size(SIZE) and the return on equity(ROE) were expected to have a positive relation with the corporate bond rating.

Kim et al.(2006) reported that as the company with high debt ratio had high risk to default, the debt ratio had a negative relation with the corporate bond rating. In this regard, this study included debt ratio(LEV) to the model. Jung and Byun(2016) reported that the company with high growth potential increases the corporate bond rating. This study measured the growth potential of the company with the growth rate of sales. The growth rate of sales was expected to have a positive(+) relation with the corporate bond rating.

Jung and Byun(2016) described that the frequent changes in sales environment of the company could reduce the corporate bond rating. This study measured the change of sales environment with the variability of cash flow of operation(σ(CFO)), and added to the model. Concretely, the variability of cash flow of operation(σ(CFO)) was expected to have a negative(−) relation with the corporate bond rating. Standard deviation of the annual daily price earnings ratio(VOL) was added to the model in order to control the effect of the asymmetry of the information on the corporate bond rating(Park et al. 2013 ; Jung and Byun 2016). Standard deviation of the annual daily price earnings ratio(VOL) was expected to have a negative(−) relation with the corporate bond rating.

The level of voluntary disclosure(VD) was added to the model in order to control the effect of amount of information to the corporate bond rating. Jung(2015b) reported that the level of voluntary disclosure and the earnings quality had interchangeable relation. This meant that the company with low accounting quality may have higher level of voluntary disclosure. In this context, the level of voluntary disclosure was expected to have a negative(－) relation with the corporate bond rating. Year dummy(YD) and industry dummy(ICODE) were added to control the effect of year dummy and industry dummy on the corporate bond rating.

2. Measuring Managerial Overconfidence

This study measured the proxy about the managerial overconfidence with managerial overconfidence1(MOC1) and managerial overconfidence2(MOC2). Managerial Overconfidence1 (MOC1) was measured by the methodology based on Na and Kim(2016).

Na and Kim(2016) measured the managerial overconfidence as a dummy variable focusing on the capital expenditure(acquisition of building, structure and facility(Code number in Kis－Value ：162552)) based on the study of Malmendier and Tate(2005). Concretely Na and Kim(2016) counted as ‘1’ if ‘the ratio of the total asset amount in the previous period to the capital expenditure in the present period(capital expenditure(t) / total asset amount(t－1))’ was larger than the median(year － industry), and if not, counted as ‘0’.

The managerial overconfidence2(MOC2) to be used in this study was measured by the methodology of Ryu and Kim(2015). Ryu and Kim(2015) conducted the regression analysis (equation 2) per year － industry based on the study of Schrand and Zechman(2012) and used the residual to measure the managerial overconfidence.

Concretely, Ryu and Kim(2015) counted as ‘1’ if the residual was positive(＋) and as ‘0’ if negative to measure the managerial overconfidence. This study applied the methodology of Ryu and Kim(2015) to measure the managerial overconfidence 2(MOC2). Therefore the company with the value of MOC1 and MOC2 were ‘1(0)’ could be considered as the company with high (low) managerial overconfidence. The managerial overconfidence used in this study was measured from 2001 to 2011, targeting 4,909 companies.

$$\triangle ASSET_{i,t} = \beta_0 + \beta_1 \triangle GRW_{i,t} + \epsilon_{i,t} \qquad \text{equation (2)}$$

△ASSET ： Growth Rate of Assets
△GRW ： Growth Rate of Sales

3. Measuring Tax Subsidy(TS)

The tax subsidy(TS) was measured with the methodology of Jung and Byun(2016). Jung and Byun(2016) described the residual from below equation (3) as the estimation of the controlled tax subsidy with the opportunistic managerial earning management.

$$TSP_{i,t} = \beta_1 TAC_{i,t} + \beta_2 YD_{i,t} + \beta_3 IND_{i,t} + \epsilon_{i,t}(TS) \quad \text{equation (3)}$$

TSP : {(net income before income taxes × (the highest)tax rate) − Income tax expense}/equity
TAC : Total accrual(net Income − cash flow from operating)
YD : Year dummy
IND : Industry dummy
ϵ : Tax Subsidy(TS)

4. Selecting Samples

The samples range from the year of 2001 to 2011. Companies that met below criteria were selected as samples.

(1) Listed corporation in the stock market from 2001 to 2011 excluding financial corporations
(2) Corporations with positive (+) capital and the settling day in December
(3) Corporations of which information of NICE(Corp.) corporate bond rating could be extracted from the database in Data − Guide5 of Fn − Guide.
(4) Corporations of which financial statements and stock price information could be extracted from NICE(Corp) Kis − Value and TS − 2000 database.
(5) Corporations of which information about the number of voluntary disclosure, registered executives and nonexecutive directors could be collected from Data Analysis, Retrieval and Transfer System(http : //dart.fss.or.kr/)

<Table 1> showed the distribution of the firms that satisfied the above conditions by the industry and the year. The industrial classification suggested in <Table 1> follows classification of NICE(Corp). In <Table 1>, there were 485 manufacturing activities(company − year), 105 professional, scientific and technical services activities(company − year), 96 wholesale and retail activities(company − year), and 85 construction activities(company − year) among total 805 final samples(company − year), and these four industries take over 85% of all samples. To control the effect of the industries suggested in <Table 1>, this study included the industry dummies

in the model.

〈Table 1〉 Distribution of sample by firm−year and industry

Industry	01	02	03	04	05	06	07	08	09	10	11	Total
Farming, Forestry and Fishing	1											1
Mining	1	1	1									3
Manufacturing	47	35	38	40	39	45	44	43	52	54	48	485
Electricity, Gas, Capital and Steam	4	2	2	3	3	3	3	2	5	4	4	35
Construction	5	5	5	8	11	9	8	10	12	8	4	85
Wholesale and Retail	7	7	7	9	8	10	9	8	10	13	8	96
Transportation	4	4	2	4	6	6	6	6	5	5	3	51
Publishing, Motion Picture, Video, Television Programme Production and Information Service Activities	2	2	3	4	4	4	3	5	5	5	3	40
Professional, Scientific and Technical Services	12	13	10	12	9	13	12	10	6	6	2	105
Creative, Arts, Recreation Related Services, Sports and Amusement	1											1
Total	84	69	68	80	80	90	85	84	95	95	72	902

<Table 2> described the corporate bond ratings per year. This study set it as 't+1 period'. In this regard, the years in <Table 2> were from 2002 to 2012. Among 902 final samples(company−year), 116(company−year), 114(company−year), and 107(company−year) companies had their bond rated with 'A+', 'A−' and 'BBB+'. In addition, 103(company−year), and 107(company−year) were rated with 'A' and 'A−'. These five categories combined were shown to comprise more than 59% of all the samples. On the other hand, the corporate bond rating in this study were scaled from 1(the worst) to 20(the best) based on the methodology of Na and Kim(2009), Kim and Jeon(2014) and Jung and Byun(2016).

<Table 2> Distribution of corporate bond rating by year

Rating		02	03	04	05	06	07	08	09	10	11	12	Total
AAA	20	4	5	4	5	4	2	4	3	5	4	3	43
AA+	19				1	2	3	4	6	6	8	6	36
AA	18	3	4	3	1	1	1	1	3	10	8	11	46
AA-	17	5	2	3	5	7	10	8	12	17	19	13	101
A+	16	6	6	7	8	8	10	17	15	15	15	9	116
A	15	8	7	10	11	9	13	11	12	9	8	5	103
A-	14	12	8	6	13	13	15	9	8	9	11	10	114
BBB+	13	13	12	12	10	8	9	12	9	9	6	7	107
BBB	12	10	8	6	13	15	13	9	6	4	6	2	92
BBB-	11	7	5	10	6	10	10	5	6	5	3	2	69
BB+	10	7	10	5	4			2		2	2		32
BB	9	7	1	1	1	1	2	2			2	3	20
BB-	8	1			1	1			1	2	1		7
B+	7							1	1	1			3
B	6	1		1			1		1		1		5
B-	5		1				1						2
CCC	4								1	1	1	1	4
C	2				1	1							2
Total		84	69	68	80	80	90	85	84	95	95	72	902

Ⅳ. The Result of Empirical Analysis

1. Descriptive Statistics and Relation Analysis of Key Variables

<Table 3> was a descriptive statistics of the variables used in empirical analysis. In <Table 3>, the mean(median) value of the corporate bond rating(CRA) was 14.3869(14.0000) and the standard deviation was 3.0171. Jung and Byun(2016) reported the mean(median) value of the corporate bond rating as 14.3297(4.0000), which were close to the outcome(CRA) of this study.

The mean and median value of the managerial overconfidence1(MOC1) were 0.4945 and

0.0000 and those of the managerial overconfidence2(MOC2) were 0.5765 and 1.0000. And the standard deviation of managerial overconfidence1(MOC1) and managerial overconfidence2 (MOC2) were 0.5002 and 0.4944.

The mean(median) value of the earnings quality1(EQ_DD) were −0.0568(0.0405), and the mean(median) value of the earnings quality2(EQ_F) were −0.0545(−0.0391). Shon et al.(2009), reported the mean(median) value of the earnings quality1 and the accrual2 as 0.067(0.049) and 0.066(0.048). This study multiplied '(−1)' to the estimated quality of the accrual1 and 2(EQ_DD and EQ_F) to measure. Therefore, this study suggested negative values for the estimated quality of the accruals(EQ_DD and EQ_F), unlike the study of Sohn et al.(2009). However the mean and the median showed similar values to those of Shon et al.(2009).

For other controlled variables, the mean(median) value of size of the auditors(BIG) were 0.7838(1.0000). The mean(median) value of foreign owner ratio(FOR) were 0.1725(0.1244) and the mean(median) value of abnormal outside director(BOD) were −0.0005(0.0000). These variables showed similar pattern of dispersion to that of the study of Jung and Byun(2016). Concretely, in the study of Jung and Byun(2016), the mean(median) value of foreign owner ratio(FOR) were reported as 0.1747(0.1247) and the mean(median) value of abnormal outside director(BOD) were reported as 0.0026(0.0000).

The mean(median) value of corporate size(SIZE) and the return on equity(ROE) were 27.8248 (27.7861) and 0.1208(0.1152). The mean(median) value of debt ratio(LEV) and growth rate of sales(GRW) were 0.5616(0.5752) and 0.0964(0.0781). The mean value of these variables showed to be similar to the median.

The mean(median) variability of cash flow of operation(σ(CFO)) were 0.0543(0.0454), which were shown to be similar to the mean value(0.0560) and the median value(0.0473) of Jung and Byun(2016). The mean(median) value of the standard deviation of the annual daily price earnings ratio(VOL) were 0.0270(0.0255) and the mean(median) voluntary disclosure(VD) were reported to be 0.0556(0.0000). And the mean(median) value of tax subsidy(TS) were 0.0087(0.0101) which was slightly smaller than the mean value(0.0094) and the median value(−0.0005) of Jung and Byun(2016). This study limited the samples to the companies with the corporate bond rating information available. In this regard, there seemed to be a slight difference of the mean and median value of tax subsidy between this study and Jung and Byun(2016).

<Table 3> Descriptive statistics of variables(n=902)

Variables	Mean	Standard Deviation	Min	25%	Median	75%	Max
CRE	14.3869	3.0171	2.0000	12.0000	14.0000	16.7500	20.0000
MOC1	0.4945	0.5002	0.0000	0.0000	0.0000	1.0000	1.0000
MOC2	0.5765	0.4944	0.0000	0.0000	1.0000	1.0000	1.0000
EQ_DD	−0.0568	0.0617	−0.7988	−0.0752	−0.0405	−0.0182	−0.0001
EQ_F	−0.0545	0.0622	−0.7895	−0.0712	−0.0391	−0.0171	0.0000
BIG	0.7838	0.4119	0.0000	1.0000	1.0000	1.0000	1.0000
FOR	0.1725	0.1626	0.0001	0.0401	0.1244	0.2577	0.8706
BOD	−0.0005	0.1348	−0.5000	−0.0500	0.0000	0.0714	0.3500
SIZE	27.8248	1.4623	23.5855	26.6641	27.7861	28.8435	31.9405
ROE	0.1208	0.1314	−0.8818	0.0607	0.1152	0.1805	0.5935
LEV	0.5616	0.1790	0.0758	0.4347	0.5752	0.6866	0.9979
GRW	0.0964	0.2263	−0.9773	0.0118	0.0781	0.1668	1.7397
sCFO	0.0543	0.0353	0.0047	0.0303	0.0454	0.0674	0.2534
VOL	0.0270	0.0088	0.0000	0.0213	0.0255	0.0310	0.0723
VD	0.0549	0.0981	0.0000	0.0000	0.0000	0.0713	0.8677
TS	0.0087	0.0492	−0.4545	0.0013	0.0101	0.0215	0.3235

Variable definitions : CRA(corporate bond rating), MOC1(managerial overconfidence1), MOC2(managerial overconfidence2), EQ_DD(earnings quality1), EQ_F(earnings quality2), BIG(size of auditors(1 if the auditor is big 4, 0 for others)), FOR(foreigner ownership ratio(average common stock foreigner ownership)), BOD(percentage of abnormal outside directors), SIZE(ln(total assets)), ROE(return on equity(operation profit/equity)), LEV(debt ratio(total liability/total assets)), GRW(growth rate of sales), σ(CFO)(variability of cash flow of operation), VOL(standard deviation of daily stock returns), VD(voluntary disclosure) and TS(tax subsidy)

<Table 4> described the Pearson correlation coefficient between the variables in empirical analysis. In <Table 4>, the corporate bond rating(CRA) was shown to have a significantly negative(−) correlation to the measured values of managerial overconfidence(MOC1 and MOC2). This result did not consider any factors that also affect rating of the corporate bonds, however, even so, it suggested that the managerial overconfidence negatively affect the corporate bond rating.

<Table 4> Correlation coefficient(n=902)

		CRE	MOC		EQ		BIG	FOR	BOD	SIZE	ROE	LEV	GRW	sCFO	VOL	VD
			MOC1	MOC2	EQ_DD	EQ_F										
MOC	MOC1	−0.1306***														
	MOC2	−0.1110***	−0.0050													
EQ	EQ_DD	0.1422***	−0.0463	0.0296												
	EQ_F	0.1585***	−0.0642*	0.0131	0.8937***											
BIG		0.2996***	−0.0516	−0.0086	0.0454	0.0682**										
FOR		0.4967***	−0.0232	−0.0732**	0.0768**	0.0955***	0.1270***									
BOD		0.0501***	0.0076	0.0038	0.0043	0.0052	0.1145***	0.0106								
SIZE		0.5772***	−0.1551***	0.0672**	0.0853**	0.1072***	0.3537***	0.4145***	0.1025***							
ROE		0.1780***	−0.0295	−0.0566*	0.0291	0.0374	0.0215	0.1817***	0.0245	0.0574*						
LEV		−0.2015***	−0.0662**	−0.1556***	−0.0567*	−0.0489	0.0925***	−0.1697***	0.0625**	0.1640***	0.1133***					
GRW		0.0519	0.0250	0.0021	−0.0556*	−0.0509	0.0704**	0.0225	−0.0132	0.0001	0.0722**	0.1479***				
σ(CFO)		−0.1802***	−0.0070	−0.0030	−0.1496***	−0.1051***	−0.0096	−0.0509	0.0022	−0.0729**	0.0893***	0.1630***	0.0358			
VOL		−0.5101***	0.0443	0.0812**	−0.1117***	−0.1214***	−0.1957***	−0.2312***	0.0552*	−0.2307***	−0.0671***	0.1879***	0.0031	0.1762***		
VD		0.0858**	−0.1004***	0.0262	−0.0486	−0.0182	0.1209***	0.0431	0.0218	0.2435***	−0.0619*	0.0997***	0.0152	0.0561*	−0.0243	
TS		0.1922***	−0.0722**	−0.1294***	0.0407	0.0535	0.0069	0.0745**	0.0193	0.0054	0.1855***	−0.0564*	0.1152***	0.0163	−0.1424***	0.0395

1) ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

2) Refer to <Table 3> for variable definitions.

Analyzing the correlation between the corporate bond rating and the controlled variables, the corporate bond rating(CRA) was shown to have a significantly positive(+) correlation with quality of the earnings(EQ_DD and EQ_F), size of the auditors(BIG), foreigner ownership ratio(FOR), abnormal outside director(BOD), size of the corporate(SIZE), return on equity(ROE), and level of voluntary disclosures(VD). However the bond rating was shown to have a significantly negative(−) correlation with variability of cash flow of operation(σ(CFO)), the standard deviation of the annual daily price earnings ratio(VOL), and debt ratio(LEV).

2. Verification Result of the Hypothesis

<Table 5> was the result of empirical analysis of the hypothesis of this study. Model 1 and model 2 in <Table 5> were the managerial overconfidence measured with the managerial overconfidence1(MOC1), and model 3 and model 4 were the managerial overconfidence measured with the managerial overconfidence2(MOC2). Also, model 1 and model 3 measured the earnings quality with the earnings quality1(EQ_DD) and model 2 and model 4 measure the earnings quality with the quality of accrual2(EQ_F), and the individual model dependent variables were the corporate bond rating(CRA).

Analyzing <Table 5>, the regression coefficients of the measured value of managerial overconfidence(MOC1 and MOC2) suggested significantly negative(−) values in all models (Model 1, 2, 3, and 4). This result was consistent with the hypothesis of this study, and it could be considered that the companies with high managerial overconfidence had lower corporate bond rating than the companies with low managerial overconfidence.

Analyzing the other controlled variables, the regression coefficients of the measured quality of earnings(EQ_DD and EQ_F) suggested significantly positive(+) values in their models. This result was consistent with the expected sign of this study, and the increase in the quality of the accounting quality could be synonymous with the increase of the corporate bond rating. The regression coefficients of the size of the auditors(BIG) showed significantly positive(+) value in their models. This study included the size of the auditors(BIG) as a proxy measure of the audit quality to control the effect of the audit quality to the corporate bond rating. In this regard, the corporate bond rating could be considered that the size of the auditors acted as a positive factor toward the corporate bond rating.

The both regression coefficients of the foreign owners ratio(FOR) and the corporate size(SIZE) showed significantly($p < 1\%$) positive(+) value in their models. This result was consistent with

the expected sign of this study, and the better governance and bigger size of the corporate could be synonymous with the better corporate bond rating. The regression coefficients of the return on equity(ROE) suggested significantly($p<1\%$) positive(+) value in their models. This could mean that the better profit worked as a factor to improve the corporate bond rating.

The regression coefficients of the debt ratio showed negative values in all of their models. Therefore this could be interpreted as the company with higher debt ratio would have their corporate bond rating decreased. The regression coefficients of the sales growth rate showed significantly positive(+) value in their models. This result was consistent with the study of Jung and Byun(2016), and could mean that the high growth rate of companies would increase the corporate bond rating.

The regression coefficients of the variability of the cash flow of the operation(σ(CFO)) showed all significantly negative values in model 1 and model 2. Therefore the high variability of the sales environment was considered to decrease the corporate bond rating. The regression coefficients of the standard deviation of the annual daily price earnings ratio(VOL) significantly($p<1\%$) negative(−) value in their models. According to this result, the high asymmetry of information would be considered to decrease the corporate bond rating. The regression coefficients of the tax subsidy(TS) showed significantly($p<1\%$) positive(+) value in their models. This result was consistent with the study result of Jung and Byun(2016), and suggested that the tax subsidy worked as a positive factor toward the rating of corporate bonds. However the regression coefficients of quality of earnings(EQ_DD and EQ_F), abnormal outside director ratio(BOD) and the voluntary disclosure(VD) showed no relation.

To summarize the result of <Table 5>, the bond rating of the corporate with high managerial overconfidence will be lower than the bond rating of the corporate with low managerial overconfidence. In this regard, the result suggested that the managerial overconfidence worked as a negative factor toward rating of the corporate bonds.

〈Table 5〉 Regressions the for effect of managerial overconfidence on the corporate bond ratings

$$CRA_{i,t+1}=\beta_1 OC_{i,t}+\beta_2 EQ_{i,t}+\beta_3 BIG_{i,t}+\beta_4 FOR_{i,t}+\beta_5 BOD_{i,t}+\beta_6 SIZE_{i,t}+\beta_7 ROA_{i,t}+\beta_8 LEV_{i,t}+\beta_9 GRW_{i,t}+\beta_{10}\sigma(CFO)_{i,t}+\beta_{11} VOL_{i,t}+\beta_{12} VD_{i,t}+\beta_{13} TS_{i,t}+\beta_{14} YD_{i,t}+\beta_{15} IND_{i,t}+\epsilon_{i,t}$$

		Model 1, n=902		Model 2, n=902		Model 3, n=902		Model 4, n=902	
		Coef.	z−value	Coef.	z−value	Coef.	z−value	Coef.	z−value
MOC	MOC1	0.2577	−2.10***	0.2544	−2.07***	0.8882	−6.75	0.8880	−6.75
	MOC2								
EQ	DD	0.7134	0.71			1.0973	1.09		
	F			0.9261	0.95			1.2776	1.31
BIG		0.3201	1.88*	0.3165	1.86*	0.3436	2.02**	0.3384	1.99**
FOR		5.1829	10.37***	5.1703	10.33***	4.7736	9.59***	4.7578	9.55***
BOD		−0.2434	−0.47	−0.2458	−0.48	−0.2506	−0.48	−0.2504	−0.48
SIZE		0.9638	15.15***	0.9632	15.13***	1.0574	16.07***	1.0566	16.06***
ROE		3.2794	5.76***	3.2893	5.78***	3.5472	6.20***	3.5570	6.22***
LEV		−3.9798	−9.62***	−3.9795	−9.62***	−4.8204	−10.95***	−4.8219	−10.96***
GRW		0.5830	2.02**	0.5851	2.02**	0.7213	2.45**	0.7242	2.46**
σ(CFO)		−3.7693	−1.93*	−3.7635	−1.94*	−3.0572	−1.57	−3.0769	−1.58
VOL		−96.5772	−10.07**	−96.3834	−10.05***	−93.4466	−9.71***	−93.2371	−9.68***
VD		−0.2291	−0.33	−0.2347	−0.33	−0.0260	−0.04	−0.0397	−0.06
TS		7.2750	4.63***	7.2743	4.63***	6.1932	3.82***	6.2017	3.82***
YD		Included		Included		Included		Included	
IND		Included		Included		Included		Included	
Model Chi−square		1191.95***		1192.34***		1233.89***		1234.41***	
Pseudo. R^2		0.2680		0.2681		0.2774		0.2775	

1) ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

2) Refer to <Table 3> for variable definitions.

3. Robust Test

The overconfidence measures of managers in this study were measured based on Ryu and Kim (2015). Ryu and Kim (2015) is a measure of managerial confidence that takes into account the situation in Korea. Specifically, MOC1 means companies with high capital expenditures. A large amount of capital expenditure indicates a lot of capitalization. And a large number of assets indicates management's confidence in future cash flows.

MOC2 represents asset expansion considering sales. MOC2 means more investment in asset expansion than companies in the same industry. However, MOC2 may have a problem of autocorrelation. In this study, we measured additional managerial overconfidence proxy(managerial overconfidence3(MOC3) and analyzed the relationship between managerial overconfidence and credit rating.

The MOC3 of this study was measured based on the methodology of Cha(2016). Cha(2016) explains that managers with high confidence levels have lower dividends. Therefore, Cha(2016) measures a company with zero dividend rate as a firm with high confidence. Specifically, Cha(2016) counted as '1' if the dividend rate was zero and as '0' if the dividend rate was not zero.

<Table 6> shows the relationship between additional managers' confidence measures and credit ratings. The regression coefficients of the measured value of managerial overconfidence(MOC3) suggested significantly negative(−) values in Model 1 and Model 2). This result was consistent with the <Table 5>, and this result means that high−managerial overconfidence reduce bond rating.

〈Table 6〉 Robust test : Regressions the for effect of managerial overconfidence3(MOC3) on the corporate bond ratings

		Model 1, n=851		Model 2, n=851	
		Coef.	z−value	Coef.	z−value
MOC3		−2.9443	−11.87***	−2.9391	−11.87***
EQ	DD	−0.3087	−0.28		
	F			0.0957	0.09
BIG		0.3183	1.79*	0.3178	1.79*
FOR		4.8710	9.36***	4.8638	9.34***
BOD		−0.3125	−0.59	0.3169	−0.60
SIZE		1.1891	17.28***	1.1882	17.26***

〈Table 6〉 Robust test : Regressions the for effect of managerial overconfidence3(MOC3) on the corporate bond ratings (continued)

	Model 1, n=851		Model 2, n=851	
	Coef.	z-value	Coef.	z-value
ROE	3.3971	5.33***	3.3943	5.32***
LEV	-4.1022	-9.54***	-4.1037	-9.53***
GRW	0.4663	1.54	0.4689	1.55
σ(CFO)	-0.0316	-0.02	-0.0694	-0.09
VOL	-73.6608	-7.08***	-73.4697	-7.08***
VD	0.2011	0.27	0.2175	0.29
TS	2.8209	1.75*	2.8026	1.74*
YD	Included		Included	
IND	Included		Included	
Model Chi-square	1284.65***		1284.58***	
Pseudo R^2	0.3080		0.3080	

1) ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.
2) Variable definitions : MOC3(1 if the dividend rate was zero, 0 for others) and refer to <Table 3> for other variable definitions.

Ⅴ. Conclusion

This study established a hypothesis, which the bond rating of the corporate with the higher managerial overconfidence would be lower than that of the corporate with the lower managerial overconfidence, and conducted an empirical study. Managerial overconfidence was measured by the methodologies of Na and Kim(2016) and Ryu and Kim(2015). Corporate bond rating data from Korea Investors Service Inc. were scaled and used for analysis to measure the corporate bond rating. The study samples were 902 companies(company-year) from 2001 to 2011.

The previous studies related to the corporate bond rating conducted empirical analysis to show how the corporate bond rating was related to the various business variables. Meanwhile, it was reported that the high managerial overconfidence would create optimistic bias, which could cause higher tendency of misreporting the net income. Also, in the similar context, higher managerial overconfidence showed the increase in the cost stickiness.

Na and Kim(2016) reported that there were higher tendency of fraud to be committed to the financial statement as the managerial overconfidence was higher. This suggested that the managerial overconfidence could act as a negative factor toward rating the corporate bond. However, there had been no study that analyzed how the managerial overconfidence affects the corporate bond rating. Therefore, this study conducted empirical study to find how the managerial overconfidence affects the corporate bond ratings.

As the result of the empirical study, the regression coefficient of the managerial overconfidence showed to have a significantly negative(−) value. The result could be interpreted as the companies with high managerial overconfidence would have lower ratings of the corporate bonds than the companies with low managerial overconfidence. Again, it suggested that the managerial overconfidence worked as a negative factor toward rating of the corporate bonds.

The previous corporate bond rating studies conducted empirical analysis on the relation between the corporate bond rating and the various corporate business variables, however there had been no studies about the relation between the corporate bond rating and the managerial overconfidence. In this regard, the result of this study, which suggested that the managerial overconfidence significantly affected the corporate bond rating, had an implication that the managerial characteristics could be a factor of the capital financial cost. However there was a constraint to this study, which was the managerial overconfidence could not be scaled to levels due to the limitation of domestic disclosure data.

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경영자의 과대확신이 회사채 신용등급에 미치는 영향

정현욱* · 변선영**

<요 약>

본 연구는 경영자의 과대확신이 높은 기업의 회사채 신용등급은 경영자의 과대확신 수준이 낮은 기업의 회사채 신용등급보다 낮을 것이라는 가설을 설정하고, 순서형 로짓모형(ordered logistic model)을 이용하여 실증분석을 수행하였다. 본 연구의 가설은 경영자의 과대확신이 높아질수록 재무제표에 회계부정(fraud)이 개입될 유인이 높아진다고 보고한 나영 · 김정우(2016)의 연구결과에 근거하고 있다.

2001－2011년 기간 동안 902개(기업－년)를 대상으로 분석한 결과, 경영자의 과대확신의 회귀계수는 유의한 음(－)의 값을 가지는 것으로 나타났다. 이는 경영자의 과대확신이 높은 기업의 회사채 신용등급은 경영자의 과대확신 수준이 낮은 기업의 회사채 신용등급보다 낮은 것으로 해석할 수 있을 것이다. 또한, 이는 경영자의 과대확신은 회사채 신용등급 산정에 부정적인 요인으로 작용할 수 있음을 시사한다.

회사채 신용등급과 관련된 선행연구에서는 회사채 신용등급과 다양한 기업특성요인들 간의 관련성을 실증분석하고 있지만, 경영자의 특성과 회사채 신용등급 간의 관련성을 분석한 연구는 없는 실정이다. 이러한 점에서 경영자의 과대확신이 회사채 신용등급의 유의한 영향을 미친다는 본 연구의 결과는 경영자의 특성이 자본조달비용에 영향을 미치는 요인이 될 수 있다는 자료를 제공한다는 점에서 시사점이 있다고 판단된다.

<주제어> 경영자의 과대확신, 회사채 신용등급, 회계부정

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