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## Do Audit Fees and Audit Hours Influence Credit Ratings?: A Comparative Analysis of Big4 vs Non-Big4

Lim Hyoung-joo\* · Mali Dafydd\*\*

### < Abstract >

We examine the relationship between credit ratings / changes and audit fees (hours) for Big4 and Non-Big4 firms. Audit fee (hours) may be considered as a default risk metric for credit ratings agencies. However, firms audited by Big4 are larger, better performing and operate with lower leverage compared to firms followed by Non-Big4. Therefore, the association between audit fee (hours) may be different for firms followed by Big4 and Non-Big4 audit firms. We find that there is a negative association between audit fees and credit ratings for firms followed by Big4 audit firms. However, we find an insignificant relation for firms followed by Non-Big4. We conjecture the different association due to the Big4 firms having more robust accounting procedures; Big4 firms must offer competitive audit fees because they are engaged in fierce competition with other Big4 firms. Moreover, Big4 and Non-Big4 firms have different relationships with their clients because Non-Big4 firms are more income dependent on their clients.

Using a sample of 1,717 firm-year observations between 2002 and 2013, we establish a relation between audit fees in period  $t$  and credit ratings in period  $t+1$ , for firms followed by Big4 auditors. We do not find a significant relation for firms followed by Non-Big4 firms, suggesting that credit ratings agencies perceive audit fee differently for Big4 and Non-Big4 firms. Client firms followed by Big4 auditors that experience a credit rating change in period  $t+1$  pay lower audit fees in period  $t$  compared to firms that do not experience a credit rating change. Our additional analysis suggests a different association between firms audit fees and firm performance for firms that experience a credit rating increase and decrease. Firms that experience a credit ratings increase in period  $t+1$  have strong performance and lower audit fees in period  $t$ . On the other hand, firms that experience a credit rating decrease have weak financial performance and negative audit fees compared to firms that do not experience a credit ratings change. Our results suggest that audit fees combined with financial performance influence a credit ratings agency' perception of default risk.

Key word : credit ratings, long-term debt, audit fees, audit hours, Big4.

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## 감사보수와 감사시간은 신용등급에 영향을 미치는가?: Big4와 Non-Big4 감사법인 비교를 중심으로

임 형 주\* · 말리 다피드\*\*

### < 국문초록 >

본 연구는 감사보수와 감사시간이 신용등급과 신용등급의 변화에 영향을 미치는지에 대해 검토하는 것을 목적으로 한다. 선행연구에 따르면 감사인들은 위험수준이 높은 기업들에 더 많은 감사노력을 투입하여 소송위험과 같은 잠재적 위험을 사전에 차단하려고 노력하는 것으로 알려져 있다(Davis et al. 1993; Bell et al. 2001; Johnstone and Bedard 2001, 2004). 높은 감사보수와 감사시간은 높은 감사노력으로 연결되어 높은 감사품질을 견인할 수 있지만, 감사인과 피감사기업의 유착관계 혹은 위험이 높은 기업에 대한 추가적 감사시간투입으로 인지될 수도 있다. 이는 실증적으로 해결해야 할 문제이며 이에 관한 연구는 실로 부족한 실정이다. 특히, 우리나라의 경우 수많은 감사인 관련 제도가 입법화 되면서 Big4 감사인간의 보수 과당경쟁이 심화되었고 이로 인해 근본적인 감사품질의 제고가 필요하다는 우려의 목소리가 커지고 있다. Big4와 Non-Big4는 감사보수 및 위험에 관한 유인에 체계적인 차이가 있을 것으로 예상되므로 본 연구는 이 두 그룹을 철저하게 분리하여 분석하는 방법을 채택하였다.

본 연구는 2002년부터 2013년 상장기업 중 회사채를 발행한 1,717 기업-년을 표본으로 선정하고 감사보수 및 시간이 신용등급에 미치는 영향을 고찰하였다. 연구결과, 감사보수와 당기 신용등급 및 차기 신용등급과 유의적인 음(-)의 관련성이 Big4표본에서만 관찰되었다. Big4의 경우 감사보수는 과당경쟁으로 인해 사전에 할인되어 결정되는 경우가 빈번한데 감사보수가 증가한다는 것은 유착관계 등의 위험 신호로 인지될 가능성이 있다. 그러나 Non-Big4의 경우 지역 고객유치에 치중하는 경향이 강하므로 상대적으로 과당 보수경쟁으로부터 자유로울수 있고 따라서 감사보수의 증가는 감사품질의 향상으로 인지될 가능성이 있다. 이는 감사보수의 증가가 Big4와 Non-Big4의 분류에 따라 상이한 신호로 인지될 수 있는 가능성을 시사하는 결과이다. 한편 감사시간은 신용등급 및 신용등급의 변화와 유의적인 관련성이 없는 것으로 나타났다. 이는 신용등급평가기관들이 감사시간을 위험신호로 고려하지 않는 것에 기인할 수도 있고 또 감사품질을 향상시키기 위한 추가적인 감사시간투입과 위험회피성 감사투입 시간 투입의 혼재된 결과일 수도 있다. 본 연구는 Big4와 Non-Big4 여부에 따라 감사보수와 감사시간이 신용등급을 예측할 수 변수로 사용될 때 차이가 있다는 점을 확인했다는 점에서 의의가 있다.

주제어 : 신용등급, 장기 사채, 감사보수, 감사시간, Big4

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## I. Introduction

We examine whether a firm's credit rating level and credit ratings changes are associated with auditors assessment of audit risk, consequently audit fees (hours). Moreover, we compare a credit ratings agency's perception of risk for firms followed by Big4 and Non-Big4 audits. Credit risk is the possibility or expectation of financial default (Moody's Investor Service 2009; Standard and Poor's 2012). Firms with low credit ratings have a higher expectation of default compared to firms with higher credit ratings. The purpose of an audit is to provide an impartial view about a firms reporting system, operations and financial statements, and to reduce audit risk below a given level (Gul 2006). Therefore, given that monitoring is likely to reduce risk (PCAOB 2007), monitoring by audit firms is likely to influence credit ratings.

Previous studies find that credit ratings are calculated using numerous financial and non-financial metrics (Bhojraj and Sengupta, 2003; Ashbaugh-Skaife et al., 2006; Kraft, 2014). Evidences suggest that auditors provide a higher level of audit service to riskier clients (Davis et al. 1993; Bell et al. 2001; Johnstone and Bedard 2001, 2004). Thus, firms with low-quality ratings signal higher liquidity risk, as a result, these firms are likely to increase the likelihood of auditor assessment of risk, hence an increase in audit fee (hours). The audit process of Big4 accounting firms are considered to be superior to Non-Big4 firms. Therefore, given the relation between risk and the superiority of the accounting process of Big4 firms, there is a possibility that audit fees have a different relation with credit ratings for firms followed by Big4 and Non-Big4 auditors.

To establish a relation between credit rating and credit rating changes with audit fee (hour) for Big4 vs Non-Big4 firms, we perform numerous empirical tests. First, we perform a mean difference test to compare the financial statement characteristics of firms audited by Big4 and Non-Big4 firms. Our results suggest that firms audited by Big4 are generally larger, have higher performance proxied by ROA and CPS, pay higher audit fees and experience higher levels of audit hours.

Secondly, we test the relationship between credit ratings and audit fees (hours). Using ordered probit regression, we find that firms with high credit ratings have lower audit fees compared to lower rated firms for our Big4 sample. We do not find a statistically significant relationship between audit fee and credit rating for firms followed by Non-Big4 firms. Our results are consistent with credit ratings agencies considering the

audit quality of Big4 auditors to be superior to the audit quality on Non-Big4 firms. Moreover, we postulate, that because of the fierce competition among Big4 firms, Big4 audit firms have incentives to 'lowball' competing Big4 firms to capture client contracts, hence Big4 firms are likely to provide more competitive fees compared to Non-Big4 firms<sup>1)</sup>. Firms audited by Non-Big4 have a different relationship with clients compared to Big4 firms. Thus, we infer that the insignificant association between audit fee and credit ratings for Non-Big4 firms could be because Non-Big4 firms are more income dependent on clients compared to Big4 firms.

Thirdly, we use ordered probit regression to establish the relation between credit ratings  $t+1$  and audit fees (hours) in period  $t$ . We examine the relation between audit fees (hours) and credit ratings in period  $t+1$  to establish the possibility that audit fees influence a credit rating analysts perception of risk in the following period. We posit that a positive relation between audit fees in period  $t+1$  and credit ratings in period  $t$  would be interpreted by a credit rating agency analyst as a form of collusion between an auditor and client firm. We find a negative relation between audit fee in period  $t$  and credit rating in period  $t+1$  for firms followed by Big4 auditors, suggesting that credit ratings agencies consider audit fee as a risk metric related to corporate governance when calculating credit ratings in post periods. We do not find a relation between audit fees in period  $t$  and credit ratings in period  $t+1$  for Non-Big4 firms, suggesting that credit ratings agencies perceive audit fees differently for Big4 firms and Non-Big4 firms.

Next, we use logistic regression to establish if firms that experience a credit rating increase / decrease have different levels of audit fee (hours) compared to firms that do not experience a credit rate change. We find that firms that experience a credit rating change have lower audit fees compared to firms that do not experience a credit rating change, when followed by Bi4 auditors. The results suggest that audit fee is a metric with the potential to signal default risk to auditors. We perform additional tests to establish the different association between firms that increase and decrease their credit ratings compared to control groups. We find that firms that experience a credit rating increase have lower audit fees and show stronger performance compared to firms that do not experience a credit rating change.

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1) It is well known that there is a fierce competition amongst audit providers because various legislative policies, such as the 'auditor retention rule', 'mandatory audit partner' and 'firm rotation policy', have been implemented.

Moreover, we find that firms that experience a credit rating decrease in period  $t$  also have negative audit fees in period  $t+1$ . However, the results suggest these firms have statistically significantly negatively weaker performance compared to sample groups, suggesting that audit fees can be considered as a metric with the potential to signal default risk for both strong performing and weak performing firms.

There is limited research establishing a relation between audit fee and credit ratings in South Korea. Chun et al. (2014) find a positive association between abnormal audit hours and credit ratings, suggesting that credit ratings agencies are more likely to issue a higher credit rating to a firm that have experienced more audit hours. Park et al (2011) finds a negative (a positive) association between abnormal audit fees and credit ratings for public firms (private firms). In South Korea, a the relationship between audit fees and credit ratings for Big4 vs Non-Big4 is an empirical question left unanswered. Our research is motivated by this caveat. We contribute to the literature by providing evidence that there are fundamental differences in a credit rating agencies interpretation of risk for Non-Big4 and Big4 firms. Moreover, we find that credit ratings agencies consider an increase in audit fees as a proxy for risk for Big4 firms.

The remained of this paper proceeds as follows. In the next section, we provide a review of relevant literature and develop hypotheses; in Section III, we explain the research design and model specification; Section IV presents our results. In Section V we perform additional analysis. Section VI concludes.

## II. Literature review and Hypotheses development

Standard and Poor's (2012) and Moody' s Investor Service (2009) define credit risk as the possibility or expectation of financial default. A credit rating is the current opinion of a credit rating agency about a firm's credit worthiness obtained from public and private information. As a rule, there are ten credit ratings categories. The highest categories in descending order are AAA, AA, A, BBB, BB, B, CCC, CC, C, D; each category from AA to CCC is divided into subcategories with +/- . A firm can experience a credit rating increase if credit risk decreases. If a credit ratings agency perceives an increase in credit risk, a firm may experience a credit risk decrease. Credit ratings are extensively used by bond investors, debt issuers, and governmental officials as a measure

of a firm's default risk. Boot et al. (2006) argue that credit ratings provide an 'economically meaningful role' by facilitating equilibrium in bond investment. Thus, firms with a similar credit rating are grouped together as firms of similar quality (Kisgen, 2006).

The purpose of an audit is to reduce audit risk below a given level (Gul 2006). An audit provides assurance to the shareholders and other stakeholders that the financial statements are impartial. Whilst audits provide evidence of impartiality, an element of audit risk remains. Audit risk is the likelihood of an undetected error in a client's reporting systems, operations or financial statements. An auditor evaluates risk based on controls related to that environment and the monitoring levels of external monitors such as analysts, lenders and credit rating's agencies (PCAOB 2007). Moreover, the monitoring, performed by external monitors is explicitly included as one of the controls for risk evaluation. Thus, this evaluation of the control environment "can result in increasing or decreasing the testing that the auditor would have performed on other controls" (PCAOB 2007, para. 23), which likely affects the audit fee. Higher levels of risk result in higher levels of effort to detect audit risk about a firm's reporting systems, operations or financial statements. Prior studies suggest that auditors provide a higher level of audit service to riskier clients, hence an increase in audit fees (Davis et al. 1993; Bell et al. 2001; Johnstone and Bedard 2001, 2004).

Boot et al. (2006) explains that credit ratings are valuable for two institutional features; first, a credit rating agency is a valuable monitor of corporate governance and financial reporting; secondly, credit ratings provide relevant information for institutional investors. In addition to financial fundamentals, ratings take into account developments in management structure and corporate governance quality (Crouchy et al., 2001; Bhojraj and Sengupta, 2003; Ashbaugh-Skaife et al., 2006). When assessing a firm's credit worthiness, the ratings analyst considers numerous factors including, industry, and macro information. Credit ratings are based on both quantitative and qualitative information. Credit ratings agencies have access to a firm's undisclosed information; therefore, a credit rating provides additional information to that already in the public domain. Kraft (2014) explains that credit rating agencies base credit ratings on 'hard' financial statement data, and soft adjustments based on managerial performance, which raises the possibility of a higher or lower credit rating based on non-financial data. Thus, firms with low-quality ratings signal higher liquidity risk. As a result, high risk firms are likely

to increase the likelihood of auditor assessment of audit risk, proxied by audit fee (hours).

In South Korea, there is limited research establishing a relation between audit fee and credit ratings (Park, 2012). Kim et al. (2010) analyze the effect of credit fee on credit ratings, and find an insignificant relation between audit fee / audit hours and credit ratings. Chun et al. (2014) test the effect of abnormal audit hours on credit rating and cost of debt. They find a positive association between abnormal audit hours and credit ratings, suggesting that credit ratings agencies are more likely to issue a higher credit rating to a firm that have experienced more audit hours. The study most closely resembling our research is conducted by Park et al. (2011). Their research compares the audit fees and credit ratings of public and private firms. They find a negative (a positive) association between abnormal audit fees and credit ratings for public firms (private firms). They interpret their results as credit rating agencies issuing a lower credit ratings for firms with higher audit fees because they are considered to have a close relationship with their auditors; therefore, auditor independence may be impaired. Our research differs from Park et al. (2011) because we compare the difference between the audit fee (hours) of Big4 and Non-Big4. Moreover, we establish an association between audit fee and credit rating changes.

Prior studies suggest that auditors provide a higher level of audit service to riskier clients, hence an increase in audit fees (Davis et al., 1993; Bell et al., 2001; Johnstone and Bedard, 2001, 2004; Park et al., 2010). South Korea legislators have adopted numerous auditing policies since 1982 (Han and Moon, 2009). The auditor retention rule triggered a fierce competition, and the mandatory audit firm rotation rule brought audit fees to its minimum level. The 'low-price' competition is considered more serious among Big4 firms. Therefore, higher audit fee for Big4 firms can be considered by credit ratings analyst as a form of collusion, thus higher default risk. Therefore, we may interpret a negative relation between audit fee and credit ratings because firms with higher credit rating (therefore lower default risk) pay lower audit fee because less effort is required to audit their account. Moreover, we expect that firms with higher ratings are less likely to be associated with financial misreporting and collusion compared to firms with lower credit ratings. Therefore, we expect firms with higher credit ratings to have low audit risk and lower audit fees (hours); hence, we expect an inverse relation between auditor assessment of audit risk and ratings. Thus, we make the following

hypothesis:

*H1: Audit fees/hours have a negative association with credit ratings.*

Next, we examine if audit fees (hours) have the possibility to influence a credit rating analysts perception of risk. We expect a negative relationship between audit fee (hours) in period t and credit ratings in period t+1 because credit rating agencies may consider an increase audit fees (hours) as a corporate governance metric with the potential to signal increased risk or the possibility of collusion between auditors and clients. Thus, we make the following hypothesis:

*H2: Audit fees/hours negatively influence credit ratings in t+1 period.*

Based on our previous hypotheses, we make the assumption that negative audit fees are a signal of strong corporate governance; therefore, we estimate a negative relation between a credit rating increase and audit fees. However, the relationship between a credit rating downgrade and audit fee/hour is more complicated. The market reacts to ratings changes, especially downgrades (Ederington et al., 1987; Hull et al., 2004; Norden and Weber, 2004). Credit rating agencies' decision on whether to keep a credit rating stable or downgrade credit ratings are based on firm's financial numbers and corporate governance measures as a proxies for risk. On one hand, credit rating agencies may perceive an increase in audit fee (hours) as a signal of collusion or impaired independence. As a result, a firm's accounting numbers can no longer be considered reliable. Therefore, a credit ratings agency may be motivated to downgrade a firms credit rating. On the other hand, a firm may pay a lower audit fee due to financial distress. A firm with weak financial performance may simply not have sufficient funding to pay audit fees. Therefore, a negative association between audit fee and credit rating in period t+1 for firms with weak financial fundamentals may also imply an increase in risk. Thus, we suggest that firms that experience a credit ratings change should have different levels of audit fees (hours) compared to firms that do not experience a credit rating change. Therefore, we make the following hypothesis:

*H3: Audit fees/hours have a relation to credit rating changes.*

Big4 auditors provide higher levels of quality of audit information compared to Non-Big4 auditors (DeAngelo 1981; Becker et al., 1998; Khurana and Raman, 2004; Behn et al., 2008). Academic literature provides three reasons why Big4 accounting firms have higher audit quality compared to Non-Big4. First, the income dependence of Non-Big4 auditors is higher than Big4, creating incentives for auditors to collude with client firms. Second, Big4 audit firms have higher incentives to retain their public image and reputation to avoid litigation risk (DeAngelo, 1981; Basu et al., 2001). Third, Big4 auditors have better audit systems and professionals. Moreover, after the adoption of the mandatory audit rotation rule, there has been fierce competition amongst Big4 audit firms. Therefore, we would expect a different relationship between credit ratings and risk as proxied by audit fee (hours) for Big4 and Non-Big4 audit firms.

### III. Research Design

#### 3.1 Sample selection

All credit rating data is collected from TS2000 and financial data is collected from FN guide. Our sample period is from 2002 to 2013 and all data is collected per fiscal year. Our credit ratings variable is taken from the highest credit rating level for the four largest credit ratings agencies in South Korea, National Information & Credit Evaluation (NICE), Korea Investor Services (KIS), Korea Ratings (KR) and Seoul Credit Rating & Information (SCI). We combine the highest values of all four credit rating agencies to increase our sample. Due to the possibility that each of our four samples may provide inconsistent credit ratings levels, we conducted a battery of mean-difference tests comparing the credit rating of each firm. We find statistically insignificant differences between the credit ratings levels of each firm, hence the combination of the highest level of credit ratings for each credit rating agency is a homeogenous group. We exclude the results for brevity.

Panel A in <Table 1> shows our sample selection process. There are 2,480 firm year observations of firms borrowing equity in the form of public debt. We delete 739 post period firms, and an additional 24 because no financial data was available. leaving a total

of 1,717 observations. Panel B in <Table 1> provides details of our sample's distribution. Credit ratings take an ordinal score from 1 to 17. A value of 17 represents the highest credit ratings level, AAA or equivalent (from of KIS, KR, NICE and SCI). Firms with a credit rating of AA+ are coded with an ordinal score of 16, firms with AA are given an ordinal score of 15, firms with a credit rating of AA- are coded with an ordinal score of 14. B- firms receive an ordinal score coding of 2. All firms below CCC+, and below are given an ordinal score of 1. We base this approach on Alissa et al. (2013). <Table 1> Panel B illustrates a relatively normal distribution. The most common credit ratings are A-, followed by A, A+, AA and BBB+ suggesting that the majority of firms straddle the investment grade cut-off level.

<Table 1> Audit fee sample selection by credit ratings

Panel A: Audit fee and CR sample from 2002-2013					
Initial CR Sample		2,480			
Excluding Post periods		(739)			
Potential Sample		1,741			
Excluding firms with no financial data available		(24)			
Final Sample		1,717			
Panel B: Sample selection by credit ratings					
<i>CR scores</i>	<i>CR</i>	<i>Obs</i>	<i>CR scores</i>	<i>CR</i>	<i>Obs</i>
17	AAA	87	8	BBB-	168
16	AA+	69	7	BB+	73
15	AA	80	6	BB	73
14	AA-	156	5	BB-	72
13	A+	158	4	B+	44
12	A	172	3	B	32
11	A-	193	2	B-	17
10	BBB+	155	1	Below B-	32
9	BBB	136	Total		1,717

### 3.2 Model specifications and variables descriptions

The purpose of this paper is to examine whether a firm's credit rating level and credit ratings changes are associated with auditors assessment of audit risk and consequently audit fee (hours). Moreover, we test if credit ratings agencies perceive risk differently for Big4 audit firms compared to Non-Big4. To examine the relation between credit ratings and audit fee, we develop based the following model:

$$CR_{i,t} = \beta_0 + \beta_1 \text{Audit\_Fee}(\text{Hour})_{i,t} + \beta_2 \text{Size}_{i,t} + \beta_3 \text{Lev}_{i,t} + \beta_4 \text{Grw}_{i,t} + \beta_5 \text{ROA}_{i,t} + \beta_6 \text{CPS}_{i,t} + \text{ID} + \text{YD} + \epsilon_{i,t} \quad (1)$$

Where,

<i>CR</i>	: Credit Ratings in t period
<i>Audit Fee</i>	: Natural logarithm of audit fee
<i>Audit Hrs</i>	: Natural logarithm of audit hours
<i>Size</i>	: Natural logarithm of total assets
<i>Lev</i>	: Total liabilities / Total assets
<i>Grw</i>	: $(\text{Sales}_t / \text{Sales}_{t-1}) - 1$
<i>ROA</i>	: Net income / Total assets
<i>CPS</i>	: Cashflow from operation / Outstanding shares
<i>ID</i>	: Industry fixed effect
<i>YD</i>	: Year fixed effect

CR, a firm's credit rating is our dependent variable. CR is an ordinal scale that takes on a value of 1 to 17. Audit fee (Audit\_Fee), the natural logarithm of audit fee and audit hour (Audit\_Hour), the natural logarithm of audit hour are our independent variables of interest. We expect an inverse relationship between credit rating levels and audit fee hours. Firms with lower credit rating level are considered riskier compared to firms with higher credit ratings. Therefore, we expect  $\beta_1$  to be negative.

In equation 2, we examine the relation between audit fee in period t and credit rating in period t+1. Our dependent variable, Post\_CR is a firm's credit rating in period t+1. Our variables of interest, Audit\_Fee and Audit\_Hour( $\beta_1$ ) are described previously. The purpose of equation (2) is to establish if audit fees in period t influence a credit ratings perception of risk in period t+1. A positive relation between audit fee in period t and credit rating in t+1 could be interpreted as collusion between an auditor and a client firm. Thus, we expect a negative relation between audit hour hours (fee) in period t and credit ratings in period t+1

$$\text{Post\_CR}_{i,t+1} = \beta_0 + \beta_1 \text{Audit\_Fee}(\text{Hour})_{i,t} + \beta_2 \text{Size}_{i,t} + \beta_3 \text{Lev}_{i,t} + \beta_4 \text{Grw}_{i,t} + \beta_5 \text{ROA}_{i,t} + \beta_6 \text{CPS}_{i,t} + \text{ID} + \text{YD} + \epsilon_{i,t} \quad (2)$$

Where,

<i>Post_CR</i>	: Credit Ratings in t+1 period
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In equation 3, we examine the relation between credit rating changes and audit fee (hour). CR\_Change is an indicator variable that takes 1 if credit rating changed from t

to t+1 period, 0 otherwise. We conjecture that the audit fee (hours) in period t for firms that experience a credit rating change in period t+1 will be different to firms that do not experience a credit rating change. For firms that experience a credit rating increase, we expect  $\beta_1$  to be negative, signalling a reduction in risk.  $\beta_1$  can be positive or negative depending on a firms financial performance. We interpret a positive  $\beta_1$  and strong performance as collusion. We interpret negative  $\beta_1$  and weak financial fundamentals as financial distress.

$$CR\_Change_{i,t} = \beta_0 + \beta_1 Audit\_Fee(Hour)_{i,t} + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} + \beta_4 Grw_{i,t} + \beta_5 ROA_{i,t} + \beta_6 CPS_{i,t} + ID + YD + \epsilon_{i,t} \quad (3)$$

Where,

*CR\_Change* : Dummy variable that takes 1 if a credit rating changed from t to t+1 period, 0 otherwise.

Our control variables are taken from previous studies (Hovakimian et al. 2001, 2009). Size, the natural logarithm of total assets is expected to have a positive sign. Lev, Total liabilities divided by Total assets is a proxy for default risk. We expect Lev to be negative. Grw,  $(Sales_t/Sales_{t-1})-1$  is a proxy for future growth options. Growing firms are expected to have less risk; we expect Grw to be positive. ROA, net income divided by total assets and CPS, cashflow from operation divided by outstanding shares are proxies for firm performance. We expect ROA and CPS to be positive. ID and YD are industry fixed effect and Year fixed effect.

## VI. Empirical Results

### 4.1 Descriptive Statistics and Pearson Correlation

Panel A in <Table 2> illustrates the descriptive statistics and the results of our mean-difference test comparing the financial fundamentals of firms followed by Big4 and Non-big4 firms. All our variables are winsorized at the top and bottom 1% levels to eliminate the effect of outliers. The credit rating levels, audit fee/hour, size, growth level, firm performance and cash flow from operation are statistically significantly larger

for Big4 firms compared to for Non-Big4 firms at the 1% level. Univariate tests find statistically significant differences between the business fundamentals of our two groups: firms audited by Big4 and Non-Big4 firms.

Pane B in <Table 2> shows the Pearson Correlations for our sample. Our variables of interest are illustrated in column 1. Credit ratings are significantly correlated with our variables of interest and control variables. We find a statistically significant positive relation between credit rating and larger audit fee/hour. Our results suggest that larger firms, with lower risk (lev) and higher performance (ROA and CPS) have higher credit ratings.

<Table 2> Descriptive Statistics, Mean difference test and Pearson Correlation

Panel A: Descriptive Statistics and Mean difference test										
Var	(1) Full Sample			(2) Big4			(3) Non-Big4			Diff test (2)-(3)
	Mean (Med)	Max (Min)	S.D	Mean (Med)	Max (Min)	S.D	Mean (Med)	Max (Min)	S.D	t value
CR	10.62 (11)	17 (1)	3.82	11.24 (12)	17 (1)	3.65	8.34 (8)	17 (1)	3.59	2.90*** (12.28)
A_Fee	11.84 (11.71)	14.50 (9.90)	0.91	12.01 (11.92)	14.73 (10.24)	0.89	11.23 (11.15)	12.63 (9.27)	0.64	0.78*** (14.17)
A_Hrs	7.08 (7.23)	10.24 (0.69)	1.65	7.36 (7.46)	10.49 (0.69)	1.52	6.05 (6.58)	8.23 (0.69)	1.68	1.31*** (12.91)
Size	20.64 (20.55)	24.29 (17.56)	1.62	20.94 (20.86)	24.71 (17.77)	1.58	19.53 (19.39)	23.32 (17.39)	1.25	1.41*** (14.28)
Lev	0.52 (0.53)	0.93 (0.07)	0.18	0.51 (0.53)	0.91 (0.05)	0.18	0.53 (0.55)	0.94 (0.17)	0.18	-0.02* (-1.84)
Grw	0.08 (0.07)	1.16 (-0.72)	0.26	0.08 (0.07)	1.30 (-0.73)	0.27	0.06 (0.06)	0.81 (-0.59)	0.22	0.03* (1.73)
ROA	0.03 (0.03)	0.18 (-0.35)	0.08	0.03 (0.03)	0.20 (-0.28)	0.08	0.01 (0.02)	0.14 (-0.47)	0.09	0.02*** (4.31)
CPS	5.53 (1.72)	83.77 (-11.8)	14.0	6.18 (1.99)	92.0 (-12.1)	15.08	3.14 (0.82)	32.31 (-5.53)	8.69	3.04*** (3.35)
Obs	1717			1372			345			

  

Panel B: Pearson Correlations									
	1.	2.	3.	4.	5.	6.	7.	8.	
1. CR	1								
2. Audit fee	0.41***	1							
3. Audit hour	0.28***	0.62***	1						
4. Size	0.54***	0.83***	0.53***	1					
5. Lev	-0.42***	0.05**	0.02	0.03	1				
6. Grw	0.03	0.03	-0.00	0.08***	0.02	1			
7. ROA	0.35***	0.14***	0.08***	0.18***	-0.40***	0.23***	1		
8. CPS	0.32***	0.26***	0.17***	0.32***	-0.21***	0.05*	0.19***	1	

Note 1: Variable definitions

CR : Credit Ratings in t period

*Audit Fee* : Natural logarithm of audit fee  
*Audit Hrs* : Natural logarithm of audit hours  
*Size* : Natural logarithm of total assets  
*Lev* : Total liabilities / Total assets  
*Grw* :  $(Sales_t / Sales_{t-1}) - 1$   
*ROA* : Net income / Total assets  
*CPS* : Cashflow from operation / Outstanding shares  
*ID* : Industry fixed effect  
*YD* : Year fixed effect

Note 2. \*, \*\*, \*\*\* are significance level at 10%, 5%, and 1% respectively

## 4.2 Multivariate Analysis results

We perform ordered probit regression to test the relation between credit ratings and audit fee (hours). <Table 3> illustrates the results of our analysis. We find a negative relation between credit ratings and audit fee at the 5% level for our complete sample and Big4 auditors. The results suggest that as credit ratings increase, a client firms audit fees decrease; consistent with hypothesis 1. Thus, audit fees have a relation with credit risk.

<Table 3> Ordered Probit Regression Analysis (DV: Credit Ratings)

<i>Ordered probit regression Model:</i>							
$CR_{i,t} = \beta_0 + \beta_1 Audit\_Fee(Hour)_{i,t} + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} + \beta_4 Grw_{i,t} + \beta_5 ROA_{i,t} + \beta_6 CPS_{i,t} + ID + YD + \epsilon_{i,t}$ (1)							
	Sign	Full Sample		Big4		Non-Big4	
<i>Audit Fee</i>	?	-0.10** (-1.98)		-0.14** (-2.36)		-0.03 (-0.23)	
<i>Audit Hours</i>	?		0.01 (0.28)		-0.00 (-0.07)	-0.02 (-0.66)	
<i>Size</i>	+	0.47*** (15.71)	0.42*** (20.47)	0.44*** (12.78)	0.37*** (16.34)	0.53*** (8.18)	0.53*** (9.80)
<i>Lev</i>	-	-2.83*** (-17.57)	-2.84*** (17.64)	-2.69*** (-15.13)	-2.70*** (-15.19)	-3.69*** (-9.34)	-3.68*** (-9.32)
<i>Grw</i>	?	-0.14 (-1.47)	-0.14 (-1.36)	-0.18* (-1.70)	-0.17 (-1.55)	0.03 (0.12)	0.04 (0.15)
<i>ROA</i>	+	1.42*** (3.97)	1.42*** (3.95)	1.46*** (3.50)	1.42*** (3.40)	0.81 (1.10)	0.77 (1.05)
<i>CPS</i>	+	0.01*** (3.40)	0.01*** (3.48)	0.01*** (3.17)	0.01*** (3.26)	0.02*** (2.61)	0.02** (2.53)
<i>ID</i>		<i>Included</i>	<i>Included</i>	<i>Included</i>	<i>Included</i>	<i>Included</i>	<i>Included</i>
<i>YD</i>		<i>Included</i>	<i>Included</i>	<i>Included</i>	<i>Included</i>	<i>Included</i>	<i>Included</i>
<i>Chi2</i>		1044.42***	1040.58***	697.46***	691.91***	251.51***	251.90***
<i>Pseudo R2</i>		0.1138	0.1134	0.0971	0.0963	0.1409	0.1411
<i>Obs</i>		1717	1717	1372	1372	345	345

Note 1: Variables are defined in descriptive statistics

Note 2: Numbers in parenthesis indicate z statistics

Note 3 \*, \*\*, \*\*\* are significance level at 10%, 5%, and 1% respectively

Audit Fee shows a negative sign for our Non-Big4 sample, but the results are statistically insignificant. Firms audited by Big4 auditors, tend to be larger, perform well financially, and have lower risk compared to firms audited by Non-Big4 auditors (See table 1). Therefore, credit ratings agencies may consider an audit performed by Big4 auditors as an audit of superior audit quality, especially considering Korea's experiment with recent auditing policies. Moreover, because of fierce competition among Big4 firms, Big4 audit firms have incentives to 'lowball' competing Big4 firms to capture client contracts, hence Big4 firms are likely offer more competitive audit fees to potential customers compared to Non-Big4 firms. Moreover, we infer an insignificant association between audit fee and credit ratings for Non-Big4 firms because Non-Big4 firms are more dependent on clients for income compared to Big4.

<Table 4> Ordered Probit Regression Analysis (DV: Credit Ratings in t+1 period)

*Ordered probit regression Model:*

$$Post\_CR_{i,t+1} = \beta_0 + \beta_1 Audit\_Fee(Hour)_{i,t} + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} + \beta_4 Grw_{i,t} + \beta_5 ROA_{i,t} + \beta_6 CPS_{i,t} + ID + YD + \epsilon_{i,t} \quad (2)$$

	Sign	Full Sample		Big4		Non-Big4	
<i>Audit Fee</i>	?	-0.10** (-1.95)		-0.12** (-2.11)		-0.12 (-1.05)	
<i>Audit Hours</i>	?		0.01 (0.36)		-0.00 (-0.03)		-0.21 (-0.63)
<i>Size</i>	+	0.46*** (15.52)	0.41*** (20.17)	0.43*** (12.43)	0.37*** (16.07)	0.54*** (8.37)	0.51*** (9.47)
<i>Lev</i>	-	-2.86*** (-17.71)	-2.87*** (-17.78)	-2.69*** (-15.14)	-2.70*** (-15.19)	-3.98*** (-9.92)	-3.99*** (-9.95)
<i>Grw</i>	?	-0.12 (-1.19)	-0.11 (-1.08)	-0.15 (-1.33)	-0.13 (-1.19)	-0.05 (-0.20)	-0.04 (-0.17)
<i>ROA</i>	+	2.31*** (6.36)	2.29*** (6.33)	2.25*** (5.33)	2.22*** (5.24)	2.15*** (2.90)	2.14*** (2.87)
<i>CPS</i>	+	0.01*** (3.40)	0.01*** (3.48)	0.01*** (3.21)	0.01*** (3.29)	0.02*** (2.55)	0.02** (2.55)
<i>ID</i>		<i>Included</i>	<i>Included</i>	<i>Included</i>	<i>Included</i>	<i>Included</i>	<i>Included</i>
<i>YD</i>		<i>Included</i>	<i>Included</i>	<i>Included</i>	<i>Included</i>	<i>Included</i>	<i>Included</i>
<i>Chi2</i>		1098.58***	1094.90***	727.24***	722.80***	285.16***	284.47***
<i>Pseudo R2</i>		0.1198	0.1194	0.1015	0.1009	0.1593	0.1590
<i>Obs</i>		1717	1717	1372	1372	345	345

Note 1: *Post\_CR* : Credit Ratings in t+1 period. Other variables are defined in descriptive statistics.

Note 2: Numbers in parenthesis indicate z statistics

Note 3 \*, \*\*, \*\*\* are significance level at 10%, 5%, and 1% respectively

Audit hours do not show a statistically significant relation with credit ratings. In South Korea, audit fees are negotiated and fixed at the beginning of the fiscal year. Audit fees in South Korea are lower compared to developed countries and fixed regardless of audit hours. Thus, auditors have few incentives to invest additional hours into audits. Therefore, increased audit hours can be seen as an additional effort to avoid potential litigation. Hence, audit hours may not affect credit ratings.

<Table 4> illustrates the results of our ordered probit regression analysis, testing our second hypothesis; whether audit fees influence post year credit ratings (t+1 period). Alissa (2013) suggests that management decisions, economic conditions, industry trends and management errors within period t have the potential to distort long term credit rating; therefore, 'capital structure adjustments may not be timely enough to allow firms to move closer to their expected ratings in period t. Therefore, we include a t+1. Credit ratings agencies may perceive higher audit fees as a form of collusion between auditor and client firm. A lower audit fee can be considered as a proxy for strong corporate governance. We find a negative association between audit fees and credit ratings in t+1 period for Big4 auditors at the 5% level, suggesting that increased audit fees negatively affect credit ratings in the following period. Thus, a negative relation between audit fees in period t and credit ratings in period t+1 signals strong internal controls and corporate governance. Due to fierce competition in audit contracts among Big4 auditors, audit fees are less likely to significantly increase compared to Non-Big4 firms. Therefore, credit ratings agencies analysts may make decisions based audit fee.

We fail to find a significant association between audit fees and credit ratings in t+1 period for the Non-Big4 sample, suggesting that audit fees do not influence credit ratings in the following period for Non-Big4 client firms. Non-Big4 firms have less competition in audit contracts, compared to Big4, since their clients often tend to be local clients. Credit rating agencies may consider the relationship between Non-Big4 and their clients to be different to the relationship between Big4 audit firms and their clients. Hence credit ratings agencies may not perceive an audit fee as a metric with the potential to proxy risk for Non-Big4 client firms. Audit hours have an insignificant association with credit ratings in t+1 period for all samples. As discussed above, credit rating agencies may see an increased audit hours as additional work to avoid litigation risks.

<Table 5> Logistic Regression Analysis (DV: Change)

*Logistic Regression Model:*

$$CR\_Change_{i,t} = \beta_0 + \beta_1 Audit\_Fee(Hour)_{i,t} + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} + \beta_4 Grw_{i,t} + \beta_5 ROA_{i,t} + \beta_6 CPS_{i,t} + ID + YD + \epsilon_{i,t} \quad (3)$$

Variables	Sign	Full Sample		Big4		Non-Big4	
<i>Audit Fee</i>	-	-0.27*** (-2.53)		-0.27** (-2.17)		-0.49 (-1.60)	
<i>Audit Hrs</i>	-		-0.05 (-1.34)		-0.06 (-1.28)		-0.08 (-1.04)
<i>Size</i>	+	0.27*** (4.17)	0.16*** (3.81)	0.24*** (3.34)	0.15*** (3.00)	0.32** (2.28)	0.19* (1.67*)
<i>Lev</i>	-	0.78** (2.21)	0.73** (2.09)	0.76** (2.00)	0.72* (1.89)	1.00 (1.11)	0.93 (1.03)
<i>Grw</i>	?	-0.35 (-1.50)	-0.33 (-1.42)	-0.37 (-1.47)	-0.35 (-1.40)	-0.21 (-0.32)	-0.18 (-0.27)
<i>ROA</i>	+	0.55 (0.68)	0.48 (0.60)	0.72 (0.77)	0.63 (0.68)	-0.03 (-0.02)	-0.08 (-0.05)
<i>CPS</i>	+	-0.01 (-1.34)	-0.01 (-1.30)	-0.01 (-1.17)	-0.01 (-1.12)	-0.02 (-0.80)	-0.02 (-0.74)
<i>ID</i>		<i>Included</i>	<i>Included</i>	<i>Included</i>	<i>Included</i>	<i>Included</i>	<i>Included</i>
<i>YD</i>		<i>Included</i>	<i>Included</i>	<i>Included</i>	<i>Included</i>	<i>Included</i>	<i>Included</i>
<i>Chi2</i>		28.85***	24.23***	19.76***	16.68**	17.48**	4.97
<i>Pseudo R2</i>		0.0147	0.0124	0.0124	0.0104	0.0211	0.0141
<i>Obs</i>		1717	1717	1372	1372	345	345

Note 1: Variable definitions

*CR\_Change*: Indicator variable that takes 1 if credit rating changed from t to t+1 period, 0 otherwise, Other variables are defined in descriptive statistics.

Note 2: \*, \*\*, \*\*\* are significance level at 10%, 5%, and 1% respectively

<Table 5> illustrates the results of our logistic regression analysis, testing our third hypothesis, whether audit fees influence credit rating changes (upgrades or downgrades). In this model *CR\_Change* is a dummy variable that takes on the value of 1 if credit rating changed from t to t+1 period, 0 otherwise. We find a significantly negative association between audit fees and credit rating changes for the Big4 and full samples. We do not find a statistically significant relation between credit ratings and audit fee, consistent with our previous tests. Our results suggest that firms that experienced a credit rating change in period +1 have a lower audit fees in period t compared to firms that did not experience a credit rating change in period t+1; if a firm is audited by a Big4 firm. Consistent with previous results, audit hours are not related with credit rating changes.

## V. Additional Analysis

Credit rating changes in <Table 5> include positive changes and negative changes. We further partition our sample into 3 sub-samples: 1) positive change, 2) negative change, 3) to provide further evidence to support our initial hypothesis, that the audit fees influence a credit ratings analyst's perception of risk. We hypothesize that firms that experience a credit ratings increase have strong corporate governance, therefore, we can expect a negative relation between audit fee in period  $t$  and credit rating in period  $t+1$ . Firms that experience a credit rating decrease in period  $t+1$ , are expected to have different audit fees in period  $t$  compared to firms that do not experience a credit ratings change. A positive sign would suggest collusion between credit auditor and client firm, hence a lack of independence. On the other hand, weak financial fundamentals and for audit fee (hour) would suggest that firms that firms cannot pay for auditor services. Therefore, it is possible that credit ratings agencies perceive either of these signals as a signal of an increase in default risk, depending on financial performance.

<Table 6> shows our results. In Panel A, we perform Logistic regression comparing positive changes with negative credit ratings change. In Panel A, CR\_Change is an indicator variable that takes a value of 1 if a credit rating increased from  $t$  to  $t+1$  period, 0 if value decreases. Our results in Panel A suggest an insignificant difference between the audit fees (hours) for firms that experience a credit increase/decrease.

In Panel B, we compare the relation between audit fee (hours) and the post period credit ratings for firms that experience a positive credit rating change and firms that do not experience a credit rating change. In Panel B, CR\_Change is an indicator variable that takes on the value of 1 if a credit rating increases from  $t$  to  $t+1$  period, 0 if the credit rating remains unchanged. CR\_Change is statistically significant at the 10% level for our Big4 sample. The results suggest that firms that experience a positive credit rating change in period  $t+1$  are more likely to have lower audit fees that firms that do not experience a credit rating change, suggesting a link between audit fees and risk. In Panel C, we compare the relation between audit fee (hours) and the post period credit ratings of firms that experience a negative credit rating change and firms that do not experience a credit rating change. CR\_Change, is an indicator variable that takes the value of 1 if credit ratings decrease from  $t$  to  $t+1$  period, 0 if a credit ratings have not changed. We find a negative association between audit fee and negative credit ratings for our Big4, and full sample.

<Table 6> Additional Logistic Regression Analysis (DV: CR Change)

Panel A: Logistic regression on Positive Change vs Negative Change :							
$CR\_Change_{i,t} = \beta_0 + \beta_1 Audit\_Fee(Hour)_{i,t} + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} + \beta_4 Grw_{i,t} + \beta_5 ROA_{i,t} + \beta_6 CPS_{i,t} + ID + YD + \epsilon_{i,t}$							
	Sign	Full Sample			Big4		Non-Big4
<i>Audit Fee</i>	?	0.08(0.37)		0.19(0.83)		-1.43(-1.58)	
<i>Audit Hours</i>	?		-0.05(-0.63)		-0.02(-0.23)		-0.27(-1.27)
<i>Size</i>	+	-0.00(-0.02)	0.07(0.76)	-0.11(-0.74)	0.00(0.00)	0.62(1.55)	0.18(0.73)
<i>Lev</i>	-	-0.79(-0.97)	-0.85(-1.04)	-0.26(-0.29)	-0.28(-0.33)	-5.21(-1.98)**	-4.22(-1.69)*
<i>Grw</i>	?	0.55(1.02)	0.57(1.05)	0.29(0.50)	0.31(0.52)	2.09(1.45)	1.96(1.46)
<i>ROA</i>	+	9.10(3.92)***	8.93(3.88)***	9.98(3.69)***	9.88(3.69)***	4.46(0.94)	4.00(0.88)
<i>CPS</i>	+	0.00(0.34)	0.00(0.29)	0.00(0.36)	0.00(0.29)	-0.02(-0.26)	0.01(0.21)
<i>Chi2</i>		49.03***	49.31***	33.46***	32.84***	19.74***	17.82***
<i>Pseudo R2</i>		0.0920	0.0925	0.0776	0.0762	0.2033	0.1835
<i>Obs</i>		441	441	369	369	72	72
Panel B: Logistic regression on Positive Change vs No Change							
$CR\_Change_{i,t} = \beta_0 + \beta_1 Audit\_Fee(Hour)_{i,t} + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} + \beta_4 Grw_{i,t} + \beta_5 ROA_{i,t} + \beta_6 CPS_{i,t} + ID + YD + \epsilon_{i,t}$							
<i>Audit Fee</i>	?	-0.25(-1.97)**		-0.23(-1.79)*		-0.53(-1.59)	
<i>Audit Hours</i>	?		-0.06(-1.35)		-0.06(-1.29)		-0.10(-1.11)
<i>Size</i>	+	0.26(3.49)***	0.17(3.53)***	0.22(2.58)**	0.14(2.61)***	0.34(2.06)**	0.22(1.54)
<i>Lev</i>	-	0.56(1.43)	0.52(1.32)	0.66(1.54)	0.61(1.43)	0.21(0.19)	0.13(0.12)
<i>Grw</i>	?	-0.14(-0.53)	-0.12(-0.46)	-0.20(-0.73)	-0.18(-0.67)	0.26(0.34)	0.33(0.42)
<i>ROA</i>	+	0.34(3.10)***	3.36(3.04)***	3.26(2.71)***	3.18(2.65)***	3.61(1.20)	3.60(1.17)
<i>CPS</i>	+	-0.01(-1.09)	-0.01(-1.03)	-0.00(-0.88)	-0.00(-0.81)	-0.02(-0.63)	-0.01(-0.62)
<i>Chi2</i>		30.23***	28.17***	18.22***	17.31***	8.31	6.45
<i>Pseudo R2</i>		0.0192	0.0179	0.0139	0.0132	0.0331	0.0257
<i>Obs</i>		1588	1588	1272	1272	316	316
Panel C : Logistic regression on Negative Change vs No Change :							
$CR\_Change_{i,t} = \beta_0 + \beta_1 Audit\_Fee(Hour)_{i,t} + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} + \beta_4 Grw_{i,t} + \beta_5 ROA_{i,t} + \beta_6 CPS_{i,t} + ID + YD + \epsilon_{i,t}$							
<i>Audit Fee</i>	?	-0.35(-2.01)**		-0.38(-1.90)*		-0.33(-0.83)	
<i>Audit Hours</i>	?		-0.03(-0.44)		-0.03(-0.36)		-0.03(-0.25)
<i>Size</i>	+	0.27(2.74)***	0.13(1.84)*	0.30(2.59)***	0.14(1.73)*	0.19(0.98)	0.10(0.62)
<i>Lev</i>	-	1.39(2.39)**	1.35(2.30)**	1.19(1.85)*	1.15(1.77)*	2.21(-1.59)	2.13(1.51)
<i>Grw</i>	?	-0.73(-1.80)*	-0.69(-1.71)*	-0.69(-1.58)	-0.64(-1.45)	-0.95(-0.91)	-0.95(-0.90)
<i>ROA</i>	+	-2.57(-2.44)**	-2.60(-2.49)**	-2.93(-2.34)**	-3.01(-2.43)**	-1.08(-0.50)	-1.09(-0.51)
<i>CPS</i>	+	-0.01(-1.28)	-0.01(-1.31)	-0.01(-1.13)	-0.01(-1.16)	-0.04(-0.85)	-0.03(-0.79)
<i>Chi2</i>		39.11***	35.42***	28.73***	25.36***	11.63*	11.02*
<i>Pseudo R2</i>		0.0454	0.0411	0.0428	0.0378	0.0609	0.0577
<i>Obs</i>		1405	1405	1103	1103	302	302
<i>ID &amp; YD for All Models</i>		<i>Included</i>	<i>Included</i>	<i>Included</i>	<i>Included</i>	<i>Included</i>	<i>Included</i>

*Note 1: Variable definitions*

*CR\_Change* for Panel A: Indicator variable that takes 1 if credit rating increased from t to t+1 period, 0 if decreased.

*CR\_Change* for Panel B: Indicator variable that takes 1 if credit rating increased from t to t+1 period, 0 if credit rating unchanged

*CR\_Change* for Panel C: Indicator variable that takes 1 if credit rating decreased from t to t+1 period, 0 if credit rating unchanged

*Other variables are defined in descriptive statistics.*

*Note 2* \*, \*\*, \*\*\* are significance level at 10%, 5%, and 1% respectively

We interpret the negative relation between audit fee in period t and credit rating change in period t+1 differently in Panel B and Panel C. In panel B, our independent variable ROA shows the correct positive sign, suggesting that firms with strong performance generally have lower audit fees. In Panel C, 3 out of 4 of our independent variables of interest show a statistically significant sign of financial distress. Firms that experience a negative credit rating change have poor financial performance (ROA -2.57), negative growth (GRW -0.73) and higher levels of leverage (LEV 1.39) comparative to firms that do not experience a credit rating change. Therefore, whilst we find a statistically negative relation between audit fee and negative credit rating changes in our main analysis. Additional tests find that there is a different association between a firm's audit fees, credit rating changes and firm performance for firms that experience a credit rating increase and decrease. A lower audit fee for firms with strong fundamentals suggests strong corporate governance when followed by Big4 firms. A lower audit fee for firms with weak fundamentals is a signal of increased risk when a firm is followed by a Big4 auditor. Weak performing firms may simply not be able to purchase auditing services, or auditors may simply have to ask for lower fees due to the financial constraints of the company.

## VI. Conclusions

We examine the relationship between credit ratings / changes and audit fees (hours) for Big4 and Non-Big4 firms. We find a negative association between audit fees and credit ratings in t period for Big4 firms. However, we do not find a statistically significant relation between credit ratings and audit fees for Non-Big4 firms. We

conjecture that credit ratings analysts consider the relationship between Big4 firms and their clients to be different to the relationship between Non-Big4 firms and their clients. Moreover, Big4 firms face fierce competition with other Big4 audit firms. As a result, Big4 firms must offer competitive prices to compete with other Big4 firms, hence offer lower audit fees. Moreover, Non-Big4 firms are more income dependent relation with client firms. Therefore, audit fees may not be considered as a meaningful proxy for risk for Non-Big4 firms' clients. In addition, the auditing procedures of Bi4 firms are considered superior to Non-Big4, therefore audit fee may only be considered as an additional risk metric for Big4 firms. Moreover, since the adoption of the mandatory audit firm rotation policy, the competition between Big4 firms have increased.

Credit rating agencies may perceive an increase in audit fees as a signal of collusion between auditors and client firms. We find that Credit ratings agencies perceive audit fees as a corporate governance metric with the potential to capture default risk for firms followed by Big-4 auditors, but not Non-Big4 auditors. We find a negative association between audit fees and credit ratings in t+1 period for Big4 firms; However, we find insignificant a relation between credit audit fees in period t, and credit ratings in period t+1 for Non-Big4 firms. Therefore, credit ratings agencies are likely perceive audit fee differently for Non-Big4 firms and Big4 firms.

Our results suggest that audit fees in period t influence credit ratings in period t+1. However, auditors may interpret the association between audit fee and financial fundamentals differently for firms that experience a credit rating increase and credit rating decrease. Firms that experience a credit rating increase have lower audit fees and are better performing compared to firms that do not experience a credit ratings; auditors can interpret this relationship as a proxy for strong corporate governance. Firms that experience a negative credit rating change in period t+1 also have lower audit fees in period t+1 compared to firms that do not experience a credit rating change. However, the financial performance measures of these firms are much weaker compared to firms that do not experience a credit rating change, suggesting that a decrease in audit fee and weak performance can be a signal of increased default risk for firms audited by Big4 firms.

A weakness of our paper is that our results based on a Korean context may not be applicable other countries because the financial, legal and legislative systems may be different. Possible future research may examine the relationship audit fees and credit

ratings / credit rating changes in an international context. A possible example is a comparative study between the association between audit fee and credit ratings in the U.S. / U.K. compared to South Korea.

“본 논문은 다른 학술지 또는 간행물에 게재되었거나 게재 신청되지 않았음을 확인함 “

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