The effect of market competition on audit fees and audit hour: focusing on the interaction with earnings management

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Abstract: As the level of competition in industry becomes intense, many studies examined the effect of the increase in competition on firm's stakeholders. The market competition can influence on audit procedure, nevertheless, there are few researches that examine the effect of competition in industry on audit fees or audit hour. This study provides the evidence on the effect of market competition on audit fees and audit hour using the Herfindahl–Hirschman index as the measure of an competition intensity in industry.

The study was conducted on the listed companies having the fiscal year ending in December except banking companies. The study was made on 6,550 firm-year from 2005 to 2010. The results of analysis are as hollows. First, firm in more competitive industries incurs higher audit fees and audit hour. This results show that the more competition in the industry, the burden laid on the auditor grows heavier by the increase of client's business risk. Second, the more monopolistic an industry is, the weaker the positive relation between earnings management and audit fees(hour) becomes. This results can be interpreted that when the auditors estimate the audit risk for firms in less competitive industry, they consider less the risk from misreporting financial statement by opportunistic earnings management.

The study provides the evidence on the effect of market competition on auditor who is also one of the external stakeholder of corporate. Also, our results bring the two existing opposite arguments on the relation between market competition and auditor's risk to a conclusion. Also, this study shows how the magnitude of earnings management is reflected in the assessment of audit risk in higher level of industrial competition. We find that when the firm is in more monopolistic industry, auditor are less likely to consider the increase of audit risk by likelihood of opportunistic earnings management. Therefore, we expect that the study contributes to auditing literature by verifying the auditor's view on market competition to estimate audit fees and audit hour.

These results suggest the implications to firm's manager, auditor and regulators. Through this study, managers are needed to be aware the impact of market competition on their budget for audit fees. Also, auditor should focus on the manager's motivation for misreporting earnings because the manager's intention can be hidden by high profitability and stability of profit when the firm is in less competitive industries. Regulators should consider the likelihood that audit procedure for firm in the monopolistic industries could be reduced because there are possibilities that auditor underestimates audit risk.
1. Introduction

Since Market competition is a crucial factor to decide the profitability in industry (Porter 2008), it can affects many aspects of corporate management, especially business strategy. Accounting information implies the results of the implementation of business strategy. Consequently, the strength of competition in industry influences the firm's reporting process of accounting information.

According to the Korean Generally Accepted Auditing Standards, auditor should have sufficient knowledge of business and collect the relevant information about industry. The knowledge of business and industry is used to estimate audit risk and make a decision for the extent of audit procedure. More specifically, the level of market competition should been reflected in the estimation of audit fees and audit hours.

Starting with Simunic (1980), many studies were conducted to find the determinants of audit fees (Francis 1984; Simon 1985; Francis and Stokes 1986; Palmrose 1986, Maher et al. 1992). The determinants of audit fees which were verified by prior studies are the size of firm, complexity of operation, audit risk, financial performance, ratio of account receivables and inventory, characteristic of auditor, et cetera. However, despite the increase of market competition due to, there are few researches that examine the effect of competition in industry on audit fees (hour). Many researches were carried out to examine the effect of competition in industry on managers' behavior. For example, Fee and Thomas (2004) examine product-market effects on managers' investment decision using sample of horizontal mergers and acquisition. Zmijewski and Hagerman (1981) find that market concentration ratio have a association with the choice of a firm’s accounting policy. There are many studies that examine the relation between market competition and corporate disclosure decisions (Botoson and Standard 2005; Rogers and Stocker 2005; Verrecchia and Iber 2006). Marciukaityte and Park (2009) show the relation between product market competition and earnings management. Considering that accounting reporting process is influenced by managers' behavior, our paper shed light on the effect of market competition on auditors’ choice not examined in the previous literature.

There exist two contradictory arguments on the relation between market competition and litigation risk which auditor bears. First, market competition work as corporate external governance to mitigate agency problem. Strong governance can
improve the accuracy of the financial reporting thus, audit risk will reduced. On the other hand, firms in more competitive industries confront more liquidation risk(Schmidt 1997). The increase of audit client’s business risk is linked to the increase of auditor’s litigation risk. In conclusion, the level of market competition has conflicting effects on auditors’ risk. Considering auditor’s risk is directly reflected in audit fees and audit hour, this paper examine the relation between market competition and audit fees(hour).

In addition, we also test the effect of earnings management on the relation between market competition and audit fees(hour). According to previous literatures, market competition can affect to manager’s motivation to manipulate earnings in two contradictory ways. Strengthened governance by intense competition in industry aligns interest between managers and shareholders. Therefore, manager are less likely to engage in opportunistic earnings management. On the other hand, as firm's profitability is exacerbated by competition in industry, the firm has tendency to distort the operating performance. Along with the effect on auditor’s risk, market competition also affects the magnitude of earnings management in two contradictory ways. As the magnitude of earnings management is reflected in assessment of audit risk(Gul et al. 2003), consequently, market competition affects audit fees and audit hour both thorough the channel of audit risk and business risk intrinsically and through earnings management indirectly.

Our findings are summarized as follows. First, firm in more competitive industries incur higher audit fees and audit hour. This results shows that the more competition in the industry, the burden laid on the auditor grows heavier by the increase of client’s business risk. Second, the more monopolistic an industry is, the weaker the positive relation between earnings management and audit fees(hour) becomes. This results can be interpreted that when the auditors estimate the audit risk for firms in less competitive industry, they consider less the risk from misreporting financial statement by opportunistic earnings management.

The study has several contribution. First, we expect that this study adds to the existing literature to test the impact of industrial concentration on stakeholder of corporate such as manager, analysts, shareholders and debt holders. It is difficult to find the previous literature which deal with the effect of competition in industry on auditor. The study provides the evidence of the effect of market competition on auditor who is also one of the external stakeholder of corporate. Also, our results bring the two
existing opposite arguments on the relation between market competition and auditor’s risk to a conclusion.

Second, this study shows how the magnitude of earnings management is reflected in the assessment of audit risk in higher level of industrial competition. We find that when the firm is in more monopolistic industry, auditor are less likely to consider the increase of audit risk by likelihood of opportunistic earnings management. It can be concluded that, in Korean management environment, auditor concerns that diminished business risk in lower competitive industry is more important than increased audit risk caused by lack of external governance role. The study contributes to auditing literature by verifying the auditor’s view on market competition to estimate audit fees and audit hour.

The remainder of the paper is as follows. Section 2 introduces extant research regarding the market competition, auditor’s risk and earnings management and develops the hypotheses. Section 3 describes the variables used in this study and sample selection procedure. Section 4 presents the descriptive statistics and empirical results. Section 5 concludes.

2. Literature Review and Hypotheses Development

Audit fees and audit hour relate with auditor exposure to losses from litigation. Simunic (1980) provides the model of audit fees as a linear combination of the marginal cost of auditing plus expected losses from litigation. While audit effort, which represents audit hour, increases the cost of auditing, it decreases expected loss of litigation. Litigation risk is composed of two risks: audit risk and business risk. Audit risk is defined as the likelihood there are material mistakes in the client’s audited financial statement (Gul and Tsui, 1998). Business risk describes the likelihood that the client is involved in financial distress and auditor cannot eliminate. According to prior literatures, market competition effects both audit risk and business risk. Thus, audit fee and audit hour vary with the market competition.

2.1 Market competition and audit risk

Prior studies show that there are positive relations between market competition
and firm's productivity, so it helps to align the interests between managers and shareholders. Defond and Park (1999) prove that CEO turnover rate is higher in a competitive industry. Scleifer and Vishny (1997) argue that the possibility of CEO turnover is lower in less competitive industry because it is difficult to compare firm's performance and verify the negligence of manager. In order words, an increase in market competition carry out function to discipline manager to do best effort for keeping their positions (Hart 1983; Schmidt 1997; Griffith 2001). Thus, market competition plays a corporate external governance role and works as effective mechanism to mitigate the agency problems between managers and investors.

Watts and Zimmerman (1986) find that demand for high quality audit increases with agency cost, either voluntarily undertaken by managers as a bonding mechanism or externally imposed as a monitoring mechanism by stakeholders. Many empirical studies support for this argument on agency cost and the demand for high audit quality (Chow 1982; Gul and Tsui 1998). Thus, audit fees and audit hour demanded by firms may be lower if market competition mitigates agency problems by encourage managers to work harder.

Based on these evidences in prior literature, it is predictable that market competition will decrease audit fees and audit hour because auditor may expect that audit risk will be lower in competitive industry by governance role of competition.

2.2 Market competition and business risk

Business risk is regarded as the risk that the auditors encounter no matter whether an auditor failure exists under the regulation (Bell, Landsman, and Shackelford 2001; Morgan and Stocken 1998). O'Malley (1993) finds that anyone who suffered a financial loss may sue the auditors and demand compensation from the auditors even if there are no misstatements in the audited reports. Thus, auditors are inclined to charge a higher audit fees in the client with higher business risk since business risk cannot be eliminated (Morgan and Stocken 1998).

In general, firms in competitive industries have more business risk than those in less competitive industries. Schumpeter (1912) proves that firms on competitive industries tend to engage in innovative activities more than those in less competitive industries. Schmidt (1997) shows that competition increases the probability of liquidation. Firms in competitive industries involve more liquidity risk due to threats from potential
rivals who are likely to enter these industries. Liquidity problem cause a firm's financial failure (Seetharaman, Gul and Lynn 2002). Also, financially distressed firms are often involved in auditor litigation (Palmrose 1997). Therefore, auditors should have to charge higher audit fees and expend more effort on firms in a more competitive industries in order to cover the higher business risk. Based on these logic, we can predict that market competition will increase audit fees and audit hour to cover the business risk.

In conclusion, considering the litigation risk, two contradictory predictions are possible on the relation between market competition and audit fees and audit hour. First, firms in competitive industry can mitigate agency problems because the competition in industry plays a corporate governance role. Thus, these firms can decrease audit risk and audit fees and audit hour may decrease. On the other hand, firms in a more competitive industry bear a more business risk due to liquidity risk and distress risk. Thus, Auditor may charge higher audit fees and expend more effort on firms in a more competitive industry.

Therefore, we set up hypothesis on the relation between market competition and audit fees and audit hour in the form of a null hypothesis as follows:

**Hypothesis 1. There is no significant relation between market competition and audit fees (audit hour).**

### 2.3 Market competition and earnings management

Earnings management is one of the determinants of audit fees. If discretionary accruals are used as means of opportunistic earnings management, this leads to an upward revision of auditor's inherent risk assessment. Thus, auditor expects to make higher audit effort and charges a higher audit fees (Gul et al., 2003).

Meanwhile, the degree of competition in industry also exerts influence on opportunistic earnings management. Marciauityte and Park (2009) shows that firms in more competitive industries are less likely to engage in opportunistic earnings management as measured by the magnitude of discretionary accruals. This result is caused by the decrease of the information asymmetry. As noted above, competition in industry mitigate the information asymmetry between managers and investors and improves the accuracy of financial reporting.

However, since firms in competitive industry bear higher operating risk, the
volatility of earnings increases (Lev 1983) and the profitability decreases (Porter 1980). This circumstance induces managers to distort economic performance. Thus, the firms in competitive industry are more likely to report misleading earnings.

In summary, market competition also affects the magnitude of earnings management in two contradictory ways. On the one hand, firms in more competitive industry are less likely to manipulate in financial reporting due to decrease of agency problem. Thus, audit fees and audit hour decrease because audit risk decreased. On the other hand, manager of firms in competitive industry tends to manipulate earnings for the purposes of hiding the volatility of earnings, which results in higher audit hour and audit fees. As a result, market competition affects audit fees and audit hour both thorough the channel of audit risk and business risk intrinsically and through earnings management indirectly.

Therefore, we set up hypothesis in the form of a null hypothesis considering the interaction effect to audit hour and audit fees as follows:

**Hypothesis 2:** There is no significant relation between market competition and audit fees (audit hour) after considering the effect of earnings management.

### 3. Empirical Tests

#### 3.1 Measurement of market competition

The main explanatory variable of this paper is the magnitude of market competition, which is measured using Herfindahl–Hirschman Index (HHI). HHI is defined as the sum of the square of market share (Equation 1) (Grullon and Michaely 2007; Giroud and Mueller 2011). In Equation 1, firm i’s sales is $s_i$ and $S$ represents the total sales in the industry.

$$HHI = \sum_{i=1}^{N} \left( \frac{s_i}{S} \right)^2$$  \hspace{1cm} (1)

Industry is classified by three-digit code based on Korean Standard Industrial Classification. Total number of industry, $j$, is 208. The larger HHI means that the industry is less competitive. The firm’s smaller HHI means that the industry in which
the firm included is more competitive.

3.2 Earnings management

We define earnings management as the absolute value of abnormal accruals, using the performance-augmented discretionary accruals model of Kothari, Leone, and Wasley (2005). This is because discretionary accruals can be used to increase or decrease reported earnings.

Total accruals for firm \( i \) in year \( t \) are measured as:

\[
TA_{it} = (\Delta CA_{it} - \Delta CL_{it} - \Delta Cash_{it} + \Delta STDEBT_{it} - DEPN_{it}) / Assets_{i,t-1}
\]

(2)

where:

\( \Delta CA_{it} \) = firm \( i \)'s change in current assets from year \( t-1 \) to year \( t \);
\( \Delta CL_{it} \) = firm \( i \)'s change in current liabilities from year \( t-1 \) to year \( t \);
\( \Delta Cash_{it} \) = firm \( i \)'s change in cash from year \( t-1 \) to year \( t \);
\( \Delta STDEBT_{it} \) = firm \( i \)'s change in debt in current liabilities from year \( t-1 \) to year \( t \);
\( DEPN_{it} \) = firm \( i \)'s depreciation and amortization expenses in year \( t \); and
\( Assets_{i,t-1} \) = firm \( i \)'s book value of assets in year \( t-1 \).

The abnormal accrual for firm \( i \) in year \( t \) is the residual \( \varepsilon_{it} \) from the following regression.

\[
TA_{it} = \beta_{0i} + \beta_{1i} \left( \frac{1}{Assets_{i,t-1}} \right) + \beta_{2i} (\Delta REV_{it} - \Delta AR_{it}) + \beta_{3i} PPE_{it} + \beta_{4i} ROA_{i,t-1} + \varepsilon_{it}
\]

(3)

where:

\( \Delta REV_{it} \) = firm \( i \)'s change in revenues scaled by lagged total assets \( Assets_{i,t-1} \);
\( \Delta AR_{it} \) = firm \( i \)'s change in account receivables scaled by \( Assets_{i,t-1} \);
\( PPE_{it} \) = firm \( i \)'s net property, plant and equipment scaled by \( Assets_{i,t-1} \); and
\( ROA_{i,t-1} \) = firm \( i \)'s return on assets.

3.3 Model Specifications
We estimate the following models for the empirical tests. We used models (4) and (5) for the testing of hypothesis 1 and 2, respectively.

\[
LFEE_{i,j,t} = (LHOUR_{i,j,t}) = \alpha_0 + \alpha_1 HHI_{i,t} + \alpha_2 MS_{i,j,t} + \alpha_3 SIZE_{i,t} + \alpha_4 INVREC_{i,j,t} + \alpha_5 LEV_{i,t} + \alpha_6 LIQ_{i,j,t} + \alpha_7 LOSS_{i,j,t} + \alpha_8 BMT_{i,j,t} + \alpha_9 MARKET_{i,j,t} + \alpha_{10} BIG4_{i,j,t} + \alpha_{11} \sum YR + \epsilon_{i,j,t}
\]  

(4)

\[
LFEE_{i,j,t} = (LHOUR_{i,j,t}) = \alpha_0 + \alpha_1 HHI_{i,t} + \alpha_2 DA_{i,j,t-1} + \alpha_3 HHI_{i,t} \times DA_{i,j,t-1} + \alpha_4 MS_{i,j,t} + \alpha_5 SIZE_{i,t} + \alpha_6 INVREC_{i,j,t} + \alpha_7 LEV_{i,t} + \alpha_8 LIQ_{i,j,t} + \alpha_9 LOSS_{i,j,t} + \alpha_{10} MARKET_{i,j,t} + \alpha_{11} BIG4_{i,j,t} + \alpha_{12} \sum YR + \epsilon_{i,j,t}
\]  

(5)

where,

- \textit{i} represents firm, \textit{j} represents industry, and \textit{t} represent year;
- \textit{LFEE}: natural log of audit fee;
- \textit{LHOUR}: natural log of audit hour;
- \textit{HHI}: Herfindahl_Index;
- \textit{DA}: absolute value of abnormal accruals;
- \textit{MS}: sales scaled by total sales in industry;
- \textit{SIZE}: natural log of total assets;
- \textit{INVREC}: total inventories and accounting receivables scaled by total assets;
- \textit{LEV}: total liabilities scaled by total assets;
- \textit{LIQ}: current assets scaled by current liabilities;
- \textit{LOSS}: an indicator variable that equal 1 if a firm reports negative earnings, and 0 otherwise;
- \textit{BTM}: book to market ratio;
- \textit{MARKET}: an indicator variable that equal 1 if a firm is listed KOSDAQ and 0 otherwise;
- \textit{BIG4}: an indicator variable that equals 1 when audit firm is Big 4 auditor and 0 otherwise; and
- \textit{YR}: year indicators.

Along with our variables of interest, the magnitude of competition in industry(HHI) and earnings management(DA), we also include the control variables that have been shown by prior studies to affect the audit fees and audit hour.
We control for the market share of the firm using MS because market share influences the profitability and complexity of firm's operation that are determinants of audit fees and audit hours (Simunic 1980; Francis 1984; Craswell et al. 1995). We also control for the client's firm size (SIZE) because large firm implies larger potential litigation risk, so audit fees and audit hour increase (Reynolds and Francis 2004; Kwon and Kim 2001; Park et al. 2007). The ratio of inventory and the accounts receivables (INVREC) increase the difficulty of the audit, leading to higher audit fees and audit hour (Simunic 1980).

We measure audit risk and business risk using leverage, profitability and growth opportunities. A firm's leverage (LEV) implies the auditor's business risk. The greater leverage means the more risks of financial distress, thus the auditors are likely to charge higher audit fees and extend their audit work to reduce the risk (Cahan and Zhang 2006). The current ratio (LIQ) is a proxy for audit complexity. We also control for the profitability of the firm using LOSS because the business risk increase when the firm reports negative earnings and thus, auditor tend to charge higher audit fees. We include the book-to-market ratio (BTM) as a proxy for the firm's growth opportunities because the higher growth opportunities, the more audit complexity.

We also include the classification of stock market (MARKET). Prior studies show that whether the firms is listed in KOSPI or KOSDAQ affects the audit hour (Lee et al. 2007). We control for the auditor characteristic (BIG4). Big 4 auditor tend to greater expertise and reputation and thus they charge the premium. Finally, we include dummies for the year.

3.4 Sample Selection

Our sample includes firms listed on the Korean stock market for the period from 2005 to 2010. The financial data are collected from the KIS-Value database. We exclude financial industry and non-calendar year-end firms. Our final sample constitutes 6,550 firm-years. To reduce the effects of outliers, we winsorize the top and bottom 1 percent of each continuous variable excluding the natural log variables.

4. Empirical Results
4.1 Descriptive Statistics

Table 1 presents descriptive statistics of the variables used in the tests. The natural log of audit fee (LFEE) has a mean of 17.993, which means that an average audit fees is approximately 65 million won. The mean of the natural log of audit hour (LHOUR) is 6.588, which means that the auditor spend approximately 730 hours per client. Herfindahl–Hirschman index (HHI) has a mean of 0.249. The mean (median) of market share (MS) of our samples is 10.7% (2.0%). The natural log of firm size (SIZE) has a mean (median) of 25.657 (25.351). The mean (median) of LEV and LIQ is 0.417 (0.417) and 0.861 (0.661), respectively. About 24.2% of our samples reported negative earnings.

[Insert Table 1 around here]

4.2 Main Results

Table 2 shows the results of regression for hypothesis 1 testing the relation between market competition and audit fees and audit hour. In the first column, Table 2, the coefficient of HHI is $-0.125(t=-4.63)$, significant at $p<0.01$. This means that there is a negative relation between Herfindahl–Hirschman index and audit fees. This result is interpreted that auditor charge higher to client firm in more competitive industries. In the second column, Table 3, the coefficient of HHI is $-0.095(t=-2.55)$, significant at $p<0.05$. This results means that the auditor expend more effort on firms in more competitive industries.

In summary, the results present evidence that firms in a more competitive industry bear a more business risk due to liquidity risk and distress risk. This can be interpreted that the external governance role of competition which mitigate agency problem is offset by increase of business risk. The increase of business risk work as a burden to auditors thus, firms in more competitive industries are charged higher and needed more time to reduce the audit risk to an acceptable level.

Table 3 shows the test results for hypothesis 2. The purpose of the test for hypothesis is to verify the effect of earnings management on the relation between market competition and audit fees and audit hour. In the first column, Table 3, the coefficient of variable interest, HHI*DA, is $-0.316(t=-3.07)$, significant at $p<0.01$, while
the coefficient of DA is 0.197(t=2.35), significant at p<0.01. The results for DA is consistent with the prior studies that prove the positive relation between earnings management and audit fee. However, the negative coefficient for the interaction term of HHI and DA means that if the level of competition become closer to the monopoly, the positive effect of earnings management on audit fee is reduced. In order words, when the auditors estimate the audit risk for firms in less competitive industry, they consider less the risk from misreporting financial statement by earnings management.

5. Conclusion

We examined whether auditor reflect the level of market competition on audit fees and audit hour. We also investigated the indirect effect of market competition on audit fees(hour) through earnings management.

Our findings can be summarized as follows. First, we found evidence for an association between the market competition and audit fees and audit hour. It shows that auditor charge audit fees differentially in accordance with level of industrial competition. Auditor charge higher audit fees on firms in more competitive industries and expend more time to that firms. Second, we were able to find an effect of earnings management arisen by increase of business risk due to intense competition on audit fees and audit hour. Considering the level of competition in industry, the positive relation between earnings management and audit fees(hour) proved in existing literature become weaker. This means that auditor is less likely to care about the manager's intention for earnings management when the level of industrial competition is closer to monopoly.

These results suggest the implications to firm’s manager, auditor and regulators by analysis the effect of market competition on audit fees and audit hour. Through this study, managers need to be aware the impact of market competition on their budget for audit fees. Also, auditor should focus on the manager's motivation for misreporting earnings because the manager's intention can be hidden by high profitability and stability of profit when the firm is in less competitive industries. Regulators should consider the likelihood that audit procedure for firm in the monopolistic industries could be reduced because there are possibilities that auditor underestimates audit risk.
The limitation in the study is that there can be measurement error of interested variables, Herfindahl–Hirschman index and discretionary accruals. Therefore, future studies shall be done to complement the limitation.
References


**<Table 1> Descriptive Statistics**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Q1</th>
<th>Median</th>
<th>Q3</th>
<th>Std. Dev.</th>
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<tr>
<td>LFEE</td>
<td>17.993</td>
<td>17.553</td>
<td>17.876</td>
<td>18.258</td>
<td>0.667</td>
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<tr>
<td>LHOUR</td>
<td>6.588</td>
<td>6.148</td>
<td>6.477</td>
<td>6.910</td>
<td>0.723</td>
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<tr>
<td>HHI</td>
<td>0.249</td>
<td>0.119</td>
<td>0.201</td>
<td>0.316</td>
<td>0.205</td>
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<tr>
<td>DA</td>
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<td>0.022</td>
<td>0.048</td>
<td>0.094</td>
<td>0.124</td>
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<tr>
<td>MS</td>
<td>0.107</td>
<td>0.005</td>
<td>0.020</td>
<td>0.084</td>
<td>0.213</td>
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<tr>
<td>INVREC</td>
<td>0.271</td>
<td>0.149</td>
<td>0.258</td>
<td>0.377</td>
<td>0.159</td>
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<tr>
<td>LEV</td>
<td>0.417</td>
<td>0.258</td>
<td>0.417</td>
<td>0.560</td>
<td>0.205</td>
</tr>
<tr>
<td>LIQ</td>
<td>0.861</td>
<td>0.391</td>
<td>0.661</td>
<td>0.980</td>
<td>2.209</td>
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<td>LOSS</td>
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<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.429</td>
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<td>BIG4</td>
<td>0.554</td>
<td>0.000</td>
<td>1.000</td>
<td>1.000</td>
<td>0.497</td>
</tr>
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</table>

LFEE: natural log of audit fee;
LHOUR: natural log of audit hour;
HHI: Herfindahl_Index;
DA: absolute value of abnormal accruals;
MS: sales scaled by total sales in industry;
SIZE: natural log of total assets;
INVREC: total inventories and accounting receivables scaled by total assets;
LEV: total liabilities scaled by total assets;
LIQ: current assets scaled by current liabilities;
LOSS: an indicator variable that equal 1 if a firm reports negative earnings, and 0 otherwise;
BTM: book to market ratio;
MARKET: an indicator variable that equal 1 if a firm is listed KOSDAQ and 0 otherwise;
BIG4: an indicator variable that equals 1 when audit firm is Big 4 auditor and 0 otherwise;
<Table 2> Association between Market Competition and Audit Fees (Hour)

\[ LFE_{i,t} = (LHOUR_{i,t}) = \alpha_0 + \alpha_1 HHI_{i,t} + \alpha_2 MS_{i,j,t} + \alpha_3 SIZE_{i,j,t} + \alpha_4 INVREC_{i,t} + \alpha_5 LEV_{i,t} \\
+ \alpha_6 LIQ_{i,j,t} + \alpha_7 LOSS_{i,t} + \alpha_8 BTM_{i,j,t} + \alpha_9 MARKET_{i,t} + \alpha_{10} BIG4_{i,t} + \alpha_{11} \sum YR + \epsilon_{i,t} \]  

<table>
<thead>
<tr>
<th>Variable</th>
<th>Hypothesis 1</th>
<th></th>
<th></th>
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<tr>
<td></td>
<td>LFEE</td>
<td>LHOUR</td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>9.037(79.93)***</td>
<td>-2.906(-19.12)***</td>
<td></td>
</tr>
<tr>
<td>HHI</td>
<td>-0.125(-4.63)***</td>
<td>-0.095(-2.55)***</td>
<td></td>
</tr>
<tr>
<td>MS</td>
<td>0.218(7.52)***</td>
<td>0.206(5.16)***</td>
<td></td>
</tr>
<tr>
<td>SIZE</td>
<td>0.244(46.54)***</td>
<td>0.362(63.37)***</td>
<td></td>
</tr>
<tr>
<td>INVREC</td>
<td>0.028(0.98)</td>
<td>-0.140(-3.48)***</td>
<td></td>
</tr>
<tr>
<td>LEV</td>
<td>0.186(8.10)***</td>
<td>0.037(1.18)</td>
<td></td>
</tr>
<tr>
<td>LIQ</td>
<td>-0.002(-0.95)</td>
<td>-0.004(-1.31)</td>
<td></td>
</tr>
<tr>
<td>LOSS</td>
<td>0.060(5.55)***</td>
<td>0.118(7.93)***</td>
<td></td>
</tr>
<tr>
<td>BTM</td>
<td>0.049(11.30)***</td>
<td>0.054(9.18)***</td>
<td></td>
</tr>
<tr>
<td>MARKET</td>
<td>0.031(2.97)***</td>
<td>-0.005(-0.39)</td>
<td></td>
</tr>
<tr>
<td>BIG4</td>
<td>-0.007(-0.71)</td>
<td>0.257(20.12)***</td>
<td></td>
</tr>
<tr>
<td>YR</td>
<td>included</td>
<td>Included</td>
<td></td>
</tr>
</tbody>
</table>

\[ Adj. R^2 = 0.759 \hspace{1cm} 0.607 \]
\[ F-Value = 1289.06 \hspace{1cm} 676.15 \]
\[ N = 6,550 \hspace{1cm} 6,550 \]

1) Variable definitions refer to Table 1
2) ***, ***, and *** present statistical significance at the 10%, 5%, and 1% level, respectively, for a two-tailed test.
### Table 3: The Effect of Earnings Management on the Association between Market Competition and Audit Fees (Hour)

\[
LFEE_{i,t} (LHOUR_{i,t}) = \alpha_0 + \alpha_1 HHI_{i,t} + \alpha_2 DA_{i,t} + \alpha_3 HHI_{i,t-1} + \alpha_4 MS_{i,t} + \alpha_5 SIZE_{i,t} + \\
+ \alpha_6 INVREC_{i,t} + \alpha_7 LEV_{i,t} + \alpha_8 LIQ_{i,t} + \alpha_9 LOSS_{i,t} + \alpha_{10} BTM_{i,t} + \\
+ \alpha_{11} MARKET_{i,t} + \alpha_{12} BIG4_{i,t} + \alpha_{13} \sum YR + \epsilon_{i,t}
\]

<table>
<thead>
<tr>
<th>Hypothesis 2</th>
<th>( LFEE )</th>
<th>( LHOUR )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>7.913(63.49)***</td>
<td>-2.930(-19.25)***</td>
</tr>
<tr>
<td>HHI</td>
<td>-0.141(-4.50)***</td>
<td>-0.064(-1.67)*</td>
</tr>
<tr>
<td>DA</td>
<td>0.197(2.35)***</td>
<td>0.336(3.28)***</td>
</tr>
<tr>
<td>HHI*DA</td>
<td>-0.316(-3.07)***</td>
<td>-0.480(-3.83)***</td>
</tr>
<tr>
<td>MS</td>
<td>0.300(9.18)***</td>
<td>0.211(5.28)***</td>
</tr>
<tr>
<td>SIZE</td>
<td>0.383(81.89)***</td>
<td>0.362(63.42)***</td>
</tr>
<tr>
<td>INVREC</td>
<td>-0.025(-0.78)</td>
<td>-0.139(-3.47)***</td>
</tr>
<tr>
<td>LEV</td>
<td>0.199(7.60)***</td>
<td>0.032(1.00)</td>
</tr>
<tr>
<td>LIQ</td>
<td>-0.003(-1.44)</td>
<td>-0.003(-1.27)</td>
</tr>
<tr>
<td>LOSS</td>
<td>0.106(8.65)***</td>
<td>0.118(7.93)***</td>
</tr>
<tr>
<td>BTM</td>
<td>0.068(14.04)***</td>
<td>0.052(8.79)***</td>
</tr>
<tr>
<td>MARKET</td>
<td>0.026(2.18)***</td>
<td>-0.011(-0.75)</td>
</tr>
<tr>
<td>BIG4</td>
<td>0.091(8.67)***</td>
<td>0.26(20.01)***</td>
</tr>
<tr>
<td>YR</td>
<td>included</td>
<td>Included</td>
</tr>
<tr>
<td>( Adj. R^2 )</td>
<td>0.692</td>
<td>0.608</td>
</tr>
<tr>
<td>( F-Value )</td>
<td>865.81</td>
<td>598.63</td>
</tr>
<tr>
<td>( N )</td>
<td>6,550</td>
<td>6,550</td>
</tr>
</tbody>
</table>

1) Variable definitions refer to Table 1
2) *, **, and *** present statistical significance at the 10%, 5%, and 1% level, respectively, for a two-tailed test.