THE RELATION OF AUDIT QUALITY TO AUDIT MARKET CONCENTRATION AND THE COMPOSITION OF AUDIT COMMITTEE FINANCIAL EXPERTISE

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ABSTRACT

This study examines whether the expertise of audit committees (ACs) affects the relationship between audit market concentration and audit quality by focusing on the composition of AC financial expertise. Regulatory agencies in each country show great interest in the situation where the audit market is concentrated on a small number of auditors. This is because the concentration of the audit market can affect audit quality. Prior research has reported that the higher the concentration of the audit market measured by the Herfindahl index, the lower the audit quality. However, if ACs with expertise perform their original monitoring function properly, it is expected that the deterioration of audit quality will be restrained by reducing the tendency of oligopolistic auditors to neglect audit work although audit market concentration increases. The empirical results show that as the concentration of the audit market increases, the audit quality deteriorates and that this negative relation between audit market concentration and audit quality decreases only when ACs have certified accountants, other accounting experts such as chief financial officers and controllers, or finance experts (excluding finance professors). In addition, this study finds that ACs with accounting experts only or all the three types of financial experts decrease the negative relation between audit market concentration and audit quality. These results indicate that the impacts of AC expertise on the relationship between audit market concentration and audit quality depend on the composition of AC financial experts. Thus, this paper fills the gap in the literature by highlighting the importance of AC financial expertise for the influence of audit market concentration on audit quality and by providing a more comprehensive view of ACs' effectiveness.

Keywords: Audit Committee, Corporate Governance, Financial Expertise, Audit Market Concentration, Audit Quality.

INTRODUCTION

This study examines the effects of the composition of audit committee (AC) financial expertise on the relationship between audit market concentration and audit quality measured by the magnitude of earnings management. Previous studies show that the concentration of the audit market affects audit quality (e.g., Boone et al., 2012; Cho et al., 2014). In addition, prior studies on the effects of AC expertise find that ACs with financial expertise curb the magnitude of earnings management and enhance audit quality (e.g., Xie et al., 2003; Bédard et al., 2004). By extending these prior studies, this paper investigates how the composition of expertise of ACs, which play a key role in corporate governance, affects the relation between audit market concentration and audit quality.

Citation Information: Song, B. (2021). The relation of audit quality to audit market concentration and the composition of audit committee financial expertise. *Academy of Accounting and Financial Studies Journal, 25*(6), 1-18.

ACs are responsible for improving corporate transparency and the quality of financial reporting by supervising the management and external auditors from an independent position (Securities and Exchange Commission (SEC, 2003). Since the Great Depression, some US firms have voluntarily established ACs to improve corporate governance, and the proportion of these firms has continued to increase. Since 1989, the establishment of the AC has been made mandatory for all listed firms in the US. After the Enron scandal, Section 407 of the Sarbanes-Oxley Act (SOX) of 2002 further strengthens the role of ACs by mandating that listed firms in the US include at least one financial expert on ACs. Korea has also made it mandatory for large firms with total assets of KRW 2 trillion (approximately US$ 1.7 billion) or more to establish the AC since 2000 and to include one or more financial experts in the AC since 2003.

Subject to these environmental changes, the early studies conducted until the 1990s mainly examined the effects of the establishment of the AC and the characteristics of firms that established the AC. In the 2000s, studies began to investigate the effects of ACs by categorizing their characteristics. These studies classify AC characteristics into independence, expertise and activity, and suggest that independent ACs, ACs with financial expertise, and more active ACs perform the role of monitoring corporate financial reporting activities more effectively. In other words, ACs with superior characteristics increase financial reporting quality by lowering agency costs (Kwak, 2010). Some studies further categorize AC financial expertise and examine its effects. AC financial expertise is largely classified into accounting expertise, finance expertise, and supervisory expertise (SEC, 2003). However, these studies provide mixed evidence on the impacts of the three types of AC financial expertise (e.g., Zhang et al., 2007; Song et al., 2019).

Meanwhile, by the end of the 1980s, the US audit market was dominated by eight large accounting firms called the Big 8. Then, from 1989, as large accounting firms were consolidated through mergers, the number of large accounting firms gradually decreased, and when Arthur Andersen disappeared in 2002, the current Big 4 system was established. Also in other developed countries, the Big 4 system started in 2002. Similar changes occurred in the Korean audit market during the same period (Choe et al., 2007; Cho et al., 2014). Accordingly, regulators around the world show high interest in the situation in which the audit market is concentrated on a small number of auditors. This is because audit market concentration can affect audit quality. However, a number of accounting firms presented opinions that refute the views of regulators (Song & Choi, 2016). Regulators was not able to get a clear answer from their analysis of multiple views or findings from prior research, so they asked the academia to further investigate the impacts of competition in the audit market (General Accounting Office (GAO), 2003; Government Accountability Office (GAO), 2008).

Based on this view, several studies examine the effects of audit market concentration on audit quality. These studies report that the concentration of the audit market has impacts on audit quality. However, it is not possible to draw clear conclusions about this as these studies show mixed findings. For instance, Kallapur et al. (2010) and Newton et al. (2013) document that audit quality increases as the concentration of the audit market by industry increases. On the other hand, Boone et al. (2012) provide evidence that as the concentration of the audit market by industry increases, audit quality decreases. Also in Korea, it is reported that audit quality deteriorates as audit market concentration measured by the Herfindahl index increases (Cho et al., 2014).

The subject of this study is to explore the effects of the composition of AC financial experts. ACs are in the most direct position with auditors, and one of the crucial roles of ACs is to exchange opinions with auditors (Kwak, 2010). Thus, if AC financial expertise affects the

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behavior of external auditors, it can provide incentives to external auditors to faithfully perform audit work. As mentioned above, prior literature reports mixed evidence on the effects of the three types of AC financial expertise (e.g., Zhang et al., 2007; Song et al., 2019). Moreover, each subtype of AC financial experts such as a certified accountant and an accounting or a finance professor has different experience, skill and knowledge, and therefore may have different impacts on ACs' effectiveness. Nevertheless, little is known on which subtypes of financial experts contribute to ACs' effectiveness. There is also little evidence on the influence of AC financial expertise on the relationship between audit market concentration and audit quality. Accordingly, this study focuses on subtypes of financial experts on ACs and investigates the effects of ACs on the association between audit market concentration and audit quality.

Furthermore, a resource dependence theory argues that a director extracts resources of other directors in order to increase firm performance (Pfeffer, 1972). Prior research documents the consistent results that the combination of AC financial expertise has effects on the effectiveness of ACs (Dhaliwal et al., 2010; Cohen et al., 2014; Kusnadi et al., 2016). Therefore, this paper also examines whether the impacts of AC financial expertise on the relation between audit market concentration and audit quality are conditioned by the mixture of AC financial experts.

This paper uses 1,401 firm-years listed on the Korea Stock Exchange (KSE) from 2006 to 2015 to address the research questions. In Korea, ACs are mandated to include at least one member with financial experience as in the case of the SOX requirements. The results reveal that, consistent with the findings of previous studies (Boone et al., 2012; Cho et al., 2014), audit quality decreases as audit market concentration increases. This finding can be interpreted as that if the concentration of the audit market increases, the level of competition among auditors decreases and a small number of oligopolistic auditors neglect audit work, which leads to lower audit quality. This study also finds that the negative relationship between audit market concentration and audit quality decreases when ACs include certified accountants, other accounting experts such as chief financial officers (CFOs) and controllers, or finance experts (excluding finance professors). The results suggest that the effects of AC financial expertise on the relation between audit market concentration and audit quality depend on qualifications of AC financial experts. Moreover, this paper shows that ACs made up of accounting experts only or all the three types of financial experts strictly perform their original monitoring function, providing oligopolistic auditors with incentives to conduct audits faithfully. This finding indicates the importance of accounting expertise and diverse financial expertise in the effectiveness of ACs.

This paper contributes to the literature in several ways. First, most of previous studies investigate the direct influence of AC characteristics on audit quality. On the other hand, there are few studies examining the indirect effects of AC characteristics on the relationship between other variables and audit quality. The characteristics of ACs may directly affect audit quality, but may also indirectly affect audit quality through other variables. Therefore, this study has academic contributions in terms of analyzing the effects of specific characteristics of ACs on audit quality in consideration of audit market concentration. In addition, this study is important in terms of showing the effectiveness of subtypes of AC financial experts, considering that there are few prior studies that classify AC expertise in detail and examine their effects simultaneously. Second, the findings of this study are important in that they suggest to external information users such as regulators and investors under what conditions ACs can more actively perform checks and controls on management and external auditors. Third, as regulatory agencies are requesting the academia to continue research on the effects of audit market concentration, research on this is

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necessary in the future. DeFond and Zhang (2014) also call for the need for continuous research. Referring to the results of this study, subsequent research also needs to identify and analyze special circumstances that may increase or decrease audit quality.

The remainder of this paper proceeds as follows. Section 2 develops the hypotheses after reviewing previous studies. Section 3 describes the research design and samples. Sections 4 and 5 present the empirical evidence and provide a discussion of the empirical results, respectively. Finally, Section 6 presents the conclusion of the article.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Literature Review

The audit market has been changed into a market concentrated in a small number of large accounting firms due to the continuous merger of large accounting firms over the past decade. In the case of the US, the merger of several accounting firms in 1989 changed the Big 8 system in which eight large accounting firms competed to the Big 6 system. After that, in 1998, Price Waterhouse and Coopers & Lybrand merged to form the Big 5 system. In 2002, the current Big 4 system began with the downfall of Arthur Andersen. Similar to the US audit market, Korean audit market was reorganized from the Big 6 system that lasted until 1998 to the current Big 4 system in 2005 as the merge of large accounting firms progressed (Choe et al., 2007; Cho et al., 2014).

Regulators and other accounting information users expressed great concern about this structural change. The concern is that if the level of competition in the audit market decreases as a small number of auditors dominate the audit market due to an increase in the concentration of the audit market, auditors may not faithfully perform their audit duties, which may lower audit quality. However, a number of accounting firms presented opinions that refute these views (Song & Choi, 2016). The GAO (2003, 2008) could not draw a clear conclusion by analyzing multiple views or the results of prior studies and therefore requested a study on the effects of audit market concentration from academia. The findings of the academic community on audit quality are as follows.

First, Kallapur et al. (2010), the first to study the effects of audit market concentration on audit quality, find that the higher the auditor concentration, the better the audit quality. Contrary to the concern of regulators, they show that the lower the competition level in the audit market, the higher the audit quality. Similarly, Newton et al. (2013) document that as the concentration of the audit market increases, the frequency of the restatement of financial statements decreases. However, contrary to this view, there are studies that report negative findings on the oligopoly of the audit market, as feared by regulators. Boone et al. (2012), who suggest that the higher the auditor concentration measured by the Herfindahl index, the greater the likelihood that a firm will achieve its profit target through positive discretionary accruals, are an example. Also in Korea, Cho et al. (2014) report that the lower the competition level in the audit market, the lower the audit quality.

Combining the above research results, it is not possible to draw definitive conclusions about the effects of the level of competition in the audit market on audit quality. As a result, regulators continue to show keen interest in the subject (European Commission (EC), 2013).

Next, the purpose of ACs is to improve the quality of financial reporting by monitoring financial reporting process of management and auditors. Accordingly, the SEC and the SOX emphasize the role of ACs as the backbone of corporate governance. In the US, the

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establishment of the AC has been made mandatory for all listed firms since 1989. After the Enron scandal, the role of ACs is further strengthened by Section 407 of the SOX of 2002, which mandates listed firms to include one or more financial experts in ACs. Korea has also made it mandatory for large firms with total assets of KRW 2 trillion (approximately US$ 1.7 billion) or more to have the AC since 2000 and to include at least one financial expert on the AC since 2003.

Until the 1990s, studies on the characteristics of firms that established the AC and the impacts of the establishment of the AC were mainly conducted (e.g., Pincus et al., 1989; McMullen, 1996). Since then, studies on ACs have mainly analyzed how the characteristics of ACs affect financial reporting activities. AC characteristics are largely categorized into independence, expertise, activity, and power. Among the characteristics, expertise is the most important factor and Section 407 of the SOX of 2002 further enhances the role of ACs by mandating that listed firms in the US have at least one financial expert in ACs, after the Enron scandal. Likewise, the Korean Commercial Act mandated ACs to include at least one financial expert in 2004. The financial experts on ACs should have the ability to understand accounting standards and financial statements, and to judge whether a firm has carried out accounting in accordance with accounting standards. They should also be able to understand internal control and financial reporting process of the firm. These financial experts are largely divided into accounting experts, finance experts, and supervisory experts (SEC, 2003). Specifically, accounting experts are experts who are well aware of financial reporting process of firms through accounting-related expertise such as accounting and auditing. Those with experience in the field of accounting, such as certified public accountants, tax accountants, CFO, controllers or accounting professors are examples. Finance experts are experts with experience in the finance field such as banking, and supervisory experts are experts with experience in the supervisory field such as chief executive officers (CEO) and chairmen who have been involved in corporate decision-making.

Earlier studies on AC expertise do not classify these types of financial experts and find evidence that ACs with financial experts have positive influence on the quality of financial reporting (e.g., Carcello et al., 2002; Abbott et al., 2003; Bédard et al., 2004; Krishnan, 2005; Keune & Johnstone, 2012). After that, studies on ACs classify the three types of financial experts and show mixed results. Specifically, some studies report that only accounting financial experts on ACs are associated positively with financial reporting quality (Krishnan & Visvanathan, 2008; Dhaliwal et al., 2010; Song et al., 2019). In a similar vein, DeFond et al. (2005) document that the stock market values only accounting financial experts on ACs. Furthermore, there is empirical evidence that firms with AC supervisory expertise are more likely to report weaknesses in internal control (Naiker & Sharma, 2009). These findings indicate that AC members well informed of financial reporting process through expertise in the accounting field fulfil their oversight duties.

On the contrary, other research presents evidence that ACs with finance or supervisory expertise gives benefits to firms. The empirical findings that AC non-accounting financial experts decrease the magnitude of earnings management (Xie et al., 2003), increase audit fees (Hoitash & Hoitash, 2009) or decrease the probability of misuse of assets (Mustafa & Youssef, 2010) and the empirical finding that AC accounting or non-accounting financial experts are less likely to report deficiencies in internal control (Zhang et al., 2007) are examples. Goh (2009) also reports the consistent results. These findings imply that non-accounting financial experts are faithful to their oversight duties by monitoring firms' financial reporting process and preventing

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corporate misappropriation of assets. As such, prior literature finds mixed empirical evidence about the effects of the three types of AC financial experts.

More recent research shows the evidence for the effects of the mixture of AC financial expertise on ACs' effectiveness. Dhaliwal et al. (2010) document that although AC accounting financial experts are positively related to accounting information quality, ACs including both accounting and finance financial experts have the most positive influence on accounting information quality. Similarly, Kusnadi et al. (2016) report the positive impact of the combination of accounting and non-accounting experts on financial reporting quality. Cohen et al. (2014) find that AC members having both accounting and industry expertise or in any case, those having both supervisory and industry expertise enhance financial reporting quality. These empirical findings lend support to the importance of various AC financial expertise and are coherent with Pfeffer (1972)'s resource dependence theory that a director extracts human capital resources of other directors in order to increase firm performance.

Hypothesis Development

As mentioned above, prior research shows that ACs with financial expertise improve audit quality by curbing earnings management behaviors of firms (e.g., Carcello et al., 2002; Xie et al., 2003; Bédard et al., 2004). However, ACs can directly affect audit quality but they can also affect it indirectly. Therefore, it is important to analyze the indirect impacts of ACs. This study examines the influence of AC financial expertise on the relationship between audit market concentration and audit quality, especially in relation to audit market concentration.

Previous studies present mixed results on the relationship between audit market concentration and audit quality (e.g., Boone et al., 2012; Newton et al., 2013; Cho et al., 2014) as described before. Therefore, the influence of AC financial expertise on the relationship between audit market concentration and audit quality can be divided into the following two cases. The first is the case where the higher the concentration of the audit market, the lower the audit quality, and it is expected that ACs with financial expertise will be able to curb the tendency of oligopolistic auditors to neglect audit work. The second is the case where audit quality improves as audit market concentration increases, and ACs with financial expertise can be expected to induce auditors to perform more diligently audit work or to not affect the relationship between audit market concentration and audit quality. This is because it is judged that there is little room for AC's supervision activities to be effective in this case.

However, even though AC financial expertise is a core element in ensuring the effectiveness of corporate internal and external audits, prior literature reports mixed results for the impacts of the three types of AC financial expertise (e.g., Zhang et al., 2007; Song et al., 2019). In addition, each subtype of financial experts on ACs including a certified accountant and an accounting or a finance professor has different skill, knowledge and experience, and thus may have different effects on ACs' effectiveness. In fact, there is evidence using a small sample that only AC members with experience at financial institutions or professors improves the quality of financial reporting (Choi et al., 2004; Choi et al., 2008). These indicate that finance experts collect information from a variety of sources including financial statements (Dhaliwal et al., 2010) and this experience serves enhancing financial reporting quality. Moreover, professors often combine independence and professionalism in corporate decision-making (Choi et al., 2008) and thus it seems that ACs respect them rather than AC members with other experiences. However, little is known on which subtypes of financial experts contribute to the effectiveness of ACs. There is also little evidence on the effects of AC financial experts on the relation between

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audit market concentration and audit quality. Accordingly, this study focuses on subtypes of financial experts and examines the effects of ACs on the relation between audit market concentration and audit quality.

ACs are in the most direct position with external auditors, and one of the crucial roles of ACs is to exchange opinions with external auditors (Kwak, 2010). Therefore, it is expected that ACs with certain subtypes of financial experts will provide incentives to oligopolistic auditors to perform audit work more faithfully. In Korea, it has been reported that the higher the concentration of the audit market measured by the Herfindahl index, the lower the audit quality. If that is the case, ACs with certain subtypes of financial experts can restrain the tendency of oligopolistic auditors to neglect audit work. Therefore, this study establishes the following alternative hypothesis.

H1: *An audit committee with certain subtypes of financial experts reduces the tendency of a small number of oligopolistic auditors to neglect their audit work.*

Next, this study investigates whether the effects of AC financial expertise on the relation between audit market concentration and audit quality depend on the mix of AC financial experts. Even though accounting expertise is relatively more crucial among AC financial expertise (DeFond et al., 2005; Krishnan & Visvanathan, 2008; Naiker & Sharma, 2009; Dhaliwal et al., 2010; Song et al., 2019), an AC member with experience in accounting may need influence within a firm in order for his or her argument to be accepted by the firm as well as accounting expertise (Song et al., 2019). An AC member with experience in finance or supervision can boost the status and influence of the AC within the firm by helping AC accounting experts (Song et al., 2017). Consistent with the arguments, previous studies present evidence that the positive influence of ACs is greater when they include members with non-accounting expertise as well as those with accounting expertise (Dhaliwal et al., 2010; Cohen et al., 2014; Kusnadi et al., 2016). These findings back up the resource dependence theory (Pfeffer, 1972) and imply that ACs' effectiveness is increased when they are composed of members with diverse skill sets and experience. Therefore, it is expected that ACs can provide oligopolistic auditors with incentives to perform their duties with diligence when ACs have various financial experts including accounting experts. Accordingly, this paper provides the second hypothesis as follows.

H2: *An audit committee with diverse financial experts including accounting experts reduces the tendency of a small number of oligopolistic auditors to neglect their audit work.*

RESEARCH DESIGN

Research Model

First, this study uses the following Equation (1) to analyze the effects of subtypes of AC financial expertise on the relationship between audit market concentration and audit quality.

$$
\begin{aligned}
|DA| = {} & \beta_0 + \beta_1 HER + \beta_2 HER \times ACCCERT + \beta_3 HER \times ACCPROF \\
& + \beta_4 HER \times ACCOTHERS + \beta_5 HER \times FINPROF + \beta_6 HER \times FINOTHERS \\
& + \beta_7 HER \times SUP + \beta_8 ACCCERT + \beta_9 ACCPROF + \beta_{10} ACCOTHERS \\
& + \beta_{11} FINPROF + \beta_{12} FINOTHERS + \beta_{13} SUP + \beta_{14} ACIND + \beta_{15} lnACACTIVITY \\
& + \beta_{16} lnACTENURE + \beta_{17} SIZE + \beta_{18} STDSALES + \beta_{19} STDCFO + \beta_{20} ZSCORE \\
& + \beta_{21} LOSS + \beta_{22} CFO + \beta_{23} TACCt\text{-}1 + \beta_{24} ISSUE + \beta_{25} AUDITORSWITCH
\end{aligned}
$$

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$$+ \beta_{26}AUDEXPERT + Year\ Indicators + Industry\ Indicators + \varepsilon \quad (1)$$

The dependent variable (|*DA*|) is the absolute value of performance-matched discretionary accruals as a proxy for audit quality. *DA* is calculated by subtracting the normal level of accruals computed as adjusting the performance according to the methodology of Kothari et al. (2005) from actual accruals. The main variables of interest are the interaction terms between audit market concentration (*HER*) and AC expertise variables. *HER*, a proxy for audit market concentration, is the Herfindahl index measured as follows: First, by industry-year, the sum of the total assets of firms which receive external audit by each accounting firm is divided by the sum of the total assets of all firms. The ratio is then squared and the values are summed by industry-year. Only cases with 10 or more observations by industry-year are included in the analysis. AC expertise variables are *ACCCERT*, *ACCPROF*, *ACCOTHERS*, *FINPROF*, *FINOTHERS*, and *SUP*, which are dummy variables for a certified accountant, an accounting professor, other accounting experts such as a CFO and a controller, a finance professor, other finance experts such as a banker and an analyst, and a supervisory expert such as a CEO, respectively. If the negative relationship between audit market concentration and audit quality weakens as AC financial experts perform its original function well, the coefficients of interaction terms will show a negative value.

Following previous studies on audit quality (e.g., Hribar and Nichols, 2007; Cho et al., 2014), this study controls for firm-specific factors. *ACIND*, *lnACACTIVITY* and *lnACTENURE* indicate AC independence, AC activity and average tenure of AC members, respectively. *SIZE* is firm size and *ISSUE* indicates external financing. *STDSALES* and *STDCFO* are standard deviations of sales and operating cash flow for the past 3 years, respectively. *ZSCORE* is corporate financial risk and *LOSS* indicates a firm's profitability. *CFO* is cash flow from operations and *TACCt-1* indicates lagged total accruals. *AUDITORSWITCH* and *AUDEXPERT* indicate auditor change and an industry expert auditor, respectively. This study further includes fixed effect indicators by year and industry. The definitions of the variables are summarized in Table 1.

Next, this study investigates the effects of the mixture of AC financial expertise on the relation between audit market concentration and audit quality by estimating the following Equation (2).

$$\begin{aligned} |DA| = {} & \beta_0 + \beta_1 HER + \beta_2 HER \times ACCONLY + \beta_3 HER \times ACCANDANOTHER \\ & + \beta_4 HER \times ALL + \beta_5 ACCONLY + \beta_6 ACCANDANOTHER + \beta_7 ALL + \beta_8 ACIND \\ & + \beta_9 lnACACTIVITY + \beta_{10} lnACTENURE + \beta_{11} SIZE + \beta_{12} STDSALES \\ & + \beta_{13} STDCFO + \beta_{14} ZSCORE + \beta_{15} LOSS + \beta_{16} CFO + \beta_{17} TACCt\text{-}1 + \beta_{18} ISSUE \\ & + \beta_{19} AUDITORSWITCH + \beta_{20} AUDEXPERT + Year\ Indicators \\ & + Industry\ Indicators + \varepsilon \end{aligned} \quad (2)$$

In this regression model, AC expertise variables are *ACCONLY*, *ACCANDANOTHER* and *ALL*. These are dummy variables for whether the AC includes only accounting experts, for whether the AC includes either finance or supervisory experts as well as accounting experts, and for whether the AC includes all three types of financial experts, respectively. If such ACs reduce the tendency of oligopolistic auditors to neglect their audit work, the interaction coefficients would be negative.

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Sample and Data

This study uses a sample that satisfies all of the following conditions for non-financial firms listed on the KSE from 2006 to 2015: a firm with December fiscal year-end; a firm with the AC; a firm that has disclosed the AC data necessary for analysis in the annual report; a firm whose financial data necessary for analysis are available through the TS2000.

As a result, the final sample consists of 1,401 firm-years. In order to control the effects of outliers on the results of empirical analysis, this study winsorizes continuous variables at the top and bottom 1% levels.

EMPIRICAL RESULTS

Descriptive Statistics

Table 1 presents the descriptive statistics of the variables used in this study. The mean of the absolute value of performance-matched discretionary accruals according to Kothari et al. (2005) (|*DA*|) is 0.071 and the average of *HER* is 0.326. The mean values of *ACCCERT*, *ACCPROF* and *ACCOTHERS* indicate that 17.2%, 13.3% and 19.9% of firms have the AC with at least one certified accountant, accounting professor and accounting expert excluding *ACCCERT* and *ACCPROF*, respectively. The mean values of *FINPROF*, *FINOTHERS* and *SUP* indicate that 8.5%, 13.3% and 44.6% of firms have the AC with at least one finance professor, finance expert excluding *FINPROF* and supervisory expert. With respect to the mixture of AC financial experts, 29.3%, 16.4% and 1.8% of firms have only accounting experts on ACs (*ACCONLY*), either finance or supervisory experts as well as accounting experts on ACs (*ACCANDANOTHER*) and all the three types of financial experts on ACs (*ALL*), respectively.

For control variables, on average, 86.4% of firms have the AC composed of only independent directors (*ACIND*). The mean value of the number of AC meetings (*ACTIVITY*) is about 5.10 per year and the average tenure of AC members (*TENURE*) is about 3.24 years. Average firm size (*SIZE*) is 21.149, which is equivalent to about US$ 4.9 billion. The mean values of a past 3-year standard deviation of the ratio of sales to lagged total assets (*STDSALES*) and a past 3-year standard deviation of the ratio of cash flow from operating activities to lagged total assets (*STDCFO*) are 0.150 and 0.050, respectively. The average of the measure of financial risk according to Altman (1968) (*ZSCORE*) is 3.431. 18% of firms report net loss during the fiscal year (*LOSS*) and the average of operating cash flow divided by lagged total assets (*CFO*) is 0.058. The mean of the ratio of total accruals to total assets, at the beginning of the year, (*TACCt-1*) is -0.018. Firms whose equity or debt issuance exceeds 5% of lagged total assets account for 26.8% of the sample. 13.1% and 34% of firms switched their auditor (*AUDITORSWITCH*) and receive external audit from industry expert auditors (*AUDEXPERT*).

Table 1
DESCRIPTIVE STATISTICS

Variable	Mean	Std. Dev.	Min	Q1	Median	Q3	Max
|DA|	0.071	0.065	0.001	0.022	0.052	0.101	0.314
HER	0.326	0.126	0.111	0.242	0.297	0.395	0.652
ACCCERT	0.172	0.378	0.000	0.000	0.000	0.000	1.000
ACCPROF	0.133	0.340	0.000	0.000	0.000	0.000	1.000
ACCOTHERS	0.199	0.399	0.000	0.000	0.000	0.000	1.000
FINPROF	0.085	0.279	0.000	0.000	0.000	0.000	1.000

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FINOTHERS	0.133	0.339	0.000	0.000	0.000	0.000	1.000
SUP	0.446	0.497	0.000	0.000	0.000	1.000	1.000
ACCONLY	0.293	0.455	0.000	0.000	0.000	1.000	1.000
ACCANDANOTHER	0.164	0.371	0.000	0.000	0.000	0.000	1.000
ALL	0.018	0.132	0.000	0.000	0.000	0.000	1.000
ACIND	0.864	0.343	0.000	1.000	1.000	1.000	1.000
ACTIVITY	5.099	3.685	1.000	3.000	4.000	6.000	21.000
lnACACTIVITY	1.411	0.673	0.000	1.099	1.386	1.792	3.045
TENURE	3.238	1.873	1.000	2.000	2.750	4.167	10.000
lnACTENURE	1.015	0.574	0.000	0.693	1.012	1.427	2.303
SIZE	21.149	1.624	18.375	19.686	21.300	22.399	24.711
STDSALES	0.150	0.161	0.004	0.053	0.099	0.186	0.940
STDCFO	0.050	0.041	0.004	0.022	0.038	0.065	0.205
ZSCORE	3.431	3.727	-0.685	1.570	2.443	3.879	23.900
LOSS	0.180	0.384	0.000	0.000	0.000	0.000	1.000
CFO	0.058	0.075	-0.133	0.013	0.051	0.098	0.298
TACCt-1	-0.018	0.075	-0.248	-0.056	-0.019	0.018	0.202
ISSUE	0.268	0.443	0.000	0.000	0.000	1.000	1.000
AUDITORSWITCH	0.131	0.337	0.000	0.000	0.000	0.000	1.000
AUDEXPERT	0.340	0.474	0.000	0.000	0.000	1.000	1.000

|*DA*| is the absolute value of performance-matched discretionary accruals (Kothari et al., 2005). *HER* is the Herfindahl index in each year-industry at the audit market measured by total assets of clients. *ACCCERT* is an indicator variable for ACs with at least one certified accountant. *ACCPROF* is an indicator variable for ACs with at least one accounting professor. *ACCOTHERS* is an indicator variable for ACs with at least one accounting expert, neither certified accountants nor accounting professors. *FINPROF* is an indicator variable for ACs with at least one finance professor. *FINOTHERS* is an indicator variable for ACs with at least one finance expert excluding finance professors. *SUP* is an indicator variable for ACs with at least one supervisory expert. *ACCONLY* is an indicator variable for ACs with at least one accounting expert but no other financial experts. *ACCANDANOTHER* is an indicator variable for ACs with at least one accounting expert and at least one finance or supervisory expert. *ALL* is an indicator variable for ACs with at least one accounting expert, at least one finance expert and at least one supervisory expert. *ACIND* is an indicator variable for ACs composed of only independent directors. *lnACACTIVITY* is the natural logarithm of the number of meetings of ACs during the fiscal year. *lnACTENURE* is the natural logarithm of the mean number of years members of ACs have served as directors of a firm. *SIZE* is the natural logarithm of total assets. *STDSALES* is a past 3-year standard deviation of the ratio of sales to lagged total assets. *STDCFO* is a past 3-year standard deviation of the ratio of cash flow from operating activities to lagged total assets. *ZSCORE* is the measure of financial risk (Altman, 1968). *LOSS* is an indicator variable for firms with net loss during the fiscal year. *CFO* is operating cash flow divided by lagged total assets. *TACCt-1* is the ratio of total accruals (= net income – operating cash flow) to total assets, at the beginning of the year. *ISSUE* is an indicator variable for firms whose equity or debt issuance exceeds 5% of lagged total assets. *AUDITORSWITCH* is an indicator variable for firms who switched their auditor. *AUDEXPERT* is an indicator variable for firms who receive external audit from an auditor with the largest market share based on sales during a year-industry.

Table 2 shows the Pearson correlations for the main variables used in the regressions. *HER* (*ACCCERT*, *ACCOTHERS*, *ACCONLY*, *ACCANDANOTHER* and *ALL*) is positively (negatively) correlated with the absolute value of performance-matched discretionary accruals (|*DA*|), but these correlations are not statistically significant. However, these are the univariate results without controlling other variables that can affect |*DA*|. Accordingly, this paper performs multivariate analysis considering other variables that can affect |*DA*|. Meanwhile, this paper finds that the variance inflation factor of the regression analysis in this paper are below 10. Thus, it is judged that the possibility that the results of this study will be distorted due to multicollinearity is low.

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Table 2
PEARSON CORRELATIONS OF MAIN VARIABLES

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) |*DA*|	1.00										
(2) HER	0.03	1.00									
(3) ACCCERT	-0.02	-0.02	1.00								
(4) ACCPROF	0.01	-0.02	**-0.17**	1.00							
(5) ACCOTHERS	-0.03	**0.11**	**-0.15**	**-0.07**	1.00						
(6) FINPROF	0.03	**0.07**	**-0.06**	-0.02	**-0.07**	1.00					
(7) FINOTHERS	0.05	-0.05	**-0.11**	**-0.12**	**-0.14**	-0.05	1.00				
(8) SUP	0.01	0.00	**-0.15**	**-0.06**	**-0.13**	-0.01	**-0.07**	1.00			
(9) ACCONLY	-0.02	0.05	**0.33**	**0.25**	**0.40**	**-0.20**	**-0.25**	**-0.58**	1.00		
(10) ACCANDANOTHER	-0.00	-0.01	**0.25**	**0.22**	**0.17**	-0.00	-0.05	**0.34**	**-0.29**	1.00	
(11) ALL	-0.00	0.02	-0.03	**0.07**	**0.14**	**0.31**	**0.06**	**0.15**	**-0.09**	**-0.06**	1.00

The bold coefficients represent significance at the level of 0.05 and less. Please see Table 1 for the definitions of the variables.

Multivariate Results

Table 3 presents the regression results for the effects of AC financial expertise on the relationship between audit market concentration and audit quality. This paper uses standard errors clustered by firm and year for the empirical analysis (Petersen, 2008; Gow et al., 2010).

First, in Column (1), this study decomposes AC financial expertise into accounting expertise (*ACC*) and non-accounting (finance and supervisory) expertise (*FINSUP*). The coefficient on *HER* is positive and significant, indicating that the higher the concentration of the audit market, the lower the audit quality. However, the coefficient on *HER* × *ACCEXP* is significantly negative. This suggests that when ACs have accounting expertise, they perform their original monitoring role properly, providing oligopolistic auditors with incentives to faithfully perform audit work.

Column (2) reports the results of empirical analysis based on Equation (1). *HER* shows a significant positive coefficient value, whereas *HER* × *ACCCERT*, *HER* × *ACCOTHERS* and *HER* × *FINOTHERS* show a significant negative coefficient value. The coefficient on *HER* × *FINPROF* is significantly positive. These indicate that ACs including certified accountants, including other accounting experts such as CFOs and controllers, or including finance experts excluding finance professors restrain incentives for oligopolistic auditors not to work hard.

Overall, the results of Table 3 present that the effects of AC financial experts on the relation between audit market concentration and audit quality differ based on qualifications of financial experts on ACs.

Table 3
THE EFFECTS OF AC FINANCIAL EXPERTISE ON THE RELATION BETWEEN AUDIT MARKET CONCENTRATION AND AUDIT QUALITY

Variable	Dependent variable = |*DA*|			
	(1)		(2)	
	Coefficient	t-statistic	Coefficient	t-statistic
Intercept	0.011	0.21	0.016	0.29
HER	0.115***	3.05	0.122***	2.75
HER * ACC	-0.038**	-2.27		
HER * FINSUP	-0.010	-0.35		
HER * ACCCERT			-0.050*	-1.93
HER * ACCPROF			-0.019	-0.73
HER * ACCOTHERS			-0.077**	-2.58
HER * FINPROF			0.106**	2.24

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HER * FINOTHERS			-0.100***	-2.78
HER * SUP			-0.004	-0.13
ACC	0.012***	2.94		
FINSUP	0.001	0.13		
ACCCERT			0.011	1.32
ACCPROF			0.007	1.21
ACCOTHERS			0.029***	2.64
FINPROF			-0.043***	-2.91
FINOTHERS			0.034**	2.41
SUP			0.001	0.05
ACIND	-0.005	-0.89	-0.005	-0.84
lnACACTIVITY	-0.001	-0.57	-0.001	-0.77
lnACTENURE	-0.003	-0.72	-0.003	-1.02
SIZE	0.003*	1.80	0.002*	1.65
STDSALES	0.016	1.43	0.012	1.18
STDCFO	0.079**	2.42	0.086***	3.14
ZSCORE	0.001	1.51	0.001*	1.75
LOSS	0.011	1.48	0.010	1.45
CFO	0.047	1.32	0.041	1.07
TACCt-1	-0.023	-0.79	-0.021	-0.73
ISSUE	0.008*	1.81	0.008*	1.72
AUDITORSWITCH	0.004	0.69	0.004	0.70
AUDEXPERT	-0.008**	-2.04	-0.009**	-2.13
INDUSTRY	Included		Included	
YEAR	Included		Included	
CLUSTERING	Firm, Year		Firm, Year	
N	1,401		1,401	
Adjusted R2	10.3%		10.9%	

*, ** and *** indicate significance at the 0.10, 0.05 and 0.01 levels, respectively. Please see Table 1 for the definitions of the variables. *ACC* is an indicator variable for ACs with at least one accounting expert. *FINSUP* is an indicator variable for ACs with at least one non-accounting expert.

Table 4 shows the empirical results for the effects of the mixture of AC financial expertise on the relation between audit market concentration and audit quality. Column (1) reports the findings of empirical analysis based on Equation (2). The positive and significant coefficient on *HER* and the negative and significant coefficients on *HER* × *ACCONLY* and on *HER* × *ALL* suggest that the negative association between audit market concentration and audit quality decreases when ACs are composed of accounting experts only or all the three types of financial experts. That is, the results show the effectiveness of AC accounting expertise and a variety of AC financial expertise.

This study also additionally uses the following seven indicators representing the mixture of AC financial experts: *ACCONLY*, *FINONLY*, *SUPONLY*, *ACCFIN*, *ACCSUP*, *FINSUP* and *ALL*. The definitions of the variables are summarized in Table 4. Column (2) shows the regression results. Similar to the results reported in Column (1), the coefficients on *HER* × *ACCONLY* and on *HER* × *ALL* are negative. However, the coefficient on *HER* × *ALL* is not significant. Given that the proportion of the sample corresponding to *ALL* is small, the insignificant result could be due to the relatively low statistical power.

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Table 4
THE EFFECTS OF THE MIXTURE OF AC FINANCIAL EXPERTISE ON THE RELATION BETWEEN AUDIT MARKET CONCENTRATION AND AUDIT QUALITY

Variable	Dependent variable = |*DA*|			
	(1)		(2)	
	Coefficient	t-statistic	Coefficient	t-statistic
Intercept	0.010	0.19	-0.001	-0.02
HER	0.109***	3.10	0.150***	3.30
HER * ACCONLY	-0.047***	-3.06	-0.091**	-2.03
HER * ACCANDANOTHER	-0.009	-0.33		
HER * FINONLY			-0.071	-0.59
HER * SUPONLY			-0.022	-0.21
HER * ACCFIN			0.084	0.60
HER * ACCSUP			-0.046	-0.47
HER * FINSUP			-0.028	-0.27
HER * ALL	-0.117*	-1.86	-0.131	-1.13
ACCONLY	0.018***	2.84	0.034**	2.34
ACCANDANOTHER	-0.000	-0.06		
FINONLY			0.030	1.22
SUPONLY			0.019	1.00
ACCFIN			-0.007	-0.60
ACCSUP			0.020	1.04
FINSUP			0.017	0.56
ALL	0.036	1.42	0.052	1.58
ACIND	-0.006	-0.97	-0.007	-1.27
lnACACTIVITY	-0.001	-0.48	-0.002	-0.81
lnACTENURE	-0.003	-0.79	-0.002	-0.53
SIZE	0.003*	1.76	0.003*	1.74
STDSALES	0.017	1.53	0.015	1.36
STDCFO	0.075**	2.24	0.080**	2.39
ZSCORE	0.001	1.56	0.001	1.37
LOSS	0.011	1.55	0.011	1.57
CFO	0.049	1.38	0.046	1.15
TACCt-1	-0.023	-0.83	-0.024	-0.86
ISSUE	0.009*	1.84	0.008*	1.74
AUDITORSWITCH	0.004	0.77	0.004	0.66
AUDEXPERT	-0.008*	-1.93	-0.008**	-1.97
INDUSTRY	Included		Included	
YEAR	Included		Included	
CLUSTERING	Firm, Year		Firm, Year	
N	1,401		1,401	
Adjusted R2	10.4%		10.4%	

*, ** and *** indicate significance at the 0.10, 0.05 and 0.01 levels, respectively. Please see Table 1 for the definitions of the variables. *FINONLY* is an indicator variable for ACs with at least one finance expert but no other financial experts. *SUPONLY* is an indicator variable for ACs with supervisory expert but no other financial experts. *ACCFIN* is an indicator variable for ACs with at least one accounting and at least one finance expert but no supervisory expert. *ACCSUP* is an indicator variable for ACs with at least one accounting and at least one supervisory expert but no finance expert. *FINSUP* is an indicator variable for ACs with at least one finance and at least one supervisory expert but no accounting expert.

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Table 5 shows the robustness test with the alternative measure of AC financial experts, the proportion of financial experts in ACs. The results are consistent with those using the dummy variables for the presence of AC financial experts.

Table 5
ROBUSTNESS CHECK

Variable	Dependent variable = |*DA*|			
	(1)		(2)	
	Coefficient	t-statistic	Coefficient	t-statistic
Intercept	0.008	0.16	0.018	0.32
HER	0.123***	2.73	0.111**	2.51
HER * r_ACC	-0.159***	-3.96		
HER * r_FINSUP	-0.012	-0.19		
HER * r_ACCCERT			-0.161**	-2.42
HER * r_ACCPROF			-0.035	-0.46
HER * r_ACCOTHERS			-0.250**	-2.53
HER * r_FINPROF			0.363***	2.68
HER * r_FINOTHERS			-0.184**	-2.10
HER * r_SUP			0.021	0.48
r_ACC	0.050***	3.08		
r_FINSUP	-0.000	-0.00		
r_ACCCERT			0.044	1.53
r_ACCPROF			0.016	0.66
r_ACCOTHERS			0.093**	2.51
r_FINPROF			-0.143***	-3.04
r_FINOTHERS			0.060*	1.66
r_SUP			-0.009	-0.45
ACIND	-0.005	-0.97	-0.004	-0.82
lnACACTIVITY	-0.001	-0.51	-0.001	-0.66
lnACTENURE	-0.003	-0.81	-0.003	-1.01
SIZE	0.003*	1.76	0.002	1.61
STDSALES	0.015	1.37	0.012	1.13
STDCFO	0.080**	2.55	0.087***	2.87
ZSCORE	0.001	1.49	0.001*	1.76
LOSS	0.011	1.55	0.011	1.52
CFO	0.050	1.35	0.043	1.09
TACCt-1	-0.023	-0.79	-0.023	-0.83
ISSUE	0.009*	1.86	0.009*	1.78
AUDITORSWITCH	0.004	0.76	0.004	0.76
AUDEXPERT	-0.008**	-2.09	-0.009**	-2.17
INDUSTRY	Included		Included	
YEAR	Included		Included	
CLUSTERING	Firm, Year		Firm, Year	
N	1,401		1,401	
Adjusted R2	10.6%		11.0%	

*, ** and *** indicate significance at the 0.10, 0.05 and 0.01 levels, respectively. Please see Table 1 for the definitions of the variables. *r_ACC* is the ratio of accounting experts on ACs to the number of AC members. *r_FINSUP* is the ratio of non-accounting experts on ACs to the number of AC members. *r_ACCCERT* is the ratio of certified accountants on ACs to the number of AC members. *r_ACCPROF* is the ratio of accounting professors on ACs to the number of AC members. *r_ACCOTHERS* is the ratio of accounting experts, neither certified accountants nor accounting professors, on ACs to the number of AC members. *r_FINPROF* is the ratio of finance professors on ACs to the number of AC members. *r_FINOTHERS* is the ratio of finance experts excluding finance professors on ACs to the number of AC members. *r_SUP* is the ratio of supervisory experts on ACs to the number of AC

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members.

DISCUSSION

The above empirical analyses generally support the hypotheses of this study: (1) the importance of the types of AC financial expertise in restraining incentives for oligopolistic auditors not to work hard, and (2) the importance of the diversity of AC financial expertise in reducing the tendency of a small number of oligopolistic auditors to neglect their audit work. Table 3 provides evidence for the first hypothesis and Table 4 supports the second hypothesis.

The negative relationship between audit market concentration and audit quality is consistent with the extant literature, such as Boone et al. (2012) and Cho et al. (2014). In addition, this negative association is in line with the concern of regulators. The GAO (2003) argued that as the concentration of the audit market increases, competition among auditors decreases, leading to lower audit quality. The EC (2013) also argued that a small number of accounting firms dominate the audit market, making it difficult for new auditors to enter the market, thereby lowering the level of competition in the audit market. Taking one step further, U.K. House of Lords (2011) argued that in order to alleviate the concentration of the audit market, a method of artificially increasing the number of accounting firms through a division of them should be considered or a dual or joint audit system should be introduced in which two auditors simultaneously audit one firm. The GAO (2003, 2008) suggested that a system of mandatory auditor rotation should be introduced to decrease audit market concentration. However, contrary to the claims of regulators, frequent auditor changes may actually impair audit quality (Johnson et al., 2002; Myers et al., 2003) and there is little evidence that the introduction of joint audits improves audit quality (Francis et al., 2009). Therefore, rather than attempting to artificially lower the concentration of the audit market by introducing a system, it is more desirable to strengthen the monitoring of audit quality so that the negative effects of audit market concentration do not appear (Song & Choi, 2016).

The findings of this study suggest that when ACs perform their original oversight role properly, they provide oligopolistic auditors with incentives to faithfully perform audit work. Especially, this study shows under what conditions ACs can perform checks and controls on auditors well. Tables 3 and 4 highlight the significant role of the composition of AC financial expertise in decreasing negative effects of audit market concentration. Thus, in order to to reduce the negative impacts of the concentration of the audit market, regulatory agencies need to consider using ACs by referring to the findings of this study. As such, the empirical evidence of this study is important in terms of providing several implications to regulatory agencies and academia.

CONCLUSION

This study investigates the influence of AC expertise on the relationship between audit market concentration and audit quality through the composition of AC financial experts. Using firms listed on the KSE between 2006 and 2015, this study finds evidence that consistent with the findings of previous studies (Boone et al., 2012; Cho et al., 2014), audit quality decreases as audit market concentration increases. This result can be interpreted as that if the concentration of the audit market increases, the level of competition among auditors decreases and a small number of oligopolistic auditors neglect audit work, which leads to deteriorate audit quality. Moreover, this study finds that only AC members who are certified accountants, other

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accounting experts such as controllers and CFOs, or finance experts (excluding finance professors) decrease the negative relationship between audit market concentration and audit quality. These findings indicate that the impacts of AC expertise on the relation between audit market concentration and audit quality are dependent on qualifications of AC financial experts. This paper also provides evidence that ACs composed of accounting experts only or all the three types of financial experts strictly perform their original supervision function, providing oligopolistic auditors with incentives to faithfully perform audit. This result suggests the significance of accounting expertise and a variety of financial expertise in ACs' effectiveness.

Unlike most previous studies that investigate the direct effects of AC characteristics on audit quality, this study examines the indirect effects of AC characteristics on the relationship between other variables and audit quality. The characteristics of ACs may directly affect audit quality, but may also indirectly affect audit quality through other variables. Furthermore, there are few prior studies examining the AC's effectiveness by classifying its expertise in detail and analyzing their effects simultaneously. Thus, this study has academic contributions in terms of showing the direct and indirect effects of the AC at the same time considering the detailed composition of the AC financial expertise. In addition, this study is important in that it suggests to external information users including regulators and investors under what conditions the AC can perform checks and controls on the management and external auditors well. Meanwhile, considering that regulatory agencies are requesting the academia to continue research on the influence of the concentration of the audit market, follow-up studies also need to identify and investigate special circumstances that may increase or decrease audit quality by referring to the findings of this study.

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Citation Information: Song, B. (2021). The relation of audit quality to audit market concentration and the composition of audit committee financial expertise. *Academy of Accounting and Financial Studies Journal, 25*(6), 1-18.