An Empirical Study on the Determinants of Audit Quality

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Abstract: This study aimed to conduct an empirical analysis on the variables that have a significant influence on the quality of audits performed by accounting firms. To achieve its purpose, the researcher collected the financial statement data of client firms for the 2009-2015 period, the audit engagement data for client firms for the 2011-2015 period, and the accounting firm characteristic data for the 2011-2015 period. Specifically, the researcher conducted two stages of data analysis. The first stage estimated and operationalized audit quality as the absolute value of abnormal accruals; in the second stage, it regressed the absolute value of abnormal accruals to different test variables. The empirical results of this paper indicated that audit quality is influenced by the tenure of an accounting firm, the first-time audit engagements, the services other than auditing provided to client firms by an accounting firm, the market share of an accounting firm in a specific client industry, and the quick ratio of an accounting firm at least within a certain specific subsample. Therefore, the significant findings of this study suggest that auditing regulatory actions should be taken by focusing on more homogeneous groups of subsamples separately and carefully.

Keywords: Audit Quality, Abnormal Accruals, Client Firm, Accounting Firm, Audit Engagement

1. Introduction

For the past decade, the major factor to determine audit quality at the audit engagement-level has been a huge debate[1]. Yet, prior studies have not documented clear-cut empirical results as to what drives the quality of audits performed by accounting firms[2]. To provide meaningful insights to the existing mixed empirical results, this study incorporates not only audit engagement characteristic variables but also accounting firm characteristic variables as test variables in conjunction with controlling for determinants of abnormal accruals, industry fixed effects, and year fixed effects. Unlike previous studies that have related a proxy for audit quality to client firm's financial variables and audit engagement features, this study relates a measure for audit quality at the audit engagement-level to audit engagement characteristics and specific information about the accounting firm itself[3].

The primary goal of this study is to explore the factors that determine the quality of audits conducted by accounting firms. To achieve this objective, this study employs the following three different datasets: the Financial Statement Data of client firms for the 2009-2015 period, Audit Engagement Data for the 2011-2015 period, and Accounting Firm Characteristics for the 2011-2015 period. It also addresses the research question regarding how audit quality is affected. These include accounting firm tenure, first-time audit engagements, non-audit services provided by an accounting firm, accounting firm status in terms of affiliation with one of the BIG4 international accounting firms such as PwC, KPMG, DDT, and EYG, the market share of an accounting firm within the client firm's industry, and the immediate availability of cash resources of an accounting firm.

This study begins with an overview of literature review and hypothesis development in Section 2.

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Section 3 provides data collection and data analysis method by focusing on description of the data, sample, and variables, and estimation model. Section 4 presents empirical analysis including descriptive statistics, correlation matrix and estimation results. Section 5 provides concluding remarks about the implication of this study.

2. Overview of Literature Review and Hypothesis Development

Prior studies argue that the longer the continuing years the incumbent accounting firm has audited the client firm, the lower the quality of audits performed by the same accounting firm due to erosion of auditor independence over time. In contrast, there is also an opposing argument that suggests that long accounting firm's association with its client firm can give rise to enhancing audit quality. This argument suggests that notwithstanding the higher costs of audits in early years of audit firm tenure, the accounting firm is likely to benefit by gaining more relevant knowledge of the client firm over the tenure period[4]. Therefore, the following hypothesis is suggested.

Hypothesis 1: The quality of audit has a positive or negative relation with a long period of accounting firm tenure.

Although empirical evidence documenting the association between the first-time audit engagement and audit quality has been more consistent in the U.S. audit market than in other audit markets, the South Korean audit market provides a fresh and rich setting because the new accounting regulations caused a sorting of client firms and accounting firms and brought in a set of new entrants to the audit market anxious to develop their new businesses. Simultaneously, this recent economic and regulatory environment in the South Korea audit services market may have encouraged accounting firms to avoid perception of independence problems associated with the first-time audit fee discounting[5]. Therefore, this study sets up the following hypothesis.

Hypothesis 2: The quality of quality is higher for the repeat audit engagements than the first-time audit engagements

In the competitive auditing and assurance industry, accounting firms are eager to expand their new businesses by providing client firms with new non-audit services such as taxation services, book-keeping services, and management advisory services. Prior literature has found an interdependent relation between audit fees collected from a client firm and fees for other services received from the same client firm. This line of research documents a positive relation between audit fees and other fees from taxation or management advisory services, which is consistent with a positive spillover effect, which improves audit quality[6][7]. However, in an economic environment in which accounting firms concentrate on company growth by providing non-audit services to client firms, they are more likely to be lenient in expressing their audit opinions on financial statements of client firms and impair their audit quality[8]. Therefore, this study establishes the following hypothesis.

Hypothesis 3: The quality of quality is positively or negatively impacted by taxation or management advisory services by an accounting firm.

Following the economic theory positing that accounting firm's incentives to ruin its independence are associated with the importance of client firms, this paper also investigates whether the quality of audit is affected by the importance of client firms[9]. Following prior literature[10], the ratio of total fees collected from a certain client firm to total revenue for an accounting firm for the corresponding year is used as the proxy for the importance of a client firm. Specifically, this study formulates the following hypothesis.

Hypothesis 4: The quality of audit has a negative relation with the measure for the importance of a client firm.

In contrast to non-BIG4 accounting firms, the BIG4 accounting firms have a well-established affiliation that can furnish excellent training program and career development opportunities for

professionals such as a well-recognized reputation to investors abroad and the capability to provide various audits and non-audit services to multi-national corporations more effectively. Specifically, this study tests for a difference between the effect of the BIG4-affiliated accounting firms on audit quality and that of the non-BIG4 accounting firms on audit quality[11]. Therefore, this paper makes the following hypothesis.

Hypothesis 5: The quality of audit has a positive association with BIG4 affiliation.

Accounting firms are usually organized as limited liability partnerships in many countries inclusive of the U.S.A., and it is not easy to discriminate between the impact of reputation capital and financial strength on audit quality as private accounting firms do not disclose their financial statements. However, accounting firms are required to publicly disclose their annual reports in South Korea during the entire sample period. As a result, it facilitates this study to separately evaluate the effect of financial strength on audit quality by associating audit quality with the quick ratio of accounting firms[12]. Therefore, this study has the following hypothesis.

Hypothesis 6: The quality of audit has a positive relation with the quick ratio of accounting firms.

In response to the growing importance placed on more developed understanding of client firm's industry by professional auditing standards, accounting firms have started to increase their focus on industry specialization[13]. Consequently, due to investment in industry-specific knowledge, accounting firms are in a more advantageous position to provide their client firms with higher quality auditing service[14]. To examine the relation between the level of industry specialization of accounting firms and the quality of audits, this paper summarizes the following hypothesis.

Hypothesis 7: The quality of audits at the engagement-level is positively related to the degree of industry specialization of accounting firms, operationalized by the market share within the client firm's industry.

3. Research Design and Method

3.1 Data Collection: Data, Sample and Dependent Variable

The financial statement data for client firms from 2009 to 2015 were downloaded from the KISVALUE database, and audit engagement data for client firms were acquired from their annual business reports available from the website of the Korean Financial Supervisory Service. In addition, annual data on accounting firm characteristics for the 2011-2015 period were hand-collected from business reports of accounting firms which are available from the website of the Korean Financial Supervisory Service. The sample in this study covers the five-year period from 2011 to 2015, allowing two-year lag data of client firms' financial statements. Eliminating the firm-year observations from financial firms due to lack of comparability of financial statement data with non-financial firms makes 7,985 firm-year observations available. Further deletion of 199 firm-year observations with missing values on audit engagement data and accounting firm characteristics results in 7,786 firm-year final sample observations in this study.

To obtain a proxy for audit quality, abnormal accruals are estimated employing the cross-sectional modified Jones model[10]. First, taking the Korean Industry Standard codes in account, this study segments all observations into 16 different industries to ensure that each industry has an adequate number of observations in each year in estimating abnormal accruals. The industry classification used in this study is summarized in [Table 1].

Second, the abnormal accruals (DAC) for each industry defined in [Table 1] employing all firm observations belonging to that industry from 2011 to 2015 are computed as the residual from the following regression equation (1)[10].

$$ACCRUAL = \alpha_0 \times \frac{1}{TA_{-1}} + \alpha_1 \times \frac{\Delta SALES - \Delta AR}{TA_{-1}} + \alpha_2 \times \frac{PPE}{TA_{-1}} + \varepsilon \quad (1)$$

In equation (1), *ACCRUAL* denotes total accruals deflated by *TA₋₁*, *TA₋₁* is the beginning balance of total assets. *ΔSALES* is the change in sales revenue for the fiscal year. *ΔAR* is the change in accounts receivable for the fiscal year. *PPE* is the net book value of tangible assets that denote property, plant, and equipment at the end of the fiscal year. *ε* is the residual obtained from equation (1). Estimating equation (1) enables the researcher to obtain the absolute value of abnormal accruals (ADA) as the proxy for the quality of audit, which is defined as the dependent variable in this paper.

[Table 1] Industry Classification

variables	Description of each industry
IND01	Production of food, beverage, and tabaco
IND02	Production of apparel, textiles, clothing accessories, leather, luggage, and footwear
IND03	Production of paper products, wood, and pulp; reproduction of recorded media; printing
IND04	Production of chemicals, briquettes, coke, refined petroleum, and chemical products
IND05	Production of pharmaceuticals, medicinal chemical products, and botanical products
IND06	Production of rubber, plastics products, and other mineral products that are not metallic
IND07	Production of metal products that are basic or fabricated
IND08	Production of computer, electronic components, and communication equipment
IND09	Production of electrical equipment including medical, precision and optical instruments
IND10	Production of other equipment and machinery
IND11	Production of motor vehicles, other transport equipment, and furniture
IND12	General construction; specialized construction activities
IND13	Sales of motor vehicles and their parts; retail trade; wholesale trade
IND14	Publishing, broadcasting, telecommunications, and information service activities
IND15	Real estate, R&D, professional & business support services, education, rental & leasing
IND16	Utilities, agriculture, forestry, fishing, mining, transport, warehousing, and food services

[Table 2] describes the distribution of the firm-year sample observations by industry and year and reports the means of (i) abnormal accruals (DAC) and (ii) absolute value of abnormal accruals (ADA) by industry and year, respectively.

[Table 2] Distribution of Sample Observations (N), and Means of DAC and ADA by Industry and Year

Industry	YEAR2011		YEAR2012		YEAR2013		YEAR2014		YEAR2015	
	DAC	ADA	DAC	ADA	DAC	ADA	DAC	ADA	DAC	ADA
IND01	N=51		N=52		N=52		N=53		N=54	
	0.009	0.051	0.005	0.036	-0.003	0.025	-0.005	0.033	-0.000	0.037
IND02	N=43		N=44		N=41		N=41		N=40	
	0.004	0.060	-0.006	0.044	0.003	0.048	-0.002	0.040	0.008	0.063
IND03	N=34		N=35		N=34		N=35		N=33	
	-0.016	0.059	-0.009	0.046	-0.003	0.041	-0.004	0.031	0.006	0.056
IND04	N=103		N=102		N=102		N=107		N=109	
	-0.004	0.069	-0.003	0.043	-0.003	0.042	0.002	0.043	-0.002	0.049
IND05	N=83		N=86		N=83		N=86		N=89	
	-0.004	0.047	-0.007	0.053	0.001	0.056	0.001	0.052	0.002	0.043
IND06	N=71		N=72		N=69		N=71		N=72	
	0.000	0.006	0.001	0.060	-0.005	0.067	0.002	0.070	0.006	0.056
IND07	N=111		N=112		N=110		N=110		N=114	
	-0.007	0.078	-0.007	0.062	-0.004	0.050	-0.004	0.053	-0.008	0.064
IND08	N=244		N=247		N=231		N=236		N=244	
	-0.022	0.132	-0.010	0.082	-0.009	0.077	0.002	0.073	-0.007	0.075
IND09	N=83		N=82		N=82		N=87		N=95	
	-0.004	0.071	-0.006	0.059	-0.000	0.061	-0.002	0.060	0.007	0.072
IND10	N=127		N=129		N=124		N=126		N=128	
	0.001	0.080	-0.004	0.080	-0.006	0.092	-0.015	0.078	-0.008	0.059
IND11	N=104		N=105		N=108		N=109		N=116	
	0.083	0.113	-0.001	0.053	-0.005	0.061	0.005	0.044	-0.003	0.044
IND12	N=50		N=52		N=48		N=49		N=52	
	-0.031	0.103	-0.002	0.091	-0.022	0.092	-0.016	0.082	-0.053	0.099

IND13	N=107		N=109		N=113		N=116		N=116	
	-0.022	0.112	-0.003	0.070	-0.021	0.068	0.023	0.093	-0.015	0.093
IND14	N=157		N=161		N=156		N=160		N=165	
	-0.017	0.120	-0.003	0.077	-0.003	0.083	-0.007	0.090	0.015	0.111
IND15	N=112		N=114		N=121		N=129		N=140	
	-0.018	0.070	-0.000	0.064	0.004	0.044	0.008	0.062	0.014	0.080
IND16	N=48		N=50		N=48		N=51		N=51	
	-0.005	0.051	0.001	0.038	-0.003	0.052	0.000	0.051	0.002	0.063
Total	N=1,528		N=1,552		N=1,522		N=1,566		N=1,618	

3.2 Data Analysis Method: Test Variables and Estimation Model

To investigate how the audit engagement characteristic variables and the accounting firm characteristic variables influence the quality of audits performed by accounting firms, the following estimation model described in equation (2) is used.

$$\begin{aligned}
 ADA_{i,t} = & \beta_0 + \beta_1 \times \ln TA_{i,t} + \beta_2 \times OCF_{i,t} + \beta_3 \times OCFpos_{i,t} + \beta_4 \times ACC_1_{i,t} \\
 & + \beta_5 \times ACC_1pos_{i,t} + \beta_6 \times ROA_1_{i,t} + \beta_7 \times ROA_1pos_{i,t} + \beta_8 \times TENURE_{i,t} \\
 & + \beta_9 \times NEWAUD_{i,t} + \beta_{10} \times NAS_{i,t} + \beta_{11} \times FEE\%_{i,t} + \beta_{12} \times BIG4_{i,t} \\
 & + \beta_{13} \times MS_{i,t} + \beta_{14} \times QUICK_{i,t} + \sum Industry\ Fixed\ Effects_{i,t} \\
 & + \sum Year\ Fixed\ Effects_{i,t} + \varepsilon_{i,t} \quad (2)
 \end{aligned}$$

In equation (2), the dependent variable *ADA* is the absolute value of abnormal accruals, which is the residual obtained from equation (1). Variables that are found to determine abnormal accruals relying on prior literature are included as control variables such as (i) *lnTA* that is the natural logarithm of total assets, (ii) *OCF* that is cash flows from operating activities divided by the balance of total assets at the start of the current fiscal year, (iii) *OCFpos* that is 0 if *OCF* < 0, and is equal to *OCF* if *OCF* ≥ 0, (iv) *ACC_I* that is total accruals for the prior fiscal year divided by the balance of total assets at the start of the prior fiscal year, (v) *ACC_Ipos* that is 0 if *ACC_I* < 0, and is equal to *ACC_I* if *ACC_I* ≥ 0, (vi) *ROA_I* that is net income for the prior fiscal year divided by the balance of total assets at the start of the prior fiscal year, (vii) *ROA_Ipos* that is 0 if *ROA_I* < 0, and is equal to *ROA_I* if *ROA_I* ≥ 0 [10]. To control for industry fixed effects, indicator variables for each industry defined in [Table 1] are included in the estimation model. In addition, to control for year fixed effects, indicator variables for each year during the 2011-2018 period are added.

To test for the impact of the audit engagement characteristic variables and the accounting firm characteristic variables on audit quality, this study considers the following test variables in equation: (i) *TENUNRE* that is the number of continuing periods the same incumbent accounting firm has audited the same client firm, (ii) *NEWAUD* that is a dummy variable, 1 for the new audit representing a first-time audit engagement for the current fiscal year, otherwise 0, (iii) *NAS* that is a dummy variable, 1 if the client firm purchases any services other than auditing from the current accounting firm, otherwise 0, (iv) *FEE%* that is the ratio of total fees collected from a client firm to total operating revenue of a certain accounting firm in percentage terms, which is a proxy for client importance to the accounting firm, (v) *BIG4* that is an indicator variable for BIG4-affiliated accounting firms, 1 if the accounting firm is affiliated as a member firm of PricewaterhouseCoopers International Limited (PwC), Ernst & Young Global Limited (EYG), Deloitte Touche Tohmatus Limited (DDT), or KPMG International Cooperative (KPMG), otherwise 0, (vi) *MS* that is the market share of an accounting firm in a certain industry measured by the ratio of total amount of audit fee revenue collected by the accounting firm in the current fiscal year relative to total industry audit fee revenues in the current fiscal year, which is a proxy for the degree of industry expertise as an industry specialist, and (vii) *QUICK* that represents the financial strength of an accounting firm operationalized by the proportion of quick assets relative to current

liabilities in a percentage terms.

4. Empirical Results and Discussion

4.1 Descriptive Statistics

The descriptive statistics for the variables employed in estimating equation (2) including client firm characteristics and accounting firm characteristics for the entire sample period are listed in [Table 3].

[Table 3] Descriptive Statistics for Pooled Sample Firm-Year Observations

Variable	N	Mean	Std Dev	25% Q1	Median	75% Q3
ADA	7,786	0.0709	0.1014	0.0189	0.0432	0.0860
DAC	7,786	-0.0044	0.1237	-0.0435	0.0010	0.0430
Control Variables:						
lnTA	7,786	18.9553	1.3987	18.0204	18.6796	19.6042
OCF	7,786	0.0456	0.1080	-0.0014	0.0443	0.0959
OCFpos	7,786	0.0636	0.0758	0	0.0443	0.0959
ACC 1	7,786	-0.0303	0.1341	-0.0689	-0.0220	0.0212
ACC 1pos	7,786	0.0238	0.0610	0	0	0.0212
ROA 1	7,786	0.0164	0.1471	-0.0060	0.0299	0.0720
ROA 1pos	7,786	0.0499	0.0686	0	0.0299	0.0720
Client Firm Characteristic Variables:						
TENURE	7,786	4.9276	3.1786	2	5	7
NEWAUD	7,786	0.1719	0.3774	0	0	0
NAS	7,786	9.55%	12.48%	0.79%	4.26%	13.54%
FEE%	7,786	0.33%	0.56%	0.03%	0.10%	0.41%
Accounting Firm Characteristic Variables:						
BIG4	7,786	0.5344	0.4989	0	1	1
MS	7,786	9.55%	12.48%	0.79%	4.26%	13.54%
QUICK	7,786	152.27%	66.30%	118.95%	142.79%	166.91%

The mean of the independent variable ADA is 0.0709 and the median is 0.0432, which implies that the distribution of ADA is skewed to the right. The interquartile range for ADA is from 0.0189 to 0.0860. The mean of accounting firm tenure is 4.9276 years, and the proportion of initial audit engagements is 17.18% on average. The proportion of client firms that purchased any non-audit services from the incumbent accounting firm is 9.55% on average, and the mean for the ratio of revenue collected from a client firm relative to total revenue of the incumbent accounting firm is 0.33%. 53.44% of 7,786 firm-year observations were audited by the accounting firms that had a membership relationship with one of BIG4 international accounting firms, and the remaining 46.56% were audited by the accounting firms that do not have any association with BIG4 international accounting firms. The mean for the market share of an accounting firm in a certain industry is 9.55%, and the quick ratio is 152.27% on average.

4.2 Correlation Matrix

In [Table 4], Panel A reported the correlations among ADA and the control variables, and Panel B provided the correlations among ADA, the audit engagement characteristic variables, and the accounting firm characteristic variables. The coefficients of the Pearson correlation are shown above the diagonal, and the coefficients of the Spearman correlation are shown below the diagonal.

4.3 Estimation Results

This study estimated how audit engagement characteristic variables and accounting firm characteristic variables along with control variables influenced ADA for each firm-year observation. [Table 5] reports

the estimation results for (i) the full sample comprising all firm-year observations, (ii) the BIG4 subsample including only those firm-year observations audited by the BIG4-affiliated accounting firms, and (iii) the non-BIG4 subsample including only those firm-year observations not audited by the BIG4-affiliated accounting firms that are a member firm of PwC, DDT, EYG, or KPMG.

[Table 4] Correlation Matrix (p-values in parentheses)

Panel A: ADA and Control Variables								
Variable	ADA	lnTA	OCF	OCFpos	ACC 1	ACC 1pos	ROA 1	ROA 1pos
ADA	--	-0.1576 ($<.0001$)	-0.2053 ($<.0001$)	0.0055 (0.6259)	-0.0212 (0.0610)	0.0174 (0.1245)	-0.0316 (0.0053)	-0.0014 (0.9029)
lnTA	-0.2019 ($<.0001$)	--	0.1232 ($<.0001$)	0.0366 (0.0012)	0.0143 (0.2062)	-0.0118 (0.2988)	0.0144 (0.2050)	-0.0061 (0.5908)
OCF	-0.1466 ($<.0001$)	0.1174 ($<.0001$)	--	0.8391 ($<.0001$)	0.0145 (0.2007)	0.0005 (0.9636)	0.0307 (0.0067)	0.0201 (0.0758)
OCFpos	-0.1257 ($<.0001$)	0.1031 ($<.0001$)	0.9912 ($<.0001$)	--	0.0118 (0.2961)	0.0069 (0.5400)	0.0233 (0.0399)	0.0232 (0.0407)
ACC_1	0.0028 (0.8028)	0.0270 (0.0172)	-0.0068 (0.5494)	-0.0097 (0.3928)	--	0.6108 ($<.0001$)	0.7048 ($<.0001$)	0.3017 ($<.0001$)
ACC_1pos	0.0225 (0.0471)	-0.0010 (0.9280)	-0.0205 (0.0709)	-0.0218 (0.0544)	0.8593 ($<.0001$)	--	0.2568 ($<.0001$)	0.4015 ($<.0001$)
ROA_1	-0.0010 (0.9311)	0.0034 (0.7661)	0.0214 (0.0585)	0.0219 (0.0532)	0.3941 ($<.0001$)	0.3040 ($<.0001$)	--	0.6326 ($<.0001$)
ROA_1pos	-0.0041 (0.7173)	-0.0002 (0.9840)	0.0216 (0.0568)	0.0229 (0.0428)	0.3645 ($<.0001$)	0.2961 ($<.0001$)	0.9909 ($<.0001$)	--
Panel B: ADA, Audit Engagement Characteristics, and Accounting Firm Characteristics								
Variable	ADA	TENURE	NEWAUD	NAS	FEE%	BIG4	MS	QUICK
ADA	--	-0.0166 (0.1390)	-0.0035 (0.7592)	-0.0011 (0.9245)	0.0168 (0.1375)	-0.0224 (0.0484)	-0.0337 (0.0029)	0.0329 (0.0037)
TENURE	-0.0175 (0.1222)	--	-0.4417 ($<.0001$)	0.0557 ($<.0001$)	-0.0632 ($<.0001$)	0.1512 ($<.0001$)	0.0794 ($<.0001$)	0.0410 (0.0003)
NEWAUD	0.0028 (0.8022)	-0.5365 ($<.0001$)	--	-0.0167 (0.1408)	0.0390 (0.0006)	-0.0528 ($<.0001$)	0.0001 (0.9942)	-0.0071 (0.5295)
NAS	-0.0055 (0.6286)	0.0358 (0.0016)	-0.0167 (0.1408)	--	0.0030 (0.7918)	0.1515 ($<.0001$)	0.1043 ($<.0001$)	0.0060 (0.5937)
FEE%	0.0156 (0.1689)	-0.1135 ($<.0001$)	0.0338 (0.0028)	0.0213 (0.0600)	--	-0.5068 ($<.0001$)	-0.3092 ($<.0001$)	0.1649 ($<.0001$)
BIG4	-0.0190 (0.0940)	0.1492 ($<.0001$)	-0.0528 ($<.0001$)	0.1515 ($<.0001$)	-0.7865 ($<.0001$)	--	0.4763 ($<.0001$)	-0.0642 ($<.0001$)
MS	-0.0646 ($<.0001$)	0.1028 ($<.0001$)	-0.0316 (0.0053)	0.1057 ($<.0001$)	-0.6424 ($<.0001$)	0.6706 ($<.0001$)	--	-0.0607 ($<.0001$)
QUICK	0.0133 (0.2407)	0.0679 ($<.0001$)	-0.0061 (0.5864)	0.0404 (0.0004)	-0.0434 (0.0001)	0.1564 ($<.0001$)	0.0402 (0.0004)	--

[Table 5] Estimation Results for the Full Sample, the BIG4 Subsample and the Non-BIG4 Subsample

Variable	Full Sample (N=7,786)		BIG4 Subsample (N=4,161)		Non-BIG4 Subsample (N=3,625)	
	Parameter Estimate	p-value	Parameter Estimate	p-value	Parameter Estimate	p-value
Intercept	0.15204***	$<.0001$	0.13342***	$<.0001$	0.17048***	$<.0001$
lnTA	-0.00599***	$<.0001$	-0.00540	$<.0001$	-0.00662***	$<.0001$
OCF	-0.61441***	$<.0001$	-0.73083	$<.0001$	-0.51850***	$<.0001$
OCFpos	0.74399***	$<.0001$	0.89022	$<.0001$	0.61720***	$<.0001$
ACC 1	-0.01444	0.4305	0.03919	0.1428	-0.04466*	0.0823
ACC 1pos	0.02702	0.3717	-0.02379	0.5947	0.05331	0.2052
ROA 1	0.00046	0.9785	-0.07541**	0.0101	0.03476	0.1250
ROA 1pos	-0.01843	0.4985	0.07343*	0.0718	-0.06456	0.1115
TENURE	-0.00065	0.1116	-0.00028	0.5691	-0.00131*	0.0777
NEWAUD	-0.00361	0.2955	-0.00908**	0.0484	0.00005	0.9918
NAS	0.00086	0.7369	0.00103	0.7518	0.00066	0.8777
FEE%	-0.00005	0.9829	-0.00421	0.7399	-0.00041	0.8776
BIG4	-0.00099	0.7409	-	-	-	-

MS	-0.00024**	0.0315	-0.00017	0.1487	-0.00044*	0.0764
QUICK	0.00005***	0.0053	0.00009	0.1173	0.00005**	0.0195
D_YEAR	Included		Included		Included	
D_INDUSTRY	Included		Included		Included	
F-value	51.64		35.18		21.59	
Adjusted R^2	0.1767		0.2082		0.1539	

In the full sample ($N=7,786$), the coefficient on MS is found to be significantly negative (coefficient estimate=-0.00024, p -value=0.0315), consistent with the argument that the quality of audit at the audit engagement-level has a positive relation with the degree of accounting firm's industry expertise proxied by the market share of the accounting firm in a specific industry. The audit quality decreased with the increase in quick ratio QUICK (coefficient estimate=0.00005, p =0.0053), suggesting that readily available cash resources do not influence audit quality positively. However, the coefficients on the remaining five test variables (TENURE, NEWAUD, NAS, FEE%, BIG4) are all statistically insignificant.

In the BIG4 subsample ($N=4,161$), the estimate of the indicator variable NEWAUD is significantly negative (coefficient estimate=-0.00908, p -value=0.0484), and it indicated that the quality of audit is significantly higher for a first-time audit engagement than for a repeat engagement. This empirical result differs between the estimation for the BIG4 subsample and the estimation for the non-BIG4 subsample. In the non-BIG4 subsample ($N=3,625$), the empirical results for MS and QUICK are the same as in the full sample. Besides, the coefficient on TENURE (coefficient estimate=-0.00131, p -value=0.0777) is found to be significantly negative, supporting the argument that the quality of audit is positively related to accounting firm tenure.

To provide additional insightful results, the BIG4 subsample is further decomposed into four different groups such as (i) the PwC group for the audit engagements performed by Samil accounting firm that has been a member firm of PwC (PricewaterhouseCoopers International Limited), (ii) the EYG group for the audit engagements performed by Hanyoung accounting firm that has been affiliated as a member firm of EYG (Ernst & Young Global Limited), (iii) the DDT group for the audit engagements performed by Anjin accounting firm that has been a member firm of DDT (Delotte Touche Tohmatus Limited), and (iv) the KPMG group for the audit engagements performed by Samjeong accounting firm that has been a member firm of KPMG (KPMG International Cooperative).

In addition, the non-BIG4 subsample is further broken down into three different groups inclusive of (i) LOCAL group that consists of those audit engagements performed by three old accounting firms (Samduck, Daejoo, and Shinhan) that were established before the fiscal year 1997 and has never been a member firm of PwC, EYG, DDT, or KPMG, (ii) NEW_BIG group that constitutes those audit engagements performed by newly established accounting firms that employed at least 50 certified public accountants, and (iii) NEW_SML group that is composed of those audit engagements performed by newly established accounting firms that employed less than 50 certified public accountants.

To gain additional empirical results for each of seven groups (PwC group, EYG group, DDT group, KPMG group, LOCAL group, NEW_BIG group, NEW_SML group), a regression is separately run for each group, and each estimation result is reported, respectively in [Table 6]. In [Table 6], Panel A lists the estimation results for four groups of BIG4 subsample, and Panel B provides the estimation results for three groups of non-BIG4 subsample.

Empirical analysis for each of seven segmented groups provides remarkably different results[15]. First, in the PwC group, the coefficients on the variables TENURE (coefficient estimate=0.00156, p -value=0.0276), MS (coefficient estimate=-0.00033, p -value=0.0603), and QUICK (coefficient estimate=0.00066, p -value<.0001) are found to be statistically significant, and those on the other three test variables are found to be statistically insignificant. The empirical results for the PwC group indicated that the quality of audit has a negative association with a long period of accounting firm and the quick

ratio. However, the quality of audits at the engagement-level is shown to have a positive relation with the level of accounting firm's industry specialization, measured by market share within the client firm's industry.

[Table 6] Estimation Results for Variables of Interest in Each of Seven Groups

Panel A: Each Group of BIG4 Subsample				
	PwC Group (N=1,411)	EYG Group (N=719)	DDT Group (N=1,062)	KPMG Group (N=969)
Variable	Parameter Estimate (p-value)	Parameter Estimate (p-value)	Parameter Estimate (p-value)	Parameter Estimate (p-value)
TENURE	0.00156** (p=0.0276)	-0.00058 (p=0.6637)	-0.00195 (p=0.1188)	-0.00113 (p=0.3273)
NEWAUD	-0.00275 (p=0.6942)	-0.00677 (p=0.5411)	-0.01918* (p=0.0957)	-0.00862 (p=0.3289)
NAS	0.00080 (p=0.8745)	0.01617** (p=0.0361)	-0.00422 (p=0.6069)	-0.00077 (p=0.8951)
FEE%	-0.01698 (p=0.5232)	-0.04221 (p=0.2552)	-0.00977 (p=0.7984)	-0.00904 (p=0.7210)
MS	-0.00033* (p=0.0603)	-0.00083** (p=0.0208)	0.00046 (p=0.1959)	-0.00028 (p=0.2360)
QUICK	0.00066*** (p<.0001)	-0.00038** (p=0.0446)	0.00013 (p=0.4866)	-0.00009 (p=0.3819)
F-value	14.30	4.00	10.26	13.50
Adjusted R^2	0.2262	0.1146	0.2129	0.2859
Panel B: Each Group of non-BIG4 Subsample				
	LOCAL Group (N=947)	NEW BIG Group (N=1,155)	NEW_SML Group (N=1,523)	
Variable	Parameter Estimate (p-value)	Parameter Estimate (p-value)	Parameter Estimate (p-value)	
TENURE	-0.00020 (p=0.8811)	-0.00038 (p=0.7861)	-0.00286** (p=0.0146)	
NEWAUD	0.00450 (p=0.6432)	-0.00493 (p=0.6327)	0.00019 (p=0.9809)	
NAS	0.00368 (p=0.6332)	0.00827 (p=0.3223)	-0.00686 (p=0.2873)	
FEE%	0.04562 (p=0.1746)	-0.00623 (p=0.5641)	-0.00154 (p=0.6428)	
MS	-0.00028 (p=0.3276)	-0.00012 (p=0.8456)	-0.00189*** (p=0.0076)	
QUICK	-0.00067* (p=0.0738)	0.00010 (p=0.2830)	0.00004** (p=0.0425)	
F-value	6.37	8.03	10.86	
Adjusted R^2	0.1538	0.1632	0.1716	

Second, in the EYG group, the coefficients on the variables NAS (coefficient estimate=0.01617, p-value=0.0361), MS (coefficient estimate=-0.00083, p-value=0.0208), and QUICK (coefficient estimate=-0.00038, p-value=0.0446) are statistically significant, and those on the other three test variables are not significant. Specifically, empirical results on the variable NAS support the hypothesis that any services other than auditing supplied by an accounting firm impair the quality of audit at the engagement-level. Furthermore, the quality of audits at the engagement-level is shown to have a positive association with the level of accounting firm's industry specialization that is measured by market share within the client firm's industry and the quick ratio of audit firms, respectively. .

Third, in the DDT group, only the coefficient on the test variable NEWAUD (coefficient estimate=-0.01918, p-value=0.0957) is estimated to be negative and statistically significant, and those on the other five test variables are not significant. This empirical result indicated that the quality of audit is significantly higher for the first-time audit engagements than for the repeat audit engagements, which is contradictory to Hypothesis 2.

Fourth, in the LOCAL group, only the coefficient on the test variable QUICK (coefficient estimate=-0.00067, p-value=0.0738) is estimated to be negative and statistically significant, and those on the other five test variables are insignificant. This empirical result demonstrated that the quality of audit has a positive association with the quick ratio of accounting firms.

Fifth, in the NEW_SML group, the coefficient on the variable TENURE is estimated to be significantly negative (coefficient estimate=-0.00286, p-value=0.0146), indicating that the quality of audit has positive relation with a long period of the incumbent accounting firm. The coefficient on the variable MS (coefficient estimate=-0.00189, p-value=0.0076) and QUICK (coefficient estimate=0.00004, p-value=0.0425) are statistically significant, and those on the remaining three test variables are not statistically significant. The empirical results for the NEW_SML group indicated that the quality of audit has a positive association with the level of accounting firm's industry specialization and a negative relation with the quick ratio of accounting firms, respectively.

Lastly, in the KPMG group and the NEW_BIG group, each of the coefficients on the six test variables is estimated to be insignificant at the 10% significance level.

5. Conclusion

Employing the data on client firms, audit engagements, and accounting firms for the 2011-2015 period, this study has explicitly examined the impacts of audit engagement characteristic variables and accounting firm characteristic variables on the quality of audits performed by accounting firms in a dynamically changing audit services market by partitioning total sample into seven subsamples.

The major findings of this study have partially supported the research hypotheses confirming that the quality of audits is influenced by the accounting firm tenure, the first-time audit engagements, the services other than auditing supplied by an accounting firm, the accounting firm's affiliation status with one of BIG4 international accounting firms, an accounting firm's market share in a specific industry that represents the level of the industry expertise as an industry specialist, and the immediate availability of cash resources at least in a certain specific subsample.

The main results of this study shed light to the auditing oversight authorities and policy makers in South Korea[16]. In summary, the regulatory actions that can lead to the improvement in audit quality should be taken by focusing on more homogeneous groups of subsamples separately and carefully.

Notwithstanding the limitations of this study, it is expected that the future directions in the line of this research associating audit quality with auditor characteristics, client characteristics, and audit engagement characteristics can bear fruitful results by extending sample period and supplementing various datasets drawn out from other global countries. This line of extension in this research area can enable future researchers to resolve the conflicts arising from the existing mixed results and to provide clear-cut understanding as to what is driving the quality of audits performed by accounting firms.

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References

- [1] M. DeFond, J. Zhang, A Review of Archival Auditing Research, *Journal of Accounting and Economics*, (2014), Vol.58, No.2-3, pp.275-326, <https://doi.org/10.1016/j.jacceco.2014.09.002>
- [2] J. R. Francis, A Framework for Understanding and Researching Audit Quality, *Auditing A Journal of Practice & Theory*, (2011), Vol.30, No.2, pp.125-152, <https://doi.org/10.2308/ajpt-50006>

- [3] S. Dunakhir, Factors Associated with Audit Quality: Evidence from an Emerging Market, *Asia Pacific Journal of Advanced Business and Social Studies*, (2016), Vol.2, No.2, pp.523-533.
- [4] T. B. Bell, M. Causholli, W. R. Knechel, Audit Firm Tenure, Non-audit Services, and Internal Assessments of Audit Quality, *Journal of Accounting Research*, (2015), Vol.53, No.3, pp.461-509, <https://doi.org/10.1111/1475-679X.12078>
- [5] B. K. Church, J. G. Jemkins, S. A. McCracken, P. B. Roush, J. D. Stanley, Auditor Independence in Fact: Research, Regulatory, and Practice Implications Drawn from Experimental and Archival Research, *Accounting Horizons*, (2015), Vol.29, No.1, pp.217-238, <https://doi.org/10.2308/acch-50966>
- [6] R. Zhang, R. M. K.Wong, G. Tian, M. M. Fonseka, Positive Spillover Effect and Audit Quality: A Study of Cancelling China's Dual Audit System, *Accounting & Finance*, (2019), Vol.61, No.1, pp.205-239.
- [7] W. R. Knechel, D. S. Sharma, V. D. Sharma, Non-audit Services and Knowledge Spillovers: Evidence from New Zealand, *Journal of Business Finance & Accounting*, (2012), Vol.39, No.1&2, pp.60-81, <https://doi.org/10.1111/j.1468-5957.2011.02268.x>
- [8] S. Demirkan, I. Demirkan, The Strategic Role of Non-audit Services in Audit Markets, *Journal of Accounting and Finance*, (2017), Vol.17, No.3, pp. 42-53.
- [9] N. Tepalagul, L. Lin, Auditor Independence and Audit Quality: A Literature Review, *Journal of Accounting, Auditing & Finance*, (2015), Vol.30, No.1, pp.101-121, <https://doi.org/10.1177/0148558X14544505>
- [10] H. Chung, S. Kallapur, Client Importance, Nonaudit Services, and Abnormal Accruals, *The Accounting Review*, (2003), Vol.78, No.4, pp.931-955, <https://doi.org/10.1177/0148558X14544505>
- [11] A. Lawrence, M. Minutti-Meza, P. Zhang, Can Big4 versus Non-Big4 Differences in Audit Quality Proxies Be Attributed to Client Characteristics?, *The Accounting Review*, (2011), Vol.86, No.1, pp.259-288.
- [12] C. Lennox, Audit Quality and Auditor Size: An Evaluation of Reputation and Deep Pockets Hypotheses, *Journal of Business Finance & Accounting*, (1999), Vol.26, No.7-8, pp.779-805, <https://doi.org/10.1111/1468-5957.00275>
- [13] K. J. Reichelt, D. Wang, National and Office-specific Measures of Auditor Industry Expertise and Effects on Audit Quality, *Journal of Accounting Research*, (2010), Vol.48, No.3, pp.647-686, <https://doi.org/10.1111/j.1475-679X.2009.00363.x>
- [14] R. Yuan, Y. Cheng, K. Ye, Auditor Industry Specialization and Discretionary Accruals: The Role of Client Strategy, *The International Journal of Accounting*, (2016), Vol.51, No.2, pp.217-239, DOI: <https://doi.org/10.1016/j.intacc.2016.04.003>
- [15] F. A. Gul, D. H. Wu, Z. Yang, Do Individual Auditors Affect Audit Quality? Evidence from Archival Data, *The Accounting Review*, (2013), Vol.88, No.6, pp.1993-2023, <https://doi.org/10.2308/accr-50536>
- [16] W. R. Knechel, Audit Quality and Regulation, *International Journal of Auditing*, (2016), Vol.20, No.3, pp.215-223, <https://doi.org/10.1111/ijau.12077>