International Journal of u- and e- Service, Science and Technology
Vol.8, No. 9 (2015), pp.291-302
http://dx.doi.org/10.14257/ijunesst.2015.8.9.30

Determinants of Audit Revenues of Accounting Firms[1]

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Abstract

In this study the researcher uses firm-level information to perform a supply-side analysis of factors that determine audit revenues of accounting firms. In particular, the researcher considers how accounting firm ownership, firm status, accumulated human capital, the mix of audit and non-audit services provided by a firm, and the entrance of new firms to an accounting service market affecting audit revenues in a competitive industry setting. This research was conducted using data from the Korean accounting service market where recent regulatory intervention changed the market structure and new rules requiring public disclosure of financial statements by all accounting firms were instituted. The researcher documented that audit revenues decreased with the dispersion of firm ownership among professionals, increased with the level of accumulated human capital, were higher for established big firms with big N affiliation relative to both established local firms without Big N affiliation and new firms formed in the market restructuring. The researcher also found that audit revenues were lower for firms that sold more taxation services and management advisory services and that audit revenues declined in the period after the market restructuring first occurred.

Keywords: *Accounting Firm, Firm Ownership, Audit Revenues, Big N affiliation*

1. Introduction

Demand-side studies of audit pricing in competitive markets have related audit fees to factors such as client characteristics and engagement conditions[1-3].Supply-side evaluation of factors affecting audit revenues was not feasible because privately-owned accounting firms were not required to disclose detailed financial information. Changes in disclosure requirements for accounting firms made as part of broader reforms in the Korean accounting service market provide a unique opportunity to perform an analysis of the impact of accounting firm characteristics on audit revenues.

In Korea, in accordance with Act on External Audit for Stock Companies amended on December 30, 1996, newly enacted Article 3-2 (Submission of Business Report) prescribes that an auditor who is an accounting firm shall submit a business report to the Securities and Futures Commission and the Korean Institute of Certified Public Accountants within three months after the end of each fiscal year. As this new disclosure requirement on accounting firms was imposed, annual business reports of Korean accounting firms became public for 1997 and subsequent periods. In addition to that, new regulations caused changes in the accounting industry structure providing an interesting opportunity to observe competitive dynamics. By instituting a minimum firm-size requirement for statutory audits, the rules forced smaller firms to coagulate into a set of

[1]The paper is an extended version of *Factors Affecting Audit Revenues: An Exploratory Study* which was presented at the 7th International Workshop on Business 2015 (Paper ID: BUS7002) on August 19, 2015.

ISSN: 2005-4246 IJUNESST

larger firms that may be regarded as new entrants to the Korean accounting service market.

Agency research suggests that distribution of ownership interests among key employees may affect firm performance [4].The researcher examines whether audit revenues were inversely related to dispersion of ownership among a firm's professional employees based on an argument that broader ownership would provide greater incentives to grow the firm and price audit services competitively.

In demand-side studies of audit fees[1-3, 5, 6], membership in the "Big N" group of accounting firms has been interpreted as a compound variable representing audit firm size, financial strength, reputation capital and access to other resources. Using supply-side data, the researcher analyzed the separate impact of a firm's financial strength and reputation capital on audit revenues. With respect to financial strength, the researcher evaluates the relation between audit revenues and measures of long-term financial solvency and short-term liquidity. With respect to reputation capital, the researcher investigated whether audit revenues were higher for established firms versus new entrants. The researcher also examines whether audit revenues were greater for established firms that had Big N affiliations than for those that did not.

Shareholder losses from recent corporate failures in the U.S. have intensified criticism that bundling of auditing services and management advisory services reduces auditor independence[7-10]. Because auditing services are commodity-like while management advisory services are more differentiated, a negative relation between audit revenues and the proportion of total firm revenues generated by management advisory services may indicate that accounting firms discount auditing services to obtain more lucrative management advisory service contracts. A negative relation may also be due to positive spillover effects between auditing services and management advisory services that reduce the costs of providing these services jointly [7]. Taxation services, on the other hand, are more commodity-like and do not provide similar opportunities for boosting profits. The researcher investigated relations between audit pricing and the provision of non-audit services by evaluating relations between audit revenues and the percentage share of firm revenues attributable to management advisory services and taxation services.

The entrance of new firms formed as a result of regulatory intervention had the effect of increasing the number of firms competing for audit engagements. The researcher examined whether audit revenues across firms were lower in periods following the entrance of new firms to the accounting service market.

To perform a supply-side analysis of factors that determine audit revenues, the researcher estimated empirical models that relate audit revenues to client size and other factors that may impact on audit revenues. The researcher documented that audit revenues decreased with the dispersion of ownership among professionals, consistent with more competitive pricing when ownership is less concentrated. The researcher shows that audit revenues increased with the level of accumulated human capital and were higher for established big firms with big N affiliation relative to both established local firms without Big N affiliation and new firms formed in the market restructuring. The researcher found that audit revenues decreased with the percentage share of revenues generated by management advisory services and by the percentage share of revenues generated by taxation services. Furthermore, the researcher demonstrates that audit revenues were lower in years following the intervention that led to new entrants in the audit market, indicating competitive audit pricing.

The remainder of this paper is organized as follows. The researcher developed a hypotheses in Section 2, the estimation models in Section 3, and data and descriptive statistics in Section 4.The researcher presents the results of the estimating model in Section 5, and the concluding remarks about the implications of the research in Section 6.

2. Hypothesis Development

Unlike demand-side studies that have related client fee data to client characteristics and engagement features [1-3], this study relates the audit revenues earned by auditors to specific information about the accounting firm itself. Because client size is likely to be the primary driver of audit revenues, the researcher's hypotheses describe firm-specific factors that may affect audit pricing in addition to client size. To proxy for client size, the researcher uses the ratio of publicly listed clients to total clients [17].

An unexplored issue in previous research is how ownership of accounting firms affect audit pricing. Jensen and Meckling [4] and Stulz [11] show that ownership affects corporate value. Demsetz and Lehn [12] argued that ownership structure is endogenously determined. In situations where ownership is concentrated among a few partners in an established firm, those partners are likely to be more interested in maintaining their existing business than aggressively courting new business. As ownership becomes more dispersed among accounting firm professionals, their collective incentives to grow the firm by adding new audit clients would increase. A more aggressive approach to adding new business would lead to lower audit revenues because of discounting to attract business and to foster the development of growth-stage companies. Therefore, the researcher made the following hypothesis:

Hypothesis 1: Audit revenues are inversely related to the percentage of accounting firm professionals who are owners.

Previous research has documented a fee premium for so-called "Big N" auditors [2, 5, 6].This fee premium has been attributed to signals provided to the investor community of "Big N" accounting firms' incentives to act diligently in order to preserve financial and reputation capital [13]. However, researchers have had difficulty discriminating between the influence of financial strength and reputation capital on audit fees because privately-held accounting firms do not disclose financial information. The researcher separately evaluated the influence of financial strength on audit revenues by relating audit revenues to financial ratios while including an indicator variable for established firms with Big N affiliation. To measure the level of the firm's proprietary capital as opposed to borrowed capital, the researcher used the equity to debt ratio. To measure the firm's cash resources versus claims against those resources the researcher used the quick ratio. Therefore, the researcher specified the following hypotheses:

Hypothesis 2a: Audit revenues are positively related to the accounting firm's ratio of equity to debt.

Hypothesis 2b: Audit revenues are positively related to the accounting firm's quick ratio.

A basic tenet of human capital theory is that people spend time and money on themselves for the sake of future monetary and nonmonetary rewards [14], thereby increasing their specific or general human capital [15]. The human-capital view of education in terms of licensing or training is that employees improve their productivity as a result of the knowledge and skills they acquire as part of their licensing or training. Lazear [16] argues that clients will use the licensing credentials of the professional as a signal in assessing the professional's service quality. Firms can develop high service quality that their professionals need to possess by hiring those who hold more licenses or encouraging them to obtain more licenses. Firms can also internally develop expertise by investing in their professionals through training costs. The researcher expects that the greater number of licenses held per employee and the higher training costs per employee allow accounting firms to generate higher audit revenues. Therefore, the researcher hypothesize as follows:

Hypothesis 3a: Audit revenues are positively related to the number of licenses held per employee.

Hypothesis 3b: Audit revenues are positively related to the training costs per employee.

In the Korean accounting service market there were three distinct groups of accounting firms: established big firms with Big N affiliation, established local firms without Big N affiliation, and non-established firms that resulted from the coagulation of smaller firms or were newly started. Therefore, along with being able to separately evaluate the influence of financial capital on audit pricing, the comparability of the Big N affiliates and non-Big N established firms provides an opportunity to evaluate the Big N effect in an unprecedented manner. With respect to the non-Big N established firms, the Big N affiliates have international associations that may provide superior training and career opportunities for employees (enabling the Big N affiliates to higher more talented personnel) as well as brand name recognition for foreign investors and the ability to service multi-national companies more completely. With reference to the non-established firms (new entrants), the established non-Big N firms have greater local reputation capital. Both the Big N affiliates and the established non-Big N firms had more established client bases than the non-established firms. In this study, I separately include indicator variables for the Big N affiliates and non-Big N established firms and test for their individual impact relative to the hold-out group of non-established firms. The researcher also tested for differences between the Big N and non-Big N effects on audit revenues. Therefore, the researcher has the following hypotheses:

Hypothesis 4a: Audit revenues are positively related to Big N affiliation.

Hypothesis 4b: Audit revenues are positively related to status as an established non-Big N firm.

Hypothesis 4c: Audit revenues are greater for established Big-N firms than for established non-Big N firms.

In this emerging competitive environment, accounting firms were also interested in developing their non-audit service businesses. Previous research has documented an interdependence between audit fees and fees for management advisory services. These studies found a positive relation between audit fees and fees for management advisory services, consistent with a spillover effect that increased the marginal benefits of both services. On the other hand, in an environment where accounting firms emphasize growth through the provision of non-audit services, firms may discount their audit fees in order to generate profitable non-audit business. This may be particularly important with respect to the development of management advisory services because those services are more differentiable than commodity-like auditing and taxation services. The researcher made the following hypotheses about relations between audit revenues and the provision of taxation services or management advisory services by Korean firms.

Hypothesis 5a: Audit revenues are negatively related to the percentage of total firm revenues derived from the provision of taxation services.

Hypothesis 5b: Audit revenues are negatively related to the percentage of total firm revenues derived from the provision of management advisory services.

The Korean Certified Public Accountant Act was amended on March 28, 2001 in order to facilitate new entry of accounting firms. Firms were required to have at least 10 certified public accountants and 0.5 billion Korean won of paid-in capital. This regulatory intervention in the Korean accounting service market altered the competitive landscape and introduced new entrants who would compete for existing business. Information about the complete set of accounting firms enables the researcher to examine whether increased competition led to reductions in audit prices in the market. The researcher evaluate differences in audit revenues over time by including indicator variables for the years subsequent to the intervention. Accordingly, the researcher specified the following hypothesis:

Hypothesis 6: Audit revenues declined after the year in which the intervention initially occurred.

3. Estimation Models

The researcher employed two estimation models to test the research hypotheses. In both models, the dependent variable LNAUDR is the natural logarithm of audit revenues. Following [17], the researcher first specified the following regression model (1) to evaluate the research hypotheses about the impact of variables of interest:

$$LNAUDR_{jt} = \alpha_0 + \alpha_1 * PCLNT_{jt} + \alpha_2 * OWNER_{jt} + \alpha_3 * EQUITY_{jt} + \alpha_4 * QUICK_{jt} + \alpha_5 * LNOFF_{jt} + \alpha_6 * LICNS_{jt} + \alpha_7 * TRAIN_{jt} + \alpha_8 * BIG_j + \alpha_9 * LOCAL_j + {}_{10} * TAX\%_{jt} + \alpha_{11} * MAS\%_{jt} + \alpha_{12} * POST_t + \varepsilon_{jt} \quad (1)$$

In model (1), PCLNT is the percentage of clients that are publicly listed, OWNER is the percentage of professionals that are owners, EQUITY is the equity-to-debt ratio, QUICK is the quick ratio, LNOFF is the natural logarithm of the number of offices, LICNS is the average number of licenses held per employee, TRAIN is the average training costs per employee, BIG is an indicator variable for firms that are affiliated with the Big N brand name, LOCAL is an indicator variable for firms established prior to 1997 that were not affiliated with the Big N brand name, TAX% is the percentage of total firm revenues generated from taxation services, MAS% is the percentage of total firm revenues generated from management advisory services, POST is an indicator variable to denote the period 2002-2012 period, and ε is a random error term.

To control for time varying fixed effects by including year dummies (YEAR), the researcher also specified the following regression model (2):

$$LNAUDR_{jt} = \alpha_0 + \alpha_1 * PCLNT_{jt} + \alpha_2 * OWNER_{jt} + \alpha_3 * EQUITY_{jt} + \alpha_4 * QUICK_{jt} + \alpha_5 * LNOFF_{jt} + \alpha_6 * LICNS_{jt} + \alpha_7 * TRAIN_{jt} + \alpha_8 * BIG_j + \alpha_9 * LOCAL_j + \alpha_{10} * TAX\%_{jt} + \alpha_{11} * MAS\%_{jt} + \alpha_{13} * YEAR_t + \varepsilon_{jt} \quad (2)$$

4. Data and Descriptive Statistics

The data used in this study were obtained from the 1997-2012 annual business reports of Korean accounting firms submitted to the Securities and Futures Commission and the Korean Institute of Certified Public Accountants. There were a total of 32 firms in 1997. Some mergers and new entry occurred throughout the sample period, resulting in 125 firms in 2012. The final sample consists of 1,182 firm-year observations.

Table 1 provides descriptive statistics of total audit revenues (AUDR), the number of audits performed (AUDITN), the audit revenue per audit (AUDRPA), and other contextual variables. All monetary value items were deflated to 2010 Korean won using the index of consumer prices. Over the sample period, the median values of all variables used in this study except for MAS are smaller than their mean values, indicating that the data are skewed to the right. The mean of annual audit revenues (AUDR) per firm is 6,615M of Korean won, and the median is 1,665M of Korean won. The mean of the number of audits performed (AUDITN) per firm is 169, and the median is 78. The mean of audit revenue per audit (AUDRPA) is 26.5M of Korean won, and the median is 23.2M of Korean won. The mean (median) values of the percentage of public clients from all clients (PCLNT), the percentage of professionals that are owners (OWNER), the equity-to-debt ratio (EQUITTY), the quick ratio (QUICK), the number of offices (OFFICE), the average number of licenses held per employee (LICNS), the average training costs per employee (TRAIN), the percentage of total firm revenues from taxation services (TAX%), and the percentage of total firm revenues from management advisory services (MAS%) are 10.6% (8.8%), 49.6% (45.9%), 97.4% (72.3%), 168.2% (143.5%), 2.62 (2.00), 0.05 (0.03), 0.49M of Korean won (0.33M of Korean won), 19.5% (16.8%), and 46.0% (47.2%), respectively.

The mean total audit revenues (AUDR), the average number of audits performed (AUDITN), and the average audit revenue per audit (AUDRPA)declined by 29.52%, 26.55%, and 29.62%, respectively, from 1997 to 2012 [17]. The proportion of public clients (PCLNT) fell from 20.1% in 1997 to 7.2% in 2012. The percentage of

professionals that were owners (OWNER) stayed around 50% over the sample period. The percentage of revenues generated from taxation services (TAX%) rose from 13.9% in 1997 to 22.4% in 2012 [17]. The percentage of revenues generated from management advisory services (MAS%) also rose from 38.6% in 1997 and 47.6% in 2012 [17]. The equity to debt ratio (EQUITY) increased from 1997 to 2012, indicating financing of expansion through equity, and the quick ratio (QUICK) increased monotonically over the sample period.

Table 1. Descriptive Statistics

Panel A: 1997 (N=32)					
Variables	Mean	Std.Dev	25%	Median	75%
AUDR	7,733M	11,134M	1,324M	1,738M	13,435M
AUDITN	228	298	57	75	372
AUDRPA	28.7M	8.4M	23.5M	26.2M	31.7M
PCLNT	20.1%	12.9%	8.8%	17.7%	31.0%
OWNER	47.9%	33.7%	17.3%	36.8%	87.1%
EQUITY	90.1%	78.3%	34.0%	68.0%	120.2%
QUICK	151.9%	91.1%	106.1%	134.0%	155.1%
OFFICE	2.50	1.57	1.00	2.00	4.00
LICENS	0.03	0.03	0.00	0.02	0.05
TRAIN	0.66M	0.90M	0.11M	0.29M	0.79M
TAX%	13.9%	6.8%	8.6%	12.4%	20.2%
MAS%	38.6%	18.6%	26.1%	38.9%	51.0%
Panel B: 2002 (N=52)					
Variables	Mean	Std.Dev	25%	Median	75%
AUDR	8,330M	18,795M	692M	2,199M	5,577M
AUDITN	171	299	23	78	148
AUDRPA	37.2M	21.9M	27.4M	30.3M	37.2M
PCLNT	15.2%	10.6%	10.0%	16.1%	20.2%
OWNER	44.8%	27.9%	23.6%	36.0%	68.0%
EQUITY	71.0%	61.8%	36.9%	50.6%	90.1%
QUICK	154.9%	91.0%	110.1%	135.5%	157.1%
OFFICE	2.60	1.73	1.50	2.00	3.00
LICNS	0.05	0.07	0.00	0.02	0.07
TRAIN	0.58M	0.54M	0.22M	0.43M	0.75M
TAX%	19.3%	14.3%	11.8%	16.6%	22.6%
MAS%	43.1%	18.7%	29.1%	44.9%	53.9%
Panel C: 2007 (N=94)					
Variables	Mean	Std.Dev	25%	Median	75%
AUDR	6,796M	20,470M	1,008M	1,703M	2,780M
AUDITN	168	320	44	79	127
AUDRPA	25.5M	11.0M	19.6M	23.8M	27.5M
PCLNT	9.3%	8.5%	2.7%	6.8%	13.9%
OWNER	50.1%	24.6%	30.4%	45.8%	71.4%
EQUITY	94.2%	97.4%	46.6%	69.9%	103.4%
QUICK	171.5%	145.0%	111.3%	136.6%	176.7%
OFFICE	2.56	1.64	1.00	2.00	3.00
LICNS	0.06	0.11	0.00	0.04	0.07
TRAIN	0.61M	0.68M	0.21M	0.41M	0.72M
TAX%	18.5%	12.4%	11.7%	15.7%	21.1%
MAS%	48.0%	16.6%	37.6%	48.1%	58.4%
Panel D: 2012 (N=125)					
Variables	Mean	Std.Dev	25%	Median	75%
AUDR	5,451M	18,741M	850M	1,450M	2,639M
AUDITN	167	320	45	88	139
AUDRPA	20.2M	10.2M	15.5M	17.6M	21.0M

PCLNT	7.2%	7.2%	1.2%	5.4%	10.5%
OWNER	53.2%	22.6%	38.9%	50.0%	72.7%
EQUITY	109.1%	77.0%	59.9%	85.8%	133.7%
QUICK	174.5%	80.2%	124.6%	162.1%	193.6%
OFFICE	2.73	1.79	1.00	3.00	3.00
LICNS	0.05	0.08	0.00	0.03	0.06
TRAIN	0.31M	0.28M	0.12M	0.23M	0.43M
TAX%	22.4%	13.6%	14.4%	19.6%	28.4%
MAS%	47.7%	16.0%	38.8%	48.1%	57.5%
Panel E: Pooling(N=1,182)					
Variables	Mean	Std.Dev	25%	Median	75%
AUDR	6,615M	18,478M	880M	1,665M	3,053M
AUDITN	169	304	42	78	134
AUDRPA	26.5M	25.1M	18.8M	23.2M	28.9M
PCLNT	10.6%	9.2%	3.5%	8.8%	15.7%
OWNER	49.6%	25.4%	29.6%	45.9%	72.0%
EQUITY	97.4%	97.5%	48.4%	72.3%	115.5%
QUICK	168.2%	105.1%	116.1%	143.5%	185.3%
OFFICE	2.62	1.65	1.00	2.00	3.00
LICNS	0.05	0.07	0.00	0.03	0.07
TRAIN	0.49M	0.61M	0.17M	0.33M	0.59M
TAX%	19.5%	13.0%	12.1%	16.8%	22.7%
MAS%	46.0%	17.4%	34.9%	47.2%	56.4%

N = number of accounting firms in the sample, AUDR = total audit revenues in millions (M) of Korean won (KRW), AUDITN = number of audits performed, AUDRPA = audit revenue per audit in millions (M) of Korean won (KRW), PCLNT = percentage of public clients from all audit clients, OWNER = percentage of professionals that are owners, EQUITY = equity-to-debt ratio, QUICK = quick ratio, OFFICE = number of offices, LICNS = average number of licenses held per employee, TRAIN = average training costs per employee in millions (M) of Korean won (KRW),TAX% = percentage of total firm revenues from taxation services, MAS% = percentage of total firm revenues from management advisory services.

Pearson and Spearman correlations for audit revenues and the eleven contextual variables are presented in Table 2 for all sixteen years pooled together. Pearson and Spearman correlations between the equity-to-debt ratio (EQUITY) and the quick ratio (QUICK) are 0.710 ($p < 0.0001$) and 0.697 ($p < 0.0001$), respectively.

Table 2. Correlation Matrix (p-Values in Parentheses)

	AUDR	PCLNT	OWNER	EQUITY	QUICK	OFFICE	LICNS	TRAIN	BIG	LOCAL	TAX%	MAS%
AUDR	--	0.571 (0.000)	-0.358 (0.000)	-0.219 (0.000)	-0.061 (0.036)	0.080 (0.006)	0.226 (0.000)	0.265 (0.000)	0.414 (0.000)	0.163 (0.497)	-0.210 (0.000)	-0.267 (0.000)
PCLNT	0.242 (0.000)		-0.355 (0.000)	-0.222 (0.000)	-0.050 (0.088)	0.096 (0.001)	0.252 (0.000)	0.173 (0.000)	0.389 (0.000)	0.202 (0.000)	-0.270 (0.000)	-0.278 (0.000)
OWNER	-0.233 (0.000)	-0.361 (0.000)	--	0.203 (0.000)	0.182 (0.000)	-0.115 (0.000)	-0.313 (0.000)	-0.264 (0.000)	-0.416 (0.000)	-0.199 (0.000)	0.360 (0.000)	0.057 (0.049)
EQUITY	-0.124 (0.000)	-0.227 (0.000)	0.224 (0.000)		0.697 (0.000)	-0.263 (0.000)	-0.056 (0.063)	-0.070 (0.017)	-0.216 (0.000)	-0.228 (0.000)	0.125 (0.000)	0.107 (0.000)
QUICK	-0.052 (0.073)	-0.066 (0.000)	0.086 (0.003)	0.425 (0.000)	--	-0.153 (0.000)	0.013 (0.655)	0.079 (0.007)	-0.056 (0.053)	-0.174 (0.001)	0.156 (0.000)	-0.045 (0.122)
OFFICE	0.051 (0.073)	0.137 (0.000)	-0.205 (0.000)	-0.298 (0.000)	-0.158 (0.000)		-0.017 (0.566)	0.163 (0.000)	0.258 (0.000)	0.250 (0.000)	0.109 (0.000)	-0.031 (0.281)
LICNS	0.219 (0.000)	0.352 (0.000)	-0.243 (0.000)	-0.016 (0.577)	-0.038 (0.190)	-0.031 (0.290)	--	0.137 (0.000)	0.344 (0.000)	-0.046 (0.116)	-0.187 (0.000)	-0.052 (0.074)
TRAIN	0.147 (0.000)	0.150 (0.000)	-0.249 (0.000)	-0.070 (0.015)	0.134 (0.000)	0.030 (0.300)	0.177 (0.000)		0.310 (0.000)	-0.072 (0.013)	-0.106 (0.000)	-0.022 (0.459)
BIG	0.367 (0.000)	0.477 (0.000)	-0.417 (0.000)	-0.250 (0.000)	-0.071 (0.015)	0.262 (0.000)	0.344 (0.000)	0.262 (0.000)	--	-0.056 (0.055)	-0.094 (0.001)	-0.133 (0.000)
LOCAL	0.0198 (0.497)	0.185 (0.000)	-0.183 (0.000)	-0.198 (0.000)	-0.097 (0.001)	0.436 (0.000)	-0.046 (0.114)	-0.057 (0.050)	-0.056 (0.055)	--	-0.131 (0.000)	-0.228 (0.000)
TAX%	-0.105 (0.003)	-0.279 (0.000)	0.241 (0.000)	0.137 (0.000)	0.164 (0.000)	-0.026 (0.367)	-0.143 (0.000)	-0.037 (0.197)	-0.101 (0.001)	-0.109 (0.000)	--	-0.389 (0.000)
MAS%	-0.084 (0.004)	-0.183 (0.000)	0.036 (0.219)	0.118 (0.000)	-0.023 (0.439)	-0.100 (0.000)	0.068 (0.020)	0.039 (0.183)	-0.120 (0.000)	-0.229 (0.000)	-0.502 (0.000)	--

Pearson correlations are below the diagonal and Spearman correlations are above the diagonal.

BIG = 1 if the firm is one of the Big N member firms and 0 otherwise.

LOCAL =1 if the firm was started prior to 1997 but is not one of the Big N member firms and 0 otherwise.

Other variable definitions appear in Table 1.

5. Results of Estimation

The researcher formed an unbalanced panel of pooled cross-sectional and times-series data for the sixteen-year period from 1997 to 2012 after deflating audit revenues by the 2010 consumer price index of Korea. The researcher found evidence of serial correlation among residuals in both equations (1) and (2). The industry average autocorrelation coefficient was estimated to be 0.396 and 0.393, respectively for equations (1) and (2). The researcher accounted for first-order autocorrelation using a variant of the Prais-Winston [18] estimator proposed by Park and Mitchell [19]. The researcher transformed the data using the first-order autocorrelation coefficient estimate, including the first observation for each time-series, and estimated the model using the transformed data. Park and Mitchell's[19] version of the Prais-Winston [18] estimator is consistent, performs very well for a small number of periods and trended data [20], and reduces the extent to which the autocorrelation coefficient tends to be underestimated [21].

The researcher conducted several econometric tests of model specification. The researcher used Belsley, Kuh and Welsch's [22] diagnostics to evaluate the effects of multicollinearity. These diagnostics indicated collinearity between just two variables, EQUITY and QUICK. This collinearity may inflate the standard errors for these two variables but would not impair the overall results. White's [23] test did not indicate heteroskedasticity for any of the models estimated. I employed the criteria proposed by Belsley, Kuh and Welsch [22] to identify influential observations. No observation was identified as an outlier in any of the models.

Results of estimating model(1)are presented in Table 3.As anticipated, the coefficient on the client size variable PCLNT is significantly positive (coefficient = 0.0077, t-statistic = 6.30).Audit revenues declined with the percentage of professionals that were owners (coefficient for OWNER = -0.0012, t-statistic = -3.13), consistent with hypothesis 1 that more dispersed ownership would lead to more competitive audit pricing.

Audit revenues were not significantly influenced by the equity-to-debt ratio (coefficient for EQUITY = -0.0003, t-statistic = -1.09), implying that greater audit revenues were not generated by firms with greater long-term financial strength, which is contrary to hypothesis 2a. Audit revenues were not significantly affected by the quick ratio (coefficient for QUICK = 0.0001, t-statistic = 0.77), indicating that immediate availability of cash resources did not influence audit pricing, which is contrary to hypothesis 2b. The coefficient on the firm size variable LNOFF is insignificantly negative (coefficient = -0.0250, t-statistic = -1.52), suggesting that audit revenues were not significantly impacted by the number of offices.

Audit revenues increased with the number of licenses held per employee (coefficient for LICNS = 0.5009, t-statistic = 3.76) and the training costs per employee (coefficient for TRAIN = 0.0493, t-statistic = 3.33), consistent with hypotheses 3a and 3b that more accumulated human capital would result in premium audit pricing. The coefficient on BIG is significantly positive (coefficient = 0.6118, t-statistic = 13.46), consistent with hypothesis 4a that firms with Big N association would earn greater audit revenues. The strength of this variable BIG in the presence of the financial variables indicates that the Big N premium represents more than a premium for financial capital. The coefficient on the indicator variable for established local firms without Big N affiliation is insignificantly positive (coefficient for LOCAL = 0.0302, t-statistic = 0.63), inconsistent

with higher audit revenues by established firms than by new firms formed after the regulatory intervention, which is contrary to hypothesis 4b. Of interest, the positive coefficient on BIG is significantly greater than the positive coefficient on LOCAL (p-value of tests of equality = 0.0001). This indicates a greater pricing premium for established big firms with Big N affiliation than for established local firms without Big N affiliation consistent with hypothesis 4c.

With respect to hypotheses 5a and 5b, the coefficient on the percentage of total revenues generated by taxation services is significantly negative (coefficient for TAX% = -0.0042, t-statistic = -4.84), and the coefficient on the percentage of total revenues generated by management advisory services is also significantly negative (coefficient on MAS% = -0.0049, t-statistic = -7.62). These findings indicate that audit revenues were lower for firms that sold more taxation services and management advisory services. The finding of a negative relation between LNAUDR and MAS% is consistent with discounting of audits to obtain management advisory service revenues or positive spillover (cost savings) of performing audit and management advisory services jointly. However, the negative coefficient on TAX% is not significantly different from that on MAS% (p-value of tests of equality = 0.3189).

With respect to the effects of increased competition resulting from regulatory intervention, the coefficient on POST is significantly negative (coefficient = -0.0650, t = -2.43) indicating audit revenues declined after the intervention occurred (hypothesis 6). This result should be interpreted with caution because the researcher does not control for other economic events that may have affected audit revenues during the sample period.

Results of estimating model (2) are also presented in Table 3. The difference between model (2) and model (1) is that the indicator variable POST is replaced by indicator variables (YEAR) for each fiscal year to control for time fixed effects. All of the hypotheses supported by the model (1) estimations are supported by the model (2) estimations.

Table 3. Results of OLS Estimation of Empirical Model (N=1,182)

Variables	Parameter	Expected Sign	Parameter Estimate (t-value)	
			Model (1)	Model (2)
Intercept	α_0	+	3.4703*** (58.57)	3.3321*** (48.98)
PCLNT	α_1	+	0.0077*** (6.30)	0.0061*** (5.44)
OWNER	α_2	-	-0.0012*** (-3.13)	-0.0011*** (-3.11)
EQUITY	α_3	+	-0.0003 (-1.09)	-0.0002 (-1.22)
QUICK	α_4	+	0.0001 (0.77)	0.0001 (0.42)
LNOFF	α_5	?	-0.0250 (-1.52)	-0.0178 (-1.43)
LICNS	α_6	+	0.5009*** (3.76)	0.5963*** (4.89)
TRAIN	α_7	+	0.0493*** (3.33)	0.0255* (1.86)
BIG	α_8	+	0.6118*** (13.46)	0.6222*** (15.02)
LOCAL	α_9	+	0.0302 (0.63)	0.0306 (0.70)
TAX%	α_{10}	-	-0.0042*** (-4.84)	-0.0034*** (-4.27)
MAS%	α_{11}	-	-0.0049***	-0.0043***

			(-7.62)	(-7.34)
POST	α_{12}	-	-0.0650** (-2.43)	
YEAR	α_{13}	?		included
Significance level of test of $\alpha_8 = \alpha_9$			0.0001	0.0001
Significance level of test of $\alpha_{10} = \alpha_{11}$			0.3189	0.1474
F-value			93.17	62.27
Adjusted R^2			0.4836	0.5743

*, ** and *** indicate statistical significance at 10%, 5% and 1% levels, respectively.
LNOFF is the natural logarithm of the number of offices an accounting firm has.
POST = 1 if the fiscal year belongs to the 2002-2012 period and 0 otherwise.
YEAR = 1 for each fiscal year and 0 otherwise.
Other variable definitions appear in Table 1.

6. Conclusion

This supply-side study of factors affecting audit revenues provides evidence that enriches, complements, and for some factors contradicts evidence obtained from demand-side analyses of factors affecting audit fees. In this study the researcher used firm-level information to perform a supply-side analysis of factors that affect audit revenues of accounting firms. In particular, the researcher considered how accounting firm ownership, firm status, accumulated human capital, the mix of audit and non-audit services provided by a firm, and the entrance of new firms to an accounting service market affected audit revenues in a competitive industry setting. The researcher conducted this research using data from the Korean accounting service market where recent regulatory intervention changed the market structure and new rules requiring public disclosure of financial statements by all accounting firms were instituted. The researcher added to previous research by documenting a negative relation between audit revenues and the dispersion of ownership among audit professionals. However, empirical results indicated that greater audit revenues were not generated by firms with greater long-term financial strength and immediate availability of cash resources.

The researcher supplemented previous research by showing that audit revenues increased with the number of professional licenses held per employee and the training costs per employee, indicating that more accumulated human capital would result in greater audit revenues. In addition to that, established big firms with Big N association were found to earn greater audit revenues than established local firms without Big N affiliation and non-established firms. However, the researcher documented that audit revenues were not higher for established local firms without Big N affiliation than for non-established firms including new entrants to the accounting service market.

The researcher found that audit revenues were lower for firms that sold more taxation revenues and management advisory services. With respect to the effects of increased competition resulting from regulatory intervention, audit revenues were shown to decline after the intervention occurred, indicating competitive audit pricing. However, this result should be interpreted with caution because the researcher did not control for other economic events that may have affected audit revenues during the sample period.

References

[1] D. Simunic, “The Pricing of Audit Services: Theory and Evidence”, Journal of Accounting Research, vol.18,**(1980)**, pp.161-190.
[2] J. Francis, “The Effect of Audit Firm Size on Audit Prices”, Journal of Accounting and Economics,vol.6,**(1984)**, pp.133-151.
[3] D. Chungand W. Lindsay, “The Pricing of Audit Services: The Canadian Perspective”, Contemporary Accounting Research, vol.5,**(1988)**, pp.19-46.

[4] M. Jensenand W. Meckling, "The Theory of Firm: Managerial Behavior, Agency Costs and Ownership Structure", Journal of Financial Economics, vol.3,**(1976)**, pp.305-360.
[5] M. Ettredgeand R. Greenberg, "Determinants of Fee Cutting on Initial Audit Engagements", Journal of Accounting Research, vol.28,**(1990)**, pp.198-210.
[6] A. Craswell, J. Francisand L. Taylor, "Auditor Brand Name Reputations and Industry Specializations", Journal of Accounting and Economics, vol.20,**(1995)**, pp.297-322.
[7] D. Simunic, "Auditing, Consulting, and Auditor Independence", Journal of Accounting Research, vol. 22, **(1984)**, pp.679-702.
[8] Z. Palmrose, "The Effect of Nonaudit Services on the Pricing of Audit Services: Further Evidence", Journal of Accounting Research, vol. 24, **(1986)**, pp. 405-411.
[9] M. De Fondand J. Zhang, "A Review of Archival Auditing Research", Journal of Accounting and Economics Research, vol. 58, **(2014)**, pp. 275-326.
[10] N. Tepalagul and L. Lin, "Auditor Independence and Audit Quality: A Literature Review", Journal of Accounting, Auditing & Finance, vol. 30, no. 1, **(2015)**, pp. 101-121.
[11] R. M. Stulz, "Managerial Control of Voting Rights: Financing Policies and the Market for Corporate Control", Journal of Financial Economics, vol. 20, no. ½ , **(1988)**, pp. 25-54.
[12] H. Demsetz and K. Lehn, "The Structure of Corporate Ownership: Causes and Consequences", Journal of Political Economy, vol. 93, **(1985)**, pp. 1155-1177.
[13] C. Lennox, "Audit Quality and Auditor Size: An Evaluation of Reputation and Deep Pockets Hypotheses", Journal of Business Finance & Accounting, vol. 26, **(1999)**, pp. 779-805.
[14] M. Blaug, "The Empirical Status of Human Capital Theory: A Slightly Jaundiced Survey", Journal of Economic Literature, vol. 14, no. 3, **(1976)**, pp. 827-855.
[15] G. S. Becker, Human Capital, University of Chicago Press, Chicago, **(1975)**.
[16] E. Lazear, "Academic Achievement and Job Performance: Note", The American Economic Review, vol. 67, no. 2, **(1997)**, pp. 252-254.
[17] S.-Y. Lee, "Factors Affecting Audit Revenues: An Exploratory Study", H. J. Hwang, Editor. Advanced Science and Technology Letters Vol.102. Proceedings of the 7th International Workshop on Business, **(2015)** August 19-22, pp. 6-9, Jeju Island, Korea.
[18] S. J. Praisand C. B. Winsten, "Trend Estimators and Serial Correlation", Cowles Commission Discussion Paper, no. 383, **(1954)**, Chicago.
[19] R. E. Park and B. M.Mitchell, "Estimating the Auto correlated Error Model with Trended Data", Journal of Econometrics, vol. 13, **(1980)**, pp. 185-201.
[20] H. E. Doran and W. E. Griffiths, "On the Relative Efficiency of Estimators Which Include the Initial Observations in the Estimation of Seemingly Unrelated Regressions with First-Order Autoregressive Disturbances", Journal of Econometrics, vsol.23,**(1983)**, pp.165-191.
[21] J. Kmentaand R. F. Gilbert, "Estimation of Seemingly Unrelated Regressions with Autoregressive Disturbances," Journal of the American Statistical Association, vol. 65, **(1970)**, pp. 186-197.
[22] D. Belsley, E. Kuh and R. Welsch, "Regression Diagnostics", John Wiley & Sons, New York, **(1980)**.
[23] H. White, "A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity", Econometrica, vol. 48, **(1980)**, pp. 817-838.

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