The effect of mandatory audit firm rotation on audit quality and audit fees: Empirical evidence from the Korean audit market

Soo Young Kwon*

Youngdeok Lim

Roger Simnett

Acknowledgements—We are grateful for insightful comments from Michael Ettredge, Brian T. Carver, Anna Huggins and participants at the 2011 annual meeting of the American Accounting Association, as well as at seminars at the University of New South Wales and the 8th Annual ANCAAR Audit Research Forum.

Soo Young Kwon (Corresponding author)
Korea University Business School Anam-dong, Seongbuk-gu, Seoul 136-701 Korea, e-mail: sykwon@korea.ac.kr, Tel: 82-2-3290-1937

Youngdeok Lim
School of Accounting, Australian School of Business, UNSW, Sydney, NSW 2052, Australia, e-mail: youngdeok.lim@unsw.edu.au

Roger Simnett
School of Accounting, Australian School of Business, UNSW, Sydney, NSW 2052, Australia, e-mail: r.simnett@unsw.edu.au

The effect of mandatory audit firm rotation on audit quality and audit fees: Empirical evidence from the Korean audit market

SUMMARY

Using a unique setting in which mandatory audit firm rotation was required from 2006-2010, and in which both audit fees and audit hours were disclosed (South Korea), this study provides empirical evidence of the economic impact of this policy initiative on audit quality, and the associated implications for audit fees. This study compares both pre- and post-policy implementation and, after the implementation of the policy, mandatory long-tenure versus voluntary short-tenure rotation situations. Where audit firms were mandatorily rotated post-policy, we observe that audit quality (measured as abnormal discretionary accruals) did not significantly change compared with pre-2006 long-tenure audit situations and voluntary post-rotation situations. Audit fees in the post-regulation period for mandatorily rotated engagements are significantly larger than in the pre-regulation period, but are discounted compared to audit fees for post-regulation continuing engagements. We also find that the observed increase in audit fees and audit hours in the post-regulation period extends beyond situations where the audit firm was mandatorily rotated, suggesting that the introduction of mandatory audit firm rotation had a much broader impact than the specific instances of mandatory rotation.

Keywords: Audit firm rotation, Audit fees, Audit quality, Audit hours

Data availability: Most of the financial data used in the present study are available from the KIS Value database. The data for audit hours and fees were drawn from statements of operating results filed with the Financial Supervisory Services (FSS) in Korea.

The effect of mandatory audit firm rotation on audit quality and audit fees: Empirical evidence from the Korean audit market

INTRODUCTION

Whether audit firm rotation should be mandatory is an issue that has been debated for almost five decades. Proponents of mandatory audit firm rotation argue that auditor independence may be enhanced by increased professional skepticism which comes with fresh eyes. By contrast, opponents of this policy argue that incoming auditors may lack industry expertise and detailed knowledge of the client's particular situation, which may result in higher fees for initial engagements and a greater incidence of problem audits in the early years of a new engagement. To the extent that these increased costs are passed on to clients, increased audit fees will be observed across the relationship due to a limited ability to amortize these familiarization costs over an extended period (Myers et al. 2003; Carey and Simnett 2006). This study provides empirical evidence on this debate, utilizing the unique setting of Korea where this policy first took effect in 2006 and both audit fee and audit hours information is available.

A Public Company Accounting Oversight Board (PCAOB) concept paper (2011) and European Commission (EC) Green Paper (2010) both reinvigorated discussions about the desirability of mandatory audit firm rotation policies. Like most regulators/standard-setters, both the PCAOB and the EC require an analysis of the economic impact of any proposed policy, and our research has the ability to provide empirical evidence of the benefits and costs associated with the introduction of the mandatory audit firm rotation policy, constituting a timely contribution. The introduction of such a rotation policy continues to be contentious, as evidenced by the US House of Representatives legislation introduced in July 2013 that prevents the PCAOB from implementing a system of mandatory rotation for audit firms. This can be compared with the European Union (2013) agreement in December 2013 which contains requirements for the mandatory rotation of auditors after 10 years for public interest entities (PIE's). Member states may allow the auditor to continue to audit the same PIE's up to a maximum duration of 20 years where a public tendering is conducted and up to 24 years in the case of a joint audit.

It is possible to provide direct empirical evidence on the economic impact of an audit firm rotation policy in instances where countries have introduced such a rotation policy. In an attempt to provide the most appropriate empirical evidence regarding the potential impact of

the introduction of this policy initiative, we examine the recent South Korean initiative of mandatory *audit firm* rotation. The background to the South Korean initiative is that, in the wake of the 1997 Asian financial crisis, and further stimulated by the Sarbanes-Oxley Act debate, in 2003 South Korea's regulators, the Financial Supervisory Services (FSS), proposed an accounting reform bill that required audit firm rotation. This bill was implemented and, starting in 2006, listed public entities were required to rotate audit firms after six consecutive years of audit engagement. Significantly, in terms of allowing us to assess the economic impact of this policy, the Korean regulator requires disclosures of both audit fees and audit hours. This context provides an appropriate setting for providing empirical evidence of the potential benefits, improvements in audit quality associated with implementing this policy along with the potential costs in terms of increased audit effort and fees.

Using a unique database that includes South Korean public companies both before (2000-2005) and after (2006-2009) the introduction of the mandatory rotation policy, this study examines the effect of mandatory audit firm rotation on audit quality (measured by discretionary accruals in the first instance) and audit fees. After controlling for audit hours we find little impact on audit quality after the introduction of mandatory audit firm rotation in 2006, either in the first year of an engagement with a new auditor or in subsequent years. This is in comparison to voluntary rotations pre-2006, as well as voluntary (below firm tenure limit) rotations post- 2006. However, in our examination of audit quality, audit hours is significantly negative, showing that more time spent on the audit is associated with decreased accruals and therefore increased audit quality. With regards fees, audit fees in the post-regulation period for firms' mandatorily auditor-rotated engagements increase significantly compared with audit fees in the pre-regulation period. We also find that the observed increase in audit fees in the post-regulation period extends to all situations, irrespective of whether mandatory rotation of the audit firm occurred or not, suggesting that audit fees increased for all types of engagements after the introduction of the mandatory rotation requirement. This observed increase is after controlling for increased audit hours, with the increased audit effort significantly positively associated with audit fees.

Our study contributes to the literature by empirically examining the impact of the introduction of a mandatory audit firm rotation requirement on audit quality and audit fees. Previous studies (e.g., Davis et al. 2009; Myers et al. 2003) have examined either the effects of auditor tenure on earnings quality or the characteristics of firms changing auditors under a voluntary rotation system, but not a mandatory system. There are also a number of studies that have attempted to infer the possible impact of a mandatory rotation policy by examining

forced auditor change in other settings (e.g., Nagy 2005; Blouin et al. 2007; Kim and Yi 2009; Chen et al. 2009). In contrast to these prior studies, this is the first study that examines the direct effects associated with a mandatory audit firm rotation requirement.

The remainder of this paper proceeds as follows. Section 2 outlines theoretical considerations and the central research question. Section 3 describes the research design, and Section 4 reports the empirical results. Section 5 provides additional analyses, and Section 6 concludes with a summary.

THEORETICAL BACKGROUND AND RESEARCH QUESTIONS

A refocus on mandatory audit firm rotation policy

The Enron collapse in late 2001 refocused attention on the audit profession's effectiveness in protecting the public interest. Subsequently, the 2002 Sarbanes-Oxley Act (SOX) required the United States General Accounting Office (GAO) to study the potential effects of mandatory rotation of audit firms registered under the Act. The GAO's 2003 study concluded that mandatory audit firm rotation might not be the most efficient way to strengthen auditor independence. Some legislatures thus settled on rotating lead partners. The GAO, however, left the issue of revisiting the mandatory audit firm rotation requirement open if the other requirements of the Sarbanes-Oxley Act did not lead to improved audit quality. In 2011, Public Company Accounting Oversight Board (PCAOB) Chairman James Doty rekindled the debate by suggesting that mandatory audit firm rotation could be part of overhauling the auditing profession (Chasan 2011).[1] The PCAOB (2011) released a concept paper soliciting public comment on mandatory audit firm rotation and convened three public roundtable meetings in 2012 to hear views about the implications of introducing such a policy. However, in July 2013, the U.S. House of Representatives approved legislation that prohibits the Public Company Accounting Oversight Board (PCAOB) from requiring mandatory audit firm rotation (Chasan 2013). The American Institute of Certified Public Accountant's President and CEO, Barry Melancon, stated that "In the absence of evidence that mandatory audit firm rotation would enhance audit quality, the House has sent regulators in the United States and Europe a clear message that the time has come to end the debate over rotation" (AICPA 2013).

[1] The PCAOB Chairman James Doty said the accounting industry watchdog would consider instituting a mandatory audit rotation requirement for U.S. companies. The idea was to force companies to switch external auditors every few years so that the auditor-client relationship does not get too comfortable. Such a comfortable relationship, according to Doty, threatens to undermine audit quality.

The aftermath of the financial crisis in 2008 also triggered the European Commission (EC) to consider the policy of mandatory audit firm rotation in its Green Paper (2010) as a way to enhance auditor independence and a catalyst to introduce more dynamism into the audit market. The Green Paper called for more research to further inform this potential policy initiative. The EC is proposing major reforms to the European audit profession in response to perceived issues it identified during the global financial crisis (EC 2011). In this proposal they state "With a view to addressing the threat of familiarity that results from the audited undertaking often appointing and re-appointing the same audit firm for decades, the regulation introduces mandatory rotation of audit firms after a maximum period of 6 years that may be, under certain exceptional circumstances, extended to 8 years" (EC 2011, section 3.3.3).

In the U.K., the House of Lords Select Committee on Economic Affairs (2011) suggested that regulators need to achieve greater rotation of audit firms of FTSE 350 companies in order to improve audit quality. However, in its final summary report on this issue, the United Kingdom Competition Commission (2013) inquiry into the competitiveness of its statutory audit services market moved away from plans to mandate audit firm rotation for listed entities on the basis of insufficient empirical evidence. It has proposed instead a requirement that audit committees of UK listed companies must place their audits up for tender after 10 years. As mentioned earlier, the approaches in the U.S and U.K. differ from the European Union (2013) agreement in December 2013 which contains requirements for the mandatory rotation of auditors after 10 years for PIE's. Our study contributes empirical evidence on the logic behind these developments by examining the impact on audit quality and audit costs associated with the introduction of an audit firm rotation policy.

International instances of audit firm rotation and the Korean audit market

In determining whether we can learn about the impact of this policy from the experiences gained in other countries, we need to first identify those countries that have implemented this policy, and the availability of data. The countries with an audit firm rotation system currently in place are Italy, Brazil, and Singapore. Italy has a statutory requirement for audit firm rotation every nine years. In Brazil, companies are required to change audit firms every three years. In Singapore, banks are required to change audit firms every five years, but there is no such requirement for other listed companies. Spain also introduced mandatory rotation in 1988 after a maximum audit firm tenure of nine years, but abolished the requirement in 1995.

South Korea also implemented this policy from 2006-2010, and there is appropriate and unique data available in the form of audit fees and audit hours spent in this setting. It is important to understand the context in which this reform was implemented in order to gain a better understanding and assess the generalizability of any lessons learned from the Korean experience to other national settings.

From the early 1970s the Korean economy experienced significant growth, which along with a rapid development in capital markets and an opening up to international markets, increased the demand for credible financial reporting and external auditing. These influences prompted the regulatory authority in Korea to introduce the Act on External Audit (AEA), implemented in 1980. The AEA led to many changes in the accounting and auditing professions in Korea. On the demand side, the AEA increased significantly the number of firms that were subject to external audits by requiring the financial statements of a firm whose total assets exceed a regulatory limit (currently 100 billion Korean won or about US $8.5 million) to be audited by an independent auditor. On the supply side, the AEA relaxed restrictive licensing procedures for certified public accountants (CPAs), resulting in an increase in the number of CPAs. The Korean Institute of Certified Public Accountants (KICPA) was established in 1954 to improve CPA skills and monitor the professional conduct of its members. One hundred and thirteen audit firms were practicing as of 2011 and many of them have a member firm relationship with an international accounting firm, including the Big 4 audit firms who have maintained between 50-60% of the listed company market share for the last ten years.

The focus of the current research is the South Korean mandatory audit firm rotation policy. In 2002, the South Korean government formed a task force composed of experts from both the public and private sectors. The group was mandated with formulating robust reform proposals to further strengthen Korea's corporate regulatory standards. In April 2003, South Korean regulators proposed a reform bill that would require listed companies to rotate audit firms periodically. The bill passed the National Assembly, and consequently the mandatory rotation rule, which took effect in 2006, required audit firm rotation after six consecutive years of audit engagement.[2] This law was intended to prevent auditors from compromising their duty or independence because of financial interests or a long-term relationship with the

[2] Under this rule, a firm could keep the same auditor beyond six consecutive years under certain exemption conditions. Mandatory audit firm rotation was not required if: 1) as a foreign controlled firm, it was necessary to retain the same audit firm as the overseas parent company; or 2) a firm was listed on a foreign stock exchange. We found eight of these observations in our sample. We conduct a sensitivity analysis excluding these eight observations from our final sample and find that our main results hold.

same client. Following significant discussion and anecdotal comments about its cost and effectiveness, the mandatory audit firm rotation policy was abolished in 2010. This paper provides an empirical analysis of the issues of cost and effectiveness that underpinned this decision, and informs other policy makers who are considering introducing such a policy.

Literature review

There are two major strands of research that can inform the discussion with regard to mandatory audit firm rotation. In the first strand, most of the major published research has attempted to infer conclusions about mandatory audit firm rotation policies by looking at the audit quality associated with long-tenure versus short-tenure auditor-client relationships in settings where mandatory audit firm rotation is not required, on the basis that a rotation policy would not allow instances of long tenure relationships. Some studies have reported results consistent with the rationale for the introduction of this policy, noting that audit quality deteriorates as the length of audit tenure increases (Deis and Giroux 1992; Bazerman et al. 2002; Davis et al. 2009). Other studies have, by contrast, provided conflicting results (Geiger and Raghunandan 2002; Johnson et al. 2002; Carcello and Nagy 2004; Myers et al. 2004; Davis et al. 2009), or have found results against the rationale of the policy (Myers et al. 2003; Ghosh and Moon 2005). Clearly, prior research on the effect of audit firm tenure on audit quality has been mixed.

Results obtained from these other settings, however, may not easily extend to a mandatory audit firm change requirement and thus may not accurately inform the policy debate. For example, in the voluntary settings used in these studies, a company is free to either choose a different audit firm or remain with its current auditor. There is, therefore, the possible concern of endogeneity in extending the findings from voluntary settings as, for example, troubled firms may change auditors more often than do sound ones. Furthermore, incentives may exist for managers to switch to lower quality auditors the moment a problem appears, rather than identifying and disclosing the problem. Lower quality auditors may not identify the problem or, if they do identify the problem, management may dissuade the auditors from disclosing it (DeAngelo 1981b). Therefore the association between auditor tenure and audit quality examined in these studies has a potential self-selection bias (i.e., clients with long tenure tend to be better performers with fewer incentives to manage earnings). Any generalization of such findings, therefore, to a regime with mandatory audit rotation should be treated with caution.

The second relevant stream of research studied the effect of forced auditor change in other settings (i.e., mandatory rotation *per se* rather than a mandatory rotation *requirement*).

These other settings include the failure of Arthur Andersen (AA) in the U.S. (Nagy 2005; Blouin et al. 2007), the failure of eight Chinese audit firms in 2001 (Chen et al. 2009), and the auditor designation rule in Korea (Kim and Yi 2009). Significantly, however, none of these studies examine data from a context in which a general mandatory audit firm rotation policy was being implemented, which underscores an important incremental contribution of the current study.

Perhaps the study that is most similar to the present study is Kim and Yi's (2009) examination of the impact of the "auditor designation" rule in South Korea from 1991-2000. The auditor designation rule was a forerunner to the mandatory rotation requirement whereby firms that were deemed by the relevant regulatory authority to be "problematic" in the sense that they had "strong incentives and/or great potential for opportunistic earnings management" were required to have designated auditors replace the extant auditors and be retained for a specified period (p. 207). The authors found that firms with designated auditors from 1991-2000 had significantly lower levels of discretionary accruals than firms with a free selection of auditors, and compared to firms with voluntary auditor changes. However, the findings from this study may not translate to a broader mandatory audit firm rotation since the sample is restricted to "problematic" firms, highlighting the distinction between a general mandatory rotation policy and specific mandatory rotation policy situations.

Other prior studies have examined the effect of audit partner rotation on audit quality (Carey and Simnett 2006; Chen et al. 2008; Chi et al. 2009).[3] However, audit partner rotation differs considerably from audit firm rotation; although the former increases the risk of audit failures during a partner's initial years on an engagement *and* brings fresh eyes to an engagement, thereby increasing audit quality, the extent of the fresh view and the increased costs incurred are likely to be less than that of the latter because of the potential knowledge transfer and staff sharing within the audit firm. Thus, it is not clear whether the results from these studies can be extended to a mandatory audit firm rotation setting. Furthermore, Bamber and Bamber (2009) suggested that, compared with audit firm rotation, audit partner rotation is likely to yield second-order effects.

To date, two studies have examined the effect of audit firm rotation under a mandatory rotation requirement. Using the number of suspended partners imposed by the Italian National Commission as a proxy for audit quality, Cameran et al. (2007) concluded that

[3] Carey and Simnett (2006) found that audit quality, proxied by the propensity to issue going-concern opinions and the incidence of just beating (missing) earnings benchmarks, decreased under long partner tenure. Using audit data from Taiwan, Chi et al. (2009) found no support for the claim that mandatory auditor audit partner rotation enhances audit quality, whereas Chen et al. (2008) found that audit quality increased with partner tenure.

mandatory auditor rotation was detrimental to audit quality because it increased start-up costs and disrupted the appointment phase. Ruiz-Barbadillo et al. (2009) examined the impact of mandatory audit firm rotation on auditor behavior in the Spanish context. They used the likelihood of issuing going-concern opinions as a proxy for audit quality and focused on financially distressed firms from 1991-2000. They found no evidence that the mandatory audit firm rotation policy (which was in effect for part of this period, 1991-1995) had a positive impact on audit quality. The results of these two studies should be interpreted with caution, because both partner suspensions and going-concern opinions are rare and occur only in specific circumstances. They therefore may not provide the complete story about the cost and effectiveness of a general mandatory audit firm rotation requirement.

Research Questions

DeAngelo (1981a) defined audit quality as the joint probability of detecting and reporting material misstatements, suggesting that auditor independence and auditor competence are important audit quality components. Even though audit quality is a complex concept and cannot be reduced to a simple definition (Francis 2011), we can identify the expected impact of a mandatory audit firm rotation policy on audit quality by examining its likelihood of enhancing auditor independence and/or impairing auditor competence. The most widely used arguments in favor of audit firm rotation, some of which were foreshadowed in the introduction to this study, are as follows. First, if audit firms continue to audit a particular entity for a long period, they risk developing a close relationship with the client and compromising independence. Second, periodically engaging a new auditor brings a fresh look to the company's financial reporting, helping the auditor deal appropriately with financial reporting issues (Carey and Simnett 2006; EC 2010).

In relation to audit quality, the main argument against mandatory audit firm rotation is that in the initial years of an audit firm's tenure, new auditors may miss problems because they lack adequate experience with the client to notice either unusual events or important changes in the client's environment. Because of the lack of client familiarity, the incoming auditor may increasingly rely on the client's estimates and representations in the initial years of the engagement. Also, the benefits associated with engaging industry specialist auditors may be lost, as audit firm rotation will mean that the audit client will, after a time, have to rotate away from the audit firm they deem to be the most appropriate specialist for their

business.[4] Client-specific knowledge of items including operations, accounting systems, and internal control structure is crucial for auditors to detect material errors and misstatements, indicating that mandatory audit firm rotation could harm auditor competence. Thus, it is of interest to empirically test the overall effect of mandatory audit firm rotation on audit quality. In this analysis we include audit hours as a control variable to identify the extent to which auditors expend additional effort to reduce any adverse effects of lack of client familiarity on audit quality, and to identify the effects of the rotation policy beyond additional hours on audit quality. Consequently, we extend prior studies by examining our first research question, RQ1:

RQ1: What is the impact of introducing a mandatory audit firm rotation policy on audit quality?

As well as questions regarding the impact of the introduction of mandatory audit firm rotation on audit quality, there are questions as to its impact on audit fees. It is anticipated that in the initial years of an audit firm engagement with a new client, the audit firm will have to work harder to build up client familiarization to a satisfactory level to achieve the appropriate level of audit quality. This will involve greater auditor exertion (audit hours), and greater audit costs.

However, competition among public accounting firms to provide audit services may impact the audit fees that the client has to pay. Audit firms may offer audit fee discounts on initial audit engagements as a tactic to gain access to a continuing audit revenue stream or fees for providing other services (commonly referred to as low-balling).[5] DeAngelo (1981b) suggested that a learning curve in auditing can lead to auditors pricing below cost when bidding to perform a new engagement. Simon and Francis (1988) suggested that price-cutting exists in early periods and that fee discounting occurs when clients incur considerable incremental costs when changing auditors. Deis and Giroux (1996) provided empirical evidence that initial audits in particular are associated with lower audit fees.

The incidence of offering audit fee discounts is more likely to occur when the client has the opportunity to remain with its incumbent audit firm for a longer period (that is, the audit

[4] For companies limited to using one of the Big N firms, the selection may be further limited by an audit firm providing certain non-audit services or serving as a company's internal auditor because independence rules prohibit that audit firm from also serving as its auditor of record. In some cases, a company may also be limited in its choice of firms if an audit firm audits one of the company's major competitors and the public company decides not to use that firm as its auditor of record (GAO 2003).

[5] These practices may also have a detrimental effect on audit quality by resulting in insufficient audit work being completed, with auditors working within the constraints of lower budgets (lower audit quality).

firm has a longer period over which it can recoup any initial fee discounts). Petty and Cuganesan (1996) argued that under a mandatory audit firm rotation policy, audit fees are likely to increase because auditors would have a shorter time to absorb the familiarization costs associated with the first year of auditing. For engagements under a mandatory audit firm rotation regime, the period over which economic benefits can be realized is truncated due to an inability to extend the relationship beyond a defined period. Arrunada and Paz-Ares (1997), through their detailed review and mathematical modelling of audit costs, argued that mandatory rotation could cause decreased competition and a subsequent increase in cost to the client as there would be a reduction in the incentives for audit firms to be efficient.

However, mandatory audit firm rotation may intensify price competition due to increased dynamics in the audit market. Due to audit fee pressure in an environment where every audit firm must continuously compete to find new companies to audit, audit fees may decrease in the short term. In the case of auditing, which is generally considered a public interest activity, such competition may be considered as inappropriate. The 2003 GAO study suggested that if intense price competition occurs, the expected benefits of mandatory audit firm rotation can be undermined if audit quality suffers as a result of audit fees that do not support an appropriate level of audit work. If this were the case, audit fees under the mandatory audit firm rotation regime would be less than those under the voluntary auditor change regime. In this analysis we include audit hours as a control variable to identify the relationship between audit effort and audit fees, and to identify the effects of the rotation policy beyond additional hours on audit fees. Thus, our second research question will examine the impact of mandatory audit firm rotation on audit fees:

RQ2: What is the impact of introducing a mandatory audit firm rotation policy on audit fees?

The two research questions considered together inform the benefit-cost analysis which is undertaken by regulators/standard-setters when making policy decisions. As we have discussed, and as depicted in Figure 1, there is tension both within and between these two research questions. As stated above, if we take the central aim of mandatory audit firm rotation as improving audit quality, there is tension between the potential positive impacts associated with the fresh eyes of a new auditor, and the potential negative impacts arising from the loss of auditor familiarity with the client and the client's industry. The potential costs associated with decreased auditor familiarity can potentially be overcome by increased audit effort. As previously discussed, greater audit effort will usually result in clients being

charged higher audit fees, except where audit fee discounting occurs. Thus, to examine RQ2, audit fee data are analyzed to elucidate the potential costs associated with the introduction of a mandatory rotation requirement.

<Insert Figure 1 here>

RESEARCH DESIGN

Audit quality model

Consistent with prior research, we posit that higher quality audits constrain the extreme choices managers make in presenting the firm's financial position. Accruals have been used widely to identify these extreme reporting decisions (Becker et al. 1998; Myers et al. 2003). In this regard, we document the effect of mandatory audit firm rotation on earnings quality using absolute and signed accrual measures as proxies for earnings quality.

We use performance-matched discretionary accruals (DA^{adj}) as the measure for discretionary accruals. Following Tucker and Zarowin (2006), DA^{adj} is calculated as the residual from regression (1), as in Kothari et al. (2005).[6] To measure the discretionary portion of accruals, we first estimate the predicted nondiscretionary accruals by using the cross-sectional model of the performance-matched modified Jones model, and then subtract these predicted nondiscretionary accruals from the total accruals. Specifically, we estimate the following regressions for each year and each industry using the same two-digit industry code in the sample:

$$ACC_{jt}/TA_{jt-1} = \alpha_0/TA_{jt-1} + \alpha_1(\Delta REV_{jt} - \Delta REC_{jt})/TA_{jt-1} + \alpha_2 PPE_{jt}/TA_{jt-1} + \alpha_3 ROA_{jt}/TA_{jt-1} + \varepsilon_{jt} \quad (1)$$

where ACC_{jt} is accruals in year t for firm j; TA_{jt-1} is total assets in year $t-1$ for firm j; ΔREV_{jt} is revenues in year t less revenues in year $t-1$ for firm j (i.e., change in revenues); ΔREC_{jt} is receivables in year t less receivables in year $t-1$ for firm j (i.e., change in receivables); PPE_{jt} is property, plant, and equipment in year t for firm j; ε_{jt} is the error term in year t for firm j; and ROA_{jt} is the net income in year t for firm j.

[6] Kothari et al. (2005) found that performance-matched discretionary accrual measures enhance the reliability of inferences from earnings management research.

We scale all the variables in regression (1) by total assets in year *t-1* to reduce potential heteroskedasticity. The nondiscretionary accruals deflated by the total assets (*NDACC*) for the sample firms are computed as follows:

$$NDACC_{jt} = a_0 / TA_{jt-1} + a_1(\Delta REV_{jt} - \Delta REC_{jt}) / TA_{jt-1} + a_2 PPE_{jt} / TA_{jt-1} + a_3 ROA_{jt} / TA_{it-1} \quad (2)$$

where a_0, a_1, a_2, and a_3 are the estimated coefficients from regression (1). Then, the discretionary accruals (*DACC*) are computed as the difference between total accruals scaled by prior-year total assets and *NDACC*.

We use the following model to test the impact of mandatory audit firm rotation on audit quality. Our model specification is as follows[7]:

$$DA_{jt} = \beta_o + \beta_1 Postreg_{jt} + \beta_2 LAH_{jt} + \beta_3 LTA_{jt} + \beta_4 BIG_{jt} + \beta_5 AGE_{jt} + \beta_6 OCF\_TA_{jt} + \beta_7 IND\_GRWTH_{jt} + \beta_8 CA\_CL_{jt} + \beta_9 LEV_{jt} + \beta_{10} TENURE_{jt} + \text{Industry dummies} + \text{Year dummies} + v_{jt} \quad (3)$$

$$DA_{jt} = \beta_o + \beta_1 Prereg\_Short_{jt} + \beta_2 Prereg\_Long_{jt} + \beta_3 Postreg\_Cont_{jt} + \beta_4 Postreg\_Short_{jt} + \beta_5 Postreg\_Long_{jt} + \beta_6 LAH_{jt} + \beta_7 LTA_{jt} + \beta_8 BIG_{jt} + \beta_9 AGE_{jt} + \beta_{10} OCF\_TA_{jt} + \beta_{11} IND\_GRWTH_{jt} + \beta_{12} CA\_CL_{jt} + \beta_{13} LEV_{jt} + \beta_{14} TENURE_{jt} + \text{Industry dummies} + \text{Year dummies} + v_{jt} \quad (4)$$

Each measure is described in Appendix 1.

As illustrated in Figure 2, we identify six conditions (*Prereg_Cont, Prereg_Short, Prereg_Long, Postreg_Cont, Postreg_Short, Postreg_Long*) in the pre-/post- regulation categories, which provide us with appropriate benchmark samples from which we can examine our research questions. If the intercept (β_o) is suppressed, the estimates of β_1, etc. can be compared directly against one another. For example, to determine whether audit quality for voluntary audit firm rotation increased from the pre-regulation period to the post-regulation period, we compare β_1 versus β_4.

<Insert Figure 2 here>

[7] We also re-estimated equations 3 and 4 by lagging the control variables. Our findings for equations 3 and 4 do not change qualitatively.

First, we include *Postreg* in equation 3 in order to compare audit characteristics of all firm-years in the pre-regulation periods with audit characteristics of all firm-years in the post-regulation periods (regardless of whether the firm-years are cases of continued engagements, short-tenure auditor change or long-tenure auditor change). We then compare audit characteristics of each subsample in the post- versus pre-regulation periods, i.e., *Postreg_Cont* versus *Prereg_Cont* (*β3 vs* zero), *Postreg_Short* versus *Prereg_Short* (*β4 vs β1*), as well as *Postreg_Long* versus *Prereg_Long* (*β5 vs β2*). Finally, we further compare *Postreg_Long* (*β5*), *Postreg_Short* (*β4*), and *Postreg_Cont* (*β3*) to shed light on the differences between mandatory auditor change, voluntary auditor change, and continued engagements under a mandatory rotation regime in equation 4.

Similar to any bid for a new engagement, auditors under a mandatory audit firm rotation regime need to develop a detailed knowledge of a company's business, its risks, and its changing external and internal environment (International Auditing and Assurance Standards Board 2009). Thus, auditors are expected to expend additional effort for a first time engagement, in order to reduce any adverse effects of lack of client familiarity on audit quality. We therefore include the LAH variable to identify the extent to which this is happening and to control for the overall effect of audit hours on audit quality. The other control variables in our analysis are drawn from Myers et al. (2003), and are outlined in Appendix 1. Client size is positively related to abnormal accruals (Becker et al. 1998). Thus, we include client size (*LTA*) as a control variable. We include a dummy variable (*BIG*) to control for differences in earnings management between Big N and non-Big N client firms (Becker et al. 1998). We include *AGE* because accruals differ with changes in firms' life cycles (Myers et al. 2003), with an expectation of lower accruals for more mature companies. *OCF_TA* is included because firms with higher cash flows from operations are more likely to be better performers (Frankel et al. 2002) and because accruals and cash flows are negatively correlated on average (Dechow et al. 1995; Myers et al. 2003). We control for *IND_GRWTH* because growth in the industry should be positively correlated with accruals (Myers et al. 2003). Butler et al. (2004) found a positive relation between discretionary accruals and liquidity. Based on their study, we include the current ratio (*CA_CL*) to control for liquidity. In addition, leverage (LEV), which is expected to negatively correlated with discretionary accruals, and auditor tenure (TENURE), which is expected to be positively correlated with discretionary accruals, are included (DeAngelo et al. 1994; Myers et al. 2003). Finally, we control for industry and year effects by adding dummy variables for industry and year.

Audit fee model

As outlined above, we employ audit fee and audit hour data to inform analysis of the economic impact of the introduction of a mandatory audit firm rotation requirement, particularly in relation to the potential costs associated with this requirement. Korea provides an ideal research setting for collecting and analyzing data on audit fees and hours as, to enhance corporate transparency, South Korean listed companies are required to disclose such data in annual reports filed with the Financial Supervisory Services (Securities Issuance and Disclosure Rules §72(1)). Audit fees are the fees paid for the financial statement audit only, meaning that in our analysis the other fees paid to the audit firm related to tax services, information system audits and non-audit services are reported separately and captured in *FEERATIO*. Audit hours are the actual audit hours recorded as worked for all audit staff associated with a particular financial statement audit.

We examine the effect of mandatory audit firm rotation on audit fees to answer RQ2. Any increases in audit costs passed on to clients will allow us to inform the debate about the economic impact of the introduction of mandatory audit firm rotation.

We use the following model[8] to test the effects of mandatory audit firm rotation on audit fees. The multivariate regression is as follows:

$$LAF_{jt}=\gamma_o+\gamma_1 Postreg_{jt}+\gamma_2 LAH_{jt}+\gamma_3 DA_{jt}+\gamma_4 LTA_{jt}+\gamma_5 BIG_{jt}+\gamma_6 SUB_{jt}+\gamma_7 FRGN_{jt}+\gamma_8 AR\_INV_{jt}+\gamma_9 ROI_{jt}+\gamma_{10} LOSS_{jt}+\gamma_{11} OPINION_{jt}+\gamma_{12} IND\_SPEC_{jt}+\gamma_{13} POWER_{jt}+\gamma_{14} FEERATIO_{jt}+\gamma_{15} POWER_{jt}+\gamma_{16} FEERATIO_{jt}+\text{Industry dummies}+\text{Year dummies}+u_{jt} \quad (5)$$

$$LAF_{jt}=\gamma_o+\gamma_1 Prereg\_Short_{jt}+\gamma_2 Prereg\_Long_{jt}+\gamma_3 Postreg\_Cont_{jt}+\gamma_4 Postreg\_Short_{jt}+\gamma_5 Postreg\_Long_{jt}+\gamma_6 LAH_{jt}+\gamma_7 DA_{jt}+\gamma_8 LTA_{jt}+\gamma_9 BIG_{jt}+\gamma_{10} SUB_{jt}+\gamma_{11} FRGN_{jt}+\gamma_{12} AR\_INV_{jt}+\gamma_{13} ROI_{jt}+\gamma_{14} LOSS_{jt}+\gamma_{15} OPINION_{jt}+\gamma_{16} IND\_SPEC_{jt}+\gamma_{17} POWER_{jt}+\gamma_{18} FEERATIO_{jt}+\text{Industry dummies}+\text{Year dummies}+u_{jt} \quad (6)$$

Each measure is described in Appendix 1.

Related to the relationships of interest for this study as depicted in Figure 1, we include both audit hours and audit quality measures in our examination of audit fees. Audit fees are, in general, a positive function of audit hours. Further, audit fees can also be related to audit quality. There can be a potential positive relation as auditors can charge higher audit fees for high quality audits, while there can be a negative function to the extent that high-quality audits reduce auditor legal liability risk significantly (Choi et al. 2008), indicating the

[8] We also specified equations 5 and 6 with the control variables defined in a lagged form and re-estimated them. Our findings for equations 5 and 6 do not change qualitatively.

potential for lower audit fees. Therefore, we control for the overall effect of audit hours and audit quality measured as signed discretionary accruals on audit fees.[9] The control variables in our analysis are drawn from the significant body of research on audit fees (e.g., Casterella et al. 2004; DeFond et al. 2002; Huang et al. 2007). Audit fees are positively related to client size (*LTA*), client complexity (*SUB*, *FOREIGN*), client-specific risk factors (*AR_INV*, *OPINION*), high-quality service (*BIG*), and auditor industry specialization (*IND_SPEC*). Audit fees are negatively related to profitability (*ROI*) due to the client's financial condition , client bargaining power (*POWER*), and the proportion of non-audit services (*FEERATIO*). As audit fees may be affected by audit firms' pricing strategies in particular industries, we further control for this potential affect by including industry dummies. Finally, we control for the general increase of audit fees over time by adding dummies for year.

Sample

The sample firms were selected from companies listed on the Korean Stock Exchange (KSE) and Korea Securities Dealers Automated Quotations (KOSDAQ) from 2000 to 2009. Initially, a total of 16,064 firm-year observations were obtained from the KIS value database.[10] Non-December year-end firms were excluded because their audit hours and audit fees differ systematically from those of December year-end firms.[11] Consistent with prior studies (e.g., Craswell et al. 1995; Frankel et al. 2002), we also excluded 323 financial and insurance observations from the sample because of differences in financial characteristics. Mandatory auditor changes may emanate from the auditor designation rule (Kim and Yi 2009) before and after the mandatory rotation requirement was imposed; on this basis, we excluded 471 firm-years.

We further deleted observations if audit fee, audit hour, and required financial data were not available during the sample period. Firms in an industry with less than eight member firms each year were also excluded because discretionary accruals were estimated for each industry and each year by using the cross-sectional modified Jones model (Kothari et al. 2005). These procedures resulted in the final sample comprising 6,710 firm-year observations (Table 1). Although the disclosure requirement of audit hours and audit fees was first introduced in 2000, more observations were found for the period after 2005 as these disclosures stabilized.

[9] We will test the effects of mandatory audit firm rotation on audit hours in additional analyses.
[10] The KIS value database is provided by Korea Investors Service Inc., which is affiliated with Moody's.
[11] The non-December year-ends were composed primarily of companies in the financial and insurance industry, which were also excluded, and many were associated with overseas parents, which were commonly exempt from the requirement to rotate an audit firm appointed to the corporate group.

<Insert Table 1 here>

Panel A of Table 2 reports the frequency of observations for the initial and continuing audit firm engagements. Among the 6,710 observations, 5,489 (81.8%) are continuing audits and 1,221 (18.2%) are audits new to the audit firm. Of these 1,221 new engagements, 829 observations are classified as voluntary auditor change. The remaining 392 engagements are due to auditor change required under the mandatory audit firm rotation policy. Panel B shows the distribution of observations for each of the six cells outlined in Figure 2. Panel C exhibits the distribution of the firm-years based on continuing engagements, voluntary auditor rotation, and mandatory auditor rotation by year. [12] Unreported results show that firms are distributed relatively evenly across all industries, indicating no significant industry clustering.

<Insert Table 2 here>

EMPIRICAL RESULTS

Descriptive statistics

Table 3 presents the descriptive statistics for the variables used in our analysis. The mean and median values of audit hours (*AH*) are 854 and 550, respectively. The corresponding values of audit fees (*AF*) are ₩78,824,223 and ₩52,000,000 (US$72,873 and $48,067), respectively. The means of both variables are larger than the medians, indicating right-skewed distributions for both audit hours and audit fees. Consistent with prior studies, we therefore took logarithms of audit hours and audit fees to normalize the distributions. The mean (median) DA^{adj} is -0.00 (0.01), indicating that discretionary accruals are close to 0, on average. In relation to the auditor-related variables, the mean value of *BIG* is 0.57, indicating that 57% of the sample are audited by Big N audit firms. TENURE has a range of 1 to 17 years and an average value of 3.87 which is lower than the 6 years limit imposed by the mandatory audit firm rotation. The mean value of FEERATIO is 0.18.

<Insert Table 3 here>

[12] The distribution for mandatory firm rotation incidences is identified as very uneven, with more rotations (both voluntary and mandatory) occurring in 2008, and less in 2009. The reasons for this unevenness are unclear, but it may be due to industry dynamics (such as if an audit firm is successful in winning some new clients, capacity constraints may mean it is unable to service some existing clients).

Benefit analysis: regression analyses of the impact of mandatory audit firm rotation on audit quality

In this section we document the effect of adopting the mandatory audit firm rotation requirement on earnings quality. Table 4 presents the results of the OLS regression model estimated with the dependent variable of abnormal accruals.

<Insert Table 4 here>

The estimate of equation 3 shows an insignificant coefficient for *Postreg*, indicating that audit quality in the post-regulation period is not different from the audit quality in the pre-regulation period. The estimate of equation 4 indicates that *Prereg_Short* is negative and significant, suggesting a higher audit quality for such voluntarily rotated firms before the mandatory audit firm rotation was implemented, compared with *Prereg_Cont* which is measured in the intercept. However, the F-test (*Prereg_Short = Postreg_Short*) results show the difference for appropriate comparison groups as a result of the introduction of the mandatory audit firm rotation requirements is not significant. All F-test results reported in Table 4 show that the difference between these dummy variables is not significant at the 0.1 level, providing evidence that there is no discernible improvement in audit quality under the mandatory rotation regime.[13]

The *LAH* variable in the estimates of equations 3 and 4 is significantly negative.[14] This is consistent with the results of Caramanis and Lennox (2008) and suggests that more time spent on the audit appears to be associated with decreased accruals and therefore increased audit quality. For abnormal accruals, the *BIG* coefficient is not different from 0, suggesting no difference in audit quality between Big N auditors and other auditors. The *OCF_TA* control variables both have significantly negative coefficients, implying that financially healthy firms are less likely to manage earnings. The *LEV* variable is significantly negative,

[13] We found similar results for *Postreg* for the estimate of equation 3 of Table 4, when we examined the absolute value of discretionary accruals, and positive abnormal accruals using truncated regression (Caramanis and Lennox 2008). We also test equation 4 for the dependent variable measured by absolute discretionary accruals and positive/negative discretionary accruals, respectively. F-tests identified a higher level of discretionary accruals (lower audit quality) for *Postreg_Short* compared with *Postreg_Cont* and *Postreg_Long* (when absolute discretionary accruals are used), and *Prereg_Short* (when positive discretionary accruals are used). We do not find an improvement in audit quality for Postreg_Long when alternative discretionary accruals are used.

[14] In additional unreported analysis we included an interaction effect of *LAH***Postreg_Long* in the regression of audit quality and found that the coefficient is not significant. This provides evidence that there is no separately identifiable impact of additional audit hours on audit quality for mandatorily rotated firms.

suggesting that the higher the firm's debt-to-equity ratio, the less likely it is that the firm will manage earnings (DeAngelo et al. 1995). The *TENURE* variable is positive, but the significance and magnitude of the coefficient is small.

Cost analysis: the effects of mandatory audit firm rotation on audit fees

The results reported in Table 5 illustrate the association between audit firm rotation variables and audit fees.

<Insert Table 5 here>

The estimate of equation 5 shows a positive and significant coefficient for *Postreg*, indicating that audit fees in the post-regulation periods are greater than audit fees in the pre-regulation periods after controlling for the inflation effect in year dummy variables. The estimate of equation 6 shows that the coefficient of *Prereg_Short* is negative and significant, and that *Prereg_Long* is negative, but not significant, providing some evidence that there were audit fee discounts for audit firm change situations before the implementation of the audit firm rotation policy. The estimate of equation 6 also shows positive coefficients (0.271, 0.256 and 0.227) on *Postreg_Cont*, *Postreg_Short* and *Postreg_Long*, indicating an overall increase in the audit fees of all three main categories in the post-regulation period. The reported F-tests (*Postreg_Cont = Prereg_Cont*, *Postreg_Short = Prereg_Short*, and *Postreg_Long = Prereg_Long*) support this interpretation. Interestingly, the coefficient on *Postreg_Long* (0.227) is significantly lower than the coefficient on *Postreg_Cont* (0.271) according to the F-test (*Postreg_Cont = Postreg_Long*), which indicates the incidence of audit fee discounts for *Postreg_Long* situations. Thus there is some evidence that certain types of first-time audit engagements, both pre- and post-regulation, were able to attract discounts on audit fees.

In the estimates of equations 5 and 6, we include the *LAH* variable to control for the impact on, and examine the relationship between, audit hours and audit fees.[15] The coefficients of *LAH* are positive and highly significant (*t*-statistic = 14.0), providing evidence of the strong positive relationship between audit fees and audit hours. The estimate of equation 6 further shows that the result that the introduction of the rotation policy significantly increased audit fees still holds when including *DA* in the regression. Both the

[15] In additional analysis we included an interaction effect of LAH*Postreg_Long in the regression of audit fees and found that the coefficients are not significant. This provides evidence that there is no separately identifiable impact of additional audit hours on audit fees for mandatorily rotated firms.

positive and negative associations between DA and audit fees seem to cancel each other out here as DA is insignificant in the audit fee model.

Unreported separate regressions [16] in the pre- and post- regulation periods show significant and negative coefficients (-0.031 (t-statistics=-1.67); -0.039 (t-statistics=-2.45)) on *Prereg_Short* and *Postreg_Long.* Before the mandatory rotation policy was implemented, voluntarily rotated firms with short-tenure audit engagements were priced lower than continuing audit engagements. This suggests that audits were being low-balled because the initial familiarization costs were not fully priced. After the policy change, however, the mandatorily rotated engagements were priced lower than continuing audit engagements, which is consistent with the interpretation that these engagements were low-balled compared to continuing engagements in the post-regulation period.

The *LTA* and *BIG* variables are significantly positive, consistent with prior studies (e.g., Craswell et al. 1995). The proxies for operational complexity (*SUB*, *FRGN*, and *AR_INV*), and those for audit risk (*ROI* and *LOSS*. *SUB, ROI* and *LOSS*) are consistently significant and in the expected direction. The coefficient of *IND_SPEC* is also significantly positive, indicating that specialist auditors received an audit fee premium. The coefficient of *POWER* is significantly positive, which is not consistent with prior research (Casterella et al. 2004; Huang et al. 2007).[17]

ADDITIONAL ANALYSES

We perform several additional analyses and sensitivity tests to check the robustness of our results.

The effects of mandatory audit firm rotation on audit hours

An increase in audit hours provides further information of the extent to which audit firms respond to the need to improve client familiarity with further audit effort. In Korea, companies know that an audit firm's initial engagement under a mandatory audit firm rotation will be more closely scrutinized by the regulators (the FSS) than will the results of

[16] In the pre-regulation period, the dependent variable audit fees was regressed on Prereg_Short, Prereg_Long and other controls with an intercept. In the post-regulation period, audit fees was regressed on Postreg_Short, Postreg_Long and other controls with an intercept.

[17] Casterella et al. (2004) and Huang et al. (2007) documented a negative association between client bargaining power and audit fees, suggesting that audit fees are lower when clients have greater bargaining power. In this study, when only including POWER and LTA with industry and year dummies, the coefficient for POWER is negative and significant, -0.293 (t-value=-2.41). However, when controlling for other factors that affect audit fees, the coefficient for POWER changes to become positive and significant.

subsequent audits.[18] Thus, auditors under the mandatory auditor regime could be expected to exert more audit effort and apply professional skepticism in order to meet regulators' increased surveillance. Further, due to the learning curve that audit firms face with any new audit, audits under mandatory audit firm rotation policy could be less efficient at the beginning of an engagement, and present a higher level of audit risk. If audit firms were regularly being rotated, these factors would increase the effort of the audit process as a whole.

We used the following model to test the effects of mandatory audit firm rotation on audit hours:

$$LAH_{jt} = \beta_o + \beta_1 Prereg\_Short_{jt} + \beta_2 Prereg\_Long_{jt} + \beta_3 Postreg\_Cont_{jt} + \beta_4 Postreg\_Short_{jt} + \beta_5 Postreg\_Long_{jt} + \beta_6 LTA_{jt} + \beta_7 BIG_{jt} + \beta_8 CA\_CL_{jt} + \beta_9 LEV_{jt} + \beta_{10} FEERATIO_{jt} + \text{Industry dummies} + \text{Year dummies} + e_{jt} \quad (7)$$

$$LAH_{jt} = \beta_o + \beta_1 Prereg\_Short_{jt} + \beta_2 Prereg\_Long_{jt} + \beta_3 Postreg\_Cont_{jt} + \beta_4 Postreg\_Short_{jt} + \beta_5 Postreg\_Long_{jt} + \beta_6 LTA_{jt} + \beta_7 BIG_{jt} + \beta_8 CA\_CL_{jt} + \beta_9 LEV_{jt} + \beta_{10} FEERATIO_{jt} + \text{Industry dummies} + \text{Year dummies} + e_{jt} \quad (8)$$

Each variable is defined in Appendix 1.

Our model of audit hours is based on O'Keefe et al. (1994) and Caramanis and Lennox (2008).[19] We included a dummy variable (*BIG*), which equals 1 if audited by one of the Big N audit firms and 0 otherwise. We included the log of total assets (*LTA*) to control for client size as the most important determinant of audit hours. We controlled for client complexity by using the ratio of current assets to current liabilities, and we controlled for audit risk by using the leverage ratio (*LEV*). Finally, we controlled for industry and year effects by adding dummies for industry and year.

The results of our additional analyses regarding audit hours are presented in Table 6.

<Insert Table 6 here>

These results show that mandatory audit firm changes post-2006 were associated with a significant increase in audit effort compared with long-tenure audit firm changes pre-2006. This implies that new auditors exert additional effort in an attempt to reduce a higher level of

[18] In its December 2005 newsletter, the FSS declared it would scrutinize the effect of mandatory audit firm rotation because the rule was to be implemented without cumulative knowledge or compelling evidence.

[19] When we run the audit hours regression with the same set of control variables (i.e. LTA, BIG, SUB, FRGN, AR_INV, ROI, LOSS, OPINION, TELE, UTIL, IND_SPEC, POWER, FEERATIO) in the audit fee regression, we found that our results still hold.

audit risk after the mandatory rotation, possibly because they are not familiar with their new clients. The results also suggest that new auditors put more effort into maintaining the audit quality that has been achieved by the previous auditors. The consequence is that audit effort increases, supporting the client familiarity story.

We also observe that audit hours for firms with continuing audit engagements and voluntarily auditor-rotated engagements substantially increased under the mandatory rotation regime. Furthermore, the results indicate that the introduction of mandatory audit firm rotation affected audit hours of continuing engagements and voluntarily rotated engagements, as well as those of mandatorily rotated engagements in the new regulatory regime.

Alternative measures of audit quality

We also test the effect of mandatory audit firm rotation on earnings quality by using the observations that just beat or miss breakeven as an alternative earnings quality measure. Consistent with Carey and Simnett (2006), the propensity to just beat or miss breakeven is defined as situations where profit or loss are less than 2% of total assets.[20]

$$Pr(BEAT=1) \text{ or } Pr(MISSES=1)_{jt} = \beta_o + \beta_1 Postreg + \beta_2 LTA_{jt} + \beta_3 AGE_{jt} + \beta_4 LEV_{jt} + \beta_5 BIG_{jt} + \beta_6 OCF\_TA_{jt} + \beta_7 FEERATIO_{jt} + v_{jt} \quad (9)$$

$$Pr(BEAT=1) \text{ or } Pr(MISSES=1)_{jt} = \beta_o + \beta_1 Prereg\_Short_{jt} + \beta_2 Prereg\_Long_{jt} + \beta_3 Postreg\_Cont_{jt} + \beta_4 Postreg\_Short_{jt} + \beta_5 Postreg\_Long_{jt} + \beta_6 LTA_{jt} + \beta_7 AGE_{jt} + \beta_8 LEV_{jt} + \beta_9 BIG_{jt} + \beta_{10} OCF\_TA_{jt} + \beta_{11} FEERATIO_{jt} + v_{jt} \quad (10)$$

All variables are defined in Appendix 1.

Descriptive results show that the introduction of the policy had very little effect on the proportion of Just Beats Breakeven to Just Misses Breakeven. For the period before the introduction of mandatory audit firm rotation, the proportion of just beats breakeven observations to the combined just beats and just misses breakeven observations is 435 of 545 (79.8 percent), compared to 505 of 648 (77.9 percent) after the introduction of the policy. The lack of significant difference in these proportions is consistent with the results (unreported) from the logistic regressions outlined above, which show that for the estimate of equation 9, *Postreg* is not significant where the dependent variable is *Pr(BEAT=1)* (t= -1.62, p >0.10) as well as *Pr(MISSES=1)* (t= -0.11, p >0.10). Similarly for the estimate of equation

[20] Using the model specified by Carey and Simnett (2006), we also explore using the auditor's propensity to issue a going-concern opinion for distressed companies as a dependent variable, but find that the equation cannot be estimated due to the small number of observations with a modification to the auditor's report related to going-concern.

10, *Postreg_Long* is not statistically significant where the dependent variable is *Pr(BEAT=1)* (t= 1.10, p >0.10), as well as when it is *Pr(MISSES=1)* (t= -0.81, p >0.10).

Alternative cut-off

As shown in Panel B of Table 2, firms frequently changed their auditors voluntarily the year before the new regulation on audit firm rotation was implemented. We examine if a cut-off around 2005 affects our main results. When we change the cut-off to 2005, we find that there are no differences in the significance of our results or the conclusions reached, suggesting there was pre-reaction of the firms prior to the actual change of regulation.[21]

Changes in audit quality and fees beyond the first year of mandatory rotation

It may be that audit quality does not change in the first year of serving a new client, but improves in subsequent years as familiarization increases. It may also be that the increased fees observed after the policy was introduced are only a first-year effect due to familiarization requirements. We therefore look beyond the first year after mandatory rotation was implemented to determine if the effect on audit quality or audit fees continued after 2006.[22] Examining the number of years after mandatory rotation, *MAN_YR,* Table 7 shows that no significant change occurred in audit fees and quality when the audit hour variable is controlled.[23] Thus, importantly, we find no consequential increase in audit quality or a consequential decrease in audit fees after the first year of the mandatory rotation policy, although there was a consequential decrease in audit effort after the initial year.

<Insert Table 7 here>

The effect of mandatory audit firm change in relation to industry specialist

Gul et al. (2009) show that the association between auditor tenure and audit quality might be conditional on the auditor's industry expertise. Knechel et al. (2007) indicate that the perceived audit quality of initial engagements is affected by the new auditor's industry expertise. To provide more insights into the impact of mandatory audit firm rotation in Korea,

[21] We also examined whether the results for audit quality and fees are robust when the transition year (that is, 2006) is excluded and found they are consistent.

[22] The number of firm-years in post regulation is 3,833. We deleted the sample with *MAN_YR*=1 so that the sample for this analysis is 3,496.

[23] We also tested a dummy variable with a value of 1 if this is the first year after mandatory rotation (and 0 otherwise) in the three regressions. Out of 3,833 observations, 337 take 1 for the dummy variable. We found there were no differences in the significance of our results or the conclusions reached. Further, we excluded all first-year observations from the sample to examine whether this makes a difference to the findings on the rotation variables and found that our results still hold.

we investigate whether the effect of mandatory auditor change in the post-regulation period is different for industry-specialist new auditors than for non-specialist new auditors. First, results (untabulated) show significant differences in the means of IND_SPEC between the pre- and post- regulation periods (i.e. 0.227 and 0.151, t-statistic=8.01), indicating that the rotation policy is not likely to allow auditors to build industry specialization. Second, we examine the impact of industry specialist on audit quality and fees and the interaction impact with mandatory audit firm rotation. While the coefficient for IND_SPEC is -0.006 (t-statistic=-1.93) showing a marginally significantly negative effect (improvement in the form of reduced discretionary accruals) in the regression of audit quality and 0.056 (t-statistic=2.90) in the regression of audit fees (they are paid more), untabulated results indicate insignificant coefficients for the *Postreg*IND_SPEC* and *Postreg_Long*IND_SPEC* interaction variables in the audit quality and audit fees regressions. This suggests that there is no significant change in the effect of industry-specialist characteristics in the post-regulation period.

Alternative control for the time trend in audit fees

The increased audit fees observed could be due to a general increase of audit fees over time, as the year dummies may not be sufficient to fully control for the time trend. Consistent with Carson et al. (2012), we also deflate audit fees and total assets for movements in the Korean Consumer Price Index (CPI). All other variables are either ratios or indicator variables that do not require price-level adjustments. We find that results are similar and conclusions are unchanged when we adjust for CPI.

Other sensitivity analyses

To check the robustness of our results we perform the following sensitivity tests. Following Dechow et al. (1995), we obtain discretionary accruals based on the modified Jones model, DA^{mod}. The unreported results using DA^{mod} as earnings quality are similar to those using DA^{adj}, suggesting the robustness of our findings to different measures of estimating discretionary accruals. We also winsorize all the continuous variables at the top 1 and bottom 99 percentiles to avoid outlier problems. We find that the results remain qualitatively unchanged (results not reported for brevity).

CONCLUSIONS

The mandatory rotation of audit firms has long been debated as a strategy for improving audit effectiveness. Recent legislation passed by the US House of Representatives and a related determination by the UK Competition Commission which have reduced some of the

impetus for introducing mandatory audit firm rotation, can be contrasted with the recent European Union (2013) agreement in December 2013 which contains requirements for the mandatory rotation of auditors after 10 years for public interest entities. In an attempt to inform this debate, we investigated the effect of mandatory audit firm rotation on audit quality, audit fees and audit hours using a unique database consisting of Korean public listed companies between 2000 and 2009. After mandatory audit firm rotation took effect in 2006, we find that audit quality remained unchanged either in the first year of using the new auditor or in subsequent years. This is in comparison to voluntary rotations pre-2006, as well as voluntary (below firm tenure limit) rotations post-2006. These results are robust to alternative measures of audit quality.

In terms of the impact of mandatory firm rotation on audit fees, we find that audit fees in the post-regulation period for firms' mandatorily auditor-rotated engagements are significantly larger than in the pre-regulation period. Increases in audit fees in the post-regulation period for firms' continuing engagements and voluntarily auditor-rotated engagements indicate that the mandatory rotation policy had a much broader impact than the specific instances of mandatory rotation. Specifically, our findings suggest that mandatory audit firm rotation increased the cost for all audit firms and clients, while having no discernible positive effect on audit quality. An important implication of this study is that imposing mandatory audit firm limits on the duration of the auditor-client relationship does not result in an improvement in audit quality, which runs counter to the intended purpose of the policy. Our main findings provide empirical support for the decision to abandon this policy in South Korea after 2010, on the basis that the impact on audit quality is not clear.

The current study has focused on the impact of mandatory audit firm rotation on financial reporting quality (discretionary accruals) and its effect on client costs (audit fees) in Korea. We recognize the difficulties of generalizing these results to other settings as many variables can impact both audit quality and audit fees. Both of these factors are multi-faceted, and audit firm rotation is only one policy choice that can impact audit quality. This generalizability of results from Korea to other countries is particularly pertinent given a number of different contextual factors, including differing litigation environments and structuring of audit services markets (e.g., Kim and Yi 2009; Khurana and Raman 2004). It is also recognized that difficulties exist in associating financial reporting quality measures back to audit quality. In this regard, future research using alternative proxies for audit quality (e.g., earnings response coefficients or restatements) is warranted to further examine the effect of mandatory audit firm rotation on audit quality.

REFERENCES

American Institute of Certified Public Accountants (AICPA). 2013. House Passes Legislation Banning Auditor Rotation Mandate. Available at http://www.aicpa.org/advocacy/cpaadvocate/2013/pages/housepasseslegislationbanningauditorrotationmandate.aspx.

Arruñada, B. and C. Paz-Ares. 1997. Mandatory rotation of company auditors: A critical examination. *International Review of Law and Economics* 17(1): 31–61.

Bamber, E. M., and L. S. Bamber. 2009. Discussion of 'Mandatory audit partner rotation, audit quality, and market perceptions: Evidence from Taiwan'. *Contemporary Accounting Research* 20 (2): 393–402.

Bazerman, M., G. Loewenstein, and D. Moore. 2002. Why good accountants do bad audits. *Harvard Business Review* 80: 97–102.

Becker, C., M. DeFond, J. Jiambalvo, and K. R. Subramanyam. 1998. The effect of audit quality on earnings management. *Contemporary Accounting Research* 15: 1–24.

Blouin, J., B. M. Grein, and B. R. Rountree. 2007. An analysis of forced auditor change: The case of former Arthur Andersen clients. *The Accounting Review* 82 (3): 621–650.

Butler, M., A. Leone, and M. Willenborg. 2004. An empirical analysis of auditor reporting and its association with abnormal accruals. *Journal of Accounting and Economics* 37: 139–165.

Cameran, M., M. Livatino, N. Pecchiari, and A. Viganò. 2007. A survey of the impact of mandatory rotation rule on audit quality and audit pricing in Italy. Working paper, SDA Bocconi School of Management.

Caramanis, C., and C. Lennox. 2008. Audit effort and earnings management. *Journal of Accounting and Economics* 45: 116–138.

Carcello, J., and A. Nagy. 2004. Audit firm tenure and fraudulent financial reporting. *Auditing: A Journal of Practice & Theory* 23: 55–69.

Carey, P., and R. Simnett. 2006. Audit partner tenure and audit quality. *The Accounting Review* 81: 653–676.

Carson, E., Simnett, R., Soo, B. S., and A. M. Wright. 2012. Changes in Audit Market Competition and the Big N Premium, Auditing: A Journal of Practice & Theory 31 (3): 47-73.

Casterella, J., J. Francis, B. Lewis, and P. Walker. 2004. Auditor industry specialization, client bargaining power, and audit pricing. *Auditing: A Journal of Practice and Theory* 23: 123–140.

Chasan, E. 2011. Auditor rotation mandate rears its head again. *The Wall Street Journal*, CFO Report (June 3).

Chasan, E. 2013. Bill to Ban PCAOB From Forcing Auditor Rotation Advances. *The Wall Street Journal*, CFO Report (June 19).

Chen, C., C. Lin, and Y. Lin. 2008. Audit partner tenure, audit firm tenure, and discretionary accruals: Does long auditor tenure impair earnings quality? *Contemporary Accounting Research* 25: 415–445.

Chen, C. J. P., X. Su, and X. Wu. 2009. Forced audit firm change, continued partner-client relationship, and financial reporting quality. *Auditing: A Journal of Practice & Theory* 28 (2): 227–246.

Chi, W., H. Huang, Y. Liao, and H. Xie. 2009. Mandatory audit partner rotation, audit quality, and market perception: Evidence from Taiwan. *Contemporary Accounting Research* 26: 359–391.

Choi, J-H., J-B. Kim, X. Liu, and D. A. Simunic. 2008. Audit pricing, legal liability regimes,

and Big 4 premiums: Theory and cross-country evidence. *Contemporary Accounting Research* 25 (1): 55–99.

Craswell, A., J. Francis, and S. Taylor. 1995. Auditor brand name reputations and industry specializations. *Journal of Accounting and Economics* 20: 297–322.

Davis, L. R., B. S. Soo, and G. M. Trompeter. 2009. Auditor tenure and the ability to meet or beat earnings forecasts. *Contemporary Accounting Research* 26: 517–548.

DeAngelo, L. E. 1981a. Auditor size and audit quality. *Journal of Accounting and Economics* 3: 183–200.

DeAngelo, L. E. 1981b. Auditor independence, low-balling and disclosure regulation. *Journal of Accounting and Economics* 3: 113–127.

DeAngelo, H., L. DeAngelo, and D. J. Skinner. 1994. Accounting choice in troubled companies. *Journal of Accounting and Economics* 17: 113–143.

Dechow, P., R. Sloan, and A. Sweeney. 1995. Detecting earnings management. *The Accounting Review* 70: 193–225.

DeFond, M., K. Raghunandan, and K. R. Subramanyam. 2002. Do non-audit service fees impair auditor independence? Evidence from going concern audit opinions. *Journal of Accounting Research* 40: 1247-1274.

Deis Jr., D. R., and G. A. Giroux. 1992. Determinants of audit quality in the public sector. *The Accounting Review* 67: 462–479.

Deis Jr., D. R., and G. A. Giroux. 1996. The effect of auditor changes on audit fees, audit hours, and audit quality. *Journal of Accounting and Public Policy* 15: 55–76.

European Commission (EC). 2010. Green Paper – Audit Policy: Lessons from the Crisis. Brussels. Available at: http://ec.europa.eu/internal_market/consultations/docs/2010/audit/green_paper_audit_en.pdf.

European Commission (EC). 2011. Proposal for a Regulation of the European Parliament and of the Council on Specific Requirements Regarding Statutory Audit of Public-Interest Entities. Available at: http://ec.europa.eu/internal_market/auditing/docs/reform/COM_2011_779_en.pdf.

European Union (EU). 2013. Agreement on the reform of the audit market. Available at: http://www.consilium.europa.eu/uedocs/cms_Data/docs/pressdata/en/intm/140170.pdf

Francis, J. 2011. A framework for understanding and researching audit quality. *Auditing: A Journal of Practice & Theory* 30 (2): 125–152.

Francis, J., and D. Simon. 1987. A test of audit pricing in the small-client segment of the U.S. audit market. *The Accounting Review* 62: 145–157.

Frankel, R., M. Johnson, and K. Nelson, 2002. The relation between auditors' fees for nonaudit service and earnings management. *The Accounting Review* 77: 71–105.

General Accounting Office (GAO). 2003. Required Study on the Potential Effects of Mandatory Audit Firm Rotation. Report to the Senate Committee on Banking, Housing, and Urban Affairs and the House Committee on Financial Services. Washington, DC: GAO.

Geiger, M., and K. Raghunandan. 2002. Auditor tenure and audit quality. *Auditing: A Journal of Practice & Theory* 21: 187–196.

Ghosh, A., and D. Moon. 2005. Auditor tenure and perceptions of audit quality. *The Accounting Review* 80: 585–613.

Gul, F. A., S. Y. K. Fung, and B. Jaggi. 2009. Earnings quality: Some evidence on the role of auditor tenure and auditors' industry expertise. *Journal of Accounting and Economics* 47 (3): 265–287.

House of Lords Select Committee on Economic Affairs. 2011. Auditors: Market Concentration and Their Role, Volume I: Report. House of Lords: London.

Huang, H., L. Liu, K. Raghunandan, and D. V. Rama. 2007. Auditor industry specialization, client bargaining power, and audit fees: Further evidence. *Auditing: A Journal of Practice & Theory* 26: 147–158.

International Auditing and Assurance Standards Board (IAASB). 2009. Identifying and Assessing the Risks of Material Misstatement through Understanding the Entity and its Environment. *International Standard on Auditing ISA 315*. New York: IAASB.

Johnson, V., I. Khurana, and J. Reynolds. 2002. Audit-firm tenure and the quality of financial reports. *Contemporary Accounting Research* 19: 637–660.

Khurana, I. K., and K. K. Raman. 2004. Litigation risk and the financial reporting credibility of Big 4 versus Non-Big 4 audits: Evidence from Anglo-American countries. *The Accounting Review* 79: 473–496.

Kim, J. B., and C. H. Yi. 2009. Does auditor designation by the regulatory authority improve audit quality? Evidence from Korea. *Journal of Accounting and Public Policy* 28: 207–230.

Knechel, W. R., V. Naiker, and G. Pacheco. 2007. Does auditor industry specialization matter? Evidence from market reaction to auditor switches. *Auditing: A Journal of Practice & Theory* 26 (1): 19–45.

Kothari, S. P., A. J. Leone, and C. E. Wasley. 2005. Performance matched discretionary accrual measures. *Journal of Accounting and Economics* 39: 163–197.

Myers, J., L. Myers, and T. Omer. 2003. Exploring the term of the auditor-client relationship and the quality of earnings: A case for mandatory auditor rotation? *The Accounting Review* 78: 779–799.

Myers, J., L. Myers, Z. V. Palmrose, and S. Scholz. 2004. Mandatory auditor rotation: Evidence from restatements. Working paper, University of Illinois at Urbana-Champaign.

Nagy, A. L. 2005. Mandatory audit firm turnover, financial reporting quality, and client bargaining power: The case of Arthur Andersen. *Accounting Horizons* 19 (2): 51–68.

O'Keefe, T., D. Simunic, and M. Stein. 1994. The production of audit services: Evidence from a major public accounting firm. *Journal of Accounting Research* 32 (Autumn): 241–261.

Petersen, M. A. 2009. Estimating standard errors in finance panel data sets: Comparing approaches. *Review of Financial Studies* 22: 435–480.

Petty, R., and S. Cuganesan. 1996. Auditor rotation: Framing the debate. *Australian Accountant* 66(4): 40–41.

Public Company Accounting Oversight Board (PCAOB). 2011. Concept Release on Auditor Independence and Audit Firm Rotation. PCAOB Release No. 2011-006.

Ruiz-Barbadillo, E., N. Gomez-Aguilar, and N. Carrera. 2009. Does mandatory audit firm rotation enhance auditor independence? Evidence from Spain. *Auditing: A Journal of Practice & Theory* 28: 113–135.

Simon, D., and J. Francis. 1988. The effects of auditor change on audit fees: Tests of price cutting and price recovery. *The Accounting Review* 63: 255–269.

Tucker, S. J., and P. Zarowin. 2006. Does income smoothing improve earnings informativeness? *The Accounting Review* 81: 251–270.

United Kingdom Competition Commission. 2013. Statutory Audit Services for Large Companies Market Investigation. Available at: http://www.competition-commission.org.uk/assets/competitioncommission/docs/2011/statutory-audit-services/131015_summary.pdf.

FIGURE1: Impact of Introduction of Mandatory Audit Firm Rotation

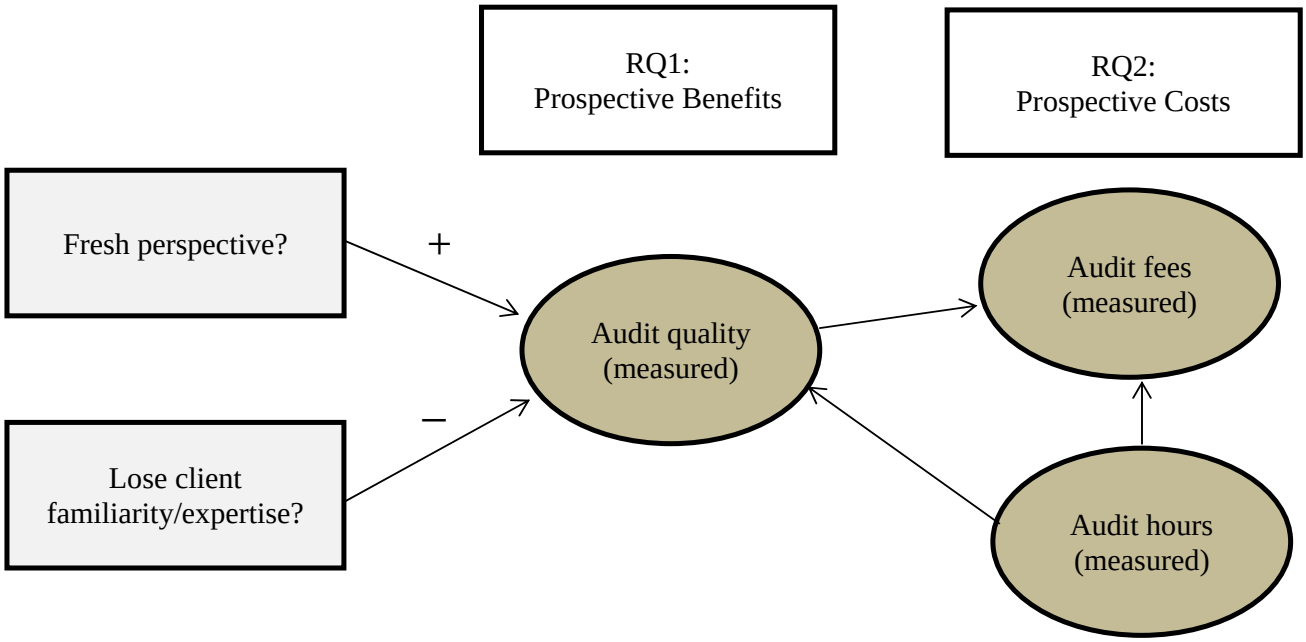

FIGURE 2: Structure of test: Pre- vs. Post-regulation of mandatory audit firm rotation regime in 2006, Continuing Engagement vs. Initial Engagement, and Short Tenure vs. Long Tenure

$$(DA, LAF) = b_0 + b_1\text{Prereg\_Short} + b_2\text{Prereg\_Long} + b_3\text{Postreg\_Cont} + b_4\text{Postreg\_Short} + b_5 Postreg\_Long + controls$$

Category	Continuing	Audit Firm Rotation	
		After Short Tenure	After Long Tenure
Pre_Regulation	*Prereg_Cont* (b_0)	*Prereg_Short* (b_0+ b_1)	*Prereg_Long* (b_0+ b_2)
Post_Regulation	*Postreg_Cont* (b_0+ b_3)	*Postreg_Short* (b_0+ b_4)	*Postreg_Long* (b_0+ b_5)

Note: Prereg_Short and Prereg_Long are instances of voluntary rotation, whereas in post-regulation conditions, Postreg_Short are instances of voluntary rotation post-regulation (audit firm tenure is not at the maximum allowed after the introduction of the rotation policy) and Postreg_Long are instances of mandatory rotation post-regulation (audit firm tenure is at the maximum allowed after the introduction of rotation policy).

TABLE 1
Sample selection procedure

Sample selection criteria	Number of firms	Number of firm-years
Number of firms listed on the KSE or KOSDAQ	2,516	16,064
Less: Non-December fiscal year-end firms	(281)	(1,453)
Firms in the financial and insurance industries	(58)	(323)
Firms impacted by the auditor designation rule	(19)	(471)
Firms missing relevant data	(794)	(6,463)
Firms with less than 8 firms in an industry in each year	(58)	(644)
Final sample	1,306	6,710

The final sample consisted of 6,710 firm-years over the period 2000-2009.

TABLE 2

Frequency of observations with respect to initial audit engagement and year

Panel A: Frequency of continuing and new audit engagements

Category	Number of firm-years	Percentage
Continuing engagement	5,489	81.80
New engagement	1,221	18.20
Voluntary audit firm rotation	829	12.35
Mandatory audit firm rotation	392	5.84
Total	6,710	

Panel B: Distribution of the sample by structure of test

Classifications		*Prereg_Cont*	*Prereg_Short*	*Prereg_Long*
Pre_Regulation	Number of firm-years	2,440	353	84
		Postreg_Cont	*Postreg_Short*	*Postreg_Long*
Post_Regulation	Number of firm-years	3,049	392	392

Panel C: Distribution of the sample by year

Year	Number of firm-years	Percentage	Number of firm-years (Continuing)	Number of firm-years (Voluntary auditor rotation)	Number of firm-years (Mandatory auditor rotation)
2000	341	5.08	277	64	
2001	380	5.66	330	50	
2002	412	6.14	363	49	
2003	474	7.06	443	31	
2004	483	7.20	413	70	
2005	787	11.73	614	173	
2006	928	13.83	794	82	52
2007	959	14.29	787	87	85
2008	915	13.64	574	124	217
2009	1,031	15.37	894	99	38
Total	6,710	100.00	5,489	829	392

TABLE 3
Descriptive statistics of study variables[1)]

Variable[2)]	Mean	Median	Standard deviation	Min	Max
Postreg	0.57	1.00	0.49	0.00	1.00
Prereg_Short	0.05	0.00	0.22	0.00	1.00
Prereg_Long	0.01	0.00	0.11	0.00	1.00
Postreg_Cont	0.45	0.00	0.50	0.00	1.00
Postreg_Short	0.06	0.00	0.23	0.00	1.00
Postreg_Long	0.06	0.00	0.23	0.00	1.00
AH	854	550	1,439	32	40,000
AF	₩78,824	₩52,000	₩115,720	₩3,000	₩2,840,000
AFdollar	$72,873	$48,067	$111,689	$2,782	$2,921,505
LAH	6.39	6.31	0.76	3.47	10.60
LAF	17.89	17.77	0.66	14.91	21.77
DA^{mod}	-0.00	0.01	0.20	-4.79	2.02
DA^{adj}	0.00	-0.00	0.11	-1.47	1.27
TENURE	3.87	3.00	2.72	1.00	17.00
BIG	0.57	1.00	0.50	0.00	1.00
LTA	25.57	25.30	1.42	20.72	31.82
TA	₩576,124,191	₩97,316,753	₩2,525,054,783	₩993,741	₩65,642,590,576
TAdollar	$522,144,277	$88,928,115	$2,311,577,218	$952,041	$69,966,521,611
POWER	0.91	0.92	0.08	0.42	1.13
IND_SPEC	0.18	0.00	0.39	0.00	1.00
FRGN	0.27	0.01	0.31	-0.02	1.00
AR_INV	0.28	0.27	0.16	0.00	0.87
ROI	-0.04	0.03	0.65	-28.84	28.53
LOSS	0.29	0.00	0.45	0.00	1.00
OPINION	0.00	0.00	0.04	0.00	1.00
TELE	0.01	0.00	0.09	0.00	1.00
UTIL	0.01	0.00	0.08	0.00	1.00
CA_CL	2.50	1.49	5.87	0.01	339.74
LEV	0.40	0.38	0.53	-0.58	26.34
IND_GRWTH	1.08	1.10	0.12	0.52	2.10
OCF_TA	0.03	0.04	0.19	-7.14	1.69
AGE	28.04	27.08	14.42	1.00	113.04
SUB	2.07	0.00	7.06	0.00	148.00
FEERATIO	0.18	0.00	1.46	0.00	58.18

[1)] The number of observations for all the variables was 6,710 (Table 1). [2)] See Appendix 1 for variable definitions.

TABLE 4

The effect of mandatory auditor rotation on audit quality measured by discretionary accruals

Variable[1)]	Expected Sign	Equation 3 Coefficient (t-statistic)	Equation 4 Coefficient (t-statistic)
Intercept		-0.189*** (-3.95)	-0.183*** (-3.84)
Postreg	?	0.001 (0.18)	
Prereg_Short	?		-0.016** (-2.16)
Prereg_Long	?		-0.006 (-0.72)
Postreg_Cont	?		-0.002 (-0.3)
Postreg_Short	?		-0.003 (-0.34)
Postreg_Long	?		0.002 (0.33)
LAH	–	-0.009*** (-3.6)	-0.009*** (-3.59)
LTA	+	0.010*** (5.0)	0.010*** (5.01)
BIG	?	0.000 (0.03)	0.000 (0.04)
AGE	–	0.000 (0.4)	0.000 (0.32)
OCF_TA	–	-0.329*** (-4.45)	-0.330*** (-4.47)
IND_GRWTH	+	0.005 (0.47)	0.005 (0.44)
CA_CL	?	0.000 (-1.26)	0.000 (-1.25)
LEV	–	-0.020*** (-2.64)	-0.020*** (-2.66)
TENURE	+	0.001*** (2.69)	0.001* (1.72)
Industry Dummies?		Yes	Yes
Year Dummies?		Yes	Yes
F-test (*Postreg_Cont = Prereg_Cont*)			0.09
F-test (*Postreg_Short = Prereg_Short*)			1.18
F-test (*Postreg_Long = Prereg_Long*)			0.57
F-test (*Postreg_Cont =Postreg_Short*)			0.03
F-test (*Postreg_Cont =Postreg_Long*)			0.81
F-test (*Postreg_Long =Postreg_Short*)			0.45
Adj R-square		0.296	0.297
F-statistic		2.86***	2.8***
Number of observations		6710	6710

[1)] See Appendix 1 for variable definitions. */**/*** denote two-tailed significance at the 0.1, 0.05, and 0.01 levels, respectively. The t-statistics are based on robust standard errors adjusted for clustering on the company level (Petersen 2009).

TABLE 5

Regression analysis of the effect of mandatory auditor rotation on audit fees

Variable[1)]	Expected sign	Equation 5 Coefficient (t-statistic)	Equation 6 Coefficient (t-statistic)
Intercept		8.430*** (29.61)	8.434*** (29.53)
Postreg	?	0.274*** (12.04)	
Prereg_Short	?		-0.034* (-1.78)
Prereg_Long	?		-0.054 (-1.21)
Postreg_Cont	?		0.271*** (11.99)
Postreg_Short	?		0.256*** (8.63)
Postreg_Long	?		0.227*** (8.42)
LAH	+	0.249*** (14.0)	0.249*** (14.0)
DA	?	-0.012 (-0.29)	-0.012 (-0.3)
LTA	+	0.277*** (23.85)	0.277*** (23.81)
BIG	+	0.054*** (2.56)	0.054*** (2.56)
SUB	+	0.007** (2.0)	0.007** (2.0)
FRGN	+	-0.000 (-0.01)	-0.000 (-0.01)
AR_INV	+	0.039 (0.7)	0.039 (0.7)
ROI	–	-0.071** (-2.29)	-0.071** (-2.29)
LOSS	+	0.089*** (5.83)	0.089*** (5.8)
OPINION	+	0.147 (0.68)	0.157 (0.73)
IND_SPEC	+	0.057*** (2.95)	0.056*** (2.9)
POWER	–	0.421*** (2.61)	0.426*** (2.64)
FEERATIO	?	0.002 (0.89)	0.002 (1.01)
Industry Dummies		Yes	Yes
Year Dummies		Yes	Yes
F-test (*Postreg_Cont = Prereg_Cont*)			143.70***
F-test (*Postreg_Short = Prereg_Short*)			69.52***
F-test (*Postreg_Long = Prereg_Long*)			28.86***
F-test (*Postreg_Cont =Postreg_Short*)			0.55
F-test (*Postreg_Cont =Postreg_Long*)			7.84***

F-test (*Postreg_Long =Postreg_Short*)			1.20
Adj R-square		0.752	0.752
F-statistic		109.23***	101.63***
Number of observations		6710	6710

[1)] See Appendix 1 for variable definitions. */**/*** denote two-tailed significance at the 0.1, 0.05, and 0.01 levels, respectively. The t-statistics are based on robust standard errors adjusted for clustering on the company level (Petersen 2009).

TABLE 6

Additional analysis- Regression analysis of the effect of mandatory auditor rotation on audit hours

Variable[1)]	Expected Sign	Equation 7 Coefficient (t-statistic)	Equation 8 Coefficient (t-statistic)
Intercept	?	-2.549*** (-7.5)	-2.562*** (-7.51)
Postreg		0.705*** (19.21)	
Prereg_Short	?		0.015 (0.42)
Prereg_Long	?		0.030 (0.48)
Postreg_Cont	?		0.708*** (19.04)
Postreg_Short	?		0.718*** (16.15)
Postreg_Long	?		0.685*** (14.9)
LTA	+	0.315*** (24.66)	0.315*** (24.61)
BIG	+	0.269*** (12.65)	0.269*** (12.63)
CA_CL	–	-0.002 (-1.56)	-0.002 (-1.58)
LEV	+	0.083*** (3.49)	0.083*** (3.52)
FEERATIO		0.000 (0.01)	0.000 (-0.02)
Industry Dummies		Yes	Yes
Year Dummies		Yes	Yes
F-test (*Postreg_Cont* = *Prereg_Cont*)			362.48***
F-test (*Postreg_Short* = *Prereg_Short*)			176.98***
F-test (*Postreg_Long* = *Prereg_Long*)			67.02***
F-test (*Postreg_Cont* =*Postreg_Short*)			0.13
F-test (*Postreg_Cont* =*Postreg_Long*)			0.84
F-test (*Postreg_Long* =*Postreg_Short*)			0.82
Adj R-square		0.531	0.531
F-statistic		53.21***	48.89***
Number of observations		6710	6710

[1)] See Appendix 1 for variable definitions. [2)]Each cell exhibits coefficient (t-statistic). */**/*** denote two-tailed significance at the 0.1, 0.05, and 0.01 levels, respectively. The t-statistics are based on robust standard errors adjusted for clustering on the company level (Petersen 2009).

TABLE 7

Additional analyses – change in audit quality, audit fees and audit hours beyond the first year after mandatory rotation

Variable[1)]	DA^{adj} Coefficient (t-statistic)	*LAF* Coefficient (t-statistic)	*LAH* Coefficient (t-statistic)
Intercept	-0.292*** (-5.5)	8.911*** (31.67)	-2.433*** (-6.62)
MAN_YR	0.001 (0.43)	-0.003 (-0.24)	-0.040** (-2.06)
LAH	-0.013*** (-3.07)	0.349*** (14.19)	
DA		-0.017 (-0.32)	
LTA	0.016*** (5.9)	0.236*** (17.3)	0.338*** (24.22)
BIG	0.001 (0.23)	0.074*** (2.91)	0.235*** (10.21)
CA_CL	-0.001** (-2.46)		0.000 (0.28)
LEV	-0.055*** (-3.67)		0.186*** (4.52)
AGE	0.000 (0.22)		
OCF_TA	-0.498*** (-10.36)		
IND_GRWTH	0.006 (0.48)		
TENURE	0.001* (1.71)		
SUB		0.006*** (2.77)	
FRGN		0.015 (0.42)	
AR_INV		0.036 (0.59)	
ROI		-0.082*** (-2.61)	
LOSS		0.087*** (4.7)	
OPINION		0.111 (0.4)	
IND_SPEC		0.040* (1.81)	
POWER		0.621*** (3.35)	
FEERATIO		0.002 (1.07)	-0.001 (-0.38)
Industry Dummies	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes
Adjusted R-square	0.468	0.749	0.559
F-statistic	4.84***	95.16***	44.38***
Number of observations	3496	3496	3496

[1)] See Appendix 1 for variable definitions. The t-statistics are based on robust standard errors adjusted for clustering on the company level (Petersen 2009).

APPENDIX 1

Definition of variables

Variables	Definition
Postreg	1 if the years are 2006-2009 and 0 otherwise; Postreg_Cont + Postreg_Short + Postreg_Long
Prereg_Cont	1 if continuing engagement before 2006 and 0 otherwise;
Prereg_Short	1 if voluntary audit firm rotation when audit tenure is less than 6 years in year prior to the audit firm change before 2006 and 0 otherwise
Prereg_ Long	1 if voluntary audit firm rotation when audit tenure is equal or greater than 6 years in year prior to the audit firm change before 2006 and 0 otherwise
Postreg_Cont	1 if continuing engagement since 2006 and 0 otherwise
Postreg_Short	1 if voluntary audit firm rotation since 2006 and 0 otherwise
Postreg_Long	1 if mandatory audit firm rotation since 2006 and 0 otherwise
AH	total audit hours spent on the audit engagement
AF	total audit fees paid for the audit engagement in Korean won '000
AFdollar	the audit fee translated using the exchange rate at year end (US$)
LAF	natural logarithm of audit fees in Korean won for the company
LAH	the natural logarithm of audit hours for the company
DA^{mod}	the discretionary accrual measure following Dechow et al. (1995)
DA^{adj}	the performance-matched discretionary accrual measure following Kothari et al. (2005)
TENURE	the number of consecutive years that the company was audited by the same audit firm
BIG	1 if the audit is performed by one of the Big N audit firms; 0 otherwise
LTA	the natural logarithm of total assets measured in Korean Won
TA	total assets measured in Korean won'000
TAdollar	total assets measured in US$
FRGN	the percentage of foreign-based sales
AR_INV	the percentage of total assets in receivables and inventory
ROI	return on investment (net income divided by total assets)
LOSS	1 if a loss reported in any of the past three years and 0 otherwise
OPINION	1 if the audit report was modified for going concern and 0 otherwise
IND_SPEC	1 if the auditor had 25 percent or more market share in an industry in each year. An audit firm's market share for an industry is calculated as the sum of sales of its individual clients in an industry, divided by the sum of sales for all companies in the industry on a national level.
POWER	the natural logarithm of each company's sales divided by the sum of industry sales for all firms in the industry audited by the company's auditor
CA_CL	current assets/current liabilities
LEV	(total liabilities-cash)/total assets
IND_GRWTH	$\sum_{i=1}^{N} Sales_{it} / \sum_{i=1}^{N} Sales_{it-1}$ by the two-digit SIC code
OCF_TA	the firm's cash flows from operations divided by the previous year's total assets
AGE	the number of years after the company's establishment
SUB	the company's number of subsidiaries
FEERATIO	non-audit fees to total fees paid to the incumbent auditor
MAN_YR	number of years after mandatory audit firm rotation