MANDATORY AUDIT ROTATION: AN INTERNATIONAL INVESTIGATION

Kathleen Harris
Scott Whisenant[#]

Bauer College of Business
The University of Houston
March 21, 2012

Abstract

This study investigates whether mandatory auditor rotation rules are associated with changes in the quality of audit markets. The variation in audit quality of interest to our study is the amount of unexpected opportunistic discretion in earnings before and after adoption of MAR rules. The more discretion in earnings, *ceteris paribus*, the lower the audit quality. We use available data from countries that have adopted mandatory auditor rotation (MAR) rules. First, we investigate the *debonding* effect of an MAR policy (i.e., debonding is goal of rotation rules in an effort to enhance auditor independence in audit markets). We compare all available years of data in the pre-adoption period to all available data in the post-adoption years. In the sample period after adoption of MAR rules, the data show evidence of less earnings management, less managing to earnings targets, and more timely loss recognition compared to the sample before adopting MAR rules. From these results we conclude that the quality (as we have defined it) of audit markets appear to improve, on average, from enactment of MAR rules. We then investigate the allowed discretion in the year before and the year after auditor changes in which rotation rules have been adopted (termed the *low client-specific knowledge effect*). We find evidence of lower audit quality in *both* years. The evidence is in stark contrast to empirical evidence from voluntary audit changes (DeFond and Subramanyam 1998) using U.S. data in which predecessor auditors tend to constrain opportunistic actions by managers in reported earnings. These results highlight the importance, particularly to regulators of audit markets, of considering ways to mitigate the erosion of audit quality when making the transition to new auditors under MAR rules. Suggested ways to mitigate the erosion of audit quality around audit firm changes include the use of detailed handover files between predecessor and successor audit firms or "four-eyes principle" (two auditor involvement) in years of initial audits.

[#] Corresponding author:
Scott Whisenant, Ph.D.
Associate Professor and Bauer Faculty Fellow
The University of Houston, C.T. Bauer College of Business
334 Melcher Hall, Suite 390-H
Houston, TX 77204-6021
713-743-4852
email: scottwhisenant@uh.edu

MANDATORY AUDIT ROTATION: AN INTERNATIONAL INVESTIGATION

1. INTRODUCTION

Mandatory audit firm rotation is defined in the Sarbanes-Oxley (SOX) Act [1] as the imposition of a limit on the period of years during which an accounting firm may be the auditor of record. Mandatory audit firm rotation is often discussed as a potential way to improve audit quality – typically gaining attention when public confidence in the audit function has been eroded by events such as corporate scandals or audit failures (see, for example, McLaren 1958; Seidman 1967; Corporate Accountability Research Group 1976; Hoyle 1978; Imhoff 2003). It is often argued that mandatory auditor rotation (MAR) rules have the *potential* to produce both benefits and costs to audit markets. The benefits often used to justify rotation rules are to have a *fresh look* at the financial statements, break the *economic bond* that potentially threatens the objectivity of auditors, and to increase competition in audit markets. Proponents of rotation rules have argued that each would lead to an improvement in audit quality.[2] On the other hand, opponents argue that the costs of MAR rules will outweigh the benefits. Opponents express concerns about the loss of client-specific knowledge caused by frequent auditor changes that result in audit firms being less effective as monitors of opportunistic actions of managers. Additionally, opponents argue that audit fees will increase as (relatively more) costly initial audits occur due to rotation cycles causing more auditor changes under MAR rules.

---

[1] Sarbanes-Oxley Act, Section 207.

[2] Audit quality can be defined in a number of ways and from different perspectives. We take a broad interpretation of audit quality consistent with definition offered in DeAngelo (1981). She defines the concept of audit quality as the market-assessed probability that the financial statements contain material errors and that the auditor will both discover and report them (DeAngelo 1981). Her definition allows for variation in both the level of competence of the audit firm (or audit model) and the level of independence.

Our study offers archival-based empirical evidence from the audit markets that have adopted mandatory audit rotation (MAR) rules on the proposition that rotation rules have the potential to affect audit quality in both positive and negative ways. We contribute to the literature that investigates the effects of audit quality on aspects of the auditor-client relationship in two ways. First, we use sample evidence from three countries that have adopted MAR rules over a number of years. To our knowledge, these three countries (Italy, South Korea, and Brazil) represent the only countries with data from audit markets based on rotation rules for most companies in those markets (e.g., cross-listed firms are typically excluded from rotation rules).[3] Second, we investigate whether rotation rules affect audit quality by using earnings management proxies used in the literature that measure different types of discretionary actions in earnings by managers (Lang, Raedy, and Yetman 2003; Leuz, Nanda, and Wysocki 2003; Ball and Shivakumar 2005, 2006; Lang, Raedy, and Wilson 2006). Given that the earnings management proxies focus on a range of potential discretion in earnings (e.g., earnings smoothing, timely loss recognition and small positive earnings targets), these earnings management measures are less likely to be the result of accounting policy choice and more likely to be the result of decisions on factors over which management has discretion. Prior research typically focuses on individual countries and only one aspect of earnings management (e.g., discretion in working capital accruals).

Consistent with prior research, we expect firms with higher quality earnings to exhibit less earnings smoothing, less management toward targets, and more timely loss recognition. We predict that earnings under MAR rules will be less managed than before those rules were enacted

---

[3] South Korea and Brazil have available data to investigate pre- and post-adoption effects on audit quality, while all three countries have data to investigate whether auditor changes after adopting rotation rules exhibit changes in audit quality in the year before and year after those changes.

primarily due to rotation rules reducing the threats to auditor independence. As those threats are reduced, we predict that audit firms will be more effective monitors of opportunistic discretion in earnings. On the other hand, opponents of rotation rules predict that more auditor changes will produce less effective audits due to a loss of client-specific knowledge. This is of particular interest before and after audit changes once rotation rules have been adopted. Thus, we also investigate whether the allowed discretion in earnings in the year before and after auditor changes indicates any changes to audit quality.

Our research design can be summarized in the following way. First, we investigate whether audit quality is improved following the passage of regulations requiring that companies implement mandatory audit firm rotation. We term this aspect of the study as a test of the *debonding hypothesis* as it investigates differences in audit quality following passage of legislation for mandatory audit firm rotation rules. We term this the debonding test because proponents of MAR rules have argued that audit firms are economically-bonded to clients as audit firm tenure increases and dismissal threats are reduced.[4] The bond strengthens as auditors view the relationship as a long-term contract and, it is argued, lose objectivity in periodic audit engagements due to the long-term perspective of the audit fee inflows to the audit firm. The second hypothesis test is motivated by the arguments often cited by opponents to rotation rules. Opponents argue that the most obvious impact of rotation rules is not an increase in audit quality in the long term, but is instead the erosion of audit quality in the short term caused by an

---

[4] GAO (2003) found that the average tenure of Fortune 1000 public companies was 22 years. Also, approximately 10 percent of those 1,000 public companies that had the same auditing firm for more than 50 years and have an average tenure period of more than 75 years. They note that both numbers would have been much higher had the dissolution of Arthur Andersen not caused a substantial number of auditor changes for these companies.

increasing number of new auditor-client engagements. Three countries (South Korea, Brazil, and Italy) have available sample data to investigate this empirical question. We term this test as the *low client-specific knowledge hypothesis*.

We believe our study is the first comprehensive global investigation of the effects of mandatory audit firm rotation on audit markets. Our inferences are based on sample evidence that includes data from 1991 to 2010. In two of the three countries, the sample data required manual collection of auditor names because of missing data in the global financial statement database used as the source of financial statement data. We implement a research design that mitigates the effects of changes in incentives, when constructing our accounting quality metrics relating to earnings management and timely loss recognition, by including controls for factors that prior research identifies as associated with voluntary accounting decisions (e.g., growth, auditor choice, leverage, and the need to access the capital markets).

We begin by comparing accounting quality metrics obtained from pre-adoption years to those same metrics obtained from post-adoption years following the enactment of MAR rules to investigate whether audit markets in which rotation rules have been adopted exhibit higher quality accounting signals. We find that the data from audit markets in the post-adoption years indicate less earnings management and more timely loss recognition compared with pre-adoption years. Specifically, observations in post-adoption years have a higher variance of the change in net income, less negative correlation between accruals and cash flows, manage less to an earnings target of small profits, and have a higher frequency of large negative net income. The findings indicate that audit markets appear to improve, on average, from enactment of MAR rules. We then investigate whether the allowed discretion is different from expected discretion in

the year *before* and the year *after* auditor changes in periods in which MAR rules have been adopted. We find evidence of lower audit quality in *both* years. This finding highlights the importance to regulators of considering ways to mitigate potential problems in audits around the frequent transition points the occur under rotation rules (e.g., additional regulatory oversight in both years, the use of detailed handover files between predecessor and successor audit firms, or a "four-eyes principle" where two audit firms are involved at varying levels in the years of initial audits).

The remainder of the paper is organized as follows. In section 2, we present our prior literature and the development of our two main hypotheses. In section 3, we discuss research design. In section 4, we present the results of empirical analysis. In section 5, we provide a conclusion to our study and discuss potential avenues for related research.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

In 2002, following several highly publicized accounting scandals (e.g., Waste Management, Computer Associates, Xerox, Enron, Adelphia, Global Crossing, Tyco and WorldCom), Congress considered various changes to the regulation of both audit and capital markets including mandatory audit firm rotation. The General Accountability Office (GAO), as directed by section 207 of the SOX, conducted a study of the potential effects of mandatory audit firm rotation. The study, based primarily on survey data, concluded that although respondents overwhelmingly made the argument that mandatory audit firm rotation would lead to higher costs, the argument for the benefits was less convincing. In the end, the report stated that "the most prudent course at this time is for the SEC and the PCAOB to monitor and evaluate the effectiveness of the (SOX) requirements to determine whether further revisions, including

mandatory audit firm rotation, may be needed to enhance auditor independence and audit quality"

(GAO 2003). In August 2011 following eight years of reforms established by SOX, the Public

Company Accounting Oversight Board (PCOAB) stated that the time has come to again explore

mandatory auditor rotation and to consider "ending a firm's ability to turn each engagement into

a long-term income stream" and "as a result, significantly enhance the auditor's ability to serve

as an independent gatekeeper" (PCOAB Release No. 2011-006). In his discussion of the concept

release on auditor independence and audit firm rotation, Jay Hanson, a PCAOB Member, appears

to cautiously state that we "need to weigh carefully whether its benefits would outweigh its costs

and potential unintended consequences" (Hanson 2011).

Accounting scandals are not unique to the United States (e.g., Lernout & Hauspie - Belgium;

OneTel - Australia; Parmalat - Italy; Vivendi - France; Banco Nacional - Brazil; Bank of Credit

and Commerce International - U.K.; National Kidney Foundation - Singapore; Royal Ahold -

Netherlands; Anglo Irish Bank - Ireland; Satyam Computer Services - India; Olympus - Japan).

Thus, the debate on whether audit firms should be rotated following a finite number of audit

engagements is a global debate.[5] Unlike the United States where so many corporate scandals

have occurred, some countries have already adopted MAR rules (e.g., Italy adopted a nine-year

rotation rule in 1974; Spain adopted a nine-year rule in 1989; South Korea adopted a six-year

---

[5] In 2010 the European Commission issued a green paper entitled "Audit Policy: Lessons from the Crisis."
The EC Green Paper described concerns about an auditor's "societal role in offering an opinion" on
companies' financial statements. The report states that it "is time to probe into the true fulfilment of this
societal mandate." Adopting many of the recommendations in the 2010 Green Paper, the European
Commission proposed in November 2011 that (among many proposals affecting the audit profession) 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" with some exceptions. The proposal also mandates a cooling-off period
of four years before an audit firm can be re-engaged and requires the predecessor audit firm to transfer a
"handover" file to the successor audit firm to ensure a smooth transition.

rule in 2003; Brazil enacted a five-year rule in 1999; Singapore and Canada adopted rotation rules for domestic banks; Austria adopted a six-year rule in 2004). Reasons reported in these countries for requiring mandatory audit firm rotation related to strengthening auditor independence, improving audit quality, or increasing competition in audit markets. Interestingly, a few countries that adopted mandatory rotation ended the policies after some time (e.g., Canada, Spain, and Austria). Reasons for abandoning the requirements for mandatory audit firm rotation related to its lack of cost-effectiveness, increased cost, and having achieved the objective of increased competition for audit services.

The Demand for Auditing

Contracting theory is often used to explain accounting and auditing practices. In that theory, accounting and auditing (of those accounts) play an important role in the design and enforcement of contracts that define a corporation. When parties to a contract attempt to transfer wealth from another party within a corporation, accounting and auditing are often relied upon to reduce such value-reducing actions (agency costs). Rational parties to contracts expect such value-reducing actions and will price-protect themselves forcing the potential "bad" actors to write contracts that restrict certain actions and monitor their own activities. In one of the seminal studies on the theory of agency, Jensen and Meckling (1976) demonstrate who bears the costs (and why) of an agency relationship. Yet, contacting is both costly and imperfect leaving the potential for some value-reducing actions to go undetected.

Two examples of monitoring actions are the preparation of financial statements and the attestation by an independent audit firm.[6] Jensen and Meckling (1976) show that these costs, while initially borne by the shareholder, are transferred to managers through contracting. For example, in the manager-shareholder contracting, monitoring costs are transferred by adjusting the compensation package paid to managers according to the perceived level of required monitoring. In the shareholder-debtholder contracting, monitoring costs are transferred by use of debt covenants. In both contract settings, the quality of the monitoring activity reduces agency costs borne invariably by managers.[7] Thus, managers will demand contracts that restrict their own actions which might have otherwise been detrimental to shareholders or creditors including the demand for accounting and auditing services. This well-documented result begs the question of why so many corporate managers oppose mandatory auditor rotation rules (GAO 2003).

The answer may exist in the literature describing ways in which managers self-deal at the expense of other parties within the corporation. Given a setting with imperfect contracting and monitoring, however, managers have incentives to opportunistically report earnings to maximize their utility of the employment contract. Empirical evidence provides support for this behavior. For example, Yermack (1997) finds that managers receive stock option grants shortly before good news announcements and delay such grants until after bad news announcements. His

---

[6] Watts (1977) examines the presence of financial statements in an unregulated environment during the 19th century and noted that agency contracts existed at that time and were linked to the existence of financial reporting. These findings lend support to the argument that one of the objectives of financial reporting is to reduce agency costs.

[7] Jensen and Meckling (1976) acknowledge that it is too costly to align the interests of shareholders and management perfectly. The costs incurred after monitoring and bonding are characterized as the residual loss. This "loss" is borne by the principal or shareholders, indicating that shareholders have incentives to improve the effectiveness of contracting and monitoring activities.

results suggest that managers use the timing of stock option grants as a covert mechanism of self-dealing. Managers can also use their accounting discretion to create reserves during years of good performance by understating current earnings, allowing both current and future reported earnings to appear less variable. Healy (1985) and Holthausen, Larcker, and Sloan (1995) provide evidence that firms with capped bonus awards are more likely to defer income when that maximum bonus is reached than firms that have comparable performance but which have no bonus cap. Additionally, Lie (2005) and Edelson and Whisenant (2012) offer two alternative detection techniques designed to identify stock option backdating by corporate managers. Both indicate the practice was widespread and resulted in substantial wealth transfers from shareholders to corporate managers.

The provision of audited financial statements is often regarded as a cost-effective (but imperfect) contractual response to agency costs (DeAngelo 1981; Watts and Zimmerman 1986). Empirical evidence shows that one role of the audit is to monitor opportunistic actions of managers. For example, Kinney and Martin (1994) document that adjustments to financial statements from more than 1,500 audits made by audit firms over a 15-year period overwhelmingly have negative effects on unaudited net earnings and net assets. Using empirically supported guidelines for materiality, the authors of the study find that audit-related adjustments reduce unaudited earnings and assets by an amount exceeding materiality levels bu a factor of at least two and in some cases as high as eight.

Regulators of financial reporting are also concerned about the *perceived* monitoring role of audit firms of publicly-owned corporations. For example, the SEC states that users (of financial statements) must be confident in relying on the work performed by auditors and "this sense of

confidence depends on reasonable investors perceiving auditors as independent professionals who have neither mutual nor conflicting interests with their audit clients and who exercise objective and impartial judgment on all issues brought to their attention" (Hunt 1997). A loss of confidence would be expected to increase information risk to contracting parties of public corporations.

The importance of independence and objectivity has also been recognized by the accounting profession. Article IV of the AICPA Code of Professional Conduct specifically states that a "member should maintain objectivity and be free of conflicts of interest in discharging professional responsibilities" (AICPA 1994). In order to accomplish this objective, the AICPA has recommended rotation of audit engagement members and required rotation of partners on audit engagements (AICPA 1978). Although both actions can be viewed as lessor forms of mandatory audit firm rotation, however, each is motivated by the same perceived threats to audit firm independence – the longer the relationship between the client and an audit engagement member, the more likely an economic bond occurs that threatens objectivity in the monitoring role that auditor is expected to perform.

Audit Quality

The auditing literature describes how a variation in audit quality can occur. DeAngelo (1981) defines audit quality as "the market-assessed joint probability that a given auditor will both (a) discover a breach in the client's accounting system and (b) report the breach." Stated differently, the quality of an audit is a function of (1) the competence of the audit firm (i.e., the auditor's ability to detect material omissions or misstatements in the client's financial statements), and (2) the level of actual threats to auditor independence (i.e., the probability the auditor will reveal

material errors). The variation in the level of the discovery aspect represents the variation in the

level of competency of the audit firm, while the variation in the incentives to report represents

the level of audit firm independence. An improvement in either competence or independence

would lead to an improvement in audit quality. Of course, an erosion of either could lead to

lower audit quality.[8]

The level of perceived threats to auditor independence, however, is also important to the

debate on mandatory audit firm rotation. Even if no real effects on audit quality occur following

mandatory rotation, users may perceive the audit firm to be a more objective monitor and, thus,

the financial reporting would be viewed as having lower information risk. Prior research

supports the supposition that investors and managers react to, and price accordingly, audits that

have higher perceived quality. For example, Titman and Trueman (1986) and Datar, Feltham,

and Hughes (1991) provide models in which the value of an initial public offering is shown to be

an increasing function of perceived audit quality. Further, extant research provides support that

there are capital market consequences when the perception of audit quality is compromised by a

---

[8]   Audit quality can be defined in a number of ways and from different perspectives. For example, from a practitioner's perspective, audit quality can be defined as the degree to which the audit conforms to applicable reporting or auditng standards (Cook 1987; Copley, Doucet, and Gaver 1994; Aldhizer, Miller, and Moraglio 1995; McConnell and Banks 1998; Tie 1999; Krishnan and Schauer 2000). Research on audit markets tends to take a broader focus defining audit quality by defining the concept as the market-assessed probability that the financial statements contain material errors and that the auditor will both discover and report them (DeAngelo 1981). Other definitions include the probability that an auditor will not issue an unqualified report for statements containing material errors (Lee, Ingram and Howard 1999), the accuracy of the information reported on by auditors (Titman and Trueman 1986; Beatty1989; Krinsky and Rotenberg 1989; Davidson and Neu 1993), and a measure of the audit's ability to reduce noise and bias and improve fineness in accounting data (Wallace 1980, 2004). These definitions encompass components of both the competencies in terms of obtaining sufficient and appropriate evidence to support conclusions about financial statement assertions as well as the abilities of the audit engagement members to make objective and appropriately supported audit judgments. The debate on how to define and, perhaps as important, on how to measure audit quality is ongoing.

possible reduction in independence (see, for example, Francis and Ke 2006; Frankel, Johnson, and Nelson (2002). Philip A. Laskawy, the Chairman of Ernst & Young, stated in the public hearings held before the Senate Subcommittee on Securities Committee on Banking, Housing and Urban Affairs that "the appearance of independence is perhaps as important as is actual independence" (Levitt 2000 SEC). Indeed, the SEC requires auditors under its jurisdiction to be independent in both fact and appearance (Rule 201 (b)).[9] If audit firms are viewed as less independent (e.g., economically bonded as tenure increases), perceived audit quality is eroded.

The findings from both experimental and analytical studies also provide support for the argument that MAR rules will be associated with improved audit quality. In an experimental setting, Dopuch, King, and Schwartz (2001) find that mandated auditor rotation leads to less bias in audit reports. In an analytical setting, Lu and Sivaramakrishnan (2009) find that mandatory auditor rotation decreases overstatements and increases understatements implying increased reporting conservatism. Although the importance of perceived audit quality is discussed here, our study is a focus on the real effects of mandatory audit firm rotation on audit quality as evidenced by the effects on financial reporting. Nevertheless, an interesting line of research to follow this study is the investigation of the effect of mandatory audit firm rotation on perceptions

---

[9] The Supreme Court has emphasized the importance of the connection between investor confidence and the appearance of independence: "The SEC requires the filing of audited financial statements in order to obviate the fear of loss from reliance on inaccurate information, thereby encouraging public investment in the Nation's industries. It is therefore not enough that financial statements be accurate; the public must also perceive them as being accurate. Public faith in the reliability of a corporation's financial statements depends upon the public perception of the outside auditor as an independent professional. . . . If investors were to view the auditor as an advocate for the corporate client, the value of the audit function itself might well be lost." (United States v. Arthur Young and Co., 465 U.S. 805, 819 n.15 (1984)).

of audit quality. For archival investigations, this would require (at a minimum) audit markets that have adopted rotation rules.

Information Risk

Whether information risk is diversifiable is an important question to the accounting profession and securities regulators. Traditional asset-pricing theory (e.g., Fama 1991) takes the position that information risk is diversifiable and should have no effect on expected returns. More recently, O'Hara (2003) and Easley and O'Hara (2004) develop a model in which firms with less public and more private information have greater information risk and higher expected returns. They argue that this result follows from the fact that uninformed investors are not able to adjust their portfolio weights in the same way as informed investors and, therefore, information risk cannot be diversified away. Lambert, Leuz, and Verrecchia (2007) consider the role of performance reports (e.g., earnings) in aligning firms and investors with respect to capital investments. They argue that poor quality reporting impairs the coordination between firms and their investors, with respect to the firm's capital investment decisions, and thereby creates information risk. Anticipating this, investors demand a higher risk premium. The authors conclude that even in an economy with many firms and a systematic component to the payoff from investment, a portion of information risk is nondiversifiable.

Empirical tests of the predicted positive relation between information risk and the cost of capital use different characterizations of information risk. Botosan (1997) focuses on disclosure scores based on the quantity of annual report information and analyst perceptions of disclosures, as captured by Association for Investment Management and Research (AIMR) scores. Easley, Hvidkjaer, and O'Hara (2002) focus on the information asymmetry between informed and

uninformed traders, which they operationalize using PIN (probability of informed trading) scores. Francis, LaFond, Olsson, and Schipper (2005) examine whether accruals quality is a determinant of the cost of capital. They use the results of time-series asset-pricing regressions to lend support to their conclusions that "information risk (as proxied by accruals quality) is a priced risk factor", and that "accruals quality plays a statistically and economically meaningful role in determining the cost of equity capital." Bhattacharya, Daouk, and Welker (2003) examine the association between country-level measures of the average cost of equity and earnings opacity, defined as a composite measure of earnings aggressiveness, loss avoidance, and smoothness. Their findings, based on a sample of 34 countries over 1986 to 1998, although sensitive to the cost of equity proxy, suggest that earnings aggressiveness is positively associated with their dividend-based cost of equity estimates. In sum, empirical evidence casts doubt on the traditional view that firm-specific and country-specific factors contributing to information risk are diversifiable and should not affect on expected returns.

Audit Firm Tenure

Johnson and Lys (1990) find that auditors obtain competitive advantages via specialization and clients lose the resulting benefits if they change auditors. Other studies document that short audit firm tenure, by affecting the client-specific knowledge of an auditor, can lead to an erosion of audit quality and be associated with increased litigation risk to audit firms. A limitation, however, of these studies, acknowledged by most of the authors, is that their results from a voluntary change setting may not extend to a mandatory audit firm setting. For example, Geiger and Raghunandan (2002) find that auditors are more likely to issue a clean report prior to a bankruptcy filing in the early years of auditor tenure. Other studies find similar negative

consequences to audit markets in the early stages of audit engagements. Carcello and Nagy (2004) find that fraudulent financial reporting is more likely during early years of auditors' tenure than in later years. Contributing to the literature on the link between low client-specific knowledge (proxied by short-term tenure) and litigation risk, St. Pierre and Anderson (1984) find that audit errors and lawsuits against auditors occur more frequently during early years of an auditor-client relationship. Together, these results suggest that more initial audits caused by mandatory audit firm rotation have the potential to erode audit quality as client-specific knowledge is reduced in many audit engagements.

Studies have also linked longer audit tenure to improvements in audit quality. Johnson, Khurana and Reynolds (2002) and Myers, Myers, and Omer (2003) conclude that longer audit firm tenure constrains extreme discretion in accruals. Mansi, Maxwell, and Miller (2004) find that longer audit firm tenure is associated with lower cost of debt. Using a field-based analysis, Bamber and Iyer (2007) find longer audit firm tenure mitigates acquiescence to the client's preferences. Carey and Simnett (2006) investigate the association between audit quality and long audit partner tenure in Australia utilizing the following three measures of audit quality: (1) the auditor's propensity to issue a going-concern audit opinion for distressed companies; (2) the direction and amount of abnormal working capital accruals; and (3) just beating (missing) earnings benchmarks. While their study provides evidence that long tenure partners are less likely to issue a going-concern opinion and some evidence of just beating (missing) earnings benchmarks, consistent with deterioration in audit quality associated with long audit partner tenure, they find no evidence of an association of long audit tenure with abnormal working capital accruals. Results from both short and long tenure studies form the basic argument of

opponents to mandatory audit firm rotation that *potential* costs outweigh the benefits due to the loss of client-specific knowledge.

Related empirical evidence has been offered in a context in which audit partner rotation, but not audit firm, is required. This effort to improve audit partner independence has been adopted in many countries, including the United States, the United Kingdom and Australia. The public disclosure of the rotation of audit partners, however, is not a required disclosure in most of these countries. Taiwan and Australia are notable exceptions. Hamilton, Ruddock, Stokes and Taylor (2005) capitalize on these disclosures and examine audit partner changes in Australia and find that audit partner changes are associated with lower signed discretionary accruals. In tests confined to Big 5 audit partner changes, they find that positive (but not negative) discretionary accruals are significantly lower at the time of partner rotation implying that partner rotation is associated with lower allowed discretion in reported earnings. Chi and Huang (2007) examine the effect of mandatory audit partner rotation on audit quality from the viewpoint of learning experience, using the level of discretionary accruals as a proxy for audit quality. Although their findings suggest that client-specific knowledge produces higher quality of earnings, they also find that excessive familiarity impairs audit quality. However, Chi, Huang, Liao, and Xie (2009) find no real or perceived differences in audit quality from a five-year audit partner rotation rule using audit markets data form Taiwan. In the discussion of Chi et al. (2009), Bamber and Bamber (2009) argue that audit partner rotation is likely to yield "second-order effects relative to the effects of audit firm rotation" in an effort to explain the (failure to reject the null) findings. results

To summarize, if audit firm rotation produces some measure of the effect on audit quality that partner rotation appears to have, the findings of these studies offer inconsistent guidance on the potential benefits. The literature does document the importance of client-specific knowledge in detecting material errors in the financial statements. This evidence is based on voluntary changes instead of changes when auditors and clients know that tenure will end (in a setting in which rotation rules must be followed). It is also generally argued, as well, that the learning curve of obtaining client-specific knowledge flattens out after several years. The empirical question is whether policies might be in place or proposed (e.g., handover files between predecessor and successor audit firms or "four-eyes principle" in years of initial audits) that can mitigate these effects, in an effort to retain the overall benefits of MAR rules (if any exist).

Statement of Hypotheses

The goal of this study is to investigate the effects on audit markets of mandatory audit rotation policies in countries adopting various forms of rotation rules. That is, the study utilizes an international context of sample evidence to investigate whether audit quality is affected (either improved or eroded) by enacting mandatory audit firm rotation (MAR). The maintained hypothesis is that the audit/earnings quality metrics employed in the study are reasonable proxies for the various methods employed by corporate insiders to exercise discretion to manage reported earnings that is not constrained by their audit firm. Consistent with prior literature, we argue that more (less) evidence of discretion, *ceteris paribus*, in earnings, implies lower (higher) audit quality.

H1: Mandatory Auditor Rotation (Mar)(Debonding) Effect

Proponents of mandatory auditor rotation rules argue that rotation cycles will cause audit firms to view their monitoring roles more objectively as the *perception* of a long-term nature of the audit engagement contract is removed. A potential threat to auditor independence occurs as the client-auditor relationship increases to a level that the audit engagement team (broadly defined) views the relationship as a long-term contract that has a relatively low dismissal threat. As the audit engagement team members become increasingly concerned about the stream of future profits, professional skepticism or professional judgments about the design of audit programs or evaluations of audit evidence may be eroded or biased (often termed economic bonding).

Long auditor tenure can also lead to a "familiarity threat" in which auditors tend to anticipate audit evidence (based on their own prior work) instead of adopting rigorous and innovative evidence gathering processes.[10] Contributors to the auditing literature have recognized the potential for this problem for many years. For example, almost a half century ago, in *The Philosophy of Auditing*, authors Robert K. Mautz and Hussein A. Sharaf warned auditors:

> [T]*he greatest threat to his independence is a slow, gradual, almost casual erosion of this honest disinterestedness—the auditor in charge must constantly remind his assistants of the importance and operational meaning of independence.*

---

[10] Arthur Andersen auditors on the Enron engagement offer an example of how familiarity can erode professional skepticism and audit judgment. The audit engagement team had permanent office space (this is not unique to the Enron engagement) at Enron headquarters and dressed business-casual like their Enron colleagues. They shared in office birthdays, frequented lunchtime parties in a nearby park and weekend fund-raisers for charities. They even went on Enron employees' ski trips to Beaver Creek, Colo. "[P]eople just thought they were Enron employees," says Kevin Jolly, a former Enron employee who worked in the accounting department. "They walked and talked the same way … It was like Arthur Andersen had people on the inside … the lines become very fuzzy" ("Were Enron, Anderson Too Close to Allow Auditor to Do Its Job?," by Thaddeus Herrick and Alexei Barrionuevo, *The Wall Street Journal*, January 21, 2002).

Experimental and analytical evidence has been offered that mandatory auditor rotation rules can improve audit quality by removing either economic bonding or the familiarity threat existing in long tenure audit engagements. In an experimental setting, Dopuch, King, and Schwartz (2001) find that mandated auditor rotation decreases the auditors willingness to issue biased reports. In an analytical setting, Lu and Sivaramakrishnan (2009) find that mandatory auditor rotation decreases overstatements and increases understatements implying increased reporting conservatism.[11]

In the first hypothesis, offer archival-based empirical evidence to the debate on the costs and benefits of MAR rules. We investigate whether audit quality is improved, on average, following adoption of MAR rules. We term this investigation as a test of the *debonding hypothesis* that is the primary motivation for proponents of rotation rules. With the goal of investigating different manifestations of earnings management, we focus on the effect of adopting MAR rules on earnings smoothing activities, managing activities towards positive earnings, and timely loss recognition. We expect MAR-based earnings to be less managed, driven by greater auditor independence and thus more effective monitoring activities, than Non-MAR-based earnings. Regarding our earnings management metrics, we follow prior research that assumes that firms with less earnings smoothing, fewer instances of hitting earnings targets, and greater incidence of large losses are indicative of higher audit/earnings quality (Lang, Raedy, and Yetman 2003;

---

[11] It is an empirical question as to how many, if ever, years of tenure are necessary to impair objectivity of auditors. In our study, we argue that optimal levels are determined based on country-specific factors in our sample of mandatory auditor rotation countries of interest to us. That is, regulators presumably set rotation cycles near the point at which perceived threats to objectivity are expected.

Leuz, Nanda, and Wysocki 2003; Ball and Shivakumar 2005, 2006; Lang, Raedy, and Wilson

2006). We term this test as the *debonding hypothesis* (stated in null form):

> **H1$_0$**:   Enactment of mandatory audit firm rotation is *not* associated with improvements in audit quality.

We note that, although we predict that adoption of mandatory auditor rotation rules improve

audit quality of the audit markets in our sample, we report the strength of our statistical tests to

alleviate concerns that a directional prediction (one-tailed test) choice affects our inferences.

H2: the Low Client-specific Knowledge Effect

Opponents of MAR rules argue that the benefits of the learning experience from repeat audit

engagements of the same client will erode, on average, audit quality. The argument is often

supported by empirical evidence of early tenure audit quality using Non-MAR samples. In

addition to those studies previously cited, the original line of research investigating the effects of

auditor tenure focused on audit failures (AICPA 1978, AICPA 1987, Geiger and Raghunandan

2002, Carcello and Nagy 2004). For example, Geiger and Raghunandan (2002) and Carcello and

Nagy (2004) find that audit failures (defined as failure to issue a going-concern opinion to

soon-to-be bankrupt clients and firms subject to SEC enforcement actions, respectively) are more

likely in the early years of an audit engagement. The mapping, however, of these findings to

auditor changes under an MAR regulatory environment is not clear. For example, if regulators

are concerned about lower audit quality in auditor changes following enactment of rotation rules,

implicit or explicit actions could be required to mitigate audit quality issues at the transition

points (e.g., handover files between predecessor and successor audit firms).

Two related lines research have examined the relation between initial audits and audit quality. DeFond and Subramanyam (1998) find that discretionary accruals are income-decreasing during the last year with the predecessor auditor and generally insignificant during the first year with the successor. Sankaraguruswamy, Willenborg, and Whisenant (2012) also find no evidence that initial audit discounting practices are associated with lower audit quality in either the first or second year of new audit engagements.

The competing evidence from these lines of research motivate our second hypothesis in an effort to investigate whether auditor changes following enactment of MAR rules are associated with changes in audit quality. We investigate the audit quality in audit engagements before and after auditor changes in audit markets with rotation rules. As a reasonable amount of tension in the hypotheses exist about the potential direction (if any) of changes in audit quality, we state both in null form. Hypothesis 2a is an investigation of how a predecessor audit firm in the last year of an audit engagement (with an expectation of a terminal date) performs the monitoring role on reported earnings.

H2$_{a0}$: The audit quality of audits after the enactment of mandatory auditor rotation regulation is not associated with changes in audit quality in the year before auditor changes.

On the other hand, hypothesis 2b is an investigation of the arguments by MAR opponents that initial audits under MAR rules will have low client knowledge and clients could use this opportunity to exercise greater discretion in reported earnings. We term this hypothesis as the *low client-specific knowledge hypothesis* stated as follows:

H2$_{b0}$: The audit quality of new audits after the enactment of mandatory auditor rotation regulation is not associated with changes in audit quality in the first year following auditor changes.

In summary, H1 offers empirical evidence to the *debonding hypothesis* in which proponents of MAR rules would predict that longer tenure would not have the bonding effects caused by tenure without a terminal period in sight. Thus, proponents would argue that an MAR regulatory setting would not offer auditors incentives to lower audit quality leading, on average, to an improvement in audit quality in audit markets adopting auditor rotation rules. In contrast, H2a and H2b offer empirical evidence on the unintended consequence of mandatory auditor rotation rules. In an effort to end long auditor tenure, more auditor changes would occur leading to audit engagements at the end and beginning of rotation cycles associated with changes in audit quality.

3. RESEARCH DESIGN

Mandatory Rotation and Audit Quality

The main goal of the study is to investigate whether mandatory rotation rules affect audit quality. By using an international perspective, we avoid potential biases caused by investigating the audit quality of a specific country in response to rotation rules or policies. Empirical evidence on the effect of audit firm rotation on audit quality has been offered using a one-country research design (Chung 2004; Kim, Min, and Yi 2004; Bae, Rho, and Ro 2007; Cameron, Prencipe, and Trombetta 2008). The inconsistent findings suggest that a global research design can offer more reliable empirical evidence about the effects of mandatory audit firm rotation on audit quality. For example, Chung (2004) and Kim, Min, and Yi (2004) examine the impact of limiting auditor tenure on earnings and audit quality using a sample of firms in Korea, which established mandatory auditor rotation in 1990 for "designated" (i.e., high-risk) registrants. The results show that discretionary accruals of firms that fulfill the rotation requirement decrease after the passage to a mandatory rotation regime, which suggests that limiting the length of the

auditor-client relationship results in enhanced audit independence and provides auditors with greater incentives to resist management pressures.

Bae, Rho, and Ro (2007) examine the effect of mandatory auditor retention/rotation on audit quality, proxied by signed discretionary accruals, using a sample of Korean firms that initially hired their auditors in the three year period following the enactment of the External Audit Act of 1996. The External Audit Act of 1996 required that all listed firms not subject to auditor "designation" policy adopt a three year mandatory auditor retention policy. After the mandatory three-year retention period, the firm may either choose to stay with the current audit firm or hire a new audit firm for the next three years. They provide evidence that firms that complied the mandatory auditor retention in the first and second year following the External Audit Act of 1996 had significantly lower discretionary accruals relative to both the pre-compliance levels of accruals and firms that adopted the mandated policy in the third year implying that mandatory auditor retention/rotation improves audit quality. In contrast, Cameron, Prencipe, and Trombetta (2008) state, using Italy data where mandatory audit firm rotation has been in place for over twenty years, that their findings "do not provide empirical support to the hypothesis that a mandatory rotation rule improves audit quality."

Measures of Audit Quality

Audit quality is unobservable in any study of how characteristics of audit markets might affect audit quality. Empirical studies on audit quality typically use output-based proxies that are expected to capture audit quality with some error. Inconsistencies in the literature on the effects of MAR rules in different countries could be explained by the use of highly contextual earnings management technologies employed in the research designs. In our study, we offer a broad range

of investigations of how MAR rules affect the quality of audit markets. Our goal is to incorporate various proxies of audit quality into the research design to provide a more complete picture of the effects of MAR rules on audit markets.

Drawing on the existing earnings management literature (see Healy and Wahlen 1999; Dechow and Skinner 2000), we use different measures of earnings management that capture various dimensions along which corporate insiders can exercise their discretion to manage reported earnings. It is difficult to specify *ex ante* which techniques firms use to obscure firm performance. Therefore, we following prior research that adopts a broad array of reported earnings measures that might be used opportunistically by corporate managers to manage earnings (Leuz, Nanda, and Wysocki 2003; Barth, Landsman, and Lang 2008). We interpret differences in the various audit quality proxies as evidence that MAR rules affect the quality of audit markets by capturing the level of allowed discretion by auditors on the opportunistic actions of managers.

We obtain the audit quality proxies from disclosures in *Compustat Global*. Some measures require calculation of accruals and cash flows. Computing accruals using the balance sheet method is typical in international accounting research (e.g., Bhattacharya, Daouk, and Welker 2003; Land and Lang 2002; Leuz, Nanda, and Wysocki 2003) as statement of cash flow disclosures may not be available across the sample period for all countries. Hribar and Collins (2002), however, show that a measure of accruals derived from balance sheet data contains significant measurement error, especially when firms are involved in mergers and divestitures. In an effort to obtain the largest sample possible, we report the main results based on measures of cash flows and accruals obtained from either the statement of cash flows disclosures (when

available) and from the balance sheet method. We assess the sensitivity of the results to

inclusion of observations that use the balance sheet approach in the supplemental analysis section

of our paper. Ball, Kothari, and Robin (2000), Bushman and Piotroski (2006), and Pincus,

Rajgopal, and Venkatachal (2007) also use *Compustat Global* (formally known as *Global*

Vantage).[12]

We compare accounting quality metrics for firms adopting MAR rules in the pre- and post-

implementation periods, thereby effectively using each firm as its own control for these

differences. We operationalize accounting quality using earnings management and timely loss

recognition metrics. Consistent with the predictions in this prior research, we predict that firms

with higher audit quality exhibit less earnings management and more timely loss recognition.[13]

Thus, we compare accounting quality metrics for firms adopting MAR rules in the pre- and post-

---

[12] Compustat Global is a database of non-U.S. and non-Canadian fundamental and market information on more than 33,900 active and inactive publicly held companies with annual data history from 1987. The manual for Compustat Global data notes the following: "...the data are normalized to provide comparability across a wide variety of global accounting standards and practices. Accounting standards vary considerably among countries, making accurate comparisons of as-reported data somewhat difficult. Rather than adopt one country's set of accounting principles as the standard for collecting data from all countries, we have created consistent sets of financial data items for the Global database by examining financial statements from a variety of countries and identifying items that are widely reported by companies, regardless of their geographic location, business activity or accounting practices. Within these uniform data sets, we normalize the data to local accounting principles, disclosure methods and data item definitions. As a result, you can make more meaningful comparisons among industries and countries" (McGraw-Hill Companies, Inc., 2011). Given the difficulty in gathering international data provided by Compustat Global, we offer no empirical evidence to support these claims. We do, however, note that the standardization has the potential of inducing systematic bias and/or noise into our empirical tests. We make no efforts to correct these effects of the data employed in our study except as discussed in the paper for the identification of audit firms.

[13] Plausible reasons for making the opposite prediction can exist. For example, accounting quality can be affected by discretion exercised by managers to reveal private information about the firm (Watts and Zimmerman 1986) or non-opportunistic error in estimating accruals. The metrics reflect these joint effects. It is worth noting, however, that we expect discretionary accounting choices used opportunistically by managers other than to reveal private information about a firm will have a greater effect on audit quality (e.g., see Kinney and Martin 1994).

implementation periods, thereby effectively using each firm as its own control for these differences.

We assume that firms with more earnings smoothing exhibit a more negative correlation between accruals and cash flows (Lang, Raedy, and Yetman 2003; Leuz, Nanda, and Wysocki 2003; Ball and Shivakumar 2005, 2006; Lang, Raedy, and Wilson 2006). Land and Lang (2002) and Myers, Myers, and Skinner (2007), among others, interpret a more negative correlation as indicating earnings smoothing because managers respond to poor cash flow outcomes by increasing accruals. Ball and Shivakumar (2005, 2006) show that timely gain and loss recognition, which is consistent with higher earnings quality, attenuates the negative correlation between accruals and current period cash flow. Thus, we predict that firms following MAR implementation exhibit a less negative correlation between accruals and cash flows than those applying domestic standards.

For the second manifestation of earnings management investigated in firm-specific tests, prior research identifies positive earnings as a common target of earnings management. Related studies use the frequency of small positive net income as a metric to provide evidence of managing towards positive earnings. The notion underlying this metric is that management prefers to report small positive net income rather than negative net income. Thus, we predict that firms under MAR regimes report small positive net income with lower frequency than those under Non-MAR regimes.

Studies also argue that higher quality earnings exhibit a higher frequency of large losses as losses are more timely recognized (e.g., see Ball, Kothari, and Robin 2000; Lang, Raedy, and Yetman 2003). The argument is motivated by an expected characteristic of higher quality

financial reporting systems – large losses are recognized as they occur rather than being deferred to future periods or smoothed out over all periods. This characteristic is closely related to earnings smoothing in that if earnings are smoothed, large losses should be relatively rare. Thus, we predict that firms under MAR regimes report large losses with higher frequency than those under Non-MAR regimes.

Smoothing Reported Operating Earnings

Beidleman (1973) defines income smoothing as ''an attempt on the part of the firm's management to reduce abnormal variations in earnings to the extent allowed under sound accounting and management principles.'' Earnings smoothing occurs when the variability of reported earnings is reduced. We define income smoothing as the management of accruals to reduce the variability of reported earnings and conceal a firm's real economic performance. Earnings smoothing can therefore result from changes in the classification of accounting items or by the alteration of the time of an item's recognition criteria (Ronen and Sadan 1980). A smoothing measure is intended to capture the degree to which insiders reduce the variation of reported earnings by altering accruals (Leuz, Nanda, and Wysocki 2003). The ability of managers to smooth earnings, and thus act opportunistically and unconstrained by auditors, is proxied by the variance of the change in net income, the ratio of the variance of the change in net income to the variance of the change in cash flows, the correlation between accruals and cash flows.

In the correlation tests, we note that Pearson's correlation coefficient is a parametric statistic employed in empirical tests when normality assumptions about the underlying distributions can be made. It is less reliable when those assumptions are unlikely to be supported in sample data

which suggests that utilizing non-parametric correlation measures, such as Spearman's rank

correlation coefficient, may be appropriate. To consider the possibility of nonnormal

distributions, we use Spearman's rank correlation (a non-parametric measure of correlation) to

assesses how well an arbitrary monotonic function could describe the relation between two

accounting metrics from different sample periods that does not rely on normality assumptions

about the probability distribution of the variables. Although less statistically powerful than

parametric methods if the assumptions underlying the latter are met, Spearman's rank correlation

coefficient are less likely to give distorted results when there are departures from the

assumptions.

In the tests of differences in accounting metrics, we interpret a higher variance of the change

in net income, higher ratio of the variances of the change in net income and change in cash flows,

and less negative correlation between accruals and cash flows as evidence of lower earnings

management and higher audit quality. Higher variance of the change in net income, higher ratio

of the variances of the change in net income and the change in cash flows and less negative

correlation between accruals and cash flows indicate that, ceteris paribus, insiders exercise

relatively low levels of opportunistic accounting smoothing in reported earnings, thereby

implying higher audit quality.

Discretion in Reported Earnings to Avoid Losses

Burgstahler and Dichev (1997) demonstrate a relatively smoothed single-peaked, bell-shaped

distribution except in the area of zero earnings. That is, earnings slightly less than zero occur

much less frequently than would be expected given the smoothness of the remainder of the

distribution; conversely, earnings slightly greater than zero occur much more frequently than

would be expected. This suggests that firms might manage reported earnings so as to avoid reporting losses in earnings when losses are small. That is, although non-financial firms can hide small losses, they cannot hide large ones. Burgstahler and Dichev (1997) also find that managers of U.S. firms use their accounting discretion to avoid reporting decreases in small earnings. Therefore, our measure for managing towards positive earnings is small positive net income (SPOS). We measure SPOS as an indicator variable that equals one if net income scaled by total assets is between 0 and 0.01 (Lang, Raedy, and Yetman 2003). The interpretation of discretion in reported earnings to avoid small losses is that higher scores represent more earnings management and lower audit quality. Lower values of this measure indicate that, ceteris paribus, insiders exercise relatively low levels of opportunistic accounting discretion in reported earnings, thereby implying higher audit quality.

Discretion in Reported Earnings (Timely Loss Recognition)

Ball, Kothari, and Robin (2000); Lang, Raedy, and Yetman (2003); Leuz, Nanda, and Wysocki (2003); Ball and Shivakumar (2005, 2006); and Lang, Raedy, and Wilson (2006) suggest that one characteristic of higher quality earnings is that large losses are recognized as they occur rather than being deferred over future periods. This characteristic is closely related to earnings smoothing in that if earnings are smoothed, large losses should be relatively rare. Large negative net income (LNEG) is an indicator variable that equals one for observations for which annual net income scaled by total assets is less than -0.20, and zero otherwise.

Discretion in Reported Earnings (Discretionary Accruals)

In addition to management minimizing fluctuations in firm performance, managers can use their reporting discretion to conceal their firm's economic performance. The use of accrual-

based measures as proxies for audit quality have become an accepted proxy for earnings

management and earnings quality in the accounting literature (Healy and Wahlen 1999; Dechow

and Dichev 2002). When audit quality is high, auditors constrain management's opportunistic

income-increasing or opportunistic income-decreasing accruals, resulting in reported earnings

that are of high quality (Myers, Myers and Omer 2003). Opportunistic accruals are often used in

audit markets literature to investigate how an audit firm's monitoring role can impact its

litigation risk on audit engagements. Prior literature also provides evidence that income

overstatements effect both the frequency and likelihood of an auditor being sued by investors

(Lys and Watts 1994; St. Pierre and Anderson 1984). To estimate the firm-level measure of

audit quality, we employ the traditional estimation technique for discretionary accrual proxies

that estimates expected values of accruals based on all observations in an industry for each year

using one country's data. We include an industry-year intercept α_{0it} to reduce the impact of

heteroscedasticity and omitted scale effects (Kothari, Leone, and Wasley 2005).

Tests for H1 (Debonding Hypothesis)

The degree of auditor enforcement of GAAP (i.e., level of audit quality) at the firm-level is

operationalized by using different measures of firm-level proxies for audit quality (Lang, Raedy,

and Yetman 2003; Lang, Raedy, and Wilson 2006; Barth, Landsman, and Lang 2008).

Earnings Smoothing

Following prior literature (Barth, Landsman, and Lang 2008; Leuz, Nanda, and Wysocki

2003; Lang, Raedy, and Yetman 2003), we assume that firms with less earnings smoothing

exhibit more earnings variability. The first measure of earnings smoothing, variability of net

income (ΔNI where NI equals IB + XI +DO using Compustat Global mnemonics), is the

variability of the change in net income scaled by total assets (AT).[14] Changes in net income are

likely sensitive to other factors unrelated to the audit rotation rules. Therefore, following prior

research (Barth, Landsman, and Lang 2008 and Lang, Raedy, and Yetman 2003), we measure

variability of the change in net income($\Delta NI'$) as the variance of the residuals from a regression of

the change in net income on variables identified in prior research as controls for these factors

(Ashbaugh 2001; Pagano, Roell, and Zechner 2002; Lang, Raedy, and Yetman 2003; Tarca

2004; Lang, Raedy, and Wilson 2006).[15]

Previous research suggests that the incentive to manipulate earnings upward is reduced for

large corporations assumed to be more politically sensitive. The increased scrutiny would

provide relatively higher levels of monitoring by various stakeholder groups resulting in any

earnings management being more likely to be detected (Watts and Zimmerman 1978; Zmijewski

and Hagerman 1981). Higher monitoring levels thereby reduces the incentives to manipulate

earnings. We include a control variable for the level of political costs using total revenues, SIZE,

from the previous fiscal year.[16] Proxies for growth, new equity, and new debt are also included

---

[14] Unlike the North American database, the Compustat Global database does not report net income (or loss) after subtracting extraordinary items (XI) and discontinued operations (DO). Thus, our measure of net income or loss is a constructed measure (Compustat Global mnemonics IB + XI +DO). Our conclusions are qualitatively similar if we use income before extraordinary items (IB) as the income measure used throughout the analysis.

[15] We base our inferences on the variance of residuals from equation (1) and assume that inclusion of the control variables effectively results in a measure of variability of change in net income that is unrelated to the controls. An alternative and more direct approach is to first compute variability of change in net income, and then use it as the dependent variable in equation (1). In our setting, this approach is not feasible because it requires sufficient time series of firm-specific data to estimate variability of change in net income not available for our sample data.

[16] Additional size proxies (e.g., market value of equity, total assets, number of employees, and number of shareholders) were used as alternative controls for the variation in political costs. The conclusions are not qualitatively different. We use total revenues from the previous fiscal year to maximize the sample size as

to control for the expected incentive effects of these events to manipulate earnings. To control for the incentive effects to manipulate earnings as debt covenant slack reduces, we include the debt-to-equity ratio in the model. Another control variable included in the model include asset turnover (which is expected to offer managers greater ability to manipulate earnings). Lastly, we include two control variables shown to be associated with accounting quality metrics, cash from operations, CFO; and larger audit firms, BIG.

To incorporate our controls into our estimate of earnings smoothing, we first estimate a regression of the change in annual net income (scaled by total assets), pooling the pre and post-adoption MAR observations, on the control variables.[17] We then use the residuals from that regression to compute our measure of earnings variability. The equation we estimate to measure the variability of the change in net income is shown in equation (1). The variable of interest is the *variability of ΔNI* (*ΔNIʼ*) or the variance of the residuals from estimating equation (1).

$$\Delta NI_{it} = b_0 + b_1 SIZE_{i,t-1} + b_2 GROWTH_{it} + b_3 EISSUE_{it} + b_4 LEV_{it} + b_5 DISSUE_{it} +$$

$$b_6 ATO_{it} + b_7 CFO_{it} + b_8 BIG_{it} + e_{it}, \tag{1}$$

NI = net income (where NI = IB + XI +DO using Compustat Global mnemonics) at year t divided by total assets (AT) at year t.
ΔNI = one-year change in NI at year t divided by total assets (AT) at year t.
SIZE = natural logarithm of total revenue (Compustat Global mnemonic REVT, to which we add the value of 1) at year t-1.[18]
GROWTH = one-year growth rate in total revenues at year t (ΔREVT).

---

alternative controls (e.g, market value of equity) reduce the sample size considerably due to lack of available data in the Compustat Global database.

[17] Variables in all of our analyses are winsorized at the 1st and 99th percentiles to control for outliers.

[18] The Compustat Global database provides total revenues (REVT) and net sales (SALE) for revenue measures. When net sales is missing in the database, we use total revenues.

EISSUE   = a categorical variable equal to one if sale of common and preferred stock (SSTK, a financing activity of the statement of cash flows) at year t is greater than 10 percent of total assets (AT) at year t; zero otherwise.

LEV   = total liabilities (LT) divided by end of year equity book value (SEQ) at year t.

DISSUE   = one-year growth rate in total liabilities at year t (ΔLT).

ATO   = total revenues (REVT) at year t divided by total assets (AT) year t.

CFO   = cash flow from operating activities (OANCF) at year t divided total assets (AT) at year t.

BIG   = an indicator variable that equals 1 if audited by a global audit firm in year t, 0 otherwise. Global audit firms during our sample period include Arthur Andersen, Coopers & Lybrand (Coopers & Lybrand merged with Price Waterhouse on July 1, 1998), Ernst & Young, Deloitte & Touche, KPMG, PricewaterhouseCoopers, Binder, Dijker, Otte (known as BDO Seidman in North America), and Grant Thornton.

When comparing MAR observations in the pre- and post-implementation periods (hypothesis 1), we pool all sample years from South Korea and Brazil (as both countries include observations in either the pre- or post-adoption years). In this comparison, we compute the difference in the *variability of ΔNI* (ΔNI^{ν}) between the pre- and post-adoption samples as the difference in the residual variances for pre- and post-adoption observations after estimating equation (1) for the pooled sample.

The second smoothing measure is based on the mean ratio of the variability of the change in net income, ΔNI^{ν}, relative to the variability of the change in cash flows, ΔCFO^{ν}, which is intended to capture the extent that firms use their accounting discretion to conceal the firm's economic performance, controlling for the variability of the change in cash flows. We define operating cash flows using statement of cash flow disclosures in our main tests. As with ΔNI, ΔCFO is expected to be sensitive to various factors that are, in part, unattributable to the financial reporting system. Therefore, following prior research (Barth, Landsman, and Lang 2008; Lang Raedy, and Yetman 2003), we measure variability of cash flows from operations

ΔCFO^v as the variance of the residuals from a regression of the change in cash flows from operations on variables identified in prior research as controls for these factors as in equation (1). We estimate an equation similar to equation (1), but with ΔCFO as the dependent variable to obtain a measure of variability of ΔCFO^v:

$$\Delta CFO_{it} = b_0 + b_1 SIZE_{i,t-1} + b_2 GROWTH_{it} + b_3 EISSUE_{it} + b_4 LEV_{it} + b_5 DISSUE_{it} +$$
$$b_6 ATO_{it} + b_7 CFO_{it} + b_8 BIG_{it} + u_{it} , \qquad (2)$$

As with equation (1), we pool observations all sample observations from South Korea and Brazil. The variability of ΔCF^v is the variance of groups of residuals from equation (2). Specifically, the variable of interest is the ratio of ΔNI^v to ΔCF^v estimated in both pre- and post-adoption MAR periods. Higher levels of the ratio, controlling for the variation in cash flows, indicates more use of accruals to manage earnings, and thus lower audit quality.

The third measure of audit quality is the correlation between accruals and cash flows. This measures obtains a proxy for each country's audit quality for each year. Allowed earnings smoothing efforts are represented by the correlation between changes in accounting accruals and changes in operating cash flows. The motivation for the measure is that it should capture the extent that firms use their accounting discretion and *are allowed by auditors* to conceal the firm's economic performance (Leuz, Nanda, and Wysocki 2003). A negative correlation is a natural result of accrual accounting (Dechow 1994). Large magnitudes of this correlation indicate, ceteris paribus, efforts to smooth reported earnings that do not reflect a firm's underlying economic performance (Skinner and Myers 1999). The accrual and operating cash flow components of earnings are computed as in equation (1) and (2) and the correlation is computed over the pooled set of firms before and after adoption of MAR rules (i.e., South Korea and Brazil

observations). We compare the correlations of the residuals from equations (3) and (4)

controlling for the effects of known determinants of cash flows, *CF*, accruals, *ACC*. *ACC* is

defined as *NI* minus *CF*. Equations (3) and (4) are similar to equations (1) and (2), excluding

CF, as follows:

$$CF^v_{it} = b_0 + b_1 SIZE_{it} + b_2 GROWTH_{it} + b_3 EISSUE_{it} + b_4 LEV_{it} + b_5 DISSUE_{it} +$$

$$b_6 ATO_{it} + b_7 BIG_{it} + v_{it}, \tag{3}$$

$$ACC^v_{it} = b_0 + b_1 SIZE_{it} + b_2 GROWTH_{it} + b_3 EISSUE_{it} + b_4 LEV_{it} + b_5 DISSUE_{it} +$$

$$b_6 ATO_{it} + b_7 BIG_{it} + w_{it}, \tag{4}$$

Compared with the first two measures of earnings smoothing, this investigation offers a more

direct approach to capture the smoothing effect of accruals. It is well documented that the

accrual process results in a negative correlation between accruals and cash flows. The question

of interest to us is the magnitude of the negative correlation. Myers and Skinner (2002) and Land

and Lang (2002) have argued that, all else equal, a more negative correlation is suggestive of

earnings smoothing since managers appear to respond to poor cash flow outcomes by increasing

accruals.

Managing Earnings Toward Targets

The fourth measure of audit quality estimates the extent to which firms manage earnings to

avoid reporting earnings losses. Following prior literature (discussed in connection with

discretion in reported earnings to avoid losses) that examines earnings management discretion in

reported earnings to avoid losses (Burgstahler and Dichev 1997; Barth Landsman, and Lang

2008), we measure the extent to which firms manage earnings to avoid reporting earnings losses

as the existence of small profits in the range (0.00 to 0.01). Specifically, we are interested in the

variable representing the small profits in the range to avoid reporting losses (*SPOS*) which is
defined as an indicator variable that equals one if net income scaled by total assets is between 0
and 0.01 (Lang, Raedy, and Yetman 2003).

If MAR rules improve audit quality, firms would manage earnings toward small positive
amounts less frequently after adoption of the rules.[19] We use a logistic regression to model the
dichotomous outcome variable (MAR adoption) and to translate the predicted log odds into
predicted probability values under MAR regimes. Comparing audit quality of MAR versus Non-
MAR periods, we estimate the following logistic regression pooling observations from all sample
years and estimating:

$$MAR(0,1)_{it} = b_0 + b_1 SIZE_{i,t-1} + b_2 GROWTH_{it} + b_3 EISSUE_{it} + b_4 LEV_{it} + b_5 DISSUE_{it} +$$

$$b_6 ATO_{it} + b_7 CFO_{it} + b_8 BIG_{it} + b_9 SPOS_{it} + u_{it} \qquad (5)$$

SPOS   = an indicator variable that equals one if net income scaled by total assets is
                  between 0 and 0.01.

The logistic regression is estimated where MAR(0,1) is an indicator variable that equals one for
observations in the post-adoption period; zero otherwise. Modeling the outcome of mandatory
auditor rotation regimes (i.e., MAR=1), a negative coefficient on *SPOS* indicates that MAR firms
manage earnings toward small positive amounts less frequently (higher audit quality) than
NonMAR firms. Of course, a positive coefficient on *SPOS* would indicate the MAR
observations manage earnings to avoid reporting earnings losses more than NonMAR

---

[19]   Greene (1993) reports that logit models are extremely sensitive to the effects of heteroskedasticity.
However, the errors (i.e., residuals) from the linear probability model violate the homoskedasticity and
normality of errors assumptions of OLS regression, resulting in invalid standard errors and hypothesis tests.
For a more thorough discussion of these and other problems with the linear probability model, see Long
(1997, p. 38-40). Our conclusions, however, are unchanged using OLS regression.

observations (or lower audit quality). We base inferences on the estimated coefficient on *SPOS*

from equation (5) rather than directly comparing the MAR and Non-MAR firms' percentages of

small positive income because the *SPOS* coefficient reflects the incremental effects after

controlling for other factors that affect financial reporting outcomes.

Timely Loss Recognition

The final measure of audit quality investigated following enactment of MAR rules is the

extent to which firms manage earnings as it relates to timely loss recognition. Following prior

literature, we measure the extent to which firms exhibit timely loss recognition as the existence

of large losses (-0.20). This is consistent with Ball, Kothari, and Robin (2000); Lang, Raedy,

and Yetman (2003); Leuz, Nanda, and Wysocki (2003); Ball and Shivakumar (2005, 2006); and

Lang, Raedy, and Wilson (2006), who suggest that one characteristic of higher quality earnings is

that large losses are recognized as they occur rather than being deferred to future periods.

If MAR rules improve audit quality, firms would report large losses more frequently after

implementation of MAR rules or relative to Non-MAR regime. Comparing MAR firms in the

pre- to post-adoption periods we estimate the following by pooling all sample observations and

estimating the following equation:

$$MAR(0,1)_{it} = b_0 + b_1 SIZE_{i,t-1} + b_2 GROWTH_{it} + b_3 EISSUE_{it} + b_4 LEV_{it} + b_5 DISSUE_{it} +$$
$$b_6 ATO_{it} + b_7 CFO_{it} + b_8 BIG_{it} + b_9 LNEG_{it} + v_{it} , \qquad (6)$$

$LNEG$ $\quad$ = is an indicator variable that equals one for observations for which annual net income scaled by total assets is less than -0.20, and zero otherwise.

MAR(0,1) is an indicator variable that equals one for observations in the post-adoption period;

zero otherwise. Modeling the outcome of mandatory auditor rotation regimes (i.e., MAR=1), a

positive (negative) coefficient on *LNEG* indicates that MAR firms recognize large losses more (less) frequently than NonMAR firms.

Tests for H2 (Client Knowledge Hypothesis)

The use of accrual-based measures as proxies for audit quality have become an accepted proxy for earnings management and earnings quality in the accounting literature (Healy and Wahlen 1999; Dechow and Dichev 2002; Myers, Myers, and Omer 2003). Prior literature provides evidence that income overstatements effect both the frequency and likelihood of an auditor being sued by investors (Lys and Watts 1994; St. Pierre and Anderson 1984). Courts are also more likely to award damages for accruals that overstate (as opposed to understate) earnings and assets (Kellogg 1984). It is generally assumed that high (low) quality audits are those observations in which opportunistic accrual choices that managers might make are lower (higher).

We measure the extent that insiders exercise discretion in reporting earnings using abnormal accruals. Total accruals (*TOT_ACC*) is defined as net income before extraordinary items, less cash flows from operations, scaled by total assets. Various discretionary accrual models exist in the literature. Dechow, Sloan, and Sweeney (1995) report that the Jones (1991) and the modified-Jones models (i.e., the modification by Dechow, Sloan, and Sweeney 1995) perform the best. The most notable difference between the two models is that the modified-Jones model attributes the entire change in receivables to earnings management. In our approach, we estimate the model as if all changes in accounts receivable arise from earnings management.[20]

---

[20] The conclusions are robust to use of the Jones (1991) model of discretionary accruals instead of the modified-Jones model. Additionally, Kothari, Leone, and Wasley (2005) show tests of discretionary accruals using a performance-matched approach are better specified than those using a linear

Consistent with prior discretionary accrual research, we exclude firm-year observations that do not have sufficient data to compute total accruals or the variables needed to estimate the Jones model. We also exclude all firm-year observations where there are fewer than ten observations in any two-digit SIC code in any given year.[21] Similar to Kothari, Leone, and Wasley (2005), we estimate the discretionary accrual models cross-sectionally each year using all firm-year observations in the same two-digit SIC code for each country.

$$TOT\_ACC_{it} = \alpha + \beta_1 (1 / ASSETS_{it}) + \beta_2 (\Delta SALES_{it} - \Delta AR_{it}) + \beta_3 (PPE_{it}) + ERROR_{it} \quad (7)$$

We use firm-specific errors (*ERROR*) from the annual cross-sectional regression model in (7) as a proxy for abnormal accruals. The variables are measured as:

TOT_ACC = net income before extraordinary items less cash flows from operations, scaled by lagged total assets.

AB_ACC = the residual from a regression predicting non-discretionary accruals as calculated in Kothari, Leone, and Wasley (2005). AB_ACC is the residual from this regression performed over separate industry-year groupings where industries are based on 2-digit SIC codes with at least 20 observations per year.

ASSETS = total assets (Compustat Global mnemonics are shown parenthetically, for example AT).

SALES = total revenue (REVT).

AR = accounts receivable (RECT).

PPE = gross property, plant and equipment (PPEGT).

---

regression-based approach (i.e., an inclusion of ROA in the estimation of expected accruals). They suggest using an adjustment of discretionary accrual for a performance-matched firm's discretionary accrual , where matching is on the basis of a firm's return on assets and industry member ship. Our conclusions are robust to this approach.

[21] This limitation on the number of firm-year observations for an industry is an attempt to exclude observations in which the estimates are imprecise caused the inconsistencies in the parameter estimates for small samples of OLS regressions. Ideally, the minimum number would approach at least 30 observations per year and industry, however, the sample size is considerably smaller using this minimum number. The conclusions are robust to a minimum number would of 20 and 30 observations per year and industry (untabulated).

We also consider an alternative specification of discretionary accrual estimation shown in Ball and Shivakumar (2006). They show models incorporating proxies for gains and losses, substantially increases the explanatory power of accruals models.

Following the literature on auditor changes (DeFond and Subramanyam 1998), we investigate the allowed discretion in accruals for auditor changes in periods after rotation rules have been adopted. The allowed discretion of interest of us is that amount in the year before and after auditor changes. The following accruals (both total and discretionary) are of interest to our analysis to investigate the potential *low client-specific knowledge effect* following auditor changes under MAR regulations (using South Korea, Brazil and Italy observations as adoption effects are not the focus).

$YEAR_{t-1}$ = refers to the last audited set of financial statements opined on by the predecessor audit firm.

$YEAR_t$ = refers to the first audited set of financial statements opined on by the successor audit firm.

Recall that an expected outcome of implementing MAR rules is that the frequency of auditor changes, and therefore initial audits, will increase. Auditor tenure beyond the end of the rotation period will no longer be allowed which would indicate more frequent auditor changes (assuming the average tenure in each audit market is longer than rotation cycles absent the rotation rule). Opponents argue that this unintended effect of mandatory audit firm rotation will erode overall audit quality.

4. EMPIRICAL ANALYSIS

Data

We conduct the empirical analysis using available data from South Korea, Brazil and Italy in the Compustat Global database. These three countries are the focus of our study since mandatory audit rotation rules have been adopted broadly by their audit markets (except for companies cross-listed on foreign exchanges). Italy adopted a nine-year audit firm rotation policy in 1975. Thus, the available data for Italy are post-adoption of mandatory audit rotation (MAR) rules. South Korea adopted a six-year rotation policy in 2003. Brazil enacted a five-year audit firm rotation policy in 1999. South Korea and Brazil have available data that includes pre- and post-adoption of MAR rules.

To begin the study, we obtained the data on auditor names from the Compustat Global database for the three countries. For two of the three countries (Brazil and South Korea), the auditor names were unreliable in the Compustat database due to either missing or erroneous coding of auditor names.[22] To address this issue for the Brazilian observations, we collected the information on the auditing firm from the Brazilian Securities Commission (CVM) database. The Brazilian Securities Commission (CVM) has annual filings in Portuguese. We used translation software to confirm auditor identification for observations from Brazil. The data on South Korean auditor identifications posed an even greater problem. Due to affiliations with domestic firms, Compustat Global codes all observations of South Korean auditor names "OTHER". To address this data issue, we also examined corporate filings at South Korean stock

---

[22] Harris and Whisenant (2012) discuss the reasons for and research implications of similar coding errors in the North American (domestic U.S.) data.

exchanges to identify auditor names for the sample of firms with available financial statement data in Compustat Global. Unlike the Brazilian Securities Commission (CVM), the South Korean stock exchanges offered little or no ability to translate (and in some cases even identify) the annual reports of interest to us. We requested the data from the Financial Supervisory Service (FSS) in South Korea through their parent organization, the Financial Services Commission. Data, in Korean language, were provided to us. The data were then translated to produce the auditor names used in our study.

Descriptive Statistics

Our initial sample comprises 25,455 firm year observations for firms in countries where mandatory audit firm rotation is required or adopted between 1991 and 2010. Table 1 denotes the countries that will be included in the tests for hypothesis 1 and hypothesis 2. Due to data availability limitation in our global financial statement database, the examination of the impact of the enactment of mandatory auditor rotation on audit quality used data from Brazil and South Korea. Italy adopted mandatory auditor rotation in 1974. Table 2 represents descriptive statistics on our sample for the pre- and post-adoption of MAR rules by year. South Korea enacted mandatory audit firm rotation in 2003. Due to data availability limitation on the key variable, auditor name, Korean observations subsequent to 2007 are not included in our sample. Brazil enacted mandatory audit firm rotation in 1999. Table 3 presents the industry breakdown for our sample. The sample comprises a range of industries, with most in durable manufacturing, computers, finance, insurance and real estate, or services.

Table 4 presents descriptive statistics relating to variables used in our analyses of hypothesis 1. Table 4 shows that MAR observations have fewer incidents of small positive earnings and

more incidents of large negative earnings than do NonMAR observations. Although these

descriptive statistics do not control for other factors, they suggest that MAR firms are less likely

than NonMAR firms to manage earnings towards a target and more likely to recognize losses

in a timely manner. In terms of control variables, MAR observations show less leverage scaled

by assets, lower size, less equity issuance, and lower levels of asset turnover and Global Six audit

firms. The MAR observations show a higher rate of growth in debt.

Results of H1 (debonding effect)

Table 5 presents results comparing the quality of accounting for NonMAR and MAR

observations in the pre- and post-adoption periods, respectively.[23] It reveals that observations in

the post-adoption periods generally evidence less earnings management and more timely loss

recognition than the observations in the pre-adoption period. The first finding relating to

earnings management indicates that MAR observations exhibit a significantly higher variability

of change in net income, ΔNI , 0.0198 versus 0.0101. This difference of residual variances of

0.0097 represents approximately 65 percent of the residual variance (0.0097/0.015), using the

midpoint between the two residual variances.[24] The second finding is consistent with the first.

---

[23] Our research design detects differences between NonMAR and MAR groups of firms in earnings smoothing, as measured by residual earnings variability, under the assumption that the mean level of the residuals from equation (1) does not differ significantly between the two groups of firms. Controlling the differences in the variance, we fail to reject the null of differences in the means level of residuals from equation (1) between NonMAR and MAR groups.

[24] Although the order of magnitude of the residual variances is similar to that in Lang, Raedy, and Wilson (2006) and Barth, Landsman, and Lang (2008), the variances are not directly comparable between the three studies because our change in net income regression does not include the same control variables (due to data limitations). Recognizing omitted correlated variables (relative to Barth, Landsman, and Lang 2008) pose a potential problems when such control variables are not specified in two-stage regression designs such as ours, we note the our sample of firms are essentially firm-specific controls across the pre- and post-adoption groups. As such, it is unlikely that the differences in our models would systematically bias our results. Additionally, one of the excluded controls is, by construction, not an important determinant since cross-listed

After controlling for other factors, we cannot reject equality of the cash flow variability between the two samples. Although a formal statistical test for differences in the ratios of variances is not performed, the data indicate the ratio of net income variability to cash flow variability is substantially lower for the NonMar observations (1.0841) than for the MAR observations (1.8154). The data indicate that the smoother earnings stream observed for the NonMAR observations is not a result of a smoother cash flow stream.

Consistent with the first two metrics, the third finding indicates that the correlation between accruals, ACC, and cash flow, CF, for MAR observations, −0.2176, is significantly less negative than for NonMAR observations, −0.4481, using Spearman correlation coefficients. The results are confirmed using Pearson correlation coefficients. The correlation between accruals, ACC, and cash flow, CF, for MAR observations, −0.2842, is significantly less negative than for NonMAR observations, −0.5594. This finding indicates that MAR observations smooth earnings less than NonMAR observations.

The final two tests are investigations of the level of managing earnings toward small positive profits and timely loss recognition comparing pre- and post-adoption periods. The coefficient on SPOS, −0.512, is significantly less negative, suggesting that NonMAR observations more frequently report small positive earnings, consistent with managing earnings towards an earnings target. The last finding reported in Table 5 relates to timely loss recognition. The significantly positive coefficient on LNEG, 1.5732, indicates that, incremental to effects associated with the included control variables, MAR observations recognize large losses more frequently than

companies are generally not subject to (domestic) mandatory auditor rotation rules.

NonMAR observations. This finding suggests that, relative to MAR observations, NonMAR observations smooth earnings by delaying the effects of large negative outcomes.

Results of H2 (Low-knowledge Effect)

To investigate hypothesis 2, we follow DeFond and Subramanyam (1998) and investigate the allowed discretion in the year before and after auditor changes. We estimate expected accrual models by country and by year, requiring at least 15 observations in each 2-digit SIC industry per year. The resulting sample sizes are smaller than those tested in H1 due to the loss of observations when estimating expected accruals. We also delete all auditor change observations in which the predecessor auditor is Arthur Andersen in years 2000 to 2002, and control for auditor mergers during our sample period.

The number of auditor changes in our sample, with available data and auditor names that can be reliably used to identify change, include 958 observations for South Korea, 292 for Brazil, and 145 for Italy. We note that the sample size can be characterized as a lower bound on auditor changes in each country since we have strict data requirements on auditor names (must be identified in Compustat or from our other data sources) and the observations must have required data to estimate expected accruals.

After calculating expected accruals from two different methods (Jones 1991; Ball and Shivakumar 2005), we present the results in table 6. Mean and median levels and changes in discretionary accruals are presented for each measure along with p-values for two-tailed tests of significance. The first row reports that the mean and median levels of both methods of estimating discretionary accruals. The first row reports the discretionary accruals obtained in the year before an auditor change in MAR periods. Means are insignificantly different from zero, however,

median levels indicate that discretionary accruals are significantly positive. The tests on median levels is a nonparametric test based on Wilcoxon signed-ranks, requiring no assumptions about the distribution of the discretionary accruals. When normal assumption is not satisfied, it is a powerful alternative of one-sample parametric tests. Since tests of normality (Kolmogorov-Smirnov and Shapiro-Wilk) are rejected for the distribution of discretionary accruals shown in table 6, the data would indicate that the results based on the median values (nonparametric tests) would be more reliable tests of whether the resulting discretionary accruals deviate from zero than parametric tests. In sum, the evidence, although not overwhelming, shows that audit quality is lower in the year *before* an auditor change in MAR periods.

The results shown in the second row of table 6 are tests of differences of discretionary accruals between those in the last year audited by predecessor auditors to the first year of the successor auditor. We find that the mean and median levels of changes in discretionary accruals obtained from both the Jones (1991) and the Ball and Shivakumar (2006) models are insignificantly different from zero.

The third row shows the results of proxies for allowed discretion in the first year audited by successor audit firms in MAR periods. Similar to the first row, the evidence, again though not overwhelming, does indicate that audit quality is lower in the year *after* an auditor change in MAR periods. Considering the level of allowed discretions (in median values) compared with the levels of scaled accruals (not tabulated), the evidence suggests that approximately 25 percent of realized accruals are allowed opportunistic discretion. The median values of discretionary accruals, particularly in initial audits, also range from ½ to one percent of total assets.

It is difficult to argue that such levels would *not be* considered economically meaningful. In sum, the evidence from the more powerful statistical tests of the two employed shows that audit quality surrounding auditor changes is lower.

Supplemental Tests

Hribar and Collins (2002) show that a measure of accruals derived from balance sheet data contains significant measurement error, especially when firms are involved in mergers and divestitures. We assess the sensitivity of the results to using only the measures of cash flows and accruals obtained from the statement of cash flows disclosures. The resulting samples are different because the main tests include accruals and cash flow measures from both the statement of cash flows (when available) and the balance sheet measures. Although the statement of cash flows (in an international format in Compustat Global database) is available for most of our sample, a requirement that our accruals and cash flow data be obtained from the statement of cash flows results in a reduction of our sample size by approximately 20 percent for tests of H1 and H2. In neither case, does the reduction in the sample size change our inferences.

5. CONCLUSIONS

Our results indicate that the audit markets in which mandatory audit firm rotation rules have been enacted are of higher quality than those audit markets prior to the adoption of rotation rules. We find that firms in audit markets with rotation rules exhibit less earnings smoothing, less managing of earnings towards a target of small positive earnings, and more timely recognition of losses. Although we include research design features to mitigate the effects of incentives and the economic environment, we cannot be sure that our findings are attributable to rotation rules rather than to changes in firms' incentives and the economic environment across the two audit

markets. Since our firms in those markets are effectively their own firm-specific controls, this seems less plausible than attributing the changes to rotation rules.

Our inferences are based on comparisons of accounting quality metrics for a broad sample obtained from three countries that have adopted rotation rules using data between 1991 and 2010. Since rotation rules are likely to increase the level of audit firm changes (by construction) in audit markets adopting rotation rules, we also investigate whether audit quality changes around those transition points (the years before and after auditor changes). The results show that audit quality is lower and appears to be economically important levels of allowed discretion in both the year before and after an auditor change. In both cases, the predecessor auditor and the successor audit appear to allow more discretion in earnings than is predicted by different models used in prior literature. We conclude that the results are strong that audit quality improves in audit markets with rotation rules, however, the erosion of audit quality around auditor changes is also evident. These findings suggest that any adoption of rotation rules warrants careful consideration (as has been discussed in the past) of ways to mitigate the erosion of audit quality when making the transition to new auditors under rotation rules.

A limitation of our study is that we did not address some other potential costs to rotation rules. It is possible that rotation rules will increase the overall costs of audits in audit markets when rotation rules are adopted due to the increase in costly initial audits. Given the level of audit fees to firm values reported in some studies (e.g., Sankarguruswamy et al. 2012 report fees are less than 1 percent of market values) and the relative costs of audit failures (e.g., Waste Management lost $6 billion in market capitalization in 1998 when revelations of irregularities in accounting were disclosed), however, the argument that *changes* in audit fees is an important

consideration seems difficult to support on that basis alone. Finally, other benefits of rotation rules were unaddressed by our research design (including increased levels of competition, enhanced perceived auditor independence by stakeholders to corporations, and lower levels of audit concentration). We leave those important and unaddressed research questions to future research.

REFERENCES

Aldhizer, G., J. Miller, and J. Moraglio. 1995. Common attributes of quality audits. *Journal of Accountancy* 179: 61-68.

American Institute of Certified Public Accountants (AICPA). 1978. *The commission on auditors responsibilities: Report, conclusions and recommendations*, New York, NY: AICPA.

American Institute of Certified Public Accountants (AICPA). 1992. *Statement of position regarding mandatory rotation of audit firms of publicly held companies*, SEC practice section. New York, NY: AICPA.

American Institute of Certified Public Accountants (AICPA). 1994. *Professional standards*. New York, NY: Commerce Clearing House, Inc.

Ashbaugh, H. 2001. Non-US firms' accounting standard choices. *Journal of Accounting & Public Policy* 20 (2): 129-153.

Bae, G., J. Rho, and B. Ro. 2007. The effect of mandatory audit firm retention on audit quality: Evidence from the Korean audit market. *Working paper*, Purdue University.

Ball, R. and L. Shivakumar, 2005. Earnings quality in UK private firms: Comparative loss recognition timeliness. *Journal of Accounting & Economics* 39 (1): 83-128.

Ball, R. and L. Shivakumar, 2006. Role of accruals in asymmetrically timely gain and loss recognition. *Journal of Accounting Research* 44 (2): 207-242.

Ball, R., S.P. Kothari, and A. Robin. 2000. The effect of international institutional factors on properties of accounting earnings. *Journal of Accounting and Economics* 29: 1-51.

Bamber, E.M., and L. Bamber. 2009. Discussion of "Mandatory audit-partner rotation, audit quality and market perception: Evidence from Taiwan." *Contemporary Accounting Research*. 26: 393-402.

Bamber, E.M., and V. Iyer. 2007. Auditors' identification with their clients and its effect on auditors' objectivity. *Auditing: A Journal of Practice & Theory* 26 (2): 1-24.

Barth, M., W. Landsman, and M. Lang. 2008. International accounting standards and accounting quality. *Journal of Accounting Research* 46: 467-498.

Beatty, R. 1989. Auditor reputation and the pricing of initial public offerings. *The Accounting Review* 64 (4): 693-709.

Beidleman, C. 1973. Income smoothing: The role of management. *The Accounting Review* 48 (4): 653-667.

Bhattacharya, U., H. Daouk, and M. Welker. 2003. The world price of earnings opacity. *The Accounting Review* 78 (3): 641-678.

Botosan, C. 1997. Disclosure level and the cost of equity capital. *The Accounting Review* 72 (3): 323-349.

Burgstahler, D., I. Dichev. 1997. Earnings management to avoid earnings decreases and losses. *Journal of Accounting and Economics* 24 (1): 99–129.

Bushman, R. and J. Piotroski. 2006. Financial reporting incentives for conservative accounting: The influence of legal and political institutions. *Journal of Accounting and Economics* 42 (1-2): 107-148.

Cameron, M., A. Prencipe, and M. Trombetta. 2008. Earnings management, audit tenure and auditor changes: Does mandatory auditor rotation improve audit quality? *Working paper*, Universita Boncconi.

Carcello, J., and A. Nagy. 2004. Audit firm tenure and fraudulent financial reporting. *Auditing: A Journal of Practice &Theory* 23 (2):55-69.

Carey, P., R. Simnett. 2006. Audit partner tenure and audit quality. *The Accounting Review* 81 (3): 653-676.

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.

Chi, W. and J. Huang. 2007. Discretionary accruals, audit-firm tenure and auditor tenure: An empirical case in Taiwan. *Working paper*, National Taiwan University.

Chung, H. 2004. Selective mandatory auditor rotation and audit quality: An empirical investigation of auditor designation policy in Korea. *Working paper*, Purdue University.

Cook, M. 1987. Two years of progress in financial accounting and reporting-February 1985 to January 1987. *Journal of Accountancy* (June): 96-108.

Copley, P., M. Doucet, and K. Gaver. 1994. A simultaneous equations analysis of quality control review outcomes and engagement fees for audits of recipients of federal assistance programs. *The Accounting Review* 69 (1): 244-256.

Corporate Accountability Research Group 1976. U.S. Senate Committee on Commerce, *Corporate Rights and Responsibilities*, Hearing, 94th Congress, 2nd Session, June 17, 1976.

Davidson, R., and D. Neu. 1993. A note on the association between audit firm size and audit quality. *Contemporary Accounting Research* 9 (2): 479-488.

Datar, S., G. Feltham, and J. Hughes. 1991. The role of audits and audit quality in valuing new issues. *Journal of Accounting and Economics* 14 (1): 3–49.

DeAngelo, L. 1981. Auditor independence, "low-balling" and disclosure regulation. *Journal of Accounting and Economics* 3 (2): 113-127.

DeAngelo, L. 1981. Auditor size and audit quality. *Journal of Accounting and Economics* 3 (3): 183-199.

Dechow, P. 1994. Accounting earnings and cashflows as measures of firm performance: The role of accounting accruals. *Journal of Accounting and Economics* 18 (1): 3–42.

Dechow, P. and I. Dichev. 2002. The quality of accruals and earnings: The role of accrual estimation errors. *The Accounting Review* 77 (supplement): 35-59.

Dechow, P. and D. Skinner. 2000.   Earnings management: Reconciling the views of accounting academics, practitioners, and regulators. *Accounting Horizons* 14 (2): 235-250.

Dechow, P., R. Sloan, and A. Sweeney. 1995. Detecting earnings management. *The Accounting Review* 70 (2): 193-225.

DeFond, M., and K. R. Subramanyam. 1998. Auditor changes and discretionary accruals. *Journal of Accounting and Economics* 25 (1): 35-67.

Dopuch, N., R. King, and R. Schwartz. 2001. An experimental investigation of retention and rotation requirements. *Journal of Accounting Research* 39 (1): 93-117.

Easley, D., O'Hara, M.. 2004. Information and the cost of capital. *Journal of Finance* 59:1553-1583.

Easley, D., S. Hvidkjaer, and M.O'Hara. 2002. Is information risk a determinant of asset returns? *Journal of Finance* 57 (5): 2185–2221.

Edelson, R., and S. Whisenant. 2012. A Study of Companies with Abnormally Favorable Patterns of Stock Option Grant Dates. *Working paper*, The University of Houston.

Fama, Eugene. 1991. Efficient capital markets: II. *Journal of Finance* 46 (5):1575-1617.

Francis, J., P. Michas, and S. Seavey. 2012. Does audit market concentration harm the quality of audited earnings? Evidence from audit markets in 42 countries. *Contemporary Accounting Research* (forthcoming).

Francis, J. and B. Ke. 2006. Disclosure of fees paid to auditors and the market valuation of earnings surprises. *Review of Accounting Studies* 11 (4): 495-523.

Francis, J., R. LaFond, P. Olsson, and K. Schipper. 2005. The market pricing of accruals quality. *Journal of Accounting and Economics* 39 (2): 295–327.

Frankel, R., M. Johnson, and K. Nelson. 2002. The relation between auditors' fees for nonaudit services and earnings management. *The Accounting Review* 77 (Supplement): 71-105.

Ghosh, A. and D. Moon. 2005. Auditor tenure and perceptions of audit quality. *The Accounting Review* 80 (2): 585-612.

Geiger, M., and K. Raghunandan. 2002. Auditor tenure and audit reporting failures. *Auditing: A Journal of Practice & Theory* 21 (1): 67-78.

Graham, J., C. Harvey, and S. Rajgopal. 2005. The economic implications of corporate financial reporting. *Journal of Accounting and Economics* 40 (1-3): 3-73.

Hamilton, J., C. Ruddock, D. Stokes, and S. Taylor. 2005. Audit partner rotation, earnings quality and earnings conservatism. *Working paper*, University of Technology.

Harris, K., and S. Whisenant. 2012. Auditor tenure errors in COMPUSTAT: Implications for Empirical Research. *Working paper*, The University of Houston.

Healy, P. 1985. The effect of bonus schemes on accounting decisions. *Journal of Accounting and Economics* 7 (1-3): 85-107.

Healy, P. and J. Wahlen. 1999. A review of the earnings management literature and its implications for stand setting. *Accounting Horizons* 13 (4): 365-383.

Hribar, P., and D. Collins. 2002. Errors in estimating accruals: implications for empirical research. *Journal of Accounting Research* 40 (1): 105-134.

Holthausen, R., D. Larcker, and R. Sloan. 1995. Annual bonus schemes and the manipulation of earnings. *Journal of Accounting and Economics* 19 (1): 29-74.

Hoyle, J., 1978. Mandatory auditor rotation: The arguments and an alternative; *Journal of Accountancy* May: 69-78.

Hunt, I. 1997. Auditor independence and related issues. September 23, 1997, U.S. Securities and Exchange Commission.

Imhoff, E. 2003. Accounting quality, auditing and corporate governance. *Accounting Horizons* 17 (Supplement): 117-128.

Jensen, M. and W. Meckling. 1976. Theory of the firm: Managerial behavior, agency costs, and ownership structure. *Journal of Financial Economics* 3 (4): 305-360.

Johnson, W.B., and T. Lys. 1990. The market for audit services: Evidence from voluntary auditor changes. *Journal of Accounting and Economics* 12 (1-3): 281-308.

Jones, J. 1991. Earnings management during import relief investigations. *Journal of Accounting Research* 29 (2): 192-228.

Kellogg, R. 1984. Accounting activities, securities prices and class action lawsuits. *Journal of Accounting and Economics* 6 (3): 185-204.

Kim, J., C. Min, and C. Yi. 2004. Selective auditor rotation and earnings management: Evidence from Korea. *Working paper*, Hong Kong Polytechnic University.

Kinney, W. and R. Martin. 1994. Does auditing reduce bias in financial reporting? A review of audit-related adjustment studies. *Auditing: A Journal of Practice & Theory* 13 (1): 149-156.

Kothari, S.P., A. Leone, and C. Wasley. 2005. Performance matched discretionary accrual measures. *Journal of Accounting and Economics* 39 (1): 163-197.

Krinsky, I. and W. Rotenberg. 1989. The valuation of initial public offerings. *Contemporary Accounting Research* 5 (2): 501-515.

Krishnan, J., and P. Schauer. 2000. The differentiation of quality among auditors: Evidence from the not-for-profit sector. *Auditing: A Journal of Practice & Theory* 19 (2): 9-25.

Lambert R., C. Leuz, and R. Verrecchia. 2007. Accounting information, disclosure, and cost of capital. Journal of Accounting Research 45: 385-420.

Land, J. and M. Lang. 2002. Empirical evidence on the evolution of international earnings. *The Accounting Review* 77 (supplement): 115-133.

Lang, M., J. Raedy, and M. Yetman. 2003. How representative are firms that are cross listed in the United States? An analysis of accounting quality. *Journal of Accounting Research* 41 (2): 363-386.

Lang, M., J. Smith, J. Raedy, and W. Wilson. 2006. Earnings Management and Cross Listing: Are Reconciled Earnings Comparable to U.S. Earnings? *Journal of Accounting and Economics* 42 (1-2): 255-283

Lee, T., R. Ingram, and T. Howard. 1999. The difference between earnings and operating cash flow as an indicator of financial reporting fraud. *Contemporary Accounting Research* 16 (4): 749-786.

Leuz, C., D. Nanda, and P. Wysocki. 2003. Earnings management and investor protection: an international comparison. *Journal of Financial Economics* 69 (3): 505-527.

Levitt, Arthur. September 28, 2000. SEC Testimony concerning: Commission's auditor independence proposal. U.S. Securities and Exchange Commission.

Lie, E. 2005. On the timing of CEO stock option awards. *Management Science* 51: 802-812.

Lu, T. and K. Sivaramakrishnan. 2009. Mandatory audit firm rotation: Fresh look versus poor knowledge. *Journal of Accounting and Public Policy* 28: 71-91

Lys, T. and R. Watts.1994. Lawsuits against auditors. *Journal of Accounting Research* 32:65-93.

McConnell, D. and G. Banks. 1998. A common peer review problem. *Journal of Accountancy* June.

McLaren, N. 1958. Rotation of auditors. *Journal of Accountancy* July: 41-44.

Myers, J., L. Myers, and T. Omer. 2003. Exploring the term of auditor-client relationship and the quality of earnings: A case for mandatory auditor rotation? *The Accounting Review* 78 (3): 779–799.

Myers, J., L. Myers, and D. Skinner. 2007. Earnings momentum and earnings management. *Journal of Accounting, Auditing & Finance* 22(2):249-84.

O'Hara, M. 2003. Liquidity and price discovery. *Journal of Finance* 58 (4): 1335–1354.

Pagano, M., A. Roell, and J. Zechner (2001). The geography of equity listing: Why do companies list abroad? Journal of Finance 57 (6): 2651-2694.

Pincus, M., S. Rajgopal, and M. Venkatachal. 2007. The accrual anomaly: International evidence. *The Accounting Review* 82 (1): 169-203.

Ronen, J. and S. Sadan. 1980. Accounting classification as a tool for income prediction. *Journal of Accounting, Auditing and Finance* 80:339-353.

Sankaraguruswamy, S., M. Willenborg, and S. Whisenant. 2012. Pricing initial audit engagements: Empirical evidence following public disclosure of audit fees. Working paper, University of Houston.

Seidman, J. S. 1967. Letters to the journal. *Journal of Accountancy*, May: 30.

Skinner, D., L. Myers. 1999. Earnings momentum and earnings management. Unpublished working paper, University of Michigan and University of Illinois.

St. Pierre, K., and J. Anderson. 1984. An analysis of the factors associated with lawsuits against public accounts. *The Accounting Review* 59 (2): 242-263.

Subramanyam, K.R. 1996. The pricing of discretionary accruals. *Journal of Accounting and Economics* 22 (1-3): 249-281.

Tarca, A. 2004. International convergence of accounting practices: Choosing between IAS and US GAAP. *Journal of International Financial Management & Accounting* 15 (1): 60-91.

Tie, Robert. 1999. Concerns over auditing quality complicate the future of accounting. *Journal of Accountancy* 188.

Titman, S. and B. Trueman. 1986. Information quality and the valuation of new issues. *Journal of Accounting and Economics* 8 (2):159-172.

U.S. General Accounting Office (GAO). 2003. Public Accounting Firms: Required Study on the Potential Effects of Mandatory Audit Firm Rotation. Washington D.C.: Government Printing Office.

Wallace, W. 1980. *The economic role of the audit in free and regulated markets*. New York, NY: Touche Ross & Co.

Wallace, W. 2004. The economic role of the audit in free and regulated markets: A look back and a look forward. *Research in Accounting Regulation* 19: 267-298.

Watts, R. 1977. Corporate financial statements, a product of the market and political process. *Australian Journal of Management* 2 (1): 53-75.

Watts, R. and J. Zimmerman. 1978. Towards a positive theory of the determination of accounting standards. *The Accounting Review* 53 (1): 112-144.

Watts, R. and J. Zimmerman. 1986. *Positive Accounting Theory*. Prentice Hall, Upper Saddle River, New Jersey.

Yermack, D. 1997. Good timing: CEO stock option awards and company news announcements. *Journal of Finance* 52 (2): 449-476.

Zmijewski, M. and R. Hagerman. 1981. An income strategy approach to the positive theory of accounting standard setting/choice. *Journal of Accounting and Economics* 81 (3): 129-149.

TABLE 1
COUNTRIES ADOPTING MANDATORY AUDIT ROTATION (MAR)

Countries	H1 (debonding)	H2 (client knowledge)
South Korea	Yes	Yes
Brazil	Yes	Yes
Italy	No[a]	Yes

This table denotes the mandatory audit rotation (MAR) countries that will be included in the tests of hypotheses H1 and H2. Financial accounting information are obtained from the July 2011 update of the Compustat Global Database. Due to data availability limitations in the database (which begin in 1991), Italy, which has required mandatory audit firm rotation since 1974, only has available data for the post-adoption period (H2 only).

TABLE 2
DESCRIPTIVE STATISTICS: YEARLY BREAKDOWN

Year	Firm-Year Observations (before adoption of auditor rotation rules)					Firm-Year Observations (after adoption of auditor rotation rules)				
	Italy	S. Korea	Brazil	Total	Percent	Italy	S. Korea	Brazil	Total	Percent
1991	0	0	652	652	6.08%	0	0	0	0	0.00%
1992	0	2	673	675	6.29%	77	0	0	77	0.52%
1993	0	68	561	629	5.86%	68	0	0	68	0.46%
1994	0	66	563	629	5.86%	69	0	0	69	0.47%
1995	0	65	600	665	6.20%	94	0	0	94	0.64%
1996	0	106	784	890	8.29%	113	0	0	113	0.77%
1997	0	132	782	914	8.52%	143	0	0	143	0.97%
1998	0	144	852	996	9.28%	187	0	0	187	1.27%
1999*	0	0	881	881	8.21%	190	0	226	416	2.83%
2000	0	0	1,131	1,131	10.54%	226	0	248	474	3.22%
2001	0	0	1,296	1,296	12.08%	259	0	243	502	3.41%
2002	0	0	1,372	1,372	12.79%	260	0	248	508	3.45%
2003**	0	0	0	0	0.00%	255	1,446	270	1,971	13.39%
2004	0	0	0	0	0.00%	264	1,448	282	1,994	13.54%
2005	0	0	0	0	0.00%	273	1,496	301	2,070	14.06%
2006	0	0	0	0	0.00%	289	1,485	317	2,091	14.20%
2007	0	0	0	0	0.00%	296	1,560	322	2,178	14.79%
2008	0	0	0	0	0.00%	283	0	325	608	4.13%
2009	0	0	0	0	0.00%	277	0	318	595	4.04%
2010	0	0	0	0	0.00%	262	0	305	567	3.85%
Total	0	583	10,147	10,730	100.00%	3,885	7,435	3,405	14,725	100.00%

Sample of firms by year in pre- and post-adoption of mandatory auditor rotation (MAR) rules. South Korea adopted rotation rules in 1999, Brazil in 2003. Italy adopted rotation rules in 1974, predating the start of available financial statement data.

TABLE 3
DESCRIPTIVE STATISTICS: INDUSTRY ANALYSIS

	South Korea		Brazil		Italy	
Industry	**N**	**%**	**N**	**%**	**N**	**%**
Mining & Construction	779	4.4%	146	3.7%	127	3.3%
Agriculture	835	4.7%	223	5.6%	81	2.1%
Textiles & Printing	1,572	8.9%	406	10.2%	362	9.3%
Chemicals	1,160	6.6%	248	6.2%	115	3.0%
Pharmaceuticals	988	5.6%	15	0.4%	55	1.4%
Extractive	116	0.7%	47	1.2%	64	1.6%
Durable Manufacturers	6,486	36.9%	898	22.5%	904	23.3%
Computers	2,691	15.3%	53	1.3%	219	5.6%
Transportation	610	3.5%	340	8.5%	253	6.5%
Utilities	217	1.2%	494	12.4%	278	7.2%
Retail	721	4.1%	182	4.6%	184	4.7%
Financial Services	476	2.7%	561	14.1%	975	25.1%
Services	811	4.6%	87	2.2%	125	3.2%
Unclassified	120	0.7%	288	7.2%	143	3.7%
Totals	17,582	100.0%	3,988	100.0%	3,885	100.0%

Industry membership is determined by SIC classifications as follows: agriculture/food (0100-0999) mining & construction (1000-1999, excluding 1300-1399), food (0100-0999, 2000-2111), textiles & printing/publishing (2200-2799), chemicals (2800-2824, 2840-2899), pharmaceuticals (2830-2836), extractive (2900-2999, 1300-1399), durable manufacturers (3000-3999, excluding 3570-3579 and 3670-3679), computers (7370-7379, 3570-3579, 3670-3679), transportation (4000-4899), utilities (4900-4999), retail (5000-5999), financial services (6000-6999), services (7000-8999, excluding 7370-7379), and all others as unclassified.

TABLE 4
DESCRIPTIVE STATISTICS RELATING TO VARIABLES: Hypothesis 1

	Pre-MAR			Post-MAR		
	Mean	**Median**	**Variance**	**Mean**	**Median**	**Variance**
Test Variables						
ΔNI	0.002	0.003	0.013	-0.001	0.004	0.027
ΔCFO	0.003	0.007	0.016	0.002	0.003	0.018
SPOS	0.126	-	-	0.077	-	-
LNEG	0.030	-	-	0.080	-	-
LEV	0.599	0.609	0.228	0.548	0.508	0.397
SIZE	10.906	10.782	1.872	9.658	10.193	3.001
GROWTH	0.181	0.117	0.468	0.186	0.100	0.525
EISSUE	0.249	-	-	0.182	-	-
DISSUE	0.174	0.091	0.524	0.225	0.089	0.646
ATO	1.008	0.910	0.552	0.919	0.840	0.581
BIG	0.718	-	-	0.603	-	-

Sample of firms that adopted mandatory auditor rotation rules (MAR) in South Korea and Brazil starting with fiscal years 1991(for South Korea) and 1992 (for Brazil). MAR rules were adopted in 2003 in South Korea and 1999 in Brazil. Tabulated statistics are from the years before and after passage of MAR rules.

TABLE 4
DESCRIPTIVE STATISTICS RELATING TO VARIABLES: Hypothesis 1
(continued)

NI	=	the net income (where NI = IB + XI +DO using Compustat Global mnemonics) at year t divided by total assets (AT) at year t.
ΔNI	=	the one-year change in NI at year t divided by total assets (AT) at year t.
CFO	=	the cash flow from operations (OANCF) at year t divided by total assets (AT) at year t.
ΔCFO	=	the one-year change in CFO at year t divided by total assets (AT) at year t.
SPOS	=	is an indicator that equals 1 for observations with net income (NI) scaled by total assets (AT) at year t between 0.00 and 0.01.
LNEG	=	is an indicator that equals 1 for observations with net income (NI) scaled by total assets (AT) at year t less than −0.20.
SIZE	=	the natural logarithm of total revenue (Compustat Global mnemonic REVT, to which we add the value of 1) at year t-1.
GROWTH	=	one-year growth rate in total revenues at year t (ΔREVT).
EISSUE	=	a categorical variable equal to one if sale of common and preferred stock (SSTK, a financing activity of the statement of cash flows) at year t is greater than 10 percent of total assets (AT) at year t; zero otherwise.
LEV	=	total liabilities (LT) divided by end of year equity book value (SEQ) at year t.
DISSUE	=	one-year growth rate in total liabilities at year t (ΔLT).
ATO	=	total revenues (REVT) at year t divided by total assets (AT) year t.
CFO	=	cash flow from operating activities (OANCF) at year t divided total assets (AT) at year t.
BIG	=	an indicator variable that equals 1 if audited by a global audit firm in year t, 0 otherwise. Global audit firms during our sample period include Arthur Andersen, Coopers & Lybrand (Coopers & Lybrand merged with Price Waterhouse on July 1, 1998), Ernst & Young, Deloitte & Touche, KPMG, PricewaterhouseCoopers, Binder, Dijker, Otte (known as BDO Seidman in North America), and Grant Thornton.

*indicates significantly different from pre-MAR and post-MAR at the 5% level, respectively, using parametric (means) and nonparametric (medians) two-sample tests.

TABLE 5
TESTS OF HYPOTHESIS 1 (*DEBONDING EFFECT*)
Comparison of Accounting Quality Metrics Before and After Adoption of MAR Policies in South Korea and Brazil

AQ Metric	Test	Pre-MAR	Post-MAR	Difference
Panel A: Earnings Smoothing Metric				
Variability of ΔNI^v	Pre ≺ Post	0.0101	0.0198	0.0097*
Earnings Smoothing Metric **Variability of ΔNI^v over ΔCF^v**	Pre ≺ Post	1.0841	1.8154	0.7313**
Variability of ΔCFO^v	Pre ≠ Post	0.0093	0.0109	0.0016
Correlation of ACC and CF				
Spearman correlation coefficients	Pre ≺ Post	-0.6657	-0.4481	-0.2176**
Pearson correlation coefficients	Pre ≺ Post	-0.5594	-0.2753	-0.2842**
Panel B: Managing Earnings Toward Targets		**Estimated Coefficient**		
Small Positive NI (SPOS)	negative	-0.5512**		
Panel C: Timely Loss Recognition				
Large Negative NI (LNEG)	positive	1.5732**		

We define variability of ΔNI (ΔCF) as the variance of residuals from a regression of the $\Delta NI(\Delta CF)$ on the control variables, and the variability of ΔNI over ΔCF as the ratio of the variability of ΔNI divided by the variability of ΔCF. Correlation of ACC and CF is between the residuals from the ACC and CF regressions; we compute both sets of residuals from a regression of each variable on the control variables. ΔNI, ΔCF, ACC, and CF are defined in table 4.
* indicates significant difference between the pre- and post-adoption periods at the 5% level (one-tailed).
** indicates significant difference between the pre- and post-adoption periods at the 1% level (one-tailed).

TABLE 6
TESTS OF HYPOTHESIS 2
Discretionary accruals in years before and after changing auditors in Post-MAR periods

Year relative to auditor change	Jones (1991) Discretionary Accrual Proxy		Ball and Shivakumar (2006) Discretionary Accrual Proxy	
	Mean	**Median**	**Mean**	**Median**
Year −1	-0.004	**0.006**	-0.005	**0.002**
(*p*-value)	(0.305)	**(0.091)**	(0.114)	**(0.030)**
Change from −1 to 0	-0.001	0.001	0.000	0.001
(*p*-value)	(0.861)	(0.826)	(0.992)	(0.905)
Year 0	-0.001	**0.007**	-0.002	**0.005**
(*p*-value)	(0.725)	**(0.008)**	(0.489)	**(0.001)**

Sample of firms with mandatory auditor rotation rules (MAR) in South Korea, Brazil, and Italy. MAR rules were adopted in 1974 in Italy, 2003 in South Korea, and 1999 in Brazil. Tabulated statistics are from the years after passage of MAR rules with available data for all three countries.
p-values for the means are from two-tailed t-tests of the null hypothesis that the mean equals 0.
p-values for the medians are from two-tailed Wilcoxon sign rank tests of the null hypothesis that the central tendency equals 0.