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EMPIRICAL EVIDENCE ON AUDIT QUALITY UNDER A DUAL MANDATORY AUDITOR ROTATION RULE

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Abstract

Regulators in the US ruled against introducing mandatory firm rotations in addition to the existing rule for periodic partner rotations. In contrast, European regulators ruled in favour of a dual mandatory rotation rule in which both audit firm and audit partner rotations are required. Employing a unique setting where a dual regime of audit and firm rotations are required, we assess the net benefit (cost), of audit firm rotation incrementally to partner rotation. Specifically, we analyse several earnings-based measures of audit quality along with the market perception of audit quality. Controlling for partner rotation, we do not find that firm rotations have a positive incremental effect. In contrast, we find audit partner rotation under the dual regime appears to improve both the earnings-based measures of audit quality, and market perceptions of earnings. Our evidence suggests that any benefit arising from dual rotation is likely to be driven by the change in partner. However, whether the audit firm rotation should still be required is unclear, given that the observed benefits arising from the audit partner rotation could potentially be preconditioned on audit firm rotation.

Keyword: audit-firm rotations, audit-partner rotations, audit quality, investor perceptions

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1. Introduction

The audit process reduces agency costs by providing the market with 'independent' verification of financial information prepared by managers, thereby reducing the cost of the information exchange between managers and investors (Dopuch & Simunic, 1980; 1982). However, since management controls the process of auditor hiring and retention, there are quasi-rents associated with such auditing contracts (DeAngelo, 1981). Consequently, auditors have incentives to yield to pressure from management, implying the quality of the information contained in audited financial statements depends on the ability of the audit partner to resist such pressures (Becker, DeFond, Jiambalvo & Subramanyam, 1998). If the auditor does not remain independent in-fact, the auditor will be less likely to report the irregularities and audit quality will be impaired.

A number of countries require audit partner mandatory rotation as a means of enhancing auditor independence (e.g., the US, Taiwan, Australia, as well EU member states) and thus audit quality. In response to the Financial Crisis in 2008 the EU passed a new regulation, effective as of June 2016, to strengthen auditor independence in-fact by requiring in addition to audit partner rotation - mandatory audit firm rotation every ten years, thus creating a dual rotation regime.[1] This policy stands in stark contrast to US requirements. The US Congress in July 2013 ruled against adding mandatory rotation at the audit firm level to the already required audit partner rotation and, consequently, the Public Company Accounting Oversight Board (PCAOB) removed audit firm rotation from its agenda. Notwithstanding that Europe and the US are heading in opposing directions, there is no

[1]REGULATION (EU) No 537/2014. This regulation applies to public interest entities (PIEs), which essentially are publicly listed firms. Thus, the new regulation can be viewed as an attempt by the EU to increase oversight and monitoring of firms whose shares are widely held by the public.

empirical evidence to date that investigates whether having both layers of rotation enhances auditor independence. In the light of this void, we explore a setting which requires dual rotation of both audit firm and audit partner. Specifically, using an Italian sample for the period 2006-2012, we examine the incremental effect on audit quality of firm rotations, controlling for mandatory partner rotation.

A number of arguments have been advanced in favour and against a mandatory audit firm or audit partner rotation. Supporting the general principle of mandatory rotations is the notion that it enhances an auditor's independence in-fact[2] because it reduces the familiarity effect, social bonding and economic dependence (Bell, Causholli, & Knechel, 2015; Cameran, Francis, Marra, & Pettinicchio, 2015). Arguments specifically opposing rotations are: that long tenure provides auditors with more client-specific knowledge; it imposes considerable switching and setup costs (Knapp, 1991; Johnson, Johnson, Khurana, & Reynolds, 2002; DeAngelo, 1981); and new audit firms may exert insufficient effort to overcome the lack of client-specific knowledge.[3]

Empirical evidence pertaining to rotation rules is scarce and is only available for a single rotation rule. A few papers examine the effects of mandatory partner rotations (e.g., Chi, Huang, Liao, & Xie, 2009, in Taiwan), or mandatory and regulator-imposed firm rotations (e.g., Kim, Min, & Yi, 2004, in Korea; Nagy, 2005, following the demise of Arthur Andersen in US; Cameran et al., 2015; Cameran, Prencipe & Trombetta., 2016; and Corbella, Florio, Gotti, & Mastrolia, 2015, in Italy) and provide inconsistent results as to whether such rotations improves audit quality.

It is unclear ex-ante whether requiring two layers of rotation can generate any incremental net benefits over a single rotation rule. Dual rotation may increase the frequency

[2]Independence in-fact is defined a state of mind that is unaffected by influences that might compromise professional judgement and allows an individual to act with integrity and or exercise objectivity and professional scepticism (International Federation of Accountants, 2004).

[3]The literature on audit tenure indicates higher rate of audit failures during the initial engagement period (Geiger & Raghunandan 2002) and that audit quality is lower in the first two-three years (Johnson et al., 2002).

of the fresh-eyes effect, and/or lead to greater criticism by the outgoing auditor, but at the same time may reduce incentives for auditors to invest in acquiring client-specific knowledge relative to a single rotation rule. While the balance of these effects is hard to predict, it is possible it is different under a dual rotation rule than under a single rotation rule. Moreover, because audit partner and firm rotations have been studied separately, one cannot draw safe conclusions from the empirical evidence as to how audit quality would be affected when requiring both rotation types.

Italy has required mandatory rotation of audit firms since 1975 (Presidential Decree D.P.R. 136/1975), with a maximum audit tenure of nine years. However, since 2006, following the major accounting scandals of the last decade (Enron, Parmalat), Italian legislators introduced an additional requirement to mandatory rotate the engagement partner after a maximum of six years,[4] in line with EU regulation. More specifically, the dual regime requires an audit firm rotation after nine years, and a partner rotation after six years. This provides us with a rich set to investigate how audit quality varies with both rotation types.

To assess the effect of each rotation type incrementally to the other, we employ a number of discrete tests, as suggested by DeFond & Zhang (2014). The first test examines whether each rotation type improves auditors' independence in-fact and thereby improves audit quality. Independence in-fact is unobservable; but consistent with prior studies we assume variations in audit quality are associated with variations in the audit firm's or partner's level of independence in-fact. We employ a number of earnings-based measures of audit quality including abnormal accruals, and discretionary revenues. The second test examines whether rotation improves auditor independence in-appearance – thereby enhancing the market perception of audit quality. The perception-based measure employed is based on the informativeness of reported earnings. If rotation improves the perception of auditor

[4]The limit was then extended to seven years in 2013.

independence, even if independence in-fact has not improved, we would expect to see a closer relation between returns and reported earnings (Carcello & Li, 2013). A perception-based measure also has the unique advantage over other output-based measures, as it allows us to observe investors' views of the perceived benefits and costs of such regulatory intervention (DeFond & Zhang, 2014).

Using our entire sample, controlling for partner rotations, we do not find that audit firm rotation incrementally improves audit quality. In contrast, we find that under the dual audit rotation regime, mandatory audit partner rotation appears to improve audit quality given it is incrementally associated with all our measures of audit quality. This improvement is economically as well as statistically significantly correlated with partner rotation, resulting in, between 36% and 26% reduction in our earnings-based measures of audit quality. With respect to market perception of audit quality of rotations, we find investors appear to perceive a net benefit from audit partner rotation, but a net cost from audit firm rotation. Specifically audit partner rotation appears to improve earnings informativeness relative to all non-rotation years, unlike audit firm rotation which diminishes it.

The audit quality results are robust to an alternative specification. When we restrict the sample to include the year of rotation and the preceding year only, we find that improvement in audit quality is related to the arrival of a new partner. However we do not find investors' perceptions of rotations differ in earnings informativeness during this two year period.

Given the lack of association we find between audit quality and audit-firm rotation under the dual system, we also investigate whether this reflects a relative change in benefits (costs) of audit firm rotation under a single rotation system. We find that prior to the introduction of the dual system, audit firm rotation was largely unrelated to all our measures of discretionary earnings. In other words, we find little evidence that under either the dual or single regimes audit-firm rotation is significantly associated with better audit quality.

Additionally, we do not find evidence supporting an incremental change in earnings informativeness due to audit firm rotation under the dual system relative to the single system.

Collectively, our findings suggest that in a dual audit regime it is the audit partner rotation, not the audit firm rotation, that improves both audit quality and the investors' perceptions of audit quality. One explanation of our findings is that any benefits of changing the audit partner – which also occurs when the audit firm changes – are cancelled out by also changing the audit firm. If this explanation is correct, it raises doubt over whether audit-firm rotation is any longer desirable or necessary when audit-partner rotation is required. Thus, this explanation provides support for the PCAOB's decision to abandon its effort to require audit firm rotation, in addition to the five-year partner rotation requirement.

However, an alternative explanation is that mandatory audit firm rotation is a necessary precondition for the observed effectiveness of audit partner rotation. Specifically, the rotating audit partner's incentives will be influenced by whether she is replaced internally or by a new audit firm. Partner rotations without firm rotations may not provide a sufficiently strong incentive to enhance audit quality to either the outgoing or incoming partner. The idea is that any correction of poor auditing could hurt the audit firm's reputation, or simply face a strong resistance from the client. Hence, as long as the audit firm does not expect to be replaced, poor auditing may persist. In contrast, under the dual rotation rule, knowing that a new audit firm will be taking over, the incumbent partner is exposed to the risk that the new auditor would demand a correction. Thus, the incumbent partner is likely to increase audit effort. Reputation effects also suggest the previous partner within the same audit firm faces a strong incentive to enhance audit quality. Put differently, both partners face a potential

‘embarrassment effect,’ if their poor audit quality is revealed by the new audit firm (Lennox, Wu, & Zhang 2014).[5]

A recent paper by Gipper, Hail, & Leuz (2018) fails to find evidence that partner rotations improve audit quality in the U.S. If their results are applicable to our Italian setting, it potentially provides some support for the explanation that firm rotation is a precondition for the benefits of partner rotation; otherwise we would expect to see no benefit of partner rotation consistent with Gipper et al. (2018). Unfortunately, because we do not have the counterfactual evidence, i.e., a single audit partner rotation regime in Italy, we are unable to explicitly test these competing explanations.

We contribute to the literature on auditor rotations in several ways. First, we are the first, to the best of our knowledge, to examine audit quality under a dual rotation rule. We are thus able to assess the incremental effect on audit quality of one rotation type over the other. Second, our evidence should be of use to regulators who consider, and in some cases require, mandatory firm and partner rotations. Specifically, in early 2014 the PCAOB, under political pressure, abandoned its effort to require audit firm rotation, in addition to the five-year partner rotation requirement (Ryan, 2014). In the EU, the final rule requiring a 10-year rotation – extendable to 20 years - is a watered-down version of the initial proposal for six years (Abela, 2015). Third, because prior research examined a single rotation regime, mostly for partners, its relevance for regulators considering a dual rotation arrangement is limited. We thus contribute to the literature by providing evidence that speaks more directly to the effects of partner rotations under a dual rotation regime. Finally, our analysis of the period prior to 2006 extends the small body of research examining a single audit firm rotation rule.

[5]This is consistent with Lennox, Wu, & Zhang (2014, p. 1777) who refer to the embarrassment effect as follows: “[T]he departing partner has an incentive to conduct a higher quality audit in his/her final year t in order to avoid the embarrassment of the audit deficiencies being found by the incoming partner in year t+1.” The embarrassment effect thus leads to higher audit effort by the outgoing auditor, which further mitigates audit risk.

In particular, our evidence suggests firm rotations alone do not improve audit quality, although potentially when combined with partner rotations they may have a positive impact.

The remainder of this paper is organized as follows. Section 2 presents our motivation and prior literature. Section 3 describes the sample and research design where Section 4 presents the main results. Additional analyses are reported in Section 5 while Section 6 concludes.

2. Motivation and prior literature

Mandatory audit-firm rotation has been on the regulatory agenda of many countries reflecting a concern that long association with the client impairs auditor's independence and leads to the deterioration of, and the perception of, audit quality.

In the European Union, audit-firm rotation was optional in the Directive (2006/43/EC), until the passing of Regulation (EU) No 537/2014 in June 2016, which now requires audit-firm rotation every ten years with an additional ten years if tendering takes place. While it is not a-priori clear this regulation would enhance auditor independence in-fact, regulators may have been motivated to set rules that enhance auditor independence in-appearance (Dopuch, King, & Schwartz, 2003).[6]

The debate on the advantages and disadvantages of mandatory audit-firm rotation is extensive. Proponents of rotation rules often refer to a "professional routine" (Shockley, 1981), and "familiarity effect" that are associated with a long-standing relationship between the management and the auditor (Mautz & Sharaf, 1961; Farmer, Rittenberg, & Trompeter, 1987; Brody & Moscove, 1998; Bell et al., 2015; Cameran et al., 2015), which adversely

[6]The international Federation of Accountants (IFAC) defines independence as follows: "Independence of mind – the state of mind that permits the expression of a conclusion without being affected by influences that compromise professional judgement, thereby allowing an individual to act with integrity, and exercise objectivity and professional skepticism. Independence in appearance – the avoidance of facts and circumstances that are so significant that a reasonable and informed third party would be likely to conclude that a firm's or an audit or assurance team member's integrity, objectivity or professional skepticism has been compromised." (See, https://www.ifac.org/system/files/publications/files/Final-Pronouncement-The-Restructured-Code_0.pdf.) Dopuch et al. (2003, p. 84) provides definitions similar in spirit although he uses the term "independence in-fact" and not "independence of mind."

affects reporting quality (Bazerman, Morgan, & Lowenstein, 1997). Auditor rotation potentially reduces the familiarity threat, by bringing in "fresh eyes" (AICPA, 1978; Hoyle, 1978; McLaren, 1958), as well as changing the incumbent auditor's incentives due to the potential "embarrassment effect" (i.e. new auditor may criticize their work).[7]

Opponents of mandatory rotation warn of the risk of loss of client-specific knowledge (e.g., PWC, 2012), and its adverse effect on reporting quality (Petty & Cuganesan, 1996; Geiger & Raghumamdan, 2002; Myers, Myers, & Omer, 2003; Carcello & Nagy, 2004). Mandated firm rotations at fixed intervals may also involve repeated low balling of fees, erosion of incentives to invest in client-specific knowledge, and lower audit effort (DeAngelo, 1981; Elitzur & Falk, 1996; Cameran et al., 2015).

These arguments are generally valid for both rotation types – audit-firm and audit-partner - however there are a number of noteworthy differences, which may influence audit quality. Bamber, Bamber, & Michael (2009) note with partner rotations the potential for judgment errors is relatively moderate given that the audit firm methodology, prior working papers and audit team members largely remain intact. Moreover, the "low balling" at partner level may not be present so the threat to audit quality is also lower (Palmrose, 1986). On the other hand, the new partner is nominated from within the same audit team so the benefit of fresh-eyes may be lower than under firm rotation.

It is a-priori unclear what the effects of combining mandatory partner and mandatory firm rotations may be. While the overall benefits (or costs) of rotation is an empirical issue, it is quite possible it is different under a dual than under a single rotation rule. Auditors and prepares overall tend to stress the costs of a dual regime, such as higher risk of audit errors

[7]Consistent with this, Cameran et al. (2015) provide evidence that audit fee and effort are higher prior to mandatory firm rotations. However, as we report later, we do not find evidence consistent with improved reporting quality in the last year of the audit engagement.

and misreporting along with higher internal costs (PWC, 2012).[8] However, European regulators argue that a dual system would increase audit quality and investors' confidence in financial information (e.g., Barnier, 2013[9]).

2.1. Prior empirical evidence

Direct evidence on the effect of either mandatory firm rotations or partner rotations (within the same firm) is very sparse owing to data limitations. To overcome this limitation, prior research has attempted instead to provide indirect evidence by examining the role of tenure or voluntary rotations on reporting quality. However, it should be noted that this indirect evidence may not accurately inform the mandatory rotation debate, as conditions and incentives may not be directly comparable (Johnson et al., 2002; Ewelt-Knauer, Gold, & Pott, 2012; Casterella & Johnson, 2013; Kwon, Lim, & Simnett, 2014; Lennox, 2014; Cameran et al., 2016).

2.1.1. Direct evidence on mandatory firm rotations

Only a few countries have required regular audit-firm rotations before the recent changes in the EU (among these are Italy [since 1975], South Korea [2006-2010] and Spain [1989-1995]).[10] A small number of studies have investigated the Italian setting (Cameran et al., 2015; Cameran et al., 2016; Corbella et al., 2015). Cameran et al. (2016) examine variations in audit quality before the dual regime. During their sample period the incumbent audit firm was nominated for an initial three-year period, renewable twice up to a maximum of nine years. They find auditors become more conservative in the last three-year period, compared to the previous six years. Cameran et al. (2015), finds the first three years of an incumbent auditor are less conservative, compared to the following six years. It is unclear from these results as to whether the increase in accounting conservatism in the later periods is due to the

[8]See http://pcaobus.org/rules/rulemaking/pages/docket037comments.aspx, comment letter No. 136.
[9]See http://ec.europa.eu/internal_market/auditing/reform/.
[10]For a more detailed list of countries in which the mandatory rotation rule is enforced, see Lennox (2014).

imminent mandatory rotation and the need to reduce any embarrassment effect, or that it merely reflects a learning curve due to a longer tenure period.[11] Unfortunately, one cannot disentangle these two explanations. Cameran et al. (2016) also find a marginal increase in the earnings response coefficient in the last three-year period of engagement compared to the prior periods. This suggests that Italian investors' perception of audit quality tends to improve in the final engagement period, prior to mandatory rotation. However, their results could also suggest independence in-fact does not increase as audit quality may be lower under the new auditor.

Both Cameran et al. (2015) and Corbella et al. (2015) explicitly investigate the year of rotation and find no significant impact on audit quality in either the year of rotation or year before rotation. In Spain Ruiz-Barbadillo, Gómez-Aguilar, & Carrera (2009) find no evidence of any significant change in auditors' economic incentives to issue biased reports between these two periods. Kwon et al. (2014) examine the effect of mandatory audit firm rotation on audit hours, audit fees, and audit quality in South Korea and find similar results to Cameran et al. (2015). In contrast, Kim & Yi (2009) find audit quality improved after the passage of the mandatory rotation rule.

2.1.2. Direct evidence on mandatory partner rotations

Partner rotations within the same audit firm have been required for some years in the EU, Australia, U.S., and some other countries. However, evidence is limited given audit partner names were only recently required to be disclosed (e.g. PCAOB, 2015; Statutory Audit Directive, 2006/43/EC))

We are only aware of five studies on mandatory partner rotations, one in Taiwan (Chi et al., 2009), three in China (Firth, Rui, & Wui, 2012; Lennox, 2014; Lennox, et al., 2014)

[11]Both studies in robustness tests find tenure is associated with audit quality; longer tenure is associated with higher levels of conservatism.

and two in the US (Laurion, Lawrence, & Ryan, 2016[12]; Gipper et al., 2018). Lennox (2014) and Lennox et al. (2014) find mandatory audit-partner rotation results in higher audit quality in the year immediately surrounding rotation and Firth et al. (2012) find a higher incidence of issuing a modified audit opinion. Chi et al. (2009) find no evidence that reporting quality of companies subject to mandatory audit partner rotation improves. However, in both China and Taiwan there are two partners that are responsible for the audit, with both partners required to rotate in Taiwan, but only one partner is rotating in China. Thus, this evidence is of limited relevance for many countries in which there is a single partner.

In the US, Gipper et al. (2018) find little support for fresh-look benefits on audit quality after the five-year mandatory rotation period. They also find the outgoing partner spends fewer hours in the last two years of the engagement relative to the previous three, which is inconsistent with the embarrassment effect. Laurion et al. (2016) document an increase in restatements following partner rotations, suggesting audit quality improves with partner rotations, but it is not associated with an embarrassment effect for the outgoing auditor.

2.1.3. Indirect evidence: the role of tenure and voluntary switches

Since mandatory rotations limit auditor tenure, the literature has attempted to identify whether long (short) tenure is associated with poorer (better) reporting quality. US-based evidence suggests short (long) firm tenure is associated with poorer (better) reporting quality (Johnson et al. 2002; Geiger & Raghunandan, 2002; Myers et al. 2003). In contrast, in Taiwan, Chi & Huang (2005) find abnormal accruals decline in the first years of the audit firm tenure but increase afterwards, while Chen, Lin, & Lin (2008) fail to document a relation between accruals and tenure. In Belgium, Knechel & Vanstraelen (2007) do not find any effect of long tenure on the issuance of going-concern opinion. To the extent that long tenure may improve earnings quality, then the client's cost of capital and cost of debt are also

[12]Although Laurion et al. (2016) cannot identify which partner rotations are mandatory and which are voluntary, they report from conversations with Big-4 firms that in the US voluntary partner rotations are rare.

expected to decrease with tenure. Mansi, Maxwell, & Miller (2004), Ghosh & Moon (2005) and Boone, Khurana, & Raman (2008) report evidence consistent with this hypothesis.

With respect to partner tenure and voluntary rotation,[13] Carey, & Simnett (2006) find mixed evidence on the association between audit partner tenure and reporting quality in Australia. Chen et al. (2008) find a positive link between reporting quality and partner tenure in Taiwan. Fargher, Lee, & Mande (2008) find evidence that voluntary partner rotations in Australia are associated with poorer audit quality, although audit quality improves in the subsequent years for partner rotations within the same audit-firm. Hallman, Kartapanis & Schmidt (2018) find incumbent auditors who are aware they are going to be replaced by the client enhance audit quality broadly consistent with the embarrassment effect. However, Hamilton, Ruddock, Stokes, & Taylor (2011) find no difference in discretionary accruals and reporting conservatism in the year preceding and year following a voluntary partner change (see also Fargher et al., 2008).

Summarizing this literature, we note the paucity of evidence on mandatory rotations, either at the firm level or at the partner level. Moreover, there is no direct evidence on regimes involving both rotation types. The indirect evidence, while richer, is obtained under voluntary regimes which may be influenced by other factors that are irrelevant for mandatory changes (e.g., client's financial distress and breakdown in relationship). Therefore, we cannot infer from these findings the likely impact of a mandatory dual rotation (Carey & Simnett, 2006, and Lennox, 2014). It is an open empirical question as to whether there is any incremental benefit of adding audit firm rotation to a regime which already requires partner rotation.

3. Sample and research design

[13]Voluntary auditor changes may be caused by a variety of reasons including the health of the client-firm, the need to realign the needs of managers, severity of audit opinion and overly conservative auditors (See DeFond & Zhang, 2014, for a review of the literature).

The sample consists of Italian non-financial companies listed on the Milan Stock Exchange during the period 1993 to 2012. In May 2006, following EU Directive 2006/43/EC, effective 19 June 2006, Italy has required mandatory partner rotation every six years.[14] Additionally, there is a rule of no re-hiring within three years. Prior to 2006 an audit firm was hired for a period of three years, with the engagement renewable twice to a total of nine years (so a 3+3+3 system). However, following the introduction of the audit partner rotation in 2006, audit firm tenure of the incumbent audit firm was restricted to a straight nine years; removing the 3+3+3 system. When investigating the dual mandatory rotation regime, we focus on the period 2006 to 2012. All sample firms report under International Financial Reporting Standards (IFRS), as promulgated by the IASB and required in the EU since 2005.

The audit market in Italy is an interesting setting to study the effect of rotations because the stock market is small and most publicly listed firms are audited by the Big-4 firms (which is also the case in many other audit markets). The analysis of Gietzmann & Sen (2002) indicates that in such markets the risk of auditor-client collusion is high and so mandatory rotations may be an effective tool to limit this behaviour. Furthermore, anti-trust investigation carried out in 2000 found evidence of collusion in fee pricing among big Italian audit firms (Cameran, 2005). If fees and, hence audit effort, are fixed, it is a-priori unclear that audit effort would be affected by firm rotations.[15]

Accounting data are taken from Compustat Global (industrial/commercial issue). The names of the audit firm and audit partner were hand-collected from financial statements, available online or on the cd-rom Borsa Italiana.[16] The final sample for the period 2006-2012 consists of 1,100 client-year observations (227 client-firms belonging to 11 industries[17]). In

[14]In particular, a break was mandated in 2006 for all partner engagements which in that year had a duration of six years or more.
[15]See Cameran (2005) for further detail on the Italian audit market.
[16]Audit firm data are also available on Compustat, but many mistakes were found. For this reason, audit firm identity was manually checked against the client's annual report.
[17]Using the Fama-French 12-industries classification.

total, we have 76 firm mandatory rotations, and 150 partner mandatory rotations (which include firm rotations). In additional analyses we examine a sample that includes the period preceding the introduction of mandatory partner rotations. The resultant extended sample period of 1993-2012 contains 2,104 firm year observations (inclusive of 141 firm mandatory rotations). All the samples exclude firm-years with voluntary partner or voluntary firm rotations. [18]

3.1. Measures of Audit Quality

High-quality audit is characterized by its ability to constrain management's self-serving accounting choices (Jones, 1991; Dechow, 1994; Subramanyam, 1996; DeFond & Jiambalvo, 1994; Dechow, Sloan, & Sweeney, 1995; Wysocki, 2004). Since audit quality is unobservable, we regard reported earnings as the outcome of a process in which the auditors influence clients' reporting decisions (Antle & Nalebuff, 1991), and so earnings are also a function of audit quality (e.g., Becker et al., 1998). We therefore employ a number of different measures of audit quality, each possibly capturing different dimensions of audit quality (DeFond & Zhang, 2014). In addition, we also examine the market's perception of earnings quality (DeFond & Zhang, 2014).

3.1.1. Accounting-based measures of audit quality – abnormal accruals

Building on prior research, we employ three measures of audit quality, including two measures of abnormal accruals and one measure of discretionary revenues. The first is absolute abnormal working capital accruals (*AAWCA*). Following DeFond & Park (2001) and Carey & Simnett (2006), abnormal working capital accruals are defined as:

$$AAWCA_{i,t} = \left| WC_{i,t} - WC_{i,t-1} * \frac{S_{i,t}}{S_{i,t-1}} \right| \quad (1)$$

where $WC_{i,t}$ is the actual level of working capital observed in year *t* for firm *i*, scaled by total assets. In particular (ignoring the index *i* and scaling):

[18] We find our results are not sensitive to the exclusion of voluntary rotation firm-years. See section 5 below.

$$WC_t = (Current\ assets_t - Cash_t - Short\ term\ investments_t) - (Current\ liabilities_t - Short\ term\ debt_t) \quad (2)$$

The second term ($WC_{i,t-1} * \frac{S_{i,t}}{S_{i,t-1}}$) in Equation (1) represents the predicted value of working capital, calculated as prior year's working capital adjusted for the change in sales. As noted by Wysocki (2004), this measure of abnormal accruals is particularly suitable for this sample, because the Italian stock market is relatively young and small. We use the absolute measure of *AWCA* consistent with extant prior research (e.g., Carey & Simnett, 2006; Fargher et al., 2008; Carcello, & Li, 2013) to mitigate the concern that there is an offsetting effect in signed accruals between positive and negative abnormal accruals.

The second measure of audit quality, following Dechow & Dichev (2002) and McNichols (2002), is the absolute value of the regression residual (*ADD*):

$$CA_{i,t} = \alpha + \beta_1 CFO_{i,t-1} + \beta_2 CFO_{i,t} + \beta_3 CFO_{i,t+1} + \beta_4 \Delta Rev_{i,t} + \beta_5 PPE_{i,t} + \varepsilon_{i,t} \quad (3)$$

where current accrual (*CA*) is net income before extraordinary items, plus depreciation and amortization, minus operating cash flows, scaled by beginning of year total assets. The inclusion of the three operating cash flows stems from the accounting process, whereby accruals allocate to current income past, present and past cash flows (Dechow & Dichev, 2002). One limitation of the Dechow & Dichev (2002) model is that the limited time series of operating cash flows leaves out fundamental factors that may affect accruals. McNichols (2002) suggests that this limitation can be mitigated by the inclusion of change in sales (*ΔRev*) and property plant and equipment (*PPE*). The residual thus captures the part in current accruals that is not attributed to the time series of cash flows and other fundamentals. It therefore proxies for managerial discretion in accruals.

The third measure of audit quality is the absolute value of discretionary revenues (*ARESREV*) (McNichols & Stubben, 2008; Stubben, 2010; Chen, Hope, Li & Wang, 2011).

Specifically, *ARESREV* is the absolute value of the residual from a model that relates the change in accounts receivables to the change in revenues:

$$\Delta AR_{i,t} = \alpha + \beta \Delta Rev_{i,t} + \varepsilon_{i,t} \quad (4)$$

where $\Delta AR_{i,t}$ is annual change in accounts receivable and $\Delta Rev_{i,t}$ is the annual change in revenues, each scaled by beginning total assets. Stubben (2010) argues this measure is subject to a smaller measurement error and bias than other measures of discretionary accruals. Additionally, manipulating earnings is commonly carried out at the revenue recognition level.

3.1.2. Market perceptions of audit quality

To measure a market-based proxy of audit quality we follow recent studies (Carcello & Li, 2013; Cameran et al., 2015) and examine how the earnings response coefficient (*ERC*) from the regression of stock returns on rotation variables and various controls varies with mandatory rotations. *ERC* is a common measure of earnings informativeness, reflecting investors' perceptions of audit quality. DeFond & Zhang (2014) argue that although this is an indirect measure of audit quality, it is more comprehensive because it also captures auditor's influence on disclosure quality and subtler audit deficiencies. This approach captures the effect of rotations on perception in-appearance of auditor independence,

3.2. Regression models

3.2.1. Audit quality

To examine the incremental effect on audit quality of adding audit partner rotations, to a regime that already requires audit firm rotation, we estimate the following model (omitting firm *i* and time *t* indexing):

$$AQ = \alpha_0 + \alpha_1 PMROT + \alpha_2 FMROT + \alpha_3 AGE + \alpha_4 BIG + \alpha_5 SIZE + \alpha_6 LOSS + \alpha_7 LEV + \alpha_8 GROWTH + \alpha_9 ROA + \alpha_{10} CFO + Year\ F.E. + Firm\ F.E. + \varepsilon \quad (5)$$

where *AQ* is either *AAWCA*, *ADD* or *ARESREV*, as defined above. Our main variables of interest are *PMROT*, which takes the value of one if either the audit partner rotates, or the

audit firm rotates, and zero otherwise, and *FMROT*, which takes the value of one if the audit firm rotates, and zero otherwise. More specifically, all firm rotations taking place within the nine-year period are deemed as voluntary. If a partner serves for six years following a firm rotation, then we identify the seventh year as a mandatory partner rotation. Partner rotations following a tenure of less than six years, or less than three years in the case of a partner replacing a six-year partner, are regarded as voluntary. If partner tenure is three years and is preceded by partner tenure of six years and ends with a firm rotation, we classify this as a mandatory firm and partner rotation. This coding reflects the fact that, whenever the audit firm changes, the partner also changes. The coefficient on *FMROT* therefore measures the incremental effect of rotating audit firm over and above the effect of partner rotating. Finding that a particular type of rotation is positively (negatively) associated with *AQ*, would suggest that this rotation type is associated with poorer (better) audit quality.

We also include a number of client-specific control variables based on the prior literature. These include: firm age (*AGE*), the number of years the client company has been listed on the Milan Stock Exchange (Anthony & Ramesh, 1992; Carey & Simnett, 2006); Big-4 auditor indicator (*BIG*) (Becker et al., 1998; Francis, Maydew, & Sparks, 1999); the size of the client-firm (*SIZE*), since abnormal accruals are found to be negatively related to firm size (Johnson et al., 2002; Cameran et al., 2015 and Cameran et al., 2016). We include a number of additional variables which control for the client's incentives to manage earnings. The first is an indicator variable if the firm made a prior year loss (*LOSS*).[19] We do so since firms who report a loss in the previous year are expected to engage more aggressively in earnings management in order to avoid showing losses in the current financial year (Carey & Simnett, 2006; Cameran et al., 2015). Additionally, we include leverage (*LEV*), since earnings management is often used to avoid violation of debt covenants (DeFond &

[19]Using current loss does not change our results.

Jiambalvo, 1994; Carey & Simnett, 2006); firm growth (*GROWTH*) controls for the impact of growth on accruals (Carey & Simnett, 2006), while return on assets (*ROA*), which is based on earnings before extraordinary items (Carcello & Li, 2013), controls for the possibility that abnormal accruals are influenced by underlying profitability (Kothari, Leone & Wasley, 2005). Finally, we include operating cash-flows (*CFO*) as an accruals-free measure of performance (Davis, Soo & Trompeter, 2009; Carcello & Li, 2013).

3.2.2. Earnings informativeness analysis

To test how the market perceives the incremental benefit of mandatory partner rotation and firm rotation, using the level of earnings informativeness, we run the following model, which is based on Carcello & Li (2013) (omitting firm *i* and time *t* indexing):

$$RET = \alpha_0 + \alpha_1 PMROT + \alpha_2 FMROT + \alpha_3 AGE + \alpha_4 BIG + \alpha_5 SIZE + \alpha_6 LOSS + \alpha_7 LEV + \alpha_8 GROWTH + \alpha_9 ROA + \alpha_{10} CFO + \alpha_{11} PMROT*ROA + \alpha_{12} FMROT*ROA + \alpha_{13} AGE*ROA + \alpha_{14} BIG*ROA + \alpha_{15} SIZE*ROA + \alpha_{16} LOSS*ROA + \alpha_{17} LEV*ROA + \alpha_{18} GROWTH*ROA + \alpha_{19} CFO*ROA + Year\ F.E + Firm\ F.E. + \varepsilon, \quad (6)$$

where *RET* is client firm's stock return over the fiscal year. Note that α_9 is the *ERC* in non-rotation years. The main variables of interest in this analysis are the interactions: *PMROT***ROA* and *FMROT***ROA*. In particular, to the extent that mandatory partner rotation is associated with higher (lower) earnings informativeness (i.e., higher, or lower, *ERC*), the coefficient α_{11} is expected to be positive (negative). To the extent that mandatory firm rotation is associated with incremental increase (decrease) in earnings informativeness, α_{12} is expected to be positive (negative).

In all regression models above, we also control for year and firm fixed effects and all regressions utilize robust variance estimates clustered at the individual firm level to control for potential bias in the estimates (Petersen, 2009). All continuous variables are winzorised at the top and bottom 1%. Appendix 1 presents detailed variable definitions.

4. Empirical results

4.1. Descriptive statistics and univariate analysis

Panel A of Table 1 reports the descriptive statistics of all the variables in Equations (5) and (6). *AAWCA* has a mean (median) value of 0.101 (0.042), which is comparable to Cameran et al. (2015) (0.085 and 0.039, respectively). *ADD* has a mean (median) value of 0.038 (0.025) and *ARESREV* a mean (median) of 0.049 (0.028). We also report the descriptives for the signed measures, *AWCA*, *DD* and *RESREV*. The mean values of *AWCA* and *RESREV* are consistent with conservative accounting. Annual stock return (*RET*) is negative, on average with a return of -3.5%. We find mandatory partner rotations, either within the same audit firm or as a result of change in audit firm, occur in almost 14% of firm-year observations and audit firm rotation of 7% of firm-year observations. This implies the rate of partner rotations within the same audit firm in the sample is also about 7% (or half of all mandatory rotations).

As for the control variables, client firms are mature, with an average age of 17 years. Most clients are audited by Big-4 audit firms (86%), about 18% report a prior loss, have an average ratio of debt to total assets (*LEV*) of 0.265, and show sales growth of 8.8%.[20] Though the rate of loss reporting is small, the average ROA is negative. Nevertheless, the median firm is profitable (*ROA* = 0.015). Operating cash flow is positive (mean = 0.048).

Panel B of Table 1 reports the distribution of rotation types per year for the 2006-2012 period. Of the 150 partner rotations 40 occurred in 2006; this large number reflects the fact the rule was applied retrospectively. Additionally, 2008 is characterized by a large number of rotations, both at the firm and partner levels (31 & 23, respectively). We are not aware, however, of any particular underlying cause for such a high frequency. Panel C of Table 1 compares rotation years where only the partner changes (i.e., 74 within the incumbent audit

[20]The mean and median values of our leverage ratio are lower than what is reported by Cameran et al. (2016) (0.53 & 0.55, respectively). However, we account only for debt liabilities whereas Cameran et al. (2016) use total liabilities. Growth rate in their sample is slightly higher than ours (mean: 0.11; median: 0.07).

firm) to rotation years where the audit firm and partner change (76 observations). Partner rotations within the same firm are associated with significantly lower mean absolute and signed accruals (*AAWCA* and *AWCA*, respectively). The mean of the signed *DD* measure is also lower for partner rotations within the same firm. Firm rotations are associated with negative mean and median returns, while partner rotations are associated with positive mean and median returns. The differences in *RET* are statistically significant.

[Insert Table 1 here]

Table 2 presents the pairwise Pearson correlation coefficients below the diagonal and Spearman above the diagonal. Overall, most correlation coefficients are either insignificant, or have a low significance. However, *PMROT* is negatively and significantly associated with all measures of discretionary accruals, in contrast to *FMROT* which is insignificant, except in the case of *ARESREV*. *PMROT* and *FMROT* are highly correlated, owing to the fact that firm rotations is a subset of *PMROT*.[21]

[Insert Table 2 here]

4.2. Regression results

4.2.1. Accounting-based measures of audit quality

Table 3 reports the coefficients of Equation (5) for each of our measures of discretionary earnings and standard errors in parentheses. In column (1) the dependent variable is *AAWCA*, column (2) *ADD* and column (3) *ARESREV*. The last column reports the results of Equation (6).

We find partner rotation (*PMROT*) is associated with improved audit quality across the two measures of discretionary accruals and the measure of discretionary revenues. Specifically, the coefficient on *PMROT* in columns (1), (2) and (3) is negative and significant at the one percent or five percent level. In contrast, the coefficient on *FMROT* in all columns

[21] We run the VIF test in our regressions and results show no sign of multicollinearity issues (maximum VIF around 2, well below the 10-threshold suggested by Kennedy, 2008).

(1 to 3) is positive, but only significant at the five percent level in column (1). The economic effect is also substantial. Partner rotation is associated with a 36% reduction of the mean of *AAWCA*. For *ADD* and *ARESREV* the reduction is equal to 26% of their means. As to the controls, *SIZE* is positively and significantly related to *ADD* and *GROWTH* is negatively related to *AAWCA* with modest significance. The other controls are largely insignificant, but this is likely attributable to the use of firm fixed effects which reduces the variability of the independent variables.[22] [23]

[Insert Table 3 here]

4.2.2. Earnings informativeness

Column (4) in Table 3 provides the evidence on earnings informativeness around rotation years, as per Equation (6). Recall the coefficients of interest - the interaction between *ROA* and the rotation variables. The coefficient on *PMROT*ROA* is positive and significant at the one percent level, suggesting that partner rotations are associated with improved earnings informativeness, as perceived by the market. The coefficient of 2.578 suggests that one standard deviation in *PMROT*ROA* is associated with an increase of 6% in annual return. In contrast, the coefficient on *FMROT*ROA* is negative, and significant at the one percent level, indicating the market perception of the effect of firm rotations on audit quality is not incrementally favourable. Specifically, one standard deviation in *FMROT*ROA* is associated with a decrease of 6% in annual return.

With respect to the control variables the evidence supports the positive association between returns and firm age, firm size and leverage. Additionally, earnings informativeness is positively related to operating cash flows and auditor size.

4.2.3. Comparing rotation year to the preceding year

[22]Most of the controls in Cameran et al. (2015) in their analysis of *AAWCA* are also insignificant, as they also use firm fixed effects.

[23]The following variables lose significance in one or more specifications once we include firm fixed effects instead of industry fixed effects: *SIZE*, *AGE*, *ROA*, *CFO*, *AGE*ROA* and the intercept

The main analyses pool together rotation years with *all* non-rotation years and uses the latter as the reference point. A concern regarding this specification is that the results may be attributed not to the effect of rotations per-se, but potentially to other differences in the cross-section we do not control for. We therefore analyse a subsample of firm-years excluding non-rotation years.[24] In other words, for each firm that has experienced a mandatory rotation (either at the audit firm level or partner level) we have two observations.While the aim is to form a balanced panel for the year preceding and year that immediately follows rotations, we are constrained by the fact that we do not have observations prior to 2006, as we exclude observations that relate to the pre-period.

The results of this analysis are presented in Table 4, which is structured in a similar fashion to Table 3. The coefficient on *PMROT* is negative and significant at the five percent (column 1) and ten percent (columns 2&3). The reduction in the measures of *AQ* owing to mandatory partner rotations is equivalent to 33% reduction of the mean of *AAWCA*. The comparable figures for *ARESREV* and *ADD* are 27% and 29%, respectively. In contrast, the coefficient on *FMROT* in columns (1)-(3) is insignificant. This suggests that mandatory firm rotation does not have a discernible effect on audit quality in the first year. Column (4) indicates that the *ERC* is similar in the year preceding and the year of rotation, regardless of the rotation type. Nevertheless, returns are on average lower in a firm rotation year (coefficient = -0.283 and significant at the one percent level).

[Insert Table 4 here]

4.2.4. Firm rotation under single rotation regime

Our results so far suggest audit firm rotation does not improve audit quality. One potential explanation is that, while partner rotations improve audit quality, firm rotations involve an

[24]This analysis focuses on the immediate effects of firm and partner rotations relative to the previous year, and so cannot speak about longer-term effects of rotations. Note that, like Cameran et al. (2016) (in the case of mandatory firm rotations), this specification holds fixed the client firm. However, unlike Cameran et al. (2016), it compares the year audited by the outgoing audit firm to the year audited by the incoming audit firm.

incremental adverse effect perhaps owing to loss of client-specific knowledge and other set-up costs. Since audit firm rotation involves partner rotation, the finding of no relation between firm rotations and audit quality suggests that the two effects cancel each other out. With these insights in mind, we explore the period prior to the requirement to rotate audit partners e.g., before 2006, when in Italy only firm rotation was mandatory. The aim is to assess whether the no effect we have documented from 2006 onwards is unique to the dual rotation regime period, or more general in nature. Specifically, we examine the 1993-2004[25] period, which features 63 mandatory firm rotations. The sample consists of 860 observations and Panel A of Table 5 describes this sample. Comparing this sample to the 2006-2012 sample we note they are similar. For example, firm rotation rate in the early period is 7.3% while in the later period is 6.9%. Nonetheless some differences are noteworthy. *RET* and *ROA* in the early period are positive, on average, but negative in the 2006-2012 period. Firm size seems larger in the early period and growth rates lower.

Panel B of Table 5 presents the results of this analysis. We find no relation between mandatory firm rotation and audit quality (columns (1)-(3)).[26] This is broadly consistent with the findings reported in Table 3 for 2006-2012 for the audit quality measures. There is also no evidence that earnings informativeness is affected by mandatory firm rotations (column (4)). While these findings do not indicate that mandatory firm rotations in 1993-2004 improved audit quality, or earnings informativeness, this may reflect that audit quality and earnings informativeness are sufficiently high prior to the rotation.

[Insert Table 5 here]

We further explore the possibility that the effect of firm rotation differs between the two rotation regimes. To do so we combine the two periods to a single sample of 1,960 observations during 1993-2012. The descriptive statistics of this sample are reported in Panel

[25]We excluded year 2005 as this was the first year in which IFRS were introduced for listed companies in Italy.
[26]Our results remain the same if we control for partner voluntary rotations in this period.

A of Table 6. Broadly speaking, the descriptives for 1993-2012 are similar to the two sub-periods we have examined above. We re-run Equations (5) and (6), as before, but now allowing the coefficient of *FMROT* to vary between the two periods. We do so by adding an interaction term *FMROT*POST06*, where *POST06* is equal to 1 in 2006-2012 and zero otherwise. We also allow a different intercept for the two periods by adding *POST06* to the models. The results of these analyses are reported in Panel B of Table 6. For *AAWCA*, the coefficient on *FMORT* is negative and significant at 5% or better. This suggests that *AAWCA* was negatively related to mandatory firm rotation up to 2004. However, the interaction term *FMROT*POST06* is positive and marginally significant at the ten percent level, suggesting that firm rotations in 2006-2012 have a countervailing effect on *AAWCA* than before. The sum of the two coefficients, representing the overall relation between *AAWCA* and mandatory firm rotation in 2006-2012, is 0.010 and is insignificant. As for the other measures of audit quality we do not find that either in the early period or the later period firm rotations are associated with improved audit quality. We therefore conclude that there is little evidence of improved audit quality associated with mandatory firm rotations.

Regarding price informativeness, as is seen from the coefficient on *FMROT*POST06*ROA* in column (4) of Panel B, there is no evidence that the information effect of firm rotation varies significantly between the two periods. Moreover, in the early period there is no information effect, consistent with Table 5. As for the 2006-2012 the sum of the coefficients *FMROT*ROA* + *FMROT*POST06*ROA* is -0.701 and is statistically insignificant.

5. Additional analyses

We run several robustness tests to affirm the nature of our findings. First, it is possible that when client firms rotate their auditors, changes to other corporate governance mechanisms also take place. This could confound our findings. Therefore, we hand-collect data on CEO

duality, board size and percentage of independent directors. The results from this analysis remain qualitatively unchanged (untabulated).

Second, we repeat our analyses excluding cases where audit firm rotations include a change of auditor type (i.e. between the group of Big and non-Big audit firms) to assess whether these changes drive the results. We find that these cases are quite rare: 18 switches in total. Our results are not sensitive to this specification (untabulated).

Third, in the main analyses we exclude firm-years with voluntary partner or firm rotations, as these rotations may be motivated by a breakdown in auditor-client relationship, owing for example, to financial distress. We examine the sensitivity of our results to the inclusion, or exclusion of these observations. We re-estimate Tables 3, 5 and 6 in two ways. First by including voluntary rotation years, and adding voluntary rotation indicator variables, and second by excluding ALL client-firm-year observations, if a voluntary rotation takes place at any time during the period. The second approach is very conservative as it removes many useful observations, but at the same time controls for unobserved factors that may be associated with a voluntary rotation either prior to or following the rotation. As we report in the online appendix,[27] we find our inferences are largely unaffected.

Fourth, we acknowledge the possibility the effects of mandatory firm rotations are detectable beyond the first year, maybe due to auditor learning effects documented in the prior literature (e.g., Myers et al., 2003); or that auditor incentives may be influenced by an imminent rotation e.g. incentives to reduce the embarrassment effect after rotation. To investigate these possibilities we re-run Tables, 3, 5 & 6 dropping rotation firm years and replacing them with an indicator variable for the preceding year and an indicator variable for the following year; or alternatively expanding the window to include two years preceding and two years following a mandatory rotation. Overall, we find our inferences regarding the

[27] The online appendix also reports other analyses that, for brevity, are not discussed in this section.

effects of mandatory firm rotations after 2006 do not change (see online appendix). However, we find some accruals-based evidence that audit quality improves in the year prior to mandatory firm rotation in 1993-2005.

Fifth, in our main analyses we use absolute measures of abnormal accruals. This could potentially mask rotation effects on aggressive vs. conservative reporting. To examine this issue we rerun Tables 3, 5 & 6 using signed measures (see online appendix). In 2006-2012 we find evidence suggesting partner rotations reduce extreme reporting in both directions. In 1993-2005 we find firm rotations reduce earnings inflation, but that this effect is reversed in 2006-2012.

Sixth, Aobdia (2019) finds that reporting small profits (*SPOS*) is highly correlated with audit deficiencies detected by the PCAOB. Accordingly, we run logit regressions to assess if mandatory rotations are associated with the incidence of *SPOS*, where *SPOS* takes the value of one if *ROA* is between 0% to 3% and zero otherwise. As reported in the online appendix, in 2006-2012 we find that mandatory partner rotations are negatively related to the likelihood of SPOS (*p*-value = 10%), while firm rotations are unrelated to *SPOS*. This is consistent with the accruals-based measures results reported in Table 3. When we compare the year before and year after rotations in 2006-2012, we find results consistent with Table 4. Examining 1993-2004, when only firm rotation was required, we find that firm rotations are unrelated to *SPOS* consistent with Table 5.

Seventh, we follow Chen et al.'s (2018) advice and rerun the one-step models for the Dechow & Dichev (2002) model and the McNichols and Stubben (2008) model (see online appendix). Overall, the results and inferences are largely consistent with Tables 3-5 above (see online appendix).

Lastly, we repeat our analyses using the smaller sample for which we have data for all our variables (i.e. 703 observations for the post-2006 period); our results remain qualitatively similar using this panel.

6. Conclusion

Overall our findings suggest, in a dual mandatory audit rotation regime, the market perceives partner rotations as enhancing earnings informativeness and improving accounting quality. However, firm rotation does not improve either informativeness or accounting quality. Collectively, these findings could support the decision by US regulators not to require audit firm rotations, and the EU Regulation to allow long firm tenure. However, we cannot rule out the possibility that the observed partner rotation benefits may be preconditioned on the subsequently audit firm rotation. If this is true, the US regulators' decision not to rotate firms may reduce the benefits arising from the audit partner rotation requirement.

In assessing this paper's results further two observations are in order. First, we study a specific regime in which firm tenure is restricted to nine years and partner tenure is limited to six years. Other countries have adopted a different set of limits to partner and firm tenure and the combined effect may differ from what is documented here. Second, institutional settings vary across audit and capital markets (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1998; Spamann, 2010). To the extent that audit quality is influenced by these features, our results do not generalize to countries with stronger or weaker institutions. This caveat notwithstanding, Leuz (2010) finds Italy has similar regulatory and market attributes consistent with 21 other countries (see also La Porta et al. (1998) and Wingate (1997)). Therefore, our findings may be of relevance for a significant number of countries that share similar characteristics with Italy. However, we call on future research to explore the effects of a dual mandatory rotation regime in countries with similar, or dissimilar, regulatory characteristics as in Italy, if and when data become available.

Supplemental Data and Research Materials

Online Appendix: Additional Analyses

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Appendix: Variable Definitions

	Definition[28]
DEPENDENT VARIABLES	
AAWCA	Absolute value of abnormal working capital accruals (*AWCA*) (DeFond and Park, 2001) scaled by total assets which is determined as a function of working capital (*WC*) and current and lagged sales (S): $AAWCA_{i,t} = \left\| WC_{i,t} - WC_{i,t-1} * \frac{S_{i,t}}{S_{i,t-1}} \right\|$ Working capital (*WC*) is defined as current assets (Compustat mnemonic ac) excluding cash (ch) and short-term investment (ivstsf) minus current liabilities (lct) excluding short-term debt (dlcfs). The mnemonic for *S* is revt and for total asset is at.
ADD	The absolute value the residual from Dechow and Dichev's model (2002), as modified by McNichols (2002): $CA_{i,t} = \alpha + \beta_1 CFO_{i,t-1} + \beta_2 CFO_{i,t} + \beta_3 CFO_{i,t+1} + \beta_4 \Delta Rev_{i,t+} \beta_5 PPE_{i,t+} \varepsilon_{i,t}$ Where, *CA* = is net income before extraordinary items (ib) plus depreciation and amortization minus (dp) operating cash flows (oancf), scaled by beginning of year total assets (at). Compustat mnemonics are: *CFO* - oancf and *PPE* – ppegt. *DD* is the signed residual.
ARESREV	Absolute discretionary revenues (McNichols and Stubben, 2008; Stubben, 2010; Chen et al., 2011), which is the absolute value of the residual from a model that relates the change in accounts receivables to the change in revenues: $\Delta AR_{i,t} = \alpha + \beta \Delta Rev_{i,t} + \varepsilon_{i,t}$ where $\Delta AR_{i,t}$ is annual change in accounts receivable (mnemonic rect) and $\Delta Rev_{i,t}$ is the annual change in revenues, each scaled by beginning total assets. *RESREV* is the signed residual.
RET	Firm's stock return over the fiscal year.
VARIABLES of INTEREST (Audit partner and audit firm data were hand-collected from the audit report.)	
$PMROT_t$	An indicator dummy (ID) = 1 if there has been a mandatory partner rotation, inclusive of a change in partner as a result of an audit firm change in year t, 0 otherwise.
$FMROT_t$	ID = 1, if there has been a mandatory firm rotation in year t, 0 otherwise.
CONTROL VARIABLES	
AGE	Number of years passed since the client's IPO. Source: the Italian Stock Exchange Website.
BIG	ID = 1 if the audit firm is a Big-4 audit firm (E&Y, PWC, KPMG, Deloitte), 0 otherwise.
SIZE	Natural logarithm of total sales.
LOSS	ID = 1 if net income is negative in prior year, 0 otherwise (in).
LEV	Long term Debt (dltt) + Debt in current liabilities (dlc) divided by total assets (at).
GROWTH	Change in sales between period t and t-1, divided by sales in year t-1.
ROA	Return on Assets, measured as Income Before Extraordinary Items (ib) over total assets (at).
CFO	Operating cash flows (oancf) in year t scaled by beginning total assets

[28] Where possible, Compustat mnemonics are indicated in parentheses.

Table 1: Sample of Italian Firms between 2006-2012

Panel A: Descriptive statistics

	N	*Mean*	*SD*	*Q1*	*Median*	*Q3*
Dependent Variables						
AAWCA	1,100	0.101	0.198	0.016	0.042	0.093
ADD	912	0.038	0.041	0.001	0.025	0.051
ARESREV	1,100	0.049	0.072	0.011	0.028	0.056
AWCA	1,100	-0.006	0.239	-0.051	-0.004	0.046
DD	912	0.003	0.059	-0.022	0.004	0.028
RESREV	1,100	-0.002	0.086	-0.033	-0.005	0.020
RET	703	-0.035	0.539	-0.350	-0.082	0.147
Variables of Interest						
$PMROT_t$	1,100	0.136	0.343	0.000	0.000	0.000
$FMROT_t$	1,100	0.069	0.254	0.000	0.000	0.000
*PMROT*ROA*	703	0.002	0.025	0.000	0.000	0.000
*FMROT*ROA*	703	0.001	0.017	0.000	0.000	0.000
Control Variables						
AGE	1,100	16.973	25.938	6.000	10.000	15.500
BIG	1,100	0.864	0.343	1.000	1.000	1.000
SIZE	1,100	6.581	3.257	4.538	5.634	7.514
LOSS	1,100	0.175	0.381	0.000	0.000	0.000
LEV	1,100	0.265	0.163	0.134	0.269	0.374
GROWTH	1,100	0.088	0.487	-0.050	0.052	0.172
ROA	1,100	-0.003	0.096	-0.018	0.015	0.041
CFO	1,100	0.048	0.080	0.006	0.049	0.091

All variables are defined in Appendix 1.

Panel B: Number and type of rotations by year

Year	PMROT (#)	FMROT (#)
2006	40	2
2007	15	9
2008	31	23
2009	11	5
2010	17	13
2011	14	7
2012	22	17
TOTAL	**150**	**76**

Panel C: Mandatory partner rotation year vs. mandatory firm rotation year in 2006-2012

	Partner Rotation without Firm Rotation			Mandatory Firm Rotation			Difference	
	N	**Mean**	**Median**	**N**	**Mean**	**Median**	**Mean**	**Median**
	(1)	(2)	(3)	(4)	(5)	(6)	(2)-(5)	(3)-(6)
Dependent Variables:								
AAWCA	74	0.060	0.033	76	0.099	0.042	-0.038*	-0.009
ADD	69	0.028	0.020	56	0.029	0.018	-0.001	0.002
ARESREV	74	0.037	0.020	76	0.031	0.021	0.006	-0.001
AWCA	74	0.011	0.033	76	0.034	0.042	-0.023**	-0.009
DD	69	-0.005	0.020	56	0.005	0.018	-0.010*	0.002
RESREV	74	0.000	0.020	76	-0.001	0.021	0.001	-0.001
RET	59	0.056	0.050	47	-0.240	-0.269	0.296***	0.319***
Independent Variables:								
AGE	74	17.216	9.000	76	20.231	12.000	-3.021	-3.000***
BIG	74	0.932	1.000	76	0.901	1.000	0.025	0.000
SIZE	74	7.511	6.347	76	7.780	6.779	0.270	-0.432
LOSS	74	0.135	0.000	76	0.145	0.000	-0.010	0.000
LEV	74	0.272	0.263	76	0.306	0.301	-0.330*	-0.038
GROWTH	74	-0.013	0.040	76	-0.019	0.028	0.007	0.012
ROA	74	0.011	0.021	76	-0.004	0.014	0.015	0.007
CFO	74	0.044	0.047	76	0.062	0.060	-0.018*	-0.013

Variable definitions: see Appendix 1. Differences in means are tested using t-tests and differences in medians are performed using the Wilcoxon rank-sum test. ***, **, * denote significance at the 1, 5 and 10 % respectively.

Table 2 - Correlations

	FMROT	*PMROT*	*AAWCA*	*ADD*	*ARESREV*	*RET*	*AGE*	*BIG*	*SIZE*	*LOSS*	*LEV*	*GROWTH*	*ROA*	*CFO*
FMROT		**0.795**	-0.023	-0.026	-0.036	-0.042	**0.129**	0.008	**0.076**	-0.013	0.036	-0.031	-0.003	0.038
PMROT	**0.830**		**-0.054**	**-0.060**	**-0.065**	-0.016	**0.132**	0.023	**0.072**	-0.018	0.037	-0.026	-0.004	-0.026
AAWCA	-0.027	**-0.045**		**0.360**	**0.264**	-0.006	-0.027	-0.032	**-0.186**	**0.076**	**-0.044**	0.009	**-0.181**	-0.018
ADD	-0.039	**-0.077**	**0.318**		**0.346**	**-0.056**	**-0.116**	**-0.080**	**-0.076**	-0.076	'0.070	0.006	**-0.073**	**-0.135**
ARESREV	**-0.040**	**-0.056**	**0.201**	**0.343**		0.008	**-0.117**	-0.039	**-0.083**	0.039	0.031	0.032	**-0.109**	**-0.119**
RET	-0.040	-0.032	-0.009	-0.045	-0.010		**0.063**	**0.069**	**0.114**	**-0.105**	-0.031	0.051	**0.307**	**0.231**
AGE	0.060	**0.048**	**0.111**	**0.049**	0.010	0.033		**-0.064**	**0.214**	-0.010	-0.017	**-0.119**	**-0.064**	0.018
BIG	0.011	0.021	-0.017	**-0.081**	-0.018	**0.046**	0.033		**0.246**	**-0.116**	0.028	0.039	**-0.128**	**-0.099**
SIZE	0.064	**0.005**	**-0.016**	-0.037	-0.022	**0.092**	**0.117**	**-0.171**		**-0.289**	**0.065**	**0.154**	**0.194**	**0.183**
LOSS	-0.009	-0.010	**0.097**	**0.069**	0.031	**-0.091**	0.033	**0.091**	**-0.028**		**0.198**	**-0.106**	**-0.280**	**-0.129**
LEV	0.034	**0.035**	**-0.044**	0.004	0.019	-0.001	0.013	0.026	0.009	**0.185**		**-0.056**	**-0.175**	**-0.055**
GROWTH	-0.019	-0.024	0.017	0.023	0.028	-0.020	**-0.041**	-0.001	**0.119**	-0.015	**-0.034**		**0.133**	0.091
ROA	-0.003	0.005	0.005	**-0.152**	**-0.244**	**0.218**	-0.057	**-0.087**	**0.155**	**-0.237**	**-0.099**	0.014		**0.513**
CFO	0.022	0.007	0.007	**-0.161**	**-0.202**	**0.135**	-0.057	**-0.078**	**0.146**	**-0.144**	**-0.059**	0.011	**0.464**	

The table reports Pearson correlation coefficients below the diagonal and Spearman correlation above the diagonal. Variable definitions are reported in Appendix 1. Bold face indicates a correlation coefficient that is significantly different from zero at a 5% level or better.

Table 3: Mandatory rotation and reporting quality (2006-2012)

$AQ = \alpha_0 + \alpha_1 PMROT + \alpha_2 FMROT + \alpha_3 AGE + \alpha_4 BIG + \alpha_5 SIZE + \alpha_6 LOSS + \alpha_7 LEV + \alpha_8 GROWTH + \alpha_9 ROA + \alpha_{10} CFO + Year\ F.E. + Firm\ F.E. + \varepsilon;$ (Eq. 5)

$RET = \alpha_0 + \alpha_1 PMROT + \alpha_2 FMROT + \alpha_3 AGE + \alpha_4 BIG + \alpha_5 SIZE + \alpha_6 LOSS + \alpha_7 LEV + \alpha_8 GROWTH + \alpha_9 ROA + \alpha_{10} CFO + \alpha_{11} PMROT*ROA + \alpha_{12} FMROT*ROA + \alpha_{13} AGE*ROA + \alpha_{14} BIG*ROA + \alpha_{15} SIZE*ROA + \alpha_{16} LOSS*ROA + \alpha_{17} LEV*ROA + \alpha_{18} GROWTH*ROA + \alpha_{19} CFO*ROA + Year\ F.E. + Firm\ F.E. + \varepsilon.$ (Eq. 6)

	Dependent Variable			
	(1)	(2)	(3)	(4)
	AAWCA	***ADD***	***ARESREV***	***RET***
PMROT	-0.036***	-0.010**	-0.013**	-0.076
	(0.013)	(0.004)	(0.006)	(0.061)
FMROT	0.053**	0.004	0.010	0.038
	(0.023)	(0.006)	(0.007)	(0.080)
AGE	-0.022	-0.011	-0.004	0.234**
	(0.022)	(0.009)	(0.008)	(0.103)
BIG	-0.022	0.011	-0.022	0.074
	(0.053)	(0.015)	(0.021)	(0.125)
SIZE	-0.000	0.002**	0.000	0.023**
	(0.003)	(0.007)	(0.001)	(0.010)
LOSS	0.017	0.000	0.001	-0.053
	(0.022)	(0.005)	(0.006)	(0.057)
LEV	0.015	-0.011	0.004	0.420*
	(0.057)	(0.016)	(0.020)	(0.229)
GROWTH	-0.020*	-0.005	-0.007	-0.041
	(0.011)	(0.004)	(0.005)	(0.038)
ROA	0.044	0.008	-0.001	-0.426
	(0.133)	(0.033)	(0.030)	(1.201)
CFO	0.057	-0.028	0.090	0.353
	(0.101)	(0.036)	(0.060)	(0.447)
*PMROT*ROA*				2.578***
				(0.671)
*FMROT*ROA*				-3.595***
				(1.042)
*AGE*ROA*				-0.027
				(0.017)
*BIG*ROA*				2.227*
				(1.181)
*SIZE*ROA*				-0.017
				(0.132)
*LOSS*ROA*				0.200
				(0.845)
*LEV*ROA*				1.342
				(0.229)
*GRWTH*ROA*				0.103
				(0.510)
*CFO*ROA*				8.200*
				(4.529)
Intercept	0.382	0.194	0.117	-3.594**
	(0.326)	(0.124)	(0.117)	(1.531)
Observations	1,100	912	1,100	703
Year F.E.	Yes	Yes	Yes	Yes
Firm F.E.	Yes	Yes	Yes	Yes
R-Squared (within)	0.054	0.033	0.034	0.345

This table reports the OLS estimates from Eq. (5) in columns 1-3, where the dependent variable is either *AAWCA*, *ADD*, and *ARESREV* and Eq. (6) in column 4. Variables of interest are: *PMROT*, equals one if either the audit partner or the audit firm rotates, zero otherwise; *FMROT*, equals one when the audit firm rotates, zero otherwise. Heteroskedasticity-robust standard errors are clustered by firm and reported in parentheses. *, **, and *** represent significance level of 10%, 5%, and 1%, respectively (two-tailed). All continuous variables are winzorised at 1%. All variable definitions are as reported in the Appendix above.

Table 4: Mandatory rotation and reporting quality - rotation vs. preceding year (2006-2012)

$AQ = \alpha_0 + \alpha_1\ PMROT + \alpha_2 FMROT + \alpha_3 AGE + \alpha_4 BIG + \alpha_5 SIZE + \alpha_6 LOSS + \alpha_7 LEV + \alpha_8 GROWTH + \alpha_9 ROA + \alpha_{10} CFO + Year\ F.E. + IND + \varepsilon$ (Eq.5)

$RET = \alpha_0 + \alpha_1 PMROT + \alpha_2 FMROT + \alpha_3 AGE + \alpha_4 BIG + \alpha_5 SIZE + \alpha_6 LOSS + \alpha_7 LEV + \alpha_8 GROWTH + \alpha_9 ROA + \alpha_{10} CFO + \alpha_{11} PMROT*ROA + \alpha_{12} FMROT*ROA + \alpha_{13} AGE*ROA + \alpha_{14} BIG*ROA + \alpha_{15} SIZE*ROA + \alpha_{16} LOSS*ROA + \alpha_{17} LEV*ROA + \alpha_{18} GROWTH*ROA + \alpha_{19} CFO*ROA + Year\ F.E. + IND. + \varepsilon.$. (Eq. 6)

	Dependent Variable			
	(1)	(2)	(3)	(4)
	AAWCA	***ADD***	***ARESREV***	***RET***
PMROT	-0.028**	-0.010*	-0.012*	-0.043
	(0.130)	(0.005)	(0.007)	(0.086)
FMROT	0.039	0.003	-0.005	-0.283***
	(0.026)	(0.006)	(0.009)	(0.087)
AGE	0.002**	-0.000	-0.000**	-0.002
	(0.001)	(0.000)	(0.000)	(0.001)
BIG	0.005	-0.006	-0.028	-0.161
	(0.029)	(0.008)	(0.024)	(0.157)
SIZE	-0.003	-0.000	0.001	0.018
	(0.003)	(0.001)	(0.010)	(0.011)
LOSS	0.017	0.004	0.012	-0.138
	(0.026)	(0.009)	(0.021)	(0.094)
LEV	0.058	-0.008	0.017	0.068
	(0.064)	(0.013)	(0.028)	(0.247)
GROWTH	0.003	0.006**	0.001	-0.036
	(0.013)	(0.003)	(0.007)	(0.062)
ROA	-0.297**	-0.057*	-0.001	0.291
	(0.117)	(0.003)	(0.050)	(1.851)
CFO	-0.182	0.066	0.007	0.191
	(0.137)	(0.055)	(0.122)	(0.775)
*PMROT*ROA*				0.743
				(1.120)
*FMROT*ROA*				-0.145
				(1.157)
*AGE*ROA*				-0.004
				(0.016)
*BIG*ROA*				0.984
				(1.381)
*SIZE*ROA*				-0.039
				(0.154)
*LOSS*ROA*				-0.138
				(0.979)
*LEV*ROA*				0.667
				(3.418)
*GRWTH*ROA*				-0.036
				(0.062)
*CFO*ROA*				6.507
				(6.967)
Intercept	0.020	0.033***	0.027**	0.067
	(0.034)	(0.008)	(0.012)	(0.158)
Observations	297	270	297	223
Industry Fixed Effects	Yes	Yes	Yes	Yes
R-squared (within)	0.271	0.153	0.194	0.142

This table reports the OLS estimates from Eq. (5) in columns 1-3, where the dependent variable is either *AAWCA*, *ADD*, and *ARESREV* and Eq. (6) in column 4. Variables of interest are: *PMROT*, equals one if either the audit partner or audit firm rotates, zero otherwise; *FMROT*, equals one when the audit firm rotates, zero otherwise. The sample excludes years other than the rotation year and the preceding year. Heteroskedasticity-robust standard errors are clustered by firm and reported in parentheses. *, **, and *** represent

significance level of 10%, 5%, and 1%, respectively (two-tailed). All continuous variables are winzorised at 1%. All variable definitions are as reported in the Appendix above.

Table 5: Mandatory audit firm rotation and reporting quality during single rotation regime (1993-2004)

Panel A: Descriptive Statistics

	N	Mean	SD	Q1	Median	Q3
Dependent Variables						
AAWCA	860	0.109	0.201	0.021	0.049	0.098
ADD	694	0.058	0.059	0.017	0.038	0.078
ARESREV	860	0.074	0.141	0.014	0.037	0.078
RET	766	0.053	0.493	-0.243	-0.005	0.241
Variables of Interest						
FMROT	860	0.073	0.261	0.000	0.000	0.000
Control Variables						
AGE	860	16.151	25.938	3.000	6.000	15.500
BIG	860	0.936	0.245	1.000	1.000	1.000
SIZE	860	8.143	3.909	4.066	6.944	11.964
LOSS	860	0.123	0.329	0.000	0.000	0.000
LEV	860	0.257	0.156	0.133	0.265	0.356
GROWTH	860	0.009	0.453	-0.085	0.034	0.153
ROA	860	0.004	0.091	-0.003	0.021	0.046
CFO	860	0.053	0.092	0.006	0.051	0.106

Panel B: Regression analysis of firm rotations (*FMROT*)

$AQ = a_0 + a_1\ PMROT + a_2 FMROT + a_3 AGE + a_4 BIG + a_5 SIZE + a_6 LOSS + a_7 LEV + a_8 GROWTH + a_9 ROA + a_{10} CFO + Year\ F.E. + Firm\ F.E. + \varepsilon$ (Eq.5)

$RET = a_0 + a_1 PMROT + a_2 FMROT + a_3 AGE + a_4 BIG + a_5 SIZE + a_6 LOSS + a_7 LEV + a_8 GROWTH + a_9 ROA + a_{10} CFO + a_{11} PMROT*ROA + a_{12} FMROT*ROA + a_{13} AGE*ROA + a_{14} BIG*ROA + a_{15} SIZE*ROA + a_{16} LOSS*ROA + a_{17} LEV*ROA + a_{18} GROWTH*ROA + a_{19} CFO*ROA + Year\ F.E. + Firm\ F.E. + \varepsilon.$. (Eq. 6)

	Dependent Variable			
	(1)	(2)	(3)	(4)
	AAWCA	***ADD***	***ARESREV***	***RET***
FMROT	-0.010	-0.009	-0.010	0.034
	(0.013)	(0.006)	(0.112)	(0.078)
AGE	0.000	0.002	0.000	-0.015***
	(0.001)	(0.001)	(0.002)	(0.004)
BIG	0.046	-0.020*	0.027	-0.230*
	(0.055)	(0.012)	(0.019)	(0.140)
SIZE	0.001	-0.001	-0.000	-0.010
	(0.002)	(0.001)	(0.002)	(0.006)
LOSS	-0.009	-0.006	0.005	-0.090*
	(0.024)	(0.008)	(0.027)	(0.053)
LEV	0.108*	-0.040	0.065	-0.027
	(0.062)	(0.026)	(0.040)	(0.161)
GROWTH	-0.004	0.007	-0.006	-0.007
	(0.016)	(0.006)	(0.021)	(0.037)
ROA	-0.097	-0.002	0.133	0.647
	(0.143)	(0.080)	(0.140)	(0.693)
CFO	-0.136	-0.102***	-0.136	0.156
	(0.105)	(0.034)	(0.162)	(0.225)
*FMROT*ROA*				-1.150
				(0.930)
*AGE*ROA*				0.001
				(0.008)
*BIG*ROA*				0.676
				(1.638)
*SIZE*ROA*				0.153**
				(0.067)
*LOSS*ROA*				0.296
				(0.792)
*LEV*ROA*				-2.902
				(2.467)
*GRWTH*ROA*				-0.614
				(0.426)
*CFO*ROA*				0.247
				(1.308)
Intercept	0.130***	0.047***	0.062	0.142
	(0.033)	(0.015)	(0.004)	(0.131)
Observations	860	694	860	766
Year F.E.	Yes	Yes	Yes	Yes
Firm F.E.	Yes	Yes	Yes	Yes
R-squared (within)	0.046	0.184	0.060	0.190

This table reports the OLS estimates, from Eq.(5) in columns 1-3, where the dependent variable is either *AAWCA*, *ADD*, and *ARESREV* and Eq. (6) in column 4. The sample is based on the pre-dual rotation regime 1993-2004 thus *PMROT* is excluded. Variables of interest is *FMROT*, equals one when the audit firm rotates, zero otherwise. Heteroskedasticity-robust standard errors are clustered by firm and reported in parentheses. *, **, and *** represent significance level of 10%, 5%, and 1%, respectively (two-tailed). All continuous variables are winzorised at 1%. All variable definitions are as reported in the Appendix above.

Table 6

Mandatory audit firm rotations and reporting quality pre and post dual audit rotation regime (1993 – 2012)

Panel A: Descriptive Statistics

	N	Mean	SD	Q1	Median	Q3
			Dependent Variables			
AAWCA	1,960	0.107	0.202	0.018	0.046	0.097
ADD	1,606	0.047	0.051	0.013	0.030	0.062
ARESREV	1,960	0.061	0.110	0.012	0.032	0.068
RET	1,469	0.009	0.522	-0.297	-0.054	0.196
			Variable of Interest			
FMROT	1,960	0.074	0.261	0.000	0.000	0.000
			Control Variables			
AGE	1,960	16.589	25.989	4.000	9.000	15.000
BIG	1,960	0.894	0.308	1.000	1.000	1.000
SIZE	1,960	7.257	3.640	4.703	6.054	8.967
LOSS	1,960	0.153	0.360	0.000	0.000	0.000
LEV	1,960	0.261	0.161	0.132	0.267	0.367
GROWTH	1,960	0.057	0.478	-0.066	0.044	0.164
ROA	1,960	-0.000	0.095	-0.012	0.018	0.043
CFO	1,960	0.051	0.086	0.000	0.050	0.097

PANEL B: Regression analysis

$AQ = a_0 + a_1FMROT + a_2FMROT*POST06 + a_3POST06 + a_4AGE + a_5BIG + a_6SIZE + a_7LOSS + a_8LEV + a_9GROWTH + a_{10}ROA + a_{11}CFO + Year\ F.E. + Firm\ F.E. + \varepsilon$

$RET = a_0 + a_1FMROT + a_2FMROT*POST06 + a_3POST06 + a_4AGE + a_5BIG + a_6SIZE + a_7LOSS + a_8LEV + a_9GROWTH + a_{10}ROA + a_{11}CFO + a_{12}FMROT*ROA + a_{13}FMROT*POST06*ROA + a_{14}POST06*ROA + a_{15}AGE*ROA + a_{16}BIG*ROA + a_{17}SIZE*ROA + a_{18}LOSS*ROA + a_{19}LEV*ROA + a_{20}GROWTH*ROA + a_{21}CFO*ROA + Year\ F.E. + Firm\ F.E. + \varepsilon.$.

	Dependent Variable			
	(1)	(2)	(3)	(4)
	AAWCA	***ADD***	***ARESREV***	***RET***
FMROT	-0.028**	-0.008	-0.017*	0.024
	(0.014)	(0.005)	(0.011)	(0.070)
*FMROT*POST06*	0.038*	0.008	0.007	-0.091
	(0.021)	(0.006)	(0.012)	(0.088)
POST06	-0.037	-0.034	-0.037	-0.315*
	(0.032)	(0.043)	(0.043)	(0.184)
AGE	-0.001	0.002***	0.002	0.025***
	(0.001)	(0.001)	(0.002)	(0.003)
BIG	-0.011	0.012	-0.012	0.024
	(0.033)	(0.007)	(0.009)	(0.071)
SIZE	0.000	0.001	0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.005)
LOSS	0.007	0.002	0.002	-0.090**
	(0.016)	(0.004)	(0.008)	(0.044)
LEV	0.016	-0.015	0.026	0.174
	(0.052)	(0.014)	(0.020)	(0.150)
GROWTH	-0.015*	0.000	-0.006	-0.067***
	(0.008)	(0.003)	(0.007)	(0.025)
ROA	-0.229*	-0.036	-0.018	0.899**
	(0.018)	(0.034)	(0.045)	(0.346)
CFO	-0.059	0.063**	-0.126	0.276*
	(0.083)	(0.024)	(0.102)	(0.165)
*FMROT*ROA*				-0.812
				(0.534)
*POST06*ROA*				-0.482
				(0.352)
*FMROT*POST06*ROA*				0.111
				(0.840)
*AGE*ROA*				-0.006
				(0.005)
*BIG*ROA*				0.455
				(0.374)
*SIZE*ROA*				0.079
				(0.044)
*LOSS*ROA*				-0.207
				(0.302)
*LEV*ROA*				-0.661
				(0.771)
*GRWTH*ROA*				-0.272
				(0.307)
*CFO*ROA*				1.249*
				(0.591)
Intercept	0.175***	0.043***	0.034	-0.283*
	(0.032)	(0.008)	(0.030)	(0.158)
Observations	1,960	1,606	1,960	1,469

Year F.E.	Yes	Yes	Yes	Yes
Firm F.E.	Yes	Yes	Yes	Yes
R-squared (within)	0.031	0.129	0.048	0.223

This table presents the regression results based on a sample from 1993 to 2012. *FMROT* equals one if the audit firm mandatorily rotated, zero otherwise. *POST06* equals one if the year is between 2006 to 2012 and zero otherwise. Heteroskedasticity-robust standard errors are clustered by firm and reported in parentheses. *, **, and *** represent significance level of 10%, 5%, and 1%, respectively (two-tailed). All continuous variables are winzorised at 1%. All variable definitions are as reported in the Appendix above.

Online supplemental materials to

EMPIRICAL EVIDENCE ON AUDIT QUALITY UNDER A DUAL MANDATORY AUDITOR ROTATION RULE

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Additional materials are available in an online Appendix at the journal's Taylor and Francis website

Table A1

Table 3 – Mandatory rotation and reporting quality with extension to earlier and later years (2006-2012)

	Dependent Variable			
	(1)	(2)	(3)	(4)
In the paper	***AAWCA***	***ADD***	***ARESREV***	***RET***
PMROT	**-0.036*** **	**-0.010** **	**-0.013** **	-0.076
	(0.013)	**(0.004)**	**(0.006)**	(0.061)
FMROT	**0.053** **	0.004	0.010	0.038
	(0.023)	(0.006)	(0.007)	(0.080)
ROA				-0.426
				(1.201)
PMROT*ROA				**2.578*** **
				(0.671)
FMROT*ROA				**-3.595*** **
				(1.041)
Dropping rotation years, and using indicators for the year before and the year after rotation	***AAWCA***	***ADD***	***ARESREV***	***RET***
PMROT-1	0.005	-0.007	0.003	0.084
	(0.015)	(0.005)	(0.008)	(0.127)
PMROT+1	-0.017	-0.004	0.001	-0.095
	(0.028)	(0.006)	(0.009)	(0.113)
FMROT-1	0.012	**0.013***	0.010	-0.117
	(0.029)	**(0.007)**	(0.017)	(0.159)
FMROT+1	0.044	**0.021***	0.027	-0.061
	(0.037)	**(0.010)**	(0.027)	(0.138)
ROA				0.333
				(1.571)
PMROT-1*ROA				-0.639
				(1.182)
PMROT+1*ROA				0.829
				(1.516)
FMROT-1*ROA				2.345
				(1.838)
FMROT+1*ROA				-1.083
				(2.637)
Dropping rotation years, and using indicators for the two years before and the two years after rotation	***AAWCA***	***ADD***	***ARESREV***	***RET***
PMROT-1&2	0.009	-0.003	0.002	-0.106
	(0.019)	(0.008)	(0.013)	(0.126)

PMROT+1&2	-0.013	0.002	0.005	-0.183
	(0.020)	(0.006)	(0.008)	(0.111)
FMROT-1&2	0.031	0.004	0.003	0.039
	(0.027)	(0.008)	(0.016)	(0.131)
FMROT+1&2	0.038	0.006	-0.041	0.153
	(0.023)	(0.007)	(0.018)	(0.147)
ROA				-0.283
				(1.450)
PMROT-1&2*ROA				-0.275
				(1.731)
PMROT+1&2*ROA				**3.324***
				(1.818)
FMROT-1&2*ROA				-1.411
				(1.920)
FMROT+1&2*ROA				-2.721
				(2.572)

Note: We report only the coefficients of interest, but the regression models include all control variables and econometric specifications as in the main tables in the paper.

Table A2

Table 5 - Mandatory audit firm rotation and reporting quality during single rotation regime (1993-2005)

	Dependent Variable			
	(1)	(2)	(3)	(4)
In the paper	***AAWCA***	***ADD***	***ARESREV***	***RET***
FMROT	-0.010	-0.009	-0.010	0.034
	(0.013)	(0.006)	(0.012)	(0.078)
ROA				0.647
				(0.693)
FMROT*ROA				-1.150
				(0.930)
Dropping rotation years, and using indicators for the year before and the year after rotation	***AAWCA***	***ADD***	***ARESREV***	***RET***
FMROT-1	**-0.021***	-0.005	-0.016	0.121
	(0.012)	(0.009)	(0.013)	(0.077)
FMROT+1	-0.016	-0.006	-0.023	-0.013
	(0.012)	(0.009)	(0.017)	(0.052)
ROA				-0.198
				(0.768)
FMROT-1*ROA				-0.962
				(0.992)
FMROT+1*ROA				0.037
				(0.874)
Dropping rotation years, and using indicators for the two years before and the two years after rotation	***AAWCA***	***ADD***	***ARESREV***	***RET***
FMROT-1&2	-0.018	-0.004	-0.008	**0.132****
	(0.014)	(0.007)	(0.014)	**(0.064)**
FMROT+1&2	-0.009	0.001	-0.019	0.064
	(0.018)	(0.008)	(0.017)	(0.050)
ROA				-0.377
				(0.659)
FMROT-1&2*ROA				-0.408
				(0.837)
FMROT+1&2*ROA				-0.923
				(0.725)

Note: We report only the coefficients of interest, but the regression models include all control variables and econometric specifications as in the main tables in the paper.

Table A3

Table 6 - Mandatory audit firm rotations and reporting quality pre- and post-dual audit rotation regime (1993 – 2012)

	Dependent Variable			
	(1)	(2)	(3)	(4)
In the paper	***AAWCA***	***ADD***	***ARESREV***	***RET***
FMROT	**-0.028****	-0.008	**-0.017***	0.024
	(0.014)	(0.005)	**(0.011)**	(0.070)
FMROT_POST06	**0.038***	0.008	0.007	-0.091
	(0.021)	(0.006)	(0.012)	(0.089)
POST06	-0.037	-0.034	-0.037	**-0.315***
	(0.032)	(0.042)	(0.043)	**(0.184)**
ROA				**0.899****
				(0.346)
FMROT*ROA				-0.812
				(0.534)
POST06*ROA				-0.482
				(0.352)
FMROT*POST06*ROA				0.111
				(0.840)
Dropping rotation years, and using indicators for the year before and the year after rotation	***AAWCA***	***ADD***	***ARESREV***	***RET***
FMROT-1	**-0.039*****	-0.006	**-0.024****	0.049
	(0.013)	(0.008)	**(0.011)**	(0.073)
FMROT+1	**-0.025****	-0.012	**-0.034*****	-0.070
	(0.012)	(0.008)	**(0.013)**	(0.048)
FMROT-1_POST06	**0.055***	0.016	0.029	-0.137
	(0.032)	(0.010)	(0.021)	(0.108)
FMROT+1_POST06	0.046	**0.033*****	**0.066****	-0.061
	(0.031)	**(0.012)**	**(0.033)**	(0.090)
POST06	-0.037	**-0.035***	-0.050	**-0.449****
	(0.420)	**(0.019)**	(0.039)	**(0.226)**
ROA				**0.855****
				(0.432)
FMROT-1*ROA				0.255
				(0.887)
FMROT+1*ROA				0.511
				(0.724)
POST06*ROA				-0.401
				(0.406)
FMROT-1*POST06*ROA				0.982

				(1.410)
FMROT+1*POST06*ROA				-2.075
				(1.542)
Dropping rotation years, and using indicators for two years before and two years after rotation	***AAWCA***	***ADD***	***ARESREV***	***RET***
FMROT-1&2	**-0.039*** **	-0.005	-0.012	0.075
	(0.014)	(0.006)	(0.012)	(0.075)
FMROT+1&2	**-0.029** **	-0.001	-0.011	-0.030
	(0.014)	(0.007)	(0.012)	(0.046)
FMROT-1&2_POST06	**0.049* **	0.008	0.011	**-0.167** **
	(0.026)	(0.007)	(0.016)	**(0.078)**
FMROT+1&2_POST06	**0.045** **	0.009	0.004	**-0.039**
	(0.020)	(0.009)	(0.013)	**(0.094)**
POST06	**-0.048**	-0.017	-0.004	**-0.354**
	(0.041)	(0.044)	(0.034)	**(0.222)**
ROA				**0.700* **
				(0.392)
FMROT-1&2*ROA				0.254
				(0.650)
FMROT+1&2*ROA				0.420
				(0.559)
POST06*ROA				-0.559
				(0.404)
FMROT-1&2*POST06*ROA				1.004
				(1.155)
FMROT+1&2*POST06*ROA				1.420
				(1.417)

Note: We report only the coefficients of interest, but the regression models include all control variables and econometric specifications as in the main tables in the paper.

Table A4

Table 3 - Mandatory rotation and reporting quality: sensitivity analysis to the exclusion of all client firms experiencing a voluntary partner or firm rotation during 2006-2012, or alternatively, controlling for voluntary rotations

	Dependent Variable			
	(1)	(2)	(3)	(4)
In the paper (where we exclude annual observations with voluntary rotations)	***AAWCA***	***ADD***	***ARESREV***	***RET***
PMROT	**-0.036*** **	**-0.010** **	**-0.013** **	-0.076
	(0.013)	**(0.004)**	**(0.006)**	(0.061)
FMROT	**0.053** **	0.004	0.010	0.038
	(0.023)	(0.006)	(0.007)	(0.080)
ROA				-0.426
				(1.201)
PMROT*ROA				**2.578*** **
				(0.671)
FMROT*ROA				**-3.595*** **
				(1.042)
Controlling for voluntary rotation years	***AAWCA***	***ADD***	***ARESREV***	***RET***
PMROT	**-0.035*** **	**-0.010** **	**-0.016** **	-0.084
	(0.013)	**(0.004)**	**(0.007)**	(0.064)
FMROT	**0.055** **	0.005	0.014	0.016
	(0.023)	(0.006)	(0.009)	(0.080)
ROA				0.312
				(0.839)
PMROT*ROA				**2.240*** **
				(0.803)
FMROT*ROA				**-2.534** **
				(1.154)
PVOL	0.016	0.001	-0.010	0.163
	(0.015)	(0.004)	(0.006)	(0.101)
FVOL	0.027	0.009	0.037	0.096
	(0.029)	(0.009)	(0.031)	(0.102)
Without voluntary rotating client-firm- years	***AAWCA***	***ADD***	***ARESREV***	***RET***
PMROT	**-0.016***	**-0.010***	-0.005	-0.088
	(0.009)	**(0.005)**	(0.006)	(0.090)
FMROT	0.014	0.008	0.009	0.091
	(0.013)	(0.007)	(0.008)	(0.112)
ROA				-0.043
				(0.256)
PMROT*ROA				1.898

	(1.165)
FMROT*ROA	**-2.736****
	(1.277)

Note: We report only the coefficients of interest, but the regression models include all control variables and econometric specifications as in the main tables in the paper

Table A5

Table 5 - Mandatory rotation and reporting quality: sensitivity analysis to the exclusion of all client firms experiencing a voluntary partner or firm rotation during 1993-2005, or alternatively, controlling for voluntary rotations

	Dependent Variable			
	(1)	(2)	(3)	(4)
In the paper (where we exclude annual observations with voluntary rotations):	***AAWCA***	***ADD***	***ARESREV***	***RET***
FMROT	-0.010	-0.009	-0.010	0.034
	(0.013)	(0.006)	(0.012)	(0.078)
ROA				0.647
				(0.693)
FMROT*ROA				-1.150
				(0.930)
Controlling for voluntary rotation years	***AAWCA***	***ADD***	***ARESREV***	***RET***
FMROT	-0.011	-0.007	-0.013	0.023
	(0.013)	(0.006)	(0.011)	(0.072)
ROA				1.076
				(0.680)
FMROT*ROA				-0.805
				(0.615)
PVOL	-0.013	-0.004	-0.003	-0.018
	(0.012)	(0.006)	(0.011)	(0.050)
FVOL	0.009	0.004	-0.018	0.018
	(0.025)	(0.012)	(0.022)	(0.094)
Without voluntary rotating client-firm-years	***AAWCA***	***ADD***	***ARESREV***	***RET***
FMROT	-0.031	0.000	-0.013	0.005
	(0.025)	(0.017)	(0.020)	(0.139)
ROA	0.392	0.262	-0.443	-0.950
	(0.546)	(0.159)	(0.284)	(1.263)
FMROT*ROA				-0.813
				(4.920)

Note: We report only the coefficients of interest, but the regression models include all control variables and econometric specifications as in the main tables in the paper

Table A6

Table 6 - Mandatory rotation and reporting quality: sensitivity analysis to the exclusion of all client firms experiencing a voluntary partner or firm rotation during 1993-2012, or alternatively, controlling for voluntary rotations

	Dependent Variable			
	(1)	(2)	(3)	(4)
In the paper (where we exclude annual observations with voluntary rotations)	***AAWCA***	***ADD***	***ARESREV***	***RET***
FMROT	**-0.028****	-0.008	**-0.017***	0.024
	(0.014)	(0.005)	**(0.011)**	(0.070)
FMROT*POST06	**0.038***	0.008	0.007	-0.091
	(0.021)	(0.006)	(0.012)	(0.089)
POST06	-0.037	-0.034	-0.037	**-0.315***
	(0.032)	(0.042)	(0.043)	**(0.184)**
ROA				**0.899****
				(0.346)
FMROT*ROA				-0.812
				(0.534)
POST06*ROA				-0.482
				(0.352)
FMROT*POST06*ROA				0.111
				(0.840)
Controlling for voluntary rotation years	***AAWCA***	***ADD***	***ARESREV***	***RET***
FMROT	**-0.027****	-0.008	**-0.018***	0.033
	(0.013)	(0.006)	**(0.010)**	(0.070)
FMROT*POST06	**0.041****	0.009	0.010	-0.105
	(0.020)	(0.007)	(0.012)	(0.089)
POST06	-0.036	-0.034	-0.037	**-0.311***
	(0.041)	(0.041)	(0.038)	**(0.175)**
ROA				**0.869****
				(0.349)
FMROT*ROA				-0.829
				(0.603)
POST06*ROA				-0.467
				(0.349)
FMROT*POST06*ROA				0.214
				(0.900)
PVOL	0.011	-0.000	-0.009	0.083
	(0.011)	(0.004)	(0.006)	(0.053)
FVOL	0.012	0.009	0.019	0.065
	(0.021)	(0.007)	(0.021)	(0.064)

Dropping voluntary rotating client-firm-years	***AAWCA***	***ADD***	***ARESREV***	***RET***
FMROT	**-0.076***	-0.015	**-0.020****	-0.064
	(0.045)	(0.016)	**(0.009)**	(0.127)
FMROT_POST06	0.067	0.023	0.018	0.113
	(0.043)	(0.018)	(0.015)	(0.185)
POST06	0.131	**0.402*****	-0.152	2.694
	(0.547)	**(0.075)**	(0.249)	(1.853)
ROA	-0.049	0.133	0.036	-0.048
	(0.410)	(0.084)	(0.088)	(2.267)
FMROT*ROA				2.537
				(4.983)
POST06*ROA				1.589
				(1.710)
FMROT*POST06*ROA				-4.453
				(5.287)

Note: We report only the coefficients of interest, but the regression models include all control variables and econometric specifications as in the main tables in the paper.

Table A7: Firm FE but without clustering

Panel A: Table 3 - Mandatory rotation and reporting quality

	Dependent Variable			
	(1)	(2)	(3)	(4)
	AAWCA	**ADD**	**ARESREV**	**RET**
PMROT	**-0.036*** **	**-0.010** **	**-0.013** **	-0.076
	(0.013)	**(0.004)**	**(0.006)**	(0.061)
FMROT	**0.053** **	0.004	0.010	0.038
	(0.023)	(0.006)	(0.007)	(0.80)
ROA				-0.426
				(1.201)
PMROT*ROA				**2.578*** **
				(0.671)
FMROT*ROA				**-3.596*** **
				(1.042)
Observations	1,100	912	1,100	703
Year F.E.	Yes	Yes	Yes	Yes
Firm F.E.	Yes	Yes	Yes	Yes
R-squared (within)	0.038	0.033	0.034	0.345
Adj_R-squared	0.455	0.267	0.326	0.254

Panel B: Table 5 - Mandatory audit firm rotation and reporting quality during single rotation regime: 1993-2005

	Dependent Variable			
	(1)	(2)	(3)	(4)
	AAWCA	***ADD***	***ARESREV***	***RET***
FMROT	-0.010	-0.008	-0.010	0.034
	(0.013)	(0.006)	(0.012)	(0.078)
ROA				0.347
				(0.693)
FMROT*ROA				-1.150
				(0.930)
Observations	860	694	860	766
Year F.E.	Yes	Yes	Yes	Yes
Firm F.E.	Yes	Yes	Yes	Yes
R-squared (within)	0.046	0.184	0.060	0.190
Adj_R-square	0.622	0.240	0.101	0.160

Panel C: Table 6 - Mandatory audit firm rotations and reporting quality pre- and post-audit rotation regime (1993 – 2012)

	Dependent Variable			
	(1)	(2)	(3)	(4)
	AAWCA	***ADD***	***ARESREV***	***RET***
FMROT	**-0.027****	**-0.009***	**-0.018***	0.019
	(0.013)	**(0.005)**	**(0.011)**	(0.070)
FMROT*POST06	**0.041****	0.009	0.009	-0.095
	(0.021)	(0.006)	(0.012)	(0.088)
POST06	-0.049	-0.016	-0.041	**-0.330***
	(0.032)	(0.043)	(0.043)	**(0.184)**
ROA				**0.896****
				(0.346)
FMROT*ROA				-0.707
				(0.534)
POST06*ROA				-0.411
				(0.352)
FMROT*POST06*ROA				0.094
				(0.840)
Observations	1,960	1,594	1,960	1,662
Year F.E.	Yes	Yes	Yes	Yes
Firm F.E.	Yes	Yes	Yes	Yes
R-squared (within)	0.037	0.147	0.058	0.231
Adj_R-square	0.409	0.235	0.144	0.214

Note: We report only the coefficients of interest, but the regression models include all control variables and econometric specifications as in the main tables in the paper.

Table A8

Clustering by firm with industry fixed effects

Panel A: Table 3 - Mandatory rotation and reporting quality

	Dependent Variable			
	(1)	(2)	(3)	(4)
	AAWCA	**ADD**	**ARESREV**	**RET**
PMROT	**0.028****	**-0.010****	**-0.017****	-0.064
	(0.011)	**(0.004)**	**(0.007)**	(0.052)
FMROT	0.029	0.004	0.004	-0.021
	(0.024)	(0.006)	(0.008)	(0.067)
ROA				0.902
				(0.560)
PMROT*ROA				**1.587****
				(0.665)
FMROT*ROA				**-1.909****
				(0.767)
Observations	1,100	912	1,100	703
Year F.E.	Yes	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes	Yes
R-squared (within)	0.172	0.105	0.049	0.296
Adj_R-square	0.152	0.079	0.027	0.262

Panel B: Table 5 - Mandatory audit firm rotation and reporting quality during single rotation regime (1993-2005)

	Dependent Variable			
	(1)	(2)	(3)	(4)
	AAWCA	***ADD***	***ARESREV***	***RET***
FMROT	**-0.029****	**0.009***	-0.019	0.042
	(0.013)	**(0.005)**	(0.011)	(0.078)
ROA				**0.734****
				(0.341)
FMROT*ROA				-0.900
				(0.727)
Observations	860	694	860	766
Year F.E.	Yes	Yes	Yes	Yes
Firm F.E.	Yes	Yes	Yes	Yes
R-squared (within)	0.174	0.162	0.114	0.240
Adj_R-square	0.146	0.128	0.084	0.203

Panel C: Table 6 - Mandatory audit firm rotations and reporting quality pre-and post-dual audit rotation regime (1993 – 2012)

	Dependent Variable			
	(1)	(2)	(3)	(4)
	AAWCA	***ADD***	***ARESREV***	***RET***
FMROT	**-0.038*** **	**-0.010***	**-0.021***	0.012
	(0.013)	**(0.005)**	**(0.011)**	(0.067)
FMROT*POST06	**0.045***	0.005	0.009	-0.096
	(0.025)	(0.006)	(0.012)	(0.082)
POST06	-0.038	0.014	-0.009	0.069
	(0.043)	(0.039)	(0.021)	(0.467)
ROA				**1.052*** **
				(0.243)
FMROT*ROA				-0.349
				(0.467)
POST06*ROA				-0.290
				(0.286)
FMROT*POST06*ROA				-0.124
				(0.654)
Observations	1,960	1,594	1,960	1,662
Year F.E.	Yes	Yes	Yes	Yes
Firm F.E.	Yes	Yes	Yes	Yes
R-squared (within)	0.141	0.157	0.085	0.239

Note: We report only the coefficients of interest, but the regression models include all control variables and econometric specifications as in the main tables in the paper.

Table A9 – Signed AQ measures

Panel A: Table 3 - Mandatory rotation and reporting quality (2006-2012)

	Dependent Variable								
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
	AWCA	***POS_AWCA***	***NEG_AWCA***	***DD***	***POS_DD***	***NEG_DD***	***RESREV***	***POS_RESREV***	***NEG_RESREV***
PMROT	0.037	**-0.030****	**-0.030*****	**-0.012****	**-0.009***	-0.006	0.006	- 0.008	**-0.022****
	(0.028)	**(0.014)**	**(0.011)**	**(0.006)**	**(0.005)**	(0.006)	(0.010)	(0.012)	**(0.008)**
FMROT	0.023	**0.093****	0.010	**0.019****	0.009	-0.005	0.003	-0.004	0.002
	(0.037)	**(0.042)**	(0.022)	**(0.008)**	(0.008)	(0.007)	(0.011)	(0.016)	(0.009)

Panel B: Table 5 - Regression analysis of firm rotations (1993-2005)

	Dependent Variable								
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
	AWCA	***POS_AWCA***	***NEG_AWCA***	***DD***	***POS_DD***	***NEG_DD***	***RESREV***	***POS_RESREV***	***NEG_RESREV***
FMROT	0.012	**-0.041*****	-0.031	0.013	**-0.011****	0.004	-0.005	**-0.039****	-0.009
	(0.014)	**(0.015)**	(0.020)	(0.009)	**(0.005)**	(0.011)	(0.013)	**(0.015)**	(0.014)

Note: We report only the coefficients of interest, but the regression models include all control variables and econometric specifications as in the main tables in the paper.

Panel C: Table 6 - Regression analysis of firm rotations 1993-2012 with interactions for the period 2005-2012

	Dependent Variable								
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
	AWCA	***POS_AWCA***	***NEG_AWCA***	***DD***	***POS_DD***	***NEG_DD***	***RESREV***	***POS_RESREV***	***NEG_RESREV***
FMROT	0.015	**-0.051*** **	**-0.034***	0.013	**-0.013** **	0.006	-0.005	**-0.047*** **	).009
	(0.014)	**(0.017)**	**(0.020)**	(0.009)	**(0.005)**	(0.010)	(0.012)	**(0.017)**	(0.014)
FMROT*POST06	0.035	**0.124*** **	0.016	-0.011	**0.013***	-0.016	0.009	**0.039** **	0.009
	(0.029)	**(0.040)**	(0.029)	(0.011)	**(0.008)**	(0.011)	(0.013)	**(0.020)**	(0.015)
POST06	**-0.106** **	0.066	-0.019	-0.029	**-0.025***	**0.066*** **	-0.032	-0.033	).021
	(0.053)	(0.061)	(0.050)	(0.051)	**(0.015)**	**(0.012)**	(0.024)	(0.036)	(0.021)

Notes: The dependent variables NEG_AWCA, NEG_DD and NEG_ RESREV are the absolute value of AWCA < 0, DD < 0 and RESERV < 0, respectively.

We report only the coefficients of interest, but the regression models include all control variables and econometric specifications as in the main tables in the paper

Table A10 – Replication of Cameran et al (2016) (1993-2004)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	AAWCA	***AAWCA***	***AWCA***	***AWCA***	***AAWCA***	***AAWCA***	***AWCA***	***AWCA***
PERIOD2	-0.001	0.002	0.007	0.003				
	(0.011)	(0.011)	(0.022)	(0.021)				
PERIOD3	**-0.020***	-0.019	-0.002	-0.004				
	(0.012)	(0.013)	(0.024)	(0.023)				
FTEN					**-0.003***	-0.002	0.001	-0.001
					(0.002)	(0.002)	(0.004)	(0.004)
PVOL		-0.138		**0.056***		-0.012		**0.056****
		(0.016)		**(0.029)**		(0.016)		**(0.029)**
FVOL		0.031		-0.046		0.027		-0.046
		(0.024)		(0.044)		(0.024)		(0.045)
AGE	0.000	-0.001	-0.001	-0.001	-0.000	-0.001	-0.001	-0.001
	(0.003)	(0.004)	(0.005)	(0.008)	(0.001)	(0.004)	(0.005)	(0.007)
SIZE	0.004	0.004	0.004	0.003	0.005	0.003	0.003	0.003
	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)
LOSS	-0.005	-0.003	**0.063****	0.038	-0.002	-0.002	0.039	0.039
	(0.016)	(0.017)	**(0.032)**	(0.031)	(0.023)	(0.017)	(0.030)	(0.031)
LEV	0.081	0.081	-0.039	0.012	0.075	0.079	0.009	0.012
	(0.050)	(0.017)	(0.099)	(0.095)	(0.060)	(0.051)	(0.093)	(0.095)
GROWTH	-1.005	-0.003	-0.029	-0.030	-0.007	-0.004	-0.024	-0.030
	(0.010)	(0.011)	(0.020)	(0.019)	(0.012)	(0.011)	(0.019)	(0.019)
ROA	-0.129	-0.116	-0.081	-0.125	-0.125	-0.114	-0.071	-0.125
	(0.084)	(0.091)	(0.017)	(0.169)	(0.138)	(0.091)	(0.157)	(0.168)
CFO	-0.078	**-0.101***	**-0.880*****	**-0.848*****	-0.084	**-0.104***	**-0.850*****	**-0.849*****
	(0.058)	**(0.060)**	**(0.115)**	**(0.111)**	(0.085)	**(0.060)**	**(0.108)**	**(0.111)**
IPO	-0.006	-0.002	0.058	0.038	-0.007	-0.002	0.062	0.039
	(0.083)	(0.084)	(0.164)	(0.156)	(0.040)	(0.084)	(0.154)	(0.155)
OWNERSHIP	-0.032	-0.100	-0.048	-0.029	-0.084	-0.103	-0.057	-0.031
	(0.110)	(0.0112)	(0.218)	(0.207)	(0.014)	(0.112)	(0.205)	(0.206)
Intercept	**0.193*****	**0.193****	0.170	0.112	**0.204*****	**0.218****	0.115	**0.193****
	(0.086)	**(0.094)**	(0.170)	(0.174)	**(0.035)**	**(0.094)**	(0.159)	**(0.174)**
Observations	932	932	932	932	932	932	932	932
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared (within)	0.048	0.054	0.094	0.107	0.047	0.051	0.099	0.054

Note: The regression is based on a sample of Big4 clients consistent with Cameran et al. (2016). PERIOD2 is a dummy variable = 1 in the years 4 to 7 of audit firm tenure, and zero otherwise; PERIOD 3 is a dummy variable

= 1 in the years 6 to 9 of audit firm tenure, and zero otherwise; IPO is a dummy = 1 if an IPO was launched in year t; OWNERSHIP is a dummy = 1 if a major shareholder owns more than 50% of the company's shares. Other variables are as previously defined

Table A11 - Chen et al. (2018)

Panel A: Table 3 - Mandatory rotation and reporting quality (2006-2012)

Dependent variable:	***CA***	***ΔAR***
PMROT	**-0.022****	**-0.003****
	(0.012)	**(0.001)**
FMROT	**0.038****	0.001
	(0.016)	(0.002)
Controls	Yes	Yes
Year F.E	Yes	Yes
Firm F.E	Yes	Yes
Observations	912	1100
R-squared (within)	0.056	0.034

Note: This table presents the regression results of the Chen et al.'s (2018) single-step equation for current assets (CA) and change in receivables (ΔAR) (omitting time and firm subscripts, unless necessary for clarity):

$$CA = \alpha_0 + \alpha_1 PMROT + \alpha_2 FMROT + \alpha_3 AGE + \alpha_4 BIG + \alpha_5 SIZE + \alpha_6 LOSS + \alpha_7 LEV + \alpha_8 GROWTH + \alpha_9 ROA + \alpha_{10} CFO + \beta_1 CFO_{i,t-1} + \beta_2 CFO_{i,t+1} + \beta_3 \Delta AR + \beta_4 PPE + Year\ F.E. + Firm\ F.E. + \varepsilon$$

$$\Delta AR = \alpha_0 + \alpha_1 PMROT + \alpha_2 FMROT + \alpha_3 AGE + \alpha_4 BIG + \alpha_5 SIZE + \alpha_6 LOSS + \alpha_7 LEV + \alpha_8 GROWTH + \alpha_9 ROA + \alpha_{10} CFO + \beta_1 \Delta Rev_{i,t} + Year\ F.E. + Firm\ F.E. + \varepsilon$$

For both regressions we utilize robust variance estimates clustered at the individual firm level. All continuous variables are winzorised at the top and bottom 1%. All other variables are defined in Appendix 1. Standard errors are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 % respectively.

Panel B: Table 4 - Mandatory rotation and reporting quality: year of rotation vs. the preceding year (2006-2012)

Dependent variable:	***CA***	***ΔAR***
PMROT	-0.004	**-0.001***
	(0.011)	**(0.001)**
FMROT	**0.058*****	0.001
	(0.020)	(0.001)
Controls	Yes	Yes
Year F.E	Yes	Yes
Firm F.E	Yes	Yes
Observations	270	297
R-squared (within)	0.216	0.105

Note: This table presents the regression results of the Chen et al.'s (2018) single-step equations for current assets (CA) and change in receivables (ΔAR) (omitting time and firm subscripts, unless necessary for clarity):

$$CA = \alpha_0 + \alpha_1 PMROT + \alpha_2 FMROT + \alpha_3 AGE + \alpha_4 BIG + \alpha_5 SIZE + \alpha_6 LOSS + \alpha_7 LEV + \alpha_8 GROWTH + \alpha_9 ROA + \alpha_{10} CFO + \beta_1 CFO_{i,t-1} + \beta_2 CFO_{i,t+1} + \beta_3 \Delta AR + \beta_4 PPE + Year\ F.E. + Firm\ F.E. + \varepsilon$$

$$\Delta AR = \alpha_0 + \alpha_1 PMROT + \alpha_2 FMROT + \alpha_3 AGE + \alpha_4 BIG + \alpha_5 SIZE + \alpha_6 LOSS + \alpha_7 LEV + \alpha_8 GROWTH + \alpha_9 ROA + \alpha_{10} CFO + \beta_1 \Delta Rev_{i,t} + Year\ F.E. + Firm\ F.E. + \varepsilon$$

For both regressions we utilize robust variance estimates clustered at the individual firm level. All continuous variables are winzorised at the top and bottom 1%. All other variables are defined in Appendix 1. Standard errors are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 % respectively.

Panel C: Table 5 - Mandatory audit firm rotation and reporting quality during single rotation regime (1993 – 2004)

Dependent variable:	***CA***	***ΔAR***
FMROT	0.004	-0.308
	(0.010)	(0.339)
Controls	Yes	Yes
Year F.E	Yes	Yes
Firm F.E	Yes	Yes
Observations	694	860
R-squared (within)	0.086	0.129

Note: This table presents the regression results of the Chen et al.'s (2018) single-step equation for current assets (CA) (omitting time and firm subscripts, unless necessary for clarity):

$$CA = \alpha_0 + \alpha_1 PMROT + \alpha_2 FMROT + \alpha_3 AGE + \alpha_4 BIG + \alpha_5 SIZE + \alpha_6 LOSS + \alpha_7 LEV + \alpha_8 GROWTH + \alpha_9 ROA + \alpha_{10} CFO + \beta_1 CFO_{i,t-1} + \beta_2 CFO_{i,t+1} + \beta_3 \Delta AR + \beta_4 PPE + Year\ F.E. + Firm\ F.E. + \varepsilon$$

We utilize robust variance estimates clustered at the individual firm level. All continuous variables are winzorised at the top and bottom 1%. All other variables are defined in Appendix 1. Standard errors are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 % respectively.

Panel D: Table 6 - Mandatory audit firm rotations and reporting quality pre and post dual audit rotation regime (1993 – 2012)

Dependent variable:	***CA***	***ΔAR***
POST06	**0.021*** **	-0.780
	(0.007)	(1.128)
FMROT	0.000	0.431
	(0.009)	(0.314)
FMROT*POST06	-0.010	0.576
	(0.014)	(0.371)
Controls	Yes	Yes
Year F.E	Yes	Yes
Firm F.E	Yes	Yes
Observations	1606	1960
R-squared (within)	0.062	0.163

Note: This table presents the regression results of the Chen et al.'s (2018) single-step equation for current assets (CA) and change in receivables (ΔAR) (omitting time and firm subscripts, unless necessary for clarity):

$$CA = \alpha_0 + \alpha_1 POST06 + \alpha_2 FMROT + \alpha_3 FMROT * POST06 + \alpha_4 AGE + \alpha_5 BIG + \alpha_6 SIZE + \alpha_7 LOSS + \alpha_8 LEV + \alpha_9 GROWTH + \alpha_{10} ROA + \alpha_{11} CFO + \beta_1 CFO_{i,t-1} + \beta_2 CFO_{i,t+1} + \beta_3 \Delta AR + \beta_4 PPE + Year\ F.E. + Firm\ F.E. + \varepsilon$$

$$\Delta AR = \alpha_0 + \alpha_1 POST06 + \alpha_2 FMROT + \alpha_3 FMROT*POST06 + \alpha_4 AGE + \alpha_5 BIG + \alpha_6 SIZE + \alpha_7 LOSS + \alpha_8 LEV + \alpha_9 GROWTH + \alpha_{10} ROA + \alpha_{11} CFO + \beta_1 \Delta Rev + Year\ F.E. + Firm\ F.E. + \varepsilon$$

For all regressions we utilize robust variance estimates clustered at the individual firm level. All continuous variables are winzorised at the top and bottom 1%. All other variables are defined in Appendix 1. Standard errors are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 % respectively

Table A12 – Aobdia (2019)

Panel A: Table 3 - Mandatory rotation and reporting quality (2006-2012)

Dependent variable:	***SPOS***
PMROT	**-0.562***
	(0.323)
FMROT	0.273
	(0.427)
Controls	Yes
Year F.E	Yes
Firm F.E	Yes
Observations	1,121
Wald-chi2	61.23

Note: This table presents the regression results of the logit model:

$Prob(0<ROA<0.03) = \alpha_0 + \alpha_1 PMROT + \alpha_2 FMROT + \alpha_3 AGE + \alpha_4 BIG + \alpha_5 SIZE + \alpha_6 LOSS + \alpha_7 LEV + \alpha_8 GROWTH + \alpha_9 ROA + \alpha_{10} CFO + Year\ F.E. + Firm\ F.E. + \varepsilon$

where SPOS = 1 if $0<ROA<0.03$

We utilize robust variance estimates clustered at the individual firm level. All continuous variables are winzorised at the top and bottom 1%. All other variables are defined in Appendix 1. Standard errors are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 % respectively.

Panel B: Table 4 - Mandatory rotation and reporting quality: year of rotation vs. the preceding year (2006-2012)

Dependent variable:	***SPOS***
PMROT	**-1.120*** **
	(0.408)
FMROT	0.501
	(0.464)
Controls	Yes
Year F.E	Yes
Firm F.E	Yes
Observations	299
Wald-chi2	24.07

Note: This table presents the regression results of the logit model:

$Prob(0<ROA<0.03) = \alpha_0 + \alpha_1\ PMROT + \alpha_2 FMROT + \alpha_3 AGE + \alpha_4 BIG + \alpha_5 SIZE + \alpha_6 LOSS + \alpha_7 LEV + \alpha_8 GROWTH + \alpha_9 ROA + \alpha_{10} CFO + Year\ F.E. + Firm\ F.E. + \varepsilon$

where SPOS = 1 if $0<ROA<0.03$

We utilize robust variance estimates clustered at the individual firm level. All continuous variables are winzorised at the top and bottom 1%. All other variables are defined in Appendix 1. Standard errors are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 % respectively.

Panel C: Table 5 - Mandatory audit firm rotation and reporting quality during single rotation regime (1993 – 2004)

Dependent variable:	***SPOS***
FMROT	-0.185
	(0.350)
Controls	Yes
Year F.E	Yes
Firm F.E	Yes
Observations	861
Wald-chi2	39.15

Note: This table presents the regression results of the logit model:

$Prob(0<ROA<0.03) = \alpha_0 + \alpha_1 FMROT + \alpha_2 AGE + \alpha_3 BIG + \alpha_4 SIZE + \alpha_5 LOSS + \alpha_6 LEV + \alpha_7 GROWTH + \alpha_8 ROA + \alpha_9 CFO + Year\ F.E. + Firm\ F.E. + \varepsilon$

where SPOS = 1 if $0<ROA<0.03$

We utilize robust variance estimates clustered at the individual firm level. All continuous variables are winzorised at the top and bottom 1%. All other variables are defined in Appendix 1. Standard errors are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 % respectively.

Panel D: Table 6 - Mandatory audit firm rotations and reporting quality pre and post dual audit rotation regime (1993 – 2012)

Dependent variable:	***SPOS***
POST06	0.076
	(0.973)
FMROT	0.186
	(0.325)
FMROT*POST06	-0.187
	(0.447)
Controls	Yes
Year F.E	Yes
Firm F.E	Yes
Observations	1,960
Wald-chi2	59.21

Note: This table presents the regression results of the logit model:

$Prob(0<ROA<0.03) = \alpha_0 + \alpha_1 POST06 + \alpha_2 FMROT + \alpha_3 FMROT * POST06 + \alpha_3 AGE + \alpha_4 BIG + \alpha_5 SIZE + \alpha_6 LOSS + \alpha_7 LEV + \alpha_8 GROWTH + \alpha_9 ROA + \alpha_{10} CFO + Year\ F.E. + Firm\ F.E. + \varepsilon$

where SPOS = 1 if $0<ROA<0.03$

We utilize robust variance estimates clustered at the individual firm level. All continuous variables are winzorised at the top and bottom 1%. All other variables are defined in Appendix 1. Standard errors are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 % respectively.