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Audit firm rotation, audit fees and audit quality: The experience of Italian public companies

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ABSTRACT

This paper examines some of the costs and benefits associated with audit firm rotation using data from Italy, where mandatory audit firm rotation has been in place since 1975. Previous studies in this area did not find consistent evidence of an association between audit quality and voluntary or mandatory audit firm rotation. A recent paper, examining Italian public companies audited by a *Big 4* audit firm, uses proprietary data and finds no statistically significant association between audit firm rotation and audit quality. In this study, we hand-collect publicly available data for a larger sample of Italian public companies audited by a *Big 4* and *non-Big 4* audit firm (1583 firm-year observations) over a longer time horizon (1998–2011). We find that audit quality, proxied by two different measures of earnings management, improves following audit firm rotation for companies audited by a *non-Big 4* audit firm. Additionally, we examine whether higher audit fees are associated with audit firm rotation. Our results indicate that following audit firm rotation, the total amount of fees paid to the auditor was lower for companies audited by a *Big 4* and unchanged for companies audited by a *non-Big 4* audit firm. The results of this study should be of interest to European and U.S. legislators who are currently, or have recently, considered implementing mandatory audit firm rotation in order to improve financial reporting quality.

1. Introduction

Agency theory indicates that the separation of management (agent) from ownership (stakeholder) leads to a moral hazard problem because the agent (management) may pursue his own self-interest at the expense of the principal (stakeholder) (Jensen & Meckling, 1976). The moral hazard problem is amplified by information asymmetry between the two parties: managers, who run the company, know more about the company and its future prospects than do shareholders. One way to reduce the consequences and the costs associated with moral hazard is to hire an external third party – an independent public accounting firm – to audit the books, records, and financial statements of a company, thereby reducing information asymmetry between the company's agents and its principals.

Audit quality is a function of the auditors' education, training, and knowledge of professional standards, as well as their independence and objectivity, their knowledge of the client's business operations and industry, and the audit team's working

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relationship with the client company's management. There are two primary schools of thought regarding long audit firm tenure. One school believes that audit firms with relatively longer tenure have greater knowledge of the company's business and industry, thereby providing a higher quality and more efficient audit (Geiger & Raghunandan, 2002; Johnson, Khurana, & Reynolds, 2002; Myers, Myers, & Omer, 2003; Carcello & Nagy, 2004). The other school believes that audit firms with relatively longer tenure provide an increased likelihood of familiarity (or even friendships) forming between the audit staff members and client staff members, an increased likelihood of a stale audit program, and a decreased likelihood that the auditor will make decisions contrary to the prior year decisions, thereby providing a lower quality and less efficient audit (Defond & Subramanyam, 1998; Arel, Brody, & Pany, 2005; Gates, Lowe, & Reckers, 2007; Dao, Mishra, & Raghunandan, 2008; Daniels & Booker, 2009). Interestingly, this latter school of thought is driven primarily by perceptions not empirical evidence.

In an effort to strengthen auditor independence, many countries have legislated limitations on the auditor–client relationship including: mandatory audit partner rotation, hiring and firing of the audit firm by the audit committee rather than management, internal reviews of audit engagements, and external peer or regulated reviews of audit engagements. Additionally, some countries, including the United States (U.S.) post-Sarbanes–Oxley Act of 2002 (SOX), limit the types of services a public accounting firm can provide to its audit clients[1], and the type of employment an auditor can take with a client company[2].

SOX, Section 203, requires rotation of the partner on an audit engagement of a public company every 5 years, but does not, currently, require audit firm rotation (Bradshaw & Sloan, 2002). In 2003, the General Accounting Office (GAO) released the results of a study on the potential effects of mandatory audit firm rotation. The GAO concluded that "mandatory audit firm rotation may not be the most efficient way to strengthen auditor independence and improve audit quality considering the additional financial costs and the loss of institutional knowledge of the company's previous audit firm of record, as well as the current reforms being implemented." Public Accounting Firms: Required Study on the Potential Effects of Mandatory Audit Firm Rotation 2003, p.1). The GAO also suggested a "wait and see" attitude until the other reforms put in place by SOX were in effect for several years, thereby leaving open the possibility that audit firm rotation would be considered again in the future (Government Accounting Office (GAO), 2003) Public Accounting Firms: Required Study on the Potential Effects of Mandatory Audit Firm Rotation 2003).

In August, 2011, the Public Company Accounting Oversight Board (PCAOB) issued a Concept Release (no. 39) on auditor independence, objectivity, and professional skepticism, including consideration of mandatory audit firm rotation. The comment period originally expired in December, 2011, but was extended to April of 2012 in order to solicit more feedback. In total, the PCAOB received 659 comment letters related to this concept release; most letters vehemently opposed mandatory audit firm rotation. During July, 2013, the Financial Services Committee of the U.S. House of Representatives took the decision out of the hands of the PCAOB by overwhelmingly passing a bill amending the Sarbanes–Oxley Act of 2002 to prohibit the PCAOB from requiring public companies to use specific audit firms or requiring public companies to change audit firms on a rotating basis; the bill also directs the GAO to revisit their 2003 study mentioned above. The bill next will be taken up by the Senate Committee on Banking, Housing, and Urban Affairs. Interestingly, in April of 2013, the European Parliament's Legal Affairs Committee took related action by approving a draft law that would require public entities to rotate audit firms every 14 years (with a possible extension to 25 years if certain safeguards are in place).

This paper adds to the existing literature regarding mandatory audit firm rotation and also informs both the decision taken by authorities in the U.S. to end discussion of mandatory audit firm rotation and the seemingly opposite decision taken by the authorities in the European Parliament. We examine some of the costs and benefits associated with mandatory audit firm rotation using data from a country, Italy, where mandatory audit firm rotation has been in place since 1975. Italy is one of the very few countries in the world to mandate audit firm rotation and is, therefore, a unique setting to examine this topic. Specifically, we test whether there is a change in audit quality associated with both mandatory and voluntary audit firm rotation. We also test whether there is a change in total audit fees paid to the auditor when there is a mandatory or voluntary audit firm rotation.

A recent study examining Italian public companies audited by a *Big 4* audit firm with private data provided by the *Big 4* audit firms (Cameran, Francis, Marra, & Pettinicchio, 2015) found no statistically significant association between audit firm rotation and audit quality. We first replicate the results of Cameran et al. (2015) using publicly available data and then extend our sample to include Italian public companies audited by a *non-Big 4* audit firm and to examine a longer time period. Extensive empirical research has shown that earnings quality is different for companies audited by one of the *Big 4* audit firms vs. companies audited by *non-Big 4* audit firms. This body of research has examined both U.S. companies (DeAngelo, 1981; Khurana & Raman, 2004) and companies from around the world (Francis & Wang, 2008).

Overall, our results indicate that for companies audited by *non-Big 4* audit firms, audit firm rotation is associated with an increase in audit quality without the added cost of an increase in audit fees. By contrast, for companies audited by *Big 4* audit firms, audit firm rotation is not associated with an increase in audit quality but is associated with a decrease in audit fees; these latter results confirm the findings in previous literature. This study makes several contributions to the literature. First, it replicates and extends a recent study (Cameran et al., 2015) using publicly available data that include

[1] SOX Section 201.
[2] SOX Section 206.

Table 1
Legislation regarding mandatory audit firm rotation in Italy.

Time	Relevant provisions*
1975–1997	• Audit firm appointed for three years • Renewable for two additional three-year terms • Five years cooling-off period
1998–2004	• Audit firm appointed for three years • Renewable for two additional three-year terms • **Cooling-off period not explicit (often interpreted as one, three-year term)**
2005	• **Audit firm appointed for six years** • **Renewable for one additional six-year term** • **Three years cooling-off period** • **Audit partner replaced after six years, with a three years cooling-off period**
2006–2009	• **Audit firm appointed for nine years** • **Not immediately renewable** • **Three years cooling-off period** • Audit partner replaced after six years, with a three years cooling-off period
2010–present**	• Audit firm appointed for nine years • Not immediately renewable • Three years cooling-off period • **Audit partner replaced after seven years, with a three years cooling-off period**

* Changes in legislation are noted in **bold** font.
** This legislation changed provisions related to partner rotation not firm rotation.

not only public Italian firms audited by a *Big 4* audit firm but also companies audited by a *non-Big 4* audit firm. Second, our study expands the existing literature to examine voluntary and mandatory audit firm rotation for both companies with *Big 4* and *non-Big 4* audit firms. The results of this study indicate that, for *non-Big 4* audit firms audit quality improves following audit firm rotation. Third, this study provides evidence that following audit firm rotation companies with *Big 4* audit firms experience lower audit fees, while companies with *non-Big 4* audit firms do not experience a change in audit fees. These results should be interesting to policy setters and regulators in Italy, policy setters and regulators in countries considering implementing mandatory audit firm rotation (the European Parliament and others), the U.S. House of Representatives, the GAO, and academic researchers.

We organize the rest of this paper as follows. Section 2 provides a description of the institutional background, literature review and hypotheses development. Section 3 describes the sample selection procedures and data collection. Section 4 describes the research design, our measure of audit quality and our test models. Section 5 reports our results. Section 6 describes our sensitivity tests and Section 7 concludes the paper and identifies the limitations of the study.

2. Institutional background, literature review, and hypotheses development

2.1. Legislation regarding mandatory audit firm rotation in Italy

Italy first legislated mandatory audit firm rotation in 1975 and has since made five significant modifications to the regulations, presumably in an effort to make the legislation as efficient and effective as possible (Table 1).

The first regulation on mandatory audit firm rotation[3] provided for an audit firm tenure of three years, renewable, if desired, for two additional three year terms. Before the end of the three-year appointment, voluntary audit firm changes are *possible* under certain conditions. After nine consecutive years, a new audit firm *must* be appointed and the original firm must wait a minimum of five years (cooling-off period) before the original firm could be reappointed. This first regulation was in force until 1997.

After 1997, the original decree was partially modified to no longer explicitly identify the length of the cooling-off period[4]. Due to the vagueness in the new legislation, audit firms commonly interpreted that the original audit firm could be reappointed after only one three year cooling-off term with another audit firm.

The third change in legislation occurred in 2005[5], in response to the well-known financial scandals of Cirio and Parmalat. This law modified the Law of Finance (Testo Unico della Finanza, 1998) extending the audit firm term from three years to six years, decreasing the number of audit firm term renewals from three to two, and explicitly introducing a three year cooling-off period. Under this new law, each audit firm's existing term was extended from three to six years, and the maximum

[3] D.P.R. no. 136/1975.
[4] Legislative Decree no. 58/1998.
[5] Law no. 262/2005.

tenure was extended from nine to twelve years. This law also regulated audit partner rotation, requiring that the partner in charge of the audit be replaced by another partner after six consecutive years. A three year cooling-off period is provided during which the same partner may not be responsible for the audit of a previous auditee and its associates, even if he/she works for another audit firm.

After just one year, in 2006, the Law of Finance was modified again to extend audit firm tenure from six years to nine years, renewable after a three year cooling-off period[6]. A provisional rule was also introduced providing that all unexpired audit firm terms as of the effective date of the Legislative Decree, with a total audit firm tenure of less than nine years, could be extended to nine years at the next shareholders' meeting. No changes were made to the provisions regarding audit partner rotation.

In January 2010, the fifth legislative change became effective extending the audit partner tenure from six to seven years[7]. The audit firm term and cooling-off period were not changed.

Overall these legislative changes, intended to improve audit quality, have increased the audit tenure compared to the first regulation of 1975, implicitly indicating that the Italian authorities believed that relatively longer tenured auditors were associated with better audit quality.

2.2. Auditor tenure literature

We detail below some of the previous literature related to audit firm rotation and auditor tenure, please see Stefaniak, Robertson, and Houston (2009) for a more thorough review of this literature. Several U.S. studies examine the relation between audit quality and auditor tenure and (voluntary) auditor change. In general, these studies do not support the claims that long-tenured auditors are associated with lower audit quality, indicating that mandatory audit firm rotation may not improve audit quality as intended. In these studies, researchers have used several proxies for audit quality: audit opinions (Geiger & Raghunandan, 2002), discretionary accruals (Johnson et al., 2002; Myers et al., 2003), total accruals (Myers et al., 2003), persistence of accruals (Johnson et al., 2002), and alleged fraudulent financial reporting (Carcello & Nagy, 2004).

Several recent archival studies also fail to support mandatory audit firm rotation. First, Jenkins and Velury (2008) examine the relation between audit firm tenure and conservatism for U.S. publicly listed firms. Using different measures of conservatism, these authors find a positive association between conservatism and the length of audit firm tenure. Interestingly, they find an increase in conservatism between short[8] and medium[9] tenure auditor–client relationships, and this higher level of conservatism does not deteriorate for long[10] tenure relationships. These results indicate that audit firm rotation may have an adverse effect on the conservatism of reported earnings due to a short tenure (lower conservatism) condition being frequently repeated.

In an international study, Jackson, Moldrich, and Roebuck (2008) examine the relation between audit firm tenure and audit quality for Australian companies. These authors find that audit quality, proxied by the likelihood of issuing a going concern opinion, increases as tenure increases. However, when audit quality is proxied by discretionary accruals, no difference is noted when tenure increases. These results would seem to indicate that mandatory audit firm rotation would not be associated with improved audit quality in Australia.

Several experimental studies have examined the perception of longer-tenured auditors vs. new auditors. The results of these studies are mixed. The results in Gates et al. (2007) indicate that MBA students demonstrate more confidence in a company's financial statements after audit firm rotation. Other studies find that both the capital and debt markets value longer-term auditors more than new auditors (Mansi, Maxwell, & Miller, 2004; Ghosh & Moon, 2005). More recently, Kaplan and Mauldin (2008) perform two experiments designed to test whether non-professional investors in the U.S. hold different independence-related perceptions for audit partner rotation vs. audit firm rotation. This study proxies independence-related perceptions with how much of an income decreasing audit adjustment management would be willing to record. Kaplan and Mauldin find no statistically significant difference in independence-related perceptions between the two rotation conditions, indicating that, for non-professional investors, audit firm rotation does not seem to be associated with a higher perception of independence than audit partner rotation. The mixed results of these studies seem to indicate the need for further empirical testing in this area.

2.3. Mandatory audit firm rotation literature

Mandatory audit firm rotation, over time, may actually preclude selection of the most qualified audit firm. On the other hand, successor auditors can offer a fresh perspective to the audit of a company. Audit firm rotation offers two advantages over partner rotation: first, a new partner from a new audit firm may be more willing to contradict judgments made by the predecessor partner; second, in a mandatory audit firm rotation environment, each partner is aware that his/her judgments

[6] Legislative Decree no. 303/2006.
[7] Legislative Decree no. 39/2010.
[8] Short tenure relationships are up to three years in duration.
[9] Medium tenure relationships are from four to eight years in duration.
[10] Long tenure relationships are over nine years in duration.

will be reviewed by another audit firm in a predetermined period of time. Presumably, either of these circumstances could lead to improved audit quality.

Several countries currently have mandatory audit firm rotation regulation. Italy has required audit firm rotation since 1975, Brazil since 1999, and Singapore has required audit firm rotation for local banks since 2002. Numerous other countries including Austria, Canada, Greece, Spain, Slovakia, and Turkey previously required mandatory audit firm rotation and have since eliminated it due, in part, to increased audit costs (Raiborn, Schorg, & Massoud, 2006; Johnson, 2007). Peter Wyman, the (then) head of professional affairs for PricewaterhouseCoopers, stated in a 2005 article "There is clear evidence from Italy and the US that audit firm rotation increases costs to business, creates problems with audit quality in the period immediately after the change of audit firms, and leads to further consolidation of audit work amongst the largest audit firms" (Wyman, 2005). At the time of Wyman's article, Italy was, and still is, the only of the EU Member States requiring mandatory audit firm rotation. Additionally, in Italy, the Bocconi University Report indicated that, while audit firm rotation is associated with reduced audit quality, it seems to improve public confidence in corporations (Arel et al., 2005).

Limited empirical research has been performed to date in actual mandatory audit firm rotation regimes; one such paper is Ruiz-Barbadillo, Gómez-Aguilar, and Carrera (2009) which examines audit firm rotation in Spain[11]. These authors find that auditors were less likely to issue going concern opinions to financially stressed clients during the mandatory audit firm rotation regime than in the six years following the mandatory rotation regime. These results would seem to indicate that mandatory audit firm rotation was not associated with improved audit quality in Spain.

In a recent paper, Cameran et al. (2015) use proprietary data provided by the *Big 4* audit firms in Italy to examine the relation between audit effort (quality) and audit fees for clients of *Big 4* audit firms between 2006 and 2009. Their results indicate that for their sample companies, audit fees in the final year of an engagement were higher than normal, which the authors attribute to opportunistic pricing. Additionally, the new audit firm appeared to discount their audit fee, even though more hours were incurred on the engagement, which the authors attribute to low-balling. Lastly, these authors find that audit quality was lower in the first three years of the audit engagement, as compared to the last years of the previous audit firm's tenure. In this study, we use publicly available data and a longer time period to both replicate the results of Cameran et al. (2015) for companies audited by *Big 4* audit firms and to extend current research to examine companies audited by *non-Big 4* audit firms.

Overall, the current empirical studies examining audit quality in a mandatory audit firm rotation environment is both limited and conflicting, indicating, we believe, a need for further research in this area. This paper provides both additional empirical evidence of an association between audit quality and mandatory audit firm rotation, and evidence of a relation between audit fees and audit firm rotation in a mandatory audit firm rotation environment. Due to conflicting results of studies examining audit firm change and audit quality, we formulate our first hypothesis in the null form:

Hypothesis 1. There is no association between a change in audit firm and audit quality.

2.4. Audit fee literature

Previous literature indicates that higher risk clients will choose higher quality auditors (Datar, Feltham, & Hughes, 1991) and it is reasonable that audit firms will charge higher fees to higher risk clients (Feltham, Hughes, & Simunic, 1991). Several empirical studies support the relation between higher (lower) client riskiness, more (less) auditor effort and higher (lower) audit fees (O'Keefe, Simunic, & Stein, 1994; Pratt & Stice, 1994; Simunic & Stein, 1996; Johnstone & Bedard, 2003). As higher risk clients are also more likely to have higher earnings management (abnormal working capital accruals), the above literature supports including an audit fees control variable when modeling earnings management.

Both the audit firm and the company invest significant effort and time (cost) following a change in audit firms. This impact will be even larger for consolidated entities that require statutory audits in many countries. In a mandatory audit firm rotation environment, these startup costs are more likely to be spread over fewer years, increasing the overall cost of the audit function for both the audit firm and the audit client[12]. Extensive research has documented a relation between audit firm change and audit fees (Ettredge & Greenberg, 1990; Pearson & Trompeter, 1994; Deis & Giroux, 1996; Simon & Francis, 1988; Cameran et al., 2015; Zain, 2013). A recent paper indicates that the relation between these two variables continues in the post-SOX period (Huang, Raghunandan, & Rama, 2009). Due to the relation between audit fees and audit firm change, the above literature supports including audit fees as a control variable when modeling auditor change and reporting quality to avoid a correlated omitted variable problem.

Our second hypothesis tests whether there is an association between total fees paid to the audit firm and audit firm rotation. Previous literature suggests that mandatory rotation might increase the auditors' fees because of the increased amount of time the new audit firm has to spend to audit a new company. However, the higher startup costs may be spread over fewer years and might not impact the audit fees paid immediately after the mandatory audit firm change. Hence, we also formulate our second hypothesis in the null form:

[11] Audit firm rotation was mandated in Spain from 1991 to 1994.

[12] A 2003 GAO study determined that the average auditor tenure in the Unites States for Fortune 1000 companies was approximately 22 years.

Hypothesis 2. There is no association between a change in audit firm and the total/abnormal audit fees paid to the audit firm by the company.

3. Sample and data

In order to test our hypotheses, we focus on the population of non-financial companies listed on the Milan Stock Exchange (Mercato Telematico Azionario, Borsa Italiana's Main Market) as of December 31, 2011. We then extend our sample backwards, to 1998[13].

We manually collect data about audit firm and audit partner changes from corporate annual audit reports[14] and shareholders' meeting reports available on the Borsa Italiana website or directly from the company's website. We also manually collect audit fee data between 1998 and 2006 from shareholders' meeting reports and, for fiscal years ending on or after July 1, 2007, from annual reports[15]. Finally, we download accounting data for the period 1997–2011[16] from the AIDA database, which contains financial information for both listed and unlisted companies in Italy. Our final sample for our main test consists of 1583 company-year observations.

4. Research design

4.1. Audit quality measure

We use abnormal working capital accruals as calculated in DeFond and Park (2001) and Francis and Wang (2008) as our primary measure of audit quality; we also use abnormal accruals as calculated in Han and Wang (1998) as a sensitivity test to make sure that our results do not depend on the audit quality measure selected[17,18]. Our primary proxy for audit quality (DeFond & Park, 2001; Francis & Wang, 2008; Cameran et al., 2015) estimates abnormal working capital accruals as the difference between actual working capital for the current year and the level of working capital predicted by the previous year's working capital to sales ratio for each company year. The calculated abnormal working capital accruals are expected to reverse against future earnings, thereby shifting profit between reporting periods. Abnormal working capital accruals are calculated as follows:

$$AWCA_{i,t} = WC_{i,t} - \left[\left(\frac{WC_{i,t-1}}{S_{i,t-1}}\right) \times S_{i,t}\right] \quad (1)$$

where *AWCA* is the abnormal working capital accruals for company *i* in time *t*. *WC* is the noncash working capital accruals computed as (current assets – cash and short term investments) – (current liabilities – short-term loans) for company *i* in time *t*, and *S* is the total sales to customers for company *i* at time *t* or *t* – 1.

We operationalize this measure of absolute value of abnormal working capital accruals (*AWCA*) to proxy for audit quality. (See Appendix A for details on how we calculated abnormal accruals from the data available in AIDA.)

4.2. Model

We test our first hypothesis by examining the coefficients from a regression of audit quality (*AWCA*) on a binary variable *Change* equal to 1 for the year following a change in audit firm, with the new audit firm signing and taking responsibility for the content of the financial statements presented to investors, and zero otherwise.

$$AWCA_{i,t} = \alpha + \beta_1 Change_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 CFO_{i,t} + \beta_4 LEV_{i,t} + \beta_5 SALESGR_{i,t} + \beta_6 ROA_{i,t} + \beta_7 LOSS_{i,t} + Year \quad fixed \quad effects + \varepsilon \quad (2)$$

[13] For the sake of transparency, we underline that the number of companies included in the sample decreases as we go back in time due to both a reduced number of listed companies and limited publicly available data.

[14] In Italy, annual audit reports are signed by the audit partner.

[15] New legislation required that companies include audit fees and non-audit fees in the annual report.

[16] In order to calculate abnormal working capital accruals, we need accounting data for the one year prior to our first test year, therefore we collect accounting data from 1997 to 2011.

[17] Our proxies for audit quality differ from the Jones-type abnormal accruals models usually adopted by accounting literature (Kothari, Leone, & Wasley, 2005). For international data, the number of observations in each industry and in each country can be small, thereby reducing the reliability of the results of abnormal accruals calculated using the Jones model (Meuwissen, Moers, Peek, & Vanstraelen, 2007; Francis & Wang, 2008). Not surprisingly, for our Italian companies, we do not have enough observations in each year/industry combination to adopt a Jones-type model to calculate abnormal accruals.

[18] We also tried to calculate another abnormal accruals proxy as used in Francis and Wang (2008), $\left\{\left[Sales_t \times \left(CA_{t-1}/Sales_{t-1}\right)\right] - \left[grossPEE_t \times \left(depr_{t-1}/grossPEE_{t-1}\right)\right]\right\}/TA_{t-1}$ but this calculation for abnormal accruals requires historical cost (gross value) of PP&E, while the Italian accounting data from Aida only provides information about net value of PP&E, and only a few observations (no more than 15) report the value of accumulated depreciation, hence making impossible an ex-post calculation of gross PP&E value.

We control for variables that previous literature has found significant in explaining levels and changes in abnormal accruals[19]. We control for *SIZE*, proxied by the natural log of net sales, as larger companies tend to have a relatively lower level of accruals compared to smaller companies (Behn, Choi, & Kang, 2008). We control for cash flow from operations (*CFO*) as previous research has indicated an inverse relation with accruals (Dechow, 1994; Sloan, 1996). To proxy for the likelihood of financial distress, we control for leverage (*LEV*) and *LOSS* (a binary variable equal to 1 if the company incurred a loss in the previous period and zero otherwise) as previous research has shown that either of these variables can proxy for the company's incentive to use accruals to manage earnings in order to avoid violating debt covenants or other market reactions to negative income (DeFond & Jiambalvo, 1994; Jaggi & Lee, 2002; Behn et al., 2008). We control for the growth opportunities of a company, proxied by the year over year percent of sales growth (*SALESGR*), as literature has shown accruals are strongly correlated with this measure (Carey & Simnett, 2006; Behn et al., 2008). We also include return on assets (*ROA*) in our model to control for the nondiscretionary component of abnormal accruals (Behn et al., 2008).

After running the regression model for the overall sample, we partition our sample into two sub-samples: public companies audited by a *Big 4* audit firm[20] (*BIG* = 1) and public companies audited by a *non-Big 4* firm (*BIG* = 0, 2, 3). To partition the sample we use the variable *BIG*:*BIG* = 1 if the company's audit firm is one of the largest four audit firms in the country, 0 if the audit firm is not one of the *Big 4* audit firms, 2 if the audit firm is Arthur Andersen, and 3 if we do not find information about the audit firm in the company's financial report[21].

We test whether the relation between audit firm change and earnings quality is different when the change in audit firm is voluntary (*Volchange*) vs. mandatory (*Manchange*)[22]. We also examine whether there is a relation between audit partner change (*Partchange*) (without a change in audit firm) and earnings quality and audit fees[23]. Finally, we test whether there is a difference in earnings quality after the change in audit firm between companies audited by a *Big 4* audit firm and companies audited by a *non-Big 4* firm. Using this methodology, we are able to first replicate the results reported in previous literature (Cameran et al., 2015) using our sample of publicly available data that covers a longer time period to document the relation between audit firm rotation and earnings quality and audit fees for companies using *Big 4* audit firms. Second, we are able to extend existing literature by examining the relation between audit firm rotation (mandatory, voluntary, and partner only) and earnings quality and audit fees for companies using *non-Big 4* audit firms. This second part of the analysis is new and can provide us with some insight about whether the impact of mandatory/voluntary audit firm rotation on audit quality is different for firms audited by a *Big 4* vs. *non-Big 4* audit firms.

We also test whether there is a change in audit fees associated with audit firm rotation. We use two measures of audit related fees: first, we measure audit fees as audit related fees scaled by the company's total sales (*totrevscaled*).

$$totrevscaled_{i,t} = \alpha + \beta_1 Change_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 CFO_{i,t} + \beta_4 LEV_{i,t} + \beta_5 SALESGR_{i,t} + \beta_6 ROA_{i,t} + \beta_7 LOSS_{i,t} + +Year \quad fixed \quad effects + \varepsilon \tag{3}$$

Second, we calculate abnormal (excess) audit related fees (*abnFees*) as suggested in Hope, Tony, Thomas, and Yong (2009).

$$abnfees_{i,t} = \alpha + \beta_1 Change_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 CFO_{i,t} + \beta_4 LEV_{i,t} + \beta_5 SALESGR_{i,t} + \beta_6 ROA_{i,t} + \beta_7 LOSS_{i,t} + +Yearfixedeffects + \varepsilon \tag{4}$$

Specifically, we calculate abnormal audit related fees by regressing total audit related fees (*TOTFEE*—scaled by total sales for the year) over a broad set of explanatory variables (see Eq. (5)) and then we use the residuals of the regression as a proxy for excess audit fees (*abnfees*)—i.e., the portion of audit related fees not explained by the independent variables in the model.

$$TOTFEE_{i,t} = \beta_0 + \beta_1 BIG_{i,t} + \beta_3 SIZE_{i,t} + \beta_9 LOSS_{i,t} + \beta_7 LEV_{i,t} + \beta_8 ROA_{i,t} + Year \quad Fixed \quad Effects + \varepsilon \tag{5}$$

We run models (3) and (4) for our entire sample and separately for *Big 4* and other audit firms.

5. Results

5.1. Descriptive statistics and correlations

Descriptive statistics are presented in Table 2: total assets for the sample companies averages 4110 million Euro (median 310 Million Euro). Net Income for the sample companies averages 160 million Euro (median 4.3 million Euro).

The correlation matrix presented in Table 3 shows a negative and significant association between abnormal working capital accruals – our first measure of earnings quality (*AWCA*) – and company size (*SIZE*) and the leverage variable (*LEV*); a

[19] All control variable calculations from AIDA data are detailed in Appendix A.

[20] In Italy, the four largest auditors in the country include Reconta Ernst & Young (REY), PricewaterhouseCoopers (PWC), Deloitte & Touche (D&T), and KPMG.

[21] We assume that for all firms where BIG is coded as three there were no changes in auditor for the sample period, thus biasing the results against finding evidence of an impact of auditor change on earnings quality.

[22] More specifically, we replace our test variable *Change* with these other two variables: *Volchange* and *Manchange*. Please see Table 4 for details.

[23] We code this variable for our first year of data as zero (no audit partner change) assuming there was no change in the audit partner between the first year and the previous year.

Table 2
Descriptive statistics.

Panel A: full sample

Variable	Count	Mean	Median	25th Perc	75th Perc	Standard Dev.
Total assets	1583	4110,000,000	301,000,000	111,000,000	1050,000,000	51,400,000,000
Net income	1583	160,000,000	4371,000	(791,000)	28,000,000	2920,000,000
Change	1583	0.060	0.000	0.000	0.000	0.238
Volchange	1583	0.011	0.000	0.000	0.000	0.106
Manchange	1583	0.047	0.000	0.000	0.000	0.213
Partchange	1583	0.091	0.000	0.000	0.000	0.288
AWCA	1583	0.339	0.177	0.043	0.335	1.268
ABHW	1583	0.773	0.013	−0.159	0.334	7.193
LOSS	1583	0.245	0.000	0.000	0.000	0.430
SIZE	1583	19.112	19.030	17.889	20.351	2.007
LEV	1583	0.539	0.553	0.425	0.667	0.187
SALESGR	1583	1.722	0.067	−0.036	0.198	39.725
ROA	1583	3.134	3.500	0.030	7.490	7.959
CFO	1583	2.620	2.105	1.819	2.381	18.774

Panel B: companies audited by Big-4 audit firms

Variable	Count	Mean	Median	25th Perc	75th Perc	Standard Dev.
Total assets	984	4080,000,000	415,000,000	180,000,000	1890,000,000	16,200,000,000
Net income	984	134,000,000	8725,500	−929,785	50,200,000	777,000,000
Change	984	0.078	0.000	0.000	0.000	0.269
Volchange	984	0.012	0.000	0.000	0.000	0.110
Manchange	984	0.065	0.000	0.000	0.000	0.247
Partchange	984	0.124	0.000	0.000	0.000	0.330
AWCA	984	0.285	0.176	0.083	0.317	0.578
ABHW	984	0.385	−0.008	−0.152	0.211	4.535
LOSS	984	0.240	0.000	0.000	0.000	0.427
SIZE	984	19.721	19.508	18.522	20.935	1.812
LEV	984	0.551	0.567	0.453	0.664	0.176
SALESGR	984	0.282	0.062	−0.036	0.189	4.465
ROA	984	3.205	3.725	0.210	7.170	7.606
CFO	984	2.116	2.076	1.770	2.353	0.739

Panel C: companies audited by non Big-4 audit firms

Variable	Count	Mean	Median	25th Perc	75th Perc	Standard Dev.
Total assets	599	4160,000,000	160,000,000	54,100,000	474,000,000	81,000,000,000
Net income	599	201,000,000	1645,292	−696,000	9356,801	4640,000,000
Change	599	0.030	0.000	0.000	0.000	0.171
Volchange	599	0.010	0.000	0.000	0.000	0.100
Manchange	599	0.018	0.000	0.000	0.000	0.134
Partchange	599	0.037	0.000	0.000	0.000	0.188
AWCA	599	0.795	0.288	0.152	0.458	1.801
ABHW	599	1.412	0.079	−0.194	0.840	10.121
LOSS	599	0.254	0.000	0.000	1.000	0.436
SIZE	599	18.113	18.090	17.314	19.188	1.911
LEV	599	0.521	0.524	0.380	0.671	0.204
SALESGR	599	4.087	0.075	−0.031	0.217	64.288
ROA	599	3.018	3.130	−0.330	8.000	8.512
CFO	599	3.447	2.164	1.904	2.416	30.504

All variables are defined in Appendix A.

positive and significant association between abnormal working capital accruals (*AWCA*) and previous year loss (*LOSS*). Our second measure of earnings quality, the abnormal accruals calculated as in Han and Wang (1998) (*ABHW*), is also positively associated with previous year loss (*LOSS*) and negatively associated with company size (*SIZE*) and returns on assets (*ROA*).

5.2. Multivariate results

Multivariate analysis examines whether audit firm rotation (*Change*) is positively/negatively associated with audit quality, as proxied by the absolute value of abnormal working capital accruals (*AWCA*) while controlling for those variables previous research has shown to have an independent effect on abnormal accruals, including audit fees and audit partner rotation[24].

[24] In a sensitivity check, we analyze signed accruals as well.

Table 3
Correlation matrix.

	Total as sets	Net income	*Change*	*Volchange*	*Manchange*	*Partchange*	*AWCA*	*ABHW*	*LOSS*	*SIZE*	*LEV*	*SALESGR*	*ROA*	*CFO*	*BIG*
Total assets	1														
Net income	0.9709*	1													
Change	0.0137	−0.0016	1												
Volchange	−0.0042	−0.0014	0.4259*	1											
Manchange	0.0179	−0.0007	0.8762*	−0.0208	1										
Partchange	0.0038	0.0027	−0.0603*	−0.0257	−0.0532*	1									
AWCA	−0.0119	−0.0106	−0.0278	−0.0175	−0.019	−0.0327	1								
ABHW	−0.0079	−0.0068	−0.0209	−0.0065	−0.0195	−0.0224	0.0199	1							
LOSS	−0.0268	−0 0369	0 0336*	0 0617*	0 0064	0 0724*	0.0771*	0.0554*	1						
SIZE	0.2194*	0.1587*	0.0875*	0.0078	0.0901*	0.0723*	−0.2044*	−0.1501*	−0.2375*	1					
LEV	0.0101	−0.0121	0.0341	0.0631*	−0.0033	0.0591*	−0.0909*	−0.0397	0.1397*	0.1782*	1				
SALESGR	0.3075*	0.2651*	0.0529*	−0.0077	0.0633*	−0.0205	0.0007	−0.0085	−0.01	0.0932*	0.0165	1			
ROA	0.0266	0.0544*	−0.0129	−0.0226	−0.0022	−0.0416*	−0.0469	−0.0943*	−0.4654*	0.2173*	−0.2398*	−0.0113	1		
CFO	0.4825*	0.4518*	0.0512*	−0.0068	0.0607*	−0.0177	−0.0057	−0.0005	−0.0295	0.1391*	−0.0094	0.7587*	0.0013	1	
BIG	0.0591*	0.0377	−0.0459*	−0.0741*	−0.002	−0.0283	−0.0128	0.0027	−0.0728*	0.1759*	−0.0107	0.0165	0.0501*	142	1

All variables are defined in Appendix A. The table reports Pearson correlation coefficients.

* Denotes significance at the 5% level.

Table 4 presents these results. Column 1 presents results for our full sample; Columns 2 and 3 present results for *Big 4* audit firms and *non-Big 4* audit firms, respectively. To determine if there is any difference between mandatory and voluntary audit firm rotation, we introduce two binary variables to replace the variable *Change*: *Volchange* is equal to 1 if the company voluntarily changes audit firm, zero otherwise; *Manchange* is equal to 1 if the company mandatorily changes audit firm, zero otherwise. Column 4 presents the results of this model for the full sample; Columns 5 and 6 present the results for *Big 4* audit firms and *non-Big 4* audit firms, respectively. Finally we introduce a binary variable – *Partchange* – that takes the value of 1 for the year when the companies in our sample have a different audit partner signing the audit report, but there was NOT a change in audit firm. Column 7 presents the results of this model for the full sample; Columns 8 and 9 present results for *Big 4* audit firms and *non-Big 4* audit firms, respectively.

We find – similar to the results from previous literature for Italian public companies audited by a *Big 4* audit firm (Cameran et al., 2015) – no significant association between audit firm rotation (voluntary and mandatory) and audit quality in the full sample and in the sub-sample of companies audited by a *Big 4* audit firm (Column 1, 2, 4, 5, 7, and 8). However, when we limit the sample to public Italian companies audited by a *non-Big 4* audit firm, we find negative and significant coefficients for *AWCA* (Table 4, Columns 3, 6, and 9). These results indicate that audit quality improves in the year of the audit firm change (both mandatory and voluntary audit firm change) for Italian public companies audited by *non-Big 4* audit firms[25]. We also find a negative and significant relation between audit partner change and audit quality (Table 4, Column 9).

We use multivariate regression to test whether there is a change in the amount of audit related fees (*totrevscaled*—Table 5) or abnormal fees (*abnfees*—Table 6) paid to the audit firm related to the audit firm rotation. Table 5 shows that – as documented in a recent paper (Cameran et al., 2015) – for Italian public companies audited by a *Big 4* audit firm, there is a statistical significant reduction in total audit fees paid to the audit firm in the first year after the audit firm change: *Big 4* auditors seem to discount their audit fees in an effort to compete for new clients. However, our results also indicate that there is not such a change in audit fees for companies audited by a *non-Big 4* audit firm. Indeed there is no evidence of a significant coefficient for the variable *Change* (Table 5, Column 3) or for *Volchange* or *Manchange* (Table 5, Column 6 and 9).

Finally, we test whether abnormal audit fees are associated with a change in audit firm or audit partner. Table 6 presents our results. Similar to the results in Table 5, we find evidence of a reduction in abnormal audit fees for the sub-sample of companies audited by a *Big 4* audit firm but no evidence of a reduction in abnormal audit fees for companies audited by *non-Big 4* audit firms (Table 6, Column 6 and 9).

Overall, our results indicate that for companies audited by *non-Big 4* audit firms, audit firm change is associated with an increase in audit quality without a change in audit fees.

6. Sensitivity checks

We conduct a number of additional analyses to validate the results of our main regression models.

6.1. Arthur Andersen

Companies audited by Arthur Andersen were included in our main analysis as $BIG = 0$. If we perform the main analysis with Arthur Andersen identified as a *Big 4* audit firm, our results and inferences do not change.

6.2. Alternative measure of audit quality

Our second proxy for audit quality (Han & Wang, 1998) calculates abnormal accruals in a two-step calculation. In the first step, we calculate the residuals of a model estimating the change in sales as a function of the change in working capital (while controlling for year fixed effects).

$$\Delta S_{i,t} = \alpha_0 + \beta \Delta WC_{i,t} + Year \quad Fixed\,Effects + \varepsilon \tag{6}$$

where *WC* is the noncash working capital accruals computed as (current assets – cash and short term investments) – (current liabilities – short-term loans) for company *i* in time *t*. ΔWC is the change in working capital accruals for company *i* in time *t*. *S* is the total sales to customers for company *i* in time *t*, and ΔS is the change in total sales to customers for company *i* in time *t*.

In the second step, we calculate abnormal accruals (our second proxy for audit quality) using the residuals from this regression model divided by total sales revenue (*ABHW*).

$$\begin{aligned} ABHW_{i,t} = {} & \alpha + \beta_1 Change_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 CFO_{i,t} + \beta_4 LEV_{i,t} + \beta_5 SALESGR_{i,t} \\ & + \beta_6 ROA_{i,t} + \beta_7 LOSS_{i,t} + Year \quad fixed \quad effects + \varepsilon \end{aligned} \tag{7}$$

The control variables are the same as identified above in our main analysis.

[25] In a sensitivity check, we test whether this change in audit quality persists in the years after the audit firm change. We find that for *non-Big 4* audit clients the improved earnings quality persists for up to two years after the audit firm change.

Table 4
All Italian listed companies audited by *Big 4* and *non-Big 4* audit firms. *AWCA* measure of audit quality. All variables are defined in Appendix A. $AWCA_{i,t} = \alpha + \beta_1 Change_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 CFO_{i,t} + \beta_4 LEV_{i,t} + \beta_5 SALESGR_{i,t} + \beta_6 ROA_{i,t} + \beta_7 LOSS_{i,t} + Year\ \ fixed\ \ effects + \varepsilon$ $AWCA_{i,t} = \alpha + \beta_1 Volchange_{i,t} + \beta_2 Manchange_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 CFO_{i,t} + \beta_5 LEV_{i,t} + \beta_6 SALESGR_{i,t} + \beta_7 ROA_{i,t} + \beta_8 LOSS_{i,t} ++ Year\ \ fixed\ \ effects + \varepsilon$ $AWCA_{i,t} = \alpha + \beta_1 Volchange_{i,t} + \beta_2 Manchange_{i,t} + \beta_3 Partchange_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 CFO_{i,t} + \beta_6 LEV_{i,t} + \beta_7 SALESGR_{i,t} + \beta_8 ROA_{i,t} + \beta_9 LOSS_{i,t} ++ Year\ fixed\ effects + \varepsilon$.

Variables	(1) *Full AWCA*	(2) *Big4 AWCA*	(3) *NonBig4 AWCA*	(4) *Full AWCA*	(5) *Big4 AWCA*	(6) *NonBig4 AWCA*	(7) *Full AWCA*	(8) *Big4 AWCA*	(9) *NonBig4 AWCA*
Change	−0.045	0.057	−0.526**						
	(−0.622)	(0.952)	(−2.117)						
Volchange				−0.145	0.127	−0.775*	−0.175	0.123	−0.830**
				(−0.848)	(0.763)	(−1.902)	(−0.987)	(0.736)	(−2.011)
Manchange				−0.015	0.046	−0.413**	−0.040	0.042	−0.433**
				(−0.203)	(0.685)	(−2.084)	(−0.522)	(0.624)	(−2.140)
Partchange							−0.211***	−0.030	−0.820***
							(−2.652)	(−0.993)	(−2.938)
SIZE	−0.221***	−0.109***	−0.329**	−0.222***	−0.109***	−0.330**	−0.219***	−0.109***	−0.327**
	(−3.295)	(−4.179)	(−2.479)	(−3.293)	(−4.195)	(−2.479)	(−3.277)	(−4.208)	(−2.468)
CFO	0.003***	−0.024	0.005***	0.003***	−0.024	0.005***	0.003***	−0.023	0.005***
	(3.068)	(−0.859)	(2.813)	(3.069)	(−0.855)	(2.812)	(3.091)	(−0.849)	(2.842)
LEV	−0.062	−0.337	0.143	−0.060	−0.338	0.147	−0.059	−0.339	0.181
	(−0.173)	(−1.491)	(0.199)	(−0.167)	(−1.498)	(0.204)	(−0.164)	(−1.498)	(0.252)
SALESGR	−0.000	0.000	−0.001**	−0.000	0.000	−0.001**	−0.000*	0.000	−0.001**
	(−1.554)	(0.177)	(−2.216)	(−1.562)	(0.194)	(−2.217)	(−1.697)	(0.172)	(−2.293)
ROA	−0.006	−0.007**	−0.003	−0.006	−0.007**	−0.003	−0.006	−0.007**	−0.003
	(−1.479)	(−2.314)	(−0.348)	(−1.474)	(−2.318)	(−0.334)	(−1.456)	(−2.320)	(−0.278)
LOSS	0.080	−0.059	0.469	0.081	−0.060	0.473	0.095	−0.057	0.500
	(0.495)	(−1.287)	(1.293)	(0.503)	(−1.303)	(1.302)	(0.585)	(−1.261)	(1.361)
Constant	4.692***	2.724***	6.314**	4.698***	2.721***	6.313**	4.647***	2.715***	6.248**
	(3.443)	(4.069)	(2.309)	(3.443)	(4.077)	(2.307)	(3.422)	(4.089)	(2.288)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1583	984	599	1583	984	599	1583	984	599
Adj. *R*-squared	0.139	0.133	0.151	0.138	0.132	0.150	0.140	0.132	0.156

Standard error clustered by company. Robust *t*-statistics in parentheses.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

Table 5
All Italian listed companies audited by *Big 4* and *non-Big 4* audit firms. Total Audit Fees Scaled by Total Assets as measure of audit fees. All variables are defined in Appendix A. $totrevscaled_{i,t} = \alpha + \beta_1 Change_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 CFO_{i,t} + \beta_4 LEV_{i,t} + \beta_5 SALESGR_{i,t} + \beta_6 ROA_{i,t} + \beta_7 LOSS_{i,t} + +Year\ \ fixed\ \ effects + \varepsilon$ $totrevscaled_{i,t} = \alpha + \beta_1 Volchange_{i,t} + \beta_2 Manchange_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 CFO_{i,t} + \beta_5 LEV_{i,t} + \beta_6 SALESGR_{i,t} + \beta_7 ROA_{i,t} + \beta_8 LOSS_{i,t} + +Year\ \ fixed\ \ effects + \varepsilon$ $totrevscaled_{i,t} = \alpha + \beta_1 Volchange_{i,t} + \beta_2 Manchange_{i,t} + \beta_3 Partchange_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 CFO_{i,t} + \beta_6 LEV_{i,t} + \beta_7 SALESGR_{i,t} + \beta_8 ROA_{i,t} + \beta_9 LOSS_{i,t} + +Year\ \ fixed\ \ effects + \varepsilon$.

Variables	(1) *Full* totrevscaled	(2) *Big4* totrevscaled	(3) *NonBig4* totrevscaled	(4) *Full* totrevscaled	(5) *Big4* totrevscaled	(6) *NonBig4* totrevscaled	(7) *Full* totrevscaled	(8) *Big4* totrevscaled	(9) *NonBig4* totrevscaled
Change	−0.001***	−0.001**	−0.000						
	(−2.658)	(−2.411)	(−0.220)						
Volchange				−0.002*	−0.002	−0.000	−0.003*	−0.002	−0.000
				(−1.679)	(−1.101)	(−0.420)	(−1.666)	(−1.119)	(−0.393)
Manchange				−0.001***	−0.001***	0.000	−0.001***	−0.001**	0.000
				(−2.918)	(−2.701)	(0.519)	(−2.777)	(−2.589)	(0.524)
Partchange							−0.001	−0.001	0.000
							(−0.603)	(−0.565)	(0.219)
SIZE	−0.002***	−0.002***	−0.001***	−0.002***	−0.002***	−0.001***	−0.002***	−0.002***	−0.001***
	(−3.092)	(−3.009)	(−4.315)	(−3.083)	(−3.004)	(−4.125)	(−3.096)	(−3.020)	(−4.127)
CFO	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.001
	(0.541)	(0.603)	(1.352)	(0.568)	(0.599)	(1.335)	(0.570)	(0.600)	(1.329)
LEV	−0.004	−0.004	0.002*	−0.004	−0.004	0.003*	−0.004	−0.004	0.003*
	(−1.253)	(−1.230)	(1.949)	(−1.252)	(−1.236)	(1.904)	(−1.243)	(−1.230)	(1.893)
SALESGR	0.000	0.000	−0.001	0.000	0.000	−0.001	0.000	0.000	−0.001
	(1.039)	(0.888)	(−0.785)	(0.985)	(0.903)	(−0.792)	(0.965)	(0.881)	(−0.815)
ROA	−0.000*	−0.000*	0.000	−0.000*	−0.000*	0.000	−0.000*	−0.000*	0.000
	(−1.892)	(−1.885)	(1.109)	(−1.890)	(−1.885)	(1.128)	(−1.889)	(−1.887)	(1.124)
LOSS	0.001*	0.002**	0.000	0.001**	0.002**	0.000	0.001*	0.002*	0.000
	(1.971)	(2.015)	(0.509)	(1.991)	(2.009)	(0.505)	(1.925)	(1.951)	(0.486)
Constant	0.037***	0.041***	0.020***	0.037***	0.041***	0.020***	0.037***	0.041***	0.020***
	(3.142)	(3.080)	(4.141)	(3.135)	(3.077)	(3.986)	(3.147)	(3.090)	(4.035)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1250	1109	141	1250	1109	141	1250	1109	141
Adj. *R*-squared	0.090	0.101	0.478	0.090	0.100	0.475	0.089	0.099	0.471

Standard error clustered by company. Robust *t*-statistics in parentheses.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

Table 6
All Italian listed companies audited by *Big 4* and *non-Big 4* audit firms. Total Audit Fees Scaled by Total Assets as measure of audit fees. All variables are defined in Appendix A. $abnfees_{i,t} = \alpha + \beta_1 Change_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 CFO_{i,t} + \beta_4 LEV_{i,t} + \beta_5 SALESGR_{i,t} + \beta_6 ROA_{i,t} + \beta_7 LOSS_{i,t}$ ++ *Year fixed effects* $+ \varepsilon$ $abnfees_{i,t} = \alpha + \beta_1 Volchange_{i,t} + \beta_2 Manchange_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 CFO_{i,t} + \beta_5 LEV_{i,t} + \beta_6 SALESGR_{i,t} + \beta_7 ROA_{i,t} + \beta_8 LOSS_{i,t}$ ++ *Year fixed effects* $+ \varepsilon$ $abnfees_{i,t} = \alpha + \beta_1 Volchange_{i,t} + \beta_2 Manchange_{i,t} + \beta_3 Partchange_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 CFO_{i,t} + \beta_6 LEV_{i,t} + \beta_7 SALESGR_{i,t} + \beta_8 ROA_{i,t} + \beta_9 LOSS_{i,t}$ ++ *Year fixed effects* $+ \varepsilon$.

Variables	(1) *Full abnfees*	(2) *Big4 abnfees*	(3) *NonBig4 abnfees*	(4) *Full abnfees*	(5) *Big4 abnfees*	(6) *NonBig4 abnfees*	(7) *Full abnfees*	(8) *Big4 abnfees*	(9) *NonBig4 abnfees*
Change	−0.001**	−0.001**	−0.000						
	(−2.247)	(−2.282)	(−0.314)						
Volchange				−0.002	−0.002	−0.000	−0.002	−0.002	−0.000
				(−1.234)	(−1.111)	(−0.626)	(−1.232)	(−1.130)	(−0.584)
Manchange				−0.001***	−0.001***	0.000	−0.001***	−0.002***	0.000
				(−2.933)	(−2.819)	(0.641)	(−2.800)	(−2.700)	(0.650)
Partchange							−0.001	−0.001	0.000
							(−0.583)	(−0.579)	(0.336)
SIZE	−0.000	−0.000	0.001**	−0.000	−0.000	0.001**	0.000	−0.000	0.001**
	(−0.001)	(−0.017)	(2.457)	(−0.002)	(−0.015)	(2.224)	(0.004)	(−0.008)	(2.214)
CFO	0.000***	0.000***	0.000	0.000***	0.000***	0.000	0.000***	0.000***	0.000
	(3.158)	(3.073)	(0.965)	(3.112)	(3.041)	(0.910)	(3.091)	(3.018)	(0.896)
LEV	0.000	−0.000	0.006***	0.000	−0.000	0.006***	0.000	−0.000	0.006***
	(0.005)	(−0.139)	(4.857)	(0.001)	(−0.146)	(4.685)	(0.007)	(−0.142)	(4.666)
SALESGR	−0.000***	−0.000***	−0.000	−0.000***	−0.000***	−0.000	−0.000***	−0.000***	−0.000
	(−3.511)	(−3.437)	(−0.702)	(−3.485)	(−3.410)	(−0.708)	(−3.484)	(−3.411)	(−0.735)
ROA	0.000	−0.000	0.000***	0.000	−0.000	0.000***	0.000	−0.000	0.000***
	(0.002)	(−0.117)	(7.521)	(0.005)	(−0.117)	(7.605)	(0.004)	(−0.122)	(7.656)
LOSS	0.000	0.000	−0.001***	0.000	0.000	−0.001***	0.000	0.000	−0.001***
	(0.038)	(0.350)	(−3.793)	(0.059)	(0.358)	(−3.843)	(0.109)	(0.386)	(−3.959)
Constant	−0.000	−0.000	−0.022***	−0.000	−0.000	−0.021***	−0.000	−0.000	−0.021***
	(−0.004)	(−0.006)	(−4.170)	(−0.003)	(−0.007)	(−3.854)	(−0.009)	(−0.014)	(−3.872)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1250	1109	141	1250	1109	141	1250	1109	141
Adj. *R*-squared	−0.014	−0.016	0.680	−0.015	−0.017	0.679	−0.016	−0.017	0.676

Standard error clustered by company. Robust *t*-statistics in parentheses
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

Table 7
All Italian listed companies audited by *Big 4* and non-*Big 4* audit firms. Total Audit Fees Scaled by Total Assets as measure of audit fees. All variables are defined in Appendix A. $ABHW_{i,t} = \alpha + \beta_1 Change_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 CFO_{i,t} + \beta_4 LEV_{i,t} + \beta_5 SALESGR_{i,t} + \beta_6 ROA_{i,t} + \beta_7 LOSS_{i,t} + +$ *Year fixed effects* $+ \varepsilon$ $ABHW_{i,t} = \alpha + \beta_1 Volchange_{i,t} + \beta_2 Manchange_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 CFO_{i,t} + \beta_5 LEV_{i,t} + \beta_6 SALESGR_{i,t} + \beta_7 ROA_{i,t} + \beta_8 LOSS_{i,t} + +$ *Year fixed effects* $+ \varepsilon$ $ABHW_{i,t} = \alpha + \beta_1 Volchange_{i,t} + \beta_2 Manchange_{i,t} + \beta_3 Partchange_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 CFO_{i,t} + \beta_6 LEV_{i,t} + \beta_7 SALESGR_{i,t} + \beta_8 ROA_{i,t} + \beta_9 LOSS_{i,t} + +$ *Year fixed effects* $+ \varepsilon$.

Variables	(1) *Full ABHW*	(2) *Big4 ABHW*	(3) *NonBig4 ABHW*	(4) *Full ABHW*	(5) *Big4 ABHW*	(6) *NonBig4 ABHW*	(7) *Full ABHW*	(8) *Big4 ABHW*	(9) *NonBig4 ABHW*
Change	−0.202	−0.076	−1.455***						
	(−1.501)	(−0.662)	(−2.886)						
Volchange				−0.450	0.200	−2.528**	−0.495	0.199	−2.657**
				(−1.014)	(0.525)	(−2.436)	(−1.102)	(0.509)	(−2.521)
Manchange				−0.103	−0.125	−0.789*	−0.144	−0.126	−0.880**
				(−0.750)	(−1.188)	(−1.852)	(−1.041)	(−1.107)	(−2.003)
Partchange							−0.384	−0.008	−2.419***
							(−1.256)	(−0.023)	(−3.453)
SIZE	−0.605***	−0.461***	−0.893**	−0.606***	−0.461***	−0.895**	−0.600***	−0.461***	−0.889**
	(−3.471)	(−2.695)	(−2.009)	(−3.467)	(−2.688)	(−2.010)	(−3.448)	(−2.701)	(−2.001)
CFO	0.012***	−0.117	0.017**	0.012***	−0.116	0.017**	0.012***	−0.116	0.017**
	(3.111)	(−0.617)	(2.520)	(3.110)	(−0.613)	(2.521)	(3.098)	(−0.614)	(2.533)
LEV	0.161	1.453	−1.744	0.167	1.444	−1.725	0.170	1.444	−1.626
	(0.176)	(1.617)	(−1.001)	(0.181)	(1.602)	(−0.989)	(0.185)	(1.603)	(−0.927)
SALESGR	−0.004	−0.010	−0.004	−0.004	−0.010	−0.004	−0.004	−0.010	−0.004
	(−1.536)	(−0.795)	(−1.586)	(−1.537)	(−0.793)	(−1.586)	(−1.553)	(−0.787)	(−1.645)
ROA	−0.048	0.006	−0.111	−0.048	0.006	−0.112	−0.048	0.006	−0.111
	(−1.190)	(0.157)	(−1.330)	(−1.188)	(0.151)	(−1.329)	(−1.190)	(0.151)	(−1.323)
LOSS	−0.206	−0.351	0.233	−0.201	−0.358	0.243	−0.171	−0.358	0.391
	(−0.402)	(−1.082)	(0.196)	(−0.392)	(−1.103)	(0.204)	(−0.330)	(−1.081)	(0.324)
Constant	12.436***	9.005***	18.745**	12.451***	8.999***	18.767**	12.369***	8.998***	18.666**
	(3.661)	(2.684)	(2.262)	(3.657)	(2.680)	(2.261)	(3.643)	(2.681)	(2.253)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1695	1070	625	1695	1070	625	1695	1070	625
Adj. *R*-squared	0.032	0.023	0.038	0.031	0.022	0.036	0.031	0.021	0.037

Standard error clustered by company. Robust *t*-statistics in parentheses.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

Table 8
All Italian listed companies audited by *Big 4* and *non-Big 4* audit firms. *Prechange*, equal to 1 for the year before the change in audit firm and zero otherwise, *Change* is equal to 1 for the year of the change in auditor. *Postchange*, equal to 1 for one year after the change in audit firm and zero otherwise, *Post2change*, equal to 1 for the second year after the change in audit firm and zero otherwise, *Post3change*, equal to 1 for the third year after the change in audit firm and zero otherwise. All variables are defined in Appendix A.
$ABHW_{i,t} = \alpha + \beta_1 Partchange_{i,t} + \beta_2 Change_{i,t} + \beta_3 Postchange_{i,t} + \beta_4 Post2change_{i,t} + \beta_5 Post3change_{i,t} + \beta_6 SIZE_{i,t} + \beta_7 CFO_{i,t} + \beta_8 LEV_{i,t} + \beta_9 SALESGR_{i,t} + \beta_{10} ROA_{i,t} + \beta_{11} LOSS_{i,t} + +Year\ \ fixed\ \ effects + \varepsilon$.

Variables	(1) *Full AWCA*	(2) *Big4 AWCA*	(3) *NonBig4 AWCA*
Prechange	−0.036	0.072*	−0.040
	(−0.421)	(1.657)	(−0.144)
Change	−0.060	0.074	−0.411*
	(−0.735)	(1.135)	(−1.933)
Postchange	−0.138*	0.021	−0.705**
	(−1.694)	(0.530)	(−2.329)
Post2change	−0.133	0.081	−0.701**
	(−1.237)	(0.851)	(−2.483)
Post3change	−0.027	0.230	−0.732***
	(−0.175)	(1.305)	(−2.958)
SIZE	−0.220***	−0.110***	−0.324**
	(−3.284)	(−4.246)	(−2.468)
CFO	0.003***	−0.023	0.005***
	(3.045)	(−0.828)	(2.892)
LEV	−0.049	−0.367	0.137
	(−0.134)	(−1.541)	(0.193)
SALESGR	−0.000	0.001	−0.001**
	(−1.519)	(0.313)	(−2.415)
ROA	−0.006	−0.007**	−0.003
	(−1.443)	(−2.396)	(−0.343)
LOSS	0.084	−0.061	0.534
	(0.517)	(−1.312)	(1.450)
Constant	4.733***	2.737***	6.260**
	(3.348)	(4.139)	(2.306)
Year fixed effects	Yes	Yes	Yes
Observations	1583	984	599
Adj. *R*-squared	0.138	0.141	0.158

Standard error clustered by company. Robust *t*-statistics in parentheses.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

We partition our sample into two sub-samples: public companies that are audited by one of the largest audit firms vs. public companies audited by a *non-Big 4* firm, using the variable *BIG* as defined above in our main analysis. We also control for audit partner rotation with a binary variable (*Partchange*) as defined above in our main analysis. Results and inferences, reported in Table 7, are qualitatively the same as the results we report in the main results section of the manuscript.

6.3. Persistence of audit quality after the audit firm change and pre vs. post change

To test whether the difference in audit quality persists for the years after the change in audit firm, and to ensure that there is a change in audit quality before vs. after the audit firm change, we introduce binary variables: *Prechange*, equal to 1 for the year before the change in audit firm and zero otherwise, *Postchange*, equal to 1 for one year after the audit firm change and zero otherwise, *Post2change*, equal to 1 for the second year after the audit firm change and zero otherwise, *Post3change*, equal to 1 for the third year after the audit firm change and zero otherwise. Table 8 reports our results: audit quality improves following a change in *non-Big 4* audit firm, while the coefficient of the *Prechange* binary variable is not statistically different from zero for companies audited by *non-Big 4* audit firms and positive but only weakly significant for companies audited by *Big 4* audit firms. There is also strong evidence that the improvement in audit quality for companies audited by a *non-Big 4* audit firm persists after the audit firm change, as each of the post-change binary variables have negative and strongly significant coefficients.

6.4. Signed accruals tests

Following previous literature (among others, Cameran et al., 2015), our main analysis used the absolute value of abnormal accruals as the dependent variable. As a sensitivity test, we also ran model (2) separately for positive (income increasing) and negative (income decreasing) accruals. Table 9 reports our results for the signed accruals tests: for companies in the

Table 9
All Italian listed companies audited by *Big 4* and non-Big 4 audit firms. (Signed accruals are tested rather than absolute value of accruals.) All variables are defined in Appendix A. $AWCA_{i,t} = \alpha + \beta_1 Volchange_{i,t} + \beta_2 Manchange_{i,t} + \beta_3 Partchange_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 CFO_{i,t} + \beta_6 LEV_{i,t} + \beta_7 SALESGR_{i,t} + \beta_8 ROA_{i,t} + \beta_9 LOSS_{i,t} + +Year\ fixed\ effects + \varepsilon$.

	Positive abnormal accruals			Negative abnormal accruals		
Variables	(1) *AWCA Full*	(2) *Big4 AWCA*	(3) *NonBig4 AWCA*	(4) *Full AWCA*	(5) *Big4 AWCA*	(6) *NonBig4 AWCA*
Volchange	−0.034	0.399	−0.633**	0.473*	0.169	1.382***
	(−0.152)	(1.564)	(−2.150)	(1.835)	(1.574)	(2.822)
Manchange	−0.081	0.031	−0.311**	0.127	−0.000	0.476
	(−1.439)	(0.579)	(−2.295)	(1.237)	(−0.005)	(0.958)
Partchange	−0.137**	−0.006	−0.717***	0.424***	0.169**	0.927**
	(−2.012)	(−0.091)	(−4.212)	(3.849)	(2.408)	(2.362)
SIZE	−0.130***	−0.090***	−0.164***	0.370***	0.102***	0.722***
	(−5.072)	(−3.415)	(−3.524)	(3.498)	(2.696)	(3.865)
CFO	−0.002**	0.000	−0.001	0.012***	0.013***	1.038**
	(−1.997)	(0.193)	(−1.399)	(4.564)	(5.853)	(2.024)
LEV	−0.133	−0.278	−0.062	0.347	0.344	0.527
	(−0.556)	(−1.490)	(−0.142)	(0.758)	(1.425)	(0.533)
SALESGR	0.002***	0.000	0.002***	−0.007***	−0.007***	−0.181***
	(3.205)	(1.498)	(6.801)	(−8.161)	(−12.835)	(−2.905)
ROA	−0.005	−0.008*	0.000	0.012	0.011*	0.006
	(−1.322)	(−1.684)	(0.002)	(1.466)	(1.928)	(0.322)
LOSS	0.062	−0.028	0.210	−0.013	−0.002	−0.521
	(0.769)	(−0.455)	(1.281)	(−0.079)	(−0.031)	(−1.260)
Constant	2.641***	1.948***	3.392***	−7.756***	−2.242***	−16.904***
	(5.534)	(3.637)	(3.765)	(−3.929)	(−2.870)	(−3.800)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1010	620	390	1102	745	357
Adj. *R*-squared	0.164	0.151	0.202	0.206	0.287	0.337

Standard error clustered by company. Robust *t*-statistics in parentheses.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

income increasing accruals subsample, audit quality improves following a change in *non-Big 4* audit firm (voluntary change, mandatory change, and partner change); for companies in the income decreasing accruals subsample, audit quality improves following a change in *non-Big 4* audit firm, but only for voluntary change and partner change. For companies audited by a *Big 4* audit firm, none of the coefficients were statistically significantly different from zero.

6.5. Extreme observations

To ensure that our results – in particular our results for the *non-Big 4* subsample – are not driven by one or two firms with extreme values, we winsorized (at 2%, both tails) the dependent variable in our main model (*AWCA*). Since the subsample of companies audited by *non-Big 4* firms includes 599 observations, this will exclude from our analysis the top and bottom 12 most extreme observations. Our results and inferences do not change for either of the Big-4 or *non-Big 4* subsamples.

6.6. Statistical significance of the difference in audit quality between Big 4 and non-Big 4 clients following audit firm change

In Table 4, we test the relation between abnormal accruals and multiple types of auditor change for *Big 4* clients and *non-Big 4* clients in separate models. We find results for *non-Big 4* clients in the accrual model but we did not test specifically whether these results are significantly different between the two sub-samples. In order to test for statistical differences in the regression coefficients between *Big 4* and *non-Big 4* clients, we run a model with both *Big 4* and *non-Big 4* clients, and add a binary variable *nonbig4* equal to one for *non-Big 4* clients, zero otherwise. Then, we include this variable and its interactions with the other independent variables in the model (*Volchange* × *nonbig4, Manchange* × *nonbig4, Partchange* × *nonbig4*).

$$\begin{aligned} AWCA_{i,t} = {} & \alpha + \beta_1 Volchange_{i,t} + \beta_2 Manchange_{i,t} + \beta_3 Partchange_{i,t} + \beta_4 nonbig_{i,t} \\ & + \beta_5 Volchange \times nonbig4_{i,t} + \beta_6 Manchange \times nonbig4_{i,t} + \beta_7 Partchange \times nonbig4_{i,t} \\ & + \beta_8 SIZE_{i,t} + \beta_9 CFO_{i,t} + \beta_{10} LEV_{i,t} + \beta_{11} SALESGR_{i,t} + \beta_{12} ROA_{i,t} + \beta_{13} LOSS_{i,t} + Year\ \ fixed\ \ effect + \varepsilon \end{aligned} \quad (8)$$

Table 10 reports our results: audit quality is higher for firms audited by *non-Big 4* following a change in audit firms.

Table 10
All Italian listed companies, audited by *Big 4* and *non-Big 4* audit firms. *Non-Big4* binary variable is equal to 1 for firms audited by a *non-Big 4* auditor, and zero otherwise. All variables are defined in Appendix A.
$AWCA_{i,t} = \alpha + \beta_1 Volchange_{i,t} + \beta_2 Manchange_{i,t} + \beta_3 Partchange_{i,t} + \beta_4 nonbig_{i,t} +$
$\beta_5 Volchange \times nonbig4_{i,t} + \beta_6 Manchange \times nonbig4_{i,t} + \beta_7 Partchange \times nonbig4_{i,t} +$.
$\beta_8 SIZE_{i,t} + \beta_9 CFO_{i,t} + \beta_{10} LEV_{i,t} + \beta_{11} SALESGR_{i,t} + \beta_{12} ROA_{i,t} + \beta_{13} LOSS_{i,t} + Year\ \ fixed\ \ effect + \varepsilon$

Variables	(1) *AWCA*
Volchange	0.038
	(0.202)
Manchange	0.094
	(1.075)
Partchange	−0.080*
	(−1.696)
Nonbig4	0.324**
	(2.159)
Volchange × *nonbig4*	−0.643*
	(−1.855)
Manchange × *nonbig4*	−0.612***
	(−2.748)
Partchange × *nonbig4*	−0.568***
	(−2.969)
SIZE	−0.197***
	(−3.010)
CFO	0.003***
	(3.075)
LEV	−0.088
	(−0.253)
SALESGR	−0.001**
	(−2.134)
ROA	−0.006
	(−1.480)
LOSS	0.102
	(0.634)
Constant	4.215***
	(3.114)
Year fixed effects	Yes
Observations	1583
Adj. *R*-squared	0.150

Standard error clustered by company. Robust *t*-statistics in parentheses.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

7. Conclusions and limitations

Authorities in the U.S. and elsewhere continue to evaluate whether the benefits of audit firm rotation outweigh the costs, and whether audit firm rotation might provide higher audit quality as compared to individual partner rotation. This study examines this question in the unique environment of a country, Italy, with a long history of mandatory audit firm rotation, with the goal of informing the discussion related to mandatory audit firm rotation elsewhere in the world. Our sample includes all listed Italian companies, from 1998 to 2011, with the necessary accounting and audit data to perform our calculations. Our results indicate that audit quality, proxied by two measures of abnormal accruals, improves following audit firm rotation (both mandatory and voluntary) but only for companies audited by a *non-Big 4* audit firm, even after controlling for audit partner rotation and other variables previous research has shown to have an association with audit quality. Additionally, our results indicate that the total fees paid to the audit firm do not change following mandatory audit firm rotation for companies audited by a *non-Big 4* audit firm.

A limitation of this study is the use of earnings management (abnormal accruals) as a proxy for audit quality. As with all studies that use this proxy for audit quality, reported financial statements are a joint product of the company management and the audit firm and, therefore, we are not able to isolate the effects of a company's financial reporting quality from the audit quality itself. As with all studies that use this measure, we cannot observe earnings quality directly, however, we do use estimates calculated by two different models in this study.

Subject to these limitations, this study makes several contributions to the literature. First, it provides empirical evidence that audit quality improves following an audit firm rotation in Italy (both mandatory and voluntary audit firm rotation) for companies audited by a *non-Big 4* audit firm. Second, it provides some evidence that total fees paid to the audit firm and the abnormal fees paid for audit services do not change following audit firm rotation for these companies. As a result of these contributions, we believe the results of this study should be interesting to policy setters and regulators in Italy, policy setters and regulators in countries considering implementing mandatory audit firm rotation (the European Parliament and others), the U.S. House of Representatives, the GAO, and academic researchers.

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Appendix A.

Variable definitions.

Compustat ITEMS (Source Compustat Global Manual)	AIDA ITEMS
ITEM 75: CURRENT ASSETS—TOTAL This item represents cash and assets expected to be converted into cash and used in the production of revenue during the next one-year operating cycle This item is a component of Assets—Total/Liabilities and Shareholders' Equity–Total (AT) This item is the *sum* of 1. Cash and Short-Term Investments (CHSTI) 2. Current Assets—Other (ACO) 3. Inventories/Stocks—Total (INVT) 4. Accounts Receivable/Debtors—Total (RECT)	1. ATTIVO CIRCOLANTE AL NETTO DEI CREDITI A LUNGO TERMINE (CA) Attivo circolante represents cash and assets expected to be converted into cash and/or used in the production of revenue during next operating cycle This item is the *sum* of 1. Disponibilità liquide (cash and cash equivalents—AIDA code vc_1070) 2. Attività finanziarie che non costituiscono immobilizzazioni (short-term financial investments—vc_1066) 3. Rimanenze (inventories—vc_1045) 4. Crediti a breve termine (short-term receivables—vc_1056) As Attivo circolante may include long-term trade receivables, to calculate CA we subtract such receivables from its total amount CA = vc_1071 – vc_1075
ITEM 60: CASH AND SHORT-TERM INVESTMENTS (CHSTI) This item represents cash and funds convertible into cash within a short period of time This item is a component of Current Assets—Total (ACT) This item is the *sum* of 1. Cash and Due From Banks (CH) 2. Short-Term Investments (IVST) This item includes liquid funds when no breakout from cash and short-term investments is available This item excludes 1. Commercial paper issued by unconsolidated subsidiaries to the parent company (included in Accounts Receivable/Debtors—Other [RECCO]) 2. Money due from sale of debentures (included in Accounts Receivable/Debtors—Other [RECCO])	2. ATTIVITÀ FINANZIARIE CHE NON COSTITUISCONO IMMOBILIZZAZIONI E DISPONIBILITÀ LIQUIDE (FINA) This item represents cash and funds convertible into cash within a short period of time This item is a component of Attivo Circolante (variable CA above) This item is the *sum* of 1. Disponibilità liquide (cash and cash equivalents – vc_1070) 2. Attività finanziarie che non costituiscono immobilizzazioni (short-term financial investments – vc_1066) FINA = vc_1070 + vc_1066
ITEM 104: CURRENT LIABILITIES—TOTAL This item represents debt and other liabilities due within one year This item is a component of Liabilities—Total (LT) This item is the *sum* of 1. Accounts Payable (AP) 2. Current Liabilities—Other (LCO) 3. Debt in Current Liabilities (DLC) This item includes the current portion of long-term debt	3. DEBITI AL NETTO DEI DEBITI A LUNGO TERMINE (LIABSHORT) Debiti includes both short-term and long-term trade payables and loans LIABSHORT is a component of Debiti and represents debts due within one year. LIABSHORT is therefore the difference between total trade payables and loans (vc_1118), and long-term trade payables and loans (vc_1117) LIABSHORT = vc_1118 – vc_1117
ITEM 94: DEBT IN CURRENT LIABILITIES This item is also referred to as Debt in Current Liabilities. It represents the total amount of debt included in current liabilities This item is a component of Current Liabilities—Total (LCT) This item is the *sum* of 1. Long-Term Debt Due in One Year (DD1) 2. Notes Payable (NP)	4. DEBITI FINANZIARI A BREVE TERMINE (LIABFIN) This item represents financial payables due within one year This item is the *sum* of 1. Obbligazioni con scadenza entro l'esercizio successivo (short-term bonds – vc_1090) 2. Obbligazioni convertibili con scadenza entro l'esercizio successivo (long-term bonds – vc_1092) 3. Debiti verso soci con scadenza entro l'esercizio successivo (short-term borrowings from shareholders – vc_1184) 4. Debiti verso banche con scadenza entro l'esercizio successivo (short-term bank loans – vc_1094) 5. Debiti verso altri finanziatori con scadenza entro l'esercizio successivo (short-term borrowings from other financiers – vc_1096) LIABFIN = vc_1090 + vc_1092 + vc_11184 + vc_1094 + vc_1096

Compustat ITEMS (Source Compustat Global Manual)	AIDA ITEMS
ITEM 1: SALES/TURNOVER (NET) This item represents gross sales less cash discounts, sales discounts and returns, excise taxes, and value-added taxes and allowances for which credit is given to customers This item is a component of Operating Income (OPINC) This item includes 1. Advertising companies' net sales or commissions earned 2. Airline companies' net mutual aid assistance and federal subsidies 3. Any external operating revenue source expected to continue for the life of the company 4. Equipment rental income 5. Franchise fees 6. Hospitals' sales net of provision for contractual allowances 7. Leasing companies' rental or leased income 8. License fees 9. Management fees 10. Retail companies' sales of leased departments (when corresponding expenses are reported in the Income Statement and no breakout is available) 11. Royalty income (when included in operating revenues) 12. Shipping companies' operating differential subsidies and income on reserve fund securities (when a breakout is available) This item excludes 1. Capitalized costs (included in Capitalized Costs [CAPCST] for companies using Income Statement Model Number 02 [Purchases Format]) 2. Effects of excise taxes and value-added taxes (when not reported on the Income Statement) (included in Cost of Goods Sold [COGS] or Operating Expense—Other [XOPRO]) 3. Equity in earnings of unconsolidated subsidiaries (included in Nonoperating Income [Expense]—Other [NOPIO]) 4. Interest income (included in Interest and Related Income [IDIT]) 5. Nonoperating income (included in Nonoperating Income [Expense]- Other [NOPIO]) 6. Other operating income (included in Nonoperating Income [Expense]—Other [NOPIO]) 7. Rental income (included in Nonoperating Income [Expense]—Other [NOPIO])	5. RICAVI NETTI DELLE VENDITE E DELLE PRESTAZIONI (NETSALES) This item represents gross sales reduced by cash discounts, sales discounts and returns, and value-added taxes and allowances for which credit is given to customers NETSALES = vc_1124
WC: WORKING CAPITAL CALCULATION $WC_t = (\text{Current Assets}_t - \text{Cash and Short-Term Investments}_t) - (\text{Current Liabilities}_t - \text{Debt in Current Liabilities}_t)$	*WC*: WORKING CAPITAL CALCULATION $WC_t = (CA_t - FINA_t) - (LIABSHORT_t - LIABFIN_t)$
AWCA: ABNORMAL WORKING CAPITAL CALCULATION $AWCA_t = WC_t - [(WC_{t-1}/\text{Sales}_{t-1}) \times \text{Sales}_t]$	*AWCA*: ABNORMAL WORKING CAPITAL CALCULATION $AWCA_t = WC_t - [(WC_{t-1}/\text{NETSALES}_{t-1})\ \text{NETSALES}_t]$

ABHW: ABNORMAL ACCRUALS MEASURED

Following Han and Wang (1998) we first regress change in sales over change in working capital accruals with year fixed effects, and measure the abnormal accruals as the residuals from the regression

$\Delta S_{i,t} = \alpha_0 + \beta \Delta WC_{i,t} + Year\ Fixed\ Effects + \varepsilon$

where ΔWC = Change in working capital accruals

Totrevscaled: the amount of audit service fees paid to the auditor scaled by total sales

abnFees: abnormal audit fees calculated as the excess audit fees amount as compared to projected audit fees

LOSS: binary variable equal to 1 if the company experienced a loss in the period, and 0 otherwise.

Change: binary variable equal to 1 for the year of the change in audit firm, with the new auditor signing and taking responsibility for the content of the financial statements presented to investors, and 0 otherwise.

Volchange: binary variable equal to 1 for the year of a change in audit firm when the change is voluntary, and 0 otherwise

Manchange: binary variable equal to 1 for the year of a change in audit firm when the change is mandatory, and 0 otherwise

Partchange: binary variable equal to 1 for the year when there has been a partner change without an audit firm change, and 0 otherwise

Prechange: binary variable equal to 1 for the year before a change in audit firm, and 0 otherwise

Postchange: binary variable equal to 1 for the year after a change in audit firm, and 0 otherwise

Post2change: binary variable equal to 1 for the second year after a change in audit firm, and 0 otherwise

Post3change: binary variable equal to 1 for the third year after a change in audit firm, and 0 otherwise

SIZE: the natural log of net sales

LEV: the difference between total liabilities and stockholders' equity over total assets

SALESGR: sales growth calculated as $(NETSALES_t - NETSALES_{t-1})/NETSALES_{t-1}$

ROA: return on assets from Aida

BIG: variable equal to 1 if the audit firm is one of the *Big 4* audit firms in Italy (Reconta Ernest & Young (REY); PricewaterhouseCoopers (*PWC*); DeloitteTouche Tohmatsu (D&T); KPMG), and zero if the audit firm is not one of the *Big 4* audit firms in Italy. The variable is equal to 2 if the audit firm is Arthur Andersen, and equal to 3 if we do not find information about the auditor in the company's financial report

CFO: Cash flow from operations calculated as

$(NET\ \ INCOME_t - EXTRAORDINARY\ \ ITEMS_t + AMORTIZATION\ \ AND\ \ DEPRECIATION_t - CURRENT\ \ ACCRUALS_t)/TOTAL\ \ ASSETS_{t-1}$

We assume that for all firms where BIG is coded as three there were no changes in auditor during the sample period, thus biasing the results against finding evidence of an impact of auditor change on earnings quality.

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