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Core earnings management: How do audit firms interact with classification shifting and accruals management?

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This study examines the interaction of audit firm characteristics with two core earnings management tools: classification shifting (CS) and core accruals management (CACM). CS occurs when management intentionally misclassifies recurring operational expenses as special items to inflate perceptions of core earnings. A Norwegian sample of companies, with forthcoming equity issues and acquisitions, reveals that CS substitutes for CACM for clients of Big 4 and industry-specialized audit firms. By contrast, CS complements CACM for clients of non-Big 4 and non-specialized audit firms. The level of auditor-provided non-audit services during a forthcoming equity issue, a measure of economic bond potential, also interacts with CS and CACM, though this interaction is different for clients of Big 4 and non-Big 4 audit firms. The overall results suggest that auditor incentives may support tolerating CS, which raises a question about the effectiveness of current accounting and auditing standards.

KEYWORDS
accruals management, audit quality, classification shifting, earnings management

1 | INTRODUCTION

Research has revealed that corporate management makes trade-off decisions between the use of various earnings management tools (e.g., Abernathy, Beyer, & Rapley, 2014; Fan, Barua, Cready, & Thomas, 2010; Guggenmos, Rennekamp, & Rupar, 2019; Zang, 2012), but less is known about how *auditors* interact with these trade-offs. Our study investigates how three common audit quality-related variables—audit firm size, industry specialization and auditor-provided non-audit services (NAS)—simultaneously interact with two types of core earnings management: classification shifting (CS) and core accruals management (CACM).

CS occurs when management intentionally misclassifies parts of recurring operational expenses as income-decreasing special items (McVay, 2006). This results in core earnings being inflated, for example, by hiding parts of the recurring administrative expenses among special items as part of restructuring charges. The strategy of inflating perceptions of core earnings has been shown to have valuation effects (e.g., Alfonso, Cheng, & Pan, 2015; Zhang & Zheng, 2011). Shifting of income within the income statement does not change bottom-line income but does increase perceived core earnings, an alternative performance measure (APM) often emphasized by financial analysts and investors (Bhattachary, Black, Christensen, & Larson, 2003; Bradshaw & Sloan, 2002; Lipe, 1986). Previous studies have shown that companies engage in CS and have analysed how CS interacts with companies' earning management incentives. For example, McVay (2006) and Fan et al. (2010) provide evidence of higher levels of CS when management has incentives to act opportunistically to meet or beat earnings benchmarks. Equity issues and acquisitions are circumstances known to provide strong incentives to enhance earnings to increase the valuation of the issues and to decrease the cost of capital (e.g., Erickson & Wang, 1999; Rangan, 1998; Teoh, Welch, & Wong, 1998a, 1998b; Teoh, Wong, & Rao, 1998). In this study, equity issues and acquisitions motivate management to pursue CS as well as CACM.

The audit quality literature has investigated how auditor incentives and competencies affect accruals management and has provided evidence of how audit firm size, industry specialization and the provision of NAS affect earnings management (e.g., DeFond & Zhang, 2014; Sharma, 2014). Classification of core operating expenses or special operating items often involves considerable judgement with potential management biases that may be difficult for auditors to detect.

Auditors may also find it difficult to challenge management's classification of expenses due to permissive accounting and auditing standards (Zalata & Roberts, 2016). A few studies have addressed how audit quality-related variables affect CS (Causholli, Chambers, & Payne, 2014; Haw, Ho, & Li, 2011; Li & Guo, 2018; Siu & Faff, 2013). These have provided little evidence about how audit quality-related variables interact with CS and CACM. Our study is unique in that it investigates how three common audit quality-related variables, audit firm size, industry specialization and auditor-provided NAS, simultaneously interact with CS and CACM.

Our sample consists of 285 Norwegian public companies that provide 1,969 company-year observations for the period 2000–2015. After establishing a positive association between CS and large equity issues, we find that the association strengthens when CACM is low but disappears when CACM is high. This indicates that CS and CACM are, on average, used as substitutes when managing core earnings.

Next, we show that, for clients of Big 4 and industry-specialized audit firms, when CACM is low (high), CS is high (low), suggesting that these auditees associate with CS substituting CACM. This relationship changes for non-Big 4 (in our sample mostly second-tier firms) and non-specialized audit firms' clients because when their CACM is low (high), their CS is low (high). This suggests that these auditees associate with CS complementing CACM. Our findings also indicate that auditor-provided NAS interact with CS and CACM. For clients of non-specialized Big 4 audit firms with high CACM, CS is also high when the provision of NAS during a forthcoming equity issue is large. This is consistent with future NAS purchases having the potential to impair audit quality for non-specialized Big 4 audit firms by allowing both CS and CACM. By contrast, for non-Big 4 and non-specialized audit firms' clients with high CACM, CS is low when future NAS provisions are large. This is consistent with non-Big 4 and non-specialized firms' intent to signal audit competence by limiting CS before equity issues but allowing CACM to obtain future NAS engagements.

Our study makes several important contributions. After establishing that CS takes place before equity issues in our sample, we provide evidence of the relative importance of two strategies to manage core earnings, CS and CACM. The evidence indicates on average a substitution rather than a complementary strategy. Next, we provide new insight into the moderating effects on the relationship between CS and CACM of three common audit firm characteristics, previously shown to relate to audit quality. Our results show that such interactions exist and how audit firm size, industry specialization and provision of NAS to the auditee influence the relative importance of CS and CACM before equity issues. Overall, the results suggest that auditor incentives may be distorted towards tolerating CS, raising the question of the effectiveness of the current accounting and auditing standards. The insights from our findings should be of interest for financial statement users, regulators and others who seek to better understand the mechanisms used to manage core earnings and how audit firm characteristics interact with such earnings management.

The remainder of the paper proceeds as follows. In Section 2, we review related literature, develop our hypotheses and introduce the testing methodology. Section 3 presents the data, variables, descriptive statistics and correlations. Section 4 contains the main tests and discusses the results. Sections 5 and 6 include additional tests and robustness tests. The final section contains concluding comments and implications for future research.

2 | HYPOTHESIS DEVELOPMENT AND TESTING METHODOLOGY

Studies have documented various forms of CS in the financial statements,[1] analysed management incentives to engage in CS and identified circumstances in the corporate information environment that may moderate or aggravate CS. McVay (2006) provides evidence of CS with increased pervasiveness when managers have incentives and opportunities to meet or beat consensus analysts' earnings forecasts, which typically exclude special items. In the same vein, Fan et al. (2010) find evidence of greater CS when managers are able to meet or beat earnings benchmarks when their ability to manipulate accruals appears to be constrained. Other studies report that a strong investor protection environment and strong internal corporate governance tend to mitigate CS (Behn, Gotti, Herrmann, & Kang, 2013; Zalata & Roberts, 2016). Haw et al. (2011) find that companies with controlling shareholders tend to be associated with more CS. Li (2016) finds that CS has declined after the implementation of the Sarbanes-Oxley Act of 2002 (SOX).

Equity issues [initial public offerings (IPOs) and secondary equity offerings (SEOs)] and mergers and acquisitions (M&A) are events with strong incentives to manage earnings to attract capital or negotiate acquisition stock swaps on favourable terms (Healy & Wahlen, 1999; Schipper, 1989). Studies of accruals management find compelling evidence that accruals are managed around equity issues and acquisitions (e.g., Erickson & Wang, 1999; Rangan, 1998; Teoh, Welch, & Wong, 1998a, 1998b; Teoh, Wong, & Rao, 1998). Similarly, Eilifsen and Knivsflå (2016) find supportive evidence of accruals management around large equity issues and acquisitions for Norwegian public companies. This suggests that incentives may exist to manage earnings by changing the classification of expenses from core to special items before equity issues and acquisitions. Indicative evidence exists to support such a notion (Causholli et al., 2014; Siu & Faff, 2013). Based on the previous discussion, we hypothesize the following:

H1. CS is positively associated with subsequent issues and acquisitions of equity.

Even though it is well documented that accruals are managed before equity issues, it is important to test hypothesis H1 because only limited evidence exists of CS before equity issues. To test H1, we extend McVay's (2006) CS model by introducing an interaction between income-decreasing special items, acquisitions and issues of new equity:

$$ABCE = \alpha_0 \cdot FIX + \alpha_{11} \cdot SI + \alpha_{12} \cdot SI \cdot FEQ + \alpha_2 \cdot FEQ + \alpha_3 \cdot CONTROLS + \varepsilon, \quad (1)$$

where ABCE denotes abnormal or unexpected core earnings divided by operating revenues (estimated by Model 6 in Section 3).[2] FIX represents fixed effects (e.g., industry and year). SI denotes income-decreasing special items relative to operating revenues. FEQ is an indicator variable of large equity issues in the following period, taking the value 1 if a large issue occurs or the value 0 if a large issue does not occur. Use of this indicator variable of large equity issues makes it more likely we will capture equity issues with high incentives for earnings management. CONTROLS represents firm-specific control variables possibly affecting ABCE (Barua, Lin, & Sbaraglia, 2010). Details about variable calculations are postponed to Section 3 (see also Table 1B). The α are coefficients, and ε is the error term.

The association between ABCE and SI is represented by the sum of coefficients $\alpha_{11} + \alpha_{12} \cdot \text{FEQ}$, in which α_{11} measures the association when FEQ = 0 and α_{12} measures the impact when FEQ changes from 0 to 1. As recognized by McVay (2006) and others (e.g., Fan et al., 2010), increased CS is consistent with observing a more positive association between ABCE and SI because core earnings improve when core expenses are misclassified as special items. According to H1, CS is expected to be positively associated with FEQ, that is, $\alpha_{12} > 0$ and statistically significant.[3]

The decision to issue equity may be determined jointly with the decision to misclassify core operational expenses as special items. Because FEQ is an indicator variable, we follow Heckman (1978) and estimate as a first step the probability of a forthcoming equity issue by a discrete probit hazard model:

$$\Pr(\text{FEQ} = 1) = f(\beta_0 \cdot \text{FIX} + \beta_{11} \cdot \text{SI} + \beta_{12} \cdot \text{SI} \cdot \text{EQ} + \beta_2 \cdot \text{EQ} + \beta_3 \cdot \text{CONTROLS}), \tag{2}$$

where f() is the standard normal cumulative distribution function, EQ is an indicator variable of an equity issue in the current period and the β are coefficients. The CONTROLS in Model 2 should include at least one instrumental variable (see footnote 16). In the second step, we add the hazard, also referred to as the inverse Mills ratio, from the first step as an additional control variable in Model 1. The coefficient estimates in 1 become two-step and are adjusted for the endogenous selection of FEQ. Typically, two-step estimators ease but do not 'solve' the endogeneity challenge.

There are several reasons earnings management by CS may be attractive for management acting opportunistically as compared with accrual earnings management and real earnings management (Abernathy et al., 2014; McVay, 2006).[4] In general, the closer a line item is to the top line of the income statement (sales), the more permanent this item tends to be. Thus, earnings generated from core business operations in the upper part of the income statement may be particularly important for investors and financial analysts (Bhattachary et al., 2003; Bradshaw & Sloan, 2002; Lipe, 1986). Next, CS of core earnings components does not change operating income or any required reporting of earnings numbers. Further, unlike accruals manipulation that shifts income between periods, CS does not mechanically reverse in future periods. Thus, the nature of CS compared with CACM may give management more incentive to use CS. In addition, the International Financial Reporting Standards (IFRS) allow companies to report APM on the face of their income statements.[5] Furthermore, the specification of line items such as recurring and non-recurring items is relatively lightly regulated under IFRS [International Accounting Standards Board (IASB), 2007, IAS 1] compared with accruals such as depreciation (IASB, 2014, IAS 16). This gives companies considerable scope to report or indicate earnings before non-recurring items (Zalata & Roberts, 2016). All this may also result in management expecting less intense scrutiny of CS compared with CACM from auditors and supervisory inspections (see discussion related to H3).

There is evidence of CS use when other available earnings management tools are constrained. Athanasakou, Strong and Walker (2009) show that large UK companies are more likely to engage in CS rather than in accruals management to meet analyst expectations and avoid negative core earnings surprises. Fan et al. (2010) provide evidence of increased CS when the opportunities to manage accruals are constrained. In the same vein, the findings of Abernathy et al. (2014) indicate that managers use CS as a substitute for accrual earnings management.

The above arguments concerning the nature of CS and management incentives to use CS relative to CACM suggest—and some research evidence points in this direction—that CS may substitute for CACM. This leads us to propose the following hypothesis:

H2. CS before equity issues is negatively associated with CACM.

To test H2, we expand Model 1 by including interactions with CACM:

$$\begin{aligned} \text{ABCE} = {} & \alpha_0 \cdot \text{FIX} + \alpha_{111} \cdot \text{SI} + \alpha_{112} \cdot \text{SI} \cdot \text{CACM} + \alpha_{121} \cdot \text{SI} \cdot \text{FEQ} \\ & + \alpha_{122} \cdot \text{SI} \cdot \text{FEQ} \cdot \text{CACM} + \alpha_{21} \cdot \text{FEQ} + \alpha_{22} \cdot \text{CACM} + \alpha_{23} \cdot \text{FEQ} \cdot \text{CACM} \\ & + \alpha_3 \cdot \text{CONTROLS} + \varepsilon. \end{aligned} \tag{3}$$

where CACM is an indicator variable of CACM, which takes the value 1 when income-increasing abnormal core accruals (estimated by Model 7 in Section 3) are large, or otherwise, it takes the value 0. By using an indicator variable for large abnormal accruals, we increase the likelihood of capturing CACM and not semi-high abnormal accruals caused by periods with extraordinary economic activity (Armstrong, Foster, & Taylor, 2016), including timing of equity issues to such periods. In addition to FEQ, CACM is endogenously determined. First-step models for FEQ and CACM are estimated, consistent with Model 2, and the hazards are included as control variables in the second-step Model 3.

The association between CS and FEQ, measured by the single coefficient α_{12} in Model 1, is expanded and measured in Model 3 by $\alpha_{121} + \alpha_{122} \cdot \text{CACM}$, yielding a coefficient conditional on CACM. According to H2, CS before FEQ is negatively associated with high CACM (=1) and, indirectly according to H1, positively associated with low CACM (=0). Thus, H2 predicts $\alpha_{121} > 0$ and $\alpha_{122} < 0$.[6]

If a material misclassification in the financial statements is detected during the audit, auditors may require management to correct the misstatement.[7] Auditor incentives and competencies have been shown to affect whether auditors detect misclassifications and the resolution of such misstatements (Joe, Wright, & Wright, 2011; Nelson, Elliott, & Tarpley, 2002). Audit firm size and industry specialization are two categories of input-based audit quality measures commonly used in the literature (DeFond & Zhang, 2014, p. 289). There is a large body of audit quality research that uses these measures as independent variables to examine whether audit firm characteristics affect the supply of audit quality—in other words, whether systematic differences in reporting quality depend on audit firm size and industry specialization (e.g., Francis, 2011).

Large audit firms, often represented by Big 4 audit firms, may have stronger incentives to provide higher audit quality because they are more exposed to reputation and litigation risk and could possess better competence than smaller firms (Arruñada, 1999; DeAngelo, 1981). However, there is a growing body of research that shows significant improvements in audit quality among non-Big 4 second-tier firms (e.g., Boone, Khurane, & Raman, 2010; Cassell, Giroux, Myers, & Omer, 2013; Jenkins & Velury, 2011). Auditors specializing in specific industries may provide higher audit quality because of better competence (i.e., ability to make more accurate audit judgements) and stronger incentives to protect industry reputation. Considerable evidence supports the notion that larger and industry-specialized audit firms supply higher quality audits (e.g., Becker, DeFond, Jiambalvo, & Subramanyam, 1998; DeFond & Zhang, 2014; Francis, 2004; Francis, Maydew, & Sparks, 1999).

Classification of expenses as core operating expenses or special operating items often involves considerable management judgement, which may be subject to management biases that may be difficult for auditors to detect. Because CS does not change bottom-line income but only shifts income within the income statement, auditors may do less work to identify and require adjustments of special items (Nelson et al., 2002). Additionally, auditors may find it difficult to challenge classification of expenses due to permissive accounting and auditing standards (Zalata & Roberts, 2016). Auditing standards discuss effects of misclassifications among the qualitative factors to be considered in the evaluation of the materiality of detected misstatements but leave considerable room for auditor judgements.[8]

Mixed and conflicting evidence exists on how audit firm size and industry specialization affect CS. Abernathy et al. (2014) report that companies audited by large audit firms are not associated with higher likelihood of CS. Also consistent with less auditor scrutiny of CS, Behn et al. (2013) find little evidence that Big 4 mitigates CS in their international sample while finding that Big 4 negatively associates with CS in their US sample. Haw et al. (2011) find that Big 4 audit firms tend to restrict CS in East Asian countries with strong legal institutions. Behn et al. (2013) do not find that audit firm industry specialization mitigates CS in their international sample, but this changes for their US sample. The latter is supported by Abernathy et al. (2014). By contrast, Siu and Faff (2013) report an increased tendency for industry specialists to tolerate CS around SEO. They show that when the ability to manage earnings appears to be constrained, a trading off of CS against managing accruals takes place with auditor industry specialization.

Even though it is believed that large and industry-specialized audit firms provide higher quality, prior evidence is inconclusive on how audit firm size and industry specialization affect CS. The literature argues that CS might have less severe consequences for auditors than accruals management, potentially exposing CS to less auditor scrutiny (Nelson et al., 2002; Zalata & Roberts, 2016). Several studies indicate or argue that CS and accrual-based earnings management are related, most commonly that CS substitutes for accrual earnings management (see H2). On the basis of these arguments, we investigate whether audit firm characteristics interact with CS and CACM. We propose the following hypothesis:

H3. CS before equity issues is positively (negatively) associated with Big 4 audit firms and audit specialization by industry when CACM is low (high).

One of the most controversial issues in the auditing literature has been whether the provision of NAS by the auditor adversely affects audit quality. Regulators have concluded that there are strong arguments for regulatory intervention and banning of auditor-provided NAS. The literature points to two opposing effects on audit quality from the provision of NAS by the incumbent auditor. On one hand, large auditor-provided NAS create economic bonds between the auditor and management that may dilute auditor objectivity (Arruñada, 1999; DeAngelo, 1981; Simunic, 1984). This contrasts with the view that provision of NAS may generate knowledge spillovers from NAS to the audit that enhance auditor ability to detect and correct biases in the financial reporting (Arruñada, 1999; Simunic, 1984). The lack of compelling evidence that auditor-provided NAS impair audit quality may therefore reflect counterbalancing knowledge spillover benefits from providing NAS (DeFond & Zhang, 2014).

The literature is inconclusive on whether the small, and possibly non-specialized, audit firms or the large audit firms are the ones benefiting most from knowledge spillovers from NAS (Eilifsen & Knivsflå, 2013; Lim & Tan, 2008). On the one hand, large audit firms may already be those with the highest competence and may therefore have less learning potential from providing NAS. On the other hand, large audit firms may be in the best position to leverage on knowledge spillovers from NAS due to their relative highest initial competence.

Causholli et al. (2014) examine the association between CS and future NAS growth opportunities for Big 5 firms. They relax the commonly held assumption that current-year NAS impact auditor judgements and argue that the economic bond between an auditor and a client can also arise from the future expected revenue that can be obtained from the client. This argument seems particularly compelling in our case when core earnings management (CS and/or CACM) likely takes place prior to large equity issues that offer NAS growth opportunities. Another benefit of using future NAS growth opportunities instead of current NAS is that the former reduces the likelihood that

NAS induces knowledge spillover (i.e., the analysis is more likely to capture any impairment of auditor independence). Causholli et al. (2014) find that both CS and accruals management positively associate with future NAS purchases pre-SOX, consistent with impaired auditor independence. But this positive association is not the case in the years after SOX, which prohibited the provision of most types of NAS to audit clients. The main effect pre-SOX is greater for companies with an SEO. Unlike the current study, however, Causholli et al. (2014) do not investigate the relative roles of CS and accruals management before the SEO.

The literature has been unable to provide compelling evidence that auditor-provided NAS impair audit quality and provides conflicting evidence on how audit firm size and industry expertise affect knowledge spillover benefits that may accrue from the provision of NAS. We propose the following hypothesis:

H4. The proposed associations between CS, audit firm size and firm specialization by industry in H3 are potentially conditional on the provision of NAS.

To test H3 and H4 jointly, we expand Model 3 by including interactions with audit quality, AUQ:

$$\begin{aligned}ABCE = {} & \alpha_0 \cdot FIX + \alpha_{111} \cdot SI + \alpha_{112} \cdot SI \cdot CACM + \alpha_{113} \cdot SI \cdot AUQ + \alpha_{114} \cdot SI \cdot CACM \\ & \cdot AUQ + \alpha_{121} \cdot SI \cdot FEQ + \alpha_{122} \cdot SI \cdot FEQ \cdot CACM + \alpha_{123} \cdot SI \cdot FEQ \cdot AUQ + \\ & \alpha_{124} \cdot SI \cdot FEQ \cdot CACM \cdot AUQ + \alpha_{21} \cdot FEQ + \alpha_{22} \cdot CACM + \alpha_{23} \cdot FEQ \cdot CACM \\ & + \alpha_{24} \cdot AUQ + \alpha_{25} \cdot FEQ \cdot AUQ + \alpha_{26} \cdot CACM \cdot AUQ + \alpha_{27} \cdot FEQ \cdot CACM \cdot \\ & AUQ + \alpha_3 \cdot CONTROLS + \varepsilon,\end{aligned} \tag{4}$$

where AUQ = (BIG4, SPE; NAS). In line with audit quality research (DeFond & Zhang, 2014; Francis, 2011), AUQ is represented by BIG4, SPEC and NAS. BIG4 is the indicator variable of a Big 4 audit firm, SPE is the indicator variable of an industry specialist and NAS is the indicator variable of large provisions of NAS during a forthcoming equity issue (see Section 3 and Table 1B for the detailed definitions of the variables). BIG4 and SPE represent high audit quality, possibly moderated by future NAS. In addition to FEQ and CACM, AUQ could be endogenous.

The association between CS and FEQ, measured by the single coefficient α_{12} in Model 1, is expanded and measured in Model 4 by $\alpha_{121} + \alpha_{122} \cdot CACM + \alpha_{123} \cdot AUQ + \alpha_{124} \cdot CACM \cdot AUQ$, producing a measure of CS that is conditional on both CACM and AUQ and on the interaction between CACM and AUQ. Because AUQ is a vector of BIG4, SPE, NAS and their interactions, the impact of AUQ on CS before FEQ is

$$\begin{aligned}\partial CS/\partial FEQ = {} & \alpha_{121} + \alpha_{122} \cdot CACM + \alpha_{1231} \cdot BIG4 + \alpha_{1232} \cdot SPE \\ & + \alpha_{1233} \cdot NAS + \alpha_{1234} \cdot BIG4 \cdot SPE + \alpha_{1235} \cdot BIG4 \cdot NAS + \alpha_{1236} \cdot SPE \cdot NAS + \\ & \alpha_{1237} \cdot BIG4 \cdot SPE \cdot NAS + \alpha_{1241} \cdot CACM \cdot BIG4 + \alpha_{1242} \cdot CACM \cdot SPE + \alpha_{1243} \\ & \cdot CACM \cdot NAS + \alpha_{1244} \cdot CACM \cdot BIG4 \cdot SPE + \alpha_{1245} \cdot CACM \cdot BIG4 \cdot NAS + \\ & \alpha_{1246} \cdot CACM \cdot SPE \cdot NAS + \alpha_{1247} \cdot CACM \cdot BIG4 \cdot SPE \cdot NAS,\end{aligned} \tag{5}$$

in which ∂CS = ∂ABCE/∂SI and the coefficients α_{123} and α_{124} in Model 4 are expanded to α_{123j} and α_{124j}, where j = 1, …, 7, to represent the three audit quality variables (BIG4, SPE and NAS) and the four possible interactions (BIG4 · SPE, BIG4 · NAS, SPE · NAS and BIG4 · SPE · NAS).[9]

According to H3, BIG4 and SPE are expected to associate positively with CS before FEQ when CACM is low (CACM = 0). Consequently, we expect $\alpha_{1231} > 0$ (BIG4), $\alpha_{1232} > 0$ (SPE) and $\alpha_{1234} > 0$ (BIG4 · SPE). When CACM is high (CACM = 1), H3 anticipates negative associations with audit firm size and specialization: $\alpha_{1241} < 0$ (CACM · BIG4), $\alpha_{1242} < 0$ (CACM · SPE) and $\alpha_{1244} < 0$ (CACM · BIG4 · SPE). For example, $\alpha_{1244} < 0$ means that the clients of Big 4 specialist audit firms are associated with low CS before FEQ when CACM is high. The coefficients α_{121} and α_{122} measure CS before FEQ when BIG4 = 0, SPE = 0 and NAS = 0, that is, for non-Big 4 non-specialized audit firms not providing NAS, the first coefficient when CACM = 0 and the second when CACM = 1.

H4 recognizes that large provisions of NAS may influence the effect of CACM, BIG4 and SPE either as an amplifier or as a moderator, depending on the trade-off between gains from knowledge spillovers and losses of independence. Thus, the coefficients α_{1233} (NAS), α_{1235} (BIG4 · NAS), α_{1236} (SPE · NAS), α_{1237} (BIG4 · SPE · NAS), α_{1243} (CACM · NAS), α_{1245} (CACM · BIG4 · NAS), α_{1246} (CACM · SPE · NAS) and α_{1247} (CACM · BIG4 · SPE · NAS) may differ from 0.

3 | DATA, VARIABLES, DESCRIPTIVE STATISTICS AND CORRELATIONS

Our sample consists of 285 Norwegian public companies listed on Oslo Børs (the Oslo stock exchange), which have 1,969 company-year observations for the period 2000–2015. Norway has been characterized as having a relatively strong investor protection environment (Choi & Wong, 2007; Hope, Kang, Thomas, & Yoo, 2009), low aggregate earnings management scores (Leuz, Nanda, & Wysocki, 2003) and low audit litigation risk (Hope & Langli, 2010).[10] As a member state of the European Economic Area (EEA), Norway complies with EU's accounting regulations and applies the international accounting and auditing standards (IFRS and ISA).

Black, Christensen, Ciesielski and Whipple (2018) find that non-Generally Accepted Accounting Principles (GAAP) performance metrics, often referred to as APMs, are more widely accepted outside of the United States, and companies are afforded significantly more latitude in where and how they present APM.[11] The scope of IFRS to allow non-standard line items in the financial statements has raised concerns about auditors' ability and/or willingness to intervene to adjust misclassifications within the financial statements (Zalata & Roberts, 2016). Not until 2016 did the Finanstilsynet (FSA), the Norway's financial supervisory authority, target the disclosure of APM (FSA, 2017).[12] Thus, in our sample period ending in 2015, Norway is a setting with considerable discretion to manage core earnings, making it an appealing arena to investigate our research question and hypotheses.

TABLE 1A Sample selection on the Oslo Stock Exchange (OSE)

		Company-year observations
	Available company-year observations at OSE 2000–2015	3,547
-	Banks and other financial company-year observations	437
-	Operating revenues less than NOK 10 million	272
-	Lagging, forwarding, and other missing observations	1,141
=	**Selected sample**	**1,969**
	Number of companies	285

Note. In bold is the sum.

Accounting and stock market data are collected from the Stock Market Database at the Norwegian School of Economics, data from Thomson Reuters Datastream and hand-collected data from annual reports. As reported in Table 1A, the number of available company-year observations is 3,547. We omit observations from financial companies (437), companies with operational revenues less than NOK 10 million (272) and companies with incomplete data (1,141). The final sample consists of 1,969 company-year observations from 285 companies.

Our methodology to test H1–H4 presented in Section 2 requires that we compute ABCE, SI, FEQ, CACM, AUQ (=BIG4, SPEC; NAS) and CONTROLS. Table 1B defines all the variables.

First, to measure abnormal core earnings (ABCE), we estimate a variant of the model used by McVay (2006) for each industry-year:

$$CE = \beta_0 + \beta_1 \cdot CE_{-1} + \beta_2 \cdot ATO + \beta_3 \cdot TAC_{-1} + \beta_{41} \cdot \Delta REV + \beta_{42} \cdot NEG + \beta_{43} \cdot NEG \cdot \Delta REV + \beta_{51} \cdot ABRET_{-1} + \beta_{52} \cdot ABRET + ABCE, \tag{6}$$

in which CE and CE_{-1} are current and previous year's core earnings, that is, operational revenues minus core operational expenses, relative to revenues. Expenses include costs of goods and services sold, sales and administrative expenses, including personnel expenses and other recurring operating expenses but exclude depreciation and amortization.[13] Thus, core earnings is constructed on the basis of line items in the reported income statement and may differ from similar APM possibly reported by the company to which we do not have access. Table 2A reports the average value of CE to be 0.091, after winsorizing 1% in each tail by year to ease the impact of extreme tails.

The β are the coefficients of the model. ATO is the average turnover of net operating assets; the mean is 2.322. TAC_{-1} is total accruals (earnings minus cash flow from operations) lagged by 1 year and calculated relative to operating revenue. The mean TAC is –0.155. ΔREV is the growth in operating revenue; the mean growth rate is 0.331. NEG has a mean of 0.330 and is an indicator variable of negative revenue growth. NEG · ΔREV is the interaction. ABRET and $ABRET_{-1}$ are the current and previous year's abnormal stock market returns.[14] After winsorizing, the mean is –0.002. ABCE is the error term with a mean of 0.001 and thus our estimate of abnormal core earnings.

Following Fan et al. (2010) and, for example, Causholli et al. (2014), Model 6 differs from the McVay model by excluding current accruals (TAC) and adjusting for performance by including abnormal stock market returns (ABRET and $ABRET_{-1}$). Current accruals are excluded because they include current special item accruals, and the performance adjustment is to control for core earnings and income-decreasing special items both being affected by poor performance.

Second, SI enters Models 1–4 and is income-decreasing special operational items divided by operating revenues when the net item is positive and 0 otherwise. The database reports special operational items as the sum of non-recurring operational expenses minus revenues and includes impairments, losses and gains on sales of fixed operational assets, fair value changes on biological assets, restructuring charges, merger-related costs and similar non-recurring items. SI may differ from the income-decreasing special operational items calculated by the company when voluntarily reporting APM. According to Table 2A, the mean is 0.061. Table 2B reveals that the correlation between ABCE and SI is –0.045 (p = 0.045). High special items are associated with poor core performance.[15]

Third, FEQ is new equity obtained in the following period relative to average total assets or the market value of equity, where new equity is calculated as the change in reported equity that is not earned as comprehensive income during the year, plus dividend payments. The average issue is 0.102, relative to the market value of equity. According to Table 2B, FEQ is negatively correlated with ABCE (–0.109; p = 0.000) and positively correlated with SI (0.142; p = 0.000). Thus, forthcoming equity issues are associated with poor performance and frequent reporting of special items. In the main tests of H1–H4, FEQ is represented with an indicator variable of large equity issues, where large means above the 75th percentile (0.034). By employing an indicator variable of large equity issues in Model 1, we are more likely to capture equity issues with strong incentive for earnings management.

Fourth, we estimate abnormal core accruals by the following extension of the performance-adjusted modified Jones model for each industry-year (Dechow, Sloan, & Sweeney, 1995; Jones, 1991; Kothari, Leone, & Wasley, 2005):

$$ACC = \gamma_0 + \gamma_1 \cdot 1/ATA + \gamma_2 \cdot (\Delta RV - \Delta RC) + \gamma_3 \cdot PPEI + \gamma_4 \cdot ROA + \gamma_5 \cdot SIOA + ABCA, \tag{7}$$

where the gammas are the coefficients and ABCA is the residual and a measure of abnormal core accruals with mean 0.000. The dependent variable ACC is total accruals, calculated as reported earnings minus cash flow from operations. When divided by average total assets (ATA), the mean is –0.063, which equals the mean return on assets, ROA (–0.005), minus the mean cash return on assets, CROA (0.057). The first explanatory variable is inverted company size (1/ATA, with mean 0.002). ΔRV is change in operating revenues, ΔRC is change in receivables both divided by ATA and the mean revenue growth adjusted for receivables growth, that is, ΔRV – ΔRC, is 0.042. PPEI is

TABLE 1B Definition of variables

FIX	Fixed industry and year effects relative to a common intercept. Thus, FIX = (INTERCEPT, INDUSTRY, YEAR), where INTERCEPT is the constant term in the regression model, INDUSTRY is a vector of indicator variables one for each industry (except one) and YEAR is a vector of indicator variables one for each sample year (except one).
ABCE	Abnormal or unexpected core earnings are the residuals in Model 6, estimated for each industry-year: CE = $\beta_0 + \beta_1 \cdot CE_{-1} + \beta_2 \cdot ATO + \beta_3 \cdot TAC_{-1} + \beta_{41} \cdot \Delta REV + \beta_{42} \cdot NEG + \beta_{43} \cdot NEG \cdot \Delta REV + \beta_{51} \cdot ABRET_{-1} + \beta_{52} \cdot ABRET + ABCE$, where the betas are the coefficients, the variables are defined below, and ABCE is the residuals.
SI	Income-decreasing net special operating items divided by operating revenues when net items are net expenses and 0 when they are net revenues. Special items, which are reported net in the database, include impairments, losses and gains on sales of fixed assets, fair value changes on biological assets, restructuring charges, merger-related cost and similar nonrecurring items.
FEQ	Forthcoming equity issues and acquisitions through business combinations. Specifically, FEQ is the positive net change in reported equity that is not comprehensive income or ordinary dividends, divided by average total assets or the market value of equity. When there is no positive net change in acquired equity, FEQ is 0. Alternatively, FEQ is an indicator variable taking the value 1 for large issue above the 75th percentile, or otherwise taking the value 0.
CACM	Income-increasing core accruals management. Because we are analysing classification shifting to improve core earnings before equity issues, the relevant measure of accruals management is positive abnormal core accruals in the same year, that is, abnormal accruals to inflate core earnings. Thus, CACM equals abnormal core accruals ABCA when ABCA > 0 or 0 otherwise, where ABCA is defined below and excludes income-increasing accruals by special items. Alternatively, CACM is an indicator variable for large ABCA above the 75th percentile.
BIG4	Indicator variable of Big 4 audit firm. Thus, BIG4 = 1 when the audit firm is Deloitte, EY, KPMG or PwC and BIG4 = 0 when it is a smaller firm, for example, BDO or Grant Thornton.
SPE, MS	MS is the audit market share of the audit firms in an industry in a particular year, calculated based on audit fees. SPE is the indicator variable of audit firm industry specialist, where an industry specialist, SPE = 1, is an audit firm with MS > 0.5. Otherwise, SPE = 0.
NAS	Non-audit service fee ratio forwarded to the year of the equity issues and calculated as the reported NAS fee divided by the sum of the audit fee and NAS fee, or NAS is an indicator variable of a high non-audit service fee ratio. Specifically, NAS = 1 when the NAS ratio is greater than its 75th percentile and 0 otherwise. NAS is forwarded to capture NAS growth opportunities related to FEQ.
CONTROLS	Control variables possibly contributing to explain ABCE. For example, we add additional performance control variables such as CROA or ROA and ERET and various risk-related variables such as BETA, SIZE, BTM and LEV. When controlling for endogeneity, the first step hazards are also included as CONTROLS. The control variables are defined below. When used in first step regressions, instrumental variables are also added.
CE, CE_{-1}	Core earnings, that is, operating revenues minus core operational expenses, divided by operating revenues. Core expenses are costs of goods and services sold, employment-related expenses and other operating costs, including sales and administrative expenses. Amortizations and depreciations are not included to avoid a possible mechanical relationship with SI through impairments. CE_{-1} means that CE is lagged 1 year. CE is consistently constructed (and does not equal any APM voluntarily reported by the companies).
ATO	Average turnover. Operating revenues divided by average net operating assets if positive.
TAC, TAC_{-1}	Total accruals divided by operational revenues; compare with ACC. Total accruals are reported earnings (EARN) minus cash flow from operations (CFO). TA_{-1} means that TA is lagged 1 year.
ΔREV	Growth in operational revenues. Thus, $\Delta REV = (REV - REV_{-1})/REV_{-1}$, where REV is operational revenues, mainly sales revenues.
NEG	Indicator variable for ΔREV < 0.
ABRET, $ABRET_{-1}$	Abnormal stock returns are the residuals in this Fama and French (1993) inspired regression model, estimated for each industry-year: ERET = $\phi_0 + \phi_1 \cdot BETA + \phi_2 \cdot SIZE + \phi_3 \cdot BTM + ABRET$, where the phis are the regression coefficients, the variables are defined below and ABRET is the residuals. $ABRET_{-1}$ means that ABRET is lagged 1 year.
ERET	The excess stock market return, ERET = RET − RF, where RET is the yearly stock market return and RF is the risk-free rate of return. Specifically, RF is the interbank rate of return after tax minus a credit risk premium corresponding to average bank rating.
BETA	Systematic stock market risk, estimated by the market model on monthly observations over the year.
SIZE	Lagged log of the inflation-adjusted market value of equity.
BTM	Lagged book-to-market ratio.
LEV	Lagged financial leverage, measured as financial or interest-bearing debt divided by total assets.
ABCA	Abnormal core accruals are the residuals in Model 7, that is, this extended performance-adjusted modified Jones model, estimated for each industry-year: ACC = $\gamma_0 + \gamma_1 \cdot 1/ATA + \gamma_2 \cdot (\Delta RV - \Delta RC) + \gamma_3 \cdot PPEI + \gamma_4 \cdot ROA + \gamma_5 \cdot SIOA + ABCA$. The gammas are coefficients, the variables are defined below and ABCA is the residuals. By including SIOA, ABCA is the abnormal accruals after excluding the effect of special items accruals, which is isolated in SI.
ACC	Total accruals, that is, earnings (EARN) minus cash flow from operations (CFO), divided by average total assets (ATA); compare TAC defined above.

(Continues)

TABLE 1B (Continued)

1/ATA	1 divided by average total assets (ATA).
ΔRV − ΔRC	Adjusted revenue growth on assets, defined as ΔRV, the change in operating revenues divided by ATA (compare ΔREV above), minus ΔRC, the change in operating receivables divided by ATA.
PPEI	Property, plant and equipment and intangible assets divided by ATA.
SIOA	Special items on assets, defined as income-decreasing net special operating items divided by ATA; compare SI defined above.
ROA, CROA	Return on assets, defined as earnings (EARN) divided by average total assets (ATA), or cash return on assets, defined as cash flow from operations (CFO) divided by ATA.
HAZ	The hazards, or inverse Mills ratios, from first step discrete probit hazard models. For example, HAZ obtained from Model 2 is included in CONTROLS when estimating Model 1, as suggested by Heckman (1978). In subsequent test models, a HAZ variable is added for each of the endogenous variables FEQ, CACM, BIG4 or SPE, and NAS, and estimated from similarly structured models as Model 2.

TABLE 2A Descriptive statistics

			Percentiles				
	Mean	St. dev.	10	25	50	75	90
CE	0.091	0.516	−0.083	0.041	0.118	0.264	0.486
ATO	2.322	5.428	0.210	0.489	1.368	2.507	4.577
TAC	−0.155	0.626	−0.427	−0.183	−0.068	−0.005	0.079
ΔREV	0.331	2.352	−0.224	−0.047	0.076	0.270	0.628
NEG	0.330	0.470	0.000	0.000	0.000	1.000	1.000
ABRET	−0.002	0.618	−0.592	−0.316	−0.062	0.210	0.596
ABCE	**0.001**	**0.176**	**−0.148**	**−0.057**	**0.005**	**0.070**	**0.156**
SI	**0.061**	**0.295**	**0.000**	**0.000**	**0.000**	**0.017**	**0.108**
FEQ	**0.102**	**0.348**	**0.000**	**0.000**	**0.000**	**0.034**	**0.248**
ACC	−0.063	0.134	−0.190	−0.101	−0.048	−0.004	0.061
1/ATA	0.002	0.004	0.000	0.000	0.001	0.002	0.006
ΔRV − ΔRC	0.042	0.234	−0.170	−0.032	0.030	0.124	0.268
PPEI	0.536	0.265	0.184	0.340	0.523	0.746	0.887
ROA	−0.005	0.161	−0.175	−0.038	0.022	0.072	0.136
CROA	0.057	0.131	−0.079	0.009	0.061	0.120	0.193
SIOA	0.024	0.078	0.000	0.000	0.000	0.012	0.054
ABCA	0.000	0.076	−0.082	−0.038	0.003	0.039	0.082
CACM	**0.027**	**0.044**	**0.000**	**0.000**	**0.003**	**0.039**	**0.082**
BIG4	**0.909**	**0.288**	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
MS	0.332	0.243	0.051	0.160	0.274	0.465	0.694
SPE	**0.228**	**0.419**	**0.000**	**0.000**	**0.000**	**0.000**	**1.000**
NAS	**0.324**	**0.178**	**0.101**	**0.195**	**0.314**	**0.438**	**0.565**
ERET	0.141	0.853	−0.624	−0.331	0.013	0.387	0.874
BETA	1.013	1.071	−0.087	0.342	0.873	1.493	2.273
SIZE	7.160	1.774	4.944	5.875	7.053	8.378	9.448
BTM	0.972	1.167	0.221	0.377	0.656	1.166	1.894
LEV	0.312	0.223	0.014	0.115	0.296	0.483	0.608

Note. Mean is the average value of the N = 1,969 observations selected in Table 1A. St. dev. is the standard deviation. The percentiles are the 10th, 25th, 50th (median), 75th and 90th. Table 1B defines all the variables. To ease the impact of extreme tails, all the variables, except the indicator variables, are winsorized 1% in each tail by years, which also explains why the mean of the residuals ABCE, ABRET and ABCA may differ slightly from 0.000. Bold is used to emphasize the test variables.

the sum of property, plant, equipment and intangible assets (0.536). The performance adjustment is by return on assets, ROA. SIOA is special items on assets (0.024). By including SIOA in Model 7, the residual is cleaned for abnormal income-decreasing special items accruals, which is included in the variable SI. Consequently, ABCA is abnormal core accruals.

TABLE 2B Correlations among test variables

	ABCE	SI	FEQ	CACM	BIG4	SPE
SI	−0.045**					
FEQ	−0.109***	0.142***				
CACM	−0.076***	0.038*	0.110***			
BIG4	0.043	−0.021	−0.002	−0.040*		
SPE	−0.000	−0.060***	−0.054**	−0.053**	0.113***	
NAS	0.029	−0.017	0.046**	0.040*	0.049**	−0.050**

Note. The panel displays the Pearson correlation coefficients.
*Statistical significance at the 10% level.
**Statistical significance at the 5% level.
***Statistical significance at the 1% level.

Abnormal accruals are a common measure of accruals management, but in combination with CS before large equity issues, we expect earnings as well as core earnings to be managed upward, suggesting that the relevant measure of CACM is income-increasing abnormal core accruals. Thus, we define the variable CACM to equal ABCA > 0 and 0 otherwise. According to Table 2A, the mean is 0.027. Table 2B shows that CACM is negatively correlated with abnormal core earnings (–0.076; p = 0.001) and positively correlated with future equity issues (0.110; p = 0.000) and weakly correlated with SI by construction (0.038; p = 0.089). In the main tests of H2–H4, CACM is represented with an indicator variable of large positive ABCA above the 75th percentile (0.039). By using an indicator variable of significant equity issues in Model 3, CACM is less likely to be driven by timing of issues to periods of naturally semi-high accruals or to otherwise be caused by ordinary economic activity.

Fifth, Big 4, industry specialization and large auditor-provided NAS are our audit quality-related variables and are included in the vector of variables AUQ (Francis, 2011). BIG4 is the indicator variable of an audit firm belonging to one of the four largest international audit firms (Deloitte, EY, KPMG and PwC). The average value is 0.909, meaning that only 9.1% of the company-years (or 180 observations) are audited by non-Big 4 audit firms. Our sample of non-Big 4 audit firms consists of nearly 60% second-tier firms (BDO, GT and RSM; 5.4% the total sample). According to Table 2B, BIG4 tends to be negatively associated with CACM (–0.040; p = 0.076).

SPE is the indicator variable of audit firms having a market share of at least 50% in any industry-year, where the market share (MS) is calculated based on audit fees. The average MS is 0.332, and 22.8% of the company-years are audited by audit firms with at least 50% industry market share. SPE is negatively correlated with SI (–0.060; p = 0.008), FEQ (–0.054; p = 0.017) and CACM (–0.053; p = 0.018) and positively correlated with BIG4 (0.113; p = 0.000).

NAS is the NAS ratio calculated as the NAS fee divided by NAS fees plus audit fees. NAS is forwarded 1 year to capture future growth opportunities in relation to large equity issues (Causholli et al., 2014), thereby reducing the likelihood that NAS induce knowledge spillover. The average NAS is 0.324. NAS is positively correlated with FEQ (0.046; p = 0.042), CACM (0.040; p = 0.073) and BIG4 (0.049; p = 0.030). NAS is negatively correlated with SPE (–0.050; p = 0.026). In the main test of H4, NAS is represented by an indicator variable indicating a NAS ratio above the 75th percentile, that is, indicating large provisions of NAS of more likely monetary importance to the providers.

Finally, as in, for example, Barua et al. (2010), we add several control variables CONTROLS to our test models. First, we control for firm performance in terms of cash return on assets (CROA) and stock market performance in terms of excess stock market return (ERET). Second, we add various common risk variables: stock market beta (BETA), firm size (SIZE), book-to-market ratio (BTM) and financial leverage (LEV). To reduce the impact of possible missing control variables, we also take into consideration fixed industry and year effects (FIX). CONTROLS also include the hazards from the first-step probit model of the endogenously determined variables (Heckman, 1978). When CONTROLS are used in first-step regressions like Model 2, instrumental variables are added as long as the inclusion has a significant effect on the identification of Model 1.[16] The control variables are defined in Table 1B, and descriptive statistics are given in Table 2A.

4 | TESTS OF HYPOTHESES

Our hypotheses, H1–H4, are specified in Section 2 along with a description of our test methodology.

4.1 | Tests of H1 and H2

H1 expects CS to be positively associated with forthcoming equity issues, FEQ. Table 3A presents the results of our main tests of H1. The first column of coefficients is the result of estimating Model 1 when a large future equity issue (FEQ) is considered a non-selected exogenous variable. The ordinary least squares coefficient on the test variable SI · FEQ, that is, our measure of CS, denoted α_{12} in 1, is 0.064. It is statistically significant (p = 0.019), taking into consideration arbitrary heteroskedasticity and clustering by companies in the standard error of the coefficient (Rogers, 1993; White, 1980). The size of the coefficient reveals that the effect is also economically significant.

TABLE 3A Test of H1

Dependent: ABCE		Coef.	*t* val.	Coef.	*t* val.
Endogeneity treatment		No		FEQ	
Estimation method		OLS		Two-step	
FIX	α_0	Yes		Yes	
SI	α_{11}	−0.048*	−1.68	−0.034	−1.14
SI · FEQ	α_{12}	**0.064****	**2.35**	**0.068****	**2.39**
FEQ	α_2	−0.027**	−2.43	−0.181***	−3.37
CROA	α_{31}	0.257***	4.19	0.160**	2.41
ERET	α_{32}	−0.007*	−1.83	−0.008*	−1.96
BETA	α_{33}	−0.010*	−1.87	−0.004	−0.78
SIZE	α_{34}	0.005*	1.80	−0.002	−0.56
BTM	α_{35}	0.006	1.32	0.003	0.56
LEV	α_{36}	0.077***	2.70	0.084***	2.89
HAZ	α_{37}	No		0.092***	3.02
First step pseudo R^2		No		0.132***	
Second step adjusted R^2		0.033***		0.037***	
Number of observations		1,969		1,969	

Note. The regression model is specified by Model 1. Table 1B defines all variables. FEQ is the indicator variable of large forthcoming equity issues above the 75th percentile (0.034). All variables are treated as exogenous in the first regression; the coefficients are estimated by OLS. In the second regression, FEQ is an endogenous variable determined by the probit model 2. We have tried and tested variables such as the current ratio as candidates for instrumental variables among the CONTROLS in 2. Except the pseudo R^2, the first step is not reported. In the second step, the hazard (HAZ, the inverse Mills ratio) from the first step is added to Model 1 as a control variable (Heckman, 1978). Consequently, the coefficients are two-step. The coefficient on HAZ tests the null hypothesis that the two steps are independent. Statistical inferences are robust to arbitrary heteroskedasticity and clustering on the 285 companies (Rogers, 1993; White, 1980). Bold is used to emphasize the test variables.
*Statistical significance at the 10% level.
**Statistical significance at the 5% level.
***Statistical significance at the 1% level.

The second column of coefficients in Table 3A presents the results of estimating Model 1 by the two-step procedure described in Section 2 (Heckman, 1978), to account that FEQ is selected endogenously. From the first-step Model 2, we obtain the hazard, HAZ, and add it to the second-step Model 1 as an additional control variable. The coefficient on HAZ is 0.092 and highly significant (p = 0.008), meaning that the second step should not be considered independent of the first step. The coefficient on the test variable SI · FEQ increases to 0.068 and remains significant (p = 0.017), which is consistent with H1.[17]

H2 expects CS to be negatively associated with CACM. Table 3B reports the results of estimating Model 3 both when the test variables are considered exogenous and endogenous. The second column of coefficients presents the result when FEQ and CACM are endogenous selection variables, though the endogeneity of CACM could be questioned, as the coefficient on the hazard (HAZ2) is insignificant. When CACM = 0, the coefficient representing CS, denoted α_{121} in Model 3, is 0.117 and significant (p = 0.027). This is consistent with H2, because CS substitutes CACM. When CACM = 1, there is a moderating effect by the coefficient −0.128 (α_{122}). The coefficient is weakly significant (p = 0.088), giving only weak evidence that CACM substitutes CS. Robustness tests indicate significance, for example, when also controlling for company fixed effects.

To summarize, our findings suggest that CS is associated with forthcoming equity issues and acquisitions, supporting H1 and consistent with Siu and Faff (2013) and Causholli et al. (2014). Furthermore, high CS is associated with low accruals management and is therefore a substitute for CACM, supporting H2. This finding is consistent with two of the studies not directly measuring CACM but relying on variables that may constrain the use of CACM (Abernathy et al., 2014; Fan et al., 2010) but contrasts with the finding of Athanasakou et al. (2009) of dominance of CS.

4.2 | Tests of H3 and H4

Now we turn to the question of whether the interaction between CS before large equity issues (FEQ) and CACM depends on audit quality-related variables (AUQ), in our study represented by audit firm size (BIG4), audit firm industry specialization (SPE) and provision of NAS. According to H3, CS is expected to be positively (negatively) associated with BIG4 and SPE when CACM is low (high). However, as discussed, some prior research points to significant improvements in audit quality among second-tier firms. According to H4, the expected interactions of H3 may be conditional of NAS, for example, because the provision of NAS may impair audit quality.

TABLE 3B Test of H2

Dependent: ABCE		Coef.	*t* val.	Coef.	*t* val.
Endogeneity treatments		No		FEQ, CACM	
Estimation method		OLS		Two-step	
FIX	α_0	Yes		Yes	
SI	α_{111}	−0.070***	−3.39	−0.054**	−2.47
SI · CACM	α_{112}	0.087*	1.81	0.087*	1.78
SI · FEQ	α_{121}	**0.103***	**1.96**	**0.117****	**2.20**
SI · FEQ · CACM	α_{122}	**−0.110**	**−1.48**	**−0.128***	**−1.71**
FEQ	α_{21}	−0.031***	−2.74	−0.182***	−3.70
CACM	α_{22}	0.109	0.82	−0.147	−1.37
FEQ · CACM	α_{23}	0.103	0.79	0.020	0.78
CROA	α_{31}	0.287***	3.78	−0.074	−0.47
ERET	α_{32}	−0.007*	−1.88	−0.004	−0.99
BETA	α_{33}	−0.010*	−1.87	−0.004	−0.79
SIZE	α_{34}	0.005*	1.71	−0.002	−0.55
BTM	α_{35}	0.006	1.32	0.002	0.38
LEV	α_{36}	0.077***	2.58	0.084**	2.50
HAZ1	α_{37}	No		0.090***	3.18
HAZ2	α_{38}	No		0.093	1.41
Adjusted R^2		0.035***		0.044***	
Number of observations		1,969		1,969	

Note. The regression model is specified by Model 3. Table 1B defines all variables. FEQ is the indicator variable of large forthcoming equity issues above the 75th percentile, and CACM is the indictor variable for large core accruals management above the 75th percentile. All variables are treated as exogenous in the first regression; the coefficients are estimated by OLS. In the second regression, FEQ and CACM are endogenous and determined in the first steps by Model 2, extended with CACM and interactions, and a corresponding probit model for CACM. The first steps are not reported. In the second step, the inverse Mills ratios from the first steps (i.e., the hazards; HAZ1 from the FEQ probit model and HAZ2 from the CACM probit model) are included as control variables for endogeneity (Heckman, 1978). Statistical inferences are robust to arbitrary heteroskedasticity and clustering on companies (Rogers, 1993; White, 1980). Bold is used to emphasize the test variables.
*Statistical significance at the 10% level.
**Statistical significance at the 5% level.
***Statistical significance at the 1% level.

Table 4 presents the results from estimating Model 4, tabulating only the coefficients on the test variables and their interactions. We introduce one audit quality variable at a time, starting with BIG4.

Equation 5 shows the impact of AUQ on CS before FEQ. When AUQ is limited to BIG4, 5 is reduced to $\alpha_{121} + \alpha_{122} \cdot$ CACM + $\alpha_{1231} \cdot$ BIG4 + $\alpha_{1241} \cdot$ CACM · BIG4. The coefficient α_{121} is the benchmark and represents CS before FEQ when CACM = 0 and BIG4 = 0, that is, for non-Big 4 audit firms' clients when CACM is low. The coefficients α_{122}, α_{1231} and α_{1241} measure the impact of changing from the benchmark case to the case where CACM = 1 (i.e., from low to high CACM), BIG4 = 1 (i.e., from non-Big 4 to Big 4 audit firms) or both (i.e., CACM = 1 and BIG4 = 1).[18]

In the first column of coefficients in Table 4, we find that the benchmark case of BIG4 = 0 and CACM = 0 yields α_{121} = −0.398 (p = 0.001). The coefficient is negative, meaning that CS and CACM are both low. This suggests that some non-Big 4 audit firms provide high audit quality. The next coefficient is α_{122} and measures the effect on CS before FEQ of changing CACM from 0 to 1, that is, from low to high CACM, holding the audit firm size constant at non-Big 4 audit firms. The coefficient α_{122} equals 0.719 (p = 0.019). When CACM = 1, CS is higher than when CACM = 0. Some non-Big 4 audit firms provide very low audit quality, that is, high CACM and high CS.

The third coefficient α_{1231} = 0.501 (p = 0.000). This is the effect on CS before FEQ of changing BIG4 from 0 to 1 when CACM = 0, that is, to the observations for Big 4 audit firms' clients where CACM is low. The coefficient is positive, consistent with H3, suggesting that Big 4 audit firms' clients associate with high CS when CACM is low. Finally, when CACM = 1, the coefficient on SI · FEQ · CACM · BIG4, denoted α_{1241}, equals −0.822 (p = 0.009). Thus, Big 4 audit firms interact with the relative roles of CS and CACM chosen by the clients. When CACM is high, CS is low, and vice versa.[19]

The next step is to add SPE, that is, an indicator variable of industry-specialized audit firms, to our analysis of CS before large equity issues. The benchmark case is now clients of non-specialized, non-Big 4 audit firms with low CACM. In 5, the benchmark is represented with coefficient α_{121}. The second column of coefficients in Table 4 reports that α_{121} = −0.432 (p = 0.001), suggesting that the benchmark audit firms' clients associate with low CS before FEQ. This

TABLE 4 Test of H3 and H4

		AUQ					
		BIG4		BIG4, SPE		BIG4, SPE, NAS	
ABCE		Coef.	t val.	Coef.	t val.	Coef.	t val.
Endogeneity treatments		Yes		Yes		Yes	
FIX		Yes		Yes		Yes	
SI interaction without FEQ		Yes		Yes		Yes	
CONTROLS		Yes		Yes		Yes	
SI · FEQ	α_{121}	−0.398***	−3.30	−0.432***	−3.22	−0.485***	−3.76
· CACM	α_{122}	0.719**	2.37	0.740***	2.88	1.031***	3.60
· BIG4	α_{1231}	0.501***	3.87	0.513***	3.63	0.588***	4.41
· SPE	α_{1232}			2.770***	2.68	2.977**	2.36
· NAS	α_{1233}					0.270	0.63
· BIG4 · SPE	α_{1234}			−1.921*	−1.93	−2.432*	−1.79
· BIG4 · NAS	α_{1235}					−0.616	−1.06
· SPE · NAS	α_{1236}					0.780	1.09
· BIG4 · SPE · NAS	α_{1237}					No	
· CACM · BIG4	α_{1241}	−0.822***	−2.63	−0.819***	−3.05	−1.131***	−3.88
· CACM · SPE	α_{1242}			−1.237**	−2.58	−2.259***	−3.03
· CACM · NAS	α_{1243}					−2.582***	−3.65
· CACM · BIG4 · SPE	α_{1244}			No		No	
· CACM · BIG4 · NAS	α_{1245}					2.783***	3.37
· CACM · SPE · NAS	α_{1246}					1.240	1.36
· CACM · BIG4 · SPE · NAS	α_{1247}					No	
Adjusted R^2		0.047***		0.046***		0.051***	
Number of obs.		1,969		1,969		1,969	

Note. The regression model is specified by Model 4. Only ∂CS/∂FEQ given by 5 is reported. Table 1B defines all variables. FEQ, CACM and AUQ = (BIG4, SPE; NAS) are endogenous selection variables and determined in the first step by Model 2—extended with CACM, AUQ and interactions—and similar probit models for CACM and AUQ. The first steps are not reported. In the second step, the inverse Mills ratios from the first steps (or hazards; HAZ1 from the FEQ probit model, HAZ2 from the CACM probit model, and HAZ31, HAZ32 and HAZ33 from the AUQ probit models) are included as control variables (Heckman, 1978). No coefficients mean that the variables are excluded to avoid multicollinearity. Statistical inferences are robust to arbitrary heteroskedasticity and clustering on companies (Rogers, 1993; White, 1980).
*Statistical significance at the 10% level.
**Statistical significance at the 5% level.
***Statistical significance at the 1% level.

is consistent with the finding above where the benchmark client has low CACM and is audited by a non-Big 4 audit firm (i.e., the case where $\alpha_{121} = -0.398$).

To test the effect of industry specialization, we now change the benchmark to a client audited by a specialized, non-Big 4 audit firm. According to Equation 5, the variable measuring this association is SI · FEQ · SPE with coefficient α_{1232}. In Table 4, $\alpha_{1232} = 2.770$ ($p = 0.008$). This means that the impact of industry specialization on CS before FEQ is positive, suggesting that specialized, non-Big 4 audit firms' clients are more associated with CS than the benchmark client audited by non-specialized, non-Big 4 audit firms with low CACM. This is consistent with H3 and the finding of Siu and Faff (2013) that CS around SEOs is positively associated with industry specialization by audit firms. Similarly, the effect of changing from the benchmark to Big 4 audit firms (BIG4 = 1) with the other characteristics unchanged (SPE = 0 and CACM = 0) is represented in Equation 5 by the variable SI · FEQ · BIG4 with coefficient α_{1231}. In Table 4, $\alpha_{1231} = 0.513$ ($p = 0.000$). We find that the effect of changing BIG4 from 0 to 1 parallels changing SPE from 0 to 1. But if both are changed (BIG4 = 1 and SPE = 1), then the effect is measured in 5 by the variable SI · FEQ · BIG4 · SPE with coefficient α_{1233} and obtains the value −1.921 ($p = 0.055$) in Table 4. Thus, the clients of Big 4, industry-specialized audit firms tend to reverse some of the two previous effects. To summarize, when CACM is low, the effect of changing to BIG4, SPE or both is increased CS before FEQ. Thus, the clients of presumed high audit quality firms associate with low CACM and high CS.

To test the effect of low versus high CACM, we now change from the benchmark audit firms' clients with low CACM to otherwise identical firms' clients with high CACM. The coefficient on SI · FEQ · CACM, denoted as α_{1231}, measures the association. In Table 4,

α_{1232} = 0.740 (p = 0.004). Thus, clients of non-specialized, non-Big 4 audit firms associate with high CACM and high CS before FEQ. Holding SPE = 0, the effect of changing to Big 4 audit firms is measured by the variable SI · FEQ · CACM · BIG4 with coefficient α_{1241}. The coefficient is −0.819 (p = 0.003) in Table 4. When CACM = 1, the effect of higher audit quality in terms of BIG4 = 1 is reduced CS. We also find the same effect when SPE changes from 0 to 1 holding BIG4 = 0, the coefficient α_{1242} = −1.237 (p = 0.010). Thus, the clients of Big 4 industry-specialized audit firms interact with the relative roles of CS and CACM. When CACM is high, CS is low, and vice versa.

Finally, we add the third audit quality-related variable NAS, representing audit firms with large provisions of NAS during the forthcoming equity issues. The third column of coefficients in Table 4 reveals that two of the NAS interactions have an effect, consistent with H4. First, the variable SI · FEQ · CACM · BIG4 · NAS with coefficient α_{1245} = 2.783 (p = 0.001). Thus, NAS increases CS before FEQ when audited by a non-specialized, Big 4 audit firm with high CACM and providing high levels of NAS, compared with similar audit firms providing low or moderate levels of NAS. This indicates that NAS impair audit quality for such audit firms. This finding is consistent with Causholli et al. (2014), suggesting that both accruals management and CS are positively associated with clients' future purchases of NAS from the auditor. Second, in the final regression model in Table 4, there is also an effect revealed by the coefficient on the variable SI · FEQ · CACM · NAS, that is, by α_{1243} = −2.582 (p = 0.000). When CACM is high, CS before large equity issues is negatively associated with large provisions of NAS when provided to clients of non-Big 4 and non-specialized audit firms.

To summarize, our findings reveal that clients audited by benchmark audit firms represented by non-specialized, non-Big 4 audit firms with low CACM also associate with low CS before forthcoming equity issues. This is consistent with high audit quality. When changing to

TABLE 5 Test of H3 and H4 with BIG4 excluded or constrained

		AUQ					
		SPE		SPE, NAS		BIG4, SPE, NAS	
ABCE		Coef.	t val.	Coef.	t val.	Coef.	t val.
Endogeneity treatments		Yes		Yes		Yes	
FIX		Yes		Yes		Yes	
SI interaction without FEQ		Yes		Yes		Yes	
CONTROLS, incl. BIG4		Yes		Yes		Yes	
SI · FEQ	α_{121}	0.043	0.80	0.065	1.31	**0.000**	**Restricted**
· CACM	α_{122}	−0.056	−0.78	−0.070	−1.01	0.553*	1.79
· BIG4	α_{1231}					0.104**	2.09
· SPE	α_{1232}	0.689**	2.28	0.537	0.98	2.236*	1.87
· NAS	α_{1233}			−0.318	−0.88	−0.194	−0.40
· BIG4 · SPE	α_{1234}					−1.691	−1.31
· BIG4 · NAS	α_{1235}					−0.151	−0.24
· SPE · NAS	α_{1236}			0.796	1.22	0.779	1.09
· BIG4 · SPE · NAS	α_{1237}					No	
· CACM · BIG4	α_{1241}					−0.653**	−2.09
· CACM · SPE	α_{1242}	−0.889*	−1.88	−1.820**	−2.42	−2.298***	−3.09
· CACM · NAS	α_{1243}			0.145	0.41	−2.137***	−2.84
· CACM · BIG4 · SPE	α_{1244}					No	
· CACM · BIG4 · NAS	α_{1245}					2.339***	2.69
· CACM · SPE · NAS	α_{1246}			0.771	0.84	1.223	1.34
· CACM · BIG4 · SPE · NAS	α_{1247}					No	
Adjusted R^2		0.042***		0.045***		0.048***	
Number of obs.		1,969		1,969		1,969	

Note. The regression model is specified by Model 4 where only ∂CS/∂FEQ given by 5 is reported. Table 1B defines all variables. In the first and second model, BIG4 is excluded as a test variable but kept as a control variable (exogenous). In the third model, the coefficient on non-Big 4, non-specialized audit firm is constrained to be non-negative, that is, in accordance with initial expectations. Statistical inferences are robust to arbitrary heteroskedasticity and clustering on companies (Rogers, 1993; White, 1980). Bold is used to emphasize the test variables.
*Statistical significance at the 10% level.
**Statistical significance at the 5% level.
***Statistical significance at the 1% level.

high CACM while leaving the audit firm type unchanged to the benchmark, CS increases before large future equity issues (FEQ). This is consistent with non-specialized, non-Big 4 audit firms providing low audit quality on average. Future provisions of NAS moderate the negative association, consistent with signalling competence by being able to limit CS although allowing CACM.

Presumed higher quality audit firms, represented by Big 4 audit firms, industry-specialized audit firms or both, are found to behave differently. When CACM is low, CS increases, suggesting that for clients of presumed higher quality audit firms with low CACM, CS is allowed to be high. When CACM is high, CS decreases, suggesting that high CACM interacts with low CS.[20] However, when the provision of future NAS is high, clients audited by Big 4 audit firms with high CACM associate with high CS, consistent with NAS impairing audit quality.

5 | ADDITIONAL TESTS

We perform two additional tests. First, we add all marginal associations together and analyse the *net impact* on CS before equity issues, as given by Equation 5. Second, due to the relatively low number of non-Big 4 audit firm observations (180) in our sample and the risk of drawing inappropriate statistical inferences, we investigate the effect of dropping the indicator variable for Big 4 audit firms (BIG4) as test variable, as well as constraining the estimation of the coefficient not to be in the opposite direction of what is expected in H3. Robustness tests are found in Section 6.

5.1 | Net impact on CS

We now add all associations together and analyse the *net impact* on CS before equity issues given by Equation 5. Compared with the main tests, net CS excludes the possibility that the identified association between CS and presumed high-quality audit firms in the main tests are driven by corrections of overly restrictive behaviour by presumed low or medium audit quality firms. As reported below, we find very high consistency between the results of the additional tests (untabulated) and the results from the main tests reported in Section 4. The exception is when the provision of NAS is high, in which case the clients of Big 4 non-specialized audit firms no longer significantly associate high CACM with CS, suggesting only a marginal association.

Our findings from the main tests suggest that CS before equity issues are associated with presumed high-quality audit firms when

TABLE 6A Robustness tests: Limited controls, no controls and no controls and no fixed effects beyond one intercept

	AUQ					
	BIG4 and SPE		BIG4 and SPE		BIG4 and SPE	
ABCE	Coef.	*t* val.	Coef.	*t* val.	Coef.	*t* val.
Endogeneity treatments	Yes		Yes		Yes	
FIX	Yes		Yes		No, one intercept	
SI interactions without FEQ	Yes		Yes		Yes	
CONTROLS	Limited		No		No	
SI · FEQ	−0.422***	−3.57	−0.375***	−3.11	−0.397***	−4.16
· CACM	0.736***	2.90	0.676**	2.25	0.654**	2.02
· BIG4	0.503***	4.01	0.457***	3.63	0.454***	4.29
· SPE	2.709***	2.90	2.633***	2.99	3.057***	4.11
· BIG4 · SPE	−1.869**	−2.05	−1.779**	−2.00	−2.324***	−3.17
· CACM · BIG4	−0.815***	−3.07	−0.768**	−2.48	−0.728**	−2.19
· CACM · SPE	−1.225**	−2.60	−1.267***	−2.67	−1.124**	−2.36
· CACM · BIG4 · SPE	No		No		No	
Adjusted R^2	0.047***		0.043***		0.047***	
Number of obs.	1,969		1,969		1,969	

Note. The regression model is specified by Model 4 with AUQ is limited to BIG4 and SPE. Only ∂CS/∂FEQ given by 5 is reported. Table 1B defines all variables. FEQ, CACM and AUQ are endogenous selection variables and determined in the first step by Model 2—extended with CACM, AUQ and interactions—and similar probit models for CACM and AUQ. The first steps are not reported. In the second step, the inverse Mills ratios from the first steps (or hazards; HAZ1 from the FEQ probit model, HAZ2 from the CACM probit model and HAZ31 and HAZ32 from the AUQ probit model) are included as control variables (Heckman, 1978). No coefficients mean that the variables are excluded to avoid multicollinearity. Statistical inferences are robust to arbitrary heteroskedasticity and clustering on companies (Rogers, 1993; White, 1980).
*Statistical significance at the 10% level.
**Statistical significance at the 5% level.
***Statistical significance at the 1% level.

CACM is low. Consistently, we find significant net CS for industry-specialized non-Big 4 audit firms (2.492 with low provisions of NAS, p = 0.038, and 3.542 with high provisions of NAS, p = 0.000), for non-specialized Big 4 audit firms (0.103 with low NAS, p = 0.041) and for industry-specialized Big 4 audit firms (1.082 with high NAS, p = 0.000).[21]

When CACM is high, our findings from the main tests suggest that the clients of high-quality audit firms associate with low CS. Consistently, we measure significant negative net CS and thereby clearly identify low net CS, for industry-specialized non-Big 4 audit firms (−1.291 with low NAS, p = 0.000, and −0,972 with high NAS, p = 0.000) and for industry-specialized Big 4 audit firms (−1.711 with low NAS, p = 0.000).

For the clients of non-specialized, non-Big 4 audit firms, the main tests find low CS (which equals net CS, as it is the benchmark case) when CACM is low and provisions of NAS are low (−0.485, p = 0.000). Low CACM and CS are consistent with high audit quality. However, when CACM is high, these audit firms' clients do not associate with low net CS. Net CS is positive (0.545, p = 0.077) when NAS are low. But when NAS are high, net CS is negative (−1.767, p = 0.006), consistent with non-Big 4, non-specialized audit firms signalling competence by currently limiting CS to gain future provisions of NAS.

5.2 | Dropping or constraining BIG4

Our finding that non-Big 4 audit firms do restrict both CS and CACM or do not restrict core earnings management at all when Big 4 audit firms chose to balance low levels of CACM with high levels of CS or vice versa suggests that our mostly second-tier non-Big 4 audit firms occasionally may provide higher audit quality than their larger peers. Although inconsistent with H3, other studies provide similar evidence (e.g., Boone et al., 2010; Cassell et al., 2013; Jenkins & Velury, 2011).

Our analysis of non-Big 4 audit firms includes in total 180 company-years, that is, 9.1% of the sample of 1,969 company-years (see Table 2A). In combination with being a non-specialized audit firm, the subsample is 140, and when the audit firm is not providing NAS, the subsample is 95 company-years. The small sample sizes increase the risk of drawing inappropriate statistical inferences, so we perform two additional analyses to shed light on the importance of BIG4.

First, we drop BIG4 as a test variable but include it with the control variables. This leaves us with the audit quality variables SPE and NAS. Second, we restrict the coefficients for the non-Big 4, non-SPE and non-NAS samples, so they cannot have a sign in the opposite direction of what we initially expect in H3. Table 5 reports the results from these two analyses.

TABLE 6B Robustness tests: Autocorrelation and multiway clustering, fixed company effects and random-effects GLS regression model

	Changed inferences		Extended fixed effects		Random-effects GLS regression	
ABCE	Coef.	t val.	Coef.	t val.	Coef.	t val.
Endogeneity treatments	Yes		Yes		Yes	
FIX	Yes		Yes		Yes	
Fixed company effects	No		Yes		No	
SI interactions without FEQ	Yes		Yes		Yes	
CONTROLS	Yes		Yes		Yes	
SI · FEQ	−0.432***	−5.62	−0.267	−1.49	−0.414***	−3.12
· CACM	0.740***	5.77	0.852**	2.20	0.743***	2.82
· BIG4	0.513***	6.42	0.374**	2.11	0.495***	3.55
· SPE	2.770***	5.97	2.482*	1.94	2.763***	2.66
· BIG4 · SPE	−1.921***	−5.22	−1.458	−1.16	−1.882*	−1.88
· CACM · BIG4	−0.819***	−7.12	−0.962**	−2.45	−0.822***	−3.00
· CACM · SPE	−1.237**	−2.84	−1.267**	−2.58	−1.245***	−2.61
· CACM · BIG4 · SPE	No		No		No	
Adjusted R^2	0.046***		0.081***		0.060***	
Number of obs.	1,969		1,969		1,969	

Note. The regression model is specified by Model 4 with AUQ is limited to BIG4 and SPE. Only ∂CS/∂FEQ given by 5 is reported. Table 1B defines all variables. FEQ, CACM and AUQ are endogenous selection variables. The first regression reports t values taking into consideration arbitrary autocorrelation, heteroskedasticity and clustering on companies and years (Cameron, Gelbach, & Miller, 2011; Driscoll & Kraay, 1998; Newey & West, 1987; Thompson, 2011). The second regression also takes into consideration fixed company effects, changing back t values to the case where they only are adjusted for arbitrary heteroskedasticity and clustering on companies (Rogers, 1993; White, 1980). The third regression is a random-effects GLS regression. No coefficient means exclusion of variable to avoid multicollinearity.

*Statistical significance at the 10% level.

**Statistical significance at the 5% level.

***Statistical significance at the 1% level.

In the first model in Table 5, there is only one audit quality variable: audit firms specializing by industry, SPE. We find that SPE firms that prevent CACM do not restrict CS (0.689, significant), whereas SPE firms that allow CACM do restrict CS (−0.889, weakly significant). This is the same behaviour as found in the main test (see the second model in Table 4, 2.770, highly significant and −1.237, significant). In the second model in Table 5, we add NAS to the analysis. We find that the restriction of CS when there is CACM is associated with SPE firms not providing NAS (−1.820, significant; compared with −2.259, highly significant, in the third model in Table 4). We also find no significant associations between non-SPE firms and other variables, suggesting that the results regarding non-Big 4, non-SPE and non-NAS audit firms in Section 4 are driven by non-Big 4 audit firms. Thus, BIG4 is a critical variable to our analysis, but as shown next, most of our results do not depend on the behaviour of non-Big 4 audit firms.

An alternative to dropping BIG4 is to constrain the estimation of the model in accordance with the null hypothesis and (most) likely alternatives. Consequently, we constrain the coefficient on SI · FEQ to be non-negative because the negative coefficient estimate in Table 4 was the most surprising finding. That is, the sample of companies audited by a non-BIG4, non-SPE, non-NAS audit firm is constrained not to reduce CS before FEQ when presumably higher quality audit firms choose to increase CS. The third model in Table 5 reports the results. Comparing with the results from the third model in Table 4, we find that the rest of our results remain although they are less significant overall.

6 | ROBUSTNESS TESTS

We perform robustness test regarding performance adjustment, statistical analyses, variable definitions and the impact of IFRS.

6.1 | Alternative performance adjustment

The first robustness test of the results in the main tests alters how we adjust for performance, which is potentially important because low performance creates a natural negative relation between unadjusted abnormal core earnings and income-decreasing special items. In the main tests, we have two layers of performance adjustments. First, we follow Fan et al. (2010) and estimate abnormal core earnings by a model that includes abnormal stock returns as a control for performance. Second, several performance-related variables such as the cash return on assets are added as control variables when testing the hypotheses. In the first regression model presented in Table 6, we remove cash return on assets and excess stock market return as control variables, and the results are similar to (and more significant than) those reported in the main test. The consistency with the results of

TABLE 6C Robustness tests: No endogeneity treatment and different cut-offs for FEQ (base case is FEQ above the 75th percentile)

	FEQ above 67th percentile		FEQ above 75th percentile		FEQ above 90th percentile	
ABCE	Coef.	*t* val.	Coef.	*t* val.	Coef.	*t* val.
Endogeneity treatments	No		No		No	
FIX	Yes		Yes		Yes	
SI interactions without FEQ	Yes		Yes		Yes	
CONTROLS	Yes		Yes		Yes	
SI · FEQ	0.108	0.61	−0.403***	−3.88	−0.519***	−5.25
· CACM	−0.493	−0.70	0.659**	2.54	1.163***	6.70
· BIG4	0.007	0.04	0.458***	3.93	0.707***	5.21
· SPE	2.339***	4.29	2.289***	5.44	3.446***	5.53
· BIG4 · SPE	−1.684***	−2.90	−2.130***	−3.76	−2.873***	−4.22
· CACM · BIG4	0.369	0.52	−0.719***	−2.68	−1.366***	−5.71
· CACM · SPE	−0.978**	−2.25	−1.090**	−2.55	−2.031***	−3.91
· CACM · BIG4 · SPE	No		No		No	
Adjusted R^2	0.035***		0.036***		0.040***	
Number of obs.	1,969		1,969		1,969	

Note. The regression model is specified by Model 4 with AUQ limited to BIG4 and SPE. Only ∂CS/∂FEQ given by 5 is reported. Table 1B defines all variables. FEQ, CACM and AUQ are now considered exogenous variables. The second regression model presents the base case and should be compared with the corresponding model in Table 4 with endogeneity treatments. In the first regression model in this panel, FEQ is the indicator variable of forthcoming equity issues above the 67th percentile. In the third model, FEQ > 90th percentile. No coefficient means that the variable is excluded to avoid multicollinearity. Statistical inferences are robust to arbitrary heteroskedasticity and clustering on companies (Rogers, 1993; White, 1980).
*Statistical significance at the 10% level.
**Statistical significance at the 5% level.
***Statistical significance at the 1% level.

the main tests remains if we remove all control variables and both the fixed industry and year effects (see the second and third regressions of Table 6).

6.2 | Supplementary statistical analyses

In Table 6B, we first substitute the *t* values taking into consideration arbitrary heteroskedasticity and clustering on companies (Rogers, 1993; White, 1980) with statistical inferences also considering arbitrary autocorrelation and multiway clustering on years (Cameron, Gelbach, & Miller, 2011; Driscoll & Kraay, 1998; Newey & West, 1987; Thompson, 2011). The first regression model in Table 6B shows that the coefficients of the test variables in this case become more significant.

Next, in the second regression model in Table 6B, we expand the control of fixed effects by also taking into consideration fixed company effects. This could ease the impact of possible missing control variables related to firm-specific factors, for example, mitigate the omission of potential relevant corporate governance variables. The sign of coefficients does not change, but the significance of the coefficients is now weaker, and the baseline coefficient on SI · FEQ is insignificant (−0.267, p = 0.137, compared with −0.432, p = 0.001, in the main test). This suggests that we cannot ignore that the previously identified effect of reduced CS associated with the clients of non-Big 4, non-specialized audit firms with low CACM is driven instead by a company-specific characteristic, including more clients with poor performance choosing non-Big 4, non-specialized audit firms. Further analyses indicate that that the effect of high audit quality is driven by the clients of non-Big 4 audit firms and not the non-specialized firms. Given 180 observations of non-Big 4 audit firms, the results regarding these firms' clients should be interpreted with caution. Although challenged by the Hausman (1978) specification test relative to the fixed company effects in the regression model, we also perform a random-effects generalized least squares (GLS) regression with results consistent with those obtained by the main test.

We also perform a robustness test without endogeneity adjustment of the test variables when testing H3 and H4. Recall that for H1 and H2, the results are reported as the first regression models in Tables 3A and 3B, respectively, and are discussed in Section 3. For H3 and H4, the second regression model in Table 6C (FEQ above the 75th percentile) reports the results (see also the second regression model in Table 6F that includes the NAS indicator). We find that the results from the main tests hold when FEQ, CACM, BIG4 and SPE are considered exogenous variables.

Chen, Hribar and Melessa (2018) show that when residuals are used as the dependent variable, coefficients may be biased and lead to incorrect statistical inferences. Because we use the residual ABCE from 6 as the dependent variable in 1, 3 and 4, this may be an issue in our estimation. We therefore re-estimate 6 expanded with the independent variables of 1, 3 and 4 (untabulated). When expanding 6 with variables from 1, the coefficient on the test variable SI · FEQ is 0.109

TABLE 6D Robustness tests: Alternative cut-offs for CACM

	ABCA positive		ABCA above 67th percentile		ABCA above 90th percentile	
ABCE	Coef.	*t* val.	Coef.	*t* val.	Coef.	*t* val.
Endogeneity treatments	No		No		No	
FIX	Yes		Yes		Yes	
SI interactions without FEQ	Yes		Yes		Yes	
CONTROLS	Yes		Yes		Yes	
SI · FEQ	−0.367	−1.64	−0.332***	−2.67	−0.176	−1.55
· CACM	0.678***	3.52	0.595**	2.55	−0.712	−0.52
· BIG4	0.382	1.41	0.389***	2.93	0.231*	1.89
· SPE	0.996***	3.38	3.333***	5.27	2.086***	3.84
· BIG4 · SPE	No		−2.539***	−3.69	−1.757***	−3.08
· CACM · BIG4	−0.645**	−2.56	−0.673***	2.75	0.562	0.41
· CACM · SPE	−1.262***	−3.37	−1.177***	−2.76	−0.264	−0.34
· CACM · BIG4 · SPE	No		No		No	
Adjusted R^2	0.036***		0.039***		0.031***	
Number of obs.	1,969		1,969		1,969	

Note. The regression model is specified by Model 4 with AUQ limited to BIG4 and SPE. Only ∂CS/∂FEQ given by 5 is reported. Table 1B defines all variables. The base case, where CACM the indicator variable of ABCA > 75th percentile, is given by second regression model in Panel C. In this panel, CACM is first the indicator of ABCA > 0, then the indicator of ABCA > 67th percentile and finally of ABCA > 90th percentile. No coefficient means exclusion of the variable to avoid multicollinearity.

*Statistical significance at the 10% level.

**Statistical significance at the 5% level.

***Statistical significance at the 1% level.

(p = 0.072), which compares with 0.068 (p = 0.017) in Table 3A. When, for example, expanding 6 with 4, the coefficients of SI · FEQ, SI · FEQ · CACM, SI · FEQ · BIG4 and SI · FEQ · CACM · BIG4 are −1.209 (p = 0.000), 1.594 (p = 0.004), 1.314 (p = 0.000) and −1.739 (p = 0.004), respectively (which compares with the corresponding two-step coefficients found in Table 4). Most coefficient estimates increase in magnitude and become more significant statistically. To summarize, our findings in the main tests are fairly robust to changes in the econometric specification and estimation techniques.

6.3 | Alternative variable definitions

Lastly, we turn to the robustness to changes in variable definitions used in the main tests. Table 6C reports the sensitivity of changing the measure of a large equity issue from the base case 75th percentile, up to the 90th percentile and down to the 67th percentile. The significance clearly increases with the size of the equity issue, and the impact of industry specialization on CS appears before the impact of audit firm size.[22] The first regression model in Table 6D reports the sensitivity of the results for alternative definitions of CACM. The results should be compared with the second regression model in Table 6C where CACM indicates abnormal core accruals (ABCA) beyond the 75th percentile. Similar significant results as in the main tests are found when CACM is changed to the 67th percentile, but the significance is challenged when CACM indicates all positive abnormal core accruals or only very large ones above the 90th percentile. An explanation is that including all positive accruals as well as only extreme accruals is more likely to capture phenomena other than CACM. Including all positive accruals obviously means including accruals unrelated to CACM and similarly for many of the very largest accruals where the management's manipulation may be particularly difficult to conceal.

We also tested the sensitivity of using abnormal accruals including special items accruals, instead of abnormal core accruals. The first regression model in Table 6E reports the results. We find reduced significance, suggesting that it is important to concentrate the impact of CS through SI. Note, however, that the previous finding that CS before FEQ is associated with industry-specialized non-Big 4 audit firms remains; the coefficient is 2.587 (p = 0.000). The same applies to the moderating effect of being an industry-specialized Big 4 audit firm; the coefficient is −2.176 (p = 0.000). The second and third regression models in Table 6E show that the results are insensitive to alternative definitions of industry-specialized audit firms in terms of size of industry market share.

Table 6F reports the findings when the 50th percentile for large NAS is included in the model instead of the 75th percentile. We find that the NAS effect increases with the magnitude of the services

TABLE 6E Robustness tests: Use of abnormal accruals instead of abnormal core accruals and alternative cut-offs for SPE

	Alternative CACM		SPE above 40%		SPE above 60%	
ABCE	Coef.	t val.	Coef.	t val.	Coef.	t val.
Endogeneity treatments	No		No		No	
FIX	Yes		Yes		Yes	
SI interactions without FEQ	Yes		Yes		Yes	
CONTROLS	Yes		Yes		Yes	
SI · FEQ	−0.109	−0.73	−0.381***	−3.64	−0.396***	−4.00
· CACM	0.274	0.66	0.638**	2.39	0.654**	2.47
· BIG4	0.171	1.10	0.457***	3.79	0.456***	4.06
· SPE	2.587***	5.01	1.913***	3.66	0.745***	2.70
· BIG4 · SPE	−2.176***	4.00	−1.858***	−3.42	No	
· CACM · BIG4	−0.456	−1.01	−0.718**	−2.58	−0.723***	−2.64
· CACM · SPE	−0.687	−0.71	−0.337	−1.17	−1.718**	−2.45
· CACM · BIG4 · SPE	No		No		No	
Adjusted R^2	0.030***		0.035***		0.035***	
Number of obs.	1,969		1,969		1,969	

Note. The regression model is specified by Model 4 with AUQ limited to BIG4 and SPE. Only ∂CS/∂FEQ given by 5 is reported. Table 1B defines all variables. In the first regression model, CACM is the indicator of abnormal accruals above the 75th percentile where abnormal accruals are including special items accruals as in the standard performance-adjusted modified Jones model. The two next regressions analyse the sensitivity of changing SPE, the indicator of industry-specialized audit firms. The base case, in which SPE is the indicator variable of industry-year market shares above the 50%, is given by the second regression model in Panel C. In this panel, SPE is the indicator of an industry-specialized audit firm with a market share of at least 40% and 60%. No coefficient means exclusion of the variable to avoid multicollinearity.

*Statistical significance at the 10% level.

**Statistical significance at the 5% level.

***Statistical significance at the 1% level.

TABLE 6F Robustness tests: Alternative cut-offs for NAS and current instead of forward NAS

	NAS above 50th percentile		NAS above 75th percentile		Current instead of forward NAS	
ABCE	**Coef.**	***t* val.**	**Coef.**	***t* val.**	**Coef.**	***t* val.**
Endogeneity treatments	No		No		Yes	
FIX	Yes		Yes		Yes	
SI interactions without FEQ	Yes		Yes		Yes	
CONTROLS	Yes		Yes		Yes	
SI · FEQ	−0.479***	−4.88	−0.433***	−4.29	−0.421***	−3.11
· CACM	1.030***	3.41	0.894***	3.36	0.936***	4.80
· BIG4	0.603***	4.11	0.508***	4.61	0.476**	2.45
· SPE	2.558***	5.51	2.495***	5.39	2.511**	2.22
· NAS	0.430	0.90	0.280	0.61	−0.184	−0.33
· BIG4 · SPE	−2.808***	−5.24	−2.079***	−3.22	−1.863	−1.42
· BIG4 · NAS	−0.575	−1.12	−0.621	−1.03	−0.106	−0.18
· SPE · NAS	1.411***	3.52	0.844	1.30	0.676	1.09
· BIG4 · SPE · NAS	No		No		No	
· CACM · BIG4	−0.922*	−1.76	−0.999***	−3.57	−0.982***	−4.19
· CACM · SPE	−2.202	−1.24	−2.148***	−3.32	−2.538**	−2.11
· CACM · NAS	−2.345**	−2.41	−2.499***	−3.34	−2.261	−1.54
· CACM · BIG4 · SPE	No		No		No	
· CACM · BIG4 · NAS	2.163**	2.01	2.725***	3.22	2.528*	1.72
· CACM · SPE · NAS	0.858	0.47	0.998	1.18	0.943	0.72
· CACM · BIG4 · SPE · NAS	No		No		No	
Adjusted R^2	0.035***		0.040***		0.045***	
Number of obs.	1,969		1,969		1,969	

Note. The regression model is specified by Model 4. Only ∂CS/∂FEQ given by 5 is reported. Table 1B defines all variables. FEQ, CACM, and AUQ = (BIG4, SPE, NAS) are considered to exogenous variables, except in the third regression model where the variables are treated as endogenous. In the first regression model, NAS is the indicator variable of a non-audit service ratio of above the median instead of the 75th percentile, reported in the second regression model as a benchmark for comparison. The second regression model should also be compared with the last regression model in Table 4 with endogeneity treatments. The third model is identical to the last model in Table 4 expect that NAS is based on the current and not forwarded NAS ratio. No coefficients mean that the variables are excluded to avoid multicollinearity. Statistical inferences are robust to arbitrary heteroskedasticity and clustering on companies (Rogers, 1993; White, 1980).
*Statistical significance at the 10% level.
**Statistical significance at the 5% level.
***Statistical significance at the 1% level.

provided, but the 50th percentile does not materially change the findings compared with the main test reported in Table 4. In the third regression model in Table 6F, we test current NAS provisions instead of NAS during the forthcoming equity issues, yielding consistent but less significant results for the NAS interactions. Similar results (untabulated) occur when forwarding NAS beyond the forthcoming equity issues (i.e., forwarding two or more years). This suggests that the NAS results from the main test are driven by NAS growth opportunities related to future equity issues. This is consistent with the interpretation that the positive association between CS and future NAS for the clients of non-Big 4 and non-specialized audit firms when CACM is high (coefficient equals 2.783 in the third regression model in Table 4, p = 0.001) is primarily driven by signalling competence in order to gain future NAS instead of knowledge spillover benefits (coefficient equals 2.528; p = 0.087 in Table 6F).

6.4 | International Financial Reporting Standards

We have also controlled for possible differences in CS prior to large equity issues when companies report according to IFRS, mainly from 2005, relative to national GAAP. Overall, there is no significant difference (untabulated).

7 | CONCLUDING COMMENTS

Auditors' interaction with the relative role of different forms of core earnings management performed by clients is an open question. This study therefore examines how audit firm size, industry specialization and the provision of NAS interact with misclassification of core operational expenses as special items to improve perceptions of core earnings (i.e., CS) before equity issues and acquisitions, when controlling for CACM (an alternative or supplementary method for core earnings management). Based on a sample of listed companies in Norway in 2000–2015, we find evidence of CS before equity issues and find that CS substitutes for CACM. When CACM is low, CS is strengthened but disappears when CACM is high. This indicates that CS and CACM are on average substitutes.

Audit firm size and industry specialization are found to interact with the CS and CACM. For Big 4 and industry-specialized audit firms' clients, when CACM is low (high), CS is high (low), indicating that these audit firms may contribute to substitutability. This is consistent with how, on the one hand, high-quality audit firms compensate by limiting CS when they have allowed high levels of managed accruals, or have no need to engage in CS when they already have allowed managed accruals.[23] On the other hand, when high-quality audit firms prevent accrual management, they allow CS, possibly due to permissive accounting and audit standards and less supervisory attention to CS as compared with CACM.

For clients of non-Big 4 and non-specialized audit firms, either both CS and CACM are high or both CS and CACM are low, indicating that CS complements CACM. This finding is consistent with what are presumably lower audit quality firms interacting differently with core earnings management: either by preventing neither of the two core earnings management tools, that is, providing very low audit quality, or by preventing both, that is, providing very high audit quality. The relatively low number of observations (180) suggests that the latter finding of high audit quality should be interpreted with caution. Similar results have been found prior in studies for second-tier firms and a possible explanation is that second-tier firms want to signal high competence before large equity issues to attract new clients as long as they are not providing NAS.

When future NAS are large, we find that the clients of non-specialized Big 4 audit firms associate with both high CS and high CACM. This finding is consistent with future NAS for Big 4 non-specialized audit firms have the potential to impair audit quality. Note that in our case, we can exclude knowledge spillover effects from providing NAS as these are future deliverables. By contrast, for the clients of non-specialized, non-Big 4 audit firms with high CACM, CS is low when the provisions of NAS during a forthcoming equity issue are large. This is consistent with non-Big 4, non-specialized firms' intent to signal audit competence by limiting current CS before equity issues but allowing CACM to obtain future NAS provisions.

Overall, the findings show that audit firms' interactions with the relative roles of CS and CACM by clients' management align with auditor incentives and competencies. Auditors' incentives, however, may be distorted towards tolerating CS. Given that financial statement users tend to fixate on core earnings for valuation purposes, this raises the question of the suitability of the significant latitude in current accounting standards in classifying line items in the financial statements and of the vague auditing standard requirements for auditing classification of income items.

Earnings management and audit quality are inherently difficult to study. Among other things, earnings management tools are typically not mutually exclusive, and companies may not have the same ability to utilize these tools. Furthermore, the tools are differentially affected by regulators, auditors and other stewards. Proxies frequently used to capture different earnings management constructs are subject to criticism (e.g., Christensen, Huffman, & Lewis-Western, 2018). Moreover, the current study is limited to examining how three common audit quality-related variables (audit firm size, industry specialization and auditor-provided NAS) interact with the two core earnings management tools (CS and CACM). The study can be expanded in several directions. Other earnings management tools are available (e.g., real earnings management), other audit quality variables are of interest (e.g., auditor tenure) and other earnings management proxies have been proposed (e.g., abnormal revenues). We hope our study will stimulate further research of the multifaceted nature of earnings management and audit quality.

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ETHICAL APPROVAL

The authors apply the highest ethical standards.

AUTHOR CONTRIBUTIONS

Both authors have contributed equally.

DATA AVAILABILITY STATEMENT

The data are available from different public sources

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ENDNOTES

1 For example, Ronen and Sadan (1975) and Barnea, Ronen and Sadan (1976) provide evidence of expense shifting to extraordinary items. Barua, Lin and Sbaraglia (2010) find that companies shift operating expenses to discontinued operations. Lail, Thomas and Winterbotham (2014) report expense shifting from core segments to other segments.

2 The two-step procedure of using the residuals from the first-step regression model (i.e., Model 6) as the dependent variable in the second step (i.e., Model 1) may produce biased coefficients and incorrect statistical inferences (Chen, Hribar, & Melessa, 2018). In Section 6, we report from a robustness test where the two steps are merged.

3 Because the incentives for classification shifting are weaker when FEQ = 0, α_{11} is expected to be negative because poor company performance imposes a negative correlation between ABCE and SI, as documented by McVay (2006) and Fan, Barua, Cready and Thomas (2010).

[4] Real earnings management involves management operating decisions (e.g., easing customers' credit terms to boost sales revenues) normally not challenged by the auditor (Cohen, Dey, & Lys, 2008; Commerford, Hatfield, & Houston, 2018). For this reason and to keep the analyses manageable, we do not include real earnings management in our analyses.

[5] The companies in our sample report, according to IFRS from 2005. The Norwegian GAAP applied for our sampled companies prior to 2005 provided less detailed financial reporting rules than those of IFRS, that is, with more discretion to manage core earnings than IFRS. In Section 6, we report from a robustness test for differences in classification shifting before and after 2005.

[6] Abernathy, Beyer and Rapley (2014) also test whether abnormal accruals negatively affect CS. They represent both CACM and CS with indicator variables. CS occurs when ABCE is positive and the incentive for CS is fulfilled, in their case when analyst-forecasted earnings are greater than reported earnings (see also Athanasakou, Strong, & Walker, 2011). Our test follows McVay's (2006) and others' (e.g., Causholli, Chambers, & Payne, 2014; Fan, Barua, Cready, & Thomas, 2010; Siu & Faff, 2013) coefficient measure of CS (i.e., a continuous measure) with CS interacting with CACM (i.e., an indicator or a continuous measure). This allows for the classification of SI being directly correlated with ABCE. It would have been of interest to perform a sensitivity analysis of the impact of the design choices, but our data set does not allow for analyst forecast data as used by Abernathy, Beyer and Rapley (2014).

[7] International Auditing and Assurance Standards Board's (IAASB) auditing standards define a misstatement as 'a difference between the amount, *classification*, presentation, or disclosure of a reported financial statement item and the amount, classification, presentation, or disclosure that is required for the item to be in accordance with the *applicable financial reporting framework*' (IAASB, 2009, ISA 450 4 (a)) [italics added].

[8] ISA 450 A15 (IAASB, 2009) states that: 'Determining whether a classification misstatement is material involves the evaluation of qualitative considerations, such as the effect of the classification misstatement on debt or other contractual covenants, the effect on individual line items or subtotals, or the effect on key ratios'. The Public Company Accounting Oversight Board (PCAOB) more explicitly refers to misclassification by CS as a qualitative factor when evaluating the materiality of uncorrected misstatements: 'The effects of misclassifications, for example, misclassification between operating and non-operating income or recurring and non-recurring income items' (PCAOB, 2017, AS 2810 Appendix B B2.i.).

[9] A potential problem when estimating Model 4 is multicollinearity due to the interactions. As a remedy, highly multicollinear variables can be dropped. An indication of multicollinearity is high adjusted R^2 without coefficients being statistically significant due to high variance inflation factors behind their standard errors. Thus, our tests of H1–H4 could be biased towards not rejecting the null hypotheses. When coefficients are found to be significant in the presence of multicollinearity, as in our study, their significance could be underestimated.

[10] Choi and Wong (2007) measure the quality of national legal environments by using a combined index composed of law enforcement and investor protection (La Porta, Lopez-de-Silanes, Sheifer, & Vishney, 1998, 2000). Norway scores similar to the United States. Similarly, Hope, Kang, Thomas and Yoo (2009) classify Norway among the stronger investor protection countries. Leuz, Nanda and Wysocki (2003) rank Norway among the countries with lowest aggregate earnings management score. Norway and the United States belong to the same cluster characterized by large stock markets, low ownership concentration, extensive outsider rights, high disclosure and strong legal enforcement.

[11] Financial analysts and investors appear increasingly to focus on APM, such as earnings from core business operations, because earnings that exclude special items are perceived to be more informative, permanent and value relevant than GAAP earnings (Bhattachary, Black, Christensen, & Larson, 2003; Black, Christensen, Ciesielski, & Whipple, 2018; Bradshaw & Sloan, 2002; Doyle, Jennings, & Soliman, 2013; Lipe, 1986). Evidence indicates, however, that management may use APM opportunistically (Black & Christensen, 2009; Black, Christensen, Ciesielski, & Whipple, 2018; Doyle, Jennings, & Soliman, 2013; Lougee & Marquardt, 2004).

[12] The EU body, European Securities and Markets Authority (ESMA), plays an active role in building a common supervisory culture by promoting common approaches and practices within the European Economic Area (EAA). EAA includes EU member states and some non-EU member states such as Norway. ESMA has issued Guidelines on Alternative Performance Measures (ESMA, 2015). In its motivation, ESMA notes that APM may be used by issuers to present a confusing or optimistic picture of their performance by removing certain negative aspects (ESMA, 2014, 8). Financial statements are, however, excluded from the scope of the guidelines.

[13] Although depreciation and amortization should be determined before impairment, increased impairments could reduce normal depreciations and impose a positive correlation between core earnings and special items. As this form of classification shifting could be questioned to be mechanical and to not represent core earnings management, depreciation and amortization are excluded from the calculation of core earnings, as in McVay (2006) and Fan, Barua, Cready and Thomas (2010).

[14] Abnormal stock returns are estimated for each industry-year by a model inspired by Fama and French (1993): ERET = $\phi_0 + \phi_1 \cdot \text{BETA} + \phi_2 \cdot \text{SIZE} + \phi_3 \cdot \text{BTM} + \text{ABRET}$, in which ERET is excess stock market returns, that is, stock returns minus the risk-free rate of returns. The risk-free rate is approximated by the interbank rate of returns after tax minus a credit risk premium corresponding to average bank rating. According to Table 2A, the mean ERET is 0.141. The phis are coefficients. BETA is systematic stock market risk estimated by the market model on monthly observations (the mean equals 1.013), SIZE is the lagged log of the inflation-adjusted market value of equity (7.160) and BTM is the lagged book-to-market ratio (0.972). ABRET is the error term and thus a measure of abnormal stock returns.

[15] When running the regression model, ABCE = $\alpha_0 + \alpha_1 \cdot \text{SI} + \varepsilon$, we obtain an estimate of $\alpha_1 = -0.027$. The coefficient is insignificant ($p = 0.308$) when employing robust statistical inferences correcting for arbitrary heteroskedasticity and clustering on companies (Rogers, 1993; White, 1980). The effect of poor performance on both CE and SI appears by $\alpha_1 < 0$. Indirectly, the insignificance of α_1 is consistent with a counter-effect in terms of CS.

[16] We tested different candidates for instrumental variables in Model 2, for example, the current ratio (i.e., current assets divided by current debt). The current ratio is negatively correlated with the probability of a future equity issue, and the ratio could be excluded from Model 1 because it is insignificantly correlated with the error term of Model 1, suggesting that the current ratio may be a valid instrument. In sensitivity analyses, insignificant control variables in Model 1, for example, BTM, have also been reclassified as instruments in Model 2.

[17] When estimated by two-step maximum likelihood and the control function estimator (allowing separate treatment and control group variances and correlations), the coefficient estimates of SI · FEQ become 0.065 and 0.078 and remain significant. The two-step estimators are larger than the OLS estimator, suggesting that ignoring endogeneity underestimates CS before equity issues. Adding more candidates for instrumental variables in Model 2 does not change the coefficient estimate significantly (see previous footnote).

[18] The net impact on CS before FEQ of different types of audit firms is reported as an additional test in Section 5. Section 5 also contains

additional analysis of the finding that non-Big 4 audit firms in some cases deliver high audit quality.

[19] This finding is consistent with the finding of Cohen and Zarowin (2010) that real earnings management around SEO increases with BIG8, taking accrual-based earnings management into consideration (see also Abernathy, Beyer, & Rapley, 2014; Zang, 2012).

[20] A possible explanation of differences in the effects on core earnings management between Big 4 and non-Big 4 audit firms in our sample may also relate to Big 4 auditors complying with their more detailed firm guidance. This may prevent very low quality audits (high CS and high CACM) but may also discourage very high quality audits (low CS and low CACM), that is, potential 'over-auditing'. Thus, a balancing strategy may be preferred (low CS and high CACM or high CS and low CACM). By contrast, non-Big 4 auditors may have more flexibility within the scope of firm guidance, allowing room for performing either very low quality audits or very high quality audits. The latter may be induced by incentives for some small players in the public company market to signal strong competence in order to attract new clients.
Along the same line of reasoning as for the difference between Big 4 and non-Big 4 audit firms, superior client knowledge may explain why industry specialists avoid low-quality audits and 'over-auditing'. Interestingly, an inspection report by Finanstilsynet (FSA, the Norwegian financial supervisory authority) of audit firms' guidance on samples sizes for non-statistical sampling to test internal controls supports such a notion. The report indicates that large audit firms' guidance compared with non-large audit firms use tighter intervals for sample sizes; that is, the large audit firms set higher minimum and lower maximum sample sizes than the non-large audit firms (FSA, 2016).

[21] For example, the main tests show that employing a non-specialized Big 4 audit firm with low provisions of NAS increases CS relative to employing an otherwise similar non-Big 4 audit firm, when CACM is low (see third regression in Table 4, SI · FEQ · BIG4 = 0.588). However, the net impact on CS is SI · FEQ + SI · FEQ · BIG4 = −0.485 + 0.588 = 0.103 (p = 0.041). In this case, employing a Big 4 audit firm is associated with net CS—not only with an increase in CS relative to the benchmark, which could be a correction relative to a too restrictive non-Big 4 audit firm.

[22] By including all equity issues in FEQ, the test variables are insignificant (untabulated).

[23] An alternative explanation could be that that equity issues are timed to periods when the entity has experienced substantial *unmanaged* core accruals. Management's incentive to engage in CS may be lower, and even if violation of GAAP is not established for high CACM, the auditor may be motivated to scrutinize CS more carefully. This argument resembles that of Commerford, Hatfield and Houston (2018), suggesting that when management uses real earnings management, auditors more intensively scrutinize and restrict accruals management because (the unchallenged) real earnings management raises auditors' concerns about management's aggressiveness in other financial reporting decisions.

REFERENCES

Abernathy, J. L., Beyer, B., & Rapley, E. T. (2014). Earnings management constraints and classification shifting. *Journal of Business Finance & Accounting*, *41*(5&6), 600–626.

Alfonso, E., Cheng, C. S. A., & Pan, S. (2015). Income classification shifting and mispricing of core earnings. *Journal of Accounting, Auditing & Finance*, *30*, 1–32. https://doi.org/10.1177/0148558X15571738

Armstrong, C., Foster, G., & Taylor, D. (2016). Abnormal accruals in newly public companies: Opportunistic misreporting or economic activity? *Management Science*, *62*(5), 1316–1338. https://doi.org/10.1287/mnsc.2015.2179

Arruñada, B. (1999). *The economics of audit quality: Private incentives and the regulation of audit and nonaudit services*. Kluwer Academic Publishers. https://doi.org/10.1007/978-1-4757-6728-5

Athanasakou, V. E., Strong, D., & Walker, M. (2009). Earnings management or forecast guidance to meet analyst expectations? *Accounting and Business Research*, *39*(1), 3–35. https://doi.org/10.1080/00014788.2009.9663347

Athanasakou, V. E., Strong, N. C., & Walker, M. (2011). The market reward for achieving analyst earnings expectations: Does managing expectations or earnings matters? *Journal of Business Finance & Accounting*, *38*(1&2), 58–94.

Barnea, A., Ronen, J., & Sadan, S. (1976). Classification smoothing of income with extraordinary items. *The Accounting Review*, *51*(1), 110–122.

Barua, A., Lin, S., & Sbaraglia, A. M. (2010). Earnings management using discontinued operations. *The Accounting Review*, *85*(5), 1485–1509. https://doi.org/10.2308/accr.2010.85.5.1485

Becker, C. L., DeFond, M. L., Jiambalvo, J., & Subramanyam, K. R. (1998). The effect of audit quality of earnings management. *Contemporary Accounting Research*, *15*(1), 1–24. https://doi.org/10.1111/j.1911-3846.1998.tb00547.x

Behn, B. K., Gotti, G., Herrmann, D., & Kang, T. (2013). Classification shifting in an international setting: Investor protection and financial analysts monitoring. *Journal of International Accounting Research*, *12*(2), 27–50. https://doi.org/10.2308/jiar-50439

Bhattachary, N., Black, E. L., Christensen, T. E., & Larson, C. R. (2003). Assessing the relative informativeness and performance of pro forma earnings and GAAP operating earnings. *Journal of Accounting and Economics*, *36*, 285–319. https://doi.org/10.1016/j.jacceco.2003.06.001

Black, D. E., & Christensen, T. E. (2009). US managers' use of 'pro forma' adjustments to meet strategic earnings targets. *Journal of Business Finance and Accounting*, *36*(3&4), 297–326.

Black, D. E., Christensen, T. E., Ciesielski, J. T., & Whipple, B. C. (2018). Non-GAAP reporting: Evidence from academia and current practice. *Journal of Business Finance & Accounting*, *45*(3–4), 259–294. https://doi.org/10.1111/jbfa.12298

Boone, J. P., Khurane, I. K., & Raman, K. K. (2010). Do the Big 4 and the second-tier firms provide audits of similar quality? *Journal of Accounting and Public Policy*, *29*, 330–352. https://doi.org/10.1016/j.jaccpubpol.2010.06.007

Bradshaw, M., & Sloan, R. (2002). GAAP versus the street: An empirical assessment of two alternative definitions of earnings. *Journal of Accounting Research*, *40*(1), 41–66. https://doi.org/10.1111/1475-679X.00038

Cameron, A. C., Gelbach, J. B., & Miller, D. L. (2011). Robust inferences with multiway clustering. *Journal of Business and Economic Statistics*, *29*(2), 238–249. https://doi.org/10.1198/jbes.2010.07136

Cassell, C. A., Giroux, G., Myers, L. A., & Omer, T. C. (2013). The emergence of second-tier auditors in the US: Evidence from investor perceptions of financial reporting creditability. *Journal of Business Finance & Accounting*, *40*(3), 350–372.

Causholli, M., Chambers, D. J., & Payne, J. L. (2014). Future nonaudit service fees and audit quality. *Contemporary Accounting Research*, *31*(3), 681–712. https://doi.org/10.1111/1911-3846.12042

Chen, W., Hribar, P., & Melessa, S. (2018). Incorrect inferences when using residuals as dependent variables. *Journal of Accounting Research*, *56*(3), 751–796. https://doi.org/10.1111/1475-679X.12195

Choi, J.-H., & Wong, T. J. (2007). Auditors' governance functions and legal environment: An international investigation. *Contemporary Accounting Research*, *24*, 13–46. https://doi.org/10.1506/X478-1075-4PW5-1501

Christensen, T. E., Huffman, A., & Lewis-Western, M. F. (2018). Earnings management proxies: Prudent business decisions or earnings manipulation? Available at SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2793838

Cohen, D. A., Dey, A., & Lys, T. Z. (2008). Real and accrual-based earnings management in the pre- and post-Sarbanes-Oxley periods. *The Accounting Review*, *83*(3), 757–787. https://doi.org/10.2308/accr.2008.83.3.757

Cohen, D. A., & Zarowin, P. (2010). Accrual-based and real earnings management activities around seasoned equity offerings. *Journal of Accounting and Economics*, *50*, 2–19. https://doi.org/10.1016/j.jacceco.2010.01.002

Commerford, B. P., Hatfield, R. C., & Houston, R. W. (2018). The effect of real earnings management on auditor scrutiny of management's other financial reporting decisions. *The Accounting Review*, *93*(5), 145–163. https://doi.org/10.2308/accr-52032

DeAngelo, L. (1981). Auditor size and audit quality. *Journal of Accounting and Economics*, *3*(3), 183–199. https://doi.org/10.1016/0165-4101(81)90002-1

Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1995). Detecting earnings management. *The Accounting Review*, *70*, 193–225.

DeFond, M., & Zhang, J. (2014). A review of archival auditing research. *Journal of Accounting and Economics*, *58*, 275–326. https://doi.org/10.1016/j.jacceco.2014.09.002

Doyle, J. T., Jennings, J. N., & Soliman, M. T. (2013). Do managers define non-GAAP earnings to meet or beat analyst forecasts? *Journal of Accounting and Economics*, *56*(1), 40–56. https://doi.org/10.1016/j.jacceco.2013.03.002

Driscoll, J. C., & Kraay, A. (1998). Consistent covariance matrix estimation with spatially dependent panel data. *Review of Economics and Statistics*, *80*, 549–560. https://doi.org/10.1162/003465398557825

Eilifsen, A., & Knivsflå, K. H. (2013). How increased regulatory oversight of nonaudit services affects investors' perceptions of earnings quality. *Auditing: A Journal of Practice & Theory*, *32*(1), 85–112. https://doi.org/10.2308/ajpt-50305

Eilifsen, A., & Knivsflå, K. H. (2016). The role of audit firm size, non-audit services, and knowledge spillover in mitigating earnings management during large equity issues. *International Journal of Auditing*, *20*, 239–254. https://doi.org/10.1111/ijau.12073

Erickson, M., & Wang, S.-W. (1999). Earnings management by acquiring firms in stock for stock mergers. *Journal of Accounting and Economics*, *27*, 149–176. https://doi.org/10.1016/S0165-4101(99)00008-7

European Securities and Markets Authority (ESMA). (2014). Consultation Paper ESMA Guidelines on Alternative Performance Measures. Available at: https://www.esma.europa.eu/press-news/consultations/consultation-cesrs-recommendations-alternative-performance-measures

European Securities and Markets Authority (ESMA). (2015). Guidelines on alternative performance measures. Available at: https://www.esma.europa.eu/document/esma-guidelines-alternative-performance-measures-1

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns of stocks and bonds. *Journal of Financial Economics*, *33*(1), 3–56. https://doi.org/10.1016/0304-405X(93)90023-5

Fan, Y., Barua, A., Cready, W. M., & Thomas, W. B. (2010). Managing earnings using classification shifting: Evidence from quarterly special items. *The Accounting Review*, *85*(4), 1303–1323. https://doi.org/10.2308/accr.2010.85.4.1303

Finanstilsynet (Financial Supervisory Authority, FSA). (2016). Stikkprøver i revisjon: Tematilsyn 2016. Available at: https://www.finanstilsynet.no/nyhetsarkiv/nyheter/2017/stikkprover-i-revisjon—tematilsyn-2016/

Finanstilsynet (Financial Supervisory Authority, FSA). (2017). Tematilsyn vedrørende alternative resultatmål. Available at: https://www.finanstilsynet.no/nyhetsarkiv/nyheter/2017/tematilsyn-om-alternative-resultatmal/

Francis, J. R. (2004). What do we know about audit quality? *The British Accounting Review*, *36*, 345–368. https://doi.org/10.1016/j.bar.2004.09.003

Francis, J. R. (2011). A framework for understanding and researching audit quality. *Auditing: A Journal of Practice & Theory*, *30*(2), 125–152. https://doi.org/10.2308/ajpt-50006

Francis, J. R., Maydew, E. L., & Sparks, H. C. (1999). The role of Big 6 auditors in the credible reporting of accruals. *Auditing: A Journal of Practice & Theory*, *18*(2), 17–34. https://doi.org/10.2308/aud.1999.18.2.17

Guggenmos, R.. Rennekamp, K., & Rupar, K. (2019). The relationship between non-GAAP earnings and aggressive estimates in reported GAAP numbers. Available at SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3045484

Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica*, *46*, 1251–1271. https://doi.org/10.2307/1913827

Haw, I. M., Ho, S. S. M., & Li, A. Y. (2011). Corporate governance and earnings management by classification shifting. *Contemporary Accounting Research*, *28*(2), 517–553. https://doi.org/10.1111/j.1911-3846.2010.01059.x

Healy, P., & Wahlen, J. M. (1999). A review of the earnings management literature and its implications for standard setting. *Accounting Horizons*, *13*, 365–383. https://doi.org/10.2308/acch.1999.13.4.365

Heckman, J. (1978). Dummy endogenous variables in a simultaneous equation system. *Econometrica*, *46*, 931–959. https://doi.org/10.2307/1909757

Hope, O. K., Kang, T., Thomas, W., & Yoo, Y. K. (2009). Impact of excess auditor remuneration on the cost of equity capital around the world. *Journal of Accounting, Auditing & Finance*, *24*(2), 177–210. https://doi.org/10.1177/0148558X0902400203

Hope, O. K., & Langli, J. C. (2010). Auditor independence in a private firm and low litigation setting. *The Accounting Review*, *85*(2), 573–605.

International Accounting Standards Board (IASB). (2007). IAS 1 Presentation of Financial Statements.

International Accounting Standards Board (IASB). (2014). IAS 16 Property, Plant and Equipment.

International Auditing and Assurance Standards Board (IAASB). (2009). ISA 450 - Evaluation of Misstatements Identified During the Audit.

Jenkins, D. S., & Velury, U. (2011). The emergence of second-tier auditors in the post-SOX era: An analysis of accounting conservatism. *Research in Accounting Regulation*, *23*, 172–176. https://doi.org/10.1016/j.racreg.2011.06.006

Joe, J., Wright, A., & Wright, S. (2011). The impact of client and misstatement characteristics on the disposition of proposed audit adjustments. *Auditing: A Journal of Practice & Theory*, *30*(2), 103–124. https://doi.org/10.2308/ajpt-50007

Jones, J. (1991). Earnings management during import relief investigations. *Journal of Accounting Research*, *29*, 193–228. https://doi.org/10.2307/2491047

Kothari, S. P., Leone, A. J., & Wasley, C. E. (2005). Performance matched discretionary accruals measures. *Journal of Accounting and Economics*, *39*, 163–197. https://doi.org/10.1016/j.jacceco.2004.11.002

La Porta, R., Lopez-de-Silanes, F., Sheifer, A., & Vishney, R. (1998). Law and finance. *Journal of Political Economy*, *106*(6), 1113–1155. https://doi.org/10.1086/250042

La Porta, R., Lopez-de-Silanes, F., Sheifer, A., & Vishney, R. (2000). Investor protection and corporate governance. *Journal of Financial Economics*, *58*(1), 3–27. https://doi.org/10.1016/S0304-405X(00)00065-9

Lail, B. E., Thomas, W. B., & Winterbotham, G. J. (2014). Classification shifting using the "corporate/other" segment. *Accounting Horizons*, *28*(3), 455–477. https://doi.org/10.2308/acch-50709

Leuz, C., Nanda, D., & Wysocki, P. (2003). Earnings management and investor protection: An international comparison. *Journal of Financial Economics*, *69*(3), 505–527. https://doi.org/10.1016/S0304-405X(03)00121-1

Li, X. (2016). The impact of the Sarbanes-Oxley Act on earnings management using classification shifting: Evidence from core earnings and special items. *Accounting & Taxation*, *8*(1), 39–48.

Li, X., & Guo, Y. (2018). Abnormal audit fees and earnings management using classification shifting. *Journal of Accounting & Finance*, *18*(5), 113–139.

Lim, C.-Y., & Tan, H.-T. (2008). Non-audit service fees and audit quality: The impact of auditor specialization. *Journal of Accounting Research*, *46*(1), 199–246. https://doi.org/10.1111/j.1475-679X.2007.00266.x

Lipe, R. (1986). The information contained in the components of earnings. *Journal of Accounting Research*, *24*(Supplement), 37–64.

Lougee, B., & Marquardt, C. (2004). Earnings informativeness and strategic disclosure: An empirical examination of "pro forma" earnings. *The Accounting Review*, *79*(3), 769–795. https://doi.org/10.2308/accr.2004.79.3.769

McVay, E. (2006). Earnings management using classification shifting: An examination of core earnings and special items. *The Accounting Review*, *81*(3), 501–531. https://doi.org/10.2308/accr.2006.81.3.501

Nelson, M., Elliott, J., & Tarpley, R. (2002). Evidence from auditors about managers' and auditors' earnings management decisions. *The Accounting Review*, *77*(Supplement), 175–202.

Newey, W. K., & West, K. D. (1987). A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix. *Econometrica*, *55*(3), 706–708.

Public Company Accounting Oversight Board. (2017). AS 2810: Evaluating Audit Results. Appendix B—Qualitative Factors Related to the Evaluation of the Materiality of Uncorrected Misstatements. Available at: https://pcaobus.org/Standards/Auditing/Pages/AS2301.aspx

Rangan, S. (1998). Earnings management and the performance of seasoned equity offerings. *Journal of Financial Economics*, *50*, 101–122. https://doi.org/10.1016/S0304-405X(98)00033-6

Rogers, W. H. (1993). Regression standard errors in clustered samples. *Stata Technical Bulletin*, *13*, 19–23.

Ronen, J., & Sadan, S. (1975). Classification smoothing: Alternative income models. *Journal of Accounting Research*, *13*(1), 133–149. https://doi.org/10.2307/2490652

Schipper, K. (1989). Commentary on earnings management. *Accounting Horizons*, *3*, 91–102.

Sharma, D. S. (2014). Non-audit services and auditor independence. In D. Hay, W. R. Knechel, & M. Willekens (Eds.), *Routledge companion to auditing* (pp. 67–88). Milton Park, Abingdon: Taylor & Francis Group.

Simunic, D. (1984). Auditing, consulting, and auditor independence. *Journal of Accounting Research*, *22*(2), 679–702. https://doi.org/10.2307/2490671

Siu, D. T. L., & Faff, R. W. (2013). Management of core earnings using classification shifting around seasoned equity offerings. Available at SSRN: http://ssrn.com/abstract=1928578

Teoh, S. H., Welch, I., & Wong, T. J. (1998a). Earnings management and the underperformance of seasoned equity offerings. *Journal of Financial Economics*, *50*, 63–99. https://doi.org/10.1016/S0304-405X(98)00032-4

Teoh, S. H., Welch, I., & Wong, T. J. (1998b). Earnings management and the long-term underperformance of initial public offerings. *Journal of Finance*, *53*, 1935–1974. https://doi.org/10.1111/0022-1082.00079

Teoh, S. H., Wong, T. J., & Rao, G. R. (1998). Are accruals during initial public offerings opportunistic? *Review of Accounting Studies*, *3*, 175–208. https://doi.org/10.1023/A:1009688619882

Thompson, S. B. (2011). Simple formulas for standard errors that cluster by both firm and time. *Journal of Financial Economics*, *99*(1), 1–10. https://doi.org/10.1016/j.jfineco.2010.08.016

White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test of heteroskedasticity. *Econometrica*, *48*(4), 817–838. https://doi.org/10.2307/1912934

Zalata, A., & Roberts, C. (2016). Internal corporate governance and classification shifting practices: An analysis of U.K. corporate behavior. *Journal of Accounting, Auditing & Finance*, *31*(1), 51–78. https://doi.org/10.1177/0148558X15571736

Zang, A. Y. (2012). Evidence of the trade-off between real activities manipulation and accrual-based earnings management. *The Accounting Review*, *87*(2), 675–703. https://doi.org/10.2308/accr-10196

Zhang, H., & Zheng, L. (2011). The valuation impact of reconciling pro forma earnings to GAAP earnings. *Journal of Accounting and Economics*, *51*, 186–202. https://doi.org/10.1016/j.jacceco.2010.07.001

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