Is there a trade-off between accrual-based and real earnings management activities in the presence of (fe) male auditors?

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Abstract

Prior research suggests that the presence of high quality auditors (i.e. proxied by audit firm characteristics) constrains accrual-based earnings management, but it inadvertently leads to higher real activities manipulation. We investigate whether such trade-off exists between accrual-based and real earnings management activities in the presence of female or male auditors. We use a sample of UK firms for the period 2009 to 2016 and find that firms audited by female auditors do not resort to a higher level real activities manipulation when their ability to engage in accruals management is constrained. Overall, our results suggest that the benefits of hiring female auditors (i.e. less accrual-based earnings management) are overwhelmingly higher than the costs they might bring to the client firms (i.e. higher real activities manipulation).

Keywords: Auditor Gender; Abnormal Accruals; Real Activities

1. Introduction

In this paper, we investigate whether there is a trade-off between accrual-based and real earnings management activities in the presence of female or male auditors. Prior research has documented that the presence of high quality auditors constrains accrual-based earnings management, but it inadvertently leads to higher real activities manipulation (e.g., Cohen and Zarowin 2010; Chi et al. 2011; Alhadaba and Clacher 2018). These studies focused exclusively on audit firm characteristics to measure high quality auditors and disregard the individual audit engagement partners who supervise the audit process and provide certification to the audited financial statements. Recently, Ittonen et al. (2013) and Garcia-Blandon et al. (2019) find that firms audited by female audit engagement partners are associated with lower accrual-based earnings management, and they attributed the lower accrual-based management primarily to the behavioural differences between female and male auditors. A significant limitation of Ittonen et al.'s (2013) and Garcia-Blandon et al.'s (2019) studies is that they disregard real activities manipulation in their analysis. However, firms resort to real activities manipulation when their ability to engage in accrual-based earnings management is constrained by high quality auditors (Cohen and Zarowin 2010; Chi et al. 2011; Alhadaba and Clacher 2018). Consequently, research in auditor gender and earnings management cannot be complete without investigating potential unintended consequences (i.e. higher real activities manipulation) of hiring female auditors.

Despite the increasing interest in the role of auditor gender in financial reporting quality, no study to date has investigated whether the presence of female or male auditors constrains real activities manipulation and how firms trade-off between accrual-based and real earnings management in the presence of female or male auditors. We are motivated to answer this question because a growing number of psychology studies show that women are behaviourally different from men in cognitive information processing, risk tolerance, diligence, conservativism and overconfidence (see Levin et al. 1988; Feingold 1994; Fellner and Maciejovsky 2007; Nettle 2007; Schmitt et al. 2008). It has also been suggested in business and economics studies that women are behaviourally different from men in business decision contexts (see Ruegger and King 1992; Dwyer et al. 2002; Eckel and Grossman 2002; Chen, Velasquez et al. 2016). In the auditing profession, not only do female auditors exhibit greater risk aversion and ethical behaviour, they also have the ability to obtain voluntary information which may reduce the incidence of information asymmetry between auditors and company directors (Gul et al. 2009; Abdelfattah et al. 2020). These suggest that female auditors might be better auditors in presiding over the audit than male auditors.

Thus, we rely on the notion of gender socialisation theory (Mason and Mudrack 1996), which assumes that female auditors are significantly different from male auditors in presiding over financial statements (see Ittonen et al. 2013; Hardies et al. 2016; Garcia-Blandon et al. 2019;

Abdelfattah et al. 2020). From this perspective, and given that the presence of female auditors is generally associated with high quality financial information (i.e. less accruals-based earnings management), we argue that firms constrained from using accruals-based earnings management might shift to other earnings management methods (i.e. real activities manipulation) that are less or not subject to external auditor's scrutiny.

We focus on auditor gender in this study because auditing is a matter of professional judgement and therefore gender-based differences in ethics, conservativism and risk tolerance (Khazanchi 1995; Fellner and Maciejovsky 2007, Hardies et al. 2013) are more likely to affect the quality of financial information. In their study on whether female or male auditors impair audit quality, Hardies et al. (2016, p.8) make the following controversial assertion: "…the behaviour of female auditors is more aligned with the quality-orientated aspect of the audit profession (i.e. serving the public interest), whereas the behaviour of male auditors is more aligned with the revenue-orientated aspect of the profession (i.e. providing good business for their firms)". This suggests that female auditors might be more concerned about the quality of financial information of their client firms to the users of financial information and are more likely to provide superior monitoring than male auditors.

To investigate whether there is a trade-off between accrual-based and real earnings management activities in the presence of female or male auditors, we analyse a sample of UK firms over the period 2009 to 2016. In addition to the level regressions, and consistent with Huang et al. (2015), we adopt the changes analysis approach to address omitted variables and endogeneity problems. Our findings can be summarised as follows: For the full sample of firms, the presence of female auditors has a significant negative impact on both the level of abnormal accruals and the annual change in abnormal accruals. When we look at the abnormal accruals and differentiate between income increasing and income decreasing accruals management, we find that the presence of female auditors has a significant negative impact on the level and the annual change in income increasing accruals management but a significant negative impact on annual change in income decreasing accruals management only. In further analysis, we find the result to be more pronounced in firms audited by female auditors in Big 4 firms than those in non-Big 4 firms and, therefore, it seems that female auditors in Big 4 firms display different ethical standards and risk aversion, influenced, to some extent by the Big 4 firms-specific training and reputation concerns. In terms of real earnings management, we find that the presence of female auditors has no impact on both the level and the annual change in the aggregate real earnings management. When we separate the aggregate real earnings management into abnormal discretionary expenses and abnormal production costs, we find that the presence of female auditors has a significant negative impact on the level of abnormal production costs only. That is, it seems that female auditors play a significant role in

mitigating accrual-based earnings management. However, there is no evidence to suggest that firms audited by female auditors substitute real earnings management for accrual-based earnings management when they are constrained.

We contribute to the existing literature by showing that while the presence of female auditors constrains accrual-based earnings management; it does not lead to higher level real activities manipulation. Prior research has exclusively focused on audit firm characteristics when examining the impact of high quality auditors on accrual-based and real earnings management activities (Cohen and Zarowin 2010; Chi et al. 2011; Alhadaba and Clacher 2018). Our paper suggests that the benefits of hiring female auditors (i.e. less accruals earnings management) are overwhelmingly higher than the costs they might bring to the client firms (i.e. high real activities manipulation). Moreover, our paper is different from prior high quality auditors-earnings management studies because not only do we investigate the association between female auditors and the levels of abnormal accruals and real earnings management activities, we also employ changes analysis approach to address the problems associated with omitted variables and endogeneity (see Johnstone et al. 2011; Jiang and Son 2015; Huang et al. 2015). We find strong evidence of female auditors constraining accruals management with no consequential effect on real activities manipulation. These results show the importance of investigating changes in abnormal accruals and real earnings management in addition to the absolute levels in order to completely understand the effect of high quality auditors on earnings manipulation. Collectively, our evidence is important because it shows that the presence of female auditors is not associated with real earnings management activities when accrual-based earnings management is constrained.

The rest of the paper is organised as follows: Section 2 reviews the relevant literature to motivate our hypotheses. Section 3 discusses the research design, sample selection and data sources. Section 4 presents the results, while section 5 provides additional analyses. Section 6 provides conclusion, implications and limitations.

2. Literature review and hypotheses development

In this section, we discuss the relevant literature and develop our hypotheses. First, we focus on the theory underpinning our study, followed by the literature on gender differences in skills and efforts, and then on the literature on gender, high quality auditors and earnings management. Then, we draw on the theory and the existing research to motivate our hypotheses.

2.1 Gender differentiated theories

There are a number of theoretical approaches that have been used to investigate gender issues. These include gender socialisation theory and occupational socialisation theory (see Mason

and Mudrack 1996). Gender socialisation theory hypothesises that significant psychological and cognitive differences exist between men and women in ethical or moral behaviour (Betz et al. 1989). Khazanchi (1995) report that women tend to be more ethical in the workplace and less likely to use unethical behaviour to achieve financial gains, evidence supported by Mason and Mudrack (1996) who conclude that women employees appear more ethical than men in business decision making. In addition, Mason and Mudrack (1996) suggest that women are more likely to be socialised to represent common values compare to men and, consequently, it is expected that women tend to respond ethically in dilemma circumstances, such as earnings management. Further, since women are perceived to be less overconfident, less aggressive, less competitive and more emotive, they are known to be more risk-averse than men (Croson and Gneezy 2009; Byrnes et al. 1999). Powell and Ansic (1997) report that men and women use different strategies in financial decision environments, while Byrnes et al. (1999), in their review of 150 studies, confirm the proposition that women, on average, are more cautious and less aggressive (i.e. conservative) than men in a range of business decision making contexts. In the auditing profession, Gul et al. (2009) contend that females do not only exhibit greater risk aversion and ethical behaviour, they also have the ability to obtain voluntary information which may reduce the incidence of information asymmetry between female auditors and company directors. This evidence is supported by Hardies et al. (2013), who suggest that female auditors are more risk averse than male auditors. If women are generally more risk averse and more conservative in finance related decision (Fellner and Maciejovsky 2007), then female auditors are more likely to constrain earnings management than male auditors.

In contrast, occupational socialisation theory hypothesises that gender similarities exist in employees within the same work environment (Mason and Mudrack 1996). This is because gender differences related to ethics and values disappear when men and women socialised within a work environment (Posner and Munson 1981; Gomez-Mejia 1983; Lacy, Bokemeier et al. 1983; Harris 1990). Because the biological-cultural differentiation of gender becomes normalise (Ingraham 1994), Smith and Roger (2000) contend that the same may hold for accountancy profession because the similarities between men and women in ethics, values and the associated behaviours may be achieved through on-the-job socialisation. In support of this view, Clikeman et al. (2001) find no gender impact on the attitudes towards the common methods to manage earnings.

In summary, because female auditors are more ethically aware, risk averse and more conservative than male auditors (Khazanchi 1995; Fellner and Maciejovsky 2007; Hardies et al. 2013), our theoretical development is founded on gender socialisation theory. We, therefore, support the argument that there are significant differences between female and male auditors in constraining earnings management.

2.2 Gender differences in skills and effort

Drawing on gender socialisation theory which shows that women and men socialised to focus on different interests (Mason and Mudrack 1996), we argue that female and male auditors might use different skills and efforts when reacting to and evaluating ethical issues, such as earnings management. Consistent with this line of reasoning, prior research suggests that female auditors are more conservative than male auditors in business decision making contexts (Byrnes et al. 1999). Indeed, Basu (1997, p.7) define accounting conservativism as "the accountant's tendency to require a higher degree of verification to recognise good news as gains than to recognise bad news as losses". As suggested by Watts (2003), accounting conservativism has benefited the profession leading to an improvement in earnings quality to benefit the users of financial information. Given that the UK audit engagement partners are required to sign the auditor's report in their own name, auditors are personally accountable to the outcome of the audit of their client firms. Hence, auditors who are conservative are more likely to constrain earnings management in their client firms than those who are not conservative.

In contrast, auditors who are overconfident are more likely not to constrain earnings management because they may believe that they have the capacity to do so but might fail to effectively gauge the client firm's systems and procedures designed to achieve higher financial reporting quality (Owhoso and Weickgenannt 2009). This suggests that auditors who are overconfident are less likely to constrain earnings management activities in their client firms. Given that men are perceived to be more overconfident than women (Levin et al. 1988; Lundeberg et al. 1994; Bengtsson et al. 2005), we expect firms audited by female auditors to be associated with less earning manipulation than firms audited by male auditors.

Extant research also suggests that women are more risk averse than men (Jianakoplos and Bernasek 1998; Sunden and Surette 1998; Charness and Gneezy 2012). As suggested by Hardies et al. (2013), female auditors, in particular, are more risk averse than male auditors in audit judgement. However, Owhoso (2002) finds no significant differences among auditors with similar experience in fraud risk. To the extent that female auditors are more risk averse than male auditors (Hardies et al. 2013), we expect auditors who are more conservative and less overconfident to be more risk averse; hence, firms audited by female auditors are more likely to be associated with less earnings manipulation than firms audited by male auditors.

Gender differences in skills and efforts may also be linked to the glass ceiling phenomenon which suggests that women may have to show extra competence before they can be promoted to senior positions such as audit engagement partner level. As suggested by Green et al. (2009) and Kumar (2010), female financial analysts may need to have skills better than average before they can be promoted to senior positions due to gender discrimination or implicit bias. It has also been

argued that women tend to have high expectations in their area of responsibilities which may influence them to spend more time and effort in completing a task (Fondas and Sassalos 2000). From the foregoing perspectives, one might argue that female auditors at the audit engagement partner level might be more competent and hard-working than male auditors, and therefore, firms audited by female auditors are more likely to be associated with less earnings manipulation than firms audited by male auditors.

In general, previous literature suggests that "gender is a significant factor in the determination of ethical conduct and that females are more ethical than males in their perception of business ethical situations" (Ruegger and King 1992, p.149). It has also been reported that gender differences in ethics are more pronounced in an environment where gender equality persists (Chen et al. 2016). Building on from gender socialisation theory, Mason and Mudrack (1996) find that women in employment are more ethical in comparison with men and that no significant gender differences existed in individuals lacking full time employment. Focusing on the auditing profession, Bernardi and Arnold (1997) report that female auditors are more ethical than male auditors, however, their evidence is in sharp contrast with the evidence reported by other studies (see Roxas and Stoneback 2004). If female auditors are more conservative, less overconfident, more risk averse and highly competent and hardworking, then we expect them to be more ethical than male auditors, and therefore, firms audited by female auditors are more likely to be associated with less earnings manipulation than firms audited by male auditors.

2.3 Auditor gender, high quality auditors and earnings management

In an attempt to investigate the notion that women and men are behaviourally different in financial reporting quality, a number of empirical studies have sought to examine the association between auditor gender and accruals/audit quality, using a variety of accruals/audit quality proxies. In the first of such study, Breesch and Branson (2009) undertake a Belgian study in which they examine the effects of auditor gender on audit report and audit opinion. Their most important finding is that female auditors discover more potential misstatements as compared to male auditors, evidence supported by more recent studies (e.g., Hardies et al. 2015; Hardies et al. 2016; Karjalainen et al. 2018; Jones et al. 2019). In contrast, Hossain et al. (2018), in their Australian study find that female audit partners are less likely to issue a going-concern opinion for financially distressed clients. A third strand of literature suggests that auditor gender is not associated with earnings quality (Nasution and Jonnergård 2017).

In their Finnish study, Niskanen et al. (2011) find that a higher proportion of female auditors in private firms allow for discretion in accrual-based earnings management than male auditors. After grouping the sample into income increasing earnings management (overstatements) and

income decreasing earnings management (understatements), they find that the absolute value of abnormal accruals reported is driven by income decreasing accruals earnings management. In contrasting Niskanen et al. (2011) study, Ittonen et al. (2013) use a sample of Finish and Swedish public listed companies and find evidence to suggest that client firms audited by female auditors are associated with lower abnormal accruals and the results persist after grouping the sample into income increasing and income decreasing accruals earnings management. This evidence has recently been supported by Garcia-Blandon et al. (2019) in their Spanish study.

However, as recently noted by Bedard (2012), the results of single country studies cannot be generalised or assumed for another country due to the differences in the level of accountability of auditors. This is of particularly important because, for example, the results from prior single country studies might have been affected by the incidents of voluntary joint audit – a phenomenon that is rare in the UK in recent years. Specifically, Zerni et al. (2012) find that sufficient number of firms in Sweden voluntarily employs joint audit and those opted for joint audit have lower abnormal accruals, evidence supported by Ittonen and Trønnes (2014) who find similar results across Finish and Swedish firms. Even if the results from prior single country studies can be generalised in the UK, the literature has exclusively focused on accrual-based earnings management without considering real earnings management activities. Unlike accrual-based earnings management, real earnings management activities such as the significant cuts in firms' vital investment in research and development (R&D), selling, general and administrative activities, and increase in unnecessary investments in inventories leads to high long-term costs to firms' shareholders (Roychowdhury 2006). Therefore, it is worth investigating whether hiring female auditors would lead to unintended costs to firms' shareholders (i.e. high real earnings management).

Meanwhile, more recent research has evolved and focuses on the impact of high quality auditors (i.e. proxied by audit firm characteristics) on both accrual-based and real earnings management activities. In their study on accrual-based and real earnings management around Seasoned Equity Offering in the US, Cohen and Zarowin (2010) most important finding is that high quality auditors proxied by Big N audit firms and long tenure are associated with higher real activities manipulation. Chi et al. (2011) also undertake a US study in which they examine the association between high quality auditors and accrual-based and real earnings management activities around Initial Public Offerings (IPOs). They use audit firm characteristics, such as Big N audit firms, long tenure, industry expertise and audit fees to proxy high quality auditors and their most important finding suggests that higher quality auditors ability to constrain accrual earnings management leads to client firms resorting to potentially even more costly real activities manipulation. In a UK study, Alhadaba and Clacher (2018) examine the impact of high quality auditors on real and accrual-based earnings management around IPOs. They use Big N audit firms

to proxy audit quality and find that high quality auditors constrain the manipulation of discretionary accruals and the use of real activities manipulation that occurs through the management of discretionary expenses. However, they find evidence to suggest that firms audited by high quality auditors do undertake sales-based real earnings manipulation. These results suggest that hiring high quality auditors is partially costly due to the significant increase in real earnings management activities. A significant limitation of these studies is that they focused exclusively on audit firm characteristics to measure high quality auditors and disregard the individual audit engagement partners who preside over the audit process and provide certification to the audited financial statements.

The current paper investigates whether the presence of female or male auditors constrains real activities manipulation and how firms trade-off accrual-based and real earnings management in the presence of female or male auditors. We believe that our paper is different in many ways from the existing literature. First, unlike Cohen and Zarowin (2010), Chi et al. (2011) and Alhadaba and Clacher (2018) studies, we use audit partner characteristics such as audit partner gender to proxy high quality auditors. This is important because Section 503 of the Companies Act 2006 implemented by Auditing Practices Board (APB) in 2009 requires the audit engagement partner to sign the auditor's report in his/her name on behalf of the audit firm. Because the current UK regulation makes the audit partner personally accountable to the outcome of the audit of their client firms, research on high quality auditors and earnings management cannot be complete without considering the quality of individual audit partners who preside over the audit process and provide certification to the audited financial statements. Second, given that women in employment are more ethically aware in comparison with men (Mason and Mudrack 1996), we extend gender socialisation theory which posits that significant differences exist between women and men in evaluating ethical issues to how firms trade-off between accrual-based and real earnings management in the presence of female or male auditors. Third, because firms can engage in real activities manipulation when they are constrained from accrual-based earnings management by high quality auditors (Cohen and Zarowin 2010; Chi et al. 2011; Alhadaba and Clacher 2018), we believe that we take auditor gender studies (e.g., Ittonen et al. 2013; Garcia-Blandon et al. 2019) forward by investigating how firms trade-off between accrual-based and real earnings management in the presence of female or male auditors. Fourth, in addition to investigating the impact of auditor gender on the absolute values of abnormal accruals and real earnings management, we also ascertain the impact on the changes in both accrual-based and real earnings management from one year to the next. In this way, we develop the work of Cohen and Zarowin (2010), Chi et al. (2011) and Alhadaba and Clacher (2018) to address omitted variables and endogeneity problems. Thus, we

believe that we undertake a more wide-ranging analysis of the impact of high quality auditors on accrual-based and real earnings management than any other existing research.

In summary, there is a strong evidence of significant differences between female and male auditors and it is likely that female auditor's ability to constrain accrual-based earnings management might not lead to higher level real activities manipulation. While we acknowledge that real earnings management, as business decisions, is less likely to attract the attention of external auditors (Chi et al. 2011; Cohen and Zarowin 2010) and therefore some firms might exploit this and shift to more real earnings management activities, Alhadab and Clacher (2018) noted that it is still possible that auditors might question real earnings management. In essence, they build this proposition on the finding of Sohn (2011) and Kim and Park (2014). While Kim and Park (2014) show that the probability of auditor resignations is associated with real earnings management activities, Sohn (2011) find that 55% of high quality auditors (i.e. Big 4 auditors) who participated in their survey indicated their willingness to ask their client firms to correct real earnings management or at least stop it in the future. Building on from the gender socialisation theory which suggests that female auditors are more ethically aware and risk averse in comparison to male auditors (Mason and Mudrack 1996; Hardies et al. 2013), and the significant differences between female and male auditors in presiding over high quality financial information (Ittonen et al. 2013; Garcia-Blandon et al. 2019), we expect that female auditors would not only constrain firms from engaging in accrual-based earnings manipulation, but they are also more likely to constrain firms from engaging in real earnings management activities. Accordingly, our predictions are as follows:

H$_1$: Firms audited by female auditors exhibit lower level of accrual-based earnings management than firms audited by male auditors.

H$_2$: Firms audited by female auditors exhibit lower level of real earnings management than firms audited by male auditors.

3. Research design and sample selection

3.1. Research design

First, we follow extant research (see Srinidhi et al. 2011) and use Accruals Estimation Errors (AEE) as a proxy for accruals quality. Prior studies have employed different approaches to represent accruals quality. For instance, Jones (1991) defines it as the extent to which accruals are not opportunistically used by managers, while Dechow and Dichev (2002) define it as the extent to which current year accruals are associated with previous, current and subsequent year operating cash flows. McNichols (2002) combines these two methods and develops a more rigorous

estimation for accruals quality. We, therefore, follow McNichols (2002) and draw our measure for accruals quality based on AEE using the following expectation model:

$$ACC_{i,t}/AT_{i,t-1} = \beta_0 + \beta_1 OCF_{i,t-1}/AT_{i,t-2} + \beta_2 OCF_{i,t}/AT_{i,t-1} + \beta_3 OCF_{i,t+1}/AT_{i,t} + \beta_4 \Delta SALES_{i,t}/AT_{i,t-1} + \beta_5 PPE_{i,t}/AT_{i,t-1} + \varepsilon_{it} \qquad (1)$$

where, ACC is accruals measured as the difference between income before extraordinary items and cash flows from operating activities. *OCF* refers to cash flows from operations deflated by lagged total assets (AT) in years $_t$, $_{t-1}$, and $_{t+1}$. *ΔSALES* refers to the change in sales. *PPE* is the gross property, plant, and equipment. We run equation (1) annually for each two-digit SIC industry with at least 8 observations in order to get an estimation for all coefficients in equation (1) which are then used to estimate the AEE as the residuals from equation (1)[1]. Following Srinidhi et al. (2011), we focus on the absolute value of AEE where its high value indicates poor accruals quality and vice versa.

Second, we follow Roychowdhury (2006) to estimate real earnings management (REM). Whereas real activities manipulation such as overproduction of inventory reduces cost of goods sold and increases the reported earnings, cutting down discretionary expenses such as R&D, selling, general, and administrative (SG&A) expenses also increases the reported earnings. In particular, Roychowdhury (2006) and other subsequent studies (see Cohen and Zarowin 2010; Zang 2012) have provided evidence that these measures capture real activities manipulation. Therefore consistent with Roychowdhury (2006), we estimate the normal level of production costs using the following equation (2):

$$PROD_{i,t}/AT_{i,t-1} = \beta_0 + \beta_1 1/AT_{i,t-1} + \beta_2 SALES_{i,t}/AT_{i,t-1} + \beta_4 \Delta SALES_{i,t}/AT_{i,t-1} + \beta_5 \beta_4 \Delta SALES_{i,t-1}/AT_{i,t-1} + \varepsilon_{it} \qquad (2)$$

Where PROD is the sum of the cost of goods sold in year $_t$ and the change in inventory from year $_{t-1}$ to year $_t$; and SALES is the net sales in year $_t$. We run equation (2) annually for each two-digit SIC industry with at least 8 observations in order to get an estimation for all coefficients in equation (2) which are then used to estimate the abnormal production cost as the residuals from equation (2). The higher the value of the residual suggests greater amount of overproduction of inventory, leading to greater reported earnings.

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[1] To sustain sufficient number of observations, we follow previous literature (Rosner 2003; Athanasakou et al. 2011; Igbal et al. 2009; Alhadaba and Clacher 2018) and exclude firms with less than 8 observations from our expectation model. Specifically, and due to lack of sufficient observations, our approach is an improvement from both Athanasakou et al. (2011) and Alhadaba and Clacher (2018) who employed 6 observations each in the calculation of their earnings management variables in the UK.

Also, we estimate the normal level of discretionary expenses following Roychowdhury (2006) in equation (3) below:

$$DISX_{i,t}/AT_{i,t-1} = \beta_0 + \beta_1 1/AT_{i,t-1} + \beta_4 \Delta SALES_{i,t-1}/AT_{i,t-1} + \varepsilon_{it} \qquad (3)$$

where DISX is the sum of R&D and SG&A in year $_t$. We run equation (3) annually for each two-digit SIC industry with at least 8 observations in order to get an estimation for all coefficients in equation (3) which are then used to estimate the abnormal discretionary expenses as the residuals from equation (3). We multiply the residuals by -1 and the higher the values suggest the greater discretionary expenses cut to increase the reported earnings. REM is the sum of abnormal level of production costs and abnormal level of discretionary expenses[2].

3.2. Empirical Model

To test our main hypotheses of whether firms audited by female auditors' exhibit lower accrual-based and real earnings management, we employ equations (4) and (5) below:

$$ABS\_AEE_t = \beta_0 + \beta_1 FAUDITOR_t + \beta_2 SIZE_t + \beta_3 LEV_t + \beta_4 OCF_t + \beta_5 ROA_t + \beta_6 MBV_t + \beta_7 SALESG_t + \beta_8 REM_t + \beta_9 NOA_{t-1} + \beta_{10} CYCLE_{t-1} + \beta_{11} AUDTENURE_t + \beta_{12} BIG4_t + \beta_{13} BSIZE_t + \beta_{14} IND_t + \beta_{15} FEM_t + \beta_{16} FCEO_t + \beta_{17} FCFO_t + \beta_{18} YEAR\_FE_t + \beta_{19} IND\_FE_t + \varepsilon_t \qquad (4)$$

$$REM_t = \beta_0 + \beta_1 FAUDITOR_t + \beta_2 SIZE_t + \beta_3 LEV_t + \beta_4 OCF_t + \beta_5 ROA_t + \beta_6 MBV_t + \beta_7 SALESG_t + ABS\_AEE_t + \beta_9 NOA_{t-1} + \beta_{10} CYCLE_{t-1} + \beta_{11} AUDTENURE_t + \beta_{12} BIG4_t + \beta_{13} BSIZE_t + \beta_{14} IND_t + \beta_{15} FEM_t + \beta_{16} FCEO_t + \beta_{17} FCFO_t + \beta_{18} YEAR\_FE_t + \beta_{19} IND\_FE_t + \varepsilon_t \qquad (5)$$

Table 1 contains all the variable definitions we use in our analysis. In terms of our two dependent variables, ABS_AEE is the absolute value of AEE and REM is the aggregate value of real earnings management. In terms of our explanatory variable, FAUDITOR is a dummy variable that is set to one if the firm is audited by a female auditor and zero otherwise. In addition, we include in our regression models a comprehensive set of control variables that extant research (see Ittonen et al. 2013; Garcia-Blandon et al. 2019) shows that they influence earnings management activities. In particular, we control for firm size (SIZE), leverage (LEV), operating cash flows (OCF), return on assets (ROA), market-to-book value (MBV) and growth in sales (SALESG). Because auditors scrutiny/quality affect earnings management, we follow extant research (see DeFond and

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[2] It is important to highlight that we did not include abnormal level of cash flow from operations in determining our REM. This is because extant research (see Roychowdhury 2006; Zang 2012) suggests that while for example price discount and overproduction decrease cash flow from operations, cutting discretionary expenses increases it. Because these real activities affect cash flow from operations in different directions, the results is always ambiguous, hence, we excluded them from our main analysis.

Jiamabalvo 1993; Becker et al. 1998; Francis et al. 1999; Myers et al. 2003; Cohen and Zarowin 2010; Chi et al. 2011; Alhadaba and Clacher 2018) and control for Big 4 auditors (BIG4) and auditor tenure (AUDTENURE).

Zang (2012) documents that there is a trade-off between real activities manipulation and accruals earnings management. Hence, we control for REM in equation (4) and ABS_AEE in equation (5). Furthermore, we control for accounting flexibility within the accounting systems that firms are more or less likely to take advantage of, in the current accounting period. For example, and given the limited flexibility in accounting choices and accruals reversals, manager's ability to manipulate accruals upward in the current accounting period is constrained by accruals management from the previous accounting periods (Zang 2012). Consistent with Zang (2012), we control for previous accounting choices using the net operating assets at the beginning of the year (NOA_{t-1}) to represents accruals management in the previous accounting periods. This is because the overstated abnormal accruals in the past earnings are also reflected in net operating assets in the current accounting period. On the other hand, because firms with longer operating cycle are more likely to have greater flexibility for accrual management (Zang 2012), we control for accounting flexibility using operating cycle at the beginning of the year ($CYCLE_{t-1}$). This is because the larger accruals account is more likely to affect accruals reversal if the operating cycle is longer.

Extant research also suggests that earnings management is affected by corporate governance quality and, in particular, board of directors' attributes (see Krishnan and Parsons 2008; Barua et al. 2010; Peni and Vähämaa 2010; Arun et al. 2015). We, therefore, control for board size (BSIZE), independent directors (IND), independent female directors (FEM), CFO gender (FCFO) and CEO gender (FCEO).

Earnings management may differ across years and industries. Therefore, we also control for year (YEAR_FE) and industry (IND_FE) fixed effects. Significantly, our analysis includes multiple firms across different years, and therefore, the residuals from our regression models may be correlated across firms and years (Peterson 2009). In line with Petersen (2009), all our regression models are based on both firm and year levels clustered robust standard errors to address the residual dependence created by the firm and year specific effects.

Prior research (see Johnstone et al. 2011; Jiang and Son 2015; Huang et al. 2015) suggests that an analysis based on level regressions is vulnerable to correlated omitted variables and endogeneity problems leading to biased results. To overcome these problems, we follow Huang et al. (2015) and use changes regression model to control for omitted variables that are presumed to be constant overtime to mitigate potential endogeneity. The changes regression model also allows us to directly test the changes to female auditors to changes in accrual-based and real earnings management activities from one year to the next, and increases our ability to draw causality

relationship between the presence of female auditors and earnings management. Accordingly, we specify and estimate accrual-based and real earnings management changes regression models in equations 6 and 7 as follows:

$$D\_ABS\_AEE_t = \beta_0 + \beta_1 D\_FAUDITOR_t + \beta_2 D\_SIZE_t + \beta_3 D\_LEV_t + \beta_4 D\_OCF_t + \beta_5 D\_ROA_t + \beta_6 D\_MBV_t + \beta_7 D\_SALESG_t + \beta_8 D\_REM_t + \beta_9 D\_NOA_{t-1} + \beta_{10} D\_CYCLE_{t-1} + \beta_{11} D\_AUDTENURE_t + \beta_{12} D\_BIG4_t + \beta_{13} D\_BSIZE_t + \beta_{14} D\_IND_t + \beta_{15} D\_FEM_t + \beta_{16} D\_FCEO_t + \beta_{17} D\_FCFO_t + \beta_{18} YEAR\_FE_t + \beta_{19} IND\_FE_t + \varepsilon_t \qquad (6)$$

$$D\_REM_t = \beta_0 + \beta_1 D\_FAUDITOR_t + \beta_2 D\_SIZE_t + \beta_3 D\_LEV_t + \beta_4 D\_OCF_t + \beta_5 D\_ROA_t + \beta_6 D\_MBV_t + \beta_7 D\_SALESG_t + \beta_8 D\_ABS\_AEE_t + \beta_9 D\_NOA_{t-1} + \beta_{10} D\_CYCLE_{t-1} + \beta_{11} D\_AUDTENURE_t + \beta_{12} D\_BIG4_t + \beta_{13} D\_BSIZE_t + \beta_{14} D\_IND_t + \beta_{15} D\_FEM_t + \beta_{16} D\_FCEO_t + \beta_{17} D\_FCFO_t + \beta_{18} YEAR\_FE_t + \beta_{19} IND\_FE_t + \varepsilon_t \qquad (7)$$

All the variables that start with *"D"* indicate the difference in values of equations 4 and 5 variables between the current year and the previous year. Given that our variable of interest is FAUDITOR which is set to one if the firm is audited by a female auditor and zero otherwise, *D_FAUDITOR* in equations 6 and 7 represents one in the year $_t$ if the auditor in the year $_{t-1}$ and in the year $_t$ is a male and a female respectively, and zero otherwise.

[Insert Table 1 here]

3.3. Data sources and sample selection

Our sample consists of FTSE 350 index firms for the study period 2009-2016. The start of 2009 is important because in the UK, Section 503 of the Companies Act 2006 requires the auditor's report to be signed by the audit engagement partner in his or her own name, for, and on behalf of the audit firm for financial years beginning on or after 6 April 2008. Hence, 2009 is the first financial year end with the available audit partners' names. We obtained the names of the audit partners from two sources, FAME database and supplemented by the firms' annual reports if the name of an auditor is missing from the database. We then review the auditors' names from FAME database and firms' annual reports to determine the gender of each audit partner, an approach consistent with auditor gender studies (see Ittonen et al. 2013; Hardies et al. 2016; Garcia-Blandon et al. 2019).

Our initial search in FAME database yielded a sample of 2,808 total firm-year observations. Following prior studies (see Basioudis and Francis 2007; Basioudis et al. 2008), we delete 425 firm-year observations related to the financial sector from our sample because they have different regulations and financial reporting requirements. In order to ensure sufficient observations for the estimation of equations (1), (2) and (3) coefficients, we only include firms with, at least, 8

observations in each industry-year. Finally, we delete 590 firm-year observations due to missing audit and financial data. Table 2 summarises the sample distribution by year and industry, where the final sample with full data consists of 1,793 firm-year observations for the study period 2009-2016. We obtained our financial and corporate governance data from the Thomson Reuters Worldscope and BoardEx databases, respectively.

[Insert Table 2 here]

4. Results

4.1. Descriptive statistics:

Table 3 reports the descriptive statistics for the different variables used in the analysis. Whereas Panel A summarises the descriptive statistics for the full sample of 1,793 firm-year observations, Panel B separately summarises the descriptive statistics for firms audited by female auditors and the firms audited by male auditors.

[Insert Table 3 here]

As Panel A shows, 9% of our sample firms are audited by female auditors. The 9% female auditor representation is slightly lower than other recent auditor gender studies, for example, 12% and 10% in Ittonen et al. (2013) and Garcia-Blandon et al. (2019), respectively. However, our final sample of 1,793 firm-year observations is far bigger than Ittonen et al.'s (2013) 770 firm-year observations across Finnish and Swedish listed firms and Garcia-Blandon et al's. (2019) 721 Spanish listed firms. Nevertheless, the differences in female auditor representation suggest that the UK has a lower female auditor representation at the audit partner level than other European countries. Panel A of Table 3 also shows that the average absolute value of accruals estimation errors (ABS_AEE) for the whole sample is 5%, evidence slightly lower than Ittonen et al. (2013) absolute values of abnormal accruals of 7% based on modified Jones (1991) and 6% based on modified Dechow and Dichev (2002) model, respectively, across Finish and Swedish firms. On average, the aggregate real earnings management (REM) for the full sample stood at 7%. This is slightly lower than the 9% REM reported by Alhadaba and Clacher (2018) across UK IPOs firms.

Panel B of Table 3 presents the descriptive statistics of firms audited by female auditors and those firms audited by male auditors. The table also tests the differences in means (medians) for the null hypothesis that there is no difference between firms audited by female and male auditors. Interestingly, Panel B shows that the magnitudes of ABS_AEE is significantly lower at 5% (5%) for firms with female auditors, suggesting that female auditors are more likely to constrain accruals management than male auditors. In terms of REM, however, only the differences in the median are significantly lower at 1% between firms audited by female and male auditors. Apart from firm size

(SIZE), the proportion of debt financing (LEV), return on assets (ROA), market to book value (MBV), sales growth (SALESG) and the length of operating cycle (CYCLE$_{t-1}$), Panel B shows that the two groups are not significantly different in respect of OCF, NOA$_{t-1}$, AUDTENURE, BIG4, BSIZE, IND, FEM, FCEO and FCFO.

We report Pearson correlations matrix between ABS_AEE (REM), FAUDITOR and other control variables in Table 4. In terms of accrual-based earnings management (real earnings management), there is a negative and significant (negative but insignificant) association between ABS_AEE (REM) and FAUDITOR, suggesting that firms audited by female auditors exhibit lower accruals management but they do not resort to an extensive real activities manipulation. However, this result is still preliminary and inferences should only be made after the inclusion of other control variables in the regression model. In general, the correlation matrix does not show any potential serious multicollinearity problems. In addition, the variance inflation factor (VIF) in each of the regression models from Table 5 until Table 8 is less than 10 (Kennedy, 2008) and therefore our reported results are not impacted by any multicollinearity issues.

[Insert Table 4 here]

4.2. Auditor gender and accruals management

We report our analysis investigating the impact of auditor gender on both the level and change in accruals management in Table 5. In Model 1 of Panel A, we present the level regression results of the absolute value of accruals estimation errors (ABS_AEE), while Models 2 and 3 show the level regression results of income increasing (positive AEE) and income decreasing (negative AEE), respectively. In Model 1, we find that the presence of female auditors has a significant negative impact on the absolute value of accruals estimation errors suggesting, thereby, that female auditors are more likely to challenge firms' accruals-related financial reporting decisions and therefore firms audited by female auditor are associated with lower accrual-based earnings management relative to other firms audited by their male counterparts.

However, this analysis focuses on the absolute value of accruals estimation errors and does not differentiate between income increasing and income decreasing accruals management. We, therefore, differentiate between the two by dividing the sample using the sign of the AEE. Specifically, our results reported under Model 2 of Panel A shows a negative and significant association between FAUDITOR and positive AEE. Interestingly, our analysis reported under Model 3 shows a negative albeit insignificant association between FAUDITOR and the absolute value of negative AEE, suggesting therefore that the impact of female auditor is more prominent with upward earnings management.

In Panel B of Table 5, we repeat our analysis, but in this case, we regress our annual change in auditor gender on the annual change in accruals estimation errors. In Models 1, 2 and 3 of Panel B, the dependent variables are change in ABS_AEE, change in positive AEE and change in negative AEE. As shown in Model 1 of Panel B, FAUDITOR is negative and statistically significant at 1% level. In the positive and negative AEE Models (i.e. Models 2 and 3), FAUDITOR is negative and statistically significant at 1% and 5% levels, respectively. Significantly, our results with the change models are more pronounced and persist in both income increasing and income decreasing accruals management, suggesting that accruals management is lower in firms audited by female auditors. The coefficient estimates of other control variables in both the level and change regressions models are generally in line with extant research (see Ittonen et al. 2013; Zang 2012). In particular, SIZE, LEV, ROA and BSIZE are negative and statistically significant, suggesting that accruals management is generally lower in large, debt financing, profitable firms as well as firms with an average board size of eight members.

Overall, consistent with gender socialisation theory, gender differences in reacting to and evaluating ethical issues are found in auditing with female auditors constraining accrual-based earnings management in comparison with male auditors. Our results reported in Table 5 show that the presence of female auditors constrains accruals management, thus, implying that female auditors make every effort to constrain aggressive earnings management in their client firms in comparison with male auditors. In general, the negative relationship between the presence of female auditors and accrual-based earnings management is consistent with our theoretical prediction. That is, constrained discretionary accruals manipulation by female auditors is consistent with gender socialisation theory which suggests that female auditors are more ethically aware and risk averse in comparison with male auditors (Mason and Mudrack 1996; Hardies et al. 2013). This implies that, with reference to gender socialisation theory, female auditors are more likely to demonstrate stronger feelings and react ethically in dilemma situations (Mason and Mudrack 1996), such as earnings management. Our empirical findings also support H_1 and are consistent with prior auditor gender results of Ittonen et al. (2013) and Garcia-Blandon et al. (2019), who document that female auditors are associated with lower abnormal accruals.

[Insert Table 5 here]

4.3. Auditor gender and real earnings management

Table 6 presents the regression results investigating the impact of auditor gender on both the level and change in real earnings management. In Panel A of Table 6 we examine the impact of auditor gender on the abnormal level of production costs (APROD), abnormal level of discretionary

expenses (ADISX) and the aggregate REM. In Models 1 and 2 of Panel A, and in contrast to our expectation in H_2, we find that the presence of female auditor is not associated with the overall levels of real earnings management and the abnormal discretionary expenses. However, in Model 3 we find that the presence of female auditors has a negative and statistically significant impact on the abnormal level of production costs.

In Panel B of Table 6 we replicate our analysis, but in this case, we regress change in auditor gender on the annual change in real earnings management. In Models 1, 2 and 3 of Panel B, the dependent variables are the changes in REM, ADISX and APROD, respectively. As Panel B of Table 6 demonstrates, the presence of female auditor is not associated with the overall real earnings management and the associated components (i.e. ADISX and APROD). In contrast with Chi et al. (2011) and Alhadaba and Clacher (2018) findings, real earnings management in its aggregate form or individual components is not prominent in firms audited by female auditors when we use the change regression model.

Overall, our results suggest that the presence of female auditors is more likely to constrain accrual-based earnings management, but they are not associated with real earnings management activities. That is, our evidence based on the changes regression model suggests that the benefits of hiring female auditors (less accruals management) are overwhelmingly higher than the costs they might bring (i.e. high real earnings management).

Given that our main results on whether firms trade-off between accrual-based and real earnings management activities in the presence of female auditors are based on the changes regression models and the fact that the level regressions are vulnerable to omitted variable bias and endogeneity problems, our additional analyses in the next section are based on the changes regression model to ensure efficient and consistent results.

[Insert Table 6 here]

5. Additional analyses:

5.1. High vs. low auditor scrutiny and accruals management

Our results reported in subsection 4.2 suggest that the presence of female auditors constrains accruals management. Thus, we repeat our analysis using a sample of firms with high (Big 4) vs. low (non-Big 4) auditor scrutiny/quality and investigate whether female auditors in Big 4 firms constrain more or less accruals management than female auditors in non-Big 4 firms. Because Big N audit firms are more likely to be more experience, to have more reputation at risk and to invest more resources in auditing (see DeFond and Jiamabalvo 1993; Becker et al. 1998; Francis et al. 1999; Zang 2012), they are more likely to constrain accruals management than smaller firms.

Indeed, Alhadaba and Clacher (2018) report that Big N firms constrain the manipulation of discretionary accruals than smaller firms.

While we acknowledge that our result might be applicable to all female auditors, one might argue that the result in Big 4 firms might be more pronounced than in non-Big 4 firms for two reasons. First, because Big 4 firms are more likely to provide specialised and more sophisticated training to their staff, and get accreditation from some reputable agencies and peer reviews (Dopuch and Simunic 1980; Toeh and Wong 1993), female auditors in Big 4 firms might display different ethical standards than female auditors in non-Big 4 firms. Second, given that Big 4 firms have large number of clients and have more to lose when regulators discover accounting breaches that they have not reported (DeAngelo 1981; DeFond and Jiamabalvo 1993; Becker et al. 1998; Francis et al. 1999; Zang 2012), it is likely that female auditors in Big 4 firms risk aversion would be more prominent than that of their counterparts in non-Big 4 firms due to high reputational damage and financial loss associated with any unreported accounting breaches. On balance, because female auditors in Big 4 firms are more likely to display different ethical standards and are more risk averse than female auditors in non-Big 4 firms, we would expect our results of female auditors in Big 4 audit firms to be more pronounced than female auditors in non-Big 4 firms. In order to test this proposition, we divide the full sample into two subsamples; namely, firms audited by Big 4 firms and firms audited by non-Big 4 firms. We then estimate equation (6) for these subsamples separately. The results of this analysis are reported in Table 7, where Panel A represents firms audited by Big 4 audit firms and Panel B for firms audited by non-Big 4 firms.

Our results under Model 1 of Panel A show that firms audited by female auditors in Big 4 firms are associated with lower accruals management. Similarly, our results reported under Models 2 and 3 suggest that firms audited by female auditors in Big 4 audit firms have lower income increasing as well as income decreasing accruals management. However, Panel B reports our analysis for firms audited by female auditors in non-Big 4 audit firms and it appears that the significance level has decreased in this subsample, supporting, to some extent, our conjecture that the results would be more pronounced in firms presided over by female auditors in Big 4 audit firms. In general, our results demonstrate that female auditors in Big 4 audit firms are more likely to constrain accruals management than firms audited by female auditors in non-Big 4 firms, probably because female auditors in Big 4 firms display different ethical standards and are more risk averse than female auditors in non-Big 4 firms.

[Insert Table 7 here]

5.2. *High vs. low auditor scrutiny and real earnings* management

Our results in subsection 4.3 suggest that firms do not engage in extensive real activities manipulation when their ability to manipulate discretionary accruals is constrained. However, prior research suggests that Big 4 audit firms (i.e. high auditor scrutiny) are associated with higher real activities manipulation (see Cohen and Zarowin 2010; Chi et al. 2011). In contrast, Alhadaba and Clacher (2018) find that Big 4 audit firms (i.e. high auditor scrutiny) constrain the use of real activities manipulation that occurs through discretionary expenses. Given this competing evidence and because female auditors in Big 4 firms might be more ethical and risk averse than those in non-Big 4, we expect our results to be significantly different between the two groups. To test this proposition, we group the full sample into two subsamples; namely, firms audited by Big 4 firms and firms audited by non-Big 4 firms. We then estimate equation (7) for these subsamples separately. The results of this analysis are reported in Table 8, where Panel A represents firms audited by Big 4 audit firms and Panel B for firms audited by non-Big 4 firms.

Our results in Models 1 and 2 of Panel A confirm our earlier results that firms audited by female auditors in Big 4 audit firms are not associated with extensive real activities manipulation. However, in Model 3 we find weak evidence to suggest that firms audited by female auditors in Big 4 audit firms are associated with a lower abnormal level of production costs. In respect of firms audited by female auditors in non-Big 4 audit firms, Models 1, 2 and 3 of Panel B show no association between female auditors and all forms of real activities manipulation.

[Insert Table 8 here]

5.3. *Sensitivity tests*:

We perform a number of sensitivity tests to confirm the robustness of our results. First, we exclude those firm years during the recession period (2009-2012) from our primary models and we find substantively similar results (untabulated) to those reported earlier. Second, we use an alternative measure of the aggregate real earnings management (REM). In particular, we measured REM as the sum of abnormal discretionary expenses and abnormal cash flow from operations instead of the sum of abnormal discretionary expenses and abnormal production costs. Third, given that previous studies (see Roychowdhury 2006; Cohen et al. 2008; Chi et al. 2011; Cai et al. 2018; Choi et al. 2018; Kung et al. 2018) have used all the three proxies instead of the two to measure the aggregate REM, we measured REM as the sum of abnormal discretionary expenses, abnormal cash flow and the abnormal production costs to check the robustness of our results. Fourth, we use the performance-adjusted Jones model to estimate alternative accrual-based earnings management proxy. Finally, we use alternative control variables such as revenues instead of total assets to

measure firm size and total liabilities instead of long-term debt to measure debt financing. In all cases, our results (untabulated) are generally qualitatively similar to those reported earlier.

6. Conclusion, implications and limitations

In this paper, we investigate whether there is a trade-off between accrual-based and real earnings management activities in the presence of female or male auditors. Although prior research has investigated accrual-based earnings management in the presence of female or male auditors (see Ittonen et al. 2013; Garcia-Blandon et al. 2019), our paper adds to the literature by investigating whether firms trade-off between accrual-based and real earnings management in the presence of female or male auditors. Significantly, we contribute to the literature by showing that firms audited by female auditors do not resort to a higher level of real activities manipulation when their ability to engage in accruals management is constrained.

While prior research suggests that real earrings management represents a potential inadvertent consequence of appointing high quality auditors (see Cohen and Zarowin 2010; Chi et al. 2011), our results show that the presence of female auditors is not associated with real earnings management activities when accrual-based earnings management is constrained. Overall, our results suggest that the benefits of hiring female auditors (i.e. less accruals earnings management) are overwhelmingly higher than the costs they might bring to the client firms (i.e. high real activities manipulation).

Our results have important implications for audit firms, listed companies, investors, other users of financial information and regulators. For the audit firms, the total membership of the accountancy bodies has continued to grow steadily in recent years[3]. However, we find only 9% of our sample firms to have female audit engagement partners, suggesting that audit firms need to do more in their recruitment, training and promotion decisions to ensure more female representation at the audit partner level. For the listed companies, the results suggest that auditor's gender is more likely to affect the audit process and the financial reporting quality because of the inherent behaviour differences between men and women, hence, management should be aware of the gender effect when appointing a new auditor. For the investors and other users of financial information, particular attention should be given to the gender of the auditor that they engage because gender differences could affect the financial reporting quality. From a regulatory perspective, these findings can be used as a basis for, perhaps, stipulating a minimum threshold of female auditors for audit practices in a bid to enhance audit quality and address gender imbalance in the profession.

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[3] As at the end of 2016, there were 350,912 members across the U.K. and Republic of Ireland accountancy bodies relative to 294,996 in 2009, a difference representing 19% increase (Financial Reporting Council 2017).

Finally, there are two important limitations to our paper. First, we focus on only UK FTSE 350 index firms and this may affect the generalisability of our conclusions to all firms; hence, our results should be interpreted with caution. Although we use a larger sample size relative to Ittonen et al.'s (2013) 770 firm-year observations and Garcia-Blandon et al.'s (2019) 721 firm-year observations, our sample included only FTSE 350 index firms, where such firms tend to be larger firms. It would be interesting to see if our results hold for smaller companies in the UK. Second, we only use accrual-based and real earnings management in our analysis relative to the consequential effect of auditors' gender on classification shifting. Future research could examine whether auditor's gender behavioural differences are more likely to mitigate more or less classification shifting across the UK firms.

References:

Abdelfattah, T., Elmahgoub, M., & Elamer, A. A. (2020). Female audit partners and extended audit reporting: UK evidence. *Journal of Business Ethics*, Forthcoming, 1-21. https://doi.org/10.1007/s10551-020-04607-0.

Alhadab, M., & Clacher, I. (2018). The impact of audit quality on real and accrual earnings management around IPOs. *The British Accounting Review*, *50*(4), 442-461.

Arun, T. G., Almahrog, Y. E., & Aribi, Z. A. (2015). Female directors and earnings management: Evidence from UK companies. *International Review of Financial Analysis*, *39*, 137-146.

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

Barua, A., Davidson, L. F., Rama, D. V., & Thiruvadi, S. (2010). CFO gender and accruals quality. *Accounting Horizons*, *24*(1), 25-39.

Basioudis, I. G., Papakonstantinou, E., & Geiger, M. A. (2008). Audit fees, non-audit fees and auditor going-concern reporting decisions in the United Kingdom. *Abacus*, *44*(3), 284-309.

Basioudis, I. G., & Francis, J. R. (2007). Big 4 audit fee premiums for national and office-level industry leadership in the United Kingdom. *Auditing: A Journal of Practice & Theory*, *26*(2), 143-166.

Basu, S. (1997). The conservatism principle and the asymmetric timeliness of earnings. *Journal of Accounting & Economics*, *24*(1), 3-37.

Becker, C. L., DeFond, M. L., Jiambalvo, J., & Subramanyam, K. R. (1998). The effect of audit quality on earnings management. *Contemporary Accounting Research*, *15*(1), 1-24.

Bernardi, R. A., & Arnold Sr, D. F. (1997). An examination of moral development within public accounting by gender, staff level, and firm. *Contemporary Accounting Research*, *14*(4), 653-668.

Bengtsson, C., Persson, M., & Willenhag, P. (2005). Gender and overconfidence. *Economics Letters*, *86*(2), 199-203.

Betz, M., O'Connell, L., & Shepard, J. M. (1989). Gender differences in proclivity for unethical behavior. *Journal of Business Ethics*, *8*(5), 321-324.

Breesch, D., & Branson, J. (2009). The effects of auditor gender on audit quality. *IUP Journal of Accounting Research & Audit Practices*, *8*, 78-107.

Byrnes, J. P., Miller, D. C., & Schafer, W. D. (1999). Gender differences in risk taking: a meta-analysis. *Psychological Bulletin*, *125*(3), 367-383.

Charness, G., & Gneezy, U. (2012). Strong evidence for gender differences in risk taking. *Journal of Economic Behavior & Organization*, *83*(1), 50-58.

Chen, C. W., Velasquez Tuliao, K., Cullen, J. B., & Chang, Y. Y. (2016). Does gender influence managers' ethics? A cross-cultural analysis. *Business Ethics: A European Review*, *25*(4), 345-362.

Chi, W., Lisic, L. L., & Pevzner, M. (2011). Is enhanced audit quality associated with greater real earnings management?. *Accounting Horizons*, *25*(2), 315-335.

Clikeman, P. M., Geiger, M. A., & O'Connell, B. T. (2001). Student perceptions of earnings management: The effects of national origin and gender. *Teaching Business Ethics*, *5*(4), 389-410.

Cohen, D. A., & Zarowin, P. (2010). Accrual-based and real earnings management activities around seasoned equity offerings. *Journal of Accounting & Economics*, *50*(1), 2-19.

Croson, R., & Gneezy, U. (2009). Gender differences in preferences. *Journal of Economic Literature*, *47*(2), 448-74.

Dechow, P. M., & Dichev, I. D. (2002). The quality of accruals and earnings: The role of accrual estimation errors. *The Accounting Review*, *77*(s-1), 35-59.

Defond, M. L., & Jiambalvo, J. (1993). Factors related to auditor-client disagreements over income-increasing accounting methods. *Contemporary Accounting Research*, *9*(2), 415-431.

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

Dopuch, N., & Simunic, D. (1980). The nature of competition in the auditing profession: a descriptive and normative view. *Regulation and the Accounting Profession*, *34*(2), 283-289.

Dwyer, P. D., Gilkeson, J. H., & List, J. A. (2002). Gender differences in revealed risk taking: evidence from mutual fund investors. *Economics Letters*, *76*(2), 151-158.

Eckel, C. C., & Grossman, P. J. (2002). Sex differences and statistical stereotyping in attitudes toward financial risk. *Evolution and Human Behavior*, *23*(4), 281-295.

Feingold, A. (1994). Gender differences in personality: a meta-analysis. *Psychological Bulletin*, *116*(3), 429-456.

Fellner, G., & Maciejovsky, B. (2007). Risk attitude and market behavior: Evidence from experimental asset markets. *Journal of Economic Psychology*, *28*(3), 338-350.

Fondas, N., & Sassalos, S. (2000). A different voice in the boardroom: How the presence of women directors affects board influence over management. *Global Focus*, *12*(2), 13-22.

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.

Garcia-Blandon, J., Argilés-Bosch, J. M., & Ravenda, D. (2019). Is there a gender effect on the quality of audit services? *Journal of Business Research*, *96*, 238-249.

Gomez-Mejia, L. R. (1983). Sex differences during occupational socialization. *Academy of Management Journal*, *26*(3), 492-499.

Green, C., Jegadeesh, N., & Tang, Y. (2009). Gender and job performance: Evidence from Wall Street. *Financial Analysts Journal*, *65*(6), 65-78.

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

Hardies, K., Breesch, D., & Branson, J. (2016). Do (fe) male auditors impair audit quality? Evidence from going-concern opinions. *European Accounting Review*, *25*(1), 7-34.

Hardies, K., Breesch, D., & Branson, J. (2015). The female audit fee premium. *Auditing: A Journal of Practice & Theory*, *34*(4), 171-195.

Hardies, K., Breesch, D., & Branson, J. (2013). Gender differences in overconfidence and risk taking: Do self-selection and socialization matter? *Economics Letters*, *118*(3), 442-444.

Harris, J. R. (1990). Ethical values of individuals at different levels in the organizational hierarchy of a single firm. *Journal of Business Ethics*, *9*(9), 741-750.

Hossain, S., Chapple, L., & Monroe, G. S. (2018). Does auditor gender affect issuing going-concern decisions for financially distressed clients? *Accounting & Finance*, *58*(4), 1027-1061.

Huang, H. W., Raghunandan, K., Huang, T. C., & Chiou, J. R. (2014). Fee discounting and audit quality following audit firm and audit partner changes: Chinese evidence. *The Accounting Review*, *90*(4), 1517-1546.

Iqbal, A., Espenlaub, S., & Strong, N. (2009). Earnings management around UK open offers. *The European Journal of Finance*, *15*(1), 29-51.

Ingraham, C. (1994). The heterosexual imaginary: Feminist sociology and theories of gender. *Sociological Theory*, *12*, 203-203.

Ittonen, K., & Trønnes, P. C. (2014). Benefits and costs of appointing joint audit engagement partners. *Auditing: A Journal of Practice & Theory*, *34*(3), 23-46.

Ittonen, K., Vähämaa, E., & Vähämaa, S. (2013). Female auditors and accruals quality. *Accounting Horizons*, *27*(2), 205-228.

Jiang, W., & Son, M. (2015). Do audit fees reflect risk premiums for control risk? *Journal of Accounting, Auditing & Finance*, *30*(3), 318-340.

Jianakoplos, N. A., & Bernasek, A. (1998). Are women more risk averse? *Economic Inquiry*, *36*(4), 620-630.

Johnstone, K., Li, C., & Rupley, K. H. (2011). Changes in corporate governance associated with the revelation of internal control material weaknesses and their subsequent remediation. *Contemporary Accounting Research*, *28*(1), 331-383.

Jones, J., MacTavish, C., & Schultz, W. (2019). The effect of gender and firm identification on auditor pre-negotiation judgments. *Advances in Accounting*, *44*, 49-57.

Jones, J. J. (1991). Earnings management during import relief investigations. *Journal of Accounting Research*, *29,* 193-228.

Karjalainen, J., Niskanen, M., & Niskanen, J. (2018). The effect of audit partner gender on modified audit opinions. *International Journal of Auditing*, *22*(3), 449-463.

Khazanchi, D. (1995). Unethical behavior in information systems: The gender factor. *Journal of Business Ethics*, *14*(9), 741-749.

Kim, Y., & Park, M. S. (2014). Real activities manipulation and auditors' client-retention decisions. *The Accounting Review*, *89*(1), 367-401.

Krishnan, G. V., & Parsons, L. M. (2008). Getting to the bottom line: An exploration of gender and earnings quality. *Journal of Business Ethics*, *78*(1-2), 65-76.

Kumar, A. (2010). Self-selection and the forecasting abilities of female equity analysts. *Journal of Accounting Research*, *48*(2), 393-435.

Lacy, W. B., Bokemeier, J. L., & Shepard, J. M. (1983). Job attribute preferences and work commitment of men and women in the United States. *Personnel Psychology*, *36*(2), 315-329.

Levin, I. P., Snyder, M. A., & Chapman, D. P. (1988). The interaction of experiential and situational factors and gender in a simulated risky decision-making task. *The Journal of Psychology*, *122*(2), 173-181.

Lundeberg, M. A., Fox, P. W., & Punćcohaŕ, J. (1994). Highly confident but wrong: Gender differences and similarities in confidence judgments. *Journal of Educational Psychology*, *86*(1), 114-121.

Mason, E. S., & Mudrack, P. E. (1996). Gender and ethical orientation: A test of gender and occupational socialization theories. *Journal of Business Ethics*, *15*(6), 599-604.

McNichols, M. F. (2002). Discussion of the quality of accruals and earnings: multiples. *Journal of Accounting Research*, *40*(1), 135-72.

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

Nasution, D., & Jonnergård, K. (2017). Do auditor and CFO gender matter to earnings quality? Evidence from Sweden. *Gender in Management: An International Journal*, *32*(5), 330-351.

Nettle, D. (2007). Empathizing and systemizing: What are they, and what do they contribute to our understanding of psychological sex differences? *British Journal of Psychology*, *98*(2), 237-255.

Niskanen, J., Karjalainen, J., Niskanen, M., & Karjalainen, J. (2011). Auditor gender and corporate earnings management behaviour in private Finnish firms. *Managerial Auditing Journal*, *26*(9), 778-793.

Owhoso, V., & Weickgenannt, A. (2009). Auditors' self-perceived abilities in conducting domain audits. *Critical Perspectives on Accounting*, *20*(1), 3-21.

Owhoso, V. (2002). Mitigating gender-specific superior ethical sensitivity when assessing likelihood of fraud risk. *Journal of Managerial Issues*, *14*(3), 360-374.

Peni, E., & Vähämaa, S. (2010). Female executives and earnings management. *Managerial Finance*, *36*(7), 629-645.

Petersen, M. A. (2009). Estimating standard errors in finance panel data sets: Comparing approaches. *The Review of Financial Studies*, *22*(1), 435-480.

Posner, B. Z., & Munson, J. M. (1981). Gender differences in managerial values. *Psychological Reports*, *49*(3), 867-881.

Powell, M., & Ansic, D. (1997). Gender differences in risk behaviour in financial decision-making: An experimental analysis. *Journal of Economic Psychology*, *18*(6), 605-628.

Rosner, R. L. (2003). Earnings manipulation in failing firms. *Contemporary Accounting Research*, *20*(2), 361-408.

Roxas, M. L., & Stoneback, J. Y. (2004). The importance of gender across cultures in ethical decision-making. *Journal of Business Ethics*, *50*(2), 149-165.

Roychowdhury, S. (2006). Earnings management through real activities manipulation. *Journal of Accounting and Economics*, *42*(3), 335-370.

Ruegger, D., & King, E. W. (1992). A study of the effect of age and gender upon student business ethics. *Journal of Business Ethics*, *11*(3), 179-186.

Schmitt, D. P., Realo, A., Voracek, M., & Allik, J. (2008). Why can't a man be more like a woman? Sex differences in Big Five personality traits across 55 cultures. *Journal of Personality and Social Psychology*, *94*(1), 168-182.

Smith, A., & Rogers, V. (2000). Ethics-related responses to specific situation vignettes: Evidence of gender-based differences and occupational socialization. *Journal of Business Ethics*, *28*(1), 73-85.

Sohn, B. C. (2011). Do auditors care about real earnings management in their audit fee decisions? Available online at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1899189 [Access on 10 July 2020]

Srinidhi, B., Gul, F. A., & Tsui, J. (2011). Female directors and earnings quality. *Contemporary Accounting Research*, *28*(5), 1610-1644.

Sunden, A. E., & Surette, B. J. (1998). Gender differences in the allocation of assets in retirement savings plans. *The American Economic Review*, *88*(2), 207-211.

Toeh, S. H., Wong, T. J., & Rao, G. R. (1993). *Earning Management and the Long-Term Market Performance of Initial Public Offerings*. Working paper.

Watts, R. L. (2003). Conservatism in accounting part I: Explanations and implications. *Accounting Horizons*, *17*(3), 207-221.

Zang, A. Y. (2012). Evidence on the trade-off between real activities manipulation and accrual-based earnings management. *The Accounting Review*, *87*(2), 675-703.

Zerni, M., Haapamäki, E., Järvinen, T., & Niemi, L. (2012). Do joint audits improve audit quality? Evidence from voluntary joint audits. *European Accounting Review*, *21*(4), 731-765.

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Table 1

Variable Definitions

Variable		Definition
ABS_AEE	=	the absolute value of accrual estimation errors
REM	=	real earnings management measured as the sum of abnormal discretionary expenses and abnormal production cost
FAUDITOR	=	a dummy variable that is set to one if the firm is audited by female auditor, and zero otherwise
SIZE	=	firm size measured as the natural logarithm of total assets
LEV	=	leverage measured as the proportion of long-term debt to total equity
OCF	=	cash flows from operations scaled by lagged total assets
ROA	=	return on Assets measured as net income divided by lagged total assets
MBV	=	market-to-book value ratio measured as market capitalization divided by book value of common equity
SALESG	=	sales growth measured as change in sales from year $_{t-1}$ to year $_{t}$
NOA_{t-1}	=	captures accrual-based earnings management in prior years and measured as a dummy variable set to one if the net operating assets (i.e., shareholders' equity less cash and marketable securities plus total debt) at the beginning of the year divided by lagged sales are above the median of the corresponding industry-year, and 0 otherwise
$CYCLE_{t-1}$		the sum of account receivable days and inventory days less payable days at the beginning of the year
AUDTENURE		a dummy variable that is set to one if the number of years the auditor has audited is above the sample median of ten years, and zero otherwise
BIG4	=	a dummy variable that is set to one if the firm is audited by a big 4 auditor, and zero otherwise
BSIZE	=	board size measured as total number of directors on the board
IND	=	independent is measured as the proportion of independent directors to the total number of directors
FEM	=	independent female is measured as the proportion of independent female directors to the total number of directors
FCEO	=	a dummy variable set to one if the CEO is female, and zero otherwise
FCFO	=	a dummy variable set to one if the CFO is female, and zero otherwise
YEAR_FE	=	year fixed effects indicator variables
IND_FE	=	industry fixed effects indicator variables

Table 2

Sample Distribution by Year and Industry

	2009	2010	2011	2012	2013	2014	2015	2016	Total
Chemicals	2	4	5	6	6	6	6	6	**41**
Construction	20	18	22	23	24	25	24	25	**181**
Manufacturing	58	60	60	61	62	62	62	62	**487**
Farming	2	2	2	2	2	2	2	2	**16**
Mining	8	8	8	8	8	8	8	8	**64**
Pharmaceutical	3	3	3	3	3	3	3	3	**24**
Printing & Publishing	9	9	9	9	9	9	9	9	**72**
Retail	20	19	21	21	20	21	20	20	**162**
Services	56	50	52	58	60	61	62	62	**461**
Transportation	10	11	11	11	11	11	11	11	**87**
Utilities	15	16	16	16	16	16	16	16	**127**
Wholesale	9	8	9	9	9	9	9	9	**71**
Total	**212**	**208**	**218**	**227**	**230**	**233**	**232**	**233**	**1793**

Table 3

Panel A: Descriptive Statistics for the Full Sample (n = 1,793)

Variable	Mean	Median	Std. Dev.	Q1	Q3
ABS_AEE	0.045	0.030	0.059	0.013	0.057
REM	0.068	0.061	0.082	-0.178	0.202
FAUDITOR	0.092	0.000	0.274	0.000	0.000
SIZE	13.398	13.212	1.598	12.416	14.402
LEV	0.414	0.295	6.609	0.000	0.670
OCF	0.104	0.087	0.135	0.032	0.149
ROA	0.064	0.057	0.137	0.018	0.103
MBV	3.196	2.050	18.083	1.017	3.784
SALESG	0.078	0.046	0.355	-0.028	0.137
NOA$_{t-1}$	0.905	1.000	0.293	1.000	1.000
CYCLE$_{t-1}$	97.933	49.329	89.467	5.053	91.265
AUDTENURE	0.413	0.000	0.493	0.000	1.000
BIG4	0.899	1.000	0.301	1.000	1.000
BSIZE	8.034	8.000	2.091	6.000	9.000
IND	0.507	0.500	0.194	0.429	0.625
FEM	0.284	0.144	0.192	0.067	0.433
FCEO	0.152	0.000	0.361	0.000	0.000
FCFO	0.318	0.000	0.626	0.000	0.000
This table presents descriptive statistics for the variables in the regression models.					
All variables are defined in Table 1.					

Panel B: Tests for Differences

Variable	Firms audited by female auditors			Firms audited by male auditors			Tests for differences between means	Tests for differences between median
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	t-statistics	z-statistics
ABS_AEE	0.036	0.025	0.039	0.048	0.039	0.063	2.03**	2.46**
REM	0.037	0.040	1.524	0.049	0.080	0.555	0.21	3.35***
SIZE	13.348	13.163	0.958	13.769	13.499	1.624	2.81***	3.28***
LEV	0.264	0.135	1.463	0.363	0.294	7.537	3.11***	3.89***
OCF	0.104	0.105	0.084	0.108	0.100	0.098	0.31	0.90
ROA	0.043	0.039	0.097	0.060	0.057	0.107	1.25	1.97**
MBV	2.626	1.623	4.553	2.984	2.316	16.391	0.12	2.50**
SALESG	0.028	0.016	0.206	0.085	0.051	0.376	1.23	2.64***
NOA_{t-1}	0.536	1.000	0.502	0.675	0.000	0.506	-0.97	-0.97
$CYCLE_{t-1}$	48.223	65.042	89.968	102.070	49.137	75.996	3.68***	-1.47
AUDTENURE	0.464	0.000	0.502	0.409	0.000	0.492	-0.89	-0.89
BIG4	0.899	1.000	0.304	0.905	1.000	0.294	0.17	0.17
BSIZE	7.828	8.000	1.656	7.962	8.000	1.983	0.50	0.38
IND	0.495	0.571	0.245	0.522	0.556	0.194	1.11	-0.003
FEM	0.223	0.100	0.162	0.213	0.144	0.208	-0.14	-0.32
FCEO	0.159	0.000	0.369	0.162	0.000	0.368	0.05	0.05
FCFO	0.348	0.000	0.590	0.328	0.000	0.647	-0.25	-0.67
N	165			1,628				

This table presents the tests for differences between means and medians of firms audited by female auditors and firms audited by male auditors.
*, **, *** denote significant at 0.10, 0.05 and 0.01 levels, respectively.
All variables are defined in Table 1.

Table 4
Correlation Coefficients for the Dependent, Independent and Control Variables

	ABS_AEE	FAUDITOR	SIZE	LEV	OCF	ROA	MBV	SALESG	REM	NOA_{t-1}	$CYCLE_{t-1}$	AUD-TENURE	BIG4	BSIZE	IND	FEM	FCEO	FCFO
ABS_AEE	1																	
FAUDITOR	-0.040***	1																
SIZE	-0.126***	-0.012***	1															
LEV	-0.038**	-0.004	0.035	1														
OCF	0.127***	-0.010	0.017	0.003	1													
ROA	-0.037	-0.042	0.039	-0.010	0.583***	1												
MBV	0.038	-0.004	-0.037	0.675***	0.099***	0.088***	1											
SALESG	0.035	-0.041	-0.038	-0.001	0.041	0.040	0.009	1										
REM	0.033**	-0.007	-0.041	-0.001	0.152***	0.072**	0.029	0.022	1									
NOA_{t-1}	0.064*	0.032	0.171***	-0.019	-0.042	-0.137***	-0.106***	0.096***	0.062	1								
$CYCLE_{t-1}$	0.090***	-0.025	-0.034	-0.011	-0.133***	-0.025	-0.021	0.040	-0.008	0.137***	1							
AUDTENURE	0.035**	0.047	0.132***	0.057	-0.125***	-0.074**	0.077**	0.000	-0.057	-0.051	-0.076**	1						
BIG4	-0.006	-0.006	0.322***	0.001	0.099***	0.018	-0.013	-0.017	-0.023	-0.096***	-0.245***	0.110***	1					
BSIZE	-0.096***	-0.017	0.680***	0.019	0.059	0.013	0.020	0.034	-0.013	0.123***	-0.134***	0.078**	0.267***	1				
IND	0.006	-0.037	0.282***	0.020	0.050	0.002	0.034	-0.012	-0.010**	-0.064*	-0.066**	0.030	0.434***	0.270***	1			
FEM	0.031	0.005	-0.130***	-0.041	0.019	-0.025	-0.017	-0.041	0.004	-0.071**	0.149***	0.041	0.016	-0.265***	0.163***	1		
FCEO	-0.012	-0.002	0.109***	-0.028	-0.098***	-0.102***	-0.078**	-0.039	-0.019	-0.052	0.151***	0.058*	0.009	0.075**	0.174***	0.174***	1	
FCFO	-0.003	0.008	-0.014	0.001	-0.005	-0.046	-0.002	-0.050	0.003	0.028	0.164***	0.036	-0.004	-0.004	0.134***	0.358***	0.246***	1

This table presents Pearson Correlation matrix for the dependent, independent and control variables.
*, **, *** denote significant at 0.10, 0.05 and 0.01 levels, respectively.
All variables are defined in Table 1.

Table 5

Panel A: Accruals Estimation Errors Regression Results (Levels Model)

Variables	Model 1 Dependent Variable = ABS_AEE		Model 2 Dependent Variable = Positive AEE		Model 3 Dependent Variable = ABS_Negative AEE	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Intercept	0.112	4.79***	0.029	2.01**	0.003	0.73
FAUDITOR	-0.015	-2.74***	-0.012	-2.36**	-0.008	-1.34
SIZE	-0.004	-2.12**	-0.001	-2.10**	0.000	0.26
LEV	-0.012	-3.82***	-0.002	-4.36***	-0.003	-1.44
OCF	0.089	2.61***	-0.382	-4.30***	0.443	9.37***
ROA	-0.020	-2.10**	0.247	4.10***	-0.365	-11.76***
MBV	0.001	0.56	-0.001	-0.92	0.001	1.66*
SALESG	0.003	0.30	0.005	0.98	0.029	1.67*
REM	0.002	2.15**	0.001	2.56**	0.000	0.26
NOA$_{t-1}$	0.010	1.68*	0.015	2.92***	0.001	0.33
CYCLE$_{t-1}$	0.082	2.18***	0.042	1.93*	-0.011	-0.19
AUDTENURE	0.001	1.12	-0.002	-0.32	-0.007	-1.80*
BIG4	-0.006	-0.44	0.021	1.50	0.012	1.28
BSIZE	-0.014	-2.53***	0.004	-2.11**	0.001	-0.93
IND	0.013	0.75	0.001	0.24	-0.002	-0.11
FEM	0.001	0.29	-0.005	-1.37	0.003	0.79
FCEO	-0.002	-0.31	0.005	0.88	-0.003	-0.68
FCFO	-0.004	-1.06	0.003	0.72	-0.002	-0.99
YEAR_FE	YES		YES		YES	
IND_FE	YES		YES		YES	
Adjusted R^2	0.093		0.554		0.659	
F-statistics	8.63***		13.77***		20.66***	
Highest VIF Value	4.97		3.18		4.21	
N	1,793		906		887	

This table presents the level regression results of the accrual estimation errors analyses. The dependent variables are absolute value of accruals estimation errors (ABS_AEE) in model 1, positive accruals estimation errors (AEE) in model 2, and absolute value of negative accruals estimation errors (AEE) in model 3. AEE is measured as residuals from a model suggested by McNichols (2002).

*, **, *** denote significant at the 0.10, 0.05 and 0.01 levels, respectively.

The OLS regression models are estimated with dual clustered robust standard errors (both firm and year).

All variables are defined in Table 1.

Table 5 (Continued)

Panel B: Accruals Estimation Errors Regression Results (Changes Model)

Variables	Model 1 Dependent Variable = D_ABS_AEE		Model 2 Dependent Variable = Positive D_AEE		Model 3 Dependent Variable = Negative D_AEE	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Intercept	0.016	0.72	0.019	1.51	0.004	0.63
D_FAUDITOR	-0.018	-3.22***	-0.009	-2.83***	-0.005	-2.36**
D_SIZE	-0.033	-2.25**	-0.076	-3.03***	-0.025	-1.84*
D_LEV	-0.001	-2.37**	-0.001	-1.27	0.001	0.79
D_OCF	-0.010	-1.13	-0.114	-1.73*	-0.060	-0.39
D_ROA	0.074	0.38	0.359	2.01**	-0.121	-0.43
D_MBV	0.001	1.01	0.001	2.63***	-0.001	-0.85
D_SALESG	-0.002	-0.24	-0.006	-0.82	0.050	2.43**
D_REM	0.001	2.12**	0.001	2.49**	-0.001	-0.34
D_NOA$_{t-1}$	0.015	2.09**	0.004	0.27	0.010	0.50
D_CYCLE$_{t-1}$	-0.051	-0.30	0.012	0.42	-0.001	-2.41**
D_AUDTENURE	-0.011	-1.34	-0.016	-2.22**	0.012	0.90
D_BIG4	-0.010	-1.27	-0.017	-1.17	0.191	1.77*
D_BSIZE	-0.008	-3.28***	-0.008	-2.31**	0.006	0.99
D_IND	0.055	1.58	0.032	0.72	0.048	0.34
D_FEM	-0.008	-0.60	-0.009	-0.72	-0.017	-0.70
D_FCEO	0.010	0.39	0.063	2.43**	-0.007	-0.21
D_FCFO	-0.005	-1.82*	-0.003	-0.40	0.006	0.63
YEAR_FE	YES		YES		YES	
IND_FE	YES		YES		YES	
Adjusted R^2	0.054		0.330		0.167	
F-statistics	3.28***		8.59***		7.96***	
Highest VIF Value	4.37		4.60		3.59	
N	1,530		787		743	

This table presents the changes regression results. All the variables that start with "D" compute the changes in values of the variables between the current year and the previous year. The dependent variables are the changes in absolute accruals estimation errors (D_ABS_AEE) in model 1, firms with positive changes in accruals estimation errors (D_AEE) in model 2, and firms with negative changes in accruals estimation errors (D_AEE) in model 3. AEE are measured as residuals from a model suggested by McNichols (2002).

*, **, *** denote significant at the 0.10, 0.05 and 0.01 levels, respectively.

The OLS regression models are estimated with dual clustered robust standard errors (both firm and year).

All variables are defined in Table 1.

Table 6

Panel A: Real Earnings Management Regression Results (Levels Model)

Variables	Model 1 Dependent Variable = REM		Model 2 Dependent Variable = ADISX		Model 3 Dependent Variable = APROD	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Intercept	-0.017	-0.87	-0.115	-0.99	-0.064	-2.21***
FAUDITOR	-0.028	-0.61	0.074	1.38	-0.086	-2.04**
SIZE	-0.007	-1.68*	-0.009	-0.88	0.012	1.76*
LEV	-0.063	-1.22	-0.003	-1.01	-0.039	-0.55
OCF	0.322	4.70***	0.446	3.51***	-0.046	-1.02
ROA	0.124	0.79	-0.088	-0.88	-0.065	-3.49***
MBV	0.001	0.88	0.002	1.08	0.019	0.81
SALESG	-0.005	-0.19	-0.003	-0.23	0.010	0.88
ABS_AEE	0.200	1.04	0.114	0.92	0.021	2.19**
NOA$_{t-1}$	0.197	3.31***	0.128	5.76***	-0.008	-1.02
CYCLE$_{t-1}$	-0.000	-0.99	-0.055	-0.17	0.059	1.71*
AUDTENURE	-0.087	-1.36	-0.085	-3.31***	-0.009	-0.84
BIG4	0.076	1.30	0.092	1.93*	-0.069	-1.67*
BSIZE	-0.003	-0.18	-0.014	-1.85*	0.063	1.15
IND	-0.350	-1.77*	-0.262	-3.13***	-0.086	-0.17
FEM	0.025	0.44	-0.009	-0.41	0.003	1.99**
FCEO	-0.018	-0.27	-0.020	-0.63	-0.043	-1.77**
FCFO	-0.008	-0.22	0.001	0.44	-0.081	-0.26
YEAR_FE	YES		YES		YES	
IND_FE	YES		YES		YES	
Adjusted R^2	0.138		0.193		0.241	
F-statistics	4.52***		6.17***		7.98***	
Highest VIF Value	4.55		3.38		4.41	
N	1,793		1,793		1,793	

This table presents the level regression results of the real earnings management analyses. The dependent variables are the aggregate value of real earnings management (REM) in model 1, abnormal discretionary expenses (ADISX) in model 2, and abnormal production costs (APROD) in model 3. APROD and ADISX are measured as residuals following Roychowdhury (2006) and the sum of both equal REM.

*, **, *** denote significant at the 0.10, 0.05 and 0.01 levels, respectively.

The OLS regression models are estimated with dual clustered robust standard errors (both firm and year).

All variables are defined in Table 1.

Table 6 (Continued)

Panel B: Real Earnings Management Regression Results (Changes Model)

Variables	Model 1 Dependent Variable = D_REM		Model 2 Dependent Variable = D_ADISX		Model 3 Dependent Variable = D_APROD	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Intercept	-0.019	-0.17	-0.017	-1.34	-0.012	-0.88
D_FAUDITOR	-0.286	-1.33	-0.023	-0.98	-0.002	-1.56
D_SIZE	-0.109	-0.85	-0.061	-1.97**	0.023	2.07**
D_LEV	0.002	1.21	-0.001	-1.19	0.008	1.26
D_OCF	0.251	0.83	0.041	0.71	0.092	0.64
D_ROA	0.144	0.68	0.037	0.87	0.089	1.73*
D_MBV	-0.002	-1.19	0.001	0.78	-0.004	-1.58
D_SALESG	-0.018	-0.58	-0.007	-1.89*	-0.047	-0.74
D_ABS_AEE	-0.037	-0.13	0.012	0.29	0.030	1.54
D_NOA$_{t-1}$	0.067	0.81	-0.023	-1.30	0.016	1.05
D_CYCLE$_{t-1}$	0.001	1.04	0.001	1.58	-0.020	-0.82
D_AUDTENURE	-0.110	-1.42	-0.017	-1.68*	-0.013	-0.78
D_BIG4	0.122	0.48	0.016	0.66	0.067	1.80*
D_BSIZE	0.039	0.95	0.004	1.06	0.004	0.64
D_IND	-0.186	-2.20**	-0.010	-2.18**	-0.055	-0.16
D_FEM	-0.076	-0.28	0.024	1.54	-0.017	-0.69
D_FCEO	-0.010	-0.11	-0.025	-1.03	-0.003	-0.31
D_FCFO	0.031	0.21	-0.019	-1.40	0.001	0.26
YEAR_FE	YES		YES		YES	
IND_FE	YES		YES		YES	
Adjusted R^2	0.101		0.118		0.133	
F-statistics	3.31***		4.22***		5.88***	
Highest VIF Value	2.74		2.55		3.07	
N	1,530		1,530		1,530	

This table presents the changes regression results of the real earnings management analyses. All the variables that start with "D" compute the changes in values of the variables between the current year and the previous year. The dependent variables are the changes in the aggregate value of real earnings management (D_REM) in model 1, firms with changes in abnormal discretionary expenses (D_ADISX) in model 2, and firms with changes in abnormal production costs (D_APROD) in model 3. APROD and ADISX are measured as residuals following Roychowdhury (2006) and the sum of both equal REM.

*, **, *** denote significant at the 0.10, 0.05 and 0.01 levels, respectively.

The OLS regression models are estimated with dual clustered robust standard errors (both firm and year).

All variables are defined in Table 1.

Table 7

Regressions of Accruals Estimation Errors by Auditor Size (Changes Model)

Panel A: Big 4 Auditors

	Model 1		Model 2		Model 3	
	Dependent Variable = D_ABS_AEE		Dependent Variable = Positive D_AEE		Dependent Variable = Negative D_AEE	
Variables	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Intercept	0.116	0.89	0.021	1.55	0.008	0.78
D_FAUDITOR	-0.013	-2.66***	-0.011	-2.72***	-0.007	-2.20**
D_SIZE	-0.005	-2.15**	-0.001	-0.23	0.001	0.42
D_LEV	-0.001	-0.12	-0.002	-3.79***	-0.003	-1.41
D_OCF	-0.085	-0.58	-0.375	-5.01***	0.464	9.80***
D_ROA	-0.010	-0.30	0.237	4.95***	-0.386	-12.09***
D_MBV	0.000	0.69	0.001	-0.38	0.001	1.60
D_SALESG	-0.003	-0.25	-0.002	-0.28	0.032	1.76*
D_REM	0.002	2.27**	0.001	1.95*	0.000	0.22
D_NOA$_{t-1}$	0.009	1.69*	0.011	2.34**	0.001	0.21
D_CYCLE$_{t-1}$	0.004	2.43**	0.001	2.51**	0.012	0.12
D_AUDTENURE	-0.001	-0.20	-0.004	-0.72	-0.007	-1.61
D_BSIZE	-0.002	-0.61	-0.005	-2.67***	-0.002	-1.23
D_IND	0.014	0.74	-0.004	-0.23	0.003	0.16
D_FEM	0.002	0.38	-0.003	-0.63	0.001	0.27
D_FCEO	0.001	0.11	-0.010	-1.78*	-0.005	-1.10
D_FCFO	-0.001	-0.39	-0.003	-0.77	-0.002	-0.64
YEAR_FE	YES		YES		YES	
IND_FE	YES		YES		YES	
Adjusted R^2	0.041		0.183		0.135	
F-statistics	2.96***		9.09***		6.49***	
Highest VIF Value	4.46		3.24		3.83	
N	1,275		1,275		1,275	

Table 7 (Continued)

Panel B: Non-Big 4 Auditors

Variables	Model 1 Dependent Variable = D_ABS_AEE		Model 2 Dependent Variable = Positive D_AEE		Model 3 Dependent Variable = Negative D_AEE	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Intercept	0.082	0.80	0.162	0.72	0.058	0.51
D_FAUDITOR	-0.004	-0.35	-0.030	-0.88	0.019	0.36
D_SIZE	-0.003	-0.41	0.001	0.12	0.027	2.40**
D_LEV	-0.013	-0.43	-0.092	-0.36	-0.038	-0.73
D_OCF	-0.016	-0.21	-0.014	-0.11	-0.052	-0.45
D_ROA	-0.143	-1.06	0.329	1.85*	-0.443	-1.88*
D_MBV	0.003	0.97	-0.024	-1.84*	-0.003	-0.83
D_SALESG	-0.008	-0.24	-0.037	-1.34	0.040	0.67
D_REM	0.033	0.84	-0.054	-0.62	-0.026	-1.58
D_NOA$_{t-1}$	0.024	0.74	0.000	0.42	0.019	1.16
D_CYCLE$_{t-1}$	0.001	0.27	0.012	0.67	-0.000	-0.87
D_AUDTENURE	0.049	2.04**	0.021	0.62	-0.021	-0.30
D_BSIZE	-0.013	-1.67*	0.004	0.30	-0.030	-2.85***
D_IND	-0.043	-0.67	-0.314	-2.08**	-0.207	-6.73***
D_FEM	0.029	1.57	0.024	0.69	-0.035	-1.47
D_FCEO	-0.009	-0.22	-0.129	-1.59	0.179	2.87***
D_FCFO	-0.014	-0.55	0.013	0.26	-0.003	-0.19
YEAR_FE	YES		YES		YES	
IND_FE	YES		YES		YES	
Adjusted R^2	0.346		0.391		0.461	
F-statistics	8.19***		12.98***		13.28***	
Highest VIF Value	3.42		2.27		4.38	
N	255		255		255	

This table presents the changes regression results of the accrual estimation errors analyses by auditor size. All the variables that start with "D" compute the changes in values of the variables between the current year and the previous year. The dependent variables are the changes in absolute value of accruals estimation errors (D_ABS_AEE) in model 1, firms with changes in positive accruals estimation errors (D_AEE) in model 2, and firms with changes in negative accruals estimation errors (D_AEE) in model 3. AEE are measured as residuals from a model suggested by McNichols (2002).

*, **, *** denote significant at the 0.10, 0.05 and 0.01 levels, respectively.

The OLS regression models are estimated with dual clustered robust standard errors (both firm and year).

All variables are defined in Table 1.

Table 8

Regressions of Real Earnings Management by Auditor Size (Changes Model)

Panel A: Big 4 Auditors

Variables	Model 1 Dependent Variable = D_REM		Model 2 Dependent Variable = D_ADISX		Model 3 Dependent Variable = D_APROD	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Intercept	-0.027	-0.67	-0.020	-1.69*	-0.031	-0.41
D_FAUDITOR	-0.215	-1.29	0.001	0.28	-0.009	-1.85*
D_SIZE	-0.077	-0.48	-0.037	-0.19	0.035	1.93*
D_LEV	0.001	0.80	-0.001	-0.14	0.027	0.43
D_OCF	0.349	1.69*	0.025	0.41	0.010	0.83
D_ROA	0.098	0.52	0.024	0.53	-0.019	-1.90*
D_MBV	-0.001	-0.70	-0.001	-0.29	-0.044	-0.78
D_SALESG	-0.015	-0.53	-0.009	-2.29**	-0.062	-0.97
D_ABS_AEE	-0.012	-0.04	0.018	0.42	0.079	1.50
D_NOA$_{t-1}$	0.048	0.65	-0.025	-1.55	0.094	1.03
D_CYCLE$_{t-1}$	0.001	1.36	-0.000	1.54	-0.016	-0.30
D_AUDTENURE	-0.104	-2.28**	-0.016	-1.44	-0.038	-0.59
D_BSIZE	0.034	0.95	0.003	0.82	0.012	0.46
D_IND	-0.016	-2.11**	-0.011	-0.21	0.005	0.08
D_FEM	-0.037	-0.13	0.033	1.98**	0.095	0.17
D_FCEO	-0.034	-0.40	-0.027	-1.20	-0.091	-0.33
D_FCFO	0.020	0.19	-0.024	-2.88***	-0.032	-0.12
YEAR_FE	YES		YES		YES	
IND_FE	YES		YES		YES	
Adjusted R^2	0.113		0.159		0.136	
F-statistics	4.83***		5.91***		5.12***	
Highest VIF Value	2.96		2.59		3.43	
N	1,269		1,269		1,269	

Table 8 (Continued)

Panel B: Non-Big 4 Auditors

Variables	Model 1 Dependent Variable = D_REM		Model 2 Dependent Variable = D_ADISX		Model 3 Dependent Variable = D_APROD	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Intercept	-0.119	-0.81	0.041	0.55	0.023	1.12
D_FAUDITOR	-0.042	-0.36	-0.008	-0.29	-0.030	-0.78
D_SIZE	-0.047	-0.29	-0.092	-0.19	-0.042	-1.67*
D_LEV	0.134	0.89	0.127	0.75	0.009	0.80
D_OCF	0.283	1.76*	-0.169	-0.32	-0.185	-0.98
D_ROA	-0.162	-1.15	-0.213	-2.38**	0.019	1.96*
D_MBV	-0.005	-0.84	-0.016	-0.34	0.090	0.78
D_SALESG	-0.067	-2.10**	-0.060	-0.46	0.002	0.20
D_ABS_AEE	-0.262	-0.45	-0.509	-0.50	0.040	0.37
D_NOA$_{t-1}$	0.107	0.97	0.352	1.39	0.073	0.88
D_CYCLE$_{t-1}$	-0.087	-0.21	-0.001	-0.75	0.097	0.42
D_AUDTENURE	-0.007	-0.37	-0.067	-0.64	-0.040	-1.94*
D_BSIZE	0.013	0.34	-0.033	-1.86*	-0.014	-1.10
D_IND	-0.192	-2.35**	-0.178	-1.69*	-0.020	-0.10
D_FEM	0.044	0.50	0.182	1.00	-0.008	-0.48
D_FCEO	-0.111	-0.63	-0.071	-0.21	-0.012	-0.80
D_FCFO	0.134	1.11	0.041	0.26	0.034	0.91
YEAR_FE	YES		YES		YES	
IND_FE	YES		YES		YES	
Adjusted R^2	0.442		0.384		0.531	
F-statistics	13.16***		11.17***		16.86***	
Highest VIF Value	3.77		3.67		4.04	
N	261		261		261	

This table presents the changes regression results of the real earnings management analyses by auditor size. All the variables that start with "D" compute the changes in values of the variables between the current year and the previous year. The dependent variables are the changes in the aggregate value of real earnings management (D_REM) in model 1, firms with changes in abnormal discretionary expenses (D_ADISX) in model 2, and firms with changes in abnormal production costs (D_APROD) in model 3. APROD and ADISX are measured as residuals following Roychowdhury (2006) and the sum of both equal REM.
*, **, *** denote significant at the 0.10, 0.05 and 0.01 levels, respectively.
The OLS regression models are estimated with dual clustered robust standard errors (both firm and year).
All variables are defined in Table 1.