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Does Female Directorship on Independent Audit Committees Constrain Earnings Management?

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ABSTRACT**.** This study examines whether the gender of the directors on fully independent audit committees affects the ability of the committees in constraining earnings management and thus their effectiveness in overseeing the financial reporting process. Using a sample of 525 firm-year observations over the period 2003 to 2005, we are unable to identify an association between the proportion of female directors on audit committees and the extent of earnings management.

KEY WORDS: audit committee director; earnings management; ethics; gender.

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Introduction

The audit committee plays a key role in overseeing, monitoring, and advising the management of an organization in implementing internal accounting control systems and preparing financial statements. In their role as overseers of the firm's financial reporting process, members on the audit committees meet on a regular basis with the firm's internal financial managers and outside auditors to review the corporation's financial statements, audit process, and internal accounting controls (Klein, 2002a). Prior studies have examined whether audit committee characteristics are associated with earnings management. For example, Klein (2002a) finds that higher proportion of outside directors on an audit committee (i.e., audit committee independence) is associated with lower earnings management while Bedard, Chtourou, and Courteau (2004) document that audit committee members' expertise also affects earnings quality.

This study focuses on another facet of audit committee characteristics, namely, the impact of female directorship on the effectiveness of audit committees in constraining earnings management. Recently, Gul, Srinidhi, and Tsui (2007) using data for years 2001 and 2002 find that earnings management is lower if at least one female director sits on the audit committee. Their findings suggest that female audit committee members may be more ethical than males assuming that earnings management is an ethical issue as in Bruns and Merchant (1990). However, Gul et al. (2007) do not consider many control variables like other audit committee characteristics in their research design, which could have impacted their results. Thus, it is warranted to document further evidence on whether the gender of audit committee members affects earnings management.

Furthermore, in contrast to prior research (e.g., Gul et al., 2007; Krishnan and Visvanathan, 2008; Bedard et al., 2004), we employ the data of independent directors after the enactment of Sarbanes-Oxley Act (SOX) to examine whether female directors on independent audit committees more effectively constrain earnings management than male directors on independent audit committees. It is of practical value to investigate audit committees' effectiveness by focusing on audit committees consisting solely of outside directors because U.S. listed firms are currently required to possess independent audit committees. In addition, SOX has greatly expanded the responsibility of the audit committee for oversight of financial reporting.[1]

Using a sample of 525 firm-year observations over the period 2003 to 2005, we find that the proportion of females on the audit committee is not associated with earnings management. The results are robust to various additional analyses. However, the results should be cautiously interpreted as they may be affected by several measurement or operationalization issues. Overall, this study contributes to the literature by providing further evidence on whether the gender of audit committee members affects their effectiveness in constraining earnings management and thus their oversight of the financial reporting process. Since there is little research on this topic in the literature, our study sheds more light on this question. This study also contributes to the research on audit committees by focusing on the data in the new corporate governance environment.

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[1] For example, SOX Section 301 requires that the audit committee is responsible for discussing and resolving disagreements between auditors and management. Audit committee should also provide procedures to receive, retain, and treat complains regarding accounting, internal controls, or auditing matters.

Unlike prior research (e.g., Gul et al., 2007; Krishnan and Visvanathan, 2008; Bedard et al., 2004), we employ the data of independent directors after the enactment of Sarbanes-Oxley Act. Finally, our study has implications for regulators and legislators who legislate the composition of audit committees, and for boards of directors who can modify the composition of audit committees to enhance the monitoring of management's financial reporting process (Beasley and Salterio, 2001).

Background and research question

Earnings management has been defined as an intentional alteration of financial information to produce a predetermined result (Gaa and Dunsmore, 2007). Firms may engage in earnings management for opportunistic purposes. Healy (1985) finds that managers manipulate earnings to maximize their bonus compensation. Fudenberg and Tirole (1995) contend that managers have incentives to manage earnings for their job security. Haw, Hu, Hwang, and Wu (2004) document that earnings management is positively associated with the divergence between control rights and cash-flow rights.[2] Clikeman (2003) lists a variety of situations and pressures which can motivate managers to manipulate their companies' reported earnings, such as meeting market expectations, contractual, and regulatory motives.

Earnings management involves the selection of accounting estimates and the structuring of transactions resulting in reported earnings which help the company or its

[2] A large divergence between control rights and cash-flow rights indicates a high likelihood of the expropriation of minority shareholders by controlling shareholders because the expropriation is less restrained by controlling shareholders' own cash-flow stake (Claessens, Djankov, and Lang, 2000).

managers achieve their goals at the detriment of the external shareholders or other stakeholders, who are misled about the underlying economic performance of the company. Bruns and Merchant (1990) establish that earnings management is an ethical issue, and Merchant and Rockness (1994) argue that earnings management practices raise the most important ethical issues facing the business profession.

As a part of the corporate governance mechanism, audit committees play a key role in constraining earnings management and enhancing earnings quality. Extant research has documented that audit committee characteristics may affect audit committee effectiveness. For example, Klein (2002a) reports that higher proportion of outside directors on the audit committee is associated with lower earnings management, suggesting that external audit committee members serve an important role in overseeing the firm's financial reporting process and constraining earnings management. Bedard et al. (2004) examine whether audit committee expertise affects earnings management. They measure audit committee expertise with respect to three aspects: financial, governance, and firm-specific expertise. Using a sample of 300 U.S. firms in the year 1996, they find that the financial and governance expertise of audit committee members are negatively associated with the likelihood of aggressive earnings management. They also find that audit committee independence is negatively related to the likelihood of aggressive earnings management.

In addition to individual factors such as independence and expertise, prior literature suggests that other personal attributes including gender difference may affect ethical behaviour. If earnings management decision is an ethical decision, it might also

be affected by the gender of the decision makers. Mason and Mudrack (1996) propose two conflicting hypotheses regarding gender differences in ethics: gender socialization which argues that men are expected to respond in "less ethical" fashion to ethical situations than women because of the more communal values into which women are socialized, and occupational socialization which hypothesizes that there is gender similarity in employees as a result of occupational socialization. However, prior research shows mixed evidence on whether gender differences affect ethical behaviour.

Two recent studies have provided some evidence on how gender composition may affect earnings quality. Krishnan and Parsons (2008) investigate the association between earnings quality in companies and the proportion of women in the senior management ranks. They use four earnings attributes including conservatism, smoothing, loss avoidance, and persistence to measure earnings quality. Based on a sample of 770 firm-year observations for years 1996 through 2000, they find that earnings quality is higher for firms with high gender diversity in senior management than for firms with low gender diversity in senior management. Using a sample of 1,508 firm-year observations for years 2001 and 2002, Gul et al. (2007) find that earnings management is lower and earning quality is higher for firms with female directors or higher proportion of female directors on the board. They also find that firms with at least one female director on the audit committee have lower earnings management and higher earnings quality. Gul et al. (2007) argue that not only do women demonstrate greater risk aversion and ethical behaviour but they are also better at obtaining voluntary information which may reduce information asymmetry between women directors and managers.

Even if gender differences may affect an individual's ethical decision, little is known about whether gender differences will further affect group ethical decision made by the audit committee. Earnings management is constrained when a majority of the audit committee believes that earnings management is occurring and that the committee should act against it. If women are more ethical than men, female audit committee members are more likely to believe that earnings management is unethical and thus will seek to influence the committee so that a majority of the audit committee directors will choose to act against earnings management. However, there is no definitive prior research to support that women exhibit greater ethical behaviour than men.[3]

The board of directors provides leadership in the development and implementation of corporate polices. According to Lamsa and Sintone (2001), women leaders tend to be more people oriented, consultative, and democratic than men leaders. Schminke, Wells, Peyrefitte, and Sebora (2002) examine how different leadership styles may affect individual and group ethical decisions. They find that more active leadership leads to greater conformity in ethical decision. Thus, women directors who are particularly strong in managing interpersonal relationships and adopt an approach that is more consensual and participative may be able to influence the behaviour of an entire board and a company's management towards more ethical decision-making. However, this assumes that women on audit committees are leaders possessing the above qualities, which may not be the case.

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[3] For example, see the summary of mixed results provided in Ford and Richardson (1994).

The motivation and ability of a woman director to wield influence on the audit committee in order to constrain earnings management depend not only on her ethical beliefs but also on a variety of individual and interpersonal factors within the group. For examples, not only could there be variation among women directors in their financial expertise but there could also be variation among male directors in their beliefs about earnings management and abilities to resist arguments by a female audit committee director against earnings management.

In summary, extant studies document mixed evidence on whether women and men have differential ethical attitudes, standards, and behaviours and there are a variety of individual and interpersonal factors which could affect a woman director's ability to constrain earnings management. Whether female directors on independent audit committees are more inclined to constrain earnings management than male directors is likely to be an empirical question. Hence, in this study, we formulate the following research question (RQ):

RQ: Does female directorship on independent audit committees constrain earnings management?

Research design

Sample selection

Following Krishnan and Visvanathan (2008), we focus on firms included in *S&P 500* because these large firms have higher data availability on audit committee characteristics. We collect audit committee members' data including gender, board service time, additional directorship, and audit committee size from the IRRC Directors

database updated in November 2006 for years 2003 to 2005. We focus on years 2003 to 2005 because we are interested in the corporate governance quality of independent audit committees after the enactment of the Sarbanes-Oxley Act, which was signed into law in July 2002. Since the IRRC Directors database does not provide information about directors' accounting expertise, we manually review proxy statements download from the SEC's EDGAR to collect the accounting expertise data of audit committee directors. We collect the data on executives' gender from the Execucomp database. We also collect data from the Compustat database to compute financial variables used in the analyses. After excluding firms with missing data, the final sample includes 175 firms that have the data for all three years 2003 through 2005. Thus, there are 525 firm-year observations in the final sample. Table 1 presents the breakdown of 175 sample firms with independent audit committees by industry. We find that our sample involves 38 two-digit SIC industries. Electric, gas, and sanitary services (12.0%), chemicals and allied products (10.3%), industrial machinery and equipment (8.0%), electrical and electronic equipment (7.4%), instruments and related products (5.7%), and transportation equipment (5.7%) are the most widely represented industries in the sample.

Insert Table 1 about here

Measurement of earnings management

Discretionary accruals are commonly used to examine earnings management in the literature. Like other studies (e.g., Klein, 2002a; Chung and Kallapur, 2003), we measure earnings management based on discretionary accruals. First, we estimate the cross-

sectional variant of the Jones (1991) model using observations in each two-digit SIC industry-year:

$$ACC = a_0\ 1/TA_{-1} + a_1\ \Delta SALES + a_2\ PPE + e \quad (1)$$

where

ACC = total accruals measured as the difference between earnings before extraordinary items and discontinued operations and cash flow from operations, deflated by beginning total assets,

TA_{-1} = total assets at the beginning of the year,

$\Delta SALES$ = change in sales between year t-1 and year t, deflated by beginning total assets,

PPE = gross property, plant, and equipment, deflated by beginning total assets,

Like Klein (2002a), we use all firm-year observations on the Compustat over the period 2003 to 2005 and estimate the parameters in equation (1) for each two-digit SIC industry-year in which there are at least eight firms. Discretionary accruals for the sample observations are estimated as the residual values from equation (1).

Second, we adjust estimated discretionary accruals by controlling for the impact of performance on the estimates. Following Kothari, Leone, and Wasley (2005), we match each firm-year observation in the sample with a firm-year observation from the population with the same two-digit SIC industry-year and the closest return on assets (*ROA*). The performance-matched discretionary accrual for each sample observation is computed as the discretionary accrual of the observation minus the discretionary accrual of the matched observation. We use the performance-matched approach to adjust discretionary accruals because Kothari et al. (2005) show that the performance-matched discretionary accruals are less misspecified than other measures of discretionary accruals.

Finally, we use the signed value of the performance-matched discretionary accruals to measure earnings management since according to Hribar and Nichols (2006), the use of unsigned discretionary accruals increases the threat of correlated omitted variables.

Regression model

We estimate the following regression model for the main test of the hypothesis:

$$DAC = \beta_0 + \beta_1 FMDIR + \beta_2 AEDIR + \beta_3 LTDIR + \beta_4 ADDIR + \beta_5 ACSIZE + \beta_6 MB + \beta_7 CNI + \beta_8 DEBT + \beta_9 SIZE + \beta_{10} NEGNI + \beta_{11} CAC + \beta_{12} SGROW + \beta_{13} CASHF + \beta_{14} FIN + \beta_{15} BIG4 + \beta_{16} OPCYC + \beta_{17} VCASH + \beta_{18} VSALE + Industry\ dummy + \varepsilon \quad (2)$$

where

DAC = the signed value of performance-matched discretionary accruals based on the Jones model,

FMDIR = the proportion of female directors on an independent audit committee,

AEDIR = the proportion of directors with accounting expertise on an independent audit committee,

LTDIR = the proportion of long-term directors on an independent audit committee, where long-term directors are directors with the board tenure of 10 or more years,

ADDIR = the proportion of directors on an independent audit committee, who hold three or more additional board seats in other firms,

ACSIZE = audit committee size, measured as the number of directors on the independent audit committee,

MB = market-to-book ratio, measured by the ratio of the market value of the common equity to the book value of the common equity,

CNI = the change in net income between year *t*-1 and year *t*, deflated by the total assets,

DEBT = debt, measured by the ratio of long-term debt to total assets,

SIZE = size of firm, measured as the log of total assets,

NEGNI = a dummy coded 1 if net income is negative for both year *t*-1 and year *t*, and 0 otherwise,

CAC = current accruals, measured by the ratio of total accruals to total assets,

SGROW = sales growth, measured as the change in sales between year *t*-1 and year *t*, deflated by sales for year *t*-1,

CASHF = cash flow from operations, measured by the ratio of cash flow from operations to total assets,

FIN = financing dummy, coded 1 if a firm raised capital for year *t* and 0 otherwise,

BIG4 = Big 4 auditors, coded 1 if a firm is audited by Big 4 auditors and 0 otherwise,

OPCYC = operating cycle, measured as the sum of days accounts receivable and days inventory,

VCASH = volatility of cash flow, measured as the standard deviation of cash flow from operations for years *t*-2 through *t*,

VSALE = volatility of sales, measured as the standard deviation of sales for years *t*-2 through *t*.

As in Krishnan and Visvanathan (2008), we define directors with accounting expertise directors as directors who are or were certified public accountants, auditors, principal or chief financial officers, controllers, or principal or chief accounting officers. We control for directors' accounting expertise because Krishnan and Visvanathan (2008) suggest that it may affect accounting quality. We define long-term directors by using 10 years of board service time in a firm as the cut-off point because this level is close to the

average tenure of outside directors.[4] *LTDIR* is included in equation (2) because director tenure is likely to affect audit committee effectiveness. On the one hand, outside directors with long-term board service have greater experience and expertise to effectively monitor the management (Bedard et al., 2004). On the other hand, however, long-term directors are less mobile and less employable (Vafeas, 2003). The entrenchment of those directors may lead to lower governance quality.

Additional directorship could also have opposite effects in terms of governance quality. Directors who serve on additional boards have greater expertise and reputation to work well (Bedard et al., 2004). However, those directors are busy and thus may have lower monitoring effectiveness (Core, Holthausen, and Larcker, 1999; Fich and Shivdasani, 2006). Like Shivdasani (1993), we define directors with high additional directorship as those who hold at least three additional board seats. To control for the effect of additional directorship on audit committee effectiveness, we add *ADDIR* in equation (2).

We control for audit committee size (*ACSIZE*) in equation (2) as previous studies suggest that audit committee size may affect audit committee effectiveness. Bushman, Chen, Engel, and Smith (2004) argue that smaller-size boards have the disadvantage of fewer advisors and monitors of management. Moreover, it is probably more difficult for managers to exert influence over a large audit committee. Thus, larger audit committees are likely to be more effective. On the other hand, Jensen (1993) argues that in the

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[4] The average board tenure of outside directors in the IRRC database is 9.54 years.

context of boards of directors, large boards could be ineffective due to higher cooperation costs and more free riding, suggesting that large audit committees may be less effective.

In addition to those audit committee characteristics, we also add several other variables in equation (2) to control for factors that may affect discretionary accruals or audit committee effectiveness. We include *MB* because Klein (2002b) provides evidence that audit committee effectiveness measured as committee independence is related to the market-to-book ratio and Skinner and Sloan (2002) suggest that growth firms, proxied by high market-to-book ratio, are more likely to manage earnings. We add *CNI* and *DEBT* because prior research (e.g., Dechow, Sloan, Sweeney, 1996; Klein, 2002a) finds that those variables are positively associated with earnings management. We include *SIZE* because political costs, proxied by firm size, are associated with earnings management (Cahan, 2002). Klein (2002b) suggests that firm size and negative earnings dummy (*NEGNI*) affect audit committee quality. Thus, we also include *NEGNI*. Like Chung and Kallapur (2003), we control for the effect of *CAC*, *CFO*, and *FIN* on discretionary accruals. As in Bedard et al. (2004), we add sales growth and Big 4 auditor as control variables in the model. Since Francis, LaFond, Olsson, and Schipper (2004) argue that *OPCYC*, *VCFO*, and *VSALE* are firms' innate factors that may affect earnings quality, these variables are also included in the model. Finally, we add an industry dummy variable which is coded "1" if a firm is from the six two-digit SIC industries that dominate in the sample and "0" otherwise to control for fixed industry effects.

To test the hypothesis, we first estimate equation (2) on pooled cross-sectional, time series data.[5] If there is no association between the proportion of female directors on an independent audit committee and the level of earnings management, the coefficient for β_1 will be insignificant. Otherwise, the coefficient for β_1 will be significant. The coefficient for β_2 is expected to be negative. The coefficients for β_3, β_4, and β_5, could be negative or positive as these three audit committee characteristics probably have a duality in terms of governance quality. Based on the literature, we expect a negative coefficient for β_9, β_{13}, and β_{15}, and a positive coefficient for β_6, β_7, β_8, β_{10}, β_{11}, β_{12}, β_{14}, β_{16}, β_{17}, and β_{18}.

Empirical results

Table 2 reports the descriptive statistics of variables. The mean for the signed value of performance-matched discretionary accruals (*DAC*) is -0.02, which is similar to the mean for the large sample reported in Kothari et al. (2005). The average proportion of female directors on an independent audit committee is 16.0%, 16.7%, 17.4%, and 16.7% for 2003, 2004, 2005, and all the three years, respectively. The average proportion of directors with accounting expertise on an independent audit committee is 22.3%. The average proportion of long-term directors (with board service time of at least 10 years) on an independent audit committee is 30.8% and the average proportion of directors who hold at least three additional board seats is 18.2%. On average, there are about 4.22 members on an independent audit committee. In addition, we find that the mean number

[5] All continuous variables in the regressions are winsorized at 1 and 99 percent.

and median number of female directors on an independent audit committee are 0.71 and 1.00, respectively. The percentages of female and male long-term directors are 16.32% and 83.68% of total long-term directors, respectively. The average tenure of directors with five to nine years service is 6.54 years for female directors and 6.72 years for male directors, while the average tenure of directors with less than five years service is 2.81 years for female directors and 2.82 years for male directors.

Insert Table 2 about here

Table 3 provides Pearson correlations between independent variables. We find that the highest correlation coefficient is 0.50 between *CAC* and *CFO*. The condition index for the regression model is 33.05. To mitigate the concern for multicollinearity, we drop either *CFO* or *CAC* from the model. In either case, the results do not substantially change. We note a negative and significant correlation between *FMDIR* and *NEGNI*,[6] suggesting that female directors are less likely to sit on audit committees when firms incur losses.[7]

Insert Table 3 about here

Table 4 reports main results of the regression that examines the effect of gender characteristic of independent audit committees on earnings management. We find an insignificant coefficient for *FMDIR* (*t*-statistic = 0.45). Thus, there is no significant

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[6] We find an insignificant coefficient for *FMDIR* when we estimate equation (2) after dropping observations with losses. Thus, a possible self-selection bias (i.e., possibility of females avoiding risky directorships combined with possibly greater pressure to manipulate earnings under loss conditions) does not affect our results.

[7] We also find a negative and significant coefficient on *NEGNI* when we estimate equation (3).

association between the proportion of female directors on an independent audit committee and the level of earnings management.

In addition, we find an insignificant coefficient for *AEDIR* (*t*-statistic = 0.45). After the enactment of SOX, each audit committee is required to have at least one accounting expert. However, the disclosure of directors' accounting background is voluntary in proxy statements and thus this measure of accounting expertise by reviewing proxy statements is affected by measurement error. We find a positive and significant coefficient for *LTDIR* (*t*-statistic = 1.96). This suggests that audit committees with lower proportion of long-term directors may be more effective in constraining earnings management than committees with higher proportion of long-term directors. We find a negative and significant coefficient for *ADDIR* (*t*-statistic = -1.88), suggesting that directors who serve on more additional boards may be more effective in constraining earnings management. We also find an insignificant coefficient for *ACSIZE* (*t*-statistic = 1.17), suggesting that the size of audit committees may not affect the effectiveness in constraining earnings management. Furthermore, we document that the signed value of discretionary accruals is positively associated with *CNI*, *DEBT*, and *CAC*, and negatively associated with *FIN* and *OPCYC*.

Insert Table 4 about here

We also conduct several additional analyses to test the robustness of the results. First, we test the hypothesis by allowing for self-selection bias of female directors on independent audit committees. The presence of female directors on an audit committee could be driven by some firm characteristics that also affect earnings management. The

lack of significant evidence in the main test could be due to the self-selection bias. To deal with this issue, we first run a probit model as follows:

$$\Pr(FMDUM=1) = \gamma_0 + \gamma_1 SIZE + \gamma_2 NEGNI + \gamma_3 MB + \gamma_4 ACSIZE + \gamma_5 BDIND + \gamma_6 FMEXE + \varepsilon \quad (3)$$

where

FMDUM = the presence of female directors, coded 1 if there is at least one female director on an independent audit committee and 0 otherwise,

BDIND = board independence, measured as the proportion of outside directors on a board of directors,

FMEXE = the presence of female executives, coded 1 if there is at least one female executive and 0 otherwise.

Based on prior research on the determinants of audit committee composition (e.g., Klein, 2002b), we include firm size, market-to-book ratio, negative earnings dummy, and board independence in equation (3). We add audit committee size in equation (3) because the presence of a female director is more likely for audit committees with more members. We also include the presence of female executives as they are likely to recruit female directors. After the estimation of equation (3), we compute the Inverse Mills Ratio λ^ (Heckman, 1976). Then we run the second stage regression as follows:

$$DAC = \beta_0 + \beta_1 FMDIR + \beta_2 AEDIR + \beta_3 LTDIR + \beta_4 ADDIR + \beta_5 ACSIZE + \beta_6 MB + \beta_7 CNI + \beta_8 DEBT + \beta_9 SIZE + \beta_{10} NEGNI + \beta_{11} CAC + \beta_{12} SGROW + \beta_{13} CASHF + \beta_{14} FIN + \beta_{15} BIG4 + \beta_{16} OPCYC + \beta_{17} VCASH + \beta_{18} VSALE + \beta_{19} \lambda^{\wedge} + Industry\ dummy + \varepsilon \quad (4)$$

Table 5 presents results after allowing for the self-selection bias. We still find that the coefficient on *FMDIR* is insignificant (*t*-statistic = -0.53). Thus, there is no significant evidence that male and female outside directors on an audit committee differ

in their governance quality, even after we control for the self-selection bias of the presence of a female director on the committee.

Insert Table 5 about here

Second, we use accrual quality instead of discretionary accruals to measure earnings management. We conduct this analysis to examine whether the results are sensitive to using an alternative measure of earnings management. Based on Dechow and Dichev (2002) and McNichols (2002), we run the following firm-specific regression:

$$\Delta WC_t = b_0 + b_1\, CFO_{t-1} + b_2\, CFO_t + b_3\, CFO_{t+1} + b_4\, \Delta SALES_t + b_3\, PPE_t + \varepsilon_t \qquad (5)$$

where

ΔWC_t = changes in working capital accounts, measured as the increase in accounts receivable plus the increase in inventory plus the decrease in accounts payable and accrue liabilities plus the decrease in taxes accrued plus the increase (decrease) in other assets (liabilities), deflated by beginning total assets,

CFO_t = cash flow from operations, deflated by beginning total assets.

Like Francis et al. (2004), we estimate equation (5) using data over the rolling eight-year window (i.e., year t-7 to year t) for each sample firm in year t. The accrual quality labelled by *ACCQ* is measured as the firm-specific standard deviation of estimated residuals from equation (5). A high value of *ACCQ* indicates a low level of earning quality, and thus a high level of earnings management.

The regression model to test the hypothesis using the accrual quality measure is as follows:

$$\begin{aligned} ACCQ = {} & \beta_0 + \beta_1 FMDIR + \beta_2 AEDIR + \beta_3 LTDIR + \beta_4 ADDIR + \beta_5 ACSIZE + \beta_6 MB \\ & + \beta_7 DEBT + \beta_8 SIZE + \beta_9 NEGNI + \beta_{10} SGROW + \beta_{11} FIN + \beta_{12} BIG4 \\ & + \beta_{13} OPCYC + \beta_{14} VCASH + \beta_{15} VSALE + Industry\ dummy + \varepsilon \qquad (6) \end{aligned}$$

As in equation (2), we include the audit committee characteristics in equation (6). We also add several variables that may affect earnings management and accrual quality in the model.

In Table 6, we find that *ACCQ* is not significantly associated with *FMDIR* (*t*-statistic = 0.33), suggesting that the proportion of female directors on an independent audit committee does not affect earnings quality. We also document no associations between earnings management and other four audit committee governance variables, i.e., *AEDIR*, *LTDIR*, *ADDDIR*, and *ACSIZE*. In addition, we find that *NEGNI*, *SGROW*, and *VCASHF* are significantly associated with accrual quality.

Insert Table 6 about here

Third, we replace *FMDIR* in equation (2) by a dummy variable that takes the value of 1 if there is at least one female director on an independent audit committee and 0 otherwise. Similar to the main results, the dummy variable is not significantly associated with discretionary accruals.

Fourth, we examine whether the results are driven by fewer female directors on audit committees. We compare the difference in earnings management between audit committees with at least two female directors and audit committees without female directors. We replace *FMDIR* by a dummy variable coded "1" for audit committees with at least two female members and "0" for audit committees without female members, and then estimate equation (2). Columns 3 and 4 in Table 7 show that the coefficient on the dummy variable (i.e., *FMDIRD*) is insignificant (*t*-statistic = 0.09). Alternatively, *FMDIRD* is coded "1" for audit committees with at least 50% female directors and "0"

otherwise to compare the difference in earnings management between audit committees with at least 50% female directors and those with less than 50% female directors. The results on this alternative dummy variable are reported in Columns 5 and 6 in Table 7. We still find a positive and insignificant coefficient on *FMDIRD* (*t*-statistic = 1.42). Thus, it is unlikely that our results are caused by a lack of female directors on audit committees.

Insert Table 7 about here

Fifth, we examine whether the results are due to a lack of accounting expertise of female audit committee members. We estimate equation (2) by replacing *FMDIR* by a dummy variable coded "1" for audit committees with at least one female accounting expert and "0" for audit committees without female directors. Non-tabulated results indicate that the dummy variable is also not significantly associated with discretionary accruals. Thus, a lack of female directors' accounting expertise is unlikely to be a reason for the insignificant results.

Sixth, we conduct a diagnostic for the autocorrelation of our pooled regression. We find that the Durbin-Watson statistic is 1.788, which is over the critical value of 1.782. In addition, we estimate equation (2) for each of the three years to control for the potential autocorrelations of time-series data over the three-year period. We still find no significant coefficient for *FMDIR* in any year from 2003 to 2005.

Seventh, we examine whether there are any heteroskedasticity issues in our analysis. The White test shows that the test statistic is not significant. Therefore, we

cannot reject the hypothesis that the variance of the residuals is homogenous and hence heteroskedasticity is less likely to be a substantive issue in our analysis.

Finally, we detect outliers by computing statistics such as *RSTUDENT*, *H*, *COVRATIO*, *DEFITS*, and *DEBETAS*. We identify 35 observations as outliers based on these five statistics. After excluding the outliers, we still find no association between the proportion of female directors on an independent audit committee and the level of earnings management.

Discussion and conclusion

This study examines whether the gender of audit committee members affects the effectiveness of an independent audit committee in constraining earnings management. Our study, which covers a period following the enactment of SOX, finds no gender effect with respect to independent audit committees' effectiveness in constraining earnings management.

While the results could suggest that there are no significant differences in ethical beliefs towards earnings management among male and female audit committee directors, there are, however, several possible causes for the observed null result. Some female audit committee directors may believe that not all earnings management is unethical. Chong (2006) argues that earnings management is a logical result of the flexibility in financial reporting options and is not considered to be bad if the management uses earnings management to create a stable financial performance by acceptable and voluntary business decisions. According to Scott (2008), some female audit committee

directors could believe that earnings management may be useful to protect the firm from the consequences of unforeseen events when contracts are rigid and incomplete. Similarly, there could be high variation among male audit committee members as to beliefs about earnings management and ability to resist the arguments by female audit committee members against earnings management. Thus, it is difficult to test audit committee members' real ethical attitudes towards earnings management.

Another possibility is that women are not uniform in their ability to influence other audit committee members. Individual differences in this ability may mask a gender difference in earnings management beliefs and lead to observing the null results. Unfortunately, we cannot control for this effect in this study.

Like other studies, the results of this study should be cautiously interpreted because of its own limitations. Although we have attempted to control for as many factors as possible based on prior literature such as accounting expertise, tenure, and additional directorship, and have used many control variables and alternative measures of earnings management, we may still have omitted other director characteristics and control variables, and have issues on measurement errors and variable operationalization that could affect the results. Moreover, there are several possible results for the null result as discussed above. Despite these limitations, this study adds to the ethics literature by considering the gender of directors on independent audit committees and extends the line of research on earnings management and corporate governance.

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Table 1
Breakdown of Sample Firms by Industry

Two-Digit SIC Codes	Industry Description	Frequency	Percent (%)
13	Oil and gas extraction	7	4.00
20	Food products	8	4.57
26	Paper and allied products	5	2.86
27	Printing and publishing	4	2.29
28	Chemicals and allied products	18	10.29
29	Petroleum refining	5	2.86
33	Primary metal industries	5	2.86
35	Industrial machinery and equipment	14	8.00
36	Electrical and electronic equipment	13	7.43
37	Transportation equipment	10	5.71
38	Instruments and related products	10	5.71
49	Electric, gas, and sanitary services	21	12.00
53	General merchandise stores	6	3.43
73	Business services	6	3.43
Others		43	24.51
Total	38 industries	175	100.00

Table 2
Descriptive Statistics

Variable	N	Mean	Median	Std	Q1	Q3
DAC	525	-0.017	-0.006	0.105	-0.064	0.040
FMDIR	525	0.167	0.200	0.157	0.000	0.250
AEDIR	525	0.223	0.200	0.233	0.000	0.333
LTDIR	525	0.308	0.250	0.258	0.000	0.500
ADDIR	525	0.182	0.200	0.199	0.000	0.333
ACSIZE	525	4.221	4.000	1.099	3.000	5.000
MB	525	4.226	3.103	4.754	1.978	4.686
CNI	525	0.019	0.010	0.050	-0.000	0.027
DEBT	525	0.201	0.192	0.127	0.109	0.285
SIZE	525	9.260	9.250	1.167	8.355	10.071
NEGNI	525	0.032	0.000	0.177	0.000	0.000
CAC	525	-0.046	-0.042	0.042	-0.063	-0.024
SGROW	525	0.121	0.097	0.164	0.039	0.175
CASHF	525	0.110	0.106	0.065	0.066	0.147
FIN	525	0.116	0.000	0.321	0.000	0.000
BIG4	525	0.989	1.000	0.106	1.000	1.000
OPCYC	525	132.136	107.600	97.363	75.764	150.295
VCASH	525	0.028	0.021	0.024	0.012	0.033
VSALE	525	0.082	0.054	0.088	0.028	0.101
FMEX	525	0.061	0.000	0.106	0.000	0.143
BDIND	525	0.780	0.800	0.118	0.727	0.875
ACCQ	525	0.016	0.008	0.045	0.004	0.008

DAC = the signed value of performance-matched discretionary accruals based on the Jones model,

FMDIR = the proportion of female directors on an independent audit committee,

AEDIR = the proportion of accounting expertise directors on an independent audit committee,

LTDIR = the proportion of long-term directors on an independent audit committee, where long-term directors are directors with the board tenure of 10 or more years,

ADDIR = the proportion of directors on an independent audit committee, who hold three or more additional board seats in other firms,

ACSIZE = audit committee size, measured as the number of directors on the independent audit committee,

MB = market-to-book ratio, measured by the ratio of the market value of the common equity to the book value of the common equity,

CNI = the change in net income between year *t*-1 and year *t*, deflated by the total assets,

DEBT = debt, measured by the ratio of long-term debt to total assets,

SIZE = size, measured as the log of total assets,

NEGNI = a dummy coded 1 if net income is negative for both year *t*-1 and year *t*, and 0 otherwise,

CAC = current accruals, measured by the ratio of total accruals to total assets,

SGROW = sales growth, measured as the change in sales between year *t*-1 and year *t*, deflated by sales for year *t*-1,

CASHF = cash flow from operations, measured by the ratio of cash flow from operations to total assets,

FIN = financing dummy, coded 1 if a firm raised capital for year *t* and 0 otherwise,

BIG4 = Big 4 auditors, coded 1 if a firm is audited by Big 4 auditors and 0 otherwise,

OPCYC = operating cycle, measured as the sum of days accounts receivable and days inventory,

VCASH = volatility of cash flow, measured as the standard deviation of cash flow from operations for years *t*-2 through *t*,

VSALE = volatility of sales, measured as the standard deviation of sales for years *t*-2 through *t*,

FMEXE = the presence of female executives, coded 1 if there is at least one female executive and 0 Otherwise,

BDIND = board independence, measured as the proportion of outside directors on a board on directors,

ACCQ = accrual quality, measured as the firm-specific standard deviation of estimated residuals from equation (5).

Table 3
Pearson Correlations
(n=525)

Variable	*AEDIR*	*LTDIR*	*ADDIR*	*ACSIZE*	*MB*	*CNI*	*DEBT*	*SIZE*	*NEGNI*	*CAC*	*SGROW*	*CASHF*	*FIN*	*BIG4*	*OPCYC*	*VCASH*	*VSALE*
FMDIR	-0.01	0.06	0.09**	0.03	0.03	-0.01	0.00	-0.01	-0.13***	-0.05	-0.02	0.14***	-0.06	-0.08*	-0.13***	-0.07	0.07
AEDIR		-0.12***	-0.06	-0.01	0.06	0.04	-0.10**	-0.18***	0.01	-0.08*	0.03	0.11***	-0.02	-0.05	0.12***	0.14***	-0.00
LTDIR			-0.14***	-0.18***	0.01	0.04	-0.12***	-0.03	-0.04	-0.01	-0.01	0.10**	0.05	-0.03	0.03	0.01	-0.06
ADDIR				0.08*	0.01	0.09**	0.03	0.08*	-0.04	0.03	0.04	0.02	0.04	-0.05	-0.06	-0.08	-0.02
ACSIZE					-0.06	-0.04	0.19***	0.27***	-0.04	0.06	-0.01	-0.11**	-0.05	0.05	-0.09**	-0.05	0.06
MB						0.07*	0.13***	-0.20***	-0.05	-0.01	0.01	0.37***	0.00	0.05	0.14***	0.18***	-0.06
CNI							-0.14***	-0.11*	0.06	0.10**	0.30***	0.17***	0.15***	0.03	0.03	0.21***	0.10**
DEBT								0.30***	0.16***	0.12***	-0.24***	-0.37***	-0.06	0.03	0.09**	-0.11***	-0.01
SIZE									-0.04	0.17***	-0.07	-0.31***	-0.04	0.05	0.06	-0.26***	-0.08*
NEGNI										-0.18***	-0.20***	-0.27***	0.00	0.02	0.04	0.09**	0.05
CAC											-0.09*	-0.50***	0.04	-0.05	0.24***	-0.03	-0.05
SGROW												0.23***	0.23***	0.02	-0.03	0.22***	0.16***
CASHF													0.07	0.02	-0.18***	0.09**	0.02
FIN														-0.02	0.04	0.08*	0.09**
BIG4															-0.07	-0.08*	0.02
OPCYC																0.27***	-0.14***
VCASH																	0.31***

***, **, and * indicate a significance at the level of 1%, 5%, and 10%, respectively (two-tailed tests).

Table 4
Main Results

Variable	Predicted sign	Coefficient	*t*-statistic
Intercept	+/-	-0.097	-1.61
FMDIR	+/-	0.013	0.45
AEDIR	-	0.009	0.45
LTDIR	+/-	0.035	1.96*
ADDIR	+/-	-0.042	-1.88*
ACSIZE	+/-	0.005	1.17
MB	+	0.000	0.53
CNI	+	0.190	1.76*
DEBT	+	0.118	2.85***
SIZE	-	0.005	1.16
NEGNI	+	-0.015	-0.49
CAC	+	0.588	4.16***
SGROW	+	-0.023	-0.75
CASHF	-	-0.104	-0.94
FIN	+	-0.031	-2.20**
BIG4	-	0.038	0.90
OPCYC	+	-0.000	-2.16**
VCASH	+	0.112	0.51
VSALE	+	-0.014	-0.26
Industry dummy	+/-	-0.008	-0.92
N			525
F-statistic			4.66***
Adj. R^2			11.72%

The regression model is as follows:

$$DAC = \beta_0 + \beta_1 FMDIR + \beta_2 AEDIR + \beta_3 LTDIR + \beta_4 ADDIR + \beta_5 ACSIZE + \beta_6 MB + \beta_7 CNI + \beta_8 DEBT + \beta_9 SIZE + \beta_{10} NEGNI + \beta_{11} CAC + \beta_{12} SGROW + \beta_{13} CASHF + \beta_{14} FIN + \beta_{15} BIG4 + \beta_{16} OPCYC + \beta_{17} VCASH + \beta_{18} VSALE + Industry\ dummy + \varepsilon \quad (2)$$

***, **, and * indicate a significance at the level of 1%, 5%, and 10%, respectively (two-tailed tests).

Table 5
Results after Allowing for Self-Selection Bias

Variable	Predicted sign	Coefficient	*t*-statistic
Intercept	+/-	-0.090	-1.48
FMDIR	+/-	-0.032	-0.53
AEDIR	-	0.011	0.54
LTDIR	+/-	0.036	2.02**
ADDIR	+/-	-0.042	-1.86*
ACSIZE	+/-	0.005	1.06
MB	+	0.001	0.57
CNI	+	0.189	1.75*
DEBT	+	0.119	2.86***
SIZE	-	0.005	1.15
NEGNI	+	-0.017	-0.59
CAC	+	0.585	4.14***
SGROW	+	-0.022	-0.74
CASHF	-	-0.106	-0.97
FIN	+	-0.031	-2.18**
BIG4	-	0.040	0.95
OPCYC	+	-0.000	-2.20**
VCASH	+	0.105	0.48
VSALE	+	-0.016	-0.29
λ^	+/-	0.006	0.84
Industry dummy	+/-	-0.009	-0.94
N			525
F-statistic			4.46***
Adj. R^2			11.67%

The second stage regression model is as follows:

$$DAC = \beta_0 + \beta_1 FMDIR + \beta_2 AEDIR + \beta_3 LTDIR + \beta_4 ADDIR + \beta_5 ACSIZE + \beta_6 MB + \beta_7 CNI + \beta_8 DEBT + \beta_9 SIZE + \beta_{10} NEGNI + \beta_{11} CAC + \beta_{12} SGROW + \beta_{13} CASHF + \beta_{14} FIN + \beta_{15} BIG4 + \beta_{16} OPCYC + \beta_{17} VCASH + \beta_{18} VSALE + \beta_{19} \lambda^{\wedge} + Industry\ dummy + \varepsilon \quad (4)$$

where λ^ is the Inverse Mills Ratio based on the following first stage probit model:

$$\Pr(FMDUM=1) = \gamma_0 + \gamma_1 SIZE + \gamma_2 NEGNI + \gamma_3 MB + \gamma_4 ACSIZE + \gamma_5 BDIND + \gamma_6 FMEXE + \varepsilon \quad (3)$$

where *FMDUM* is coded 1 if there is at least one female director on an independent audit committee and 0 otherwise.

***, **, and * indicate a significance at the level of 1%, 5%, and 10%, respectively (two-tailed tests).

Table 6
Results on Accrual Quality

Variable	Predicted sign	Coefficient	*t*-statistic
Intercept	+/-	0.016	1.70*
FMDIR	+/-	0.002	0.33
AEDIR	-	-0.001	-0.19
LTDIR	+/-	0.001	0.29
ADDIR	+/-	0.005	1.42
ACSIZE	+/-	-0.001	-1.44
MB	+	0.000	0.04
DEBT	+	-0.017	-2.66***
SIZE	-	-0.001	-1.97**
NEGNI	+	0.023	5.40***
SGROW	+	0.013	2.77***
FIN	+	-0.002	-0.73
BIG4	-	0.007	1.03
OPCYC	+	0.000	1.24
VCFO	+	0.138	3.94***
VSALE	+	0.011	1.21
Industry dummy	+/-	0.003	1.91*
N			525
F-statistic			7.54***
Adj. R^2			16.64%

The regression model is as follows:

$$ACCQ = \beta_0 + \beta_1 FMDIR + \beta_2 AEDIR + \beta_3 LTDIR + \beta_4 ADDIR + \beta_5 ACSIZE + \beta_6 MB + \beta_7 DEBT + \beta_8 SIZE + \beta_9 NEGNI + \beta_{10} SGROW + \beta_{11} FIN + \beta_{12} BIG4 + \beta_{13} OPCYC + \beta_{14} VCASH + \beta_{15} VSALE + Industry\ dummy + \varepsilon \quad (6)$$

*** indicates a significance at the level of 1% (two-tailed tests).

Table 7
Results on Audit Committees with At Least Two or Fifty Percent Female Directors

		Two Female Directors		50% Female Directors	
Variable	Predicted sign	Coefficient	*t*-statistic	Coefficient	*t*-statistic
Intercept	+/-	-0.072	-1.00	-0.094	-1.58
FMDIRD	+/-	0.002	0.09	0.029	1.42
AEDIR	-	-0.003	-0.09	0.007	0.38
LTDIR	+/-	0.056	2.21**	0.032	1.83*
ADDIR	+/-	-0.035	-1.02	-0.043	-1.93*
ACSIZE	+/-	-0.001	-0.11	0.005	1.29
MB	+	-0.000	-0.25	0.001	0.44
CNI	+	0.066	0.47	0.186	1.73*
DEBT	+	0.190	3.00***	0.120	2.89***
SIZE	-	0.006	0.99	0.005	1.18
NEGNI	+	0.016	0.44	-0.014	-0.49
CAC	+	0.530	2.72**	0.597	4.23***
SGROW	+	0.003	0.07	-0.022	-0.73
CASHF	-	-0.044	-0.27	-0.102	-0.94
FIN	+	-0.039	-1.95**	-0.031	-2.22**
BIG4	-			0.034	0.83
OPCYC	+	-0.000	-1.59	-0.000	-2.16**
VCASH	+	0.357	1.12	0.120	0.55
VSALE	+	-0.060	-0.71	-0.016	-0.29
Industry dummy	+/-	-0.017	-1.27	-0.008	-0.88
N			262		525
F-statistic			2.57***		4.78***
Adj. R^2			9.75%		12.04%

***, **, and * indicate a significance at the level of 1%, 5%, and 10%, respectively (two-tailed tests).