Female Director, CEO Compensation, and Earnings Smoothing

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This paper is the first one in the literature to examine the effect of female directors on earnings smoothing and the potential channels through which such an effect may occur. When the interaction of female directors and CEO incentive compensation is not included, there is no significant overall effect of female directors on earnings smoothing. However, when the interaction term is added, the presence of female directors shows a strengthening effect in significantly increasing the association between incentive compensation and earnings smoothing. Further, the presence of female directors itself appears to play a moderating role in reducing the incidence of earnings smoothing, which conflicts with the effect of female directors through incentive compensation. The conflicting effects exist among both female directors in general and independent female directors. The complex effects of female directors have direct implications for corporate governance policies.

Keywords: female directors, earnings smoothing, CEO compensation

INTRODUCTION

This paper examines the effect of female directors on earnings smoothing through executive compensation. Earnings smoothing is a managerial behavior to decrease variations in reported earnings. Consequently, reported earnings will look less variable over time, particularly related to economic earnings (Beidleman, 1973; Carlson and Bathala, 1997; Goel and Thakor, 2003). The literature documents extensive evidence of earnings smoothing. (e.g., Beidleman, 1973; Ronen and Sadan, 1981; Subramanyam, 1996; Bannister and Newman, 1996; Godfrey and Jones, 1999).

Furthermore, managers engage in income smoothing for multiple reasons (Carlson and Bathala, 1997). For example, a reduction in the variation of the earnings stream may reduce investors' perceived risk of the firm and then increase the attractiveness of the firm to investors. It may also increase earnings predictability and improve managers' wealth and job security. Therefore, the management of a firm may be motivated to smooth income as a method to increase either shareholder value or personal wealth (Ronen and Sadan, 1981; Carlson and Bathala, 1997; Koh, 2005). In other words, earnings smoothing is not necessarily managerial opportunistic behavior that conflicts with shareholders' interests.

Even though the literature examines the relationship between female directors and earnings management, no such study investigates the effect of female directors on earnings smoothing. This paper intends to fill this gap.

Generally, the literature suggests that women on the board may improve the quality of earnings reports (Srinidhi et al., 2011). The argument is that compared with men, women are more risk averse, more ethical (Betz, O'Connell & Shepard, 1989; Khazanchi, 1995), have better communication skills, hold more

informed discussions, and feature better independent thinking. However, Lara et al. (2017) state that the literature "provides mixed findings and questions whether females in leadership roles are significantly different from their male counterparts."

In particular, regarding the monitoring role of female directors on accounting quality, the evidence in the literature is mixed. Krishnan and Parson (2008) and Srinidhi et al. (2011) found that earnings quality is positively and significantly related to either high gender diversity in senior management or the presence of female directors. However, Thiruvadi and Huang (2011) report a negative relationship between the presence of female representation on the audit committee and earnings management, while Sun, Liu, and Lan (2011) could not find any significant relationship.

In addition, Lara et al. (2017) distinguish themselves from the few studies in the literature that relate earnings management to gender by focusing on the gender of independent directors, not the gender of executive managers. According to Lara et al. (2017), it is the presence of independent women directors, instead of the presence of executive women directors, has a significant association with better quality accounting numbers. It appears that the key characteristic to impact accounting quality is the presence of independent directors, regardless of gender.

This paper will be the first one in the literature to examine the effect of female directors on earnings smoothing and the possible channels through which such an effect may occur.

The literature suggests that managers may attempt to increase the value of their compensation components that are linked to accounting earnings (Gong et al., 2019), such as option grants (Beneish and Vargus, 2002; Sloan, 1996; Baker et al., 2003; Cheng and Warfield, 2005; Bergstresser and Philippon, 2006; Cornett et al., 2008; McAnally et al., 2008) or bonus (Healy et al., 1987; Balsam, 1998; Das et al., 2013). Therefore, earnings-related compensation components may drive managers to pursue a variety of opportunistic behavior including earning smoothing. Will female directors suppress this association as they are expected to be more ethical and provide better monitoring? Alternatively, female directors, who appear to be more risk averse, may support earnings smoothing, so reported earnings will look less variable over time and reduce investors' perceived risk of the firm. Therefore, the effects of female directors on earning smoothing may be complex. Whether there is a dominant effect is an empirical question between the two possible opposing effects.

Being the first to examine the interaction of female directors and CEO incentive compensation on earnings smoothing among US firms in a long period between 1996 and 2017, the paper shows that female directors may have conflicting effects on earnings smoothing, which may cause mixed evidence. When the interaction of female directors and CEO incentive compensation is not included in the analysis, there is no significant overall effect of female directors on earnings smoothing. This is the case whether the representation of female directors is measured by various percentages of female directors on the board or by various dummy variables for the presence of female directors.

However, when the interaction of female directors and CEO incentive compensation is added, the presence of female directors has significantly increased the association between incentive compensation and earnings smoothing. The evidence exists whether the representation of female directors is measured by various percentages of female directors on the board or by various dummy variables for the presence of female directors.

Further, when the representation of female directors is measured by various dummy variables for the presence of female directors, the presence of female directors itself also appears to be negatively associated with the incidence of earnings smoothing, which is conflicting to the effect of female directors through incentive compensation. The conflicting effects exist among both female directors in geneal and independent female directors.

The conflicting effects show that on the one hand, female directors play a moderating role to reduce the incidence of earnings smoothing. On the other hand, after the suppressing effect has been controlled for, those firms with female directors are more likely to have earnings smoothing than those without female directors, given the same level of managerial incentive compensation.

The negative effect of female directors on earnings smoothing may show female directors possibly provide better monitoring so suppressing the incidence of earning smoothing. But there can be various

possible interpretations about the strengthening effect of female directors on the association between incentive compensation and earnings smoothing. For example, as the literature shows that managerial incentive compensation promotes risk taking (e.g., Guay, 1999; Coles et al., 2006) that may lead to an increase in the variability of earnings, risk averse female directors may support earnings smoothing, so reported earnings will look less variable over time and then reduce investors' perceived risk of the firm.

There is another possible interpretation for the strengthening effect. As earnings smoothing may not necessarily be in conflict with shareholders' interest (Ronen and Sadan, 1981; Carlson and Bathala, 1997; Koh, 2005); especially, when managers have higher incentive compensation, they are expected to be more aligned with the interest of shareholders (Nyberg, et al., 2010), and then tend to be more likely to smooth earnings when it is consistent with shareholders' interest. If this is the case, the strengthening effect of female directors on the association between managerial incentive compensation and earnings smoothing simply show female directors encourages managerial behaviors that benefit shareholders.

The findings in the paper have direct implications for corporate governance policies. Given the complex effects of female directors on managerial behavior, which may have multiple directions and then are not always in the best interest of shareholders, simply adding more female directors is not one-size-fit-all governance solution.

SAMPLE, VARIABLES, AND SUMMARY STATISTICS

Data and Sample

The author uses several databases to form the sample. The data for CEO tenure, age, and compensation are obtained from EXECUCOMP. Some governance data are collected from Thomson Reuters and RiskMetrics (formerly IRRC). CRSP is used to collect stock returns in order to calculate equity volatility, while COMPUSTAT is used to collect financial data. To be included in the sample, a firm must have data available from all the above sources for a given year. After merging the databases, the primary sample to examine the relationship between female directors and earnings management includes 10,577 firm-year observations and 1,852 unique firms. The sample mainly covers S&P 1,500 firms from 1996 to 2017, including the 500 firms in the S&P 500 Index, the 400 firms in the S&P MidCap Index, and the 600 firms in the S&P SmallCap Index. The primary sample includes financial (one-digit SIC code equals 6) and utility firms (two-digit SIC code equals 49).

Variables

This subsection describes the major variables that the author used in the empirical analysis. The detailed definitions are in the Appendix.

Earning Smoothing Variables

The paper follows Koh (2005) to identify those firms that smooth the earnings. The process starts with constructing measures of total accruals and discretionary accruals by using the modified Jones model as in the literature (Dechow, et al., 1995; Bartov, et al., 2000; Bergstresser and Philippon, 2006; Cornett, et al., 2008).

The author first calculates earnings before extraordinary items and discontinued operations minus operating cash flows from continuing operations (Cornett, et al., 2008), to construct the total accruals variable. The number is then divided by the previous year's assets to obtain the measure of total accruals (*Ratio_ta*).

Next, the modified Jones (1991) model is used to construct the variable of discretionary accruals. Discretionary accruals are the difference between total and "normal" accruals. The modified Jones model estimates "normal" accruals as a fraction of lagged assets from the following model:

$$\frac{TA_{jt}}{Assets_{jt-1}} = \alpha_o \frac{1}{Asssts_{jt-1}} + \beta_1 \frac{\Delta Sales_{jt}}{Assets_{jt-1}} + \beta_2 \frac{PPE_{jt}}{Assets_{jt-1}} \quad (1)$$

where TA_{jt} denotes total accruals for firm j in year t, $Asset_{jt-1}$ denotes total assets for firm j in year t-1, $\Delta Sales_{jt}$ denotes a change in sales for firm j in year t, and PPE_{jt} denotes property, plant, equipment for firm j in year t. The author estimates model (1) by using the firms in COMPUSTAT with the same two-digit SIC code as the sample firms in each year of the sample period.

Discretionary accruals then are defined as a fraction of assets as

$$Ratio\_da_{jt} = Ratio\_ta_{jt} - \left(\hat{\alpha}_0 \frac{1}{Assets_{jt-1}} + \hat{\beta}_1 \frac{\Delta Sales_{jt} - \Delta Receivables_{jt}}{Assets_{jt-1}} + \hat{\beta}_2 \frac{PPE_{jt}}{Assets_{jt-1}} \right) \quad (2)$$

where hats denote estimated values from model (1). The inclusion of $\Delta Receivables_{jt}$ in equation (2) is the "modification" of the Jones (1991) model. This variable attempts to capture the extent to which a change in sales is due to aggressive recognition of questionable sales.

Based on the calculation of discretionary accruals, a firm will be classified as an income smoother if its reported earnings (i.e. earnings before interest and tax and before extraordinary items, $EBIT_{jt}$) are closer to their earnings trend ($Trend_{jt}$) than are non-discretionary earnings (NDE_{jt}), where prior year's earnings level ($EBIT_{j,t-1}$) is used as the proxy for $Trend_{jt}$, and NDE_{jt} is the difference between reported earnings ($EBIT_{jt}$) and discretionary accruals ($Ratio\_da_{jt}$). Please note that reported earnings ($EBIT_{jt}$), earnings trend ($Trend_{jt}$), and non-discretionary accruals (NDE_{jt}) are all scaled by prior year's total assets, as the discretionary accruals ($Ratio\_da_{jt}$) is scaled by prior year's total assets.

Measures of CEO Option Incentives

The level of option incentives is measured by the pay-for-performance sensitivity based on CEO's total portfolio wealth, which includes newly granted and outstanding options and stocks. Then delta is used to examine the effect of options incentives on earnings smoothing.

Specifically, the calculation of the value of option sensitivity needs the risk-free rate and the volatility. The interest rate on a seven-year constant-maturity Treasury bond is obtained from the Federal Reserve Bank of St. Louis website as the risk-free rate proxy. The standard deviation of stock price over the prior sixty months is the measure of the volatility. The author then obtain the value of option sensitivity by calculating the partial derivative of individual stock option with respect to one-dollar change in share price (the Black and Scholes (1973) hedge ratio with dividends, i.e. delta), and times it with the proportion of shares represented by executive option award (see, Yermack, 1995). Note Core and Guay's (2002) "one-year approximation" method is applied to estimate the average exercise prices for previously granted options.

Measures of Other Governance Variables, Firm Characteristics, and CEO Characteristics

To examine the effects of female directors on the incidence of earnings smoothing, the author also controls for various firm characteristics, CEO characteristics, and other governance characteristics, such as board characteristics and CEO ownership, by following the earnings management literature (Carlson and Bathala, 1997; Koh, 2005; Zheng, 2010). The Appendix defines the above variables in details.

In the following analysis, all the variables except *Ppsk, Bdsize, and Ceo_tenure* are winsorized at the top and bottom 1% of the observations in order to mitigate the inordinate influence of extreme values. *Ppsk, Bdsize, and Ceo_tenure* are included in the analysis in their log format.

Summary Statistics

Table 1 presents the primary analyses' descriptive statistics of the key variables. The five panels respectively provide information on earnings smoothing, presence of female directors, CEO option incentives and other governance variables, firm characteristics, and CEO characteristics.

In particular, Panel A shows that on average around 83% of the 10,577 firm-year observations smooth their earnings. Panel B shows that the average (median) firm in our sample has 11.39% (11.11%) of female directors. The average (median) percentage of independent female directors on the board is 10.25%

(10.00%). The statistics of these two variables show that most female directors are independent. In addition, the mean (median) percentage of female independent directors relative to the total number of independent directors is 13.31% (13.33%). The average percentage of female independent directors to the total number of compensation committee members is 11.83%, while the average percentage of female independent directors outside the compensation committee to the total board size is 5.42%. The median for the last two variables are both zero.

TABLE 1
SUMMARY STATISTICS

Variable	Observations	P25	Mean	Median	P75	Std
Panel A: Earnings management						
Smooth	10577	1.00	0.83	1.00	1.00	0.38
Panel B: Female directors						
Pct_fd	10577	0.00%	11.39%	11.11%	17.65%	9.74%
Pct_fidt	10577	0.00%	10.25%	10.00%	16.67%	9.09%
Pct_fid	10567	0.00%	13.31%	13.33%	20.00%	11.85%
Pct_fid_comp	10361	0.00%	11.83%	0.00%	25.00%	16.28%
Pct_fid_ncompt	10361	0.00%	5.42%	0.00%	10.00%	6.96%
Panel C: CEO compensation						
Ppsk	10577	63.10	843.40	175.50	494.96	7202.00
Panel D: Other governance variables						
Ceoown	10577	0.36%	2.93%	0.96%	2.48%	5.81%
Ln_bdsize	10577	8.00	9.56	9.00	11.00	3.07
Pctbdind	10577	66.67%	74.77%	77.78%	87.50%	15.22%
Duality	10577	0.00	0.49	0.00	1.00	0.50
Panel E: CEO characteristics						
Age	10577	52.00	56.18	56.00	61.00	6.82
Ln_ceotenure	10577	4.00	10.14	8.00	14.00	8.59
Panel F: Firm characteristics						
Mve	10577	6.65	7.74	7.60	8.79	1.51
Lev	10577	0.07	0.22	0.22	0.34	0.18
Nisd	10577	14.36	163.32	41.07	137.79	330.19
Q	10577	1.14	1.95	1.52	2.18	1.51

This table reports the summary statistics of major variables used in the empirical analysis. *Ppsk*, *Bdsize*, and *CEO_tenure* are in their raw format[1]. All the other variables have been winsorized at the 1st and 99th percentiles. See the Appendix for the definitions of all variables.

In addition, Table 2 reports the correlation between the key variables.

TABLE 2
CORRELATION MATRIX

	[1]	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*	*[7]*	*[8]*	*[9]*
Smooth [1]	1								
Pct_fd [2]	0.01	1							
Pct_fidt [3]	0.02	**0.93*** **	1						
Pct_fid [4]	0.01	**0.91*** **	**0.96*** **	1					
Pct_fid_comp [5]	0.01	**0.61*** **	**0.64*** **	**0.64*** **	1				
Pct_fid_ncompt [6]	0.01	**0.64*** **	**0.69*** **	**0.64*** **	**-0.05**	1			
Ppsk [7]	0.01	0.00	-0.01	0.00	0.00	-0.01	1		
Ceoown [8]	-0.01	**-0.13*** **	**-0.17*** **	**-0.13*** **	**-0.10*** **	**-0.13*** **	**0.12*** **	1	
Ln_bdsize [9]	0.00	**0.24*** **	**0.24*** **	**0.22*** **	**0.13*** **	**0.24*** **	0.01	**-0.08*** **	1
Pctbdind [10]	**0.04*** **	**0.26*** **	**0.37*** **	**0.18*** **	**0.18*** **	**0.29*** **	**-0.07*** **	**-0.30*** **	**0.12*** **
Duality [11]	0.01	**0.07*** **	**0.09*** **	**0.06*** **	**0.03*** **	**0.08*** **	**-0.03*** **	**0.13*** **	-0.02
Age [12]	0.00	**0.02** **	**0.02***	0.01	0.00	0.01	0.01	**0.14*** **	**0.07*** **
Ln_ceotenure [13]	**-0.02***	**-0.13*** **	**-0.17*** **	**-0.12*** **	**-0.12*** **	**-0.11*** **	**0.07*** **	**0.43*** **	**-0.05*** **
Mve [14]	0.01	**0.30*** **	**0.32*** **	**0.29*** **	**0.15*** **	**0.30*** **	**0.13*** **	**-0.21*** **	**0.38*** **
Lev [15]	0.00	**0.08*** **	**0.08*** **	**0.07*** **	**0.06*** **	**0.06*** **	**-0.04*** **	**-0.07*** **	0.14
Nisd [16]	-0.01	**0.15*** **	**0.17*** **	**0.15*** **	**0.08*** **	**0.17*** **	**0.08*** **	**-0.12*** **	0.22
Q [17]	**-0.04*** **	0.00	-0.01	0.01	-0.01	0.00	**0.18*** **	**0.04*** **	-0.11

	[10]	*[11]*	*[12]*	*[13]*	*[14]*	*[15]*	*[16]*	*[17]*
Smooth [1]								
Pct_fd [2]								
Pct_fidt [3]								
Pct_fid [4]								
Pct_fid_comp [5]								
Pct_fid_ncompt [6]								
Ppsk [7]								
Ceoown [8]								
Ln_bdsize [9]								
Pctbdind [10]	1							
Duality [11]	**0.10*** **	1						
Age [12]	**0.04*** **	**0.15*** **	1					
Ln_ceotenure [13]	**-0.25*** **	**0.13*** **	**0.43*** **	1				
Mve [14]	**0.18*** **	**0.05*** **	**0.07*** **	**-0.10*** **	1			
Lev [15]	**0.05*** **	0.01	**0.03*** **	**-0.05*** **	**0.08*** **	1		
Nisd [16]	**0.12*** **	**0.05*** **	**0.05*** **	**-0.10*** **	**0.49*** **	**0.10*** **	1	
Q [17]	**-0.10*** **	-0.01	**-0.08*** **	**0.03*** **	**0.25*** **	**-0.18*** **	**-0.05*** **	1

This table reports the correlation of major variables used in the empirical analysis. *Ppsk*, *Bdsize*, and *CEO_tenure* are in their raw format. All the other variables have been winsorized at the 1st and 99th percentiles. See the Appendix for the definitions of all variables.

EMPIRICAL ANALYSIS

The author uses two model specifications to examine the effect of female directors on the incidence of earnings smoothing. First, by following Koh (2005), the author employs Logit panel regressions in Section 3.1 and examines the influence of female directors in general without examining the possible channel of the effect through CEO incentive compensation. To alleviate the potential endogeneity concerns, the author controls for the SIC industry and year effects in the Logit model, in addition to the extensive list of controls as described above. To alleviate the potential reverse causality, all the female directors' variables are lagged by one year (Zheng, 2010; Zheng 2021), instead of using their contemporary forms.

The second model specification employs a firm fixed effect Logit model to further account for potential omitted variable bias, as shown in Section 3.2. Some unobserved sources of firm heterogeneity can affect female directors and the likelihood of earnings smoothing simultaneously, which can bias estimation of coefficients. Fixed effects are immune to such omission of unobserved firm characteristics and, therefore can mitigate the concerns for endogeneity (Himmelberg et al., 1999; Kale et al., 2009; Kini and Williams, 2012). In both Logit and fixed effect Logit model specifications, standard errors are adjusted for heteroskedasticity and clustered at the firm level.

Furthermore, in Sections 3.1 and 3.2, the author uses different proxies to measure the representation of female directors. In particular, the author uses various percentages of female directors on the board and then uses various dummy variables for the presence of female directors. In both cases, the author first examines the effect of female directors on earnings smoothing before examining the effects of the interaction between female directors and CEO incentive compensation on earnings smoothing.

Logit Regressions

Measuring the Representation of Female Directors With Various Percentages of Female Directors on the Board

In this subsection, the representation of female directors on the board is measured as the percentage of female directors on a board, the percentage of female independent directors relative to the board size, the percentage of female independent directors relative to the total number of independent directors, and the percentage of female independent directors relative to the total compensation committee size and the percentage of female independent directors outside the compensation committee relative to the total board size.

Female Directors and Earnings Smoothing. The author runs Logit regressions of the incidence of earnings smoothing against variables for female directors and the other variables defined in section 2. The following equation is estimated:

$$Smoothing_{it} = \beta_0 + \beta_1 FemaleDirectors_{it} + \beta_2 OptionIncentives + \beta_3 OtherGovernance_{it} + \beta_4 FirmCharacteristics_{it} + \beta_5 CEOCharacteristics_{it} + \varepsilon_{it} \quad (3)$$

Different variables that measure the representation of female directors will enter one at a time (except for *per_fidir_comp* and *per_fidir_ncomp*, which are included in the regression simultaneously.)

Table 3 presents the results of the effects of various percentage measures of female directors on the incidence of earning smoothing. When the interaction of female directors and CEO incentive compensation is not included in the analysis, none of the regressions in Table 3 shows a significant effect of female directors on earnings smoothing.

TABLE 3
THE EFFECTS OF FEMALE DIRECTORS: PERCENTAGE OF FEMALE DIRECTORS AND EARNINGS SMOOTHING (LOGIT MODELS)

Dependent Variable	(1) *Smooth*	(2) *Smooth*	(3) *Smooth*	(4) *Smooth*
Pct_fd_l1	0.4717			
	(1.336)			
Pct_fidt_l1		0.5271		
		(1.373)		
Pct_fid_l1			0.3221	
			(1.134)	
Pct_fid_comp_l1				0.2720
				(1.377)
Pct_fid_ncompt_l1				0.2915
				(0.591)
Ln_ppsk_l1	0.0110	0.0108	0.0109	0.0110
	(0.427)	(0.422)	(0.423)	(0.418)
Ceoown_l1	0.3569	0.3659	0.3179	0.4199
	(0.515)	(0.527)	(0.458)	(0.603)
Ln_bdsize_l1	0.0347	0.0394	0.0424	0.0509
	(0.258)	(0.292)	(0.313)	(0.370)
Pctbdind_l1	-0.2988	-0.3324	-0.2537	-0.2502
	(-1.270)	(-1.390)	(-1.060)	(-1.047)
Duality_l1	0.0335	0.0326	0.0370	0.0312
	(0.554)	(0.538)	(0.610)	(0.505)
Age	-0.0017	-0.0017	-0.0017	-0.0016
	(-0.344)	(-0.337)	(-0.347)	(-0.315)
Ceotenure	0.0108	0.0109	0.0108	0.0054
	(0.283)	(0.288)	(0.282)	(0.141)
Mve_l1	**0.0666***	**0.0657***	**0.0671***	0.0577
	(1.870)	(1.849)	(1.887)	(1.592)
Lev_l1	0.1757	0.1779	0.1747	0.1637
	(0.901)	(0.914)	(0.898)	(0.829)
Nisd_l1	**-0.0003*****	**-0.0003*****	**-0.0003*****	**-0.0003*****
	(-3.036)	(-3.043)	(-3.055)	(-2.969)
Q_l1	**-0.1273*****	**-0.1270*****	**-0.1271*****	**-0.1252*****
	(-3.570)	(-3.567)	(-3.561)	(-3.510)
Constant	**2.2550****	**2.2682****	**2.2166****	**2.2356****
	(2.277)	(2.286)	(2.242)	(2.273)
# of Obs.	10,577	10,577	10,567	10,334
Pseudo R-squared	0.103	0.103	0.104	0.104

These models use Logit panel regressions to examine the relation between female directors and earnings smoothing. Various percentage measures of female directors are used to indicate the presence of female directors, while the incidence of earnings smoothing is the dependent variable. The sample consists of S&P 1,500 firms from 1996 to 2017. See the Appendix for the definitions of all the variables. All models include year and SIC industry dummies. These coefficients are not reported to save space. Standard errors are adjusted for heteroskedasticity and clustered at the firm level. *t*-statistics are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Model adjusted R-squared and its significance level are provided at the bottom of the table.

The Interaction Between Female Directors and CEO Incentive Compensation and Earnings Smoothing. In this section, the author examines the effect of female directors on the incidence of earnings smoothing through a potential channel of CEO incentive compensation. Therefore, an interaction variable between various percentage measures of female directors and CEO incentive compensation is added to the different regression models in Table 3.

All four regressions in Table 4 show that the impact of female directors on earnings management can be decomposed into two portions. On the one hand, it significantly increases the effect of incentive compensation on earnings smoothing. On the other hand, it has an insignificantly negative effect on earnings smoothing after excluding its interaction effect with the incentive compensation. The described effects exist when various measures for the presence of female directors are used, including the percentage of female directors on a board, the percentage of female independent directors relative to the board size, the percentage of female independent directors relative to the total number of independent directors, and the ratio of female independent directors to the total number of compensation committee members and the ratio of female independent directors outside the compensation committee to the total board size.

TABLE 4
THE EFFECTS OF THE INTERACTION BETWEEN FEMALE DIRECTORS AND CEO INCENTIVE COMPENSATION: PERCENTAGE OF FEMALE DIRECTORS AND EARNINGS SMOOTHING (LOGIT MODELS)

	(1)	(1)	(1)	(1)
Dependent Variable	*Smooth*	*Smooth*	*Smooth*	*Smooth*
Pct_fd_l1	-1.1677			
	(-1.241)			
Pct_fidt_l1		-1.2651		
		(-1.262)		
Pct_fid_l1			-0.9741	
			(-1.308)	
Pct_fid_comp_l1				-0.7553
				(-1.332)
Pct_fid_ncompt_l1				-0.2188
				(-0.162)
Ln_ppsk_l1	-0.0221	-0.0203	-0.0194	-0.0149
	(-0.711)	(-0.681)	(-0.642)	(-0.491)
Pctfd_ppsk	**0.3273***			
	(1.818)			
Pctfidt_ppsk		**0.3604***		
		(1.912)		
Pctfid_ppsk			**0.2526***	
			(1.854)	
Pctfidcomp_ppsk				**0.2025***
				(1.895)
Pctfidncompt_ppsk				0.1033
				(0.409)

	(1)	(1)	(1)	(1)
Dependent Variable	*Smooth*	*Smooth*	*Smooth*	*Smooth*
Ceoown_l1	0.4308	0.4718	0.4010	0.5178
	(0.621)	(0.673)	(0.575)	(0.742)
Ln_bdsize_l1	0.0332	0.0410	0.0446	0.0542
	(0.246)	(0.304)	(0.329)	(0.392)
Pctbdind_l1	-0.3112	-0.3627	-0.2610	-0.2691
	(-1.324)	(-1.521)	(-1.088)	(-1.129)
Duality_l1	0.0340	0.0319	0.0372	0.0309
	(0.562)	(0.526)	(0.612)	(0.501)
Age	-0.0017	-0.0014	-0.0014	-0.0013
	(-0.335)	(-0.274)	(-0.282)	(-0.267)
Ceotenure	0.0086	0.0081	0.0083	0.0032
	(0.226)	(0.214)	(0.218)	(0.083)
Mve_l1	**0.0634***	**0.0618***	**0.0649***	0.0556
	(1.772)	(1.734)	(1.823)	(1.530)
Lev_l1	0.1574	0.1610	0.1619	0.1433
	(0.806)	(0.825)	(0.830)	(0.723)
Nisd_l1	**-0.0003*****	**-0.0003*****	**-0.0003*****	**-0.0003*****
	(-3.092)	(-3.104)	(-3.102)	(-3.037)
Q_l1	**-0.1262*****	**-0.1253*****	**-0.1266*****	**-0.1242*****
	(-3.539)	(-3.523)	(-3.537)	(-3.500)
Constant	**2.4272****	**2.4234****	**2.3517****	**2.3496****
	(2.405)	(2.391)	(2.353)	(2.345)
Observations	10,577	10,577	10,567	10,334
Pseudo R-squared	0.104	0.104	0.104	0.104

These models use Logit panel regressions to examine the effects of the interaction between female directors and CEO incentive compensation on earnings smoothing. Various percentage measures of female directors are used to indicate the presence of female directors, while the incidence of earnings smoothing is the dependent variable. The sample consists of S&P 1,500 firms from 1996 to 2017. See the Appendix for the definitions of all variables. All models include year and SIC industry dummies. These coefficients are not reported to save space. Standard errors are adjusted for heteroskedasticity and clustered at the firm level. *t*-statistics are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Model-adjusted R-squared and its significance level are provided at the bottom of the table.

Measuring the Representation of Female Directors with Various Dummies for the Presence of Female Directors on the Board

In this section, the dummy variables are used to measure the representation of female directors, including those that indicate the presence of female directors on a board, female independent directors on a board, or female independent directors on the compensation committee and the female independent directors outside the compensation committee.

Female Directors and Earnings Smoothing. Table 5 repeats the regressions in Table 3, except that among the independent variables the various percentage measures of female directors are replaced with dummy variables for female directors[2]. Similar as in Table 3, none of the coefficients on the dummy variables for female directors are significant.

TABLE 5
THE EFFECTS OF FEMALE DIRECTORS: DUMMIES FOR FEMALE DIRECTORS AND EARNINGS SMOOTHING (LOGIT MODELS)

	Dependent Variable		
Independent Variables	*Smooth*	*Smooth*	*Smooth*
D_fd_l1	0.0892		
	(1.147)		
D_fidt_l1		0.0892	
		(1.147)	
D_fid_comp_l1			0.0452
			(0.653)
D_fid_ncompt_l1			0.0103
			(0.141)
Ln_ppsk_l1	0.0111	0.0111	0.0112
	(0.432)	(0.432)	(0.426)
Ceoown_l1	0.3685	0.3685	0.3878
	(0.529)	(0.529)	(0.557)
Ln_bdsize_l1	0.0150	0.0150	0.0550
	(0.108)	(0.108)	(0.381)
Pctbdind_l1	-0.3183	-0.3183	-0.2200
	(-1.336)	(-1.336)	(-0.917)
Duality_l1	0.0351	0.0351	0.0335
	(0.581)	(0.581)	(0.542)
Age	-0.0016	-0.0016	-0.0017
	(-0.327)	(-0.327)	(-0.341)
Ceotenure	0.0101	0.0101	0.0042
	(0.267)	(0.267)	(0.109)
Mve_l1	**0.0664***	**0.0664***	**0.0602***
	(1.866)	(1.866)	(1.664)
Lev_l1	0.1809	0.1809	0.1719
	(0.929)	(0.929)	(0.869)
Nisd_l1	**-0.0003*****	**-0.0003*****	**-0.0003*****
	(-3.014)	(-3.014)	(-2.938)
Q_l1	**-0.1272*****	**-0.1272*****	**-0.1257*****
	(-3.570)	(-3.570)	(-3.522)
Constant	**2.3356****	**2.3356****	**2.2323****
	(2.376)	(2.376)	(2.290)
Observations	10,577	10,577	10,334
Pseudo R-squared	0.103	0.103	0.104

These models use Logit panel regressions to examine the relation between female directors and earnings smoothing. Various dummies for female directors indicate the presence of female directors, while the incidence of earnings smoothing is the dependent variable. The sample consists of S&P 1,500 firms from 1996 to 2017. See the Appendix for the definitions of all variables. All models include year and SIC industry dummies. These coefficients are not reported to save space. Standard errors are adjusted for heteroskedasticity and clustered at the firm level. *t*-statistics are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Model-adjusted R-squared and its significance level are provided at the bottom of the table.

Similar to Section 3.1.1., the results here may continue to explain the mixed evidence that the literature has documented about the monitoring role of female directors on accounting quality. Without disentangling the channel through which female directors impact earning smoothing, the documented effects may be inconsistent and undetectable.

The Interaction Between Female Directors and CEO Incentive Compensation and Earnings Smoothing. Similar to Section 3.1.1.B, the author examines if female directors impact earnings management through CEO incentive compensation.

In Table 6, the regressions as in Table 4 are repeated, except that among the independent variables, the percentage measures of female directors are replaced with dummy variables for female directors.

The first two regressions in Table 6 show that female directors' impact on earnings management can be decomposed into two conflicting portions. On the one hand, it significantly increases the effect of incentive compensation on earnings smoothing. This is consistent with what has been shown in Table 4. On the other hand, after excluding its interaction effect with the incentive compensation, female directors have a significantly positive effect on earnings smoothing. This is different from Table 4 where the positive effect is insignificant. The described conflicting effects exist when the dummy variable for female directors measures the presence of female directors on a board or the dummy variable for female independent directors on a board.

When the presence of female directors are measured by the dummy variable for female independent directors in the compensation committee and the dummy variable for female independent directors outside the compensation committee, the positive effect of female directors on earnings smoothing becomes insignificant again. Regarding the interaction effect, it shows only female independent directors who are in the compensation committee, but not female independent directors who are outside the compensation committee, significantly increasing the effect of incentive compensation on earnings smoothing.

In addition, comparing the results in Table 4 and Table 6 shows that when the potential conflicting effects from female directors are separated, using the dummy variables, rather than the percentage of female directors, to measure the presence of female directors would be a better way to capture a conflicting effect of female director on earnings smoothing. It suggests that the differential effects of female directors on earnings smoothing may not necessarily come from the companies with more female directors versus those with fewer or no female directors but rather from companies with female directors versus those without female directors.

TABLE 6
THE EFFECTS OF THE INTERACTION BETWEEN FEMALE DIRECTORS AND CEO INCENTIVE COMPENSATION: DUMMIES FOR FEMALE DIRECTORS AND EARNINGS SMOOTHING (LOGIT MODELS)

	Dependent Variable		
Independent Variables	Smooth	Smooth	Smooth
D_fd_l1	**-0.4011****		
	(-2.051)		
D_fidt_l1		**-0.3592***	
		(-1.885)	
D_fid_comp_l1			-0.2752
			(-1.419)
D_fid_ncompt_l1			-0.1456
			(-0.774)
Ln_ppsk_l1	-0.0527	-0.0408	-0.0229
	(-1.510)	(-1.280)	(-0.722)

	Dependent Variable		
Independent Variables	Smooth	Smooth	Smooth
Dfd_ppsk	**0.0991*** **		
	(2.690)		
Dfidt_ppsk		**0.0901** **	
		(2.525)	
Dfidcomp_ppsk			**0.0635***
			(1.739)
Dfidncompt_ppsk			0.0314
			(0.903)
Ceoown_l1	0.4896	0.5310	0.5246
	(0.695)	(0.747)	(0.750)
Ln_bdsize_l1	-0.0036	0.0068	0.0554
	(-0.026)	(0.049)	(0.384)
Pctbdind_l1	-0.3125	-0.3504	-0.2436
	(-1.331)	(-1.473)	(-1.018)
Duality_l1	0.0412	0.0381	0.0344
	(0.682)	(0.629)	(0.556)
Age	-0.0015	-0.0012	-0.0015
	(-0.304)	(-0.245)	(-0.294)
Ceotenure	0.0049	0.0050	0.0013
	(0.129)	(0.132)	(0.034)
Mve_l1	**0.0626***	**0.0617***	0.0572
	(1.751)	(1.729)	(1.577)
Lev_l1	0.1650	0.1638	0.1556
	(0.845)	(0.840)	(0.783)
Nisd_l1	**-0.0003*****	**-0.0003*****	**-0.0003*****
	(-3.097)	(-3.099)	(-3.029)
Q_l1	**-0.1252*****	**-0.1248*****	**-0.1233*****
	(-3.508)	(-3.493)	(-3.455)
Constant	**2.6855*****	**2.6318*****	**2.3937****
	(2.706)	(2.662)	(2.404)
Observations	10,577	10,577	10,334
Adjusted R-squared	0.104	0.104	0.104

These models use Logit panel regressions to examine the effects of the interaction between female directors and CEO incentive compensation on earnings smoothing. Various dummies for female directors are used to indicate the presence of female directors, while the incidence of earnings smoothing is the dependent variable. The sample consists of S&P 1,500 firms from 1996 to 2017. See the Appendix for the definitions of all variables. All models include year and SIC industry dummies. These coefficients are not reported to save space. Standard errors are adjusted for heteroskedasticity and clustered at the firm level. *t*-statistics are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Model adjusted R-squared and its significance level are provided at the bottom of the table.

Fixed Effect Logit Regressions

In this section, the author employs the firm fixed effect Logit model and repeat all the regressions as in Section 3.1, to further account for potential omitted variable bias due to unobserved firm characteristics. Regression results about the effects of female directors on earnings smoothing are similar after the firm fixed effect is controlled for.

Measuring the Representation of Female Directors with Various Percentages of Female Directors on the Board

In this subsection, the representation of female directors on the board is measured as various percentages of female directors, as in Section 3.1.1.

Female Directors and Earnings Smoothing. Similar as in Section 3.1.1.A., the author runs a regression of the incidence of earnings smoothing against variables for female directors and the other variables as in equation (3). But differently, the firm fixed effect Logit model is estimated.

TABLE 7
THE EFFECTS OF FEMALE DIRECTORS: PERCENTAGE OF FEMALE DIRECTORS AND EARNINGS SMOOTHING (FIXED EFFECT LOGIT MODELS)

	(1)	(2)	(3)	(4)
Dependent Variable	*Smooth*	*Smooth*	*Smooth*	*Smooth*
Pct_fd_l1	0.0623			
	(0.106)			
Pct_fidt_l1		-0.2003		
		(-0.326)		
Pct_fid_l1			0.0586	
			(0.134)	
Pct_fid_comp_l1				0.0618
				(0.206)
Pct_fid_ncompt_l1				-0.3189
				(-0.455)
Ln_ppsk_l1	0.0559	0.0560	0.0542	0.0561
	(1.562)	(1.566)	(1.515)	(1.542)
Ceoown_l1	-0.5434	-0.5322	-0.5928	-0.4707
	(-0.531)	(-0.520)	(-0.579)	(-0.456)
Ln_bdsize_l1	-0.0684	-0.0673	-0.0767	-0.0791
	(-0.347)	(-0.341)	(-0.389)	(-0.395)
Pctbdind_l1	0.2289	0.2589	0.2888	0.3460
	(0.668)	(0.740)	(0.828)	(0.980)
Duality_l1	0.0722	0.0729	0.0664	0.0639
	(0.912)	(0.922)	(0.839)	(0.793)
Age	-0.0039	-0.0039	-0.0033	-0.0037
	(-0.478)	(-0.487)	(-0.408)	(-0.448)
Ceotenure	-0.0208	-0.0207	-0.0214	-0.0245
	(-0.375)	(-0.373)	(-0.386)	(-0.433)
Mve_l1	-0.0513	-0.0522	-0.0503	-0.0481
	(-0.664)	(-0.675)	(-0.651)	(-0.615)
Lev_l1	0.0714	0.0718	0.0660	0.1523
	(0.216)	(0.218)	(0.200)	(0.457)
Nisd_l1	**-0.0003****	**-0.0003****	**-0.0003****	**-0.0003***
	(-1.972)	(-1.976)	(-1.994)	(-1.825)
Q_l1	**-0.1239*****	**-0.1234*****	**-0.1225*****	**-0.1197*****
	(-3.411)	(-3.401)	(-3.371)	(-3.296)
# of Obs.	7,195	7,195	7,187	6,950
Model chi-squared	132.3	132.4	132.8	123.9
p-value	0	0	0	0

These models use fixed effect Logit regressions to examine the relation between female directors and earnings management. Various percentage measures of female directors are used to indicate the presence of female directors, while the incidence of earnings smoothing is the dependent variable. The sample consists of S&P 1,500 firms from 1996 to 2017. See the Appendix for the definitions of all variables. All models include year dummies. These coefficients are not reported to save space. Standard errors are adjusted for heteroskedasticity and clustered at the firm level. *t*-statistics are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Model adjusted R-squared and its significance level are provided at the bottom of the table.

Table 7 presents the results of fixed effect regressions of the effects of various percentage measures of female directors on the incidence of earning smoothing. Similar to Table 3, when the interaction of female directors and CEO incentive compensation is not included in the analysis, none of the regressions shows a significant effect of female directors on earnings smoothing.

The Interaction Between Female Directors and CEO Incentive Compensation and Earnings Smoothing. This section presents the effect of female directors on the incidence of earnings smoothing through a potential channel of CEO incentive compensation by using the fixed effect regressions. Therefore, an interaction variable between various percentage measures of female directors and CEO incentive compensation is added to the different regression models in Table 7.

The fixed effect regressions results further confirm the two conflicting effects of female directors on earnings smoothing as shown in Table 4. On the one hand, it significantly increases the effect of incentive compensation on earnings smoothing. On the other hand, it harms earnings smoothing, after excluding its interaction effect with the incentive compensation. Different from Table 4, where the negative effect is insignificant in all the regressions, this negative effect is significant here in all the regressions except the first one when the presence of female directors is measured as the dummy variable for the presence of female directors on a board. In addition, in the last regression model, it is female independent directors on the compensation committee, not those outside the compensation committee, showing the conflicting effects. The coefficients on the dummy variable for female independent directors outside the compensation committee and its interaction variable with CEO incentive compensation also have the opposite signs but both of them are insignificant.

TABLE 8
THE EFFECTS OF THE INTERACTION BETWEEN FEMALE DIRECTORS AND CEO INCENTIVE COMPENSATION: PERCENTAGE OF FEMALE DIRECTORS AND EARNINGS SMOOTHING (FIXED EFFECT LOGIT MODELS)

Dependent Variable	(1) *Smooth*	(1) *Smooth*	(1) *Smooth*	(1) *Smooth*
Pct_fd_l1	-2.2041			
	(-1.589)			
Pct_fidt_l1		**-2.5567***		
		(-1.764)		
Pct_fid_l1			**-2.1199***	
			(-1.934)	
Pct_fid_comp_l1				**-1.4206***
				(-1.745)
Pct_fid_ncompt_l1				-0.9708
				(-0.508)
Ln_ppsk_l1	0.0085	0.0143	0.0050	0.0200
	(0.191)	(0.335)	(0.116)	(0.465)
Pctfd_ppsk	**0.4476***			
	(1.800)			

Pctfidt_ppsk		**0.4656***		
		(1.791)		
Pctfid_ppsk			**0.4141****	
			(2.161)	
Pctfidcomp_ppsk				**0.2886***
				(1.952)
Pctfidncompt_ppsk				0.1280
				(0.375)
Ceoown_l1	-0.4015	-0.3739	-0.4328	-0.3306
	(-0.391)	(-0.364)	(-0.422)	(-0.319)
Ln_bdsize_l1	-0.0671	-0.0667	-0.0806	-0.0732
	(-0.340)	(-0.338)	(-0.409)	(-0.365)
Pctbdind_l1	0.2157	0.2262	0.2889	0.3383
	(0.629)	(0.645)	(0.828)	(0.957)
Duality_l1	0.0727	0.0733	0.0658	0.0633
	(0.919)	(0.927)	(0.830)	(0.785)
Age	-0.0035	-0.0036	-0.0026	-0.0034
	(-0.438)	(-0.442)	(-0.327)	(-0.409)
Ceotenure	-0.0252	-0.0254	-0.0278	-0.0292
	(-0.454)	(-0.457)	(-0.500)	(-0.514)
Mve_l1	-0.0573	-0.0602	-0.0572	-0.0571
	(-0.740)	(-0.777)	(-0.739)	(-0.729)
Lev_l1	0.0696	0.0540	0.0442	0.1305
	(0.211)	(0.164)	(0.134)	(0.391)
Nisd_l1	**-0.0003***	**-0.0003****	**-0.0003****	**-0.0003***
	(-1.949)	(-1.964)	(-1.985)	(-1.819)
Q_l1	**-0.1214*****	**-0.1212*****	**-0.1229*****	**-0.1165*****
	(-3.342)	(-3.336)	(-3.364)	(-3.208)
# of Obs.	7,195	7,195	7,187	6,950
Model chi-squared	135.6	135.6	137.5	127.8
p-value	0	0	0	0

These models use fixed effect Logit regressions to examine the effects of the interaction between female directors and CEO incentive compensation on earnings smoothing. Various percentage measures of female directors are used to indicate the presence of female directors, while the incidence of earnings smoothing is the dependent variable. The sample consists of S&P 1,500 firms from 1996 to 2017. See the Appendix for the definitions of all variables. All models include year dummies. These coefficients are not reported to save space. Standard errors are adjusted for heteroskedasticity and clustered at the firm level. *t*-statistics are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Model adjusted R-squared and its significance level are provided at the bottom of the table.

Measuring the Representation of Female Directors with Various Dummies for the Presence of Female Directors on the Board

In this subsection, the representation of female directors on the board is measured as the representation of female directors, as in Section 3.1.2., but fixed effect Logit regressions are employed.

Female Directors and Earnings Smoothing. Table 9 repeats the regressions in Table 7, except that among the independent variables, the various percentage measures of female directors are replaced with dummy variables for female directors. Similar to Table 7, none of the coefficients on the dummy variables for female directors are significant.

TABLE 9
THE EFFECTS OF FEMALE DIRECTORS: DUMMIES FOR FEMALE DIRECTORS AND EARNINGS SMOOTHING (FIXED EFFECT LOGIT MODELS)

	Dependent Variable		
Independent Variables	*Smooth*	*Smooth*	*Smooth*
D_fd_l1	0.0890		
	(0.769)		
D_fidt_l1		0.0595	
		(0.531)	
D_fid_comp_l1			0.0321
			(0.334)
D_fid_ncompt_l1			-0.0503
			(-0.523)
Ln_ppsk_l1	0.0565	0.0560	0.0562
	(1.580)	(1.565)	(1.543)
Ceoown_l1	-0.5191	-0.5283	-0.4868
	(-0.507)	(-0.516)	(-0.471)
Ln_bdsize_l1	-0.1002	-0.0872	-0.0709
	(-0.498)	(-0.435)	(-0.346)
Pctbdind_l1	0.2049	0.1937	0.3443
	(0.598)	(0.556)	(0.976)
Duality_l1	0.0720	0.0715	0.0629
	(0.910)	(0.903)	(0.781)
Age	-0.0038	-0.0038	-0.0037
	(-0.473)	(-0.473)	(-0.453)
Ceotenure	-0.0212	-0.0210	-0.0249
	(-0.382)	(-0.378)	(-0.439)
Mve_l1	-0.0519	-0.0519	-0.0474
	(-0.671)	(-0.671)	(-0.606)
Lev_l1	0.0718	0.0693	0.1569
	(0.218)	(0.210)	(0.470)
Nisd_l1	**-0.0003****	**-0.0003****	**-0.0003***
	(-1.990)	(-1.985)	(-1.814)
Q_l1	**-0.1243*****	**-0.1243*****	**-0.1199*****
	(-3.424)	(-3.423)	(-3.301)
# of Obs.	7,195	7,195	6,950
Model chi-squared	132.9	132.6	124.1
p-value	0	0	0

These models use fixed effect Logit regressions to examine the relation between female directors and earnings smoothing. Various dummies for female directors are used to indicate the presence of female directors, while the incidence of earnings smoothing is the dependent variable. The sample consists of S&P 1,500 firms from 1996 to 2017. See the Appendix for the definitions of all variables. All models include year dummies. These coefficients are not reported to save space. Standard errors are adjusted for heteroskedasticity and clustered at the firm level. *t*-statistics are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Model adjusted R-squared and its significance level are provided at the bottom of the table.

The Interaction Between Female Directors and CEO Incentive Compensation and Earnings Smoothing. Table 10 repeats the fixed effect Logit regressions in Table 8, except that among the

independent variables, the various percentage measures of female directors are replaced with dummy variables for female directors. In particular, an interaction variable between dummy variables for female directors and CEO incentive compensation is added in the regression to examine the effect of female directors on the incidence of earnings smoothing through a potential channel of CEO incentive compensation.

Consistent with what is shown in Table 8, the results of fixed effect regressions using the dummy variables for female directors once again supports the robust results of the two conflicting effects of female directors on earnings smoothing. On the one hand, it significantly increases the effect of incentive compensation on earnings smoothing, consistent across the three regressions. On the other hand, it harms earnings smoothing, after excluding its interaction effect with the incentive compensation. Slightly different from Table 8, the negative effect is significant except for the last regression, where the presence of female directors is measured as the dummy variable for female independent directors on the compensation committee and the dummy variable for female independent directors outside the compensation committee.

TABLE 10
THE EFFECTS OF THE INTERACTION BETWEEN FEMALE DIRECTORS AND CEO INCENTIVE COMPENSATION: DUMMIES FOR FEMALE DIRECTORS AND EARNINGS SMOOTHING (FIXED EFFECT LOGIT MODELS)

	Dependent Variable		
Independent Variables	Smooth	Smooth	Smooth
D_fd_l1	**-0.70704****		
	(-2.452)		
D_fidt_l1		**-0.63520****	
		(-2.336)	
D_fid_comp_l1			-0.38395
			(-1.466)
D_fid_ncompt_l1			-0.31027
			(-1.204)
Ln_ppsk_l1	-0.04790	-0.02356	0.00658
	(-0.952)	(-0.513)	(0.148)
Dfd_ppsk	**0.15746*****		
	(3.032)		
Dfidt_ppsk		**0.13575*****	
		(2.808)	
Dfidcomp_ppsk			**0.08222***
			(1.717)
Dfidncompt_ppsk			0.05117
			(1.111)
Ceoown_l1	-0.26500	-0.24217	-0.28954
	(-0.257)	(-0.236)	(-0.279)
Ln_bdsize_l1	-0.10657	-0.10034	-0.06555
	(-0.529)	(-0.501)	(-0.320)
Pctbdind_l1	0.19576	0.16848	0.32502
	(0.571)	(0.483)	(0.921)
Duality_l1	0.07779	0.07650	0.06703
	(0.983)	(0.967)	(0.831)
Age	-0.00394	-0.00354	-0.00356
	(-0.489)	(-0.440)	(-0.435)

Ceotenure	-0.02734	-0.02939	-0.02991
	(-0.492)	(-0.528)	(-0.527)
Mve_l1	-0.06277	-0.06201	-0.05634
	(-0.810)	(-0.801)	(-0.719)
Lev_l1	0.09485	0.05573	0.13724
	(0.287)	(0.169)	(0.411)
Nisd_l1	**-0.00027***	**-0.00028****	**-0.00026***
	(-1.945)	(-1.983)	(-1.819)
Q_l1	**-0.11974*****	**-0.12264*****	**-0.11604*****
	(-3.289)	(-3.356)	(-3.187)
# of Obs.	7,195	7,195	6,950
Model chi-squared	142.2	140.6	128.1
p-value	0	0	0

These models use fixed effect Logit regressions to examine the effects of the interaction between female directors and CEO incentive compensation on earnings smoothing. Various dummies for female directors are used to indicate the presence of female directors, while the incidence of earnings smoothing is the dependent variable. The sample consists of S&P 1,500 firms from 1996 to 2017. See the Appendix for the definitions of all variables. All models include year dummies. These coefficients are not reported to save space. Standard errors are adjusted for heteroskedasticity and clustered at the firm level. *t*-statistics are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Model adjusted R-squared and its significance level are provided at the bottom of the table.

CONCLUSIONS

Being the first to examine the interaction of female directors and CEO incentive compensation on earnings smoothing among US firms in a long period between 1996 and 2017, the paper shows that female directors may have conflicting effects on earnings smoothing, which may cause mixed evidence. When the interaction of female directors and CEO incentive compensation is not included in the analysis, there is no significant overall effect of female directors on earnings smoothing. This is the case whether the representation of female directors is measured by various percentages of female directors on the board or by various dummy variables for the presence of female directors.

However, when the interaction of female directors and CEO incentive compensation is added, the author finds that female directors may have conflicting effects on earning smoothing. The conflicting effects exist among both female directors in general and independent female directors.

On the one hand, female directors play a moderating role in reducing the incidence of earnings smoothing. This may show female directors possibly provide better monitoring so suppressing the incidence of earning smoothing. The results hold when the presence of female directors is measured with the dummy variables rather than the percentage of female directors. It suggests that the differential effects of female directors on earnings smoothing may not necessarily come from the companies with more female directors versus those with fewer or no female directors but rather from companies with female directors versus those without female directors.

On the other hand, the presence of female directors has significantly strengthened the association between incentive compensation and earnings smoothing. The evidence exists whether the representation of female directors is measured by various percentages of female directors on the board or by various dummy variables for the presence of female directors. There can be various possible interpretations about this strengthening effect. First, the presence of risk-averse female directors may increase the incidence of earnings smoothing given the same level of managerial incentive compensation because managerial incentive compensation promotes risk-taking that may lead to an increase in earnings variability. Second, as earnings smoothing may not necessarily conflict with shareholders' interest, the strengthening effect of

female directors on the association between managerial incentive compensation and earnings smoothing may simply show female directors encourage managerial behaviors that benefit shareholders.

The paper is the first in the literature to examine the effect of female directors on earnings smoothing. The literature has mixed evidence for the effect of female directors on accounting quality. Also, while the literature examines the relationship between female directors and earnings management, there is no such study that investigates the effect of female directors on earnings smoothing.

Further, the paper is also the first in the literature to examine the channel through which female directors may affect earnings smoothing among US firm. The strengthening effect of female directors on the association between incentive compensation and earning smoothing is a new finding in the literature. The results are robust whether the presence of female directors is measured by various percentages of female directors on the board or by various dummy variables for the presence of female directors, as well as the Logit regressions or fixed effect Logit regressions.

In addition, the conflicting effects of female directors on earning smoothing when the dummy variables measure the presence of female directors shows the effects of female directors on earnings smoothing has multiple directions. Without disentangling the possible channels of the effects, researchers may find inconsistent or insignificant results. The interpretation will also be misleading.

The findings in the paper have direct implications for corporate governance policies. The evidence of the conflicting effects of female directors on earnings smoothing shows that the role of female directors in monitoring managerial behavior may not be easily defined. Given the complex effects of female directors on managerial behavior, which may have multiple directions and be more complicated than expected, simply adding more female directors is not a one-size-fit-all governance solution.

ENDNOTES

1. These variables are transformed into the logged format in Table 3 and onward.
2. When the percentage of female independent directors relative to the board size and the percentage of female independent directors relative to the total number of independent directors are converted to dummy variables, they both measure the presence of female independent directors. So the author only keeps one. Therefore, starting from Table 5A, the number of regressions reduces to three in the tables.

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APPENDIX: VARIABLE DEFINITIONS

Variable	Definition
	Panel A: Earnings management
NDE	The difference between reported earnings (earnings before interest and tax and before extraordinary items) and discretionary accruals, scaled by prior year's total assets
Trend	Earnings before interest and tax and before extraordinary items in prior year, scaled by prior year's total assets
Smooth	Dummy equal to unity if the firm is an earnings smoother (i.e. if Abs($EBIT_{jt}$ - $Trend_{jt}$) < Abs(NDE_{jt} - $Trend_{jt}$)) in that year
	Panel B: Female directors
Pct_fd	The percentage of female directors on a board
Pct_fidt	The percentage of female independent directors relative to board size
Pct_fid	The percentage of female independent directors relative to the total number of independent directors
Pct_fid_comp	The percentage of female independent directors to total compensation committee size (total number of compensation committee members)
Pct_fid_ncompt	The percentage of female independent directors not on the compensation committee to total board size
D_fd	Dummy equal to unity if the board has at least one female director
D_fidt	Dummy equal to unity if the board has at least one female independent director
D_fidcomp	Dummy equal to unity if the board has at least one female independent director on the compensation committee
D_fidncompt	Dummy equal to unity if the board has at least one female independent director outide the compensation committee

	Panel C: CEO compensation
Ppsk	The log of one plus the sensitivity of CEO option and stock portfolio value to a 1% change in stock price, where the estimation of the average exercise price and remaining time-to-maturity for outstanding options follows Core and Guay (2002)'s "one-year approximation" (OA) method. Specifically, for the inputs for stock return volatility, dividend yield, and risk-free rate, the author uses the annualized standard deviation of monthly stock returns over the past 60 months, the average dividend yield over the past three years, and the yield-to-maturity of Treasury bonds matched by the maturities closest to options', respectively.
	Panel D: Other governance variables
Ceoown	CEOs' holdings of common shares/total shares outstanding
Ln_bdsize	Log(the number of directors on the board)
Pctbdind	The proportion of outsiders on the board
Duality	Dummy equal to unity if the CEO is also the chairman of the board
	Panel E: CEO characteristic
Age	CEO's age
Ln_ceotenure	Log(the length of time in whole years since the CEO was on the position)
	Panel F: Firm characteristics
Mve	Market value of equity
Lev	Book value of debt/(book value of debt + market value of equity)
Nisd	The standard deviation of net income during the three-year period from two years before to the current year
Q	Market value of assets/book value of assets