Top executives' gender and analysts' earnings forecasts

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ABSTRACT

This study adds a behavioral dimension to the analysts' earnings forecast literature by examining the effect of executives' gender on forecast accuracy. We theorize that these gender-based behavioral differences can influence analysts' forecast accuracy. Our research documents that the presence of female CEOs significantly improves analysts' forecast accuracy across all firms, reflecting CEO's dominant position, while female CFOs have a positive influence on analyst forecast accuracy *only* for firms with greater information asymmetry. Overall, the evidence shows that analysts are able to draw more accurate assessment of the firm's prospects for corporations led by female executives.

1. Introduction

Research on gender-based differences in accounting and financial decision-making has gained significant importance in recent years. The literature has demonstrated that women have lower risk-tolerance than men (Ittonen et al., 2013) and as managers, females tend to reduce firm's risk level (Faccio et al., 2016). Additionally, there is evidence that women differ from men in terms of ethical standards (Kennedy et al., 2017), evidenced in the degree to which they engage in fraud (Cumming et al., 2015). In support of these gender traits, prior research documents that female executives tend to pursue more informative and credible disclosures (Francis et al., 2015). Studies on gender diversity in the board of directors show a positive relation between female directors and financial reporting quality (Srinidhi et al., 2011). These results are usually attributed to women's risk-aversion, leading to a more conservative and transparent reporting policy, better monitoring, and less earnings management. However, advocates of the self-selection hypothesis propose that gender differences among top executives are small, since women who can break the glass ceiling are not representative of the female population (Kumar, 2010); some studies show no differences in terms of risk-aversion between male and female directors (Adams and Funk, 2012; Lara et al., 2017) or ethical sensitivity (Zalata et al., 2019).

A rich body of literature examines the connection between the firms' financial disclosure and analyst forecast accuracy. Although there are minimum regulatory disclosure requirements for all public firms, the quantity and quality of information provided vary largely across firms and managers. Prior evidence supports the view that analysts' forecasts accuracy increases with the informativeness of both financial and *non-financial* disclosure (Barron et al., 1998). In this study, we bridge the above streams of literature by examining how the gender of top executives, namely, the Chief Executive Officer (CEO) and Chief Financial Officer (CFO), affects earnings forecast accuracy. Particularly, if female CEOs and CFOs are associated with better disclosure and earnings quality compared to their male counterparts, we should observe more accurate analyst forecasts for companies with female CEOs and/or female CFOs. Alternatively, given the importance of verbal impression management (Westphal and Graebner, 2010), female communication style

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that undermines their authority (Goman, 2011) and negotiation abilities (Roebuck and Smith, 2013), financial analysts' judgement of the firm's future performance based on conference calls may be impacted negatively.[1] Thus, communication style is another important CEO characteristic that can influence analysts' forecasts. However, if as some studies argue, gender differences may not be evident in leadership positions (Adams and Funk, 2012), no differential in forecast accuracy will be observed. Additionally, we investigate whether the impact of executive gender on analyst forecast accuracy vary depending on firm's information opacity.

This examination adds a new dimension to the analyst earnings forecast literature and contributes to the emerging stream of behavioral accounting/finance literature on the influence of gender on corporate decision-making and outcomes. The study also contributes to the growing literature on gender-based differences in corporations, as well as to the body of research on analysts' earnings forecasts. Our analysis also extends the literatures on disclosure policy and analyst forecasts by showing that gender of a C-suite member affects analyst forecasts. Moreover, the findings complement prior research on the relevance of gender to financial reporting. Finally, we also confirm the important and dominant role of the CEO in improving the firm's information transparency.

2. Sample and research method

Our initial sample of CEOs and CFOs is collected from ExecuComp database. Firms are required to have financial information in COMPUSTAT, Center for Research in Security Prices (CRSP), and Institutional Brokers' Estimate System (I/B/E/S) databases. Our final sample is composed of 19,352 firm-year observations (2622 unique firms) during the period 1994–2018.

To assess the link between the CEO/CFO gender and analyst forecast accuracy, we regress two measures of forecast accuracy on test variables and firm control variables. The models also include industry and year fixed effects to account for any potential omitted industry-specific and macro-economic effects. The standard errors are adjusted for White's heteroskedasticity and clustered at the firm level. Our test variables, *Female CEO* and *Female CFO*, are set to one if the gender of the executive is female, and zero otherwise. We measure analyst forecast accuracy along two dimensions: forecast error and forecast dispersion. The accuracy of analyst forecasts increases when forecast error and forecast dispersion decrease. Forecast error (*FE*) is the absolute value of the difference between the median of analyst forecasts made within eight months prior to a firm's fiscal year-end and the I/B/E/S actual earnings, scaled by beginning stock price. This variable is not only a proxy for corporate transparency, information availability, and uncertainty (Botosan et al., 2004), but is also related to the analysts' evaluation of a firm's financial disclosures (Lang and Lundholm, 1996). Forecast dispersion (*FD*) is defined as the standard deviation of analysts' forecasts made within eight months prior to a firm's fiscal year-end, scaled by beginning stock price. For each firm-year, we require at least four forecasts to calculate the standard deviation of earnings forecasts. *FD* has been widely used in the literature to capture two theoretical components, the uncertainty about future performance and the degree of consensus among analysts (Abarbanell et al., 1995).

We control for firm characteristics, such as, firm size (*Assets*), leverage (*Leverage*), fixed assets (*PPE/Assets*), earnings-to-price ratio (*EP*), loss (*Loss*), growth opportunity (*MTB*), profitability (*ROA*), research and development intensity (*R&D/Sales*), and idiosyncratic volatility, measured as the sum of the squared residual from Fama–French's (1993) three-factor model. The model also includes the number of analysts following (*No. Analysts*) and forecast horizon (*Horizon*), defined as the average number of days between the forecast issuing date and earnings announcement date for each firm-year. Firm control variables are winsorized at the one percent cutoff at both tails and measured as of prior fiscal year-end.

3. Results

Table 1 provides descriptive statistics of firm characteristics and analyst forecasts classified by CEO's gender and CFO's gender. Table 2, which presents the linkage between CEO/CFO gender and analyst forecasts accuracy, indicates that *Female CEO* increases analyst forecast accuracy, as forecast error (*FE*) and forecast dispersion (*FD*) are lower (Models 1–2). The impact of female CEOs on analyst forecast accuracy is statistically significant and economically meaningful given 0.025 and 0.032 respective sample means of *FE* and *FD*. In contrast, Models 3–4 indicate no significant link between *Female CFO* and analysts' accuracy.

Although the CEO–CFO duo make most strategic and financial decisions, it is possible that gender diversity of the board may be the driver behind our results and not CEO/CFO's gender. To isolate the effect of executive gender from board diversity, we include a variable that represents the fraction of female directors on the board. The board diversity variable has the added benefit of proxying for reporting quality (Srinidhi et al., 2011). We also control for additional governance indicators: board independence (measured as the percentage of independent directors), a dummy variable for audit committee gender diversity (equals one if there is at least one female director on the audit committee), and executive ownership, measured as the number of shares (excluding options) owned by both the CEO and CFO divided by common shares outstanding. The results in Models 5–8 are very similar to those obtained in base models. The board diversity lowers forecast dispersion but has no significant effect on forecast error. Our results confirm the dominant impact of CEO gender on analyst accuracy. The conclusions are similar when additional control variables (audit quality, financial distress, and earnings surprise) are included. The totality of the findings suggests that any adverse impact from purportedly weaker female communication style is more than outweighed by greater transparency through voluntary financial and non-financial disclosure.

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[1] While females have some communication strengths (i.e., good listening skills and ability to read nonverbal cues) these strengths may be of less value in settings where executives interact with analysts during conference calls. Females' communication delivery is less authoritative compared to men who communicate more to the point while effectively displaying power—attributes that enhance credibility of messaging during conference calls, making conference calls more suitable for men's communication style (Boneva et al. 2001).

Table 1
Descriptive statistics.

Variables	Full Sample (N = 19,352) Mean	Male CEOs (N = 18,829) Mean	Female CEOs (N = 523) Mean	P-value of diff.	Male CFOs (N = 17,828) Mean	Female CFOs (N = 1524) Mean	P-value of diff
No. Analysts	10.33	10.33	10.45	0.72	10.31	10.51	0.39
Forecast Horizon	193.66	193.38	203.84	<0.0001	193.12	199.98	<0.0001
Assets ($millions)	5839	5767	8450	<0.0001	5745	6946	0.01
Leverage (%)	20.75	20.78	19.61	0.19	20.94	18.56	<0.0001
PPE/Assets	26.95	26.98	25.61	0.11	27.08	25.41	0.00
EP	0.008	0.008	0.017	0.16	0.008	0.016	0.06
Loss (%)	16.69	16.78	13.38	0.03	16.96	13.52	0.00
MTB	2.08	2.08	2.09	0.96	2.07	2.25	<0.0001
R&D/Sales	7.42	7.53	3.62	<0.0001	7.64	4.86	<0.0001
ROA (%)	9.40	9.36	10.94	<0.0001	9.26	10.99	<0.0001
Volatility	0.14	0.14	0.13	0.12	0.14	0.13	0.11
FE	0.025	0.026	0.018	0.01	0.026	0.020	0.01
FD	0.032	0.032	0.023	<0.0001	0.032	0.028	0.15

This table summarizes the statistics for salient characteristics of the sample comparing firms with male CEOs/CFOs to firms with female CEOs/CFOs. *,**, and *** denote statistical significance at the 10, 5, and 1% levels, respectively.

3.1. Robustness checks

We conduct a robustness test for potential self-selection bias in the event that female executives self-select into certain types of firms, utilizing Heckman's (1979) two-stage model. In the first-stage, we run a probit model estimating the probability that the firm will hire a female CEO/CFO as a function of firm-specific characteristics with the inclusion of the state's level of gender status equality (*Gen-Equality*) as an exclusion restriction (Di Noia, 2002; Doan and Iskandar-Datta, 2020). Firms headquartered in states friendlier to women's equality are more likely to hire female executives. The state's gender equality value for each firm is based on the location of firm's headquarters.

The results, in Panel A (Table 3), show that the coefficients on *Gen-Equality* from the first stage are significantly positive in models predicting CEO gender and CFO gender, providing validity of the exclusion restriction. In the second-stage, the coefficients for the female CEO variable (Models 1 and 2) are significantly negative, while in Models 3 and 4 the coefficients for female CFO are insignificantly negative. The insignificant inverse Mills ratios suggest that selection bias was not a major concern. The results are in line with our previous findings.

We also utilize the propensity-score matching (PSM) method (Iskandar-Datta and Jia, 2013) to address potential selection bias. Each female CEO/CFO firm is matched with a firm led by a male CEO/CFO based on firm characteristics (Assets, PPE, ROA, Leverage, R&D, and MTB) and year and industry (3-digit SIC) fixed effects. We use the nearest neighbor matching approach without replacement. The results in Panel B confirm our earlier findings. Results are unchanged when the matching algorithm uses replacement.

To addresses endogeneity concerns and contemporaneous changes, we employ a difference-in-differences research design, where the sample is constructed of firms that switch from male to female CEO (treatment group) and firms with male-to-male CEO transitions (control group) (Huang and Kisgen, 2013). The examination spans three years before and three years after the transition, excluding the transition year. We create a dummy variable, *Post*, which takes the value of one if year *t* is after the appointment, and zero otherwise. *M-F CEO* is a dummy variable that equals one for firms facing a male-to-female transition. Because we control for firm fixed effects in the difference-in-differences models, it is not necessary to include the *M-F CEO* variable (Huang and Kisgen, 2013). The results in Panel C further reinforce our findings, indicating that replacing a male CEO by a female leader leads to a significant enhancement in analyst accuracy compared to a male-to-male CEO transition. All of the above results do not lend support to the view that female executives are considered similar to male executives, at least not by financial analysts.

3.2. Information asymmetry and analysts' forecast accuracy

Given that information asymmetry between firm insiders and investors can be mitigated with greater voluntary disclosure (Diamond and Verrecchia, 1991), we argue that the benefits from informative and transparent disclosure policies are amplified in a more opaque information environment. The contingency theory of leadership, which states that the effectiveness of a leadership style depends on the organization in which leaders operate (Nekhili et al., 2018), predicts that influence of female executives on analyst forecast accuracy in firms with higher information asymmetry may be due to the female CFO style (i.e., accounting/financial choices) that reduce agency problems which are more exacerbated in the presence of high information asymmetry. Given the above, we predict such firms to accrue greater benefits from female CEOs/CFOs with tendencies to produce high quality reporting, leading to more precise forecasts.

Models 1, 2, 5 and 6 of Table 4, which test the above prediction, show a significantly positive impact of female CEOs on analyst forecast accuracy for both subgroups, while Models 3, 4, 7 and 8 tell a different story as the coefficients on *Female CFO* are significantly negative for firms with high information asymmetry (proxied by firm idiosyncratic volatility) but insignificant for those with low

Table 2
CEO/CFO gender and forecast accuracy.

Independent Variables	FE (1)		FD (2)		FE (3)		FD (4)		FE (5)		FD (6)		FE (7)		FD (8)	
Female CEO	−0.009	***	−0.010	***					−0.008	**	−0.010	***				
	(0.01)		(0.00)						(0.05)		(0.01)					
Female CFO					−0.004		−0.001						−0.006	*	−0.003	
					(0.18)		(0.64)						(0.07)		(0.27)	
Control variables																
Log(No. Analysts)	−0.011	***	−0.007	***	−0.011	***	−0.007	***	−0.012	***	−0.008	***	−0.012	***	−0.008	***
	(<0.0001)		(<0.0001)		(<0.0001)		(<0.0001)		(<0.0001)		(<0.0001)		(<0.0001)		(<0.0001)	
Log(Horizon)	0.004		−0.013	*	0.004		−0.013	*	0.000		−0.022	*	0.000		−0.022	*
	(0.68)		(0.08)		(0.68)		(0.08)		(1.00)		(0.08)		(1.00)		(0.09)	
$Log(Assets)_{t-1}$	0.003	*	0.004	***	0.003	*	0.004	***	0.001		0.003	**	0.001		0.003	**
	(0.08)		(0.01)		(0.08)		(0.01)		(0.42)		(0.04)		(0.42)		(0.04)	
$Leverage_{t-1}$	0.012		0.015	**	0.012		0.016	**	0.015		0.021	**	0.015		0.021	**
	(0.15)		(0.05)		(0.15)		(0.05)		(0.19)		(0.04)		(0.019)		(0.03)	
$PPE/Assets_{t-1}$	−0.008		0.005		−0.008		0.005		0.004		0.019		0.004		0.019	
	(0.53)		(0.70)		(0.53)		(0.69)		(0.77)		(0.26)		(0.78)		(0.26)	
EP_{t-1}	−0.108	***	−0.117	***	−0.108	***	−0.117	***	−0.081	***	−0.090	***	−0.081	***	−0.089	***
	(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(<0.0001)		(<0.0001)		(<0.0001)	
$Loss_{t-1}$	0.017	***	0.000		0.017	***	0.000		0.028	***	0.007		0.028	***	0.007	
	(0.01)		(0.98)		(0.01)		(0.97)		(0.00)		(0.37)		(0.00)		(0.37)	
MTB_{t-1}	−0.002	***	−0.002	***	−0.002	***	−0.002	***	−0.002	***	−0.002	***	−0.002	***	−0.002	***
	(0.00)		(<0.0001)		(0.00)		(<0.0001)		(0.01)		(0.01)		(0.01)		(0.01)	
$R\&D/Sales_{t-1}$	−0.001		0.006	*	−0.001		0.006	*	0.001		0.008	**	0.001		0.008	**
	(0.83)		(0.09)		(0.83)		(0.09)		(0.78)		(0.04)		(0.79)		(0.04)	
ROA_{t-1}	−0.018		−0.014		−0.018		−0.014		−0.011		−0.020		−0.011		−0.019	
	(0.54)		(0.62)		(0.54)		(0.62)		(0.71)		(0.55)		(0.73)		(0.55)	
$Volatility_{t-1}$	0.070	***	0.088	***	0.070	***	0.088	***	0.069	***	0.095	***	0.069	***	0.095	***
	(<0.0001)		(<0.0001)		(<0.0001)		(<0.0001)		(0.00)		(<0.0001)		(0.00)		(<0.0001)	
$Board\ Diversity_{t-1}$									−0.016		−0.023	**	−0.017		−0.025	**
									(0.14)		(0.04)		(0.13)		(0.03)	
$Board\ Ind_{t-1}$									0.005		0.000		0.005		0.001	
									(0.58)		(0.96)		(0.57)		(0.95)	
Audit Comm. Diversity $_{t-1}$									0.008	*	0.007	**	0.008	*	0.008	**
									(0.07)		(0.02)		(0.07)		(0.02)	
Exec Own $_{t-1}$									−0.033	***	−0.016		−0.032	***	−0.015	
									(0.01)		(0.17)		(0.01)		(0.19)	
Intercept	−0.023		0.087	**	0.114		0.087	**	0.150		0.150	**	0.150		0.150	**
	(0.69)		(0.04)		(0.25)		(0.04)		(0.23)		(0.04)		(0.23)		(0.04)	
Industry & year FE	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Adj R-Squared	0.138		0.209		0.138		0.208		0.130		0.204		0.130		0.204	
N	19,352		19,352		19,352		19,352		13,570		13,570		13,570		13,570	

This table reports the impact of female CEOs/CFOs on analyst forecast accuracy. P-values presented in parentheses are adjusted for heteroskedasticity.

*,**, and *** denote statistical significance at the 10, 5, and 1% levels, respectively.

Table 3
Robustness checks.

Panel A Heckman's two-stage method with an exclusion restriction

Independent Variables	Stage 1 Female CEO	Stage 2 FE (1)	FD (2)	Stage 1 Female CFO	Stage 2 FE (3)	FD (4)
Gen-Equality	0.008* (0.09)			0.013*** (<0.0001)		
Female CEO$_t$		−0.009*** (0.01)	−0.010*** (0.00)			
Female CFO$_t$					−0.004 (0.18)	−0.001 (0.64)
Inverse Mills ratio		0.039 (0.38)	0.021 (0.60)		0.003 (0.79)	0.004 (0.73)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry & year FE	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared	0.241	0.138	0.209	0.183	0.138	0.208
N	19,279	19,279	19,279	19,279	19,279	19,279

Panel B Propensity score matching (PSM) technique

Independent Variables	PSM subsample of CEOs FE (1)	FD (2)	PSM subsample of CFOs FE (3)	FD (4)
Female CEO$_t$	−0.021* (0.07)	−0.011*** (0.01)		
Female CFO$_t$			−0.001 (0.61)	−0.000 (0.91)
Firm controls	Yes	Yes	Yes	Yes
Industry & year FE	Yes	Yes	Yes	Yes
Adj. R-squared	0.158	0.310	0.316	0.445
N	1046	1046	3036	3036
F-statistic	40.81***	37.94***	47.09***	45.03***

Panel C Difference-in-differences approach of CEO transition

Independent Variables	FE (1)		FD (2)	
Post$_t$ * M-F CEO$_t$	−0.020 (0.07)	*	−0.015 (0.09)	*
Post$_t$	0.013 (0.25)		0.009 (0.25)	
Firm controls	Yes		Yes	
Firm & Year FE	Yes		Yes	
Adj. R-squared	0.462		0.622	
N	4978		4978	
F-statistic	32.94***		52.39***	

This table reports the impact of female CEOs/CFOs on analyst forecast accuracy using Heckman's approach (Panel A), propensity score matching technique (Panel B) and difference-in-differences approach (Panel C). P-values presented in parentheses are adjusted for heteroskedasticity.
*.**, and *** denote statistical significance at the 10, 5, and 1% levels, respectively.

Table 4
CEO/CFO gender, forecast accuracy and information asymmetry.

Independent Variables	High Volatility FE (1)	FD (2)	FE (3)	FD (4)	Low Volatility FE (5)	FD (6)	FE (7)	FD (8)
Female CEO$_t$	−0.023*** (0.01)	−0.019*** (0.01)			−0.002* (0.06)	−0.002* (0.09)		
Female CFO$_t$			−0.012*** (0.00)	−0.011*** (0.00)			−0.002 (0.30)	−0.001 (0.32)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry & year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.151	0.221	0.138	0.194	0.033	0.030	0.033	0.030
N	9676	9676	9676	9676	9676	9676	9676	9676

This table reports the impact of female CEOs/CFOs on analyst forecast accuracy conditional on the firm's environmental uncertainty proxied by idiosyncratic risk. P-values presented in parentheses are adjusted for heteroskedasticity.
*.**, and *** denote statistical significance at the 10, 5, and 1% levels, respectively.

information asymmetry. This suggests that female CFOs enhance analyst forecast accuracy for firms with less transparent information environment, paralleling the evidence in Ho et al. (2015), who document that female CEOs' conservatism is exhibited *only* in higher risk environments. Further, these results for female CFOs may be due to female CFO style (their accounting and financial choices) that may reduce the degree of agency problems which is more exacerbated in high information asymmetry firms, in line with the contingency theory of leadership. The results are robust to utilizing firm's R&D intensity and the stock price bid-ask spread as alternative proxies for information opaqueness.

4. Conclusions

Given the importance of analysts' earnings forecasts in the accounting/finance literature, we address the effect of gender-based behavioral differences of corporate top executives on analysts' forecast accuracy. We find that female top executives' gender-based propensities benefit investors through more accurate analyst forecasts, measured by forecast error and forecast dispersion. The evidence implies that any adverse impact from weaker female communication style is more than outweighed by benefits from greater transparency, whether voluntary financial or non-financial disclosure. Our findings survive a battery of robustness checks including additional control variables, the propensity score-matching technique, Heckman's approach, and difference-in-differences test.

This study contributes to the literature by documenting a novel finding of a differential impact of female CEOs and CFOs on earnings' forecast accuracy, showing that female CEOs are associated with higher analyst forecast accuracy regardless of the firm's information environment and consistent with the notion that female CEOs are able to significantly improve firms' voluntary financial and non-financial disclosure practices (i.e., beyond financial disclosure which is relatively more aligned with CFO function). In contrast, female CFOs, known to exhibit influence on financial disclosure and reporting quality, enhance analysts' forecast accuracy only for firms with more opaque information environment. This evidence highlights that, although both female CEOs and CFOs improve accuracy of analysts' forecasts, the impact of CEOs is more dominant. Further, the findings for the impact of female CFOs on forecast accuracy are consistent with the predictions of contingency theory of leadership.

Moreover, our study expands the analysis of Kim (2017), who examines the impact of CFO gender on accuracy analysts' forecast accuracy, and Gul et al. (2013), who investigate the impact of board gender diversity on analysts' forecasts. Our findings based on the gender of CEO and CFO, after controlling for board gender diversity, for a sample spanning a much longer period, show that CEO's role is the most dominant, followed by the CFO who exerts influence only in opaque environments. We find no evidence that board's gender diversity matters for analysts' earnings accuracy. Additionally, our findings complement those in Lonkani (2019), who examines management's earnings forecasts by gender and its impact on forecast bias for Thai firms, and finds that firms with female CEOs are more likely to have a smaller forecast bias when forecasting positive events.

Author statements

Sudip Datta: Conceptualization, Original draft preparation; Writing, Editing; Trang Doan: Data curation and empirical analysis, Writing, Editing, Table construction, Verification; Mai Iskandar-Datta: Writing, Supervision, Editing, Table, Verification

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