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Female CEOs with a squeeze of narcissism: A perfect cocktail for corporate performance?

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ABSTRACT

Narcissism is prevalent in the upper echelons, and CEO narcissism has been shown to affect corporate outcomes (although not corporate performance in a significant and robust way). We argue that narcissism may be performance enhancing in the context of female CEOs because female CEOs are unique – based on both nurture (i.e., the double bind) and nature (i.e., evolutionary traits) – in being able to exploit the bright sides of narcissism while moderating its dark sides. Our empirical results support our arguments. Thus, we find that narcissistic, female CEOs beat their male peers in terms of corporate performance.

1. Introduction

Manager fixed effects play a significant role in explaining variations in investment, financial, and organizational practices (Bertrand and Schoar, 2003; Hambrick and Mason, 1984). Narcissism is a regular phenomenon in the corporate world because narcissistic individuals are likely to emerge as leaders (Maccoby, 2000; Brunell et al., 2008) and because leadership roles are associated with status, visibility, and power – factors craved by narcissists (Ingersoll et al., 2019). Previous research has not established consensus about the association between CEO narcissism and corporate performance (Chatterjee and Hambrick, 2007; Olsen et al., 2014; Ham et al. 2018) in a population overwhelmingly dominated by male CEOs. Thus, we investigate the association between CEO narcissism and corporate performance among female CEOs.

We hypothesize that CEO narcissism is positively associated with corporate performance in the case of female CEOs. Our hypothesis rests on three interrelated and complementary pillars.

First, Ackerman et al. (2011) divide aspects of narcissism into three facets: Leadership/Authority (L/A), Grandiose/Exhibitionism (G/E), and Exploitative/Entitlement (E/E). The L/A facet is considered the most adaptive and indicates a person's drive to lead and their aspiration for authority and power. It reflects self-perception of assertiveness, social potency, and other adaptive self-enhancement tendencies (Ackerman et al., 2011). The G/E facet contains vanity, self-absorption, superiority, and exhibitionistic tendencies. The E/E facet is the most disturbing facet as it is linked to aggression, counterproductive work behavior, and a reluctance to forgive (Grijalva et al., 2015). The three facets of narcissism can be linked to the Big 5 personality traits. Extraversion is positively associated with the L/A and G/E facets of narcissism. Agreeableness correlates negatively with all three aspects, but the E/E facet has the strongest and most negative correlation (Ackerman et al., 2011). The E/E facet is generally related to the dark triad personality, including impulsive antisociality and Machiavellianism (Paulhus and Williams, 2002). The E/E facet displays the largest gender

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difference (Grijalva et al., 2015), which is in line with studies showing that women tend to be more agreeable than men (Feingold, 1994; Costa et al., 2001; Schmitt et al., 2008). Such higher agreeableness is also the case when comparing female and male executives (Wille et al., 2018). Thus, although we are not able explicitly to quantify the three facets of narcissism due to data limitations, we expect the higher agreeableness of female CEOs to be associated with a superior balance between the three facets (i.e., especially a less dominant E/E facet for a given degree of narcissism), which is likely to be conducive for improved performance.

Second, women pursuing leadership positions are often challenged by the double bind and gender role expectations (Eagly and Karau, 2002). Leadership qualities such as dominance, competitiveness, and assertiveness are related to beliefs about male behavior, creating different paths for men and women when striving to get a leadership position (Ingersoll et al., 2019). Due to the social role expectations of women, women are supposed to possess more communal characteristics such as being nurturing, warm, friendly, and emotionally expressive (Badura et al., 2018). Perceptions about successful leadership and feminine gender identity often conflict and force women to navigate between leadership qualities and female expectations (Ingersoll et al., 2019). Women who manage to go beyond the glass ceiling must successfully balance male-like characteristics, expectations, and leadership behavior with feminine behavior (Ingersoll et al., 2019). When women exhibit assertive, dominant, and directive leadership, they often face negative perceptions and harsher sanctions because their exploitive and/or questionable behavior deviates from what is considered appropriate for women (Grijalva et al., 2015). These social role expectations constrain the behavior of female CEOs – including narcissistic, female CEOs. Thus, while CEO narcissism has been linked to unethical and questionable behaviors (Buchholz et al., 2020; Ham et al., 2017; O'Reilly et al., 2018; Rijsenbilt and Commandeur, 2013), this is likely to be less severe in the case of narcissistic, female CEOs (and therefore less detrimental to corporate performance).

Third, women exhibit higher rates than men of empathy related evolutionary traits, which could further restrain the dark sides of narcissism (Christov-Moore et al., 2014). Thus, even without the double bind based on present day gender role expectations, female CEOs may evolutionarily have an empathy-based advantage in exploiting the favorable facets of narcissism without also suffering (too much) from the negative facet of narcissism. However, female CEOs may not be representative of the lay population of women. Female CEOs operate in a world dominated by men. Therefore, they may conform to majority norms and practices to establish legitimacy and garner stakeholder support (Ackermann and Eden, 2011; Godwin et al., 2006) and to mitigate traditional gender-related status value biases (Ridgeway, 1991). Female leaders may adopt behaviors aligned with the roles of their male counterparts (Xu et al., 2024) as male and female leaders who occupy the same roles must display the same behaviors (Kanter, 1977). In line with these arguments, Wille et al. (2018) find only small differences in personality traits linked to leadership (conscientiousness, emotional stability, and extraversion) between female and male leaders in a sample of European executives. Most notably in this context, however, Wille et al. (2018) find that executive women show higher levels of agreeableness than their male peers. Thus, it seems that women bring their higher rates of empathy-related evolutionary traits into the C-suite despite the pressure to conform to male-dominated behaviors.

We investigate 849 non-financial S&P 1500 firms from 2007 to 2020 with a total of 76 female CEOs and 1903 male CEOs. Our findings support our hypothesis. Thus, we find a positive association between CEO narcissism and corporate performance but only in the case of female CEOs. Our findings are statistically and economically significant and they are robust to a battery of robustness tests. *First*, as regards robustness, we measure corporate performance both in terms of profitability (ROA) and valuation (Tobin's Q). *Second*, we measure CEO narcissism in two alternative manners. *Third*, our results are robust to the inclusion of CEO overconfidence and other personality traits. *Finally*, our results are robust to the alteration of the sample period. Thus, it seems that CEO gender moderates the association between CEO narcissism and corporate performance in such a way that female CEOs with a high (low) level of narcissism are associated with improved (inferior) corporate performance. This is, of course, an average picture that ignores the diversity within the group of female CEOs.

To the best of our knowledge, no previous literature has investigated the moderating role of CEO gender on the association between CEO narcissism and corporate performance. Thus, we contribute to the existing literature in two main ways. *First*, and most specifically, we contribute to the literature that investigates the moderating role of CEO gender on the association between CEO narcissism and corporate outcomes. Ingersoll et al. (2019) investigate such a moderating role in relation to corporate risk-taking and questionable behaviors. They find that narcissistic, female CEOs engage in less risk-taking and less questionable behaviors than narcissistic, male CEOs. We show that narcissistic, female CEOs are associated with better corporate performance than narcissistic, male CEOs. *Second*, and more generally, we contribute to the literature that investigates the advantages and disadvantages of CEO narcissism. Judge et al. (2009) argue that narcissism has its dark sides such as arrogance, hostility, and lack of empathy as well as its bright sides such as charisma and high self-esteem, and that the net benefit – negative or positive – is context specific. We show that in the context of female CEOs, narcissism is beneficial for corporate performance.

We present our data and methodology in the next section. The third section presents the results, and the last section concludes.

2. Data and methodology

The study encompasses 849 non-financial and non-utility S&P 1500 firms as per June 2019, with observations from 2007–2020. CEO narcissism is measured by the CEO's usage of first-person singular pronouns (FSP) compared to first-person singular and plural pronouns in speech in Q&A sessions of quarterly earnings conference calls (Aktas et al., 2016; Aabo et al., 2022, 2023, and 2024). It is a continuous variable between 0 and 1. Raskin and Shaw (1988) show that individuals who score higher on narcissism tend to use more first-person singular pronouns and fewer first-person plural pronouns. We exploit CEO speech in the Q&A sessions of quarterly earnings conference calls in line with Malhotra et al. (2018). Malhotra et al. (2018) argue that as a Q&A session – as opposed to a presentation session – is not scripted, it is more likely to reveal the true personality of the CEO. In line with previous literature, we require that we have at least three quarterly earnings conference calls and at least 1000 spoken words for each CEO (Green et al., 2019;

Harison et al., 2019; Malhotra et al., 2018). Our default is to take four quarterly earnings conference calls – one for each quarter – spread across the tenure of the CEO. If possible, we avoid conference calls related to the very beginning and the very end of the tenure as these conference calls may be less representative. We treat CEO narcissism as a constant (not time-varying). This is in accordance with the psychology literature which argues that narcissism is a stable individual trait that is grounded in basic personality traits (Miller and Campbell, 2010) and is heritable (Vernon et al., 2008).

We measure corporate performance by the two most widely used measures from an accounting and valuation perspective, i.e., ROA and Tobin's Q, respectively (Hoobler et al., 2018). ROA is a short-term measure of corporate performance. Tobin's Q is a short-cut to a long-term measure of corporate performance as it exploits the stock market's best guess of the future performance of a firm (i.e., the numerator of Tobin's Q). The measures are complementary in the sense that "manipulations" are less obvious to be able to affect both measures in the same direction – e.g., a decrease in R&D expenditures will improve the short-term performance (i.e., ROA), but is likely to reduce the future value (Tobin's Q) as the firm moves from a firm where the value is tied primarily to growth options to a firm where the value is more tied to the assets-in-place. By incorporating both performance metrics into our measurement of corporate performance, we create robustness.

We control for firm characteristics (size, leverage, R&D, current ratio, and sales growth) and CEO characteristics (age, tenure, duality, stock ownership, and option ownership). We winsorize ROA, the raw version of Tobin's Q, sales growth, and option ownership at 1 % and 99 % to mitigate the effect of extreme values. We log-transform Tobin's Q, firm size (total assets), current ratio, and tenure to mitigate skewness and extreme values. We lag balance sheet items (size, leverage, and current ratio). To mitigate omitted variable bias, we apply firm fixed effects (FE) in our multivariate panel data regression analysis. We cluster standard errors at the firm level and include time dummies (Petersen, 2009).

Table 1 reports descriptive statistics for our main variables. Female CEOs account for 3.4 % of the sample. CEO narcissism shows an average of 0.24 with a median of 0.23. Female CEOs are less narcissistic than male CEOs. The average ROA is 10.2 % with a median of 9.8 %, and the raw version of Tobin's Q shows an average of 2.16 with a median of 1.71.

Table 2 reports correlation coefficients for variables used in the main regression analysis. In line with Table 1, Table 2 shows that female CEOs are significantly less narcissistic than their male peers. In terms of corporate performance, Table 2 indicates 1) that narcissistic CEO are associated with inferior corporate performance as measured by log Tobin's Q and 2) that female CEOs are associated with superior corporate performance as measured by ROA. Both these associations are, however, a result of omitted variable bias as evidenced in our subsequent analysis in Table 3. In line with expectations, Table 2 shows a significant positive correlation between our two corporate performance measures, ROA and log Tobin's Q. Finally, Table 2 shows that female CEOs tend to be employed in firms at mature stages of the life cycle (Anderson and Zeithaml, 1984) as indicated by higher total assets, higher leverage, but lower R&D expenditures and sales growth.

3. Empirical results

Table 3 reports the results of our multivariate regression analysis. Models 1 (ROA) and 3 (Tobin's Q) show that gender in itself and narcissism in itself are not robustly and significantly associated with corporate performance. This is in line with previous literature. However, and as hypothesized, Models 2 and 4 show that the interaction term between female and narcissism is significantly associated with corporate performance. Thus, a one standard deviation of female narcissism (0.070, Table 1) is associated with an increase

Table 1
Descriptive statistics.

	N	Mean	SD	p1	p25	Median	p75	p99
Corporate performance:								
ROA	11,311	0.102	0.108	-0.234	0.058	0.098	0.147	0.380
Tobin's Q	11,311	2.161	1.517	0.757	1.283	1.706	2.481	8.445
Log Tobin's Q	11.311	1.077	0.354	0.563	0.825	0.995	1.247	2.245
Narcissism:								
NAR	11,311	0.237	0.079	0.076	0.181	0.233	0.286	0.446
NAR female	382	0.213	0.070	0.045	0.162	0.214	0.263	0.374
NAR male	10,929	0.238	0.079	0.078	0.181	0.233	0.287	0.447
Firm controls:								
Total assets	11,311	7.847	1.650	4.452	6.656	7.709	8.943	11.975
Leverage	11,311	0.530	0.261	0.091	0.374	0.521	0.654	1.269
RD	11,311	0.036	0.071	–	–	0.006	0.042	0.329
Current ratio	11,246	1.111	0.436	0.000	0.843	1.070	1.342	2.358
Sales growth	11,311	0.105	1.967	-0.474	-0.018	0.055	0.138	0.949
CEO controls:								
Female	11,311	0.034	0.181	–	–	–	–	1.000
Age	11,311	56.314	6.914	41.000	52.000	56.000	61.000	75.000
Tenure	11,311	1.959	0.761	0.411	1.397	1.970	2.505	3.569
Duality	11,311	0.507	0.500	–	–	1.000	1.000	1.000
Stock ownership	11,311	0.017	0.053	–	0.001	0.003	0.010	0.267
Option ownership	11,301	0.009	0.023	–	0.001	0.004	0.011	0.085

Variables are described in the Appendix.

Table 2
Correlation coefficients.

	NAR	Female	ROA	Log Tobin's Q	Total assets	Leverage	RD	Current ratio
NAR	1.00							
Female	-0.052***	1.000						
ROA	-0.009	0.021**	1.000					
Log Tobin's Q	-0.025***	-0.003	0.497***	1.000				
Total assets	0.036***	0.033***	0.038***	-0.138***	1.000			
Leverage	0.003	0.036***	0.013	-0.001	0.342***	1.000		
RD	0.037***	-0.035***	-0.188***	0.340***	-0.224***	-0.165***	1.000	
Current ratio	0.046***	-0.053***	0.001	0.146***	-0.425***	-0.522***	0.314***	1.000
Sales growth	0.010	-0.035***	0.228***	0.198***	-0.075***	-0.087***	0.198***	0.060***
Age	0.064***	-0.035***	0.003	-0.061***	0.117***	0.015	-0.097***	-0.025***
Tenure	0.077***	-0.083***	0.011	0.073***	-0.121***	-0.137***	0.062***	0.105***
Duality	0.061***	-0.030***	0.039***	-0.004	0.175***	0.039***	-0.116***	-0.096***
Stock ownership	0.022**	-0.049***	0.014	0.041***	-0.199***	-0.128***	0.020**	0.087***
Option ownership	-0.009	-0.035***	-0.019**	0.055***	-0.288***	-0.093***	0.151***	0.133***
	Sales growth	Age	Tenure	Duality	Stock ownership	Option ownership		
Sales growth	1.000							
Age	-0.0592***	1.0000						
Tenure	0.074***	0.400***	1.000					
Duality	-0.032***	0.257***	0.325***	1.000				
Stock ownership	0.020**	0.117***	0.324***	0.177***	1.000			
Option ownership	0.067***	-0.011	0.195***	0.047	0.091***	1.00		

This table presents correlations between variables used in the regression analysis. Variables are described in the Appendix. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 3
Regression results.

	ROA (1)	ROA (2)	Tobin's Q (3)	Tobin's Q (4)	Log Tobin's Q (5)
NAR	-0.016	-0.026	-0.160	-0.341	-0.137
	(0.020)	(0.021)	(0.309)	(0.307)	(0.103)
Female	-0.010*	-0.066***	-0.004	-1.122***	-0.461***
	(0.006)	(0.019)	(0.115)	(0.241)	(0.097)
NAR x Female		0.266***		5.349***	2.111***
		(0.079)		(1.255)	(0.452)
Total assets	-0.023***	-0.024***	-0.426***	-0.434***	-0.189***
	(0.005)	(0.004)	(0.053)	(0.053)	(0.018)
Leverage	-0.016	-0.016	0.463***	0.466***	0.140***
	(0.014)	(0.014)	(0.159)	(0.159)	(0.043)
RD	-0.272***	-0.274***	0.711	0.685	0.081
	(0.068)	(0.068)	(0.741)	(0.738)	(0.206)
Current ratio	-0.010*	-0.010*	0.041	0.041	0.022
	(0.006)	(0.006)	(0.072)	(0.072)	(0.024)
Sales growth	0.119***	0.119***	0.568***	0.567***	0.243***
	(0.006)	(0.006)	(0.069)	(0.069)	(0.025)
Age	0.000	0.000	0.002	0.002	0.001
	(0.000)	(0.000)	(0.003)	(0.003)	(0.001)
Tenure	0.004**	0.004**	0.111***	0.109***	0.036***
	(0.002)	(0.002)	(0.028)	(0.028)	(0.010)
Duality	0.002	0.002	0.076**	0.070**	0.019
	(0.003)	(0.003)	(0.035)	(0.035)	(0.013)
Stock ownership	-0.017	-0.016	-1.019**	-0.991**	-0.350**
	(0.037)	(0.038)	(0.489)	(0.490)	(0.167)
Option ownership	-0.590***	-0.597***	-14.360***	-14.490***	-4.896***
	(0.150)	(0.149)	(2.365)	(2.329)	(0.660)
Constant	0.284***	0.288***	4.910***	4.995***	1.924***
	(0.035)	(0.035)	(0.469)	(0.468)	(0.158)
Firm fixed effects	✓	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓	✓
R^2	0.193	0.195	0.163	0.167	0.221
Observations	11,237	11,237	11,237	11,237	11,237
Number of firms	849	849	849	849	849

Variables are described in the Appendix. Standard errors are clustered at the firm level and presented in parenthesis.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

in ROA of 1.86 % points (= 0.266 × 0.070) and an increase in Tobin's Q of 0.37 (= 5.349 × 0.070). With a median ROA of 9.8 % and a median Tobin's Q of 1.706, the increases correspond to improvements in corporate performance of 19.0 % and 21.9 %, respectively, implying economic significance. Given the coefficients in Models 2 and 4, female CEOs are positively associated with ROA from a level

Table 4
Robustness.

Panel A: Alternative measure for CEO narcissism

	ROA (1)	Log Tobin's Q (2)
Press release	-0.003	-0.010
	(-0.002)	(-0.016)
Female	-0.006	-0.057
	(-0.011)	(-0.060)
Press release * Female	0.015**	0.215**
	(-0.007)	(-0.086)
Control variables	✓	✓
Firm fixed effects	✓	✓
Year fixed effects	✓	✓
Observations	4023	4023
Number of firms	310	310

Panel B: Controlling for CEO overconfidence

	ROA (1)	Log Tobin's Q (2)
NAR	-0.016	-0.054
	(0.021)	(0.099)
Female	-0.073***	-0.526***
	(0.017)	(0.092)
Overconfidence	0.017***	0.125***
	(0.003)	(0.017)
NAR * Female	0.279***	2.202***
	(0.072)	(0.395)
Overconfidence * Female	0.012	0.089
	(0.012)	(0.078)
Big Five personality traits	✓	✓
Control variables	✓	✓
Firm fixed effects	✓	✓
Year fixed effects	✓	✓
Observations	11,237	11,237
Number of firms	849	849

Panel C: Agreeableness as a substitute for female

	ROA (1)	Log Tobin's Q (2)
NAR	0.009	0.733
	(0.129)	(0.622)
Agreeableness	-0.002	0.049
	(0.008)	(0.042)
NAR * Agreeableness	-0.006	-0.194
	(0.031)	(0.152)
Control variables	✓	✓
Firm fixed effects	✓	✓
Year fixed effects	✓	✓
Observations	11,237	11,237
Number of firms	849	849

Panel D: Excluding financial crisis and pandemic

	ROA (1)	Log Tobin's Q (2)
NAR	-0.025	-0.207*
	(0.021)	(0.106)
Female	-0.069***	-0.494***
	(0.013)	(0.088)
NAR * Female	0.277***	2.208***
	(0.057)	(0.410)
Control variables	✓	✓
Firm fixed effects	✓	✓
Year fixed effects	✓	✓
Observations	8943	8943
Number of firms	845	845

Variables are described in the Appendix. Standard errors are clustered at the firm level and presented in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

of narcissism of 0.275 (= 0.066 / (0.266 - 0.026)). The corresponding level of narcissism for Tobin's Q is 0.224 (= 1.122 / (5.349 - 0.341)). Given the distribution of narcissism among female CEOs (Table 1), it is a large minority of female CEOs who are narcissistic to such a degree that they are positively associated with corporate performance. The raw version of Tobin's Q is skewed to the right as shown in Table 1. Thus, Model 5 in Table 3 reports the log version of Tobin's Q as the dependent variable. Model 5 shows similar results as Model 4. In our subsequent robustness analysis, we continue with the log Tobin's Q as our dependent variable to mitigate the effects of skewness. The results in Table 3 suggest that narcissistic, female CEOs can transform the bright sides of narcissism into improved corporate performance without being penalized (too much) by the dark sides of narcissism.

We perform various robustness tests in Table 4. *Panel A* applies the prominence of the CEO in press releases (Chatterjee and Hambrick, 2007) as an alternative narcissism measure for the S&P 500 firms in our sample. We reach similar conclusions as in Table 3. The alternative measure of CEO narcissism is defined as the number of times that the CEO is mentioned by name in the firm's press releases scaled by the total amount of words (in thousands) in these press releases. The correlation between the two alternative narcissism measures is 0.08. The correlation coefficient is of the same magnitude as the one between the two measures of CEO overconfidence based on option exercise ("Longholder" and "Holder 67″) and the alternative measure based on press portrayal ("TOTALconfident") in Malmendier and Tate (2008) – 0.10 and 0.05, respectively. The fact that our conclusions are robust to an alternative measure of CEO narcissism makes us confident that our conclusions do not unduly rely on a specific proxy for CEO narcissism.

We argue that female CEOs can mitigate the negative aspects of narcissism due to societal expectations and gender-specific traits. However, this approach may oversimplify complex personality dynamics. Thus, in Panels B and C, we address these potential complexities in relation to overconfidence (Panel B) and agreeableness (Panel C).

Panel B makes a horse race between CEO overconfidence and CEO narcissism. Campbell et al. (2004) show that narcissism and overconfidence are positively correlated. Thus, it might be that it is not female narcissism but female overconfidence that drives our results (i.e., a question of omitted variable bias). However, the results in Panel B do not support this alternative explanation. The interaction term with CEO narcissism is statistically significant, and the interaction term with CEO overconfidence is *not* statistically significant.

Panel C questions whether it is femaleness or agreeableness that drives our results. Women are notoriously more agreeable than men (Gray and Bjorklund, 2018) – also among CEOs (Wille et al., 2018) - and such agreeableness may hamper the negative sides of narcissism. However, when we substitute agreeableness with female, we get insignificant results. This emphasizes that gender is the crucial factor – an agreeable, male CEO cannot transform narcissism into improved corporate performance.

Panel D excludes the financial crisis (2008–2009) and the pandemic (2020) from our default sample period (2007–2020) to investigate if our results are unduly driven by these extraordinary years. The results in Panel D show that our previous conclusions are robust to such exclusion.

Do female CEOs who are high (low) in narcissism *cause* better (worse) corporate performance? Or is it merely an association caused by profitable (unprofitable) firms hiring female CEOs high (low) in narcissism? We cannot prove causality, and we abstain from trying to do so using, e.g., instrumental variables that are conceptually sound but empirically flawed (Jiang, 2017; Kahn and Whited, 2018). Still, we find it likely that female CEOs who are high (low) in narcissism cause better (worse) corporate performance. Our reasoning rests on two pillars: (1) our econometrical approach and (2) plausibility.

First, we include firm fixed effects in our regression models. Thus, we eliminate unwanted variation by focusing on within-firm variation. Effectively, we investigate firms where a male CEO is replaced with a female CEO or vice versa. Hence, to be a simple association without causality, we should be able to argue that a firm that is going to improve its corporate performance after a replacement of its male CEO would prefer a female CEO high in narcissism while a firm that is going to see a deterioration in corporate performance after a replacement of its male CEO would prefer a female CEO low in narcissism. We find it unlikely that a firm would know its performance after a CEO replacement, and even if it did, we do not see a reason why a firm that expects improving (deteriorating) performance after a CEO replacement would prefer a female CEO high (low) in narcissism. Please note that it is not enough to argue that a profitable (non-profitable) firm would prefer a narcissistic (non-narcissistic), female CEO. Thus, we do not identify profitable firms who can "afford" to hire female CEOs. Rather, we identify firms that improve their profitability *after* they hire a female CEO. Thus, we find it unlikely that our results are driven by reverse causality. Furthermore, we include various firm and CEO control variables (including personality traits and overconfidence in our robustness tests), which further reduces concerns about omitted variable bias. However, our study is impeded by the low number of female CEOs. Therefore, our conclusions may rest on spurious regressions driven by chance. This makes our next argument for causality especially important.

Second, our findings are plausible. Harvey (2017) argues that it is crucial to account for the plausibility of a theory and its assumptions and not just rely on statistical significance levels. In the introduction, we argue that it is plausible that CEO narcissism is positively associated with corporate performance in the case of female CEOs. Hence, we find it likely that (1) the higher agreeableness of our female CEOs (4.41 versus 4.08, not tabulated), (2) traditional gender role expectations, and/or (3) empathy-related evolutionary traits make CEO narcissism more conducive for corporate performance in the case of female CEOs than in the case of male CEOs because female CEOs are better able to exploit the favorable facets of narcissism while mitigating the unfavorable facet.

With these two main arguments resting on our econometrical approach and plausibility, we find it likely that female CEOs who are high (low) in narcissism *cause* better (worse) corporate performance. As already mentioned, our study is, however, impeded by the low number of female CEOs, and we must be modest. Thus, it remains to be seen if our conclusions hold when gender diversity in the upper echelons is more prevalent in the future and we have more female CEOs.

4. Conclusion

We investigate 76 female CEOs and 1903 male CEOs in 849 non-financial and non-utility S&P 1500 firms in the period from 2007 to 2020. We argue and find that CEO gender moderates the relationship between CEO narcissism and corporate performance in such a way that CEO narcissism is positively associated with corporate performance solely in the case of female CEOs. Thus, narcissistic, female CEOs outperform their male peers both in terms of profitability (ROA) and valuation (Tobin's Q). Our findings are robust, economically significant, and therefore important for CEO selection and management.

Our findings are based on CEOs of non-financial and non-utility S&P 1500 firms in the period from 2007 to 2020. Thus, we are operating in the sphere of US non-financial firms. Countries differ in terms of culture, and these cultures may modulate the relationship between female CEOs, narcissism, and corporate performance. Hence, an obvious avenue for future research is to investigate if our findings are generalizable to other countries (and financial firms). In the opposite direction, the variation in institutional frameworks, cultural norms, and business environments towards gender and narcissism across the US states provides another avenue for future research as these factors may also modulate the relationship between female CEOs, narcissism, and corporate performance.

CRediT authorship contribution statement

Tom Aabo: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization. **Sara Korsdal Rønnow:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization.

Declaration of competing interest

None.

Data availability

Data will be made available on request.

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Appendix: Variable descriptions

Corporate performance

ROA
Return on assets. Measured as EBIT divided by average total assets. Winsorized at 1 % and 99 %. Source: Compustat.
Log Tobin's Q
Log of Tobin's Q calculated as (total assets + market value of equity - book value of equity) scaled by total assets. Source: Compustat.

Main variables

NAR
Measure of CEO narcissism. Continuous variable between 0 and 1, measured as all first-person singular pronouns divided by the sum of all plural and singular pronouns in CEO speech in Q&A sessions in quarterly earnings conference calls (minimum requirement is 1000 spoken words and 3 conference calls). Sources: Factiva and Nexis Uni.
FEMALE
Binary variable equal to 1 if the CEO is female, 0 otherwise. Source: ExecuComp.

Firm control variables

Total assets
Log of total assets (lagged by one year). Source: Compustat.
Leverage
Leverage ratio calculated as total liabilities scaled by total assets (lagged by one year). Source: Compustat.

Current ratio
Log of current ratio calculated as (current assets divided by current liabilities) lagged by one year. Source: Compustat.
RD
Calculated as research and development expenditures scaled by total assets, lagged by one year. Takes the value of zero if data is missing. Source: Compustat.
Sales growth
Sales growth calculated as the one-year growth rate in sales. Winsorized at 1 % and 99 %. Source: Compustat.

CEO control variables

Age
Age of CEO in years. Source: ExecuComp.
Tenure
Log of CEO tenure with the firm in years. Source: ExecuComp.
Duality
Binary variable equal to 1 if the CEO is chairman of the board of directors, 0 otherwise. Source: Datastream.
Stock ownership
CEO stock ownership measured as shares owned by the CEO (options excluded) divided by the firm's total shares outstanding. Source: ExecuComp.
Option ownership
CEO option ownership measured as sum of vested options and unvested options divided by the firm's total shares outstanding. Winsorized at 1 % and 99 %. Source: ExecuComp.

Robustness variables

Press release
Alternative measure of CEO narcissism measured as the number of times the CEO is mentioned by name in the firm's press releases, scaled by the total amount of words (in thousands) in these press releases. Sources: Factiva and Nexis Uni.
Overconfidence
Binary variable for CEO overconfidence measured by (lack of) option exercise, following Malmendier and Tate (2005) and Campbell et al. (2011). 1 = overconfident, 0 = not overconfident, based on a cut-off rate of 67 % in-the-money. Source: ExecuComp.
Agreeableness
Agreeableness (and the other four Big Five personality traits) measured on a continuous scale from 1 (low) to 7 (high) based on CEO speech in Q&A sessions in quarterly earnings conference calls, following Harrison et al. (2019). Sources: Factiva and Nexis Uni.

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