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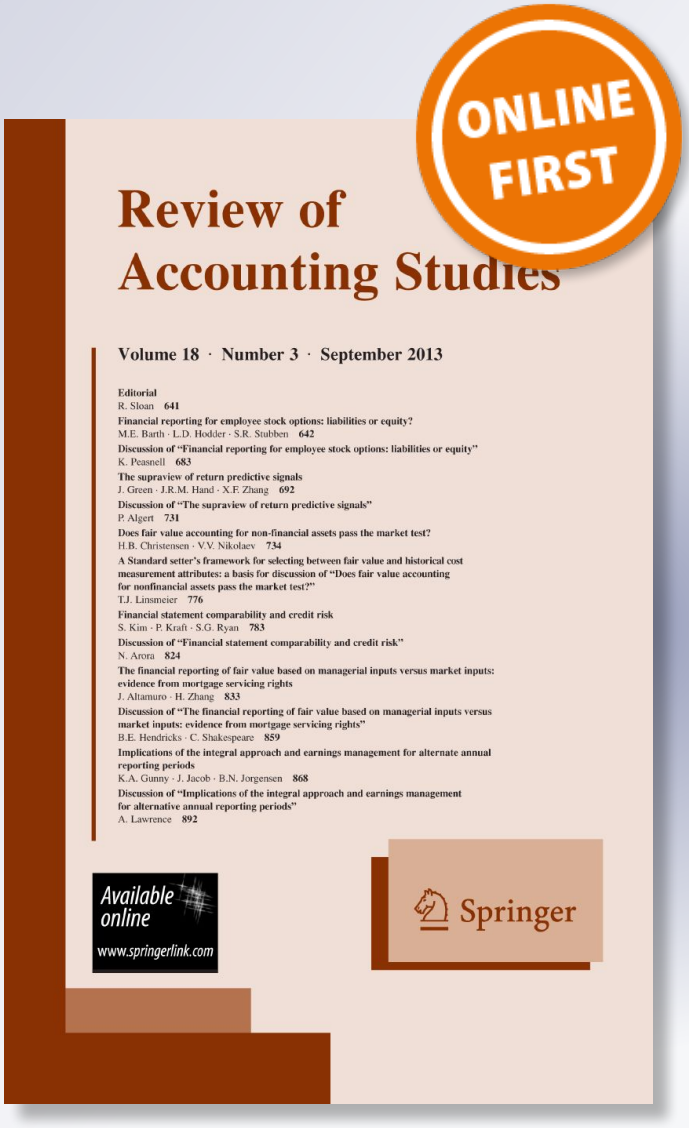

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Narcissism is a bad sign: CEO signature size, investment, and performance

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Abstract Using the size of CEO signatures in SEC filings to measure individual narcissism, we find that CEO narcissism is associated with several negative firm outcomes. We first validate signature size as a measure of narcissism but not overconfidence using two laboratory studies, and also find that our measure is correlated with employee perceptions of CEO narcissism used in prior research. We then use CEO signatures to study the relation between CEO narcissism and the firm's investment policies and performance. CEO narcissism is associated with overinvestment, particularly in R&D and M&A expenditures (but not in capital expenditures). Firms led by narcissistic CEOs experience lower financial productivity in the form of profitability and operating cash flows. Despite this negative performance, narcissistic CEOs enjoy higher absolute and relative compensation. Our results are robust to several alternative specifications, including controlling for a popular options-based overconfidence measure used in prior research.

Keywords CEO narcissism · Signature size · Investment · Performance · Compensation

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1 Introduction

This paper examines the effect of CEO narcissism on firm investment and performance using a novel measure to capture CEO narcissism: the size of the personal signature in SEC filings. We first experimentally validate the signature size measure. Using a sample of graduate business students and a traditional psychometric narcissism scale, we demonstrate a strong positive correlation between signature size and narcissism. A second laboratory study demonstrates that signature size is not significantly correlated with a traditional measure of overconfidence (Libby and Rennekamp 2012). As a final step in validation, we find that our signature size measure is strongly correlated with employee perceptions of CEO narcissism used in a prior study (O'Reilly et al. 2014). We then utilize CEO signatures from annual reports and proxy statements to document that narcissistic CEOs have a different investment style and deliver worse firm performance, yet receive higher compensation.

We predict and find that narcissistic CEOs pursue "high-exposure" investments such as research and development expenditures and merger and acquisition expenditures that could help to embellish the CEO's reputation, but not more routine capital expenditures which are necessary to maintain the condition of the firm's assets in place. The investment style pursued by narcissists may be less productive, as narcissistic CEOs generate lower profitability as well as lower operating cash flows. Despite the negative relation between CEO narcissism and firm performance, narcissistic CEOs receive higher absolute and relative compensation. Our results are robust to several alternative overinvestment proxies as well as to controlling for an options-based overconfidence measure used in Malmendier and Tate (2005) and Hirshleifer et al. (2012). It is important to note that while CEO narcissism is associated with investment policies, performance, and compensation, endogeneity remains a potential concern. While we do not claim to demonstrate causality, we attempt to mitigate endogeneity concerns through a set of robustness tests. For example, we examine pre-tenure firm and industry characteristics and observe that narcissistic CEOs are not generally hired by firms with different investment policies, suggesting that the investment policies are more likely driven by the CEO than vice versa. However, we acknowledge that endogeneity concerns cannot be entirely ruled out in our study.

1.1 Prior accounting and finance research on executive personality traits

The manner in which CEO personality traits affect company policies has recently emerged as a topic of interest in academic research. The notion that managers are not homogeneous substitutes is established in Hambrick and Mason's (1984) upper echelons theory, which states that managers' experiences, values, and personalities affect firm-related decisions, and that different managers in the same situation may therefore make different decisions (Hambrick and Mason 1984; Hambrick 2007). Drawing on upper echelons theory, several studies have documented executive-specific fixed effects, or styles, in the context of the firm's investment behavior, financing policy, and performance (Bertrand and Schoar 2003), voluntary disclosure (Bamber et al. 2010; Yang 2012), tax avoidance (Dyreng et al. 2010), conference call tone (Davis et al. 2015), and accounting practices (Ge et al. 2011).

To further the understanding of executives' styles, several papers investigate the effects of executive personality on firm decisions. For instance, a number of studies

examine how executive overconfidence affects firm behavior such as investment (Malmendier and Tate 2005; Hirshleifer et al. 2012; Ben-David et al. 2013), management earnings guidance (Hribar and Yang 2016), and accounting fraud (Schrand and Zechman 2012). Specifically, Malmendier and Tate (2005) find that overconfident CEOs exhibit greater investment sensitivity to cash flows, and Hirshleifer et al. (2012) find that overconfident CEOs are better innovators in terms of patents generated. Our study both expands on this prior research and offers unique results. We investigate the specific types of investments that narcissists are more and less likely to pursue (R&D, M&A, and capital expenditures), and also show that narcissists generate poorer firm performance. When including the options-based measure of overconfidence used in prior research in our central tests, we find that CEO overconfidence predicts a very different set of firm outcomes in our sample. Specifically, overconfidence predicts higher capital expenditures—but not R&D or M&A expenditures—and higher firm performance in terms of ROA and operating cash flows.

In addition, studies have examined how CEO narcissism affects firm behavior such as firm strategy and performance volatility (Chatterjee and Hambrick 2007), the M&A process (Aktas et al. 2016), accounting choices (Olsen et al. 2014), and tax avoidance (Olsen and Stekelberg 2015). There are several important differences between our study and prior narcissism research. First, we use a unique measure of narcissism that we validate in laboratory studies. This is critical because the most commonly used narcissism measures in extant literature have been found to correlate relatively poorly with narcissistic personality scores (Koch and Biemann 2014; Carey et al. 2015).[1] Second, prior research on CEO narcissism and performance (Chatterjee and Hambrick 2007) has focused on firms within the computer software and hardware industries. This research finds an effect of narcissism on performance extremeness but not directional performance. We find that CEO narcissism is associated with poorer firm performance and also show that despite delivering lower performance, narcissistic CEOs receive higher compensation. Third, while our results are consistent with concurrent M&A research, we investigate a broader set of investment choices and performance outcomes. Aktas et al. (2016) investigate CEO narcissism as measured by personal pronouns in CEO speeches and find that target and acquirer CEO narcissism is associated with more frequent M&A deal initiations and faster negotiations, yet lower probability of M&A deal completion. This evidence is consistent with our own findings that CEO narcissism is positively associated with the dollar volume of M&A expenditures. However, we also show how narcissistic CEOs allocate investment to different areas and are less productive in terms of profitability and operating cash flows. Further, as mentioned above, recent research has documented that personal pronoun usage may not reflect narcissism (Carey et al. 2015).

1.2 Measuring narcissism

One barrier to conducting research on the personality traits of corporate executives is the difficulty in finding a theoretically valid proxy for the underlying psychological construct. Prior psychology research has already undertaken the challenge

[1] The notion of a poor correlation is subjective, but Carey et al. (2015) find that personal pronoun usage has an insignificant correlation with narcissism scores at $r = 0.01$.

of obtaining an easily analyzable, unobtrusive measure of individual self-esteem. Zweigenhaft and Marlowe (1973) were the first to document that people with greater self-esteem have larger signatures. Zweigenhaft (1977) and Jorgenson (1977) expanded upon this finding by demonstrating that signature size can be used as an implicit measure of ego and dominance, which are both correlated with narcissism. Signature size has since been used to measure individual ego because it does not require study participants to answer direct questions about their personalities, and because participants are likely to be unaware that their ego would affect something as simple as their signature (Rudman et al. 2007). A number of studies have also shown that people possess a degree of implicit egotism, and that they strongly identify, and associate positive feelings, with their names, even to the extent that major career and life decisions can be affected (Nuttin 1987; Pelham et al. 2005). This may explain why prior studies have found a link between ego and signature size. However, a positive association between signature size and self-esteem, ego, or dominance does not guarantee a positive association between signature size and narcissism. For this reason, we use a sample of graduate business students to document that signature size is strongly positively correlated with narcissism.

A second barrier to conducting research on the personality traits of corporate executives is the time-consuming nature of collecting the necessary data. However, because many large corporations produce annual reports with letters to shareholders and/or make digital copies of their proxy statements available on their websites, the signatures of many CEOs are readily observable. This makes signature size a suitable measure of CEO narcissism.

While there are varying definitions of narcissism, we focus on narcissism as a basic personality trait rather than a psychological disorder. Narcissism has been identified as a stable personality trait that can be measured with personality assessment tools. Psychological characteristics associated with narcissists include authority, superiority, exploitativeness, entitlement, vanity, and self-sufficiency (Raskin and Howard 1988). While in more extreme cases narcissism can manifest in the form of increased hostility toward others (Rhodewalt and Morf 1995) and increased aggression (Wink 1991; Bushman and Baumeister 1998), it is most commonly associated with conceit and disregard for others (Wink 1991). Narcissism also creates a distorted self-perception in the form of an upwardly biased evaluation of one's own abilities and performance, which is maintained by ignoring objective evidence and feedback (Morf and Rhodewalt 1993; John and Robins 1994).

Narcissistic leaders have been shown to cause suboptimal group decision outcomes by dominating the decision process without incorporating feedback or ideas from other group members. Strangely, these group members mistakenly misperceive such actions from narcissists as a signal of competence and strong leadership (Nevicka et al. 2011). Similarly, Goncalo et al. (2010) find that narcissists believe they are more creative, and that they are adept at convincing others of their superior creativity, even though the work product of individual narcissists is not actually more creative. Narcissists are often perceived as better group leaders when they first assume the leadership position, but this effect wears off over time and can even become negative after groups gain experience with the narcissistic leader (Ong et al. 2016).

1.3 Narcissism versus overconfidence

Though some prior work has illustrated a positive correlation between narcissism and overconfidence (Campbell et al. 2004), there are clear psychological and behavioral differences between the two. In psychology research, overconfidence refers to the tendency to make more precise predictions than actual probability distributions would warrant, which would suggest increased risk taking. Finance literature often substitutes the term "overconfidence" for wishful thinking or unrealistic optimism, which refer to the tendency to make positively biased forecasts of future outcomes. The primary difference between narcissism and other psychological phenomena is a need for constant recognition and attention, a sense of entitlement, and a willingness to further one's own interests at the expense of others. In other words, a narcissistic manager may be subject to some degree of overconfidence, but would also suffer from other behavioral problems that would likely exacerbate poor decision making.

For example, Lakey et al. (2008) find that, in a gambling context, narcissists realize negative performance that is worse than their overconfidence alone would predict, because their poor decisions are exacerbated by an even greater tendency to take risks. Tamborski et al. (2012) also document that narcissism is distinct from overconfidence. While narcissists exhibit a tendency toward overconfidence/optimism in their self-evaluations, they also make unethical decisions and pursue their own interests at the expense of others.

More generally, psychology research has broadly failed to identify stable individual differences in overconfidence, which makes it difficult to measure overconfidence as a personality trait. Moore and Dev (2017) review the overconfidence literature in psychology and find that on some tasks, most individuals exhibit overconfidence, while on other tasks, most individuals exhibit underconfidence. They conclude that it is unlikely that overconfidence is a personality trait that predictably varies between individuals. This highlights the importance of measuring well-established personality traits that have been validated in the psychology literature, as we currently do with narcissism, to predict executive behavior. Still, studies such as Libby and Rennekamp (2012) utilize broadly accepted overconfidence scales to split individuals into low- and high-overconfidence groups. To document that our signature size metric does not capture overconfidence, we adopt the Libby and Rennekamp (2012) scale in a second laboratory experiment to distinguish the links between signature size, narcissism, and overconfidence, and find an insignificant correlation between overconfidence and signature size.

Finally, we conduct our central investment and performance tests controlling for a popular options-based measure of overconfidence. In general, we find that our narcissism measure and the overconfidence measure do not predict directionally consistent outcomes. Specifically, whereas narcissism predicts higher R&D expenditures, M&A expenditures, and total investment (but not capital expenditures), overconfidence predicts higher capital expenditures (but not R&D expenditures, M&A expenditures, or total investment). Whereas narcissism predicts lower firm performance in terms of ROA and operating cash flows, overconfidence predicts higher firm performance in these areas. There is one area of overlap—overconfidence predicts higher absolute compensation, whereas narcissism predicts both higher absolute compensation and higher relative compensation.

1.4 CEO narcissism and firm outcomes

Based on prior findings in psychology research, we expect that narcissistic CEOs are more likely to dominate decision processes (Nevicka et al. 2011), seek constant recognition and attention (Raskin and Howard 1988), and disregard feedback both from other individuals and their own prior decision outcomes (Wink 1991; Morf and Rhodewalt 1993; John and Robins 1994). In seeking recognition, narcissistic CEOs are likely to prefer investments that generate higher levels of exposure and the opportunity for self-enhancement. One potential consequence of these preferences would be a tendency for narcissistic CEOs to engage in empire building through M&A activity. In addition to CEOs' potential self-enhancement from engaging in M&A transactions, Ahern and Sosyura (2014) note that stock mergers create excessive media coverage for bidding firms, further satisfying narcissists' desire to be highly visible. Thus, we expect narcissists to allocate greater resources towards M&A expenditures.

Other investments also have the potential to generate recognition for narcissistic CEOs. Kothari et al. (2002) indicate that R&D investments offer increased potential for long-run recognition via extreme profitability. Although extreme performance could manifest in the form of either very positive or very negative outcomes, psychology research on narcissism suggests that narcissistic CEOs would be more willing to invest excessively in R&D if it has the potential to provide them with greater personal notoriety. We therefore also expect increased investment in R&D expenditures among CEOs with larger signatures.[2] On the contrary, more routine capital expenditures that involve replacing old equipment or updating internal processes are less likely to result in public recognition for the CEO.[3] Consistent with our expectations, we document that firms led by narcissistic CEOs invest more in R&D and M&A expenditures, but find no evidence of increased investment in more routine capital expenditures. We also provide evidence suggesting that the higher level of total investment can be characterized as overinvestment by (i) estimating deviations from the predicted level of investment, and (ii) focusing on periods of financial slack when overinvestment is most likely.

Because we document that narcissists are likely to pursue excessive R&D and M&A expenditures, we examine the productivity of the firm in the form of subsequent profitability and operating cash flows. Given that narcissists can cause suboptimal group decision outcomes by dominating the decision process without incorporating feedback (Nevicka et al. 2011), we expect firms led by narcissistic CEOs to be less productive. Consistent with our expectations, we document that firms led by more narcissistic CEOs deliver lower profitability and operating cash flows relative to firms led by less narcissistic CEOs.

[2] Narcissistic CEOs who are concerned with short-term financial performance may also be incentivized to reduce R&D expenditures if doing so would allow the firm to exceed near-term earnings targets, possibly at the expense of long-term growth (Baber et al. 1991). Such incentives would likely bias against finding a positive association between CEO narcissism and R&D expenditures.

[3] We acknowledge that certain capital expenditures, such as building a new headquarters, could result in public recognition. However, we believe capital expenditures will tend to be more routine in nature relative to R&D and M&A expenditures. For example, Apple is known as a company that builds flashy technology, retail stores, and headquarters. However, Apple's 2016 Annual Report indicates that the majority of its capital expenditures went to "machinery, equipment and internal use software."

Regardless of their actual performance, narcissistic CEOs may be able to command higher compensation by making positive impressions with the board of directors and/or shareholders (Goncalo et al. 2010; Nevicka et al. 2011; Ong et al. 2016). This is particularly relevant given that other individuals may misperceive narcissism as a signal of competence (Nevicka et al. 2011). In addition, prior management research documents that compensation is higher for managers who utilize popular management techniques, despite there being no difference in their actual performance (Staw and Epstein 2000). Thus, we conjecture that narcissists' compensation may not be commensurate with the lower performance they deliver. Consistent with this, we document that narcissistic CEOs earn higher absolute and relative compensation.

Our results have implications for both research and practice. First, we document that CEO narcissism has a significant association with investment policy and that this leads to overinvestment relative to peer firms, predominantly in times of excess financial slack. Narcissists pursue "high-exposure" investments such as R&D and M&A expenditures, but do not utilize higher levels of capital expenditures. Despite this tendency, narcissists' firms generate lower profitability and operating cash flows. The negative performance delivered by narcissists should be of interest to investors and the general public, as well as researchers interested in executive personality traits. Finally, our results are instructive for corporate directors who may not be aware that narcissistic CEOs command higher compensation despite delivering poorer performance. The remainder of the paper is organized as follows: Section 2 describes the data, Section 3 presents the empirical specifications and results, and Section 4 concludes.

2 Data

2.1 Signature size measure and validation

2.1.1 Validation of signature size-narcissism link

To validate our proposed measure of narcissism, we conducted two laboratory studies to determine the correlation between signature size and narcissism. In the first study, 53 graduate business students at a large public university participated. The participants were recruited in a graduate business class and were compensated five dollars to complete the task. Participants first read the study consent form, which had a large area (approximately 1/3 of a standard page) on which participants were directed to sign their name. Consistent with prior research (Ham et al. 2017; Zweigenhaft 1977) and our measure used in the archival analyses, a rectangle was drawn around each participant's signature, wherein each side of the rectangle touched the most extreme endpoint of the signature. The area consumed by the signature was then determined by multiplying the length and width (in centimeters) of the rectangle. To control for the length of the participant's name we divided the square area by the number of letters in the participant's name. We use the area-per-letter signature size measure to determine the association between signature size and narcissism. The average area of the participants' signatures is 12.7 cm and the average area-per-letter is 1.0 cm.

After reading and signing the consent form, participants then completed the 16-item Narcissistic Personality Inventory (NPI-16) developed and validated by Ames et al. (2006). The NPI-16 is an abridged version of the 40-item Narcissistic Personality Inventory (NPI-40) developed and validated by Raskin and Howard (1988). The NPI-16 consists of 16 pairs of statements wherein the participants choose one statement from each pair.[4] As in Ames et al. (2006), narcissism-consistent responses are coded as one and narcissism-inconsistent responses are coded as zero. Thus, participants' NPI-16 scores take integer values ranging from zero to sixteen. This provides the narcissism measure that we use to determine the link between signature size and narcissism. The mean (median) NPI-16 score is 5.7 (5).[5]

Consistent with our conjecture that signature size captures narcissism, the Pearson correlation between the NPI-16 scores and the area-per-letter signature size measure is $r = 0.36$ ($p < 0.01$).[6] Fig. 1 displays the mean and median NPI-16 scores for each quartile of area-per-letter signature size in our study, demonstrating a monotonic relationship between the two measures. The mean (median) NPI-16 score increases from 4.5 (4.0) in the lowest quartile of signature size to 7.3 (8.0) in the highest quartile of signature size.[7]

To provide evidence that our measure is distinct from overconfidence, we remove the six questions in the NPI-16 that are most closely related to feelings of superiority and self-sufficiency (i.e., most related to overconfidence), leaving the ten items measuring exploitativeness, authoritativeness, entitlement, and exhibitionism. The Pearson correlation between signature size and these ten items increases to $r = 0.38$ ($p < 0.01$), whereas the Pearson correlation between signature size and the six items most closely related to overconfidence is insignificant at $r = 0.17$ ($p > 0.10$).

We conducted a second study to more directly document that signature size and narcissism are independent from overconfidence. The second study is identical to the first, except that participants also completed a ten-item overconfidence scale adapted from Libby and Rennekamp (2012). This scale asks participants to provide numerical estimates in response to trivia questions involving distances, weights, and times. Participants provide their confidence boundaries (the lower and upper bounds of the range that the true answer should fall between). For each trivia item where the correct answer falls outside participants' confidence boundaries, they earn one point on the ten-point overconfidence scale. 61 undergraduate business students participated in the study. The correlation between signature size and narcissism was lower than in our first study at $r = 0.23$ ($p = 0.071$). However, the

[4] See: http://www.columbia.edu/~da358/npi16/

[5] Foster et al. (2003) find a standardized (scaled so that 0 is the lowest score and 1 is the highest score) narcissism score of 0.38 for participants aged 20 to 24 years. Our similarly aged participants had a comparable standardized score of 0.36.

[6] To mitigate the influence of outliers we rank the area-per-letter signature size measure in the experimental analyses. We are unable to winsorize the measure (as we do in the archival analyses) due to the small number of observations. Our inferences remain unchanged if we log transform or make no adjustment to the area-per-letter measure.

[7] We also examine how frequently signature size and NPI-16 scores fall into the same quartile. Whereas chance would predict an exact rank match between signature size and NPI 25% of the time, we find that signature size and NPI have an exact rank match 39% of the time.

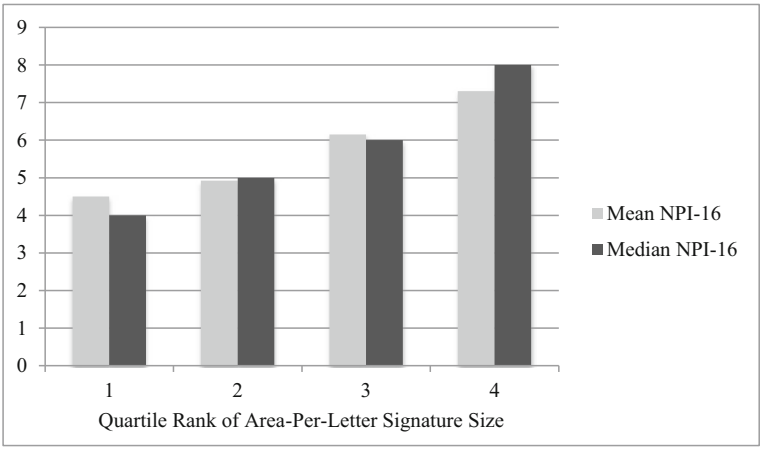

Fig. 1 Relation between signature size and NPI-16. This figure displays the mean and median narcissism score (as measured by the NPI-16 instrument) by quartile of signature size (as measured by the area-per-letter instrument) provided by 53 study participants. The 16-item Narcissistic Personality Inventory (NPI-16) consists of 16 pairs of statements wherein the participants choose one statement from each pair. Narcissism-consistent responses are coded as one and narcissism-inconsistent responses are coded as zero, so participants' NPI-16 scores take integer values ranging from zero to sixteen. To calculate the area-per-letter signature size instrument, a rectangle was drawn around each participant's signature, the length and width of the rectangle were multiplied to calculate the area consumed by the signature, and the area was divided by the number of letters in the participant's name

correlation between signature size and overconfidence did not approach significance at $r = 0.076$ ($p = 0.56$); nor did the correlation between narcissism and overconfidence at $r = -0.04$ ($p = 0.75$). One potential reason for the lower correlation between signature size and narcissism in the second study is that the overall range of narcissism was lower. The mean score on the NPI-16 was 4.5, with the maximum score being an 8. By comparison, 4.5 was the mean score on the NPI-16 in the lowest quartile of our first study. We can only conjecture as to the reasons for the lower NPI scores in the second study, but it is possible that the large focus, both in the media and among university students, on narcissistic characteristics during the 2016 presidential election may have decreased participants' willingness to admit their own level of narcissism. It is worth noting that this correlation, $r = 0.23$, still exceeds that of other measures of underlying attributes used in the accounting literature. For example, Jia et al. (2014) use facial width-to-height ratios to proxy for CEO testosterone levels. The original study (Lefevre et al. 2013) correlating facial width-to-height and testosterone found correlations in the main population ranging from an insignificant $r = 0.11$ to a significant $r = 0.21$. It is also worth noting that Foster et al. (2003) found that the largest correlations between narcissism and age, ethnicity, gender, world region, and income were age at $r = -0.17$ and income at $r = 0.08$. The varying magnitudes of correlation in these studies give us comfort about the fact that our signature size measure correlates with narcissism at between $r = 0.23$ and $r = 0.36$.

Finally, we validate our measure by correlating signature sizes of prominent CEOs with a previously used metric of narcissism in the psychology and management literatures. Specifically, O'Reilly et al. (2014) obtained employees' ratings of perceived narcissism for their firm's CEO. The O'Reilly et al. (2014) measure was obtained for 32 CEOs of technology firms and is based on surveys used in psychology research to assess perceptions of narcissism (Resick et al. 2009). We

personally contacted Charles O'Reilly, since his data guaranteed confidentiality to the employees who responded. He agreed to use the signature sizes we provided to conduct a correlation between our measure and the O'Reilly et al. (2014) measure of perceived narcissism. The correlation between signature size and employee perceptions of narcissism for the 24 CEOs with a signature available reveals a strong and significant correlation of $r = 0.51$ ($p < 0.01$).[8]

2.1.2 Archival signature size measure

The sample comprises the S&P 500 companies as of July 2011.[9] We obtained each CEO's most recent signature from the letter to shareholders in the annual report, or from the most recent proxy statement when no signature was available in the annual report. We also obtained the most recent signature from prior CEOs when available.[10] Signature examples are displayed in Appendix 2. We then matched the CEO-firm pairs to the Execucomp database to obtain the corresponding years in office for each CEO. The initial sample includes 741 CEOs from 411 firms, corresponding to 6361 firm-year observations and a median of 8 fiscal years per CEO over the period 1992–2015.[11]

Because executives are generally unwilling to take personality tests, we utilize an unobtrusive, valid proxy to capture the underlying construct of narcissism: signature size. Consistent with prior research (Zweigenhaft 1977) and our experimental measure, a rectangle is drawn around each CEO's signature, wherein each side of the rectangle touches the most extreme endpoint of the signature. The area consumed by the signature is then determined by multiplying the length and width (in centimeters) of the rectangle. To control for the length of the CEO's name we divide the square area by the number of letters in the CEO's name. The average area of the CEOs' signatures is 6.3 cm, and the average area-per-letter is 0.5 cm.

2.2 Descriptive statistics

Upon matching the hand-collected signature size data to the Execucomp database, we obtain financial statement (return) data from the Compustat (CRSP) database. We winsorize all continuous variables at the 1st and 99th percentiles to mitigate the influence of outliers. Table 1 reports descriptive statistics for the dependent and independent variables that are used in the multivariate analyses. Panel A of Table 1 reports descriptive statistics for the CEO characteristics. The mean CEO age is 55 years, the mean CEO tenure is 5 years, and female CEOs

[8] Charles O'Reilly, personal communication via e-mail, February 10, 2017.

[9] This is due to data collection constraints. While obtaining the size of a CEO's signature is not as complicated as gathering some alternative personality trait proxies, it is nonetheless a costly process. For this reason, we constrained our sample to the S&P 500 companies as of July 2011, when the data collection began.

[10] Though it may seem logical to collect multiple signatures to analyze time-series effects of narcissism, psychology research suggests that narcissism is a stable personality trait (Raskin and Howard 1988). Thus, between-CEO differences should be much larger than within-CEO differences. The time consuming nature of signature collection also makes collecting multiple signatures for each CEO very costly.

[11] Because we use the Execucomp database to identify CEOs and the corresponding years in office, our sample period is restricted to the period 1992–2015.

Table 1 Descriptive statistics and correlation matrix

Panel A: Descriptive statistics – CEO characteristics

Variable	N	Mean	StdDev	P25	Median	P75
$SIGSIZE_t$	6,361	0.493	0.233	0.316	0.452	0.621
$EXECAGE_t$	6,361	54.639	6.409	51.000	55.000	59.000
$TENURE_t$	6,361	4.925	4.190	2.000	4.000	7.000
$FEMALE_t$	6,361	0.025	0.155	0.000	0.000	0.000

Panel B: Descriptive statistics – investment analyses

Variable	N	Mean	StdDev	P25	Median	P75
$CAPEX_t$	5,766	5.270	5.448	1.756	3.778	6.899
$R\&D_t$	5,766	2.468	4.746	0.000	0.000	2.784
$M\&A_t$	5,766	2.476	6.408	0.000	0.014	1.500
$LOGAT_{t-1}$	5,766	9.249	1.485	8.257	9.180	10.167
ROA_{t-1}	5,766	0.072	0.070	0.028	0.061	0.107
MTB_{t-1}	5,766	3.673	3.592	1.740	2.748	4.405
LEV_{t-1}	5,766	0.598	0.196	0.473	0.603	0.734
RET_{t-1}	5,766	0.167	0.384	−0.058	0.135	0.337
$SD(ROA)_{t-1}$	5,766	0.034	0.041	0.010	0.021	0.041
$SD(RET)_{t-1}$	5,766	0.086	0.046	0.053	0.075	0.106
$SD(INVEST)_{t-1}$	5,766	6.041	8.183	1.285	3.253	7.189
$PERSIST(ROA)_{t-1}$	5,766	0.260	0.484	−0.071	0.198	0.590
OCF_t	5,766	0.124	0.082	0.069	0.111	0.167

Panel C: Descriptive statistics – performance analyses

Variable	N	Mean	StdDev	P25	Median	P75
ROA_t	4,955	0.080	0.072	0.037	0.071	0.115
$ROA_{t+1,t+2}$	4,955	0.155	0.132	0.074	0.140	0.222
OCF_t	4,955	0.138	0.082	0.083	0.123	0.179
$OCF_{t+1,t+2}$	4,955	0.270	0.149	0.166	0.241	0.347
$POS(ROA)_{pretenure}$	4,955	0.085	0.078	0.035	0.065	0.108
$NEGI(ROA)_{pretenure}$	4,955	0.070	0.256	0.000	0.000	0.000
$POS(OCF)_{pretenure}$	4,955	0.141	0.099	0.082	0.122	0.168
$NEGI(OCF)_{pretenure}$	4,955	0.023	0.149	0.000	0.000	0.000
$POS(ACCRUALS)_{t-1}$	4,955	0.017	0.031	0.000	0.002	0.021
$NEG(ACCRUALS)_{t-1}$	4,955	−0.012	0.024	−0.015	0.000	0.000
DIV_{t-1}	4,955	0.020	0.022	0.000	0.014	0.028
$NODIV_{t-1}$	4,955	0.259	0.438	0.000	0.000	1.000
$ATGROWTH_{t-1}$	4,955	1.136	0.266	1.009	1.070	1.173
MTB_{t-1}	4,955	3.999	4.005	1.864	2.908	4.758
$LOGMVE_{t-1}$	4,955	9.119	1.227	8.311	9.042	9.813

Panel D: Descriptive statistics – compensation analyses

Variable	N	Mean	StdDev	P25	Median	P75
$COMP_t$	6,116	9,362	8,164	4,063	7,333	12,042

Table 1 (continued)

$PAYSLICE_t$	6,116	0.394	0.114	0.331	0.403	0.464
$LOGSALE_{t-1}$	6,116	8.778	1.306	7.917	8.784	9.601
MTB_{t-1}	6,116	3.728	3.782	1.743	2.739	4.410
RET_t	6,116	0.160	0.371	−0.059	0.130	0.332
RET_{t-1}	6,116	0.170	0.388	−0.059	0.136	0.343
ROA_t	6,116	0.071	0.072	0.026	0.059	0.105
ROA_{t-1}	6,116	0.072	0.073	0.026	0.060	0.106

Panel E: Correlation matrix

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1)	$SIGSIZE_t$	1.000						
(2)	$CAPEX_t$	−0.090	1.000					
		(0.000)						
(3)	$R\&D_t$	0.010	0.003	1.000				
		(0.422)	(0.804)					
(4)	$M\&A_t$	0.025	0.009	0.148	1.000			
		(0.044)	(0.485)	(0.000)				
(5)	ROA_t	−0.141	0.204	0.195	0.064	1.000		
		(0.000)	(0.000)	(0.000)	(0.000)			
(6)	OCF_t	−0.127	0.397	0.306	0.129	0.751	1.000	
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		
(7)	$COMP_t$	0.072	−0.157	−0.020	0.049	0.004	−0.036	1.000
		(0.000)	(0.000)	(0.109)	(0.000)	(0.739)	(0.005)	
(8)	$PAYSLICE_t$	0.058	−0.035	−0.046	0.058	−0.002	−0.017	0.547
		(0.000)	(0.006)	(0.000)	(0.000)	(0.864)	(0.191)	(0.000)

Panels A through D report descriptive statistics. N is the number of observations, StdDev is the standard deviation, and P25 (P75) is the 25th (75th) percentile of the variable's distribution. Panel E reports pairwise Pearson correlations. *P*-values are reported in parentheses. Variable definitions are reported in Appendix 1.

compose 2% of the sample.[12] Panel B of Table 1 reports descriptive statistics for the investment analyses. The sample mean for capital expenditures (research and development expenditures, merger and acquisition expenditures) is 5.3% (2.5%, 2.5%) of prior year total assets. Panel C of Table 1 reports descriptive statistics for the performance analyses. The mean return on assets is 8%, and the mean operating cash flows is 14%, of prior year total assets. Panel D of Table 1 reports descriptive statistics for the compensation analyses. The mean annual total CEO compensation is $9 million, and the mean CEO pay slice—the CEO's total compensation divided by the total compensation of the five highest paid executives—is nearly 40%.

Panel E of Table 1 reports Pearson correlation coefficients between the area-per-letter signature size measure of narcissism (*SIGSIZE*) and the main outcome variables

[12] Table 1 reports the descriptive statistics for executive age, executive tenure, and total compensation before the log transformation.

used in the multivariate analyses. *SIGSIZE* is negatively correlated with capital expenditures, return on assets, and operating cash flows, and positively correlated with R&D expenditures, M&A expenditures, and both compensation proxies.

3 Empirical tests

3.1 CEO narcissism and investment

We examine the association between CEO narcissism and the firm's investment policies, including the firm's levels of capital expenditures, R&D expenditures, and M&A expenditures, by estimating the following model[13]:

$$InvestmentComponents_{it} = \beta_0 + \beta_1 SIGSIZE_j + \Sigma\beta_k Controls + \Sigma\beta_m Industry + \Sigma\beta_n Year + \varepsilon_{it} \quad (1)$$

We examine the association between CEO narcissism and the firm's investment policies via three investment proxies. *CAPEX* is defined as capital expenditures less sales of property, plant, and equipment multiplied by 100 and scaled by prior year total assets. *R&D* is defined as R&D expenditures multiplied by 100 and scaled by prior year total assets. *M&A* is defined as M&A expenditures multiplied by 100 and scaled by prior year total assets.

The primary independent variable of interest is the proxy for CEO narcissism, the area-per-letter measure of signature size (*SIGSIZE*), which is measured as previously discussed. The model includes a series of control variables, based predominantly on the model used in Goodman et al. (2014). *LOGAT* is the natural log of total assets. *ROA* is income before extraordinary items scaled by lagged assets. *MTB* is the market value of equity scaled by the book value of common equity. *LEV* is total liabilities scaled by total assets. *RET* is the cumulative monthly return over the fiscal year. *SD(ROA)* is the standard deviation of *ROA* over the prior five years. *SD(RET)* is the standard deviation of monthly returns over the fiscal year. *SD(INVEST)* is the standard deviation of investment over the prior five years. *PERSIST(ROA)* captures earnings persistence. *OCF* is operating cash flows scaled by lagged assets. *EXECAGE* is the natural log of the executive's age. *TENURE* is the natural log of the executive's tenure. *FEMALE* is an indicator variable equal to one if the CEO is female.[14] Specific variable definitions are provided in Appendix 1. The models also include industry and year fixed effects, and standard errors are clustered by firm.[15]

[13] Subscript *i* denotes firm, subscript *j* denotes CEO, subscript *t* denotes year.

[14] We include these CEO characteristics to control for other sources of variation in CEO behavior, and to capture other potential variation in CEO signatures. For example, a CEO's signature may be larger or smaller depending on gender, physical characteristics, upbringing, or education. If older CEOs learned to write their signatures in a more artistic or embellished manner, this would introduce noise in our measure. Controlling for CEO age, tenure, and gender should aid us in assuming that any remaining differences in signature size are randomly distributed across CEOs. However, all inferences remain unchanged if we omit controls for these CEO characteristics.

[15] Our inferences remain unchanged if standard errors are clustered by firm and year.

As previously discussed, because narcissistic CEOs have a strong desire to reaffirm their prestige and power among their peers (Raskin and Howard 1988; Wink 1991), we expect them to act upon these desires by engaging in empire building via higher levels of merger and acquisition expenditures. Further, following psychology studies that find narcissists' self-perceived level of innovation to be higher than others' perceptions of the narcissists' innovation levels (John and Robins 1994; Goncalo et al. 2010), we also expect that narcissists will excessively spend on research and development expenditures. Given that total funds available for investment are limited, we expect there to be less funds available for capital expenditures, though we do not formulate a formal prediction for capital expenditures. Table 2 reports the results from estimating Eq. (1). Consistent with our expectations, *SIGSIZE* is positively associated with R&D expenditures as well as M&A expenditures ($\beta = 1.071$, $p < 0.05$; $\beta = 1.662$, $p < 0.01$). *SIGSIZE* is also negatively associated with capital expenditures, although this result is not significant at conventional levels ($\beta = -0.365$, $p > 0.10$). These results indicate that firms led by narcissistic CEOs invest more in R&D expenditures as well as M&A expenditures, but invest similarly in capital expenditures.[16]

The Table 2 results document a positive association between CEO narcissism and specific investment components, namely R&D expenditures and M&A expenditures. Throughout the remainder of the analyses we aggregate the components and define total investment as the sum of capital expenditures, R&D expenditures, and M&A expenditures multiplied by 100 and scaled by prior year total assets (*INVEST*). Although we have documented a positive association between CEO narcissism and certain investment components, we note that this does not equate to *overinvestment*. Therefore, we take approaches utilized in the prior literature to determine whether CEO narcissism is associated with overinvestment.

As described in Biddle et al. (2009), firms with high cash balances have a propensity for overinvestment (Jensen 1986; Blanchard et al. 1994; Opler et al. 1999), whereas firms with high leverage may suffer from debt overhang problems that lead to underinvestment (Myers 1977). Taken together, this research suggests that overinvestment will likely be increasing in a firm's level of financial slack, defined as having high cash and low debt. We investigate whether this relation holds for narcissistic CEOs by examining whether high investment is most prominent when the firm is least financially constrained. We estimate the following model:

$$Investment_{it} = \beta_0 + \beta_1 SIGSIZE_j + \beta_2 SIGSIZE_j{}^{*} SLACK_{it-1} + \beta_3 SLACK_{it-1} + \Sigma\beta_k Controls + \Sigma\beta_m Industry + \Sigma\beta_n Year + \varepsilon_{it} \quad (2)$$

As previously discussed, *SLACK* is a ranked variable that is increasing in the likelihood of overinvestment by the firm. *SLACK* is measured as the average of the ranked deciles of the firm's levels of cash and leverage (Biddle et al. 2009; Cheng et al. 2013), and is rescaled to be between zero and one. Prior to computing the average of the ranked deciles, leverage is multiplied by negative one so that both ranked deciles

[16] In unreported analyses we also find that firms led by narcissistic CEOs invest more in advertising expenditures, which could be considered another "high-exposure" investment category.

Table 2 Relation between CEO narcissism and investment components

	$CAPEX_t$	$R\&D_t$	$M\&A_t$
$SIGSIZE_t$	**−0.365**	**1.071****	**1.662*****
	(0.445)	**(0.047)**	**(0.003)**
$LOGAT_{t-1}$	−0.226*	0.185	−0.341***
	(0.059)	(0.102)	(0.001)
ROA_{t-1}	−3.038	−3.564	−0.892
	(0.132)	(0.114)	(0.684)
MTB_{t-1}	−0.006	0.115***	−0.043
	(0.812)	(0.002)	(0.199)
LEV_{t-1}	−2.133***	−4.029***	−0.979
	(0.003)	(0.001)	(0.238)
RET_{t-1}	0.962***	−0.013	0.151
	(0.000)	(0.918)	(0.538)
$SD(ROA)_{t-1}$	−4.092	19.358***	−7.278**
	(0.172)	(0.000)	(0.030)
$SD(RET)_{t-1}$	9.111***	10.949***	−6.719**
	(0.000)	(0.000)	(0.017)
$SD(INVEST)_{t-1}$	0.008	−0.016	0.042**
	(0.541)	(0.180)	(0.026)
$PERSIST(ROA)_{t-1}$	0.006	−0.337*	−0.216
	(0.970)	(0.087)	(0.206)
OCF_t	19.250***	9.306***	7.927***
	(0.000)	(0.000)	(0.000)
$EXECAGE_t$	−0.594	−0.848	−0.970
	(0.616)	(0.485)	(0.387)
$TENURE_t$	0.038	0.194	0.014
	(0.751)	(0.217)	(0.913)
$FEMALE_t$	−0.392	0.945	−0.367
	(0.326)	(0.405)	(0.485)
Observations	5,766	5,766	5,766
Adjusted R-squared	0.547	0.547	0.072

This table reports OLS regression results of the relation between CEO narcissism and investment components. The dependent variable is capital expenditures (CAPEX), research and development expenditures (R&D), or merger and acquisition expenditures (M&A). The independent variable of interest is the CEO's area-per-letter signature size (SIGSIZE). The models include year and industry fixed-effects based on the Fama and French (1997) 48 industry classifications. Robust standard errors are clustered by firm. *P*-values are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively. Variable definitions are reported in Appendix 1.

are increasing in the likelihood of overinvestment. *SIGSIZE* and *SLACK* are interacted to test whether firms with narcissistic CEOs are likely to invest larger amounts when their firms are not subject to financial constraints. All other variables in the model are as previously defined.

First, we examine whether narcissistic CEOs with higher financial slack (*SLACK*) have higher levels of total investment (*INVEST*). Second, we directly examine whether narcissistic CEOs overinvest by calculating a deviation from the expected level of investment. Following prior literature (Goodman et al. 2014), we model the firm's expected level of investment as a function of several firm characteristics. Specifically, we estimate the following model:

$$INVEST_{it} = \beta_0 + \beta_1 INVEST_{it-1} + \beta_2 TOBINSQ_{it-1} + \beta_3 OCF_{it} + \beta_4 ATGROWTH_{it-1} + \varepsilon_{it} \quad (3)$$

TOBINSQ is the market value of equity plus the book value of short- and long-term debt scaled by lagged total assets. *ATGROWTH* is total assets in year *t-1* scaled by total assets in year *t-2*. All other variables are as previously defined. Eq. (3) is estimated for each industry-year with at least ten observations. The deviation from the expected level of investment is defined as the residual from estimating Eq. (3), *INVEST_RES*.[17]

Table 3 reports the results from estimating Eq. (2). Column (1) reports the results from estimating Eq. (2) before incorporating the *SLACK* interactions wherein *INVEST* is the dependent variable. As expected, *SIGSIZE* is positively associated with the level of total investment, *INVEST* (β = 2.576, $p < 0.01$). Column (2) reports the results from estimating Eq. (2) after incorporating the *SLACK* interactions wherein *INVEST* is the dependent variable. The positive association between *SIGSIZE* and *INVEST* is primarily driven by periods of financial slack, as evidenced by the significantly positive coefficient on the interaction term *SIGSIZE*SLACK* (β = 7.643, $p < 0.05$). These results document that narcissistic CEOs have higher levels of investment when the firm is least financially constrained.

Column (3) reports the results from estimating Eq. (2) before incorporating the *SLACK* interactions wherein *INVEST_RES* is the dependent variable. *SIGSIZE* is positively associated with overinvestment, *INVEST_RES* (β = 1.857, $p < 0.01$). Column (4) reports the results from estimating Eq. (2) after incorporating the *SLACK* interactions wherein *INVEST_RES* is the dependent variable. The positive association between *SIGSIZE* and *INVEST_RES* is primarily driven by periods of financial slack, as evidenced by the significantly positive coefficient on the interaction term *SIGSIZE*SLACK* (β = 7.298, $p < 0.01$). Collectively, these results demonstrate that firms led by narcissistic CEOs are likely to overinvest, with the effect being most pronounced when the firm is least financially constrained.[18]

[17] Our inferences remain unchanged using several other models of the expected level of investment from prior studies, such as those where the independent variables include (i) sales growth (Biddle et al. 2009), (ii) sales growth, a negative sales growth indicator variable, and the interaction between the two variables (Chen et al. 2011), (iii) Tobin's Q and operating cash flows (McNichols and Stubben 2008), or (iv) lagged investment, leverage, cash holdings, firm age, total assets, returns, and a proxy for growth opportunities (V/P) (Richardson 2006).

[18] In Table 3, the coefficients on the main effects for *SIGSIZE* and *SLACK* are both positive and significant if demeaned.

Table 3 Relation between CEO narcissism and overinvestment

	INVEST	INVEST	INVEST_RES	INVEST_RES
$SIGSIZE_t$	**2.576*** **	**−1.437**	**1.857*** **	**−1.974**
	(0.003)	**(0.361)**	**(0.008)**	**(0.133)**
$SIGSIZE_t$*$SLACK_{t-1}$		**7.643** **		**7.298*** **
		(0.023)		**(0.006)**
$SLACK_{t-1}$		−0.924		−1.114
		(0.673)		(0.523)
$LOGAT_{t-1}$	−0.469**	−0.501**	−0.294*	−0.323**
	(0.019)	(0.012)	(0.051)	(0.032)
ROA_{t-1}	−8.758**	−9.426***	−8.414**	−8.982**
	(0.017)	(0.009)	(0.031)	(0.021)
MTB_{t-1}	0.056	0.050	−0.137**	−0.142**
	(0.298)	(0.339)	(0.014)	(0.011)
LEV_{t-1}	−7.082***	−4.594**	−3.733***	−1.566
	(0.000)	(0.026)	(0.003)	(0.356)
RET_{t-1}	1.264***	1.188***	0.440	0.372
	(0.001)	(0.002)	(0.226)	(0.310)
$SD(ROA)_{t-1}$	8.027	5.579	6.714	4.509
	(0.191)	(0.353)	(0.185)	(0.369)
$SD(RET)_{t-1}$	15.115***	13.440***	8.419**	6.949*
	(0.000)	(0.001)	(0.018)	(0.051)
$SD(INVEST)_{t-1}$	0.038	0.042	−0.057***	−0.054**
	(0.162)	(0.116)	(0.007)	(0.010)
$PERSIST(ROA)_{t-1}$	−0.602*	−0.589*	−0.358	−0.347
	(0.059)	(0.068)	(0.162)	(0.177)
OCF_t	39.024***	39.214***	23.574***	23.775***
	(0.000)	(0.000)	(0.000)	(0.000)
$EXECAGE_t$	−2.517	−2.483	−2.744*	−2.695*
	(0.206)	(0.213)	(0.050)	(0.055)
$TENURE_t$	0.231	0.199	0.276	0.248
	(0.344)	(0.407)	(0.136)	(0.181)
$FEMALE_t$	−0.006	−0.166	0.053	−0.089
	(0.996)	(0.873)	(0.949)	(0.908)
Observations	5,766	5,766	5,766	5,766
Adjusted R-squared	0.358	0.361	0.080	0.083

This table reports OLS regression results of the relation between CEO narcissism and overinvestment. The dependent variable is total investment (INVEST) or abnormal total investment (INVEST_RES). The independent variables of interest are the CEO's area-per-letter signature size (SIGSIZE) and its interaction with financial slack (SLACK). The models include year and industry fixed-effects based on the Fama and French (1997) 48 industry classifications. Robust standard errors are clustered by firm. *P*-values are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively. Variable definitions are reported in Appendix 1.

3.2 CEO narcissism and firm performance

In the previous section we documented that firms led by narcissistic CEOs tend to overinvest, particularly in R&D expenditures and M&A expenditures. Next, we examine the performance of firms led by narcissistic CEOs. We examine the association between CEO narcissism and the firm's financial productivity in the form of two broad performance metrics: return on assets and operating cash flows. Return on assets captures accounting performance from revenues, expenses, and the utilization of capital; operating cash flows capture the net cash flows from the firm's core operations. We estimate the following model:

$$Performance_{it} = \beta_0 + \beta_1 SIGSIZE_j + \Sigma\beta_k Controls + \Sigma\beta_m Industry + \Sigma\beta_n Year + \varepsilon_{it} \quad (4)$$

ROA is the firm's return on assets and is measured as income before extraordinary items scaled by prior year total assets.[19] *OCF* is the firm's operating cash flows scaled by prior year total assets. We examine the relation between CEO narcissism and contemporaneous firm performance as well as future firm performance. In the future firm performance specifications, we sum *ROA* or *OCF* over the years $t + 1$ to $t + 2$. The model includes a series of control variables, based predominantly on the model used in So (2013). $POS(ROA)_{pretenure}$ is the mean ROA over the five years before the CEO's first year of tenure in our sample if ROA is positive, zero otherwise. $NEGI(ROA)_{pretenure}$ is an indicator variable equal to one if mean ROA over the five years before the CEO's first year of tenure in our sample is negative, zero otherwise. $POS(ROA)_{pretenure}$ and $NEGI(ROA)_{pretenure}$ are replaced by $POS(OCF)_{pretenure}$ and $NEGI(OCF)_{pretenure}$, respectively, when the dependent variable is *OCF*. *POS(ACCRUALS)* are accruals scaled by lagged assets if positive, zero otherwise. *NEG(ACCRUALS)* are accruals scaled by lagged assets if negative, zero otherwise. As in So (2013), accruals are defined as the change in current assets less the change in cash and cash equivalents less the change in current liabilities plus the change in debt in current liabilities. *DIV* is ordinary dividends scaled by lagged assets. *NODIV* is an indicator variable set equal to one if *DIV* equals zero, zero otherwise. *ATGROWTH* is the percentage change in total assets. *MTB* is the market value of common equity scaled by the book value of common equity. *LOGMVE* is the natural log of the market value of common equity. All other variables are as previously defined.

Table 4 reports the results. *SIGSIZE* is negatively associated with both contemporaneous and future return on assets ($\beta = -0.030, p < 0.01$; $\beta = -0.050, p < 0.01$, respectively) as well as contemporaneous and future operating cash flows ($\beta = -0.031, p < 0.01$; $\beta = -0.062, p < 0.01$). These results indicate that firms led by narcissistic CEOs are associated with lower financial productivity in the form of profitability and operating cash flows.

3.3 CEO narcissism and compensation

We next investigate whether narcissistic CEOs are compensated differently. The negative association between CEO narcissism and firm performance may suggest that

[19] Our inferences remain unchanged if we define *ROA* as net income scaled by prior year total assets.

Table 4 Relation between CEO narcissism and firm performance

	ROA_t	$ROA_{t+1,t+2}$	OCF_t	$OCF_{t+1,t+2}$
$SIGSIZE_t$	**−0.030*** **	**−0.050*** **	**−0.031*** **	**−0.062*** **
	(0.001)	**(0.008)**	**(0.000)**	**(0.001)**
$POS(ROA)_{pretenure}$	0.255***	0.445***		
	(0.000)	(0.000)		
$NEGI(ROA)_{pretenure}$	0.013	0.039*		
	(0.219)	(0.059)		
$POS(OCF)_{pretenure}$			0.258***	0.419***
			(0.000)	(0.000)
$NEGI(OCF)_{pretenure}$			0.039*	0.100**
			(0.063)	(0.032)
$POS(ACCRUALS)_{t-1}$	0.235***	0.269***	0.045	−0.087
	(0.000)	(0.009)	(0.382)	(0.335)
$NEG(ACCRUALS)_{t-1}$	0.007	−0.150	0.030	−0.154
	(0.907)	(0.220)	(0.671)	(0.235)
DIV_{t-1}	0.698***	1.437***	0.625***	1.295***
	(0.000)	(0.000)	(0.000)	(0.000)
$NODIV_{t-1}$	0.013***	0.023**	0.022***	0.041***
	(0.009)	(0.036)	(0.000)	(0.001)
$ATGROWTH_{t-1}$	−0.010*	−0.038***	−0.013**	−0.025**
	(0.081)	(0.000)	(0.014)	(0.021)
MTB_{t-1}	0.005***	0.006***	0.005***	0.008***
	(0.000)	(0.000)	(0.000)	(0.000)
$LOGMVE_{t-1}$	0.003*	−0.001	0.001	−0.004
	(0.072)	(0.884)	(0.585)	(0.312)
$EXECAGE_t$	0.021	0.046	−0.000	0.007
	(0.225)	(0.188)	(0.981)	(0.846)
$TENURE_t$	−0.000	−0.001	0.002	0.005
	(0.979)	(0.848)	(0.429)	(0.249)
$FEMALE_t$	−0.009	−0.015	−0.008	−0.013
	(0.295)	(0.402)	(0.423)	(0.610)
Observations	4,955	4,955	4,955	4,955
Adjusted R-squared	0.373	0.343	0.410	0.405

This table reports OLS regression results of the relation between CEO narcissism and firm performance. The dependent variables include current and future return on assets (ROA) as well as current and future operating cash flows (OCF). The independent variable of interest is the CEO's area-per-letter signature size (SIGSIZE). The models include year and industry fixed-effects based on the Fama and French (1997) 48 industry classifications. Robust standard errors are clustered by firm. *P*-values are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively. Variable definitions are reported in Appendix 1.

narcissistic CEOs receive lower compensation. However, psychology research suggests that narcissists have inflated self-images and thus may demand higher compensation. In addition, evidence from Nevicka et al. (2011) suggests that observers view narcissists

more favorably in a group decision-making context, despite their poorer performance. Thus, whether compensation for narcissistic CEOs is higher or lower is an empirical question. We examine whether narcissistic CEOs are compensated differently via the following model:

$$Compensation_{it} = \beta_0 + \beta_1 SIGSIZE_j + \Sigma\beta_k Controls + \Sigma\beta_m Industry + \Sigma\beta_n Year + \varepsilon_{it} \quad (5)$$

We examine two measures of CEO compensation. *COMP* is defined as the natural log of the CEO's total compensation. Total compensation includes the executive's salary, bonus, stock option grants, restricted stock grants, and long-term incentive payouts.[20] *PAYSLICE* is the CEO's pay slice, and is measured as the CEO's total compensation scaled by the sum of the five highest paid executives' total compensation, as in Bebchuk et al. (2011). The model includes a series of control variables, based predominantly on the model used in Core et al. (2008). *LOGSALE* is the natural log of sales. *RET* is the cumulative monthly return over the corresponding fiscal year. All other variables are as previously defined.

Table 5 reports the results from estimating Eq. (5). *SIGSIZE* is positively associated with both the CEO's total compensation ($\beta = 0.175$, $p < 0.05$) and the CEO's total compensation relative to other executives at the same firm ($\beta = 0.027$, $p < 0.05$). These results indicate that narcissistic CEOs earn higher absolute and relative compensation, and are consistent with psychology literature suggesting that narcissists are viewed more positively despite delivering poorer performance.

3.4 Robustness tests

A potential concern is that our signature size measure is capturing executive overconfidence. We note that our second laboratory study revealed an insignificant association between signature size and overconfidence. To assuage these concerns using archival data, we re-estimate our prior analyses while controlling for a popular options-based measure of overconfidence used in prior literature (Malmendier and Tate 2005; Hirshleifer et al. 2012). Specifically, *OCONF* is an indicator variable equal to one if the CEO's exercisable vested options are at least 67% in the money. As in Hirshleifer et al. (2012), if a CEO is identified as overconfident in a given year, the CEO remains so from that point forward. The results are reported in Table 6. Our inferences remain unchanged upon controlling for CEO overconfidence. In addition, CEO overconfidence often has directionally inconsistent relations when compared to narcissism. For example, whereas narcissism is associated with higher R&D and M&A expenditures, overconfidence is not. Narcissism is not associated with higher capital expenditures, but overconfidence is. Whereas narcissism is negatively associated with ROA and operating cash flows, overconfidence is positively associated with ROA and operating cash flows. The only consistent result is that both narcissism and overconfidence are positively associated with the level of compensation (though only narcissism is positively associated with the level of compensation relative to other executives at the firm). Based on this set of results, we conclude that our findings are not driven by the previously identified measure of CEO overconfidence.

[20] Total compensation is the variable *tdc1* in the Execucomp database.

Table 5 Relation between CEO narcissism and CEO compensation

	$COMP_t$	$PAYSLICE_t$
$SIGSIZE_t$	**0.175****	**0.027****
	(0.047)	**(0.024)**
$LOGSALE_{t-1}$	0.329***	0.000
	(0.000)	(0.893)
MTB_{t-1}	0.014**	−0.000
	(0.030)	(0.870)
RET_t	0.309***	0.026***
	(0.000)	(0.000)
RET_{t-1}	0.297***	0.022***
	(0.000)	(0.000)
ROA_t	0.377	0.012
	(0.214)	(0.753)
ROA_{t-1}	−0.253	−0.068
	(0.420)	(0.116)
$EXECAGE_t$	0.364	0.015
	(0.182)	(0.658)
$EXECTENURE_t$	0.034	0.007*
	(0.234)	(0.083)
$FEMALE_t$	0.096	0.021
	(0.309)	(0.118)
Observations	6,116	6,116
Adjusted R-squared	0.429	0.100

This table reports OLS regression results of the relation between CEO narcissism and CEO compensation. The dependent variables include total current compensation (COMP) and the CEO's total current compensation relative to other executives (PAYSLICE). The independent variable of interest is the CEO's area-per-letter signature size (SIGSIZE). The models include year and industry fixed-effects based on the Fama and French (1997) 48 industry classifications. Robust standard errors are clustered by firm. *P*-values are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively. Variable definitions are reported in Appendix 1.

A second potential concern is that narcissistic CEOs could be drawn to certain types of firms (e.g., poorly performing, highly paying firms that need to be turned around) and/or that such firms select narcissistic CEOs. Similar to Hirshleifer et al. (2012), we test the sensitivity of our results to removing the first three years of the CEO's tenure in our sample. If our results are solely driven by an initial match between CEOs and firms with poor performance or abnormal investment policies, then the strength of our previous results should significantly weaken after dropping the early years of CEO tenure. The results are reported in Table 7. Our inferences remain unchanged upon dropping the early CEO tenure years.

As another means to address the concern that our results capture a firm effect rather than a CEO effect, we collapse the data at the manager-firm level.[21] Specifically, for each

[21] We thank an anonymous reviewer for this suggestion.

Table 6 Controlling for overconfidence

	$CAPEX_t$	$R\&D_t$	$M\&A_t$	$INVEST_t$	$INVEST_t$	$INVEST\_RES_t$	$INVEST\_RES_t$
$SIGSIZE_t$	**−0.400**	**1.089****	**1.652*****	**2.544*****	**−1.475**	**1.840*****	**−1.994**
	(0.401)	**(0.043)**	**(0.003)**	**(0.003)**	**(0.346)**	**(0.008)**	**(0.128)**
$SIGSIZE_t$*$SLACK_{t-1}$					**7.654****		**7.303*****
					(0.023)		**(0.006)**
$OCONF_t$	0.610***	−0.314	0.177	0.568	0.573	0.295	0.299
	(0.002)	(0.293)	(0.490)	(0.177)	(0.172)	(0.402)	(0.390)
Observations	5,766	5,766	5,766	5,766	5,766	5,766	5,766
Adjusted R-squared	0.549	0.548	0.072	0.359	0.361	0.080	0.083
	ROA_t	**$ROA_{t+1,t+2}$**	**OCF_t**	**$OCF_{t+1,t+2}$**	**$COMP_t$**	**$PAYSLICE_t$**	
$SIGSIZE_t$	**−0.032*****	**−0.052*****	**−0.032*****	**−0.064*****	**0.161***	**0.027****	
	(0.001)	**(0.005)**	**(0.000)**	**(0.001)**	**(0.067)**	**(0.026)**	
$OCONF_t$	0.014***	0.024***	0.016***	0.027***	0.224***	0.006	
	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.493)	
Observations	4,955	4,955	4,955	4,955	6,116	6,116	
Adjusted R-squared	0.379	0.348	0.416	0.410	0.438	0.100	

This table reports OLS regression results corresponding to each of the main tests. The models are identical to those reported in the preceding tables, though we also control for CEO overconfidence (OCONF). The independent variable of interest is the CEO's area-per-letter signature size (SIGSIZE) as well as its interaction with financial slack (SLACK). Control variables are included, but suppressed for brevity. The models include year and industry fixed-effects based on the Fama and French (1997) 48 industry classifications. Robust standard errors are clustered by firm. *P*-values are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively. Variable definitions are reported in Appendix 1.

Table 7 Excluding early tenure years

	$CAPEX_t$	$R\&D_t$	$M\&A_t$	$INVEST_t$	$INVEST_t$	$INVEST\_RES_t$	$INVEST\_RES_t$
$SIGSIZE_t$	**−0.521**	**1.208****	**2.033*****	**2.969*****	**−1.741**	**2.171*****	**−1.619**
	(0.304)	**(0.038)**	**(0.001)**	**(0.003)**	**(0.355)**	**(0.006)**	**(0.315)**
$SIGSIZE_t$*$SLACK_{t-1}$					**8.814****		**7.093****
					(0.021)		**(0.025)**
Observations	3,928	3,928	3,928	3,928	3,928	3,928	3,928
Adjusted R-squared	0.581	0.546	0.076	0.348	0.351	0.080	0.083
	ROA_t	**$ROA_{t+1,t+2}$**	**OCF_t**	**$OCF_{t+1,t+2}$**	**$COMP_t$**	**$PAYSLICE_t$**	
$SIGSIZE_t$	**−0.026****	**−0.039***	**−0.034*****	**−0.062*****	**0.182***	**0.034****	
	(0.020)	**(0.075)**	**(0.003)**	**(0.009)**	**(0.055)**	**(0.014)**	
Observations	3,176	3,176	3,176	3,176	4,084	4,084	
Adjusted R-squared	0.353	0.336	0.385	0.396	0.396	0.118	

This table reports OLS regression results corresponding to each of the main tests. The models are identical to those reported in the preceding tables, but the CEO's first three years of tenure in our sample are excluded from the models. The independent variables of interest are the CEO's area-per-letter signature size (SIGSIZE) and its interaction with financial slack (SLACK). Control variables are included, but suppressed for brevity. The models include year and industry fixed-effects based on the Fama and French (1997) 48 industry classifications. Robust standard errors are clustered by firm. *P*-values are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively. Variable definitions are reported in Appendix 1.

Table 8 CEO tenure averages

	$CAPEX_{tenure}$	$R\&D_{tenure}$	$M\&A_{tenure}$	$INVEST_{tenure}$	$INVEST\_RES_{tenure}$
SIGSIZE	**−1.117***	**1.546*****	**1.714*****	**2.143****	**1.628****
	(0.069)	**(0.004)**	**(0.001)**	**(0.017)**	**(0.021)**
Observations	723	723	723	723	723
Adjusted R-squared	0.593	0.577	0.399	0.659	0.264
	ROA_{tenure}	**OCF_{tenure}**	**$COMP_{tenure}$**	**$PAYSLICE_{tenure}$**	
SIGSIZE	**−0.042*****	**−0.039*****	**0.372*****	**0.037*****	
	(0.000)	**(0.000)**	**(0.002)**	**(0.003)**	
Observations	626	626	744	744	
Adjusted R-squared	0.391	0.523	0.267	0.133	

This table reports OLS regression results corresponding to each of the main tests (except the financial slack interactions). The sample includes one observation per CEO-firm pair. The mean for each variable is taken over all years the CEO is in office in our sample. Control variables are included, but suppressed for brevity. The models include industry fixed-effects based on the Fama and French (1997) 48 industry classifications. *P*-values are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively. Variable definitions are reported in Appendix 1.

CEO-firm pair in our sample, we take the mean value for each dependent and independent variable over all years the CEO is in office in our sample. We then estimate each of our primary models, including only one observation for each CEO-firm pair in the dataset. The results are reported in Table 8. Again, our inferences remain unchanged.

Finally, we directly address the matching explanation by examining the association between CEO narcissism and a series of firm and industry characteristics before the CEO's tenure began. We regress the CEO's signature size, *SIGSIZE*, on a series of firm and industry characteristics over the five-year period before the CEO's first year in office.[22] To ensure that we are not capturing firm-years in which the CEO was in office, we only retain firm-years in which we can identify the predecessor CEO.[23] The results are reported in Table 9. Column (1) regresses signature size on the firm-level investment and performance metrics used in the main analyses. Signature size is not associated with the firm's level of capital expenditures, R&D expenditures, M&A expenditures, or operating cash flows. However, we find a negative association between return on assets and signature size. In column (2), the explanatory variables include the industry means for the same set of variables in column (1). Industry R&D loads with a significantly negative coefficient, and industry M&A loads with a significantly positive coefficient, but the other industry characteristics are not associated with the CEO's level of narcissism. In column (3), we include a series of other firm characteristics such as firm size, firm age, the market-to-book ratio, leverage, the level of cash, and corporate governance (E-Index as per Bebchuk et al. (2009)).[24] Leverage is

[22] The results are similar if we use a three-year period before the CEO's first year in office, with the exception that *IND(M&A)* becomes insignificant in column (2).

[23] We are not always able to identify the CEO's true first year in office if the CEO's first year in our sample is also the firm's first year of Execucomp coverage. Therefore, we only retain firm-years in which we can identify the predecessor CEO in Execucomp.

[24] E-Index data are obtained from the Institutional Shareholder Services database.

Table 9 Narcissism determinants

	SIGSIZE	SIGSIZE	SIGSIZE	SIGSIZE
CAPEX	−0.001			−0.001
	(0.613)			(0.663)
R&D	−0.001			−0.001
	(0.692)			(0.883)
M&A	0.001			0.001
	(0.402)			(0.530)
ROA	−0.324**			−0.267
	(0.030)			(0.113)
OCF	0.018			−0.065
	(0.897)			(0.688)
IND(CAPEX)		−0.002		0.000
		(0.333)		(0.997)
IND(R&D)		−0.004*		−0.003
		(0.072)		(0.242)
IND(M&A)		0.011*		0.015**
		(0.065)		(0.028)
IND(ROA)		0.028		0.000
		(0.832)		(0.999)
IND(OCF)		−0.078		−0.051
		(0.691)		(0.856)
LOGAT			−0.001	−0.001
			(0.901)	(0.893)
FIRMAGE			0.000	0.003
			(0.989)	(0.866)
MTB			−0.003	0.000
			(0.371)	(0.980)
LEV			0.172**	0.083
			(0.012)	(0.228)
CASH			0.044	0.047
			(0.630)	(0.648)
EINDEX			−0.011	−0.009
			(0.204)	(0.329)
Observations	2,564	2,642	2,116	2,047
Adjusted R-squared	0.010	0.011	0.022	0.035

This table reports OLS regression results of the relation between CEO narcissism and firm/industry characteristics. The dependent variable is the CEO's area-per-letter signature size (SIGSIZE). The independent variables include firm and industry characteristics over the five years before the CEO's tenure begins. Robust standard errors are clustered by firm. *P*-values are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively. Variable definitions are reported in Appendix 1.

the only firm characteristic that loads with a significant coefficient. In column (4), we include all three sets of variables in the same model. Industry M&A expenditures load significantly positively, but all other variables from the previous regressions (i.e., ROA, industry R&D, and leverage) are now insignificant.

4 Conclusion

We utilize CEO signature size, a novel measure of CEO narcissism, to test the effects of CEO narcissism on investment policy, firm performance, and compensation. Our analyses indicate that firms led by narcissistic CEOs invest more in "high-exposure" areas such as R&D and M&A expenditures, but shy away from routine capital expenditures for day-to-day business productivity. Both investment and overinvestment are most pronounced during periods of financial slack, suggesting that narcissistic CEOs prefer an aggressive management style when available. Financial productivity (profitability and operating cash flows) delivered by these narcissistic CEOs is lower. However, despite the negative relation between narcissism and firm performance, narcissistic CEOs receive higher absolute and relative compensation.

Our results have implications for researchers, investors, and regulators. We contribute to prior research on the personality traits of top executives by showing how narcissism relates to a variety of firm investments and performance outcomes. Investors can use our results to identify narcissistic CEOs and exercise increased monitoring over their potentially damaging actions. For example, during periods of financial slack, investors and corporate boards could encourage increased dividend payouts to combat excessive investment. Given that narcissistic CEOs overinvest in R&D, investors may also wish to monitor the innovative productivity of such investments. Finally, our results may help boards of directors realize that narcissistic CEOs are able to achieve higher compensation than their less narcissistic peers despite delivering lower firm performance.

There are certain limitations of our study. First, due to data and cost limitations, we restrict our data collection to S&P 500 firms. While we believe the S&P 500 are important firms in their own right, it is unclear whether CEO narcissism would have the same effects at other companies. Second, our proxy for narcissism, CEO signature size, is subject to influence from a variety of factors. The CEO's physical characteristics, education, upbringing, and instruction in penmanship can all affect signature size. After controlling for age and gender, and standardizing by the number of letters in the CEO's name, we assume that these other sources of variation are randomly distributed between CEOs and simply induce noise in our measure of narcissism. Third, while we attempt to mitigate endogeneity concerns through a set of robustness tests, we acknowledge that endogeneity concerns cannot be entirely ruled out in our study.

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Appendix 1

Table 10 Variable definitions

Name	Definition
SIGSIZE	Area-per-letter signature size metric. A rectangle is drawn around each CEO's signature, wherein each side of the rectangle touches the most extreme endpoint of the signature. The area consumed by the signature is determined by multiplying the length and width (in centimeters) of the rectangle. The square area of the rectangle is then divided by the number of letters in the CEO's name.
ATGROWTH	Year t-1 total assets scaled by year t-2 total assets.
CAPEX	Capital expenditures less sales of property, plant, and equipment multiplied by 100 and scaled by lagged assets.
CASH	Cash and cash equivalents scaled by total assets.
COMP	Natural log of total compensation.
DIV	Dividends scaled by lagged assets.
EINDEX	Entrenchment Index as per Bebchuk et al. (2009).
EXECAGE	Natural log of the executive's age in years.
FEMALE	Indicator variable equal to one if the CEO is female, zero otherwise.
FIRMAGE	Natural log of the number of years the firm has been in the Compustat database.
INVEST	Capital expenditures less sales of property, plant, and equipment plus research and development expenditures plus merger and acquisition expenditures multiplied by 100 and scaled by lagged assets.
INVEST_RES	Deviation from the expected level of investment which equals INVEST less predicted INVEST. Predicted INVEST is estimated via industry-year regressions of INVEST on lagged investment, lagged Tobin's Q, contemporaneous cash flows, and lagged asset growth for industry-years with at least ten observations based on the Fama and French (1997) 48 industry classifications.
LEV	Total liabilities scaled by total assets.
LOGAT	Natural log of total assets.
LOGMVE	Natural log of the market value of equity.
LOGSALE	Natural log of total sales.
M&A	Merger and acquisition expenditures multiplied by 100 and scaled by lagged assets.
MTB	Market value of equity scaled by the book value of common equity.
NEG(ACCRUALS)	Accruals scaled by lagged assets if accruals are negative, zero otherwise. Accruals are the change in current assets plus the change in debt in current liabilities minus the change in cash and cash equivalents and minus the change in current liabilities.
$NEGI(ROA)_{pretenure}$	Indicator variable equal to one if mean ROA over the five years before the CEO's first year of tenure in our sample is negative, zero otherwise.
$NEGI(OCF)_{pretenure}$	Indicator variable equal to one if mean OCF over the five years before the CEO's first year of tenure in our sample is negative, zero otherwise.
NODIV	Indicator variable equal to one if no dividends were paid, zero otherwise.
OCF	Operating cash flows scaled by lagged assets.
PAYSLICE	Total compensation scaled by the sum of total compensation for the top five paid executives in the respective firm-year.
PERSIST(ROA)	Earnings persistence, calculated as the coefficient on lagged ROA from regressions of quarterly ROA on seasonally lagged ROA over the three year period t-4 to t-2.

Table 10 (continued)

Name	Definition
POS(ACCRUALS)	Accruals scaled by lagged assets if accruals are positive, zero otherwise. Accruals are the change in current assets plus the change in debt in current liabilities minus the change in cash and cash equivalents and minus the change in current liabilities.
$POS(ROA)_{pretenure}$	Mean ROA over the five years before the CEO's first year of tenure in our sample if positive, zero otherwise.
$POS(OCF)_{pretenure}$	Mean OCF over the five years before the CEO's first year of tenure in our sample if positive, zero otherwise.
R&D	Research and development expenditures multiplied by 100 and scaled by lagged assets.
RET	Cumulative monthly return over the fiscal year.
ROA	Income before extraordinary items scaled by lagged assets.
SD(INVEST)	Standard deviation of INVEST over years t-5 to t-1.
SD(RET)	Standard deviation of monthly returns over year t-1.
SD(ROA)	Standard deviation of ROA over years t-5 to t-1.
SLACK	Average of the ranked deciles of the firm's levels of cash and leverage and rescaled to be between zero and one. Prior to computing the average of the ranked deciles, leverage is multiplied by negative one.
TENURE	Natural log of the number of years the CEO has been in the position (i.e., since the CEO's first year in our sample).

Appendix 2: Signature examples

Large Signature Example

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Cephalon

April 1, 2009

Dear Cephalon Stockholder:

It is my pleasure to invite you to Cephalon's 2009 Annual Meeting of Stockholders. We will hold the meeting on Tuesday, May 12, 2009 at 8:30 a.m., Eastern Daylight time, at our corporate headquarters located at 41 Moores Road, Frazer, PA 19355.

During the Annual Meeting, we will discuss each item of business described in the Notice of Annual Meeting of Stockholders and the Proxy Statement that follows, update you on important developments in our business, and respond to any questions that you may have about the Company.

We have elected to take advantage of the Securities and Exchange Commission rules that allow issuers to furnish proxy materials to their stockholders on the Internet. These rules allow us to provide our stockholders with the information they need, while lowering the costs of delivery and reducing the environmental impact of our Annual Meeting.

Your vote is important. Whether or not you plan to attend the Annual Meeting, I hope that you will vote as soon as possible. Please review the instructions for each of your voting options described in the Notice of Internet Availability of Proxy Materials.

On behalf of your Board of Directors, thank you for your continued support and interest in Cephalon.

Very truly yours,

Frank Baldino, Jr., Ph.D.
Chairman and Chief Executive Officer

Small Signature Example

ROWAN COMPANIES, INC.
2800 POST OAK BOULEVARD, SUITE 5450
HOUSTON, TEXAS 77056-6127

D. F. McNEASE
CHAIRMAN OF THE BOARD

March 17, 2005

Dear Stockholder:

We invite you to attend the Annual Meeting of Stockholders of Rowan Companies, Inc., which will be held in the Williams Auditorium located on Level 2 of the Williams Tower, 2800 Post Oak Boulevard, Houston, Texas, on Friday, April 22, 2005 at 9:00 a.m., Central Time. Your Board of Directors and management look forward to greeting personally those stockholders able to attend.

At the meeting, stockholders will be asked to elect three Class II Directors. **YOUR BOARD OF DIRECTORS RECOMMENDS A VOTE *FOR* THE ELECTION OF THE THREE NOMINEES FOR CLASS II DIRECTOR.**

Also at the meeting, stockholders will be asked to vote on a proposal submitted by the Board of Directors of the Company for adoption of the 2005 Rowan Companies, Inc. Long-Term Incentive Plan, which will replace the Company's current stock option plans. This proposal is described more fully in the accompanying proxy statement, which you are urged to read carefully. **YOUR BOARD OF DIRECTORS RECOMMENDS A VOTE *FOR* ADOPTION OF THE PROPOSED LONG-TERM INCENTIVE PLAN.**

Regardless of the number of shares you own or whether you plan to attend, it is important that your shares be represented and voted at the meeting. You are requested to sign, date and mail the enclosed proxy promptly.

Both your interest and participation in the affairs of the Company are appreciated.

Sincerely,

D. F. McNease
Chairman

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