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Executive Extraversion: Career and Firm Outcomes

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ABSTRACT: Psychology research identifies extraversion as the personality trait most closely associated with leadership emergence. We examine executive extraversion, as measured by speech patterns during conference calls, and find extraverts experience significant career benefits. Controlling for executive and firm characteristics, including firm fixed effects, we find that extraverted CEOs and CFOs earn 6–9 percent higher salaries. Moreover, extraverted CEOs are less likely to experience job turnover, have longer tenures, serve on more outside boards, and hold directorships at larger firms, and extraverted CFOs are more likely to be promoted to CEO. Executive extraversion is also linked with firm outcomes. Analyzing a sample of manager transitions, we find that increases in CEO extraversion are associated with improvements in investor recognition and sales growth. Further, extraverted CEOs are associated with higher acquisition announcement returns. Our findings highlight the role of personality traits in explaining executive career and firm outcomes.

JEL Classifications: G14.

Keywords: executive compensation; personality; labor market.

I. INTRODUCTION

Economic theory often assumes that managers vary in talent (e.g., Murphy and Zabojnik 2004; Gabaix and Landier 2008; Edmans, Gabaix, and Landier 2009), and a growing empirical literature suggests that managers have particular styles that can significantly impact corporate performance.[1] Corporate boards treat the selection of top executives as a critical element of firm success, which has led to rapid growth in CEO salaries in recent decades (Khurana 2004). However, relatively little is known about which traits are viewed as important to boards in their hiring of top executives. Indeed, Graham, Li, and Qiu (2012) conclude that unobservable managerial traits explain a large fraction of the variation in executive pay.

In this article, we explore the role of personality in explaining variation in executive labor market and firm outcomes. We place particular emphasis on extraversion, which is often described as the single most important aspect of an individual's personality (Cain 2012). Popularized by Jung (1921), extraversion is a component of virtually all comprehensive models of

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Supplemental material can be accessed by clicking the link in Appendix B.

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[1] For example, Malmendier, Tate, and Yan (2011) and Benmelech and Frydman (2015) find a connection between early life experiences and management style, and Custódio and Metzger (2013, 2014) find evidence that CEOs' employment histories influence corporate performance. Other work finds that financial management styles are influenced by measures of CEO optimism and overconfidence (Graham, Harvey, and Puri 2013; Malmendier and Tate 2005, 2008; Hirshleifer, Low, and Teoh 2012).

personality, including the Big Five model and the Myers-Briggs Type Indicator. Extraversion tends to be manifested in outgoing, talkative, energetic behavior, whereas introversion, its opposite, is manifested in more reserved and solitary behavior.

Our emphasis on extraversion is motivated by a vast psychology literature that documents a relation between extraversion and leadership. For example, Judge, Bono, Ilies, and Gerhardt (2002) conclude in their survey that extraversion is the most consistent correlate of leadership across study settings and leadership criteria, with extraverts more likely to be perceived as effective by both supervisors and subordinates.

In our analysis, we construct measures of extraversion for over 4,500 CFOs and CEOs at Standard & Poor's (S&P) 1500 firms during 2006–2013. Our approach relies on linguistic algorithms fit to speech patterns from the question-and-answer portion of quarterly conference calls. In particular, linguistic research suggests that extraverts have a higher verbal output, use less formal language, exhibit less word variety, and use more assertive language (Scherer 1979; Furnham 1990; Gill and Oberlander 2003). Extraverts also use more positive and negative emotion words than introverts (Pennebaker and King 1999). To help validate the textual approach, we compare our linguistic measure of extraversion to listener-based assessments for a subset of the sample and find that listener-based and algorithm-based extraversion measures agree 68 percent of the time in a binary setting. We also find that our linguistic measure is largely unrelated to firm performance near the time of the conference call, and it persists much more at the individual level than at the firm level, which is consistent with the view of extraversion as an innate individual characteristic.

We find strong evidence that extraverts experience greater labor market success. After controlling for a number of firm factors known to influence compensation, we find that a one-standard-deviation increase in CEO extraversion is associated with a compensation premium of 4.6 to 6.5 percent (or roughly $250,000 to $360,000). The relation is robust to controlling for other aspects of personality and managerial characteristics known to affect compensation, including optimism, education, the breadth of the CEO's past work experience, and the size of the CEO's network. We also find that extraverted CEOs are less likely to experience job turnover, have longer tenures, serve on more outside boards, and hold directorships at larger firms. Further, extraverted CFOs also receive higher compensation and are significantly more likely to be promoted to CEO.

We next explore the relation between executive extraversion and firm outcomes. If extraverted managers' career success reflects superior skill, then we expect extraverts to deliver superior performance, consistent with managers not being able to fully extract rents from their ability (e.g., Falato, Li, and Milbourn 2015).[2] On the other hand, Custódio, Ferreira, and Matos (2013) reason that in an efficient labor market, CEOs are chosen optimally by firms and, therefore, there should be no observed relation between CEO characteristics and performance. Further complicating this issue, the matching process may depend on firm performance. For example, firms may seek out extraverted managers to help explain anticipated poor performance. Despite these potential challenges, we explore whether variation in manager extraversion caused by CEO turnover is associated with changes in a number of firm outcomes.

We conjecture that extraverts' tendency to attract social attention (e.g., Ashton, Lee, and Paunonen 2002) may lead to greater external firm visibility, and we begin by exploring measures of investor recognition. We find that increases in CEO extraversion through manager turnover are associated with increases in analyst coverage and more frequent firm presentations at investor conferences. Increases in extraversion are also linked with improvements in liquidity, as evidenced by significantly higher stock turnover and lower levels of Amihud's (2002) illiquidity measure.

Executive extraversion is also significantly related to some measures of firm performance. Specifically, increases in CEO extraversion due to CEO transitions are associated with increases in sales growth and market share. If markets attribute some of the beneficial firm outcomes associated with executive extraversion to managerial ability, then we would expect to see negative announcement effects associated with voluntary departures of extraverted CEOs. We explore this hypothesis using hand-collected data on more than 500 voluntary CEO departures and find point estimates ranging from −0.27 to −0.67 percent.[3] In additional analysis, we study announcement returns to mergers and acquisitions (M&A) activity and find complementary evidence, with an increase in CEO extraversion being associated with M&A announcement returns that are 0.26 to 0.45 percent higher. Taken together, the beneficial investor recognition, firm performance, and market reaction findings provide support for a rational market-based explanation for the improved labor market outcomes of extraverted CEOs.

Our study contributes to the growing literature that explores the determinants of executive compensation, such as educational background, breadth of past work experience, or the size of an executive's network (Falato et al. 2015; Custódio et al. 2013; Engelberg, Gao, and Parsons 2013). While existing work largely focuses on acquired attributes, we highlight an important underlying psychological factor that may influence many of these variables (Hambrick and Mason 1984). Our findings also add to the literature that explores determinants of other labor market success, such as the determinants of internal

[2] Gabaix and Landier (2008) argue that even if this prediction holds, it may be difficult to empirically detect due to the differences in scale between executive compensation and firm revenues (i.e., small percentage improvements in profits potentially justify large percentage increases in compensation).

[3] We also find large negative associations between departure returns and CEO extraversion for a small sample of 14 unexpected CEO departures.

promotion to CEO (Parrino 1997) and the number of outside directorships held by CEOs (Booth and Deli 1996). Further, our study relates to recent work highlighting the importance of non-cognitive characteristics in the labor market for CEOs, such as charisma or vocal pitch (Kaplan and Sorensen 2016; Mayew, Parsons, and Venkatachalam 2013).[4] Finally, our work also contributes to research that emphasizes the role of manager characteristics in explaining corporate financial decision making (e.g., Bertrand and Schoar 2003; Kaplan, Klebanov, and Sorensen 2012) and acquisitions returns (Malmendier and Tate 2008; Custódio and Metzger 2014).

Our paper extends the growing literature on textual analysis in accounting and finance. Existing work analyzes the text of company disclosures to measure tone (Tetlock, Saar-Tsechansky, and Macskassy 2008; Loughran and McDonald 2011; Jegadeesh and Wu 2013), uncertainty (Loughran and McDonald 2013), readability (Li 2008; Loughran and McDonald 2014), and deception (Larcker and Zakolyukina 2012). Our work is among the first to use linguistic approaches to infer non-cognitive executive characteristics.[5]

II. MEASURING EXTRAVERSION

In this section, we describe extraversion, the methodology we use to measure it, and the sample datasets.

Measuring Extraversion from Speech

Psychologists commonly assess personality along five dimensions known as the Big Five (Norman 1963; John and Srivastava 1999): (1) extraversion, (2) emotional stability, (3) agreeableness, (4) conscientiousness, and (5) openness to experience. These personality traits have been repeatedly obtained in factor analyses of personality description questionnaires (Goldberg 1990), and the Big Five model has become standard in the psychology literature. We focus on extraversion, which, among the Big Five, has produced the most findings related to leadership and is easiest to infer from communication style (Dewaele and Furnham 1999).

Extraverts are described as being outgoing and energetic, whereas introverts tend to be reserved and solitary.[6] Extraversion is relatively easy to detect due to its effect on communication patterns. In spoken text, extraverts have a higher verbal output, speak more quickly and with fewer pauses, use less word variety and more informal language, and are more assertive (Scherer 1979; Furnham 1990; Gill and Oberlander 2003). Extraverts also use more emotion words and show more agreements and compliments than introverts (Pennebaker and King 1999). These differences have allowed researchers in psycholinguistics and artificial intelligence to develop fairly accurate personality models based on linguistic outputs (e.g., Argamon, Dhawle, Koppel, and Pennebaker 2005; Oberlander and Nowson 2006; Mairesse, Walker, Mehl, and Moore 2007).[7]

We rely on the trained personality algorithms of Mairesse et al. (2007), who employ four linguistic algorithms. In each algorithm, the dependent variable is the extraversion score of the individual, and the explanatory variables are word categories from the Linguistic Inquiry and Word Count (LIWC) (Pennebaker et al. 2001) and Machine Readable Cataloguing (MRC) linguistic databases (Coltheart 1981).[8] Mairesse et al. (2007) find that the following LIWC and MRC linguistic features are significantly positively related to extraversion at the 1 percent level: affective or emotional processes, anger, metaphysical issues, negative emotions, physical states and functions, positive feelings, religion, swear words, imageability, meaningfulness, word count, and language frequency, while extraversion is negatively related to assent words and word uniqueness. In short, extraverts tend to use words that are more emotionally charged and are easier to visualize. They also exhibit greater verbosity, use more common language, and exhibit less word uniqueness (i.e., repeat themselves).

Mairesse et al. (2007) confirm that the above linguistic features exhibit a significant ability to predict observer-based extraversion scores from transcribed speech. They obtain binary classification accuracies as high as 73 percent, with a

[4] Other examples include Persico, Postlewaite, and Silverman (2004), Graham, Harvey, and Puri (2014), Adams, Keloharju, and Knupfer (2014), and Otto (2014), who explore the relation between compensation and non-cognitive characteristics such as height, appearance, and optimism.

[5] Dikolli, Keusch, Mayew, and Steffen (2014) proxy for CEO integrity using excessive explanations in annual shareholder letters and find an association between integrity and ethical behavior. Davis, Ge, Matsumoto, and Zhang (2015) find evidence of persistent conference call tone style that is influenced by involvement in charitable organizations. Gow, Kaplan, Larcker, and Zakolyukina (2015) use textual algorithms to infer personality in a manner similar to our approach; they study firm policies rather than executive career outcomes. Other studies use voice (e.g., DeGroot, Aime, Johnson, and Kluemper 2011; Mayew, Parsons, and Venkatachalam 2013) or facial features (e.g., Cook and Mobbs 2017; Jia, van Lent, and Zeng 2014; Kamiya, Kim, and Suh 2016) to infer executive characteristics.

[6] For example, in the factor analysis of John and Srivastava (1999), extraversion loads positively on talkative, assertive, active, energetic, outgoing, outspoken, dominant, forceful, enthusiastic, show-off, sociable, spunky, adventurous, noisy, and bossy, and the extraversion factor loads negatively on quiet, reserved, shy, silent, withdrawn, and retiring.

[7] An alternative approach for measuring personality traits is Profiler Plus (see: https://profilerplus.org), which has been used on textual data to infer the need for power, achievement, and affiliation (McClelland and Winter 1969), and the seven leadership traits (Hermann 1999).

[8] We refer the reader to Section IA.1 of the Online Appendix for details on the mechanics of each model (see Appendix B for the link to the downloadable file).

statistically significant improvement over the baseline model (which has 50 percent accuracy). Although the algorithms in Mairesse et al. (2007) are generally less successful in capturing other Big Five personality traits from spoken language, we also consider measures of executive *emotional stability, openness, agreeableness,* and *conscientiousness* as controls in our analysis.

Estimation of Executive Extraversion

To measure executive extraversion, we apply the linguistic algorithms of Mairesse et al. (2007) to executives' spoken language from the question-and-answer (Q&A) portion of conference calls.[9] We collect conference call transcripts from two sources: Thomson Reuters StreetEvents and SeekingAlpha.com. From the Thomson Reuters dataset, we obtain a total of 88,792 transcripts (with matched I/B/E/S CUSIPs) from 2006–2011, and from the Seeking Alpha dataset, we obtain 65,447 transcripts from 2006–2013. For each report, we retrieve an identifying key, report title, date of transcript, and transcript text. When both datasets cover the same call, we select the longer transcript.[10]

We estimate the extraversion of each executive based on their dialogue from the Q&A portion of each call. We focus on the Q&A portion because it is less scripted than the presentation section (Hollander, Pronk, and Roelofsen 2010).[11] The trained personality models (Mairesse et al. 2007) take as input the dialogue for each executive from the call and generate personality ratings based on linguistic feature counts. Names extracted from the transcripts are then matched with the Execucomp database by name and six-digit CUSIP. To ensure match quality, we manually filter the non-exact name matches to obtain the final matched pairs. We require that each firm have non-missing CRSP, Compustat, I/B/E/S, and Execucomp data. The matched sample includes 37,735 CEO-call observations from 2,464 unique CEOs and 37,556 CFO-call observations from 2,772 unique CFOs. Unless otherwise stated, we further limit the sample to executives who appear in at least three calls, resulting in a sample of 2,267 unique CEOs and 2,524 unique CFOs.

For all CEOs and CFOs who appear on at least three conference calls, we construct an extraversion score that is aggregated across all calls (*Aggregate Extraversion*). To compute *Aggregate Extraversion,* we first winsorize the extraversion estimates from each of the four different linguistic algorithms (discussed in the Online Appendix) at the 1st and 99th percentiles. Next, we average across all four linguistic measures to compute a call-level measure of extraversion (*Call Extraversion*). *Aggregate Extraversion* is then computed as the weighted average *Call Extraversion* based on all calls, where each call is weighted by the number of words spoken on the call.[12] Thus, we treat extraversion as a time-invariant manager fixed effect.[13] We construct measures of the other Big Five personality traits analogously.[14]

Other Variable Construction and Summary Statistics

For all CEOs and CFOs who appear on at least three conference calls, we construct a number of additional variables. Specifically, we collect information from Execucomp on total compensation (*Total Comp*), the number of years that they have held their current position (*Tenure*), whether they were replaced during the year (*Turnover*), their gender (*Male*), their age (*Exec Age*), their tendency to hold in-the-money stock options (*Overconfidence*), and their age at the time they were first appointed as CEO or CFO (*First Age*). We also proxy for whether the executive was a founder based on whether the executive became CEO (as reported in Execucomp) within one year of when the firm went public (*Founder*). We collect information on the number of outside directorships held (*Directorships*) from RiskMetrics, and we compute a measure of optimism based on the tone of the executive during the Q&A portion of the conference call (*Optimism*). Following Li, Minnis, Nagar, and Rajan (2014), we also compute the ratio of the number of words spoken by the CEO (CFO) during the conference call to the number of words by all company executives during the conference call (*Percent CEO* [*CFO*] *Text*).

For the CEO sample, we also collected a number of managerial characteristics from BoardEx, including indicator variables for whether the executive graduated with honors (*GradHonors*), received an M.B.A. (*MBA*), a Ph.D. (*Doctorate*), or an Ivy

[9] To help bolster the validity of the linguistic extraversion measure, In Section IA.2 of the Online Appendix, we compare our textual algorithm to listener assessments for a small subset of the sample and find that the two measures are strongly correlated.

[10] Also, to control for potential textual differences between the data sources, we include a Seeking Alpha (SA) indicator variable in Equation (1) that equals 1 if the call transcript is from Seeking Alpha.

[11] In Table IA.6 of the Online Appendix, we reexamine our main results after including both the extraversion score computed from the Q&A portion of the call (*Extraversion Q&A*) and the extraversion score computed from the presentation portion of the call (*Extraversion Presentation*). In most cases, the coefficient on *Extraversion Presentation* is statistically insignificant. Moreover, the inclusion of *Extraversion Presentation* has very little impact on the estimated coefficient on *Extraversion Q&A*.

[12] We weight by word count since we expect that extraversion scores will be more precisely estimated for longer texts. In Table IA.7 of the Online Appendix, we repeat our main analyses by equally weighting across all calls and find similar (but slightly weaker) results.

[13] Aside from helping reduce measurement error, using all available calls to measure extraversion allows us to include executives immediately, rather than waiting until they appear on three calls, which allows us to examine changes in relatively short windows following CEO transitions. However, using forward-looking calls to measure extraversion raises concerns of reverse causality, and we address this issue in Section IA.3.2 of the Online Appendix.

[14] A full list of executives and their corresponding Big Five personality scores are available at: http://russelljame.com/research.html

League education (*Ivy League*). We also compute the sum of other external executives or directors related to the CEO through past professional connections, social connections, and past universities attended (*Rolodex*), as defined in Engelberg et al. (2013), as well as a measure of general managerial skills based on the breadth of the CEO's past work experience (*General Ability Index* or *GAI*), as defined in Custódio et al. (2013).

We use CRSP data to compute the number of months since the firm first appeared in CRSP (*Firm Age*), the standard deviation of daily returns (*Vol*), the firm's market capitalization (*Size*), share turnover (*Share Turnover*), the Amihud (2002) illiquidity ratio (*Illiquidity*), and the annual return on the stock (*Return*). We collect information on *Assets, Sales, Investment, Operating Cash Flows* (*Prof*), return on assets (*ROA*), sales growth, profit margin, and Tobin's Q (*Q*) from Compustat. We also consider *Firm Efficiency,* as described in Demerjian, Lev, and McVay (2012).[15] We collect from Factiva the total number of media articles in the *Wall Street Journal* that mention the firm (*Media Articles*), as well as the total number of words across all media articles (*Media Words*). We measure the number of brokerage houses covering a firm (*Analyst Coverage*) from I/B/E/S, and we collect information from Bloomberg Corporate Events Database on the number of broker-hosted investor conferences attended by a firm (*Conference Presentation*).[16] More detailed variable definitions are presented in Appendix A.

Panels A and B of Table 1 present descriptive statistics for the CEO and CFO sample, respectively. The sample includes 12,110 CEO-year observations and 11,332 CFO-year observations with non-missing extraversion scores over the 2004–2013 sample period. The average aggregate extraversion score for CEOs is 4.16, compared to 3.61 for CFOs. This difference between the two estimates is significant at the 1 percent level, which is consistent with extraversion being a more prevalent trait for CEOs relative to CFOs. However, the observed differences may also reflect differences in the expected communication roles of CEOs and CFOs in conference calls. In our analysis, we consider CEOs and CFOs separately.

III. CHARACTERIZING EXECUTIVE EXTRAVERSION

In this section, we provide additional descriptive statistics to better understand our measure of executive extraversion at the conference call level.

Determinants of Conference Call Extraversion

We first examine what drives variation in extraversion at the conference call level. We are particularly interested in understanding whether our measure of extraversion captures a stable personality trait or merely reflects the circumstances of the call. An extraversion measure that is stable across calls is preferable to one that changes with firm fundamentals for two broad reasons. First, using survey results, psychologists have found that extraversion is a highly stable personality trait (Costa and McCrae 1988). In our setting, measured extraversion is meant to be representative of others' view of the executive in a variety of settings. Our call-based measure is likely to be a stronger proxy for perceived extraversion if it is stable over time. Second, if extraversion varies considerably with changes in firm fundamentals, then there is a greater concern that extraversion may be capturing some omitted fundamental variable.

To examine the determinants of conference call extraversion, we estimate the following:

$$\begin{aligned} \textit{Call Extraversion} = {} & \beta_1 Ret_{t-63,t-2} + \beta_2 Ret_{t-1,t+1} + \beta_3 Ret_{t+2,t+63} + \beta_4 MBE + \beta_5 Surprise + \beta_6 Loss + \boldsymbol{\beta Characteristics} \\ & + Qtr + Manager + \varepsilon. \end{aligned} \tag{1}$$

Call Extraversion is the call-level extraversion score based on averaging the winsorized values of the extraversion estimates from the four linguistic models described in Section IA.1 of the Online Appendix. $Ret_{t-63,t-2}$ captures the return in the quarter prior to the call (i.e., the past two to 63 trading days). We also control for returns around the call ($Ret_{t-1,t+1}$) and returns over the subsequent quarter ($Ret_{t+2,t+63}$). Roughly 83 percent of the sample of conference calls occur in the four-day window [−1,2] around an earnings announcement (day 0). For this subset of calls, we also include three variables related to the earnings surprise: *Meet-or-Beat* is an indicator variable equal to 1 if the firm meets or beats the mean consensus analyst forecast for the most recent quarter; *Surprise* is the difference between quarterly earnings per share (EPS) and the mean consensus analyst forecast scaled by the stock price at the beginning of the quarter; and *Loss* is an indicator variable equal to 1 for firms reporting negative earnings. For non-earnings conference calls, we set the earnings-related variables equal to 0 and include a missing earnings indicator.

Characteristics is a vector that includes the following variables for both CEOs and CFOs: *Tenure, Exec Age, Male,* and *Optimism*. The CEO sample also includes *Overconfidence, Founder, General Ability Index, Rolodex, MBA, Doctorate,*

[15] We thank Peter Demerjian for making the data available at: http://faculty.washington.edu/pdemerj/data.html

[16] See Bushee, Jung, and Miller (2011) and Green, Jame, Markov, and Subasi (2014a, 2014b) for more details on broker-hosted investor conferences.

TABLE 1

Summary Statistics

Panel A: Executive Variables

	CEOs			CFOs		
	Mean	**Median**	**Std. Dev.**	**Mean**	**Median**	**Std. Dev.**
Extraversion	4.16	4.15	0.37	3.61	3.60	0.37
Total Calls	20.16	20.00	10.19	18.73	18.00	10.08
Tenure	5.16	5.00	2.83	3.84	3.00	2.70
Compensation (*$ Mil*)	5.56	3.74	6.31	1.97	1.34	2.41
Outside Directorships	0.37	0.00	0.66	0.02	0.00	0.18
Executive Turnover	0.06	0.00	0.24	0.06	0.00	0.26
Agreeableness	3.65	3.65	0.13	3.69	3.69	0.12
Conscientiousness	3.67	3.66	0.22	3.66	3.66	0.20
Openness	3.72	3.72	0.13	3.74	3.74	0.13
Emotional Stability	3.22	3.22	0.18	3.23	3.24	0.15

Panel B: Firm-Level Variables

	Mean	**Median**	**Std. Dev.**
Assets (*$ Bil*)	17.86	2.16	107.66
Sales (*$ Bil*)	6.93	1.60	21.11
Market Equity (*$ Bil*)	8.58	1.88	26.29
Volatility	2.65	2.32	1.44
Fiscal Return	7.16	1.21	54.21
Firm Age (*Months*)	268.48	235.00	150.88
Q	1.85	1.49	1.16
Sales Growth	0.09	0.07	0.21
Market Share (%)	0.76	0.16	2.28
Firm Efficiency	0.35	0.30	0.17
Profitability (*OCF*)	0.12	0.11	0.09
Profit Margin	0.06	0.06	0.14
ROA	0.14	0.13	0.12
Analyst Coverage	14.42	12.00	9.51
Conference Presentations	4.76	4.00	5.36
Media Articles	7.60	0.00	40.67
Media Words (*Thousands*)	5.05	0.00	27.97
Share Turnover	11.32	8.98	8.70
Amihud Illiquidity (× 100)	27.36	0.96	371.23

This table presents descriptive statistics for the sample of CEO, CFO, and firm-level variables over the 2004–2013 sample period. Panel A reports summary statistics for the 2,267 unique CEOs (12,110 CEO-years) for whom we are able to estimate a valid extraversion score. Panel A also presents analogous results for 2,524 unique CFOs (11,332 CFO-years). Panel B reports summary statistics for the 1,633 unique firms (12,110 firm-years) for which we observe CEO extraversion. The transcripts of the conference calls are obtained from Seeking Alpha and Thomson Reuters during the 2006–2013 sample period. *Aggregate Extraversion* scores are estimated based on the executive's responses during the question-and-answer portion of conference calls. The extraversion scores are computed using the average of four linguistic algorithms described in Section IA.1 of the Online Appendix. We limit the sample to executives that appear on at least three conference calls. We match the executives on the conference calls with executives in the Execucomp database by CUSIP and name.
Definitions of the other variables are presented in Appendix A.

GradHonors, and *Ivy League*. All variables are defined in Appendix A. All specifications include quarter fixed effects, and Specifications 3 and 6 include manager fixed effects. All continuous variables (including extraversion) are standardized to have mean 0 and variance 1, and standard errors are clustered by firm.

Specification 1 of Table 2 reports the results of Equation (1) for the CEO sample before including managerial characteristics or manager fixed effects. We find modest evidence that firm fundamentals influence extraversion. However, the size of the relation between returns and extraversion is small. For example, a one-standard-deviation change in either past quarterly returns or event-time returns accounts for a change of 0.02 standard deviations in extraversion.

TABLE 2

Determinants of Conference Call Extraversion

	CEOs			CFOs		
	[1]	[2]	[3]	[4]	[5]	[6]
$Return_{t-63,t-2}$	−0.02	−0.03	−0.02	−0.01	−0.02	−0.01
	(−3.37)	(−6.21)	(−4.16)	(−2.71)	(−3.80)	(−1.60)
$Return_{t-1,t+1}$	−0.02	−0.03	−0.01	−0.02	−0.02	0.00
	(−3.36)	(−5.78)	(−3.16)	(−2.89)	(−3.79)	(−0.01)
$Return_{t+2,t+63}$	0.00	−0.01	−0.01	0.00	0.00	0.01
	(−0.65)	(−1.68)	(−2.13)	(0.50)	(0.58)	(1.65)
MBE	0.07	0.00	0.01	0.07	0.06	0.00
	(3.19)	(0.14)	(0.60)	(3.90)	(3.04)	(−0.26)
Surprise	−0.02	−0.02	−0.01	−0.03	−0.03	0.00
	(−2.32)	(−1.71)	(−0.82)	(−3.17)	(−2.99)	(0.25)
Loss	−0.16	−0.10	−0.06	−0.03	−0.01	0.02
	(−3.71)	(−2.58)	(−2.69)	(−1.03)	(−0.44)	(0.77)
Tenure		0.08	−0.06		0.08	0.01
		(4.82)	(−1.44)		(5.67)	(0.38)
Exec Age		−0.12			−0.01	
		(−7.34)			(−0.92)	
Male		0.28			0.24	
		(4.37)			(5.28)	
Optimism (*Tone*)		0.13			0.07	
		(12.64)			(6.51)	
Overconfidence (*HD67*)		0.00				
		(0.11)				
Founder		0.05				
		(2.69)				
General Ability Index		0.03				
		(1.62)				
Rolodex		0.02				
		(0.96)				
MBA		−0.04				
		(−1.30)				
Doctorate		0.00				
		(0.01)				
GradHonors		0.07				
		(0.93)				
Ivy League		0.07				
		(1.58)				
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Manager FE	No	No	Yes	No	No	Yes
Observations	37,735	37,735	37,735	37,556	37,556	37,556
Total R^2	2.93%	7.73%	50.48%	2.71%	4.08%	41.24%
Within R^2			2.07%			1.31%

This table reports estimates from regressing executive extraversion, measured from conference call Q&A responses, on manager, firm, and call characteristics (see Equation (1) in Section III). We report the results separately for CEOs and CFOs. All specifications include quarter fixed effects. Specifications 2 and 5 add managerial characteristics, and Specifications 3 and 6 add manager fixed effects. The sample includes conference calls obtained from Seeking Alpha and Thomson Reuters over the 2006–2013 sample period that can be matched with Execucomp. All continuous variables are standardized to have mean 0 and variance 1. Standard errors are clustered by firm, and t-statistics are reported below each estimate.
Definitions for all variables are provided in Appendix A.

Specification 2 of Table 2 adds managerial characteristics. Extraversion tends to be higher for males, younger executives, executives with greater tenure, and founders. Extraverts also appear to have optimistic tones. We find no evidence that the education variables (*MBA, Doctorate, GradHonors,* and *Ivy League*) are correlated with extraversion. Collectively, including the managerial characteristics improves the R^2 from 2.93 to 7.73 percent, suggesting that managerial characteristics have a relatively modest ability to explain extraversion in the cross-section of CEOs.

We add manager fixed effects in Specification 3 of Table 2. We exclude all managerial characteristics (except tenure) due to the fact that they are highly persistent over time. Adding manager fixed effects to the CEO regression results in the R^2 jumping to 50.5 percent, which is consistent with extraversion being highly persistent at the manager level. However, in many cases, we only observe the manager working for one firm and, therefore, manager fixed effects could simply be capturing a firm fixed effect. To help distinguish between a manager and a firm fixed effect, in Table IA.2 of the Online Appendix, we compare the persistence in extraversion for a sample of firms with and without manager turnover. We observe that the correlation in the extraversion score for the same CEO over the two sample periods is 0.75, whereas the correlation in extraversion for the same firm with two different CEOs is only 0.26. This finding suggests that call-level estimates of extraversion largely capture a stable personality trait that is distinct from firm-level extraversion.

The patterns for CFOs in Specifications 4 through 6 of Table 2 are similar. In future tests, we control for the relation between call extraversion and firm fundamentals by constructing an extraversion measure based on the residuals from Specifications 1 and 4.[17] In particular, for each executive, we define *Extraversion* as the weighted average *residual* extraversion across all calls, where each call is weighted by the number of words spoken in the Q&A portion of the call by the executive. We also control for the relation between extraversion and other managerial characteristics by directly including the set of managerial characteristics as controls.

Correlation Matrix

Although the persistence in executive extraversion diminishes following managerial turnover, the coefficient estimate remains significantly greater than zero (see Table IA.2 of the Online Appendix). This finding is consistent with firms having persistent preference for extraverts, but also raises concerns that extraversion may be correlated with certain firm characteristics. To provide some descriptive evidence for the types of firms that tend to hire extraverts, we include a correlation matrix between *Extraversion* and the following firm characteristics (all in natural logs): *Sales, Q, Vol,* and *Firm Age*. For reference, we also include a host of other CEO characteristics.

We find that CEO extraversion correlates strongly with *Sales* and *Q*.[18] This finding suggests that extraverts are overrepresented at large firms and growth firms, both of which tend to more visible, have greater investment opportunities, and offer higher executive compensation (Smith and Watts 1992; Murphy 1999). Table 3 also reveals a strong correlation between *Extraversion* and *Percent CEO Text*. The positive relation is not surprising given the strong correlation between extraversion and verbosity (Mairesse et al. 2007). Importantly, all of our tests control for *Percent CEO Text,* which allows us to explore the incremental explanatory power of *Extraversion* after controlling for the impact of *Percent CEO Text*.

IV. EXECUTIVE EXTRAVERSION AND CAREER OUTCOMES

A long literature in psychology, originating with Mann (1959), documents a relationship between extraversion and leadership emergence. In this section, we explore whether the perceived leadership advantage of extraverts translates into greater labor market success.

Extraversion and Executive Compensation

We begin investigating the effects of extraversion on compensation using the following panel regression:

$$Log(Compensation)_{it} = \beta_1 Extraversion_i + \gamma \boldsymbol{FirmChar} + \delta \boldsymbol{Performance} + \omega \boldsymbol{CEOChar} + Year_t + FE_i + \varepsilon_{it}. \quad (2)$$

Our primary measure of compensation is total compensation, which consists of salary, bonus, value of restriction stock granted, value of options granted, long-term incentive payout, and other compensation (TDC1, as reported in Execucomp). We winsorize compensation values at the 1st percentile to address $1 salaries.

FirmChar is a vector that includes *Ln* (*Sales*), *Ln* (*Assets*), *Ln* (*Q*), *Log* (*Vol*), and *Ln* (*Firm Age*); ***Performance*** is a vector that includes *Ln* (*Sales Growth*) *Fiscal Return, Fiscal Return* (*t*−1), *Prof, Prof Growth,* and *Loss;* and ***CEOChar*** is a vector that includes all the CEO characteristics reported in Specification 2 of Table 2, plus *Percent CEO Text* and the other Big Four

[17] The results are robust to using unadjusted extraversion ratings (i.e., *Aggregate Extraversion,* as reported in Table 1).

[18] In Table IA.3 of the Online Appendix, we examine the determinants of hiring extraverted CEOs in a multivariate regression that includes all four firm characteristics, as well as industry fixed effects. We continue to find a strong relation between *Extraversion* and both *Sales* and *Q*.

TABLE 3

Correlations between CEO Extraversion and Firm and Manager Characteristics

	Ln (Comp)	*Ln (Sales)*	*Ln (Q)*	*Ln (Vol)*	*Ln (Firm Age)*	*Ten -ure*	*Exec Age*	*Male*	*Opti-mism*	*Over-Confi -dence*	*Foun -der*	*Chair*	*GAI*	*Rolo-dex*	*MBA*	*Grad-Honors*	*Ivy Leag.*	*Pct CEO Text*
Extraversion	**0.19**	**0.14**	**0.13**	0.02	**−0.07**	**0.07**	**−0.14**	**0.06**	**0.17**	0.03	**0.07**	0.01	0.02	**0.04**	0.01	0.02	0.00	**0.51**
Ln (Comp)		**0.66**	**0.09**	**−0.25**	**0.17**	**−0.06**	**0.08**	0.01	**0.12**	**−0.10**	**−0.11**	**0.19**	**0.33**	**0.37**	**0.06**	**0.09**	**0.10**	**−0.04**
Ln (Sales)			**−0.13**	**−0.38**	**0.32**	**−0.11**	**0.12**	0.00	**0.10**	**−0.06**	**−0.20**	**0.22**	**0.32**	**0.42**	0.04	**0.05**	**0.08**	**−0.13**
Ln (Q)				**−0.10**	**−0.16**	0.02	**−0.13**	0.02	**0.17**	**0.00**	**0.09**	**−0.04**	**−0.08**	0.01	0.00	0.00	0.02	**0.05**
Ln (Vol)					**−0.28**	0.04	**−0.07**	−0.02	0.03	−0.01	**0.14**	**−0.16**	**−0.12**	**−0.16**	−0.01	−0.03	**−0.06**	**0.07**
Ln (Firm Age)						0.00	**0.18**	0.02	**−0.06**	**0.10**	**−0.56**	**0.12**	**0.10**	**0.16**	**0.06**	−0.02	0.04	**−0.06**
Tenure							**0.36**	**0.07**	**−0.08**	**0.05**	**0.44**	**0.33**	**−0.13**	**−0.06**	**−0.07**	−0.03	0.04	0.01
Exec Age								**0.04**	**−0.18**	0.04	**0.10**	**0.28**	**0.15**	**0.06**	−0.03	−0.04	0.02	**−0.13**
Male									−0.04	0.03	0.01	0.03	**−0.08**	−0.05	0.04	0.00	0.00	0.02
Optimism										−0.02	−0.01	**−0.06**	−0.02	**0.06**	0.03	**−0.05**	−0.03	**0.10**
Overconfidence											**0.00**	0.02	**−0.08**	−0.03	0.03	−0.02	0.03	0.00
Founder												**0.12**	**−0.16**	**−0.15**	**−0.09**	−0.02	0.00	0.00
Chair													**0.13**	**0.15**	−0.02	0.02	0.06	**−0.08**
GAI														**0.40**	**0.08**	**0.14**	**0.12**	−0.03
Rolodex															**0.06**	**0.13**	**0.14**	**−0.06**
MBA																**0.05**	**0.21**	0.03
GradHonors																	**0.17**	0.02
Ivy League																		−0.03

This table reports Pearson correlations between CEO extraversion and firm and manager characteristics. *Extraversion* of CEOs is estimated using the weighted average of residuals from Specification 1 of Table 2. Statistical significance at the 5 percent level is indicated with a bold estimate. Statistical significance is computed from standard errors clustered by firm.
Firm and manager characteristics are defined in Appendix A.

personality traits. All continuous variables are standardized to have mean 0 and variance 1. Appendix A provides more detailed variable definitions. All specifications include year fixed effects (*FE*) and either industry or firm fixed effects.[19]

Specifications 1 through 4 of Table 4 report the results with industry fixed effects. Prior to including firm characteristics, performance measures, or CEO characteristics, we observe that a one-standard-deviation increase in extraversion is associated with a 17.65 percent pay premium. Specification 2 includes firm characteristics. Consistent with prior literature (e.g., Gabaix and Landier 2008), we find that CEO compensation is strongly related to proxies for firm size (*Sales* and *Assets*) and growth opportunities (*Q*). Further, including firm characteristics significantly reduces the extraversion pay premium from 17.65 to 5.95 percent. This suggests that extraverts' tendency to be employed by larger and more growth-oriented firms (Table 3 and Online Appendix Table IA.3) explains much, but not all, of the compensation premium.

Specification 3 of Table 4 includes the performance measures, and Specification 4 adds CEO characteristics. Consistent with prior work, we find that compensation is greater among firms with higher sales growth and higher returns; compensation is also greater for CEOs with higher general ability or CEOs that serve as chair.[20] Controlling for performance and CEO characteristics reduces the extraversion pay premium to 4.56 percent, but the estimate remains highly significant. Specifications 5 through 8 include firm fixed effects. Comparing Specification 4 to Specification 8, we find that including firm fixed effects substantially increases the R^2 of the model (58.07 percent versus 81.28 percent) and also increases the coefficient on *Extraversion* (4.56 percent versus 6.48 percent). In the Online Appendix (Table IA.4), we document a similar relation between CFO extraversion and compensation, and we also confirm that the relation between CEO extraversion and compensation is robust to a variety of methodological choices.

The evidence from Table 4 suggests that after controlling for basic firm characteristics, the extraversion pay premium ranges from 4.56 to 6.48 percent. The average CEO compensation is $5.5 million, which suggests that the premium would translate into roughly an additional $250,000 to $360,000 in annual compensation. The extraversion pay premium is in line with existing literature on CEO characteristics and compensation. For example, Custódio et al. (2013, Table 5, Specification 3) find that a one-standard-deviation increase in CEOs' general ability (*GAI*) is associated with an 11.7 percent increase in pay; Engelberg et al. (2013) find that a one-standard-deviation increase in professional connections (*Rolodex*) is associated with a 10.0 percent increase in CEO pay (134.69×0.00076); and Li et al. (2014) find that a one-standard-deviation increase in knowledge (*Percent CEO Text*) is associated with a 5.5 percent premium (24.2×0.229). Our findings are also in line with the literature that explores the premium associated with non-cognitive traits in the broader population. For example, Case and Paxson (2008) find compensation effects of 9.2 percent associated with an interquartile movement in height of roughly four inches. In our setting, an interquartile movement is equal to 1.2 standard deviations, implying that an interquartile movement in extraversion is associated with between a 5.5 to 7.8 percent premium.

Omitted Variable Bias

One important concern is that extraversion may be correlated with other (perhaps unobservable) managerial attributes that drive executive labor market success. In our analysis, we control for a large set of existing managerial attributes known to influence executive compensation, including *optimism, overconfidence, founder, education, general ability,* the extent of the executive's network, and the CEO's firm-specific knowledge. Our findings indicate that the career benefits associated with extraversion are distinct from these existing managerial attributes.

Nevertheless, there may be additional characteristics that are correlated with extraversion that may influence compensation, such as height or vocal pitch (Case and Paxson 2008; Mayew et al. 2013). We explore the potential severity of omitted variable bias using the framework of Oster (2016), who demonstrates that omitted variable bias is less likely to be a problem when (1) the coefficient of interest is stable after including a wide range of controls, and (2) including controls significantly increases the R^2 of the model. In our setting, we focus on Specifications 2 through 8 in Table 4, as it is unlikely that any omitted individual characteristic will have the same type of explanatory power for compensation as firm characteristics such as *sales, assets,* and *Q*.[21] The fact that the coefficients are fairly stable (ranging from 4.6 to 6.5 percent),

[19] Firm fixed effects help control for unobserved (time-invariant) firm characteristics, yet they also require valid extraversion scores for at least two CEOs for the same firm, which precludes two-thirds of the sample.

[20] Two CEO characteristic coefficients appear inconsistent with prior literature. We find an insignificant coefficient on the *Percent CEO Text* measure of Li et al. (2014), although this is driven by the correlation between *Extraversion* and *Percent CEO Text* (Table 3). Excluding *Extraversion,* the coefficient on *Percent CEO Text* increases to 2.95 percent ($t = 2.19$). Also, we observe an insignificant relation between *Rolodex* and compensation (inconsistent with Engelberg et al. [2013]), which is partially driven by the correlation between *Rolodex* and *GAI*. Excluding *GAI,* the coefficient on *Rolodex* is 4.07 percent ($t = 2.84$).

[21] Even if we consider Specification 1 in the analysis, a more formal analysis of the bias suggests that omitted variables are unlikely to completely explain our results. Specifically, under "equal selection," in which observables and unobservables have the same proportional influence on extraversion, and conservatively assuming a maximum R^2 of 100 percent, we estimate that the bias in Specification 8 of Table 4 is, at most, 2.89 percent. This suggests a lower bound for the extraversion pay premium of 3.59 percent, with a t-stat of 1.59 if the standard errors remain unchanged. However, if we assume a maximum R^2 of 90 percent, then the lower bound increases to 5.13 percent with a t-stat of 2.27. The results are also very similar if one excludes industry and year fixed effects from the baseline specification.

TABLE 4

Extraversion and CEO Compensation

	Industry and Year Fixed Effects				Firm and Year Fixed Effects			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Extraversion	17.65***	5.95***	5.76***	4.56***	5.96***	5.44**	5.75***	6.48***
	(8.31)	(4.46)	(4.31)	(2.92)	(2.76)	(2.51)	(2.67)	(2.87)
Ln (Sales)		25.30***	26.00***	23.40***		4.79	17.34**	17.82**
Ln (Assets)		48.90***	48.40***	44.00***		34.56***	37.14***	36.43***
Ln (Q)		17.70***	14.10***	12.70***		15.92***	11.78***	11.58***
Ln (Vol)		3.60***	3.40**	3.30**		−2.06	−0.97	−1.18
Ln (Firm Age)		−2.30*	−1.50	−1.20		7.68**	7.74**	5.52
Ln (Sales Growth)			5.80***	5.80***			5.04***	5.01***
Fiscal Return			5.50***	5.10***			4.49***	4.45***
Lag Fiscal Return			4.00***	3.90***			3.40***	3.33***
Profitability			2.70	2.80			3.92***	3.93***
Prof Growth			0.00	0.00			−0.48	−0.44
Loss Indicator			−3.60	−3.70			−11.08***	−10.51***
Log (CEO Tenure)				−4.40**				2.52
Log (CEO Age)				1.60				−2.81
Male				2.80				4.51
Founder				1.10				−6.41
Chair				7.50***				3.30
GAI				7.90***				5.74***
Rolodex				2.40				0.87
Percent CEO Text				2.00				1.13
Optimism				3.80***				3.16*
Overconfidence				−6.70***				−3.56**
MBA				2.70				4.78
Doctorate				12.10				−9.63
Ivy League				2.50				−0.35
GradHonors				5.20				−0.19
Emotional Stability				2.10				−2.43
Openness				−1.40				−1.61
Agreeableness				−0.50				−0.46
Conscientiousness				0.70				−0.60
R^2	8.88%	55.30%	56.42%	58.07%	79.43%	80.30%	81.07%	81.28%

***, **, * Denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.
This table reports estimates from the following panel regression:

$$Log(Comp_{it}) = \beta_1 Extraversion_i + \gamma \boldsymbol{FirmChar} + \delta \boldsymbol{Performance} + \omega \boldsymbol{CEOChar} + Year_t + FE_i + \varepsilon_{it}.$$

Comp is total compensation and is comprised of salary, bonus, value of restriction stock granted, value of options granted, long-term incentive payout, and other compensation (TDC1, as reported in Execucomp). *Extraversion* is the residual extraversion of CEOs based on Specification 1 of Table 2. ***FirmChar*** is a vector of firm characteristics; ***Performance*** is a vector of firm performance measures; and ***CEOChar*** is a vector of CEO individual characteristics. All continuous independent variables are standardized to have mean 0 and variance 1. Specifications 1–4 (5–8) include industry (firm) and year fixed effects. Standard errors are clustered by firm, and t-statistics are reported below the coefficients for *Extraversion*. In the interest of brevity, we delegate t-statistics for all other variables to Online Appendix Table IA.12. The sample includes 10,918 observations.
Appendix A provides detailed variable definitions.

despite the R^2 substantially increasing from 55 to 81 percent is reassuring. While the diagnostics above are comforting, we acknowledge that we cannot completely eliminate concerns regarding omitted variables. For example, extraversion may lead to differences in early life experience, such as increased participation or success in previous leadership roles.[22] A cautious interpretation of the relation between extraversion and compensation is that it reflects the direct effect of extraversion, as well

[22] Consistent with this view, evidence suggests that the career benefits of height and vocal pitch accrue relatively early in life (e.g., Persico, Postlewaite, and Silverman 2004; Mayew and Venkatachalam 2012).

as any indirect effects through earlier, unobserved personal or career successes. Our findings nevertheless highlight the importance of a psychologically motivated, but previously unobserved, managerial trait in explaining career success.

Extraversion and Tenure

Executives with greater perceived ability may also be less likely to experience job turnover and, therefore, may experience longer tenures. To test these conjectures, we estimate the following regression:

$$CEO\ TN_{it} = \beta_1 Extraversion_i + \gamma \boldsymbol{FirmChar} + \delta \boldsymbol{Performance} + \omega \boldsymbol{CEOChar} + Year_t + FE_i + \varepsilon_{it}. \quad (3)$$

In Specifications 1–4 of Table 4, *CEO TN* denotes *CEO Turnover,* which equals 1 if the firm changes its CEO during the year, and 0 otherwise. In Specifications 5–7, *CEO TN* denotes *CEO Tenure* and is the log of CEO tenure in months. All other variables are defined as in Equation (2).

Specifications 1–4 of Table 5 report the odds ratios from the logistic regression. Specification 1 indicates that prior to controlling for firm characteristics, performance, or CEO characteristics, a one-standard-deviation increase in extraversion is associated with a statistically significant 19 percent reduction in the likelihood of CEO turnover (relative to a 5 percent unconditional probability). Controlling for firm characteristics and performance results in a slightly larger 21 percent decline. Including all the CEO characteristics except the other Big Five personality measures (Specification 3) reduces the estimate to a still-significant 14 percent. However, the estimate loses significance after including the other Big Five personality measures (Specification 4).

Specifications 5–7 of Table 5 examine CEO tenure. We find that a one-standard-deviation increase in extraversion is associated with an increase of tenure of 5.1 to 7.5 percent.[23] Longer tenures have meaningful consequences for CEO pay. The average tenure of a departing CEO is eight years and, therefore, the 6.84 percent estimate (in Specification 7) implies that extraverted CEOs stay in office for roughly 6.5 extra months.[24] Assuming an annual incremental compensation premium from being a CEO of $3.5 million (the difference between the average CEO and CFO salary), then the extra compensation associated with extraverted CEOs' longer tenure is roughly $1.9 million ($3.5 × 5.5/12).

Extraversion and Outside Directorships

Extraverts' tendency to attract social attention (e.g. Ashton et al. 2002) may lead to greater external visibility and more invitations to sit on outside boards. Extraverts' outgoing nature may also make them more willing to accept board invitations. We, therefore, test whether extraverted executives sit on more boards by estimating the following regression:

$$Y_{it} = \beta_1 Extraversion_i + \gamma \boldsymbol{FirmChar} + \delta \boldsymbol{Performance} + \omega \boldsymbol{CEOChar} + Year_t + FE_i + \varepsilon_{it}. \quad (4)$$

We estimate two versions of Equation (5). In the first approach, we employ a logit regression, and *Y* is an indicator variable that is equal to 1 if the executive sits on any outside boards, and 0 otherwise. In the second approach, *Y* is defined as the natural log of 1 plus the number of outside directorships. All control variables are defined as in Equation (2). The independent variables are defined in Appendix A, and all continuous variables are standardized to have mean 0 and variance 1. Standard errors are clustered by executive.

Table 6 documents a significant relation between extraversion and the number of directorships (Specification 1) and the probability of having an outside directorship (Specification 2). For example, Specification 2 indicates that a one-standard-deviation increase in extraversion is associated with a 15 percent increase in the likelihood of serving on any outside board (relative to an unconditional probability of 34.6 percent).

We next examine whether extraverted CEOs receive higher-quality outside directorships. We consider firm size, as larger firms likely afford directors greater visibility and prestige (Adams and Ferreira 2008), higher compensation (Ryan and Wiggins 2004), and an increased likelihood of obtaining additional directorships (Yermack 2004). We examine the relationship between the quality of directorships and extraversion by setting *Y* in Equation (4) equal to *Ln* (*Sales*), *Ln* (*Assets*), or *Ln* (*Market Equity*) of the executive's largest outside directorship, and we require CEOs to hold at least one outside directorship position. The results, reported in Specifications 3–5 of Table 6, indicate that a one-standard-deviation increase in extraversion is associated with sitting on outside boards that are 12 to 20 percent larger, consistent with extraverted CEOs sitting on larger (i.e., higher-quality) outside boards.

[23] Longer tenures might also be a consequence of extraverted executives being appointed CEO at an earlier age. Consistent with this view, in Table IA.9 of the Online Appendix, we find that a one-standard increase in extraversion is associated with becoming CEO roughly one year earlier.

[24] This estimate is line with Mayew et al. (2013), who find that an interquartile increase in voice pitch is associated with an increase in tenure of roughly five months.

TABLE 5

Extraversion and CEO Tenure and Turnover

	Turnover				***Tenure***		
	[1]	**[2]**	**[3]**	**[4]**	**[5]**	**[6]**	**[7]**
Extraversion	0.81***	0.79***	0.86**	0.94	5.12**	7.52***	6.84***
	(−4.32)	(−4.81)	(−2.38)	(−0.87)	(2.25)	(3.27)	(3.85)
Ln (*Sales*)		1.08	1.05	1.05		−8.25	−10.97***
Ln (*Assets*)		1.18	1.08	1.10		−9.41	−11.07***
Ln (*Q*)		1.11	1.14*	1.17**		−3.59	−3.44*
Ln (*Vol*)		1.12**	1.09	1.09		−0.98	2.30
Lag (*Age*)		1.07	0.91	0.92		5.93***	21.71***
Ln (*Sales Growth*)		1.00	0.99	1.00		5.00***	2.44***
Fiscal Return		0.72***	0.74***	0.75***		−2.89***	−1.17*
Lag Fiscal Return		0.85	0.85	0.84		0.05	−0.09
Profitability		1.01	0.99	0.98		0.66	−0.37
Profitability Growth		0.93	0.94	0.94		−1.53	0.60
Loss Indicator		1.32**	1.33*	1.34*		−19.15***	−5.01*
Log (*CEO Age*)			1.73***	1.67***			21.13***
Log (*CEO Tenure*)			1.23***	1.26***			
Male			1.41	1.44			18.57**
Founder			0.66**	0.67**			104.80***
Chair			0.69***	0.69***			36.33***
GAI			1.23***	1.23***			−8.50***
Rolodex			1.13**	1.13**			7.73***
Percent CEO Text			0.91	0.95			1.64
Optimism			0.45***	0.89**			−2.62*
Overconfidence			0.90*	0.82*			1.21
MBA			0.82	0.93			−3.72
Doctorate			0.93	1.17			−24.43***
Ivy League			1.17	0.92			8.88***
GradHonors			0.92	0.98			1.03
Emotional Stability			0.92	0.80***			1.79
Openness			0.86	1.06			−4.55**
Agreeableness				1.08			−0.28
Conscientiousness				0.83**			2.01
R^2	3.23%	3.20%	5.87%	6.06%	2.28%	5.11%	51.37%

***, **, * Denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.
This table reports estimates from the following panel regression:

$$CEO\ TN_{it} = \beta_1 Extraversion_i + \gamma \boldsymbol{FirmChar} + \delta \boldsymbol{Performance} + \omega \boldsymbol{CEOChar} + Year_t + IND_i + \varepsilon_{it}.$$

$CEO\ TN_{it}$ denotes *CEO Turnover* in Specifications 1–4 and is 1 if firm *i* changes its CEO in year *t*, and 0 otherwise. In Specifications 5–7, $CEO\ TN_{it}$ denotes *CEO Tenure* and is the log of CEO tenure in months. *Extraversion* is the residual extraversion of CEOs based on Specification 1 of Table 2. ***FirmChar***, ***Performance***, and ***CEOChar*** are vectors of firm, performance, and manager characteristics detailed in Appendix A. Year and IND indicate year and industry fixed effects, respectively. All independent variables are standardized to have mean 0 and variance 1. The coefficients from the logistic regressions represent odds ratios. Standard errors are clustered by firm, and z-scores (in Specifications 1–4) and t-statistics (in Specifications 5–7) are reported below the coefficients for *Extraversion*. In the interest of brevity, we delegate test statistics for all other variables to Online Appendix Table IA.13. The sample includes 10,918 observations.

Extraversion and CFO Promotion to CEO

If extraversion is associated with perceived managerial ability, then extraverted CFOs should be more likely to be promoted to the top job following the departure of the CEO. To test this conjecture, we estimate the following regression:

$$Promotion_{it} = \beta_1 Extraversion_i + \gamma \boldsymbol{FirmChar} + \delta \boldsymbol{Performance} + \omega \boldsymbol{CFOChar} + \zeta \boldsymbol{CumPerformance} + Year_t + FE_i + \varepsilon_{it}, \quad (5)$$

Promotion is an indicator variable equal to 1 if the internal CFO is subsequently promoted to CEO following a CEO departure;

TABLE 6

CEO Extraversion and Outside Directorships

	Ln (1 + Dir.) [1]	Logit (Dir. = 1) [2]	Dir. Size: *Ln* (*Sales*) [3]	Dir. Size: *Ln* (*Assets*) [4]	Dir. Size: *Ln* (*Equity*) [5]
Extraversion	1.90**	1.15**	12.09*	20.14**	16.27**
	(2.10)	(2.15)	(1.83)	(2.56)	(2.42)
Ln (*Sales*)	3.29	1.30*	58.57***	58.98***	41.73**
Ln (*Assets*)	−1.13	1.09	28.42*	35.80*	47.99***
Ln (*Q*)	−1.34	0.95	4.22	1.74	17.15**
Ln (*Vol*)	−1.23	0.94	7.87	17.28*	9.01
Ln (*Firm Age*)	0.58	1.05	5.38	7.73	6.85
Ln (*Sales Growth*)	0.68*	1.06*	−2.77	−4.82	−2.47
Fiscal Return	−0.31	0.97	0.87	1.08	6.60
Lag Fiscal Return	−0.41	0.95	−3.92	−3.80	−3.26
Profitability	−0.05	1.01	19.98**	21.39**	20.93**
Profitability Growth	0.00	0.99	−7.87*	−6.44	−8.11
Loss Indicator	−2.59*	0.84*	2.17	1.83	6.57
Log (*CEO Tenure*)	6.28***	1.50***	2.33	−1.89	−9.57
Log (*CEO Age*)	2.01**	1.11*	2.45	13.34	16.12**
Male	−14.95***	0.31***	−64.33***	−79.33***	−75.04***
Founder	−7.84***	0.54***	28.75	21.36	22.57
Chair	3.66**	1.30**	18.99*	27.26**	23.92**
GAI	13.63***	2.38***	7.20	15.08*	11.55*
Rolodex	4.97***	1.29***	27.58***	31.65***	27.32***
Percent CEO Text	−0.54	0.95	6.75	8.83	7.18
Optimism	−1.36*	0.95	3.30	6.77	2.74
Overconfidence	−2.95*	0.77**	−12.59	−4.51	−1.33
MBA	3.65**	1.23*	2.96	−9.86	−2.94
Doctorate	−0.99	1.06	−47.24	−48.93	−28.71
Ivy League	−0.12	1.02	10.26	21.74**	16.04**
GradHonors	−1.12	0.99	16.58	8.84	17.96
Observations	9,630	9,630	2,222	2,222	2,222
R^2/Pseudo R^2	27.56%	23.05%	45.89%	43.75%	45.91%

***, **, * Denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.
This table reports the estimates from the following panel regression:

$$Y_{it} = \beta_1 Extraversion_i + \gamma \boldsymbol{FirmChar} + \delta \boldsymbol{Performance} + \omega \boldsymbol{CEOChar} + Year_t + FE_i + \varepsilon_{it}.$$

In Specification 1, *Y* is the log of 1 plus the number of directorships. In Specification 2, *Y* is an indicator variable that equals 1 if the CEO sits on an outside board, and 0 otherwise. In Specifications 3 through 5, *Y* reflects the size of the CEOs' largest outside directorships as measured by *Sales, Assets,* or *Market Equity,* and the sample is limited to the sample of CEOs with outside directorships. *Extraversion* is the residual extraversion as in Specification 1 of Table 2. Controls are defined in Appendix A, and all independent continuous variables are standardized to have mean 0 and variance 1. Standard errors are clustered by executive, and t-statistics (in Specifications 1 and 3–5) and z-scores (for the odds ratio in Specification 2) are reported below the coefficients for *Extraversion*. In the interest of brevity, we delegate test statistics for all other variables, and the coefficients for other personality dimensions, to Online Appendix Table IA.14.

FirmChar is as defined as in Equation (2); and ***CFOChar*** is a vector that includes all the CFO characteristics reported in Specification 5 of Table 2, plus the other Big Four personality traits. We expect that the promotion to CEO will depend not only on performance metrics over the prior year, but also over the CFO's entire tenure with the firm prior to the CEO's departure.[25] Accordingly, *CumPerformance* is a vector of cumulative performance measures that includes: the average returns over the CFO's tenure with the firm (*Cumulative Returns*), the average *Percent CFO Text,* and the average *Relative Forecast Error* (as defined

[25] We measure the CFO's tenure with the firm based on the first year the CFO appears in Execucomp for the firm. Limiting the CFO's tenure to only years where the executive held the title of CFO leads to very similar results.

TABLE 7

Extraversion and CFO Promotion to CEO

	[1]	[2]	[3]
Extraversion	1.55***	1.46**	0.71
	(3.10)	(2.64)	(−1.17)
Extraversion ∗ Extraverted CEO			3.01***
			(3.01)
Extraverted CEO			1.30
			(0.65)
Ln (Sales)	0.84	0.91	0.96
Ln (Q)	1.15	1.12	0.81
Lag Fiscal Return	0.92	0.86	0.99
Lag Profitability	0.97	0.98	1.04
Tenure	1.08	1.09	1.21
Exec Age	0.50	0.43*	0.38
Optimism	0.88	0.87	0.72
Emotional Stability	1.02	1.07	1.38
Openness	1.20	1.13	1.17
Agreeableness	0.97	1.02	0.95
Conscientiousness	0.88	0.87	0.70
Cumulative Returns		1.14	1.34
Relative Forecast Error		1.11	1.19*
Guidance Indicator		0.87	0.93
Percent CFO Text		1.12	1.22
Relative Salary		1.80***	2.17***
Observations	1,171	1,171	832
Pseudo R^2	5.34%	6.95%	10.60%
Obs. CFO Promotion = 1	93	93	54
Prob. of CFO Promotion	7.94%	7.94%	6.49%

***, **, * Denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.
This table reports the odds ratios for the following logistic regression:

$$Promotion_{it} = \beta_1 Extraversion_i + \gamma \boldsymbol{FirmChar} + \delta \boldsymbol{Performance} + \omega \boldsymbol{CFOChar} + \zeta \boldsymbol{CumPerformance} + Year_t + FE_i + \varepsilon_{it}.$$

Promotion is an indicator variable equal to 1 if the internal CFO is promoted to CEO following the departure of the CEO. The sample consists of all CEO departures from 2006–2013 for which we have an extraversion score for the CFO before the transition. *Extraversion* is the residual extraversion of the CFOs, as in Specification 4 of Table 2. *Extraverted CEO* is an indicator variable equal to 1 if the departing CEO has an extraversion above the median *Extraversion*. Controls include firm, recent performance, and manager characteristics, as well as the cumulative performance of the firm during the CFO's tenure (definitions in Appendix A). All regressions include industry and year fixed effects, and all independent variables are standardized to have mean 0 and variance 1. Specifications 1–2 examine all promotions, and Specification 3 examines all CFO promotions for the sample where the extraversion score for the departing CEO is available. Standard errors are clustered by firm, and z-scores are reported below the odds ratio for *Extraversion, Extraversion ∗ Extraverted CEO,* and *Extraverted CEO*. In the interest of brevity, we delegate z-scores for all other variables to Online Appendix Table IA.15.

in Hutton and Stocken 2009). Li et al. (2014) argue that *Percent Text* proxies for firm-specific knowledge, and Goodman, Neamtiu, Shroff, and White (2014) find that higher-quality earnings forecasts are associated with better investment decisions. Finally, because compensation may be an effective way of summarizing unobservable performance measures, we also include the average *CFO Pay Slice,* defined as the CFO's compensation scaled by the compensation of the top three executives over the executive's tenure.

Specification 1 of Table 7 reports the odds ratios from a logistic regression prior to including the cumulative performance measures. The results indicate that a one-standard-deviation increase in CFO extraversion is associated with a 55 percent increase in the likelihood of being promoted to CEO (relative to an 8 percent unconditional probability). The inclusion of the cumulative performance measures (Specification 2) reduces the magnitude to 46 percent, but the estimate is still highly significant.

If firms have persistent preferences for extraverted CEOs, then the tendency to promote more extraverted CFOs should be greater when the departing CEO was more extraverted. We test this hypothesis in Specification 3 by interacting *CFO Extraversion* with an indicator variable that equals 1 if the departing CEO has an extraversion score above the median (0

otherwise). Consistent with our conjecture, we find that the relationship between *CFO Extraversion* and promotion to CEO is significantly stronger among firms with a more extraverted outgoing CEO.

V. EXECUTIVE EXTRAVERSION AND FIRM OUTCOMES

The findings from the previous section are consistent with a long literature in psychology, originating with Mann (1959), documenting that people perceive extraverts as superior leaders. While the psychology literature has robustly documented that people perceive extraversion as an important leadership quality, the literature is mixed on whether extraversion is related to performance. For example, Stogdill (1974) and Bentz (1985) show that extraverted leaders receive high ratings of effectiveness from both peers and superiors, whereas recent work by Bendersky and Shah (2013) finds evidence that extraverts underperform expectations.

In an efficient labor market, we would expect optimal matching between managers and firms and, as a result, there may be no observed relation between CEO characteristics and performance (e.g., Custódio et al. 2013). Relatedly, firms may optimize over a wide range of CEO traits, in which case, firms that may benefit from an extraverted CEO could nevertheless hire an introvert who has other valuable traits. However, such firms could expend resources in other ways to synthetically obtain the benefits associated with CEO extraversion (such as increased investments in investor relations, etc.).

On the other hand, if extraverts' incremental pay reflects skills that they are not able to fully extract through salary, then we could observe a positive relation between extraversion and firm performance. However, even in this setting, detecting a relationship between extraversion and performance is challenging. For example, Gabaix and Landier (2008) calibrate a CEO talent model and argue that small, hard to empirically detect effects on firm value can justify economically large differences in compensation. The selection of CEOs is also endogenous. For example, if firms that anticipate poor performance seek out extraverted executives, then this will bias downward the effects of extraversion on performance. With these caveats in mind, in this section, we explore the relationship between extraversion and several firm outcomes.

Changes in Investor Recognition and Performance around CEO Transitions

We begin by examining changes in firm outcomes around CEO transitions. We require that the incoming CEO remains in office for at least two years, and we eliminate transitions that coincide with major corporate restructurings (e.g., spinoffs and mergers) and interim CEOs. Using the resulting sample of 618 CEO transitions, we estimate the following regression:

$$\Delta Y_{it+3,t-1} = \beta_1 \Delta Extraversion_{it+3,t-1} + \beta_2 \Delta \boldsymbol{CEOChar}_{it+3,t-1} + \varepsilon_{it}. \quad (6)$$

Y denotes one of several firm outcome measures, and the dependent variable examines the difference between the average level of Y in the three years after CEO transition (years t+1 to t+3) relative to the value of Y in the year prior to the transition (year t−1; we exclude the year of the transition). Following Perez-Gonzalez (2006), we adjust each firm outcome measure by subtracting the median Y from a control group of firms that are matched by industry and Y. The control group of firms consists of firms in the same Fama-French 12 industry group and the same industry-adjusted quintile ranking of Y in the year prior to the executive transition.

$\Delta Extraversion$ is the difference in the extraversion between the incoming and departing CEOs; and $\Delta \boldsymbol{CEOChar}$ is a vector that includes the changes in all CEO characteristics in Equation (2).[26] If data are unavailable for either the incoming (departing) CEO, then we set the value of their extraversion or other CEO characteristics equal to 0, and we include a missing incoming (departing) CEO indicator for each of the specific missing variables.[27] All variables are defined in Appendix A. Continuous independent variables are standardized to have mean 0 and variance equal to 1, and outcome measures are winsorized at the 1st and 99th percentile. Standard errors are clustered by firm.

Before turning to the firm outcome results, we first confirm that extraverts command a compensation premium when focusing on CEO transitions. Specifically, we estimate Equation (7) with Y set equal to the log of total compensation. In Table 8, Panel A, in a univariate setting in Specification 1, we find that incoming CEOs that have extraversion scores that are one standard deviation higher than the departing CEO receive compensation that is 6.82 percent higher. The result is robust to including controls for (changes in) CEO characteristics in Specification 2, with a coefficient estimate of 6.95 percent.

Extraverts tend to attract social attention (e.g., Ashton et al. 2002), which could lead to greater visibility for the firm. We begin the firm outcome analysis by exploring measures of investor recognition. We consider three broad measures: brokerage analyst attention, media attention, and stock liquidity. Analyst attention is measured using the number of analysts covering the firm (*Analyst Coverage*) and the number of times the firm presents at a broker-hosted investor conference (*Conference*

[26] By focusing on CEO transitions, we examine within-firm variation in firm outcomes (relative to similar firms in its industry) around a short window. We, therefore, exclude firm characteristics such as growth or size from the set of controls, since changes in these variables may endogenously reflect manager ability.

[27] This approach allows us to significantly expand our sample by including observations where we have extraversion scores for only one of the two transitioning CEOs. Excluding these observations results in slightly reduced statistical significance (see Online Appendix Table IA.11).

TABLE 8

CEO Extraversion around Turnovers: Compensation, Investor Recognition, and Firm Performance

Panel A: CEO Compensation

	[1]	[2]
Ind_Adj_Log (*Total Compensation*)	6.82***	6.95***
	(3.11)	(2.83)

Panel B: Investor Recognition

	[1]	[2]
Ind_Adj_Log (*Analyst Coverage*)	5.25***	4.24**
	(3.58)	(2.56)
Ind_Adj_Log (*Conf. Presentations*)	6.16***	5.25**
	(3.28)	(2.45)
Ind_Adj_Log (*Media Articles*)	2.66	5.23
	(0.83)	(1.41)
Ind_Adj_Log (*Media Words*)	19.63*	27.19**
	(1.70)	(2.05)
Ind_Adj_Log (*Share Turnover*)	4.57***	5.12***
	(2.65)	(2.60)
Ind_Adj_Log (*Amihud Illiquidity*)	−14.99***	−15.06***
	(−4.15)	(−3.66)

Panel C: Firm Performance

	[1]	[2]
Ind_Adj_Log (*Sales Growth*)	2.31***	1.68*
	(2.91)	(1.86)
Ind_Adj_Log (*Market Share*)	3.37**	3.24*
	(2.28)	(1.92)
Ind_Adj_Firm Efficiency	0.71	0.74
	(1.40)	(1.34)
Ind_Adj_Profitability (*OCF*)	0.20	0.28
	(0.73)	(0.91)
Ind_Adj_Profit Margin	0.79*	0.68
	(1.67)	(1.28)
Ind_Adj_ROA	0.15	0.10
	(0.57)	(0.33)
Ind_Adj_Log (*Q*)	1.25	1.28
	(1.17)	(1.06)
Ind_Adj_Return	0.85	0.65
	(0.74)	(0.50)

***, **, * Denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.
This table reports estimates from the following panel regressions:

$$\Delta Y_{it+3,t-1} = \beta_1 \Delta Extraversion_{it+3,t-1} + \beta_2 \Delta CEOChar_{it+3,t-1} + \varepsilon_{it}.$$

Y denotes several different variables for firm *i*. The dependent variable is the change in average level in the three years after a CEO transition (years *t*+1 to *t*+3) relative to the level in the year prior to the transition (year *t*−1). *Extraversion* is the residual extraversion of CEOs based on Specification 1 of Table 2. All measures are industry adjusted by subtracting the median *Y* from a control group of firms. The control group consists of firms in the same Fama-French 12 industry group and the same quintile ranking of *Y* in the year prior to the executive transition. Specification 1 includes *Extraversion* alone. Specification 2 includes ***CEOChar***, a vector of manager characteristics that is detailed, along with the dependent variables, in Appendix A. Standard errors are clustered by firm, and t-statistics are reported below each *Extraversion* coefficient.

Presentations) during the calendar year. Media attention is measured using the number of articles (*Media Articles*) and the number of words (*Media Words*) across all articles that mention the firm in the *Wall Street Journal* during the calendar year. Liquidity is measured using share turnover (*Turnover*) and the Amihud (2002) illiquidity ratio (*Amihud Illiquidity*). All investor recognition variables are measured in natural logs.

Panel B of Table 8 presents the results. After controlling for CEO characteristics in Specification 2, we observe that the appointment of a CEO that has an extraversion score that is one standard deviation greater than the departing CEO is associated with a 4.2 percent increase in *Analyst Coverage,* a 5.3 percent increase in *Conference Presentations,* a 5.2 percent increase in *Media Articles,* a 27.2 percent increase in *Media Words,* a 5.1 percent increase in *Turnover,* and a 15.1 percent decline in *Amihud Illiquidity*. With the exception of *Media Articles,* all of the estimates are statistically significant at the 5 percent level. The findings are consistent with the view that the appointment of an extraverted executive is associated with improvements in investor recognition. As discussed earlier, however, the positive association may reflect the endogenous matching of firms and CEOs. For example, firms that are interested in improving investor recognition or anticipate greater attention from analysts or the media may place a greater emphasis on hiring an extraverted CEO. However, this interpretation still suggests that extraverts may be valuable for firms with heightened visibility.

We next examine the relation between extraversion and measures of firm performance around CEO transitions. In particular, we set Y in Equation (6) equal to one of eight different performance measures: sales growth, market share, firm efficiency (as defined in Demerjian et al. [2012]), profit margin, profitability (i.e., scaled OCF), return on assets (ROA), Tobin's Q, and returns. All variables are defined in Appendix A. Panel C of Table 8 reports the performance results. The evidence indicates that firms that replace the departing CEO with a more extraverted incoming CEO experience a marginally significant ($p < 0.10$) increase in sales growth (1.7 percent) and market share (3.2 percent). Extraversion shows a positive relation with the other performance measures, although none of the remaining estimates are statistically significant.

In the Online Appendix (Table IA.8), we conduct mediation analysis to examine the extent to which increased compensation of extraverted executives is explained via improved firm outcomes. We find that two variables are significantly correlated with both extraversion and compensation: *Amihud Illiquidity* and *Conference Presentations*. For the 608 observations with complete data on *Amihud Illiquidity* and *Conference Presentations,* we estimate the extraversion pay premium (i.e., Panel A of Table 8) to be 5.77 percent ($t = 2.33$). However, after controlling for *Amihud Illiquidity* and *Conference Presentations,* the coefficient is reduced to 3.49 percent ($t = 1.42$). The indirect effects include a 1.61 percent increase due to *Amihud Illiquidity* and a 0.67 percent increase due to *Conference Presentations,* both of which are significant at a 5 percent level. These findings suggest that improvements in firm outcomes significantly mediate the compensation premium associated with extraversion.

CEO Extraversion and Departure Returns

The positive association between CEO extraversion and firm outcomes is consistent with extraverted CEOs adding value to their firms. We examine whether the market shares this view by studying the stock price response to CEO departure announcements. We focus on departures since the market is likely better at assessing the contributions of the departing CEO relative to incoming CEOs, about whom relatively less information may be available.

We hand-collect data on CEO departure announcements for all firms in Execucomp during our sample period (2004–2013). Specifically, we focused on the sample of departures in which we can obtain a valid extraversion score for the departing CEO, and we searched company press releases or other news sources (through Factiva) to identify the earliest reported departure dates. We also collected additional information about the circumstances surrounding each succession. We excluded departures that are directly related to major restructurings (e.g., mergers, spinoffs, going private) The final sample includes 736 CEO departures.

We examine the relationship between extraversion and departure returns by estimating the following regression:

$$CAR_{it} = \beta_1 Extraversion_{it} + \beta_2 \boldsymbol{FirmChar}_{it} + \beta_3 \boldsymbol{CEOChar}_{it} + Industry_i + Year_t + \varepsilon_{it}. \quad (7)$$

CAR is the three-day market-adjusted returns of the acquiring firm centered around the departure date. *Extraversion* is the extraversion score of the departing CEO. ***FirmChar*** and ***CEOChar*** are vectors of the firm and CEO characteristics included as controls in Equation (2).

The results are reported in Table 9. For the sample of all departures, a one-standard-deviation increase in extraversion is associated with a −0.27 percent lower announcement return, although the estimate is not statistically significant. We conjecture that extraversion may play a larger role for voluntary departures, and we identify and remove forced departures using the methodology of Parrino (1997). For the sample of 516 voluntary departures, the effect of extraversion on announcement returns increases to more than 60 basis points and becomes statistically significant in Specifications 4 and 5, although *Extraversion* loses significance after including the full set of 18 CEO characteristics as controls in Specification 6. Last, we explore whether the effect of extraversion is stronger when the departure announcement is more likely to covey new information to the market.

TABLE 9

CEO Extraversion and Departure Announcement Returns

	All Departures			Voluntary Departures			Unexpected
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Extraversion	−0.27%	−0.30%	−0.64%	−0.66%**	−0.67%**	−0.41%	−4.04%***
	(−0.87)	(−0.97)	(−1.50)	(−2.38)	(−2.39)	(−1.21)	(−3.39)
Ln (Sales)		1.26%	1.51%		0.21%	0.20%	
Ln (Assets)		−1.08%	−1.05%		0.04%	−0.03%	
Ln (Q)		−0.43%	−0.39%		−0.22%	−0.23%	
Ln (Vol)		−0.30%	0.12%		0.20%	0.33%	
Ln (Age)		−0.47%	−0.59%		−0.23%	−0.44%	
Lag Fiscal Return		−0.13%	−0.13%		−0.22%	−0.25%	
Log (CEO Tenure)			−0.20%			0.14%	
Log (CEO Age)			0.89%**			0.71%	
Male			−0.51%			−3.74%*	
Founder			−0.84%			−0.73%	
Chair			−0.87%			0.17%	
GAI			0.16%			−0.13%	
Rolodex			−0.37%			0.11%	
Percent CEO Text			0.07%			−0.34%	
Optimism			0.26%			−0.06%	
Overconfidence			−0.34%			−0.22%	
MBA			−1.06%			−0.73%	
Doctorate			2.29%*			2.42%	
Ivy League			0.44%			0.60%	
GradHonors			−0.65%			−1.94%**	
Emotional Stability			1.16%**			0.15%	
Openness			0.01%			−0.01%	
Agreeableness			−0.61%			−0.53%	
Conscientiousness			0.30%			0.64%	
Observations	736	736	736	516	516	516	14
R^2	2.95%	3.64%	7.46%	5.13%	5.55%	9.30%	21.26%

***, **, * Denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.
This table reports the estimates from the following regression:

$$CAR_{it} = \beta_1 Extraversion_{it} + \beta_2 \boldsymbol{FirmChar}_{it} + \beta_3 \boldsymbol{CEOChar}_{it} + IND_i + Year_t + \varepsilon_{it}.$$

CAR is the three-day market-adjusted return around the announcement of a CEO departure for firm *i;* and *Extraversion* is the extraversion score of the departing CEO. ***FirmChar*** and ***CEOChar*** are vectors for the firm and CEO characteristics controls, as described in Appendix A. All independent variables are standardized to have mean 0 and variance 1, and Specifications 1–6 include industry and year fixed effects. Specifications 1–3 examine all departures, 4–6 focus on voluntary departures, and 7 examines unexpected departures, as defined in Section V. Standard errors are clustered by firm, and t-statistics are reported below each *Extraversion* coefficient. In the interest of brevity, we delegate t-statistics for all other variables to Online Appendix Table IA.16.

We identify 14 "unexpected" CEO departures, including three sudden deaths (as defined in Nguyen and Nielsen [2014]), and 11 other departures that are explicitly described in the press release as "unexpected," "unanticipated," or "surprising." In a univariate setting, we find that unexpected departures of more extraverted CEOs are associated with significantly lower announcement returns.[28]

Acquisition Announcement Returns

In our final tests, we examine whether the market reaction to investment decisions varies with CEO extraversion. One area in which extraverts may be particularly valuable is mergers and acquisitions (M&A). For example, Sitkin and Pablo (2005)

[28] Due to the small sample size, we are not able to determine whether this effect is robust to the inclusion of all other controls. However, in unreported analyses, we find that the coefficient on extraversion remains significant after including any single firm or CEO characteristic.

note that M&A can act as a "revealing litmus test that highlights the quality of leadership," and Waldman and Javidan (2009) argue that charismatic leadership qualities are particularly important during post-merger integrations.

We collect M&A data from the Thomson Financial SDC Platinum database. Following Custódio and Metzger (2013), we include only transactions in which control is transferred, and we require that the transaction value of the merger is at least $50M. The final sample includes 1,503 acquisitions. We examine the relation between extraversion and announcement returns by estimating the following regression:

$$CAR_{it} = \beta_1 Extraversion_{it+3,t-1} + \beta_2 \boldsymbol{DealChar}_{it} + \beta_3 \boldsymbol{FirmChar}_{it} + \beta_4 \boldsymbol{CEOChar}_{it} + Industry_i + Year_t + \varepsilon_{it}. \quad (8)$$

CAR is the three-day market-adjusted returns of the acquiring firm centered around the announcement date of the acquisition. *Extraversion* is the extraversion score of the CEO of the acquiring firm. ***DealChar*** is a vector of deal characteristics that are known to influence announcement returns, and ***FirmChar*** and ***CEOChar*** are vectors of the firm and CEO characteristics included as controls in Equation (2) (details are in Appendix A).

Table 10 reports the results. In a univariate setting (with industry and year fixed effects), a one-standard-deviation increase in extraversion is associated with a 0.26 percent increase in three-day CARs around the acquisitions, although the estimate is not statistically significant. Controlling for deal, firm, and CEO characteristics increases the estimate to a statistically significant 0.45 percent. The evidence supports the view that extraverted CEOs add value in the M&A process.[29]

Overall, while the analysis of CEO extraversion on firm outcomes is subject to important caveats, two main findings emerge. First, we find no evidence to suggest that extraverts are associated with worse firm outcomes, which helps rule out that extraverts charismatically attract board attention, but subsequently deliver disappointing performance (e.g., Khurana 2002; Malmendier and Tate 2009). In contrast, we do find evidence that extraverted CEOs are associated with superior firm outcomes in some facets of the job, including improvements in investor recognition and acquisitions that are better received by the market. The negative announcement response to voluntary departures of extraverted CEOs corroborates this view. While the positive associations do not necessarily imply a causal relation, they do point toward possible channels that may help explain the extraversion pay premium.

VI. CONCLUSION

Relatively little is known about which executive traits are viewed as important to boards in their hiring of top executives. We explore the role of an important individual characteristic, personality extraversion, on career outcomes. We use linguistic algorithms to measure executive extraversion based on speech patterns during conference calls.

We find compelling evidence that executive extraversion is associated with improved career outcomes. After controlling for firm characteristics, as well as including controls for manager education and experience, we find that extraverted CEOs receive 4.56–6.48 percent higher compensation. Extraversion also affects career trajectory. Extraverted CEOs are less likely to experience job turnover, serve on more outside boards, and hold directorships at larger firms, and extraverted CFOs are more likely to be promoted to CEO.

Collectively, our findings highlight convincing salary and other labor market benefits to extraversion. Although we control for a host of managerial education and experience variables in our analysis, it is not possible to control for all potentially relevant intermediate effects. Thus, a cautious interpretation of the observed relation between extraversion and executive labor market outcomes is that it reflects the direct effect of extraversion, as well as any indirect effects of earlier, unobserved experiences or successes. Nevertheless, our analysis makes an important step forward in understanding which managerial traits are associated with career success.

We also examine the implications of CEO extraversion on firm outcomes. Focusing on manager transitions, we find that hiring an extraverted CEO is associated with improvements in investor recognition, sales growth, and firm efficiency. Extraverted CEOs are also associated with higher acquisition returns. While the positive associations between extraversion and firm outcomes do not necessarily imply a causal relation, the findings point toward possible channels that may help explain the extraversion pay premium, thereby providing support for a rational market-based explanation for the improved labor market outcomes of extraverted CEOs.

[29] This finding points to the possibility that extraverted executives may also be more likely to make an acquisition. In Table IA.10 in the Online Appendix, we find evidence that extraverted executives are significantly more likely to engage in M&A activity.

TABLE 10

CEO Extraversion and M&A Announcement Returns

	[1]	[2]	[3]
Extraversion	0.26	0.36**	0.45**
	(1.58)	(2.22)	(2.17)
Tender		1.50**	1.46**
Equity Finance		−2.14**	−2.26**
Mixed Finance		−0.83	−0.74
Public Target		−2.47***	−2.45***
Private Target		−0.83**	−0.82**
Ln (Sales)		−0.35	−0.11
Ln (Assets)		−0.25	−0.16
Ln (Q)		−0.25	−0.18
Ln (Vol)		0.11	0.10
Ln (Age)		0.04	(0.02)
Lag Fiscal Return		−0.18	−0.20
Log (CEO Tenure)			0.32*
Log (CEO Age)			−0.13
Male			1.06
Founder			0.19
Chair			−0.26
GAI			0.03
Rolodex			−0.27
Percent CEO Text			0.21
Optimism			−0.27
Overconfidence			0.21
MBA			−0.01
Doctorate			−0.26
Ivy League			−0.08
GradHonors			−0.12
Emotional Stability			−0.06
Openness			0.35
Agreeableness			−0.31
Conscientiousness			−0.27
R^2	3.84%	8.63%	10.23%

***, **, * Denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.
This table reports estimates from the following panel regression:

$$CAR_{it} = \beta_1 Extraversion_{it} + \beta_2 \boldsymbol{DealChar}_{it} + \beta_3 \boldsymbol{FirmChar}_{it} + \beta_4 \boldsymbol{CEOChar}_{it} + IND_i + Year_t + \varepsilon_{it}.$$

CAR_{it} is the three-day cumulative abnormal (market-adjusted) return for acquiring firm i centered at the announcement date t of the acquisition. *Extraversion* is the extraversion score of the CEO of the acquiring firm. ***DealChar*** is a vector of deal characteristics that are known to influence announcement returns. ***FirmChar*** and ***CEOChar*** are the vectors of the firm and CEO characteristics included as controls in Equation 3 (and described in Appendix A). All specifications include industry and year fixed effects. All independent variables are standardized to have mean 0 and variance equal to 1. Standard errors are clustered by firm, and t-statistics are reported below each *Extraversion* coefficient. In the interest of brevity, we delegate t-statistics for all other variables to Online Appendix Table IA.17.

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APPENDIX A

Variable Definitions

Measures of Executive Extraversion

- *Call Extraversion* = the extraversion score of an executive based on his or her speech during the question-and-answer (Q&A) portion of a conference call. For each call, the extraversion score is computed using the average of four linguistic algorithms described in Section IA.1 of the Online Appendix. The extraversion score for each linguistic algorithm is winsorized at the 1st and 99th percentile (Source: Thomson Reuters and Seeking Alpha).
- *Aggregate Extraversion* = a weighted average measure of *Call Extraversion,* where each call is weighted by the number of words spoken in the Q&A portion of the call by the executive.
- *Extraversion* = the weighted average residuals from the following panel regression:

$$\begin{aligned} \textit{Call Extraversion} = {} & \beta_1 Ret_{it-63,t-2} + \beta_2 Ret_{it-1,t+1} + \beta_3 Ret_{it+2,t+63} + \beta_4 \textit{Earnings Call} + \beta_5 MBE + \beta_6 \textit{Surprise} \\ & + \beta_7 Loss + Qtr + \varepsilon. \end{aligned}$$

  The regression is estimated separately for CEOs and CFOs (i.e., Specifications 1 and 4 of Table 2). The residuals from each conference call are weighted by the number of words spoken by the executive during the question-and-answer portion of the conference calls. Executives who speak on fewer than three conference calls are dropped from the sample.

Dependent Variables

- *Total Comp* = total compensation over the fiscal year, comprised of the following components: salary, bonus, total value of restricted stock granted, total value of stock options granted (estimated using Black-Scholes), long-term incentive payouts, and other compensation (i.e., TDC1) (Source: Execucomp).
- *Cash Comp* = salary + bonus (Source: Execucomp).
- *Equity Comp* = *Total Comp* − *Cash Comp* (Source: Execucomp).
- *First Age* = the age at which the executive was first appointed to CEO of an Execucomp firm, estimated using the *Became CEO* variable (Source: Execucomp).
- *Tenure* = the number of years the executive has held the same position at the firm (Source: Execucomp).
- *Turnover* = an indicator variable equal to 1 if the executive is replaced in a year, and 0 otherwise (Source: Execucomp).
- *Promotion* = an indicator variable equal to 1 if the internal CFO was promoted to CEO following the departure of the CEO (Source: Execucomp).
- *Directorships* = the number of outside directorships held by the executive during the calendar year (Source: ISS/RiskMetrics).
- *Directorship Size* = the size of the executive's largest outside directorship. Size is measured using either sales, total assets, or market equity (Source: ISS/RiskMetrics).
- *Amihud Illiquidity* = the ratio of the daily absolute stock return daily trading volume, averaged across all trading days in the calendar year (Source: CRSP).
- *Share Turnover* = the average daily share turnover (i.e., share volume scaled by shares outstanding) over the calendar year (Source: CRSP).
- *Analyst Coverage* = the total number of unique analysts covering a firm (i.e., issuing earnings forecasts) during the calendar year (Source: I/B/E/S).
- *Conf. Presentations* = the total number of broker-hosted investor conferences attended by the firm (Source: Bloomberg).
- *Media Articles* = the total number of media articles in the *Wall Street Journal* that mention the firm during the calendar year (Source: Factiva).
- *Media Words* = the total number of words across all *Wall Street Journal* articles that mention the firm during the calendar year (Source: Factiva).
- *Profit Margin* = net income divided by sales, winsorized at the 1st and 99th percentile (Source: Compustat).
  - *Ind_Adj_Profit Margin* = *Profit Margin* less the median *Profit Margin* of a control group of firms that are in the same Fama and French (1997) 12 industry classification and are in the same *Profit Margin* quintile in the year prior to the executive transition.
- *Operating Cash Flow* (*Prof*) = Annual cash flows from operations scaled by assets as of the end of the prior fiscal year, winsorized at the 1st and 99th percentile (Source: Compustat).

- *Ind_Adj_Prof* = *Prof* less the median *Prof* of a control group of firms that are in the same Fama and French (1997) 12 industry classification and are in the same *Prof* quintile in the year prior to the executive transition.

- *ROA* = earnings before interest, taxes, depreciation, and amortization (EBITDA) scaled by assets as of the end of the prior fiscal year, winsorized at the 1st and 99th percentile (Source: Compustat).
  - *Ind_Adj_ROA* = *ROA* less the median *ROA* of a control group of firms that are in the same Fama and French (1997) 12 industry classification and are in the same *ROA* quintile in the year prior to the executive transition.
- *Q* = (total assets + market value of equity − book value of equity)/total assets. We drop negative values and winsorize at the 99th percentile (Source: Compustat).
  - *Ind_Adj_Q* = *Q* less the median *Q* of a control group of firms that are in the same Fama and French (1997) 12 industry classification and are in the same *Q* quintile in the year prior to the executive transition.
- *Market Share* = the percentage of revenues earned by the firm within its Fama and French (1997) 49 industry classification (Source: Compustat).
  - *Ind_Adj_Market Share* = *Market Share* less the median *Market Share* of a control group of firms that are in the same Fama and French (1997) 12 industry classification and are in the same *Market Share* quintile in the year prior to the executive transition.
- *Firm Efficiency* = a measure of how efficient a firm is in generating revenue for a given set of inputs, as described in greater detail in Demerjian et al. (2012) (Source: http://faculty.washington.edu/pdemerj/data.html).
  - *Ind_Adj_Firm Efficiency* = *Firm Efficiency* less the median *Firm Efficiency* of a control group of firms that are in the same Fama and French (1997) 12 industry classification and are in the same Firm Efficiency quintile in the year prior to the executive transition.

Partitioning Variables

- *External Hire* = an indicator variable equal to 1 if the incoming CEO was hired from another firm.
- *Internal Hire* = an indicator variable equal to 1 if the incoming CEO was hired from within the same firm.
- *Voluntary Departure* = an indicator variable equal to 1 if the CEO departure was voluntary, as defined in Parrino (1997). Specifically:
  - If a news article reports that the CEO is fired, forced from the position, or departs due to unspecified policy difference, then *Voluntary Departure* = 0.
  - If the departing CEO is under 60 and the departure is not explicitly attributed to death, poor health, or accepting another position, then *Voluntary Departure* = 0.
  - If the departing CEO is under 60 and the article reports that the CEO is retiring, but does not announce the retirement at least six months before the succession, then *Voluntary Departure* = 0.
  - All other cases are classified as voluntary (i.e., *Voluntary Departure* = 1).
- *Unexpected Departure* = departures due to sudden deaths, defined as either heart attacks, strokes, accidents, or any death of natural causes described as "sudden" or "unexpected." The sample also includes departures that are described in new articles as "sudden," "unexpected," or "surprising."

Control Variables

- *Return* = the return on the stock less the value-weighted market return (Source: CRSP).
  - $FRet_t$ = the *Return* over fiscal year *t*.
  - Ret_t = the *Return* over calendar year *t*.
- *Earnings Call* = an indicator variable equal to 1 if the conference call occurred around the four-day window [−1,2] around the earnings announcement (day 0).
- *Meet-or-Beat* = an indicator variable equal to 1 if earnings meet or beat the consensus analyst forecast for the most recent quarter. This variable is set to 0 for all conference calls that are not earnings calls (Source: I/B/E/S).
- *Surprise* = the most recent earnings surprise, measured as the difference between quarterly EPS and the mean consensus analyst forecast scaled by the stock price at the beginning of the quarter. This variable is winsorized at the 1st and 99th percentile and set to 0 for all conference calls that are not earnings calls (Source: I/B/E/S).
- *Loss* = an indicator variable equal to 1 for firms reporting negative earnings in the most recent quarter. This variable is set to 0 for all conference calls that are not earnings calls (Source: I/B/E/S).
- *Exec Age* = the age of the executive (Source: Execucomp).
- *Male* = an indicator variable equal to 1 if the executive is a male (Source: Execucomp).

- *Optimism* = the total number of positive words spoken by an executive during the Q&A section of the conference call scaled by the sum of the total number of both positive and negative words [i.e., Positive Words/(Positive + Negative Words)]. The list of the positive and negative words is taken from the Loughran and McDonald (2011) dictionary.
- *Overconfidence* = a measure of an executive's tendency to hold in-the-money stock options, as defined in Campbell, Gallmeyer, Johnson, Rutherford, and Stanley (2011) (Source: Execucomp).
- *Founder* = an indicator variable equal to 1 if the year the current executive first became CEO (as reported in Execucomp) is within one year of when the firm went public (as reported in CRSP).
- *General Ability Index* (*GAI*) = a measure of general managerial ability as defined in Custódio et al. (2013). Specifically, $GAI = 0.268X_1 + 0.312X_2 + 0.309X_3 + 0.218X_4 + 0.153X_5$, where:
  - X_1 = number of different positions that a CEO performed during his career.
  - X_2 = number of firms where a CEO worked.
  - X_3 = number of industries at the four-digit SIC level where a CEO worked.
  - X_4 = an indicator variable equal to 1 if a CEO held a CEO position at another firm.
  - X_5 = an indicator variable equal to 1 if the CEO worked for a multi-division firm (Source: BoardEx).
- *Rolodex* = the sum of other external executives or directors related to the CEO through past professional connections, social connections, and past universities attended, as defined in Engelberg et al. (2013) (Source: BoardEx).
- *MBA* = an indicator variable equal to 1 if the executive has an M.B.A. (Source: BoardEx).
- *Doctorate* = an indicator variable equal to 1 if the executive has a Ph.D. (Source: BoardEx).
- *GradHonors* = an indicator variable equal to 1 if the an executive graduated with distinction, honors, *summa cum laude, magna cum laude,* or *cum laude* for any degree (Source: BoardEx).
- *Ivy League* = an indicator variable equal to 1 if the executive graduated from an Ivy League university for any degree (Source: BoardEx).
- *Percent CEO Text* = the ratio of the number of words spoken by the CEO during the conference call to the number of words spoken by all company executives during the conference call.
- *Sales* = total sales (Source: Compustat).
- *Vol* = the standard deviation of daily returns over the past 60 months (Source: CRSP).
- *Firm Age* = the total number of months since the firm first appeared in CRSP.
- *Emotional Stability* (*Emo_Stab*) = the weighted average call-level measure of emotional stability. The calls are weighted by the number of words spoken by the executive during the Q&A portion of the conference call. The call-level measure is computed using the average of four linguistic algorithms described in the Online Appendix. The extraversion score for each linguistic algorithm is winsorized at the 1st and 99th percentile (Source: Thomson Reuters and Seeking Alpha).
- *Openness* (*Open*) = the weighted average call-level measure of openness. The calls are weighted by the number of words spoken by the executive during the Q&A the conference call. The call-level measure is computed using the average of four linguistic algorithms described in the Online Appendix. The extraversion score for each linguistic algorithm is winsorized at the 1st and 99th percentile (Source: Thomson Reuters and Seeking Alpha).
- *Agreeableness* (*Agree*) = the weighted average call-level measure of agreeableness. The calls are weighted by the number of words spoken by the executive during the Q&A portion of the conference call. The call-level measure is computed using the average of four linguistic algorithms described in the Online Appendix. The extraversion score for each linguistic algorithm is winsorized at the 1st and 99th percentile (Source: Thomson Reuters and Seeking Alpha).
- *Conscientiousness* (*Consc*) = the weighted average call-level measure of conscientiousness. The calls are weighted by the number of words spoken by the executive during the Q&A portion of the conference call. The call-level measure is computed using the average of four linguistic models described in the Online Appendix. The extraversion score for each linguistic algorithm is winsorized at the 1st and 99th percentile (Source: Thomson Reuters and Seeking Alpha).
- *CFO Pay Slice* = the total compensation of the CFO scaled by the total compensation of the three highest paid executives at the firm (Source: Execucomp).
- *Assets* = total assets (Source: Compustat).
- *R&D/Assets* = research and development expenses scaled by assets at the end of the prior year, winsorized at the 99th percentile. We set missing values of R&D to 0 and include an indicator variable that equals 1 where there is a missing value, and 0 otherwise (Source: Compustat).
- *Cumulative Returns* = the average annual return over the executive's entire tenure with the firm.
- *Relative Forecast Error* = the absolute forecast error of the management forecast relative to the absolute forecast error of the prevailing consensus analyst forecast. Absolute forecast errors are computed as the absolute difference between realized earnings and forecasted earnings, scaled by price at the end of the prior quarter.
- *Guidance Indicator* = an indicator variable equal to 1 if the executive ever issued earnings guidance.
- *Tender* = an indicator variable equal to 1 for tender offer acquisitions.

- *Equity Finance* = an indicator equal to 1 if the merger is 100 percent paid with equity.
- *Mixed Finance* = an indicator equal to 1 if the merger is financed with a mix of cash and equity.
- *Cash Finance* = an indicator equal to 1 if the merger is 100 percent paid with cash.
- *Public Target* = an indicator equal to 1 if the target is a public company.
- *Private Target* = an indicator equal to 1 if the target is a private company.
- *Subsidiary* = an indicator equal to 1 if the target is a subsidiary of the company.

APPENDIX B

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