CEO Extraversion and Expected Cost of Capital

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Abstract

This paper examines whether extraversion, one of the most important personality traits, exhibited by firm's CEO affects firm's expected cost of capital. Using a measure of CEO Extraversion based on CEOs' speech patterns during conference calls, we find a strong positive association between CEO Extraversion and firm's expected cost of capital. In addition, we find that extraverted CEOs are more prone to risk-taking and have more organizational human capital. Subsample analyses suggests that CEO's risk-taking behavior and organizational capital explain a large portion of the documented positive association between Extraversion and cost of capital. These results are not driven by reverse causality, entrenchment of extraverted CEOs, or analyst optimism. Firms with extraverted CEOs also exhibit lower valuations and higher realized returns during our sample period.

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Introduction

Traditional finance theory often assumes that CEO ability has important implications for corporate outcomes. More recently, a growing body of empirical research examines how CEO's personality traits affect corporate policies and outcomes. Most notably, burgeoning literature examines the impact of CEO overconfidence and related over-optimism and finds that such CEOs implement inefficient investment policies (Malmendier and Tate, 2005); carry out lower quality acquisitions (Malmendier and Tate, 2008); and raise the risk of security class action lawsuits (Banerjee, Humphery-Jenner, Nanda, and Tham, 2017); but they also invest more in innovation and achieve higher innovation success (Hirshleifer, Low, and Teoh, 2012); and exert greater effort and commitment (Gervais, Heaton, and Odean, 2011). Other personality traits have received less attention.

One important personality trait that has not yet been widely studied in finance is extraversion. Extraversion is one of the Big Five personality traits.[1] In their review of the extraversion literature, Wilt and Revelle (2017) conclude that extraversion reflects the likelihood that people display positive affect, assertive behavior, decisive thinking, and desires for social engagement and attention.[2] Our focus on extraversion is motivated by two reasons. First, extraversion is often described as the single most important aspect of personality (Cain, 2012). Second, of the Big Five personality traits, extraversion is the strongest and most consistent

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[1] The Big Five model is standard personality model in psychology literature and it includes the following traits: 1) extraversion, 2) emotional stability, 3) agreeableness, 4) conscientiousness, and 5) openness to experience (Norman, 1963; Digman, 1990; Goldberg, 1990; Costa and McCrae, 1992, 2008; John and Srivastava, 1999).

[2] Similarly, Barrick and Mount (1991) and John and Srivastava (1999) state that extraversion is most usually related to being sociable, assertive, talkative, energetic, decisive, and gregarious.

predictor of leadership (Judge, Bono, Ilies, and Gerhardt, 2002; Bono and Judge, 2004). In this paper we examine how CEO Extraversion affects firm cost of capital.

The relation between CEO extraversion and expected cost of capital is ex-ante ambiguous. On the one hand, we expect that extraverted CEOs' desire for social engagement and attention would make them more likely to interact with firm stakeholders and increase the visibility of their firms. For example, we would expect extraverted CEOs to participate in earnings calls more frequently, to talk more during those calls, to hold more investor relations events, and to appear in media more frequently than their less extraverted counterparts. These activities by the extraverted CEO would improve the information environment of the firm, and consequently lead to higher analyst following and a larger investor base.[3] In a seminal paper, Merton (1987) shows that increase in investor awareness and investor base leads to more efficient risk sharing and reduces the cost of equity for the firm. Hence, we would expect that CEO Extraversion would be negatively related to firm's cost of capital.

On the other hand, we expect extraverted CEOs to be more prone to risk-taking. For example, Nicholson, Soane, Fenton-O'Creevy, and Willman (2005) examine risk-taking propensity across six domains and find that overall risk-taking propensity is strongly positively related with Extraversion. In the domain of financial decision making, Malhotra, Reus, Zhu, and Roelofsen (2017) show that CEOs' extraversion has positive influence on the merger and acquisition (M&A) behavior of firms. Given that M&As are considered risky investments, their evidence can be interpreted as supportive of the relation between extraversion and risk taking.

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[3] Extant literature relates analyst following to the quality of firm's disclosure and information environment (Lang and Lundholm, 1996; Healy, Hutton, and Palepu, 1999; Botosan and Harris, 2000; and Barth, Kasznik, and McNichols, 2001). The increase in investor base could follow either because of the impact of analyst coverage (Mola, Rau, and Khorana, 2012) or because investors with limited attention tend to buy stocks that are in the news (Barber and Odean, 2007).

Moreover, Eisfeldt and Papanikolau (2013) show that firms more invested in organizational capital are riskier because their stakeholders must share larger proportion of firm's cash-flows with the key talent (organizational capital). This risk is especially pronounced when key talent has more outside opportunities and results in higher cost of capital for the firm. We expect that firms with extraverted CEOs would be more exposed to organizational capital risk for two reasons. First, given that extraverted CEOs have larger professional networks (Malhotra et al., 2017), they may have more outside opportunities. Second, evidence shows that through their social dispositions, extroverts can create a more positive social environment around them (Eaton and Funder, 2003); that extraverts are skilled in achieving social connections with others to influence and persuade them to pursue collective goals (Depue and Collins, 1999; Morrone-Strupinsky and Depue, 2004); and that they are able to inspire others by conveying an optimistic vision and displaying enthusiasm in vision achievement (Watson and Clark, 1997). Hence, we expect that other employees may be less motivated to stay and achieve common goals if the extraverted CEO departs. Both, risk-taking and organizational capital channels suggest that CEO Extraversion should be positively related to firm's cost of capital. Overall, because there are both potential positive and negative consequences of CEO extraversion on firm's cost of equity capital, we test the null hypothesis of no association between CEO Extraversion and firm's cost of equity capital.

Our first objective is to empirically examine how cost of equity varies with CEO Extraversion. To that purpose, we use unscripted conference call transcripts and a novel linguistic technique to compute Extraversion and the other four personality scores for 2,333 CEOs of S&P 1500 firms over a ten-year period from 2004 to 2013. The Extraversion personality scoring linguistic technique was introduced by Mairesse, Walker, Mehl, and Moore (2007). The key linguistic features used to measure Extraversion include word count, word repetition, concreteness,

and references to family and friends. Mairesse et al. (2007) validate the measure by comparing the Big Five personality dimensions obtained using linguistic technique to those obtained from self-intake personality questionnaires and independent observers. Two recent papers use this technique to obtain CEO Extraversion and find that extraverted CEOs are more likely to engage in M&A activities (Malhotra et al. 2017) and obtain higher compensation (Green, Jame, and Lock, 2017).

Our key dependent variable is the expected cost of equity capital. Following recent literature, we use implied cost of capital to measure the expected cost of equity capital (Pastor, Sinha, and Swaminathan, 2008; Chava and Purnanandam, 2010). Implied cost of equity capital is the internal rate of return that equates firm's stock price to the present value of the expected future cash flows. Implied cost of capital is based on sound theoretical foundation of discounted future cash-flows and does not rely on either a specific asset pricing model or noisy realized returns (Richardson, Tuna, and Wysocki, 2010).[4] These features make it an appealing proxy for the expected firm cost of capital. Following prior literature, we construct our measures of implied cost of capital using both, analyst's earnings forecasts and cross-sectional models of expected earnings (Gebhardt, Lee, and Swaminathan, 2001, Easton 2004, Gordon and Gordon 1997, Hou, van Dijk, and Zhang, 2012).

Using panel regressions with firm and year fixed effects, we find that CEO Extraversion is significantly positively related to firm's cost of equity capital. Specifically, one standard deviation increase in Extraversion increases expected cost of equity capital by 0.3% per year. Given the average expected equity risk premium is between 3.33% and 5.21%, our findings imply that one standard deviation increase in CEO extraversion is associated with almost a 5-10% increase in the equity risk premium paid.

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[4] Elton (1999) shows that in small samples realized returns are very noisy proxy for expected returns. This noise may disguise the relation between realized returns and risk.

Having documented a positive relation between CEO Extraversion and implied cost of equity capital, our second objective is to explore the channels through which CEO Extraversion affects the implied cost of equity capital. We start with the risk-taking channel. We use pilot license applications as a measure of CEOs risk-taking behavior in the personal domain (Cain and McKeon, 2016); and ROA volatility (*ROAVOL)* as a direct measure of a CEO's influence on firm riskiness.[5] Our findings show that CEO Extraversion positively predicts both, propensity to obtain a pilot license and ROA Volatility. Further analyses on the subsamples of firms based on ROA Volatility and possession of pilot license suggest that CEOs risk-taking behavior is an important but not the only driver of the observed positive relation between CEO extraversion and firm cost of capital.

Next, we examine the organizational capital channel. Motivated by Eisfeldt and Papanikolaou (2013) finding that firms with high organizational capital display higher levels of executive compensation, we use CEO compensation measures. We find that Extraversion is positively related to CEO's total compensation (consistent with Green et al., 2016) and relative compensation (i.e. CEO pay slice of Bebchuk, Cremers and Peyer, 2011). More importantly, we find that extraversion is positively related to cost of capital in subsamples of firms divided by CEO relative compensation, but the magnitude of the CEO Extraversion coefficient is much higher in the high-relative compensation subsample. To the extent that CEO relative compensation is a good measure of CEOs organizational capital, our finding is consistent with the idea that CEO's organizational capital is an important driver of the documented positive relation between CEO extraversion and firm cost of capital.

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[5] We also report some of our results for market-based risk measures, total and idiosyncratic volatility, but our focus is on ROAVOL because CEO has a more direct impact on it. Results using alternative risk measures are qualitatively similar.

There are several alterative interpretations of our documented positive relation between CEO Extraversion and implied cost of capital. For example, it is possible that positive relation between CEO Extraversion and cost of capital results because extraverted CEOs for example, select to work for firms that undertake riskier projects, as these types of firms are better match for their extraverted personality. We perform two tests to deal with this reverse causality problem. First, we repeat our tests using only firm-year observations for which existing CEO has been in the position for over three years. We find that positive relation between CEO extraversion and cost of capital is even stronger for this subsample than for the full sample, indicating that it is unlikely that Extraverted CEOs simply join riskier firms. Second, we use propensity score matching to select a control group of firms to match with our treatment group of firms with extraverted CEOs. We match firms on operating risk, size, book-to-market ratio, and age. We find that firms with extraverted CEOs continue to have significantly higher cost of capital than the matched sample firms.

Another alternative interpretation is that extraverted CEOs could be more entrenched. Malhotra et al. (2017) show that extraverted CEOs have larger networks and sit on more boards. Given their sociability, it is possible that they have 'friendlier' relationships with their own board members. Our compensation results are consistent with this interpretation. We perform several tests to examine this alternative interpretation. First, we examine subsequent operating performance of firms conditional on CEO extraversion, and find that firms with extraverted CEOs actually have better operating performance than firms with introverted CEOs during the sample period. Second, we divide firms into subsamples based on strength of corporate governance and find that CEO extraversion is positively related to implied cost of capital in the subsample of firms

with strong governance. Results from these analyses do not support the entrenchment interpretation.

Finally, we perform a set of robustness tests. We report the CEO Extraversion – implied cost of capital analysis using individual measures of implied cost of capital. In addition, we use subsequent realized performance instead of implied cost of capital and find that firms with extraverted CEOs outperform firms with introverted CEOs by approximately 3% per year.

Our findings contribute to the following streams of literature. First, we contribute to the literature on the impact of extraversion, an important personality trait related to leadership, on CEO and corporate outcomes. To our knowledge, there are only three other studies that examine how extraversion affects outcomes in financial arena. Malhotra et al. (2017) document that CEO extraversion is positively related to propensity for acquisitions. Green et al. (2016) find that CEO extraversion is positively related to their pay and overall career outcomes. Finally, Gow, Kaplan, Larcker, and Zakolyukina (2015) find that CEO Extraversion impacts organizational strategy choices, investment and financial policy, and firm performance. We contribute to the literature by showing that CEO extraversion impacts cost of equity capital that firms pay and consequently firm valuation.

Second, we contribute to the growing literature on the impact of personality traits on corporate policies and outcomes. For example, Graham, Harvey, and Puri (2013), Hirshleifer, Low, and Teoh (2012) and Malmendier and Tate (2005, 2008) find that CEOs' optimism and overconfidence affects their decision making and corporate investment policies. We extend this literature to show that CEO extraversion is another important personality trait that affects corporate policies and outcomes. Our results indicate that CEO extraversion is distinct from overconfidence and in some instances subsumes the effects of overconfidence.

Third, we contribute to the literature on determinants of firm cost of capital. While traditional literature relied on standard firm characteristics, such as measures of risk, measures of the quality of information environment, firm size, leverage, and book-to-market ratio, recent research documents a role for CEO attributes, such as ability (Mishra, 2014) and compensation (Chen, Huang, and Wei, 2013). We complement this literature by showing that extent of CEO extraversion is strongly related to a firm's expected cost of capital. The effect is economically significant and robust to controls for standard measures of risk.

II. Data, Sample, and Measures

We study a large, unbalanced panel of firms for a period from 2004 to 2013. Our data comes from several sources. We use Execucomp database to identify CEOs of S&P 1500 companies. We collect CEO age, start date in the position, gender, and compensation information from Execucomp. We use BoardEx to find the number of directorships held by the CEO and collect information about CEOs education, past professional and social connections, and previous professional experiences. We then obtain the conference call transcripts from Thomson Street Events, for all quarterly earnings announcements of these firms. This procedure results in 76,815 conference call transcripts.

Number of analysts, analyst earnings forecasts, long-term growth rate forecast, dispersion of earnings forecasts and actuals come from I/B/E/S summary and actuals files. Stock price, volume, and number of shares outstanding come from CRSP daily and monthly tapes. Using CRSP share code, we limit our sample to common stocks (those with share codes of 10 or 11 in CRSP). We obtain annual accounting information, including SIC codes, book value of equity, total assets, net income, dividends, long-term debt, fiscal-year-end number of shares outstanding, fiscal-year-

end stock prices, and income before extraordinary items from COMPUSTAT annual file. We collected pilot-CEO information from the Federal Aviation Administration's Airmen Certification database.[6] Finally, we obtain the risk-free rate, Fama and French (1993) factors, and the momentum factor from Kenneth French's website.[7] After merging all data sources we are left with 10,084 firm-year observations for 1,579 firms and 2,333 unique CEOs.

A. Measuring Extraversion

Various studies in psychology and computational linguistics have identified personality markers in language. For example, a study by Gill and Oberlander (2002) finds that extraverts use more words, have reduced concreteness, use fewer numbers, have a more informal style, use less self-referents, have a tendency for positive affect words, use "be", "will be", "I'll be" and "I will be" rather than "should be", are more outspoken about their ability and use "want", "need", or "able to", rather than "trying to" or "going to" which are used more by introverts. Other studies report similar findings (e.g., Carment, Miles, and Cervin 1965; Dewaele and Furnham, 1999; Pennebaker and King, 1999). Due to developments in computer technology and the Internet, computerized text analysis has become widely available for research in different fields.

A popular software tool used for research purposes, Linguistic Inquiry and Word Count (LIWC), created by James W. Pennebaker (www.liwc.net), follows a dictionary approach. LIWC calculates the degree to which people use different categories of words. It determines the degree any text uses positive or negative emotions, self-references, causal words, and 70 other language dimensions. Although LIWC does not provide direct measures of Big Five personality traits, Pennebaker and King (1999) find significant, albeit quite low correlations between the linguistic

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[6] Available at https://amsrvs.registry.faa.gov/airmeninquiry/
[7] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

dimensions of LIWC and personality traits. Gill and Oberlander (2002) find that only few of the features identified by LIWC are capable of distinguishing extravert texts from introvert texts.

To overcome the above limitations, Mairesse et al. (2007) developed a method to measure big five personality traits through computerized textual analysis, by combining features from LIWC with 14 additional features from the MRC Psycholinguistic database (Coltheart, 1981). The MRC Psycholinguistic database contains statistics for over 150,000 words, such as estimates of the age of acquisition, frequency of use, and familiarity. They trained their algorithm using essays written by subjects who also filled out self-reported Big Five questionnaires (the same dataset that was used by Pennebaker and King, 1999). They used four different algorithms based on linear regression, support vector machine regression, and tree-based methods; and found that support vector machine (SVR) method performed best across all five personality traits.

We measure CEO extraversion by applying the SVR linguistic algorithm of Mairesse et al. (2007) to the language spoken by CEOs in the questions and answers (Q&A) portion of conference calls. Mairesse et al. (2007) algorithm is available through a Java command-line application, The Personality Recognizer, which reads text files and computes estimates of personality scores along the Big Five personality dimensions. The algorithm was used and independently validated in conference call setting by Green et al. (2016) and Malhotra et al. (2017).

We collect conference call transcripts for S&P 1500 companies for the period 2004-2013 from Thomson Reuters Street Events. Conference call transcripts generally follow the same structure which includes three distinct segments: 1) the call participants list, 2) management discussion, and 3) Q&A segment. We focus exclusively on the Q&A segment because the management discussion segment is likely to be scripted by others, and therefore not suitable for gauging personality. In contrast, language spoken by CEOs in response to analyst questions is

likely unscripted (Matsumoto, Pronk, and Roelofsen, 2011), because questions can be direct, complex, and difficult to anticipate. Moreover, as Malhotra et al (2017) argue, language spoken during the Q&A segment is particularly appropriate for assessing CEOs' extraversion because variations in extraversion are more readily revealed under complex and stressful conditions (Dewaele and Furnham, 1999).

Within the Q&A segment, there is a title above each section that denotes speaker's name. We require that each speaker's name is included in the list of participants. We identify that a speaker is CEO by hand-matching the name from the transcript to the CEO name in Execucomp and the company ticker and name from the transcript to the ticker and name in Execucomp. Given that longer texts yield more-reliable personality scores, following Malhotra et al. (2017), we aggregate language spoken by a given CEO in the Q&A segment across all call transcripts in our sample.[8] We include only those CEOs who spoke at least 500 words across the transcripts in our sample; the average word count for CEOs in our sample is 10,147 words per CEO per call, with a range of 506 to 113,956 words. For illustrative purposes, Table I lists 15 most and 15 least extroverted CEOs in our sample.

B. Estimating the Implied Cost of Capital (Equity)

We estimate the implied cost of equity capital (henceforth ICC) for a given firm as the internal rate of return that equates the current stock price to the present value of expected future cash flows. To estimate expected future cash flows, we use two methods proposed in prior

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[8] In addition to helping reduce the measurement error, using all available earnings call transcripts has two other benefits. First, it allows us to include CEOs from the beginning of their career, which is important because their personality may be more salient early on when they only have short history of performance (Green et al. 2016). Second, extraversion is a stable personality trait that should not vary over time. However, we acknowledge that using forward looking earnings call transcripts to measure extraversion raises concerns about reverse causality, and we address the issue in Section III.C.

literature, analyst earnings forecasts and cross-sectional earnings model. Use of analyst earnings forecasts has been dominant in the literature and has an advantage that analyst earnings forecasts are more accurate than cross sectional models and potentially include more recent and relevant information. However, the disadvantage is that analyst earnings forecasts are not available for all firms, even among S&P 1500 companies. Moreover, any bias in analyst earnings forecasts will translate into the estimates of the cost of equity capital. That is why we also use a cross-sectional model proposed by Hou et al. (2013). Specifically, following Hou, et al. (2013) each year, we estimate the following five pooled cross-sectional regressions using the previous ten years of data:

$$E_{i,t+\tau} = \alpha_0 + \alpha_1 A_{i,t} + \alpha_2 D_{i,t} + \alpha_3 DD_{i,t} + \alpha_4 E_{i,t} + \alpha_5 NegE_{i,t} + \alpha_6 AC_{i,t} + \varepsilon_{i,t+\tau}, \tag{1}$$

where $E_{i,t+\tau}$ denotes the earnings (Compustat item IB) of firm i in year t+τ (τ=1 to 5); $A_{i,t}$ is the total assets (Compustat item AT); $D_{i,t}$ is the dividend payment (Compustat item DVT); $DD_{i,t}$ is an indicator variable that equals one if a company pays dividends, and equals zero otherwise; $NegE_{i,t}$ is an indicator variable that equals one for firms with negative earnings, and equals zero otherwise; and $AC_{i,t}$ is accruals (IBC-OANCF+XIDOC from Compustat). All explanatory variables are measured as of year t. To reduce the impact of outliers, we winsorize level explanatory variables at 1st and 99th percentile. After obtaining the coefficients, we calculate expected earnings by multiplying the independent variables as of year t with the coefficients from the pooled regressions. We calculate up to five years of expected earnings.

Previous studies have also developed a variety of methods to estimate the ICC. To ensure that our results are not driven by any specific method, we construct three different ICC estimates and report our main results based on their average.[9] Three individual ICC estimates are based on models of Easton (modified price-earnings growth or MPEG, 2004), Gebhardt et al. (GLS, 2001),

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[9] Robustness tests section reports our main results using three individual measures.

and Gordon and Gordon (Gordon, 1997). These individual ICC estimates differ in their use of forecasted earnings, the explicit forecast horizon, and the assumptions regarding short-term and long-term growth rates. Easton and Monahan (2005) and Lee, So, and Wang (2010) provide comprehensive analysis and comparison of different ICC models. We select these three models because they broadly represent three different groups of valuation methods: GLS is based on the residual income valuation model; MPEG is based on an abnormal earnings growth model; and Gordon is based on the Gordon growth model. We provide a detailed description of the three individual ICC estimates in Appendix A.

To align firms with different fiscal-year ends in calendar time, we estimate ICC for each firm at the end of June of each year by using the end-of-June market capitalization. To ensure that the accounting information is publicly available at the time of ICC estimation, we impose a minimum reporting lag of three months. That is, we use accounting data for firms with fiscal year ends from April of year *t-1* to March of year *t*. For the analyst-earnings forecast method, our expected cash-flows are measured as of the middle of June of year *t* (I/B/E/S cutoff date). For the cross-sectional earnings method, we forecast earnings for a given firm by multiplying its accounting variables (for fiscal year ended between April of year *t-1* to March of year *t*) with the coefficients from the pooled regression estimated using the previous ten years of data. For each of the two expected cash-flow methods, we calculate an equal weighted average of the three individual ICC measures. Finally, we subtract 10-year government bond yield from the estimate, to ensure that we are only focusing on the premiums. This procedure results in two distinct 'composite' ICC measures that we use in our analyses. Following Hou et al. (2014), to maximize

coverage, we only require a firm to have at least one non-missing individual ICC estimate to compute its composite ICC.[10]

C. Other variables

For all CEOs in our sample and the firms that they lead we construct a number of additional variables. Specifically, CEO variables that we construct are *CEO Age* in years, proportion of firm's shares owned by the CEO (*CEO Ownership*), number of years that CEO has been in the position (*Tenure*), *CEO Gender*, CEO's total compensation (*CEO Compensation*), CEO's pay relative to other members of the top management team, and CEO Overconfidence (Malmendier and Tate, 2008). We follow Campbell et al. (2011) and define an overconfident CEO if the CEO delayed exercising deeply in-the-money stock options using the compensation data in the Execucomp database.

We also construct measures of firm riskiness, fundamental performance, and information environment. Specifically, we measure risk using total return volatility (*Volatility*), CAPM beta (*Beta*), idiosyncratic risk (*IVOL*), and ROA volatility (*ROAVOL*). We also collect data on total assets (*Firm Size*), book-to-market ratio (*B/M*), book value of leverage (*Leverage*), return-on-assets (*ROA*), and long-term growth rate (*LTG*). Finally, to measure information environment we construct measures of analyst following (*Coverage*), analyst bias (*Bias*), and analyst forecast error (*Ferror*). More details about variable construction and explanatory variables are available in the Appendix B.

Table II reports descriptive statistics for our sample CEOs and firms. Our main variable of interest, Extraversion has a mean value of 6.95 and a standard deviation of 0.62. The values are somewhat higher than those reported in Green et al (2016) because they use average across four different estimation methods whereas we use only the most accurate method determined by Mairesse et al (2007). Although we do not have specific hypotheses about the remaining four dimensions of personality, for completeness we report the summary statistics and include them in our analyses as controls. Average sample values are 3.08, 3.28, 6.52, and 6.18 for *Emotional Stability*, *Agreeableness*, *Conscientiousness*, and *Openness*, respectively. Average CEO age for our sample of CEOs is 55.5 years and average tenure is 7.3 years. Approximately 97% of CEOs

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[10] Our results are robust if we require that a firm has all three individual ICC measures to be included in the analysis.

in our sample are male and each CEO holds on average 0.02% of their company shares. Moving to the firm characteristics, average equity premium for our sample firms is between 3.33% (ICC^{CX}) and 5.21% (ICC^{AN}). Average firm in our sample has total *Assets* of $20 billion, book-to-market ratio (*B/M*) of 0.52, long-term-debt to total assets ratio (*Leverage*) of 16.4%, *Firm age* of 28.36 years, and 4-factor model Market *Beta* of 1.05. These numbers indicate that our sample is comprised of larger, older, stable firms, which makes sense given that our universe is S&P 1500 firms.

III. Empirical Results

A. CEO Extraversion and Expected Cost of Capital

We begin our empirical analysis by testing the null hypothesis that CEO Extraversion is unrelated to the firm's cost of equity capital. To test the hypothesis, we estimate the following panel regression:

$$ICC_{i,t}^K = \beta_0 + \beta_1 Extraversion_j + \beta_2 Emotional\ Stability_j + \beta_3 Openness_j$$
$$+ \beta_4 Agreeableness_j + \beta_5 Conscientiousness_j + \beta Firm\ Characteristics_{i,t}$$
$$+ \gamma CEO\ Characteristics_{i,t} + FE_t + FE_i + \varepsilon_{i,t},$$

where $ICC_{i,t}^K$ is implied cost of equity risk premium for firm *i* in year *t*; and subscript *K* denotes whether the expected earnings are obtained from analyst forecasts or from a cross-sectional model. Extraversion is our main explanatory variable and our null hypothesis is that extraversion has no impact on the cost of equity capital. Therefore, we expect coefficient β_1 to be statistically insignificant. *Emotional stability, Openness, Agreeableness* and *Conscientiousness* are the other four Big Five personality traits that we obtained from the linguistic analysis of conference call transcripts. Following Chen, Huang, and Wei (2014) we control for the following firm characteristics: total assets, book-to-market ratio, leverage, long-term growth rate of earnings, firm age, stock return volatility, beta, idiosyncratic volatility, analyst forecast bias, and analyst forecast error. To ensure that our results are not driven by other CEO characteristics, we also control for the following CEO variables: CEO age, CEO gender, CEO tenure, CEO ownership, and CEO overconfidence. Detailed definitions of control variables are in the Appendix B. In addition, we include year and firm fixed effects to control for constant unobservable variables. We adjust standard errors for heteroscedasticity using Huber-White adjustment.

Table III reports the results. The first column uses analyst-based ICC (ICC^{AN}) as the dependent variable and the second column uses cross-sectional-model-based ICC (ICC^{CX}). Our model explains between 77.6% and 59.8% of the variation in firm cost of capital. Consistent with prior literature, cost of capital increases significantly with book-to-market ratio and volatility, as expected given that these measures are related to risk. Similarly, firms with higher analyst forecast error experience higher cost of capital, consistent with the idea that analyst forecast errors capture the quality of the information environment and firms with poor information environment have higher cost of capital. We find that cost of capital increases with firm size, measured by total assets, and firm age which is surprising given that larger and older firms are generally considered less risky. This effect is driven by the inclusion of fixed effects in our regressions.

Turning to our key variable of interest, we find that the coefficient on extraversion is 0.30% (0.33%) for ICC^{AN} (ICC^{CX}) and statistically significant at the 5% (1%) level. The coefficient estimate indicates that one standard deviation increase in extraversion increases expected cost of capital by approximately 0.2% per year. This difference in cost of capital is relatively small but economically meaningful. To illustrate the economic impact of this difference in the cost of capital imagine that there are two equity-only firms, A and B, very similar in every regard other than the CEO Extraversion. Firm A's CEO has extraversion that is one standard deviation below sample mean (6.32) and firm B's CEO has extraversion that is one standard deviation above the mean (7.56). Further, assume that the two firms have the same 20-year project that generates $1,000,000 per year over its life and has zero salvage value. The project costs $9,000,000. Given the impact of extraversion on the cost of capital, firm A would pay cost of capital of 7.07% and firm B would pay cost of capital of 7.47%.[11] The NPV of the project would be $1.537 million for firm A and only $1.218 million for firm B. The difference in cost of capital due to CEO extraversion would translate into 20.75% lower NPV in this example.[12] The other four personality traits do not have significant impact on the cost of capital.

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[11]Average implied cost of capital before subtracting the 10-year treasury yield is 7.27%. Subtracting (adding) the impact of one-standard deviation change in extraversion of 0.2%, we get 7.07% (7.47%) for firm A (firm B).

[12] In unreported analysis we also find that CEO Extraversion negatively impacts firm's valuation, measured by Tobin's Q. In particular, we find that one-standard deviation increase in CEO Extraversion decreases Tobin's Q by 0.034, which is 1.78% of the sample average Tobin's Q of 1.92.

B. Impact of Extraverted CEOs' risk-taking and organizational capital on the Expected Cost of Capital

Having documented that CEO Extraversion is in fact positively and statistically significantly related to the expected cost of capital, we next examine the potential channels that may explain the relation between CEO extraversion and implied cost of capital, namely the risk-taking and the organizational capital channel. We begin with the risk-taking channel. We note that our baseline specification already controls for several widely used measures of firm riskiness, such as stock return volatility, stock beta, and stock idiosyncratic volatility. These three measures are mainly driven by investor's actions and their perception of the CEO, not the CEO directly. Hence, we add two risk measures that are more directly tied to CEO behavior, pilot licenses (*Pilot*) and ROA volatility (*ROAVOL*). We select pilot licenses because Cain and McKeon (2016), show that CEO's possession of an aircraft pilot license is a good measures of his *risk-taking preference*. Similarly, we select *ROAVOL* because cash-flows from the projects that CEO selects will reflect directly in the return on assets, and the riskier those projects are, the more variation in ROA we would expect. We then examine how CEO extraversion relates to both, direct and market-based measures of risk. Specifically, we estimate panel regressions of these risk measures on CEO Extraversion, the other four personality traits, and firm and CEO characteristics.

Table IV reports results of these regressions. In column (1) dependent variable is subsequent 1-year stock return volatility. In column (2) dependent variable is subsequent 3-year stock return volatility. In column (3) dependent variable is idiosyncratic volatility calculated over 3-year period using CAPM model. In column (4) dependent variable is idiosyncratic volatility calculated over 3-year period using 4-factor model.[13] In column (5) dependent variable is ROA volatility calculated over 5-year period. In column (6) dependent variable is an indicator that equals one if a CEO has aircraft pilot license, and equals zero otherwise.[14] Examining the risk-taking measures in the professional domain (columns (1)-(5)), we find that firm riskiness is positively related to book-to-market ratio, leverage, and analyst forecast errors as expected. The results also show that larger and older firms are less risky, as well as that firms run by older CEOs are less risky, consistent with decreasing risk appetite with age. More importantly, we find that CEO

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[13] In unreported analyses we also use CAPM model augmented with squared excess market return and Fama and French 3-factor model (Fama and French, 1993), and find similar results.

[14] Given that dependent variable, Pilot, is an indicator, we estimate model six (6) using logit regression.

Extraversion is significantly positively related to our measures of risk in all five regressions, consistent with the argument that extraverted CEOs are more prone to risk-taking behavior. Our results indicate that one-standard-deviation increase in CEO extraversion is associated with a 0.25%, 0.50%, 0.11%, 0.10%, and 3.20% increase in 1-year *Volatility*, 3-year *Volatility*, $IVOL^{CAPM}$, $IVOL^{FF4}$, and *ROAVOL*, respectively. The increase in market based measures of risk, although statistically significant is only marginal economically. However, the increase in *ROAVOL* is significant both statistically and economically. This result is not surprising given that *ROAVOL* is more direct measure of CEO's risk-taking behavior.

Turning to the risk-taking behavior in personal domain, our logit model in Column (6) shows that a CEO's propensity to obtain pilot license is positively related to leverage and firm age and negatively related to book-to-market ratio. When it comes to personality traits, we find that having a pilot license is significantly positively related to Extraversion, consistent with extraverted CEOs being more prone to risk-taking.

To provide a more direct analysis of the impact of Extraverted CEO's risk-taking behavior on the implied cost of capital, we split our sample into subsamples based on the two direct measures of risk-taking behavior, *ROAVOL* and *Pilot* license.[15] We then run the baseline regressions (eq. 1) in each of the four subsamples. If risk-taking of extraverted CEOs completely explains the positive relation between CEO Extraversion and ICC, we would expect to see positive relation only in the sub-samples of firms with high *ROAVOL* and with CEOs who have pilot licenses. In contrast, we would expect to find no relation between CEO Extraversion and ICC in the subsample of firms with low *ROAVOL* and the subsample of firms whose CEOs do not have pilot license. Table V reports estimates of these regressions. Columns (1)-(4) use ICC^{AN} as a dependent variable and columns (5)-(8) use ICC^{CX} as a dependent variable. Overall, we find some support for the risk-taking behavior channel. Specifically, we find that CEO Extraversion is positively associated with the implied cost of equity capital only in the high-*ROAVOL* sample, while there is no association in the low-*ROAVOL* sample. However, the association between CEO extraversion is positive and statistically significant in both subsamples based on CEO's pilot license. Taken together, our findings are consistent with the idea that CEO's risk-taking behavior

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[15] We do not split the sample based on market measures of risk because 1) they are not under CEO's direct influence, 2) empirical impact of extraversion on these measures is economically marginal, and 3) we already include them in our regressions as standard determinants of cost of capital.

is an important driver of the documented positive relation between CEO extraversion and firm cost of capital.

Next, we move to test the organizational capital channel. Following prior literature (Eisfeldt and Papanikolaou, 2013), we use CEO's total and relative compensation and CEO pay slice of Bebchuk, Cremers, and Peyer (2011) as measures of CEO's organizational capital. As with risk-taking behavior, we first examine how CEO Extraversion relates to these measures of organizational capital. Specifically, we regress each of the measures of organizational capital on CEO Extraversion, the other four personality traits and firm and CEO characteristics. We report the results of these fixed effect panel regressions in Table VI. We find that CEO total pay, CEO relative pay, and CEO pay slice are generally positively related to firm size and age; and negatively related to book-to-market ratio and leverage. More importantly, we find that CEO extraversion is positively associated with all measures of CEO organizational capital.

Having established the relation between CEO Extraversion and CEO organizational capital, we proceed to test whether the organizational capital channel can explain the positive relation between Extraversion and cost of capital. Specifically, we divide our full sample into two subsamples based on the CEO pay slice.[16] We then repeat baseline regressions (eq. 1) on the subsamples and report them in Table VII. Overall, we find support for the organizational capital channel. When using the ICC^{AN} measure of cost of capital, we find that the relation between CEO extraversion and expected cost of capital is significant only in the high- CEO pay slice subsample. When using the ICC^{CX} measure of cost of capital, we find that relation is statistically significant in both subsamples, however the magnitude of the coefficient is more than twice as large in the high-CEO pay slice as in the low-CEO pay slice, consistent with organizational capital channel explaining significant portion of the positive CEO Extraversion and expected cost of capital relation.

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[16] For brevity, we only report results for the subsamples based on the CEO pay slice; results for the other measures are similar.

C. Reverse Causality and Alternative Explanations

We interpret our finding of a positive relation between CEO Extraversion and implied cost of equity capital as evidence that CEO Extraversion leads to higher cost of capital because CEOs undertake more risk and their personality makes them more important to their firm (i.e. increases their organizational capital). An alternative interpretation in which causation is reversed is also possible. If extraverted CEOs for example, select to work for firms that undertake riskier projects, as these types of firms are better match for their extraverted personality, we could also observe positive relation between CEO extraversion and cost of capital. We test this reverse causality explanation in two ways.

In our first test, we split our sample into two subsamples based on CEOs tenure. The first subsample contains observations where CEO has been in the position for less than three (3) years and the second subsample contains observations where CEO has been in the position for more than three (3) years. We posit that if the firms themselves are risky and the CEOs Extraversion does not impact the risk-taking in the firm, the relation between CEO Extraversion and implied cost of capital should be the same when CEO is appointed and after the CEO has been in his position for several years.

Figure 1 shows how average cost of capital changes over CEO's tenure for CEOs who score high and low on extraversion. For CEOs who score low on extraversion (i.e. one standard deviation below the sample average extraversion score) the figure shows that cost of capital remains constant over their tenure. In contrast, for CEOs who score high on extraversion (i.e. one standard deviation above the sample average extraversion score) the cost of capital increases at a decreasing rate as their tenure increases (i.e. cost of capital is concave function of tenure).

We provide a more formal regression test in Table VIII. In the subsample of observations where CEO has been in the position for up to three years, we find no evidence that CEO Extraversion impacts cost of equity capital.[17] However, in the subsample of firms where CEO has been in the position for more than three years, CEO extraversion has economically and statistically significant impact on the implied cost of capital. Specifically, the magnitudes of coefficients of

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[17] There are at least two potential reasons for this finding. First, it takes time for the incoming CEO to impact the riskiness of firm's projects. Second, it takes time for the market to learn about CEOs personality, especially if they have not been in a prominent position before.

0.71% (for ICC^{AN}) and 0.57% (for ICC^{CX}) are nearly twice the magnitude of those reported in Table III. These magnitudes imply that one-standard deviation increase in CEO Extraversion leads to increase in firm's expected cost of capital between 0.36% and 0.44%. More importantly, these findings indicate that firms with Extraverted CEOs have not persistently had high cost of capital, rather firm's cost of capital increases after the new Extraverted CEO had time to undertake new projects. These results are inconsistent with the idea that Extraverted CEOs self-select into risky companies and have no impact on the firm's cost of capital.

Second, we use propensity score matching to select a control group of firms for our treatment group of firms with extraverted CEOs. Specifically, we use the sample median value of extraversion to split the firm-year sample into high CEO extroversion observations (treatment sample) and low CEO extroversion observations (control sample). To implement the propensity score matching, for each treatment firm-year observation, we select a matching control firm-year observation using the one-to-one nearest neighbor-matching technique of propensity score with replacement and without replacement of a control firm. To estimate the propensity scores, we include the firm size (log assets), book to market ratio, firm age, and 5-year ROA volatility in a Probit model. Results in Table IX shows that for the one-for-one nearest neighbor propensity score matching without replacement, we have 3,796 matching pairs. We show the density function of the propensity scores of the treatment sample and the control sample before and after the matching in Figure 2. The figure suggests improved similarity after matching the observations. In the matched sample, we find that the mean of the ICC^{CX} is 3.41 in the treatment sample (with extraverted CEOs) and 3.25 in the control sample (with less extraverted CEOs). The difference between the two samples is statistically significant at 5%. We repeat the same analysis for the ICC^{AN} measure and we still conclude the firms with extraverted CEOs (treatment sample) tend to have higher implied cost of capital than the firms with less extraverted CEOs (control sample). As a robustness check, we also use the one-to-one nearest neighbor-matching technique of propensity score with replacement of a control firm, which results in 4,923 matching pairs. The results are qualitatively the same.

Another possible alternative interpretation of our results is that extraverted CEOs are more entrenched. Malhotra et al. (2017) show that extraverted CEOs have larger networks and sit on more boards. Given their sociability it is possible that they have friendlier relationships with their

own board members. Moreover, our organizational capital results are consistent with this interpretation. We perform several tests to examine this alternative interpretation. First, we examine subsequent operating performance of firms conditional on CEO extraversion, and find that firms with extraverted CEOs actually have better operating performance than firms with introverted CEOs during the sample period. Our results in Panel A of Table X show that one standard deviation increase in CEO Extraversion increases subsequent ROA and Industry Adjusted ROA by about 0.31% per year. Second, we divide firms into subsamples based on the strength of corporate governance. We examine two measures of corporate governance, institutional ownership (*IO*; Hartzel and Starks, 2003) and proportion of independent directors on the firm's board (*Board Independence*; Weisbach, 1988). In Panel B of Table X, we find that CEO extraversion is positively related to implied cost of capital in the subsample of firms with strong governance across both measures of corporate governance and both measures of implied cost of capital. Overall, results from both of these analyses do not support the entrenchment interpretation.

Finally, given that extraverts are able to inspire others by conveying an optimistic vision and displaying enthusiasm in vision achievement (Watson and Clark, 1997) and that we use implied cost of capital, one may be concerned that our documented positive relation between CEO Extraversion and the implied cost of capital is driven by analyst optimism. We do not think that this explanation is likely for two reasons. First, in all of our regressions we control for the extent of analyst optimism with the Analyst Bias variable. Our results show that holding the bias constant, CEO extraversion is still positively related to firm's cost of capital. Second, we still find significantly positive relation between CEO Extraversion and cost of capital using our second measure ICC^{CX}, which uses cross-sectional model to predict earnings and not analyst forecasts. Hou et al. (2012) show that cross-sectional estimates of earnings are significantly less biased than the analyst forecasts.

D. Robustness tests

D.1. Individual ICC Measures

In this section we examine robustness of our results to using individual ICC measures. Results in Table XI show that extraversion is positive and statistically significant for each

individual ICC measure. Looking at the ICC measures that use analyst earnings forecasts, in Columns (1)-(3), we find that the results are strongest for ICC$^{\text{Gordon}}$, followed by ICC$^{\text{GLS}}$, and then by ICC$^{\text{MPEG}}$. For the ICC measures based on cross-sectional earnings forecasts, the results are strongest for ICC$^{\text{MPEG}}$, followed by ICC$^{\text{Gordon}}$, and finally by ICC$^{\text{GLS}}$. Overall, we conclude that our results are robust to using individual ICC measures.

D.2. Realized returns as measure of expected cost of capital

Implied cost of capital is only one way to estimate expected cost of equity capital for a firm. Much of the literature simply uses realized returns for this purpose. In this section, we examine realized stock returns conditional on CEO Extraversion. Following extant asset pricing literature, we use portfolio sorting approach. In particular, in June of each year (*t*) we sort all sample firms into quintiles based on CEO Extraversion. We construct a portfolio that is long high-Extraversion firms (top quintile) and short low-Extraversion firms (bottom quintile). We hold this portfolio from July of year *t* through the end of June of year *t+1*. Table XII reports average returns and 4-factor Alphas for high-Extraversion portfolio, low-Extraversion portfolio, and the long-short strategy. We find that high-Extraversion portfolio has significantly higher returns than low-Extraversion portfolio. Specifically, the magnitude of out-performance is 0.34% per month for equal-weighted raw returns and 0.17% per month for value-weighted raw returns. Alphas from a Fama-French 3-factor model plus momentum yield similar results. High-extraversion firms realize positive and significant 4-factor Alphas, whereas low-extraversion firms realize insignificant alphas. The difference in 4-factor alphas implies outperformance by high-extraversion firms of approximately 3% per year. Overall, these results are consistent with our implied cost of capital results.

Figure 3 depicts the economic significance of the outperformance of high-Extraversion firms over our sample period. In particular, we plot the investment values of $10,000 invested in July of 2003 in quintile of high-Extraversion firms and in quintile of low-Extraversion firms. The Extraversion portfolios equal-weighted and rebalanced annually at the end of June of each year. Figure 3 shows that $10,000 invested in low-Extraversion portfolio would have grown to $26,000 over our sample period. In contrast, $10,000 invested in high-Extraversion portfolio would have grown to $33,800. Moreover, the cumulative return on high-Extraversion portfolio is consistently higher than that of low-Extraversion portfolio.

Conclusion

In this paper we examine whether CEO Extraversion, one of the most important personality traits (Cain, 2012) has impact on firm's expected cost of capital. We measure extraversion using linguistic algorithms to analyze speech patterns during conference calls. We find that firms run by Extraverted CEOs pay higher cost of capital than otherwise similar firms run by less extraverted CEOs. The association between CEO Extraversion and expected cost of capital strengthens with CEOs tenure indicating, that extraverted CEOs do not simply select riskier firms.

Exploring the sources of the association between CEO Extraversion and cost of capital, we find that Extraverted CEOs are more prone to risk taking, and that risk taking explains a portion of the documented relation. In addition, we find evidence that Extraverted CEOs have more organizational capital, which increases the risk of the firms they run (Eisfeldt and Papanikolaou, 2013). The increased risk due to high organizational capital also explains a portion of the positive relation between CEO Extraversion and cost of capital. We find no evidence that increased risk taking is harmful to shareholders or indicates entrenchment, as firms run by Extraverted CEOs have better operating performance and better stock performance.

Appendix A – Details of Implied Cost of Capital Estimates

ICC Estimate	Source	Formula and Assumptions
ICC$_{GLS}$	Gebhardt et al. (GLS, 2001)	$$P_t = B_t + \sum_{i=1}^{11} \frac{FROE_{t+i} - ICC_{GLS}}{(1 + ICC_{GLS})^i} B_{t+i-1} + \frac{FROE_{t+12} - ICC_{GLS}}{ICC_{GLS}(1 + ICC_{GLS})^{11}} B_{t+11},$$ where P_t is market price per share in year t; B_t is book value of equity per share in year t; ICC$_{GLS}$ is the implied cost of capital estimate; and FROE is expected ROE in year $t+i$ based on the information in year t. We estimate the FROE in years t+1 to t+3 using either analysts' earnings forecasts from IBES or model-based earnings forecasts (as in Hou et al. 2014). Beyond year three, we assume that each firm's ROE fades linearly to its Fama and French 48-industry median by year twelve. Following GLS (2001) we exclude firms with loses when calculating Fama and French 48-industry median ROE. We forecast book values of equity per share (B_t) using earnings forecasts (FEPS, from either analysts or the cross sectional model) and dividend payout (dp) in the following manner: $B_{t+i+1} = B_{t+i} + $FEPS$_{t+i+1}$(1-dp). We estimate dividend payout by dividing actual dividends (Compustat item DVT) from the most recent fiscal year by the earnings over the same period (Compustat item NI). For firms with negative earnings, we follow GLS and divide the actual dividends by six percent (6%) of total assets, to compute payout.
ICC$_{MPEG}$	Easton (2004)	$$P_t = \frac{FEPS_{t+2} + ICC_{MPEG} \times FD_{t+1} - FEPS_{t+1}}{ICC_{MPEG}^2},$$ where P_t is market price per share in year t; ICC$_{MPEG}$ is the implied cost of capital estimate; FD is expected dividend in year $t+1$; and FEPS is expected earnings per share in year $t+i$ based on the information in year t. We estimate the FEPS in years t+1 and t+2 using either analysts' earnings forecasts from IBES or model-based earnings forecasts (as in Hou et al. 2014). We estimate FD by multiplying dividend payout ratio by FEPS in year t+1. We estimate dividend payout by dividing actual dividends (Compustat item DVT) from the most recent fiscal year by the earnings over the same period (Compustat item NI). For firms with negative NI, we divide the actual dividends by six percent (6%) of total assets, to compute payout. If our FEPS for year t+1 is negative, we multiply the payout ratio by 6% of total assets.
ICC$_{Gordon}$	Gordon and Gordon (1997)	$$P_t = \frac{FEPS_{t+1}}{ICC_{Gordon}},$$ where P_t is market price per share in year t; ICC$_{Gordon}$ is the implied cost of capital estimate; and FEPS is expected earnings per share in year $t+1$ based on the information in year t. We estimate the FEPS in year t+1 using either analysts' earnings forecasts from IBES or model-based earnings forecasts (as in Hou et al. 2014). This is a special case of the Gordon growth model with zero-growth assumption.
ICC^I		$$ICC^I{}_{i,t} = \frac{SUM(Non-missing(ICC_{GLS,i,t}, ICC_{MPEG,i,t}, ICC_{Gordon,i,t})}{COUNT(Non-missing(ICC_{GLS,i,t}, ICC_{MPEG,i,t}, ICC_{Gordon,i,t})} - y_{10}^{GOVT},$$ Where $ICC^I{}_{i,t}$ is either ICC^{AN} or ICC^{CX} for firm i in year t, depending on whether we use analyst earnings forecasts or cross-sectional model to predict future earnings. To obtain ICC^I, we calculate the average of three individual ICC measures and subtract yield on 10-year Treasury bonds. To preserve the number of observations we do not require that all three measures of ICC are available when computing the average.

Appendix B – Variable Definitions

Variable Name	Variable Definition and Construction
Extraversion	Aggregate Extraversion score estimate from CEO responses during the Q&A portion of conference calls and calculated using Mairesse et al. (2007) Support Vector Machine linguistic method. We require that CEO speaks at least 500 words to be included in our sample. We collect conference calls from Thomson Reuters. Details of the linguistic procedure and measure construction are available in Section II.A.
Emotional Stability	Aggregate Emotional Stability score estimate from CEO responses during the Q&A portion of conference calls and calculated using Mairesse et al. (2007) Support Vector Machine linguistic method. We require that CEO speaks at least 500 words to be included in our sample. We collect conference calls from Thomson Reuters. Details of the linguistic procedure and measure construction are available in Section II.A.
Openness	Aggregate Openness score estimate from CEO responses during the Q&A portion of conference calls and calculated using Mairesse et al. (2007) Support Vector Machine linguistic method. We require that CEO speaks at least 500 words to be included in our sample. We collect conference calls from Thomson Reuters. Details of the linguistic procedure and measure construction are available in Section II.A.
Conscientiousness	Aggregate Conscientiousness score estimate from CEO responses during the Q&A portion of conference calls and calculated using Mairesse et al. (2007) Support Vector Machine linguistic method. We require that CEO speaks at least 500 words to be included in our sample. We collect conference calls from Thomson Reuters. Details of the linguistic procedure and measure construction are available in Section II.A.
Agreeableness	Aggregate Agreeableness score estimate from CEO responses during the Q&A portion of conference calls and calculated using Mairesse et al. (2007) Support Vector Machine linguistic method. We require that CEO speaks at least 500 words to be included in our sample. We collect conference calls from Thomson Reuters. Details of the linguistic procedure and measure construction are available in Section II.A.
ICC^{AN}	Equal-weighted average of three individual ICC measures, requiring that at least one of the measures is non-missing. Expected earnings are estimated based on analyst forecasts from I/B/E/S. Winsorized at 1st and 99th percentile.
ICC^{CX}	Equal-weighted average of three individual ICC measures, requiring that at least one of the measures is non-missing. Expected earnings are estimated based on a cross-sectional model using past fundamental data from Compustat. Winsorized at 1st and 99th percentile.
Assets	Logarithm of Total Assets, item AT from Compustat
B/M	Ratio of book value of equity divided by market value of equity at the fiscal year end (Compustat items: CEQ/(CSHO*PRCC_F)). Winsorized at 1st and 99th percentile.

Leverage	Ratio of book value of long-term debt (DLTT) divided by book value of total assets (AT). Winsorized at 1st and 99th percentile.
Firm Age	Number of years since the firm first appears in Compustat Annual Database
LTG	Average analyst forecast of the long-term growth rate, item LTG from I/B/E/S summary file. Winsorized at 1st and 99th percentile.
Volatility	Standard deviation of monthly returns from CRSP estimated over prior XY months - When used as a dependent variable in Table IV it is a standard deviation of monthly returns from CRSP estimated over subsequent 12 (36) months.
Beta	Coefficient on excess market return from CAPM model estimated using monthly returns from CRSP over the past 60 months, requiring at least 24 non-missing monthly observations.
IVOL (CAPM)	Idiosyncratic volatility estimated using CAPM model and monthly returns from CRSP over the past 60 months, requiring at least 24 non-missing monthly observations - When used as a dependent variable in Table IV it is estimated using daily returns from CRSP over one-year period, requiring at least 200 daily observations.
IVOL (CAPM2)	Idiosyncratic volatility estimated using augmented CAPM model to include a square of the excess market return and daily returns from CRSP over one-year period, requiring at least 200 daily observations.
IVOL (3-Factor Model)	Idiosyncratic volatility estimated using Fama and French three-factor model and daily returns from CRSP over one-year period, requiring at least 200 daily observations.
IVOL (4-factor model)	Idiosyncratic volatility estimated using Carhart (1997) four-factor model and daily returns from CRSP over one-year period, requiring at least 200 daily observations.
ROAVOL	Standard deviation of ROA estimated over subsequent 5 years. Return on equity, ROA is defined as earnings before interest and taxes divided by total assets (Compustat items: EBIT/AT). Winsorized at 1st and 99th percentile.
Analyst Bias	Actual earnings from I/B/E/S actuals file minus the median earnings estimate from I/B/E/S summary file, scaled by the median earnings estimate from I/B/E/S summary file.
Analyst FERR	Absolute value of the difference between actual earnings from I/B/E/S actuals file minus the median earnings estimate from I/B/E/S summary file, scaled by the median earnings estimate from I/B/E/S summary file.
CEO Age	The age of the CEO from Execucomp
CEO Gender	Indicator variable that equals 1 if CEO is male and equals zero otherwise. CEO Gender is from Execucomp.
CEO Tenure	The number of year that CEO has been in the CEO position at the firm. Start date is from Execucomp.
CEO Ownership	Number of shares owned excluding options from Execucomp, divided by the number of shares outstanding from Compustat.

Overconfidence	Indicator variable equal to 1 if CEO is classified as overconfident and equal to zero otherwise. We classify CEO as overconfident if CEO holds unexercised excisable options that are 67 percent or more in the money at least twice over the period in Execucomp database, and zero otherwise. CEO is defined as overconfident from the first moment they hold unexercised exercisable options that are at least 67 percent in the money. Details of the calculation can be found in Campbell et al. (2011).
Pilot	Indicator variable that equals 1 if a CEO has pilot license, and equals 0 otherwise. Pilot license data comes from the Federal Aviation Administration's Airmen Certification database.
CEO Pay Slice	The total compensation of the CEO scaled by the total compensation of the five highest paid executives in the firm as defined in Bebchuk et al (2011). Compensation data is from Execucomp. Winsorized at 1st and 99th percentile.

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Table I – Most and least extraverted CEOs and their personality scores

This table lists a subsample of CEOs with the highest and the lowest Extraversion scores from our final sample of S&P 1500 firms over the 2004-2013 sample period. We estimate Extraversion using a linguistic technique and a sample of unscripted speech from quarterly conference call transcripts. We obtain conference call transcripts from Thomson Reuters for the period 2004-2013. Extraversion score is based only on CEO responses during the Q&A portion of the call and calculated using Mairesse et al. (2007) Support Vector Machine method. We require that CEO speaks at least 500 words to be included in our sample. We use company ticker symbols, company names, and CEO names to match the CEOs from the conference call transcripts to Execucomp database.

Most Extroverted CEOs	Company Name	Extraversion	Emotional stability	Agreeable	Conscientious	Openness
Allan R. Landon	BANK OF HAWAII CORP	9.002	3.891	3.195	7.13	6.457
Gerald B. Shreiber	J & J SNACK FOODS CORP	8.904	3.19	3.003	7.143	6.796
David R. Goode	NORFOLK SOUTHERN CORP	8.526	2.646	2.468	7.551	6.485
F. H. Merelli	KEY PRODUCTION CO INC	8.518	2.85	3.11	6.259	6.128
Dan O. Dinges	CABOT OIL & GAS CORP	8.512	3.339	2.987	6.552	6.464
Ronald R. Snyder	CROCS INC	8.396	2.662	2.848	5.466	6.214
Jean Madar	INTER PARFUMS INC	8.388	2.697	2.573	7.569	6.839
Garry W. Rogerson, Ph.D.	VARIAN INC	8.351	2.099	2.965	6.546	5.57
Jeffrey H. Curler	BEMIS CO INC	8.326	2.939	2.731	5.948	5.898
W. Howard Lester	WILLIAMS-SONOMA INC	8.315	2.145	3.217	6.559	6.057
Albert H. Nahmad	WATSCO INC	8.312	3.276	2.674	7.5	6.267
Stephen J. Hemsley	UNITEDHEALTH GROUP INC	8.311	2.567	2.846	8.088	6.77
Keh-Shew Lu, Ph.D.	DIODES INC	8.288	2.327	2.71	7.579	7.056
Thomas E. Jorden	CIMAREX ENERGY CO	8.254	2.834	2.64	5.352	5.121
Stephen H. Rusckowski	QUEST DIAGNOSTICS INC	8.226	2.564	2.929	6.342	5.978

Least Extroverted CEOs	Company Name	Extraversion	Emotional stability	Agreeable	Conscientious	Openness
Jay Seung Yoo	HANMI FINANCIAL CORP	4.301	2.4325	2.7645	6.1845	5.7535
Christopher J. Kearney	SPX CORP	4.233	1.936	3.558	5.367	5.346
Walden C. Rhines	MENTOR GRAPHICS CORP	4.15325	3.342	3.81625	6.10125	6.42
Omar S. Ishrak	MEDTRONIC INC	4.113	2.762	4.138	5.68	5.583
Mitchell L. Jacobson	MSC INDUSTRIAL DIRECT -CL A	4.052	3.059	2.583	5.767	5.052
Jan B. Packwood	IDACORP INC	4.05	2.833	3.79	5.749	5.463
Richard Robinson	SCHOLASTIC CORP	4.047	2.424	3.924	6.039	5.294
Suzanne Sitherwood	LACLEDE GROUP INC	3.951	2.964	4.769	6.217	6.35
Thomas L. Fisher	NICOR INC	3.852	1.92	2.139	4.492	5.097
Richard S. Fuld, Jr.	LEHMAN BROTHERS HOLDINGS INC	3.734	2.321	3.343	6.426	5.951
Thos. E. Capps	DOMINION RESOURCES INC	3.322	1.685	3.324	4.326	6.832
William S. Boyd	BOYD GAMING CORP	3.282	2.56	3.366	5.239	7.046
William T. Kerr	MEREDITH CORP	2.82	3.923	2.257	3.3775	7.2305
Louis J. Rampino	SIGNATURE GROUP HOLDINGS INC	2.415	3.077	4.43	2.983	4.384
John J. Koraleski	UNION PACIFIC CORP	1	4.286	1.585	8.463	7.134

Table II – Descriptive Statistics

This table presents descriptive statistics of firm and CEO variables for a sample of S&P 1500 firms over the 2004-2013 sample period. Panel A reports summary statistics for 2,333 unique CEOs for whom we can estimate Extraversion scores. Panel B reports summary statistics for 1,579 unique firms, whose CEOs are in our sample. We estimate Extraversion using a linguistic technique and a sample of unscripted speech from quarterly conference call transcripts. We obtain conference call transcripts from Thomson Reuters for the period 2004-2013. Extraversion score is based only on CEO responses during the Q&A portion of the call and calculated using Mairesse et al. (2007) Support Vector Machine method. We require that CEO speaks at least 500 words to be included in our sample. We use company ticker and name and CEO Names to match the CEOs from the conference call transcripts to ExecuComp database. Implied cost of capital (ICC) is average internal rate of return estimated using models of Gebhardt et al (2001), Easton (2004) and Gordon and Gordon (1997), as discussed in the Appendix A. Expected earnings are estimated from analyst forecasts and cross-sectional model. Appendix B contains definitions of the other variables.

Panel A: CEO Characteristics						
Variables	N	Mean	S.D.	P25	Median	P75
Extraversion	10084	6.947	0.621	6.616	6.990	7.342
Emotional stability	10084	3.080	0.473	2.807	3.124	3.395
Agreeable	10084	3.284	0.339	3.069	3.289	3.506
Conscientious	10084	6.525	0.565	6.182	6.522	6.879
Openness	10084	6.184	0.536	5.828	6.153	6.517
CEO age	10084	55.493	6.810	51.000	56.000	60.000
CEO Ownership (%)	10084	0.016	0.039	0.001	0.003	0.010
CEO tenure	10084	7.298	6.975	2.422	5.255	9.840
Male CEO	10084	0.971	0.169	1.000	1.000	1.000
CEO overconfidence	10084	0.250	0.433	0.000	0.000	0.500

Panel B: Firm Characteristics						
Variables	N	Mean	S.D.	P25	Median	P75
ICC^{CX} (%)	10084	3.329	3.361	1.045	2.804	5.091
ICC^{AN} (%)	10084	5.210	4.750	2.941	4.699	6.584
Assets ($Bil)	10084	20.000	120.000	0.772	2.300	8.100
B/M	10084	0.520	0.325	0.291	0.453	0.675
Leverage	10084	0.164	0.149	0.021	0.142	0.266
LTG	10084	0.157	0.138	0.095	0.130	0.174
Firm age	10084	28.363	17.526	14.000	22.000	43.000
ROA	10084	0.056	0.068	0.020	0.051	0.090
ROA^{IAdj}	10084	0.002	0.063	-0.022	0.000	0.027
Volatility	10084	0.095	0.050	0.060	0.084	0.117
Beta	10084	1.054	0.333	0.830	1.025	1.241
IVOL	10084	0.018	0.009	0.012	0.016	0.023
Analyst Bias	10084	-0.077	0.713	-0.079	0.008	0.070
Analyst FERR	10084	0.015	0.054	0.001	0.004	0.011

Table III – CEO Extraversion and Firm Cost of Capital

This table reports estimates from a panel regression of implied cost of equity capital risk premium on CEO Extraversion, the other four personality traits, and a set of CEO and Firm characteristics. Implied cost of equity capital (ICC^{AN} and ICC^{CX}) is average internal rate of return estimated using models of Gebhardt et al (2001), Easton (2004) and Gordon and Gordon (1997) minus the yield on 10-year Treasury bonds, as detailed in the Appendix A. ICC^{AN} uses analysts forecasts of expected earnings and ICC^{CX} uses cross-sectional model of Hou et al. (2013) to forecast expected earnings. We estimate Extraversion using a linguistic technique and a sample of unscripted speech from quarterly conference call transcripts. We obtain conference call transcripts from Thomson Reuters for the period 2004-2013. Extraversion score is based only on CEO responses during the Q&A portion of the call and calculated using Mairesse et al (2007) Support Vector Machine method. We require that CEO speaks at least 500 words to be included in our sample. We use company tickers and names and CEO Names to match the CEOs from the conference call transcripts to ExecuComp database. Details of the Extraversion measure construction are in Section II.A. Appendix B provides detailed definitions of control variables. All specifications include firm and year fixed effects. Standard errors (reported in parentheses) are adjusted for heteroskedasticity using Huber-White adjustment. Superscripts *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.

	Dependent Variables	
Controls	ICC^{AN}	ICC^{CX}
Extraversion	0.3019**	0.3341***
	(0.152)	(0.108)
Emotional stability	-0.2396	0.2164
	(0.226)	(0.151)
Agreeable	0.1651	0.0870
	(0.253)	(0.225)
Conscientious	-0.0279	0.0260
	(0.225)	(0.155)
Openness	-0.2162	-0.2538
	(0.215)	(0.172)
Assets	1.9974***	1.2187***
	(0.169)	(0.110)
B/M	1.1239***	3.4553***
	(0.288)	(0.190)
Leverage	-0.1338	-0.4921
	(0.543)	(0.475)
LTG	1.7951***	-1.5871***
	(0.386)	(0.323)
Firm age	0.2477***	0.2123***
	(0.035)	(0.018)
Volatility	9.9239***	12.3669***
	(1.140)	(0.936)
Beta	0.0246	-0.5536***
	(0.162)	(0.117)
IVOL	-12.9798	-21.3862***
	(8.171)	(5.287)
Analyst Bias	0.2000*	-0.2758***
	(0.116)	(0.070)
Analyst FERR	25.3847***	1.2818
	(3.961)	(1.241)
CEO age	-0.0005	-0.0062
	(0.017)	(0.010)
Male CEO	-0.9729***	-0.2939
	(0.282)	(0.334)
CEO ownership	-0.4562	-1.1187
	(1.492)	(1.589)
CEO tenure	0.0196	0.0128
	(0.012)	(0.010)
CEO overconfidence	0.2170	0.0874
	(0.205)	(0.135)
Constant	-18.7051***	-15.0075***
	(2.896)	(1.433)

Firm & Year FE	Yes	Yes
# observations	10,084	10,084
# firms	1,579	1,579
R^2	77.63%	59.78%

Table IV – CEO Extraversion and Risk Taking

This table reports estimates from a panel regression of risk measures on CEO Extraversion, the other four personality traits, and a set of CEO and Firm characteristics. Risk measures are total return volatility (Volatility) measured over 1-year and 3-year, period; idiosyncratic volatility (IVOL) measured over 3-year period using CAPM and 4-factor model; ROA Volatility (ROAVOL) measured over 5-year period; and an indicator variable, Pilot, which equals to 1 if a CEO has airplane pilot license and equals to 0 otherwise. Detailed definitions of the risk measures are in Appendix B. We estimate Extraversion using a linguistic technique and a sample of unscripted speech from quarterly conference call transcripts. We obtain conference call transcripts from Thomson Reuters for the period 2004-2013. Extraversion score is based only on CEO responses during the Q&A portion of the call and calculated using Mairesse et al. (2007) Support Vector Machine method. Details of the Extraversion measure construction are in Section II.A. Appendix B provides detailed definitions of control variables. Column 6 is based on logit regression. All specifications include firm and year fixed effects. Standard errors (reported in parentheses) are adjusted for heteroskedasticity using Huber-White adjustment. Superscripts *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.

Controls		(1) 1-year Volatility	(2) 3-year Volatility	(3) IVOL (CAPM)	(4) IVOL (4-factor)	(5) ROAVOL (5 years)	(6) Pilot
	Dependent variables						
Extraversion		0.0041**	0.0080***	0.0017***	0.0016***	0.0516**	0.2916**
		(0.002)	(0.002)	(0.000)	(0.000)	(0.025)	(0.145)
Emotional stability		0.0049**	0.0045	0.0015***	0.0014***	-0.1072***	0.0077
		(0.002)	(0.003)	(0.000)	(0.000)	(0.033)	(0.183)
Agreeable		-0.0037	0.0004	-0.0010	-0.0008	0.1001**	0.4861*
		(0.003)	(0.004)	(0.001)	(0.001)	(0.048)	(0.281)
Conscientious		0.0013	-0.0008	-0.0002	-0.0001	0.0766**	-0.1474
		(0.003)	(0.003)	(0.000)	(0.000)	(0.034)	(0.168)
Openness		-0.0020	-0.0009	-0.0001	-0.0003	-0.1450***	-0.0809
		(0.003)	(0.003)	(0.000)	(0.000)	(0.038)	(0.214)
Assets		-0.0186***	0.0050**	-0.0015***	-0.0014***	-0.5400***	-0.0629
		(0.002)	(0.002)	(0.000)	(0.000)	(0.025)	(0.060)
B/M		0.0635***	0.0085**	0.0055***	0.0052***	0.1418***	-0.3946*
		(0.003)	(0.003)	(0.001)	(0.001)	(0.036)	(0.215)
Leverage		0.0798***	0.0304***	0.0109***	0.0101***	0.5718***	0.9102*
		(0.008)	(0.007)	(0.001)	(0.001)	(0.096)	(0.514)
LTG		-0.0083	-0.0025	0.0001	0.0001	0.1262**	-0.2165
		(0.007)	(0.005)	(0.001)	(0.001)	(0.064)	(0.417)
Firm age		-0.0011***	-0.0049***	-0.0008***	-0.0007***	0.0181***	0.0097**
		(0.000)	(0.000)	(0.000)	(0.000)	(0.004)	(0.005)
Analyst Bias		0.0061***	-0.0078***	-0.0018***	-0.0015***	0.0409***	0.0611
		(0.001)	(0.001)	(0.000)	(0.000)	(0.011)	(0.052)
Analyst FERR		0.0460***	0.0133***	0.0044***	0.0042***	0.3392***	0.2074
		(0.005)	(0.004)	(0.001)	(0.001)	(0.048)	(0.264)
CEO age		-0.0004**	-0.0003*	-0.0001***	-0.0001***	-0.0041*	0.0016
		(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.013)
Male CEO		0.0046	-0.0003	-0.0003	-0.0004	-0.0313	-
		(0.005)	(0.004)	(0.001)	(0.001)	(0.076)	-
CEO ownership		0.0083	0.0457*	0.0160***	0.0157***	0.1109	0.6277
		(0.029)	(0.024)	(0.005)	(0.005)	(0.382)	(2.371)
CEO tenure		-0.0000	-0.0001	-0.0000	-0.0000	-0.0003	-0.0167
		(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.014)
CEO overconfidence		0.0025	0.0026	0.0003	0.0003	-0.0230	0.0895
		(0.002)	(0.002)	(0.000)	(0.000)	(0.031)	(0.192)
Constant		0.2142***	0.1504***	0.0412***	0.0391***	0.0476	-4.0782**
		(0.023)	(0.025)	(0.004)	(0.004)	(0.354)	(1.752)
Firm & Year FE		Yes	Yes	Yes	Yes	Yes	No
# obs		9,854	9,854	9,854	9,854	9,854	9,573
# firms		1,557	1,557	1,557	1,557	1,557	1,502
R^2		49.4%	63.0%	55.1%	56.4%	78.1%	1.6%

Table V – CEO Extraversion, Risk-Taking, and Expected Cost of Capital

This table reports estimates from a panel regression of implied cost of equity capital on CEO Extraversion, the other four personality traits, and a set of CEO and Firm characteristics in subsamples of firms based on risk measures. Risk measures are ROA Volatility (ROAVOL) measured over 5-year period; and an indicator variable, Pilot, which equals to 1 if a CEO has airplane pilot license and equals to 0 otherwise. We split the sample of ROA volatility based on the median value. Detailed definitions of the risk measures are in Appendix B. Implied cost of equity capital (ICC^{AN} and ICC^{CX}) is average internal rate of return estimated using models of Gebhardt et al (2001), Easton (2004) and Gordon and Gordon (1997) minus the yield on 10-year Treasury bonds, as detailed in the Appendix A. ICC^{AN} uses analysts forecasts of expected earnings and ICC^{CX} uses cross-sectional model of Hou et al. (2013) to forecast expected earnings. We estimate Extraversion using a linguistic technique and a sample of unscripted speech from quarterly conference call transcripts. We obtain conference call transcripts from Thomson Reuters for the period 2004-2013. Extraversion score is based only on CEO responses during the Q&A portion of the call and calculated using Mairesse et al (2007) Support Vector Machine method. We require that CEO speaks at least 500 words to be included in our sample. We use company tickers and names and CEO Names to match the CEOs from the conference call transcripts to ExecuComp database. Details of the Extraversion measure construction are in Section II.A. Appendix B provides detailed definitions of control variables. All specifications include firm and year fixed effects. Standard errors (reported in parentheses) are adjusted for heteroskedasticity using Huber-White adjustment. Superscripts *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.

Dependent variables	ICC^{AN}				ICC^{CX}			
Sub-samples	Low ROAVOL	High ROAVOL	Pilot=0	Pilot=1	Low ROAVOL	High ROAVOL	Pilot=0	Pilot=1
Extraversion	0.2172	0.3118*	0.4019***	1.5676**	0.1693	0.3664**	0.3518***	0.5357**
	(0.136)	(0.159)	(0.113)	(0.627)	(0.129)	(0.170)	(0.105)	(0.236)
Emotional stability	-0.4541**	0.0243	-0.2161	3.0386*	0.0560	0.3866*	0.2596*	0.0059
	(0.201)	(0.200)	(0.149)	(1.715)	(0.190)	(0.214)	(0.138)	(0.359)
Agreeable	0.4517*	-0.3633	0.0938	2.4220**	0.1447	0.0550	0.1763	0.9103*
	(0.270)	(0.304)	(0.215)	(1.175)	(0.255)	(0.325)	(0.200)	(0.487)
Conscientious	0.0271	-0.1262	-0.1038	0.7041	0.1476	-0.1121	0.0858	-1.0050***
	(0.194)	(0.207)	(0.147)	(1.919)	(0.183)	(0.221)	(0.137)	(0.380)
Openness	0.0442	-0.2923	-0.1668	-1.7895	-0.2883	-0.3125	-0.3003*	0.3991
	(0.206)	(0.246)	(0.172)	(1.249)	(0.195)	(0.263)	(0.160)	(0.364)
Assets	2.6987***	1.4744***	1.9116***	1.1411***	1.2727***	0.9855***	1.0748***	0.3530***
	(0.161)	(0.135)	(0.106)	(0.282)	(0.152)	(0.145)	(0.098)	(0.092)
B/M	1.0133***	1.1795***	0.9772***	1.0436***	3.9939***	3.1263***	3.6030***	3.0102***
	(0.209)	(0.191)	(0.151)	(0.363)	(0.198)	(0.204)	(0.141)	(0.396)
Leverage	1.4533**	-0.5916	0.4467	0.3593	2.6575***	-1.7297***	-0.1641	4.2958***
	(0.689)	(0.521)	(0.435)	(1.078)	(0.652)	(0.557)	(0.404)	(0.802)
LTG	1.6795***	1.5308***	2.0811***	-0.3718	-1.9755***	-1.3747***	-1.5742***	-1.3424*
	(0.551)	(0.286)	(0.271)	(0.604)	(0.521)	(0.306)	(0.252)	(0.758)
Firm age	0.1463***	0.3826***	0.2504***	0.0917*	0.1704***	0.2677***	0.2089***	0.0322***
	(0.025)	(0.025)	(0.018)	(0.055)	(0.024)	(0.027)	(0.017)	(0.012)
Volatility	15.2040***	7.6904***	10.3770***	11.2643***	14.5299***	11.0696***	12.8625***	14.5372***
	(1.195)	(0.964)	(0.812)	(1.862)	(1.131)	(1.032)	(0.755)	(2.518)
Beta	-0.5718***	0.1830	0.1047	-0.6531**	-0.7673***	-0.6119***	-0.4932***	-1.0449***
	(0.168)	(0.148)	(0.119)	(0.257)	(0.159)	(0.158)	(0.111)	(0.317)
IVOL	-3.5798	-14.2929**	-14.1611***	-6.1574	-8.5713	-33.3797***	-20.0283***	-46.1094***

	(6.963)	(6.500)	(5.048)	(11.990)	(6.594)	(6.953)	(4.695)	(15.161)
Analyst Bias	0.0213	0.0713	0.1056**	0.0101	-0.3232***	-0.3045***	-0.3155***	-0.1171
	(0.090)	(0.056)	(0.051)	(0.128)	(0.085)	(0.060)	(0.047)	(0.166)
Analyst FERR	20.3698***	21.3161***	26.0430***	12.2569***	2.7468**	-1.2115	2.0370**	-3.2302
	(1.151)	(1.154)	(0.851)	(2.417)	(1.090)	(1.234)	(0.792)	(2.361)
CEO age	-0.0322**	0.0110	0.0000	0.1129**	-0.0306**	0.0296**	0.0038	0.0222
	(0.014)	(0.014)	(0.011)	(0.047)	(0.013)	(0.015)	(0.010)	(0.022)
Male CEO	-0.4720	-1.2173***	-1.0969***	-	0.3149	-0.5331	-0.4626	-
	(0.507)	(0.454)	(0.321)	-	(0.480)	(0.486)	(0.299)	-
CEO ownership	-0.1007	0.9025	-0.6894	3.2099	-1.3869	-1.4750	-1.0713	-7.2019*
	(2.467)	(2.325)	(1.711)	(5.214)	(2.336)	(2.487)	(1.591)	(4.347)
CEO tenure	0.0001	0.0200	0.0211*	0.1464***	0.0229*	-0.0085	0.0163	0.0460*
	(0.014)	(0.015)	(0.011)	(0.042)	(0.013)	(0.016)	(0.010)	(0.026)
CEO overconfidence	0.1194	0.4735**	0.2722*	-0.3382	0.0061	-0.0585	0.0858	-0.2366
	(0.164)	(0.211)	(0.144)	(0.420)	(0.155)	(0.226)	(0.134)	(0.299)
Constant	-23.9703***	-15.0064***	-18.7852***	-36.6843***	-14.5158***	-14.1034***	-15.2420***	-41.0735***
	(2.076)	(2.196)	(1.602)	(9.098)	(1.966)	(2.349)	(1.490)	(13.063)
Firm & Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations	4,834	4,607	8,461	980	4,834	4,607	8,461	980
# firms	1,058	1,132	1,446	216	1,058	1,132	1,446	216
R^2	83.1%	81.5%	78.0%	84.9%	68.6%	60.6%	61.3%	64.3%

Table VI – CEO Extraversion and Organizational Capital

This table reports estimates from a panel regression of organizational capital measures on CEO Extraversion, the other four personality traits, and a set of CEO and Firm characteristics. Organizational capital measures are CEO Total Pay, CEO pay relative to the average TMT pay, CEO pay relative to the next highest pay in the TMT, and CEO Pay Slice (Bebchuk et al. 2011). Detailed definitions of the organizational capital measures are in Appendix B. We estimate Extraversion using a linguistic technique and a sample of unscripted speech from quarterly conference call transcripts. We obtain conference call transcripts from Thomson Reuters for the period 2004-2013. Extraversion score is based only on CEO responses during the Q&A portion of the call and calculated using Mairesse et al (2007) Support Vector Machine method. We require that CEO speaks at least 500 words to be included in our sample. We use company tickers and names and CEO Names to match the CEOs from the conference call transcripts to ExecuComp database. Details of the Extraversion measure construction are in Section II.A. Appendix B provides detailed definitions of control variables. All specifications include firm and year fixed effects. Standard errors (reported in parentheses) are adjusted for heteroskedasticity using Huber-White adjustment. Superscripts *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.

Controls	Dependent variables			
	(1) CEO total pay	(2) CEO pay relative to the average TMT pay	(3) CEO pay relative to the next highest pay in the TMT	(4) CEO pay slice
Extraversion	0.0665**	0.1464***	0.1300***	0.0140***
	(0.032)	(0.057)	(0.044)	(0.005)
Emotional stability	0.0455	0.1856***	0.1478***	0.0138**
	(0.044)	(0.066)	(0.053)	(0.005)
Agreeable	-0.1006	-0.2099*	-0.1066	-0.0130
	(0.070)	(0.108)	(0.083)	(0.009)
Conscientious	-0.0279	-0.0035	-0.0170	0.0017
	(0.049)	(0.076)	(0.057)	(0.006)
Openness	0.0553	0.0845	0.0299	0.0039
	(0.047)	(0.082)	(0.063)	(0.007)
Assets	0.3620***	0.0548	0.0257	0.0024
	(0.030)	(0.055)	(0.044)	(0.004)
B/M	-0.4174***	-0.3143***	-0.2388***	-0.0297***
	(0.036)	(0.071)	(0.055)	(0.005)
Leverage	-0.5148***	-0.4128**	-0.2593*	-0.0219
	(0.097)	(0.193)	(0.157)	(0.014)
LTG	-0.0807	0.0104	0.0396	0.0003
	(0.053)	(0.115)	(0.089)	(0.009)
Firm age	0.0278***	0.0092	0.0127*	0.0016**
	(0.004)	(0.008)	(0.007)	(0.001)
Volatility	-0.1652	-0.2514	-0.2015	-0.0543*
	(0.228)	(0.394)	(0.315)	(0.032)
Beta	0.0073	0.0200	0.0256	0.0024
	(0.024)	(0.049)	(0.039)	(0.004)
IVOL	0.0134	-0.7960	-0.6702	-0.1932
	(1.364)	(2.850)	(2.299)	(0.228)
Analyst Bias	-0.0039	0.0053	-0.0008	0.0007
	(0.012)	(0.023)	(0.018)	(0.002)
Analyst FERR	-0.3088	-0.4882	-0.3503	-0.0581*
	(0.261)	(0.332)	(0.280)	(0.032)
CEO age	0.0040	-0.0082	-0.0041	-0.0004
	(0.003)	(0.005)	(0.004)	(0.000)
Male CEO	-0.1384*	-0.3612**	-0.2067	-0.0271**
	(0.073)	(0.169)	(0.136)	(0.013)
CEO ownership	-1.2510**	-2.0100**	-1.1087	-0.1467*
	(0.595)	(0.889)	(0.675)	(0.081)
CEO tenure	0.0013	0.0098	0.0010	0.0003
	(0.003)	(0.006)	(0.005)	(0.000)
CEO overconfidence	0.0352	0.0049	0.0415	0.0049

	(0.037)	(0.069)	(0.056)	(0.005)
Constant	4.3714***	0.7359	0.0737	0.2638***
	(0.418)	(0.753)	(0.601)	(0.061)
Firm & Year FE	Yes	Yes	Yes	Yes
# obs	10,037	10,041	10,041	9,441
# firms	1,577	1,576	1,576	1,534
R^2	81.0%	48.2%	47.8%	53.9%

Table VII - CEO Extraversion, Organizational Capital, and Expected Cost of Capital

This table reports estimates from a panel regression of implied cost of equity capital on CEO Extraversion, the other four personality traits, and a set of CEO and Firm characteristics in subsamples of firms based CEO Pay Slice (defined in Appendix B). We split the sample based on the median value of CEO Pay Slice. Implied cost of equity capital (ICC^{AN} and ICC^{CX}) is average internal rate of return estimated using models of Gebhardt et al (2001), Easton (2004) and Gordon and Gordon (1997) minus the yield on 10-year Treasury bonds, as detailed in the Appendix A. ICC^{AN} uses analysts forecasts of expected earnings and ICC^{CX} uses cross-sectional model of Hou et al. (2013) to forecast expected earnings. We estimate Extraversion using a linguistic technique and a sample of unscripted speech from quarterly conference call transcripts. We obtain conference call transcripts from Thomson Reuters for the period 2004-2013. Extraversion score is based only on CEO responses during the Q&A portion of the call and calculated using Mairesse et al (2007) Support Vector Machine method. We require that CEO speaks at least 500 words to be included in our sample. We use company tickers and names and CEO Names to match the CEOs from the conference call transcripts to ExecuComp database. Details of the Extraversion measure construction are in Section II.A. Appendix B provides detailed definitions of control variables. All specifications include firm and year fixed effects. Standard errors (reported in parentheses) are adjusted for heteroskedasticity using Huber-White adjustment. Superscripts *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.

	Dependent variables			
	ICC^{AN}		ICC^{CX}	
	Low CEO Pay Slice	High CEO Pay Slice	Low CEO Pay Slice	High CEO Pay Slice
Extraversion	0.2200	0.4124**	0.2725*	0.6362***
	(0.163)	(0.180)	(0.147)	(0.185)
Emotional stability	-0.4419**	0.1947	0.0485	0.2322
	(0.218)	(0.226)	(0.195)	(0.233)
Agreeable	0.1900	-0.1733	0.0807	0.1501
	(0.319)	(0.348)	(0.287)	(0.359)
Conscientious	-0.0705	0.0823	-0.2376	-0.0507
	(0.226)	(0.271)	(0.203)	(0.279)
Openness	-0.3518	-0.1188	-0.0215	-0.5504**
	(0.246)	(0.271)	(0.221)	(0.279)
Assets	1.7809***	2.3434***	1.0543***	1.1439***
	(0.155)	(0.144)	(0.140)	(0.148)
B/M	1.3393***	0.8247***	3.4867***	3.4655***
	(0.215)	(0.216)	(0.193)	(0.222)
Leverage	1.5637**	-0.7259	-0.1129	0.0610
	(0.697)	(0.545)	(0.626)	(0.561)
LTG	1.9883***	1.7434***	-1.2883***	-2.1812***
	(0.396)	(0.358)	(0.356)	(0.369)
Firm age	0.2355***	0.2683***	0.2397***	0.1818***
	(0.028)	(0.024)	(0.025)	(0.025)
Volatility	6.5044***	13.2640***	10.3789***	15.6993***
	(1.175)	(1.071)	(1.055)	(1.104)
Beta	-0.2700	0.2875*	-0.6498***	-0.5014***
	(0.173)	(0.157)	(0.155)	(0.162)
IVOL	-4.0716	-26.8523***	-20.3363***	-16.5747**
	(7.077)	(6.901)	(6.357)	(7.109)
Analyst Bias	0.0866	-0.0006	-0.3648***	-0.4347***
	(0.074)	(0.074)	(0.066)	(0.076)
Analyst FERR	24.3057***	38.8823***	0.0524	3.0688*
	(1.074)	(1.540)	(0.965)	(1.587)
CEO age	-0.0094	0.0164	-0.0159	0.0204
	(0.014)	(0.015)	(0.013)	(0.016)
Male CEO	-1.2096**	-0.7477	-0.1796	-0.4678
	(0.504)	(0.455)	(0.453)	(0.469)
CEO ownership	0.6431	-2.3266	1.2500	-6.6793*
	(2.165)	(3.653)	(1.945)	(3.763)
CEO tenure	0.0153	0.0049	0.0127	0.0236
	(0.015)	(0.017)	(0.014)	(0.018)

CEO overconfidence	0.1953	0.1151	-0.0176	0.1277
	(0.224)	(0.179)	(0.201)	(0.185)
Constant	-13.1855***	-26.7302***	-12.3162***	-15.9201***
	(2.280)	(2.289)	(2.049)	(2.358)
Firm & Year FE	Yes	Yes	Yes	Yes
# observations	4,813	4,628	4,813	4,628
# firms	1,301	1,165	1,301	1,165
R^2	80.1%	81.9%	66.6%	66.0%

Table VIII – Reversed Causality, Tenure Subsample Test

This table reports estimates from a panel regression of implied cost of equity capital risk premium on CEO Extraversion, the other four personality traits, and a set of CEO and Firm characteristics, for the subsamples of observations split by CEO Tenure. Implied cost of equity capital (ICC^{AN} and ICC^{CX}) is average internal rate of return estimated using models of Gebhardt et al (2001), Easton (2004) and Gordon and Gordon (1997) minus the yield on 10-year Treasury bonds, as detailed in the Appendix A. ICC^{AN} uses analysts forecasts of expected earnings and ICC^{CX} uses cross-sectional model of Hou et al. (2013) to forecast expected earnings. We estimate Extraversion using a linguistic technique and a sample of unscripted speech from quarterly conference call transcripts. We obtain conference call transcripts from Thomson Reuters for the period 2004-2013. Extraversion score is based only on CEO responses during the Q&A portion of the call and calculated using Mairesse et al (2007) Support Vector Machine method. Details of the Extraversion measure construction are in Section II.A. Appendix B provides detailed definitions of control variables. All specifications include firm and year fixed effects. Standard errors (reported in parentheses) are adjusted for heteroskedasticity using Huber-White adjustment. Superscripts *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.

Dependent variables	ICC^{AN}		ICC^{CX}	
	CEO tenure <=3 years	CEO tenure >3 years	CEO tenure <=3 years	CEO tenure >3 years
Extraversion	-0.2710	0.7090***	0.2423	0.5684***
	(0.282)	(0.168)	(0.215)	(0.153)
Emotional stability	-0.2840	0.1340	0.1794	0.3371
	(0.446)	(0.318)	(0.257)	(0.224)
Agreeable	-0.0537	0.7779	0.2251	0.2877
	(0.469)	(0.535)	(0.420)	(0.378)
Conscientious	-0.0038	0.0623	0.0926	-0.0632
	(0.582)	(0.273)	(0.274)	(0.197)
Openness	-0.1692	-0.3058	-0.2307	-0.3712
	(0.315)	(0.331)	(0.320)	(0.254)
Assets	1.8996***	1.7353***	1.3090***	0.8941***
	(0.317)	(0.232)	(0.283)	(0.147)
B/M	0.3491	1.5574***	2.8811***	3.7114***
	(0.753)	(0.229)	(0.387)	(0.229)
Leverage	0.0123	-0.5884	-2.3638**	-0.6062
	(1.012)	(0.655)	(1.076)	(0.605)
LTG	2.1130***	1.7319***	-1.6603***	-1.3045***
	(0.557)	(0.415)	(0.641)	(0.407)
Firm age	0.1583	0.2598***	0.2065***	0.2147***
	(0.121)	(0.033)	(0.040)	(0.025)
Volatility	7.0172**	11.4694***	9.6488***	13.1401***
	(3.246)	(1.101)	(1.683)	(1.157)
Beta	0.1965	-0.2108	-0.6941***	-0.5517***
	(0.340)	(0.167)	(0.233)	(0.142)
IVOL	21.2170	-15.1482	-2.5132	-24.3709***
	(18.027)	(9.400)	(10.515)	(6.840)
Analyst Bias	0.2097	0.0170	-0.1866	-0.3018***
	(0.192)	(0.137)	(0.158)	(0.082)
Analyst FERR	16.3598***	20.9168***	5.1544*	1.3740
	(5.896)	(5.363)	(2.999)	(1.474)
CEO age	-0.0679**	0.0385*	-0.0400**	0.0001
	(0.031)	(0.022)	(0.017)	(0.020)
Male CEO	-0.7832	-0.8796**	-0.2406	-0.1807
	(0.501)	(0.413)	(0.632)	(0.596)
CEO ownership	7.2791	-0.5065	-8.1537**	-0.1473
	(7.236)	(1.577)	(3.906)	(1.788)
CEO tenure	0.2226***	0.0006	0.1202**	0.0187
	(0.083)	(0.022)	(0.060)	(0.018)
CEO overconfidence	-0.0280	0.3735	-0.1719	0.4394**
	(0.800)	(0.271)	(0.303)	(0.207)
Constant	-8.2945	-25.0096***	-13.7665***	-14.6131***
	(7.583)	(3.197)	(3.261)	(2.488)

Firm and year FE	Yes	Yes	Yes	Yes
# obs	3,081	7,003	3,081	7,003
# firms	1,077	1,414	1,077	1,414
R^2	80.9%	83.4%	70.7%	63.1%

Table IX – Robustness Test, Propensity Score Matching

This table presents the univariate test of ICC comparison between the firms with extraverted CEOs and a matched sample of firms with less extraverted CEOs using the propensity score matching technique. We use the sample median extroversion score to define extraverted CEOs (treatment sample where the scores are higher than the median) and less extraverted CEOs (control sample where the scores are lower than the median). The matching sample of less extraverted CEOs are selected using the nearest neighbor propensity score matching technique using a Probit model regressing on firm size (log assets), book-to-market ratio, firm age, and 5-year ROA volatility and controlling for the firm's Fama-French 48 industry. The results using one-to-one nearest neighbor propensity score matching both with and without replacement are reported in the table. The matched sample size, mean value of ICC measures in the treatment sample (with extraverted CEOs) and the control sample (with less extraverted CEOs), difference of the mean values, standard errors and t statistics of the mean different are reported in the table. The first two rows show the results for ICC^{CX} and the last two rows show the results for ICC^{AN}. **, *** represent significance at 0.05 and 0.01, respectively.

Nearest neighbor propensity score matching		N	Treated Sample (Extraverted CEOs)	Control Sample (Less Extraverted CEOs)	Differences in ICC	Standard Errors	t stats
ICC^{CX}	1-to-1 matching without replacement	3,796	3.41	3.25	0.16	0.08	2.06**
	1-to-1 matching with replacement	4,923	3.46	3.24	0.22	0.10	2.22**
ICC^{AN}	1-to-1 matching without replacement	3,796	5.40	5.16	0.25	0.11	2.17**
	1-to-1 matching with replacement	4,923	5.47	5.16	0.31	0.15	2.06**

Table X – CEO Extraversion, Cost of Capital, and Corporate Governance

Panel A reports estimates from panel regressions of operating performance on CEO Extraversion, the other four personality traits, and a set of CEO and Firm characteristics. We measure operating performance using return on assets (ROA) and industry adjusted return on assets (ROA^{IAdj}). Detailed definitions of the operating performance measures are in Appendix B. Panel B reports estimates from a panel regression of implied cost of equity capital risk premium on CEO Extraversion, the other four personality traits, and a set of CEO and Firm characteristics. Implied cost of equity capital (ICC^{AN} and ICC^{CX}) is average internal rate of return estimated using models of Gebhardt et al (2001), Easton (2004) and Gordon and Gordon (1997) minus the yield on 10-year Treasury bonds, as detailed in the Appendix A. ICC^{AN} uses analysts forecasts of expected earnings and ICC^{CX} uses cross-sectional model of Hou et al. (2013) to forecast expected earnings. We estimate Extraversion using a linguistic technique and a sample of unscripted speech from quarterly conference call transcripts. We obtain conference call transcripts from Thomson Reuters for the period 2004-2013. Extraversion score is based only on CEO responses during the Q&A portion of the call and calculated using Mairesse et al (2007) Support Vector Machine method. Details of the Extraversion measure construction are in Section II.A. Appendix B provides detailed definitions of control variables. All specifications include firm and year fixed effects. Standard errors (reported in parentheses) are adjusted for heteroskedasticity using Huber-White adjustment. Superscripts *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.

Panel A: Operating performance conditional on CEO Extraversion		
	(1) ROA	(2) ROA^{IAdj}
Extraversion	0.0054**	0.0050**
	(0.002)	(0.002)
Emotional stability	0.0007	0.0009
	(0.003)	(0.003)
Agreeable	0.0009	0.0030
	(0.004)	(0.004)
Conscientious	0.0006	-0.0017
	(0.003)	(0.003)
Openness	-0.0020	-0.0011
	(0.003)	(0.003)
Assets	0.0095***	0.0090***
	(0.003)	(0.003)
B/M	-0.0630***	-0.0562***
	(0.004)	(0.004)
Leverage	-0.1538***	-0.1423***
	(0.010)	(0.009)
LTG	-0.0591***	-0.0512***
	(0.007)	(0.007)
Firm age	-0.0011***	-0.0008**
	(0.000)	(0.000)
Volatility	0.0057	-0.0050
	(0.022)	(0.022)
Beta	-0.0016	-0.0001
	(0.002)	(0.002)
IVOL	-0.7867***	-0.7802***
	(0.159)	(0.158)
Analyst Bias	-0.0027**	-0.0028**
	(0.001)	(0.001)
Analyst FERR	-0.0565***	-0.0535***
	(0.021)	(0.020)
CEO age	-0.0000	-0.0000
	(0.000)	(0.000)
Male CEO	-0.0030	-0.0009
	(0.006)	(0.006)
CEO ownership	0.0349	0.0447*
	(0.027)	(0.027)
CEO tenure	0.0000	-0.0000
	(0.000)	(0.000)
CEO overconfidence	0.0004	-0.0000
	(0.002)	(0.002)

Constant	0.0612**	-0.0013
	(0.027)	(0.027)
Firm & Year FE	Yes	Yes
# observations	10,084	10,084
# firms	1,579	1,579
R^2	0.592	0.553

Panel B: CEO Extraversion and Cost of Capital, Governance Subsamples

	ICC^{AN}				ICC^{CX}			
Sub-samples	High IO	Low IO	High Independence	Low Independence	High IO	Low IO	High Independence	Low Independence
Extraversion	0.4078*	0.2904**	0.3104***	0.4246**	0.5408***	0.3134***	0.3911***	0.2676*
	(0.209)	(0.122)	(0.113)	(0.206)	(0.173)	(0.087)	(0.087)	(0.148)
Emotional stability	-0.3126	0.0731	-0.2166	0.0647	0.0795	0.2723**	0.0901	0.3971
	(0.233)	(0.175)	(0.160)	(0.312)	(0.237)	(0.123)	(0.124)	(0.251)
Agreeable	-0.0400	0.3083	0.3383	0.5883	0.1105	-0.0106	0.1909	-0.4890
	(0.308)	(0.253)	(0.216)	(0.521)	(0.308)	(0.178)	(0.172)	(0.366)
Conscientious	-0.1162	-0.1935	-0.1515	0.1452	-0.0301	-0.2042*	-0.1919	-0.2906
	(0.197)	(0.174)	(0.154)	(0.350)	(0.214)	(0.123)	(0.121)	(0.204)
Openness	0.0112	-0.2344	-0.3837**	0.0147	-0.2001	-0.0770	-0.2462*	0.5650**
	(0.245)	(0.193)	(0.175)	(0.353)	(0.247)	(0.135)	(0.135)	(0.244)
Assets	1.8158***	0.4640***	0.4701***	1.8071***	1.4089***	0.3769***	0.3744***	1.0312***
	(0.173)	(0.060)	(0.064)	(0.242)	(0.177)	(0.039)	(0.041)	(0.152)
B/M	1.0746***	2.4367***	2.0785***	1.2400***	3.1366***	4.6083***	4.0654***	3.5832***
	(0.221)	(0.205)	(0.173)	(0.385)	(0.287)	(0.150)	(0.146)	(0.283)
Leverage	-1.0873*	1.7034***	1.1533**	-0.1895	-0.9393	2.2333***	2.0022***	0.6386
	(0.615)	(0.539)	(0.459)	(0.802)	(0.598)	(0.375)	(0.352)	(0.634)
LTG	1.2275**	2.7249***	1.5504***	2.6864***	-2.4751***	-0.9702***	-1.8613***	-1.3938***
	(0.494)	(0.361)	(0.319)	(0.522)	(0.495)	(0.272)	(0.294)	(0.438)
Firm age	0.3664***	0.0145	0.0251***	0.3204***	0.2526***	0.0262***	0.0209***	0.2766***
	(0.033)	(0.009)	(0.009)	(0.042)	(0.028)	(0.006)	(0.005)	(0.025)
Volatility	10.0282***	8.0460***	8.9521***	9.1294***	11.8378***	10.4421***	11.6968***	10.9513***
	(1.069)	(1.292)	(1.052)	(2.021)	(1.264)	(0.990)	(0.996)	(1.251)
Beta	0.0724	0.1847	0.3236**	-0.1727	-0.6087***	-0.4250***	-0.3979***	-0.7769***
	(0.150)	(0.171)	(0.146)	(0.212)	(0.166)	(0.128)	(0.131)	(0.163)
IVOL	-14.1457	-22.5005***	-40.3255***	1.9212	-16.2589**	-34.4743***	-39.6370***	-9.3083
	(9.826)	(8.091)	(6.623)	(11.528)	(7.219)	(6.179)	(6.180)	(7.349)
Analyst Bias	0.0661	0.4663***	0.1612***	0.2307	-0.3545***	-0.1991***	-0.2978***	-0.1763*
	(0.187)	(0.074)	(0.061)	(0.200)	(0.111)	(0.057)	(0.056)	(0.103)
Analyst FERR	21.7855***	39.4186***	35.3897***	21.5920***	2.5413	2.0728***	2.3613***	1.6298
	(8.214)	(1.010)	(0.994)	(5.209)	(2.429)	(0.750)	(0.860)	(1.762)
CEO age	-0.0153	0.0262**	0.0080	0.0143	-0.0160	0.0111	0.0155*	-0.0132
	(0.013)	(0.012)	(0.012)	(0.024)	(0.015)	(0.008)	(0.009)	(0.012)
Male CEO	-0.8343*	-0.8568**	-1.0457***	-0.7128	-0.7762	-0.1806	-0.5686**	-0.2828
	(0.479)	(0.402)	(0.346)	(0.467)	(0.560)	(0.287)	(0.269)	(0.518)
CEO ownership	-1.6895	-4.5960***	-4.7757*	-0.1508	2.5120	-2.9984**	-3.0398*	1.7596
	(3.526)	(1.712)	(2.477)	(1.723)	(3.930)	(1.217)	(1.758)	(1.573)
CEO tenure	0.0337**	0.0352***	0.0417***	0.0159	0.0103	0.0189**	0.0121	0.0156
	(0.014)	(0.013)	(0.013)	(0.016)	(0.015)	(0.009)	(0.010)	(0.012)
CEO overconfidence	0.3235	-0.4116**	-0.3352**	0.2459	0.1017	-0.0883	-0.0765	-0.1379
	(0.247)	(0.174)	(0.159)	(0.325)	(0.199)	(0.124)	(0.124)	(0.204)
Constant	-18.8321***	-3.0051*	-0.1720	-26.1650***	-16.2827***	-4.6510***	-3.4131***	-16.1514***

	(2.617)	(1.700)	(1.590)	(2.551)	(2.227)	(1.193)	(1.209)	(1.797)
Firm & Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations	5,010	5,074	5,036	5,048	5,010	5,074	5,036	5,048
# firms	1,029	1,122	1,164	1,198	1,029	1,122	1,164	1,198
R^2	82.3%	78.9%	82.7%	80.3%	63.0%	65.5%	62.4%	67.0%

Table XI – Robustness Test, Individual Implied Cost of Capital Measures

This table reports estimates from a panel regression of implied cost of equity capital risk premium on CEO Extraversion, the other four personality traits, and a set of CEO and Firm characteristics. Implied cost of equity capital is an internal rate of return estimated using models of Gebhardt et al (2001), Easton (2004) and Gordon and Gordon (1997) minus the yield on 10-year Treasury bonds, as detailed in the Appendix A. ICC^{AN} uses analysts forecasts of expected earnings and ICC^{CX} uses cross-sectional model of Hou et al. (2013) to forecast expected earnings. We estimate Extraversion using a linguistic technique and a sample of unscripted speech from quarterly conference call transcripts. We obtain conference call transcripts from Thomson Reuters for the period 2004-2013. Extraversion score is based only on CEO responses during the Q&A portion of the call and calculated using Mairesse et al (2007) Support Vector Machine method. Details of the Extraversion measure construction are in Section II.A. Appendix B provides detailed definitions of control variables. All specifications include firm and year fixed effects. Standard errors (reported in parentheses) are adjusted for heteroskedasticity using Huber-White adjustment. Superscripts *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.

Dependent variables	ICC_{GLS}^{AN}	ICC_{Gordon}^{AN}	ICC_{MPEP}^{AN}	ICC_{GLS}^{CX}	ICC_{Gordon}^{CX}	ICC_{MPEP}^{CX}
Extraversion	0.2833**	0.5420***	0.2544*	0.2377**	0.4319***	0.6257***
	(0.112)	(0.200)	(0.143)	(0.094)	(0.138)	(0.232)
Emotional stability	-0.1037	-0.3339	-0.1949	0.2018	0.0651	0.2377
	(0.166)	(0.293)	(0.195)	(0.126)	(0.169)	(0.377)
Agreeable	0.2583	0.4455	-0.0636	0.1033	0.3127	-0.3605
	(0.198)	(0.332)	(0.288)	(0.190)	(0.255)	(0.516)
Conscientious	-0.1048	-0.2127	-0.0473	-0.0163	-0.0503	0.0149
	(0.161)	(0.288)	(0.201)	(0.144)	(0.172)	(0.324)
Openness	-0.0898	-0.1794	-0.2741	-0.1196	-0.1699	-0.5578
	(0.170)	(0.269)	(0.221)	(0.146)	(0.190)	(0.463)
Assets	1.9544***	2.5983***	1.8392***	1.4889***	1.2953***	-0.5203*
	(0.126)	(0.231)	(0.132)	(0.096)	(0.132)	(0.286)
B/M	2.2334***	-0.7013*	2.1825***	3.5914***	2.1670***	4.2305***
	(0.202)	(0.394)	(0.203)	(0.160)	(0.219)	(0.476)
Leverage	-1.0429**	-1.8729**	2.2728***	-1.3786***	-0.9859*	6.3751***
	(0.405)	(0.810)	(0.571)	(0.409)	(0.565)	(1.128)
LTG	1.5630***	-4.3096***	7.6036***	-1.4712***	-3.4844***	0.2493
	(0.289)	(0.553)	(0.347)	(0.258)	(0.434)	(0.958)
Firm age	0.2072***	0.2053***	0.4198***	0.1781***	0.2433***	0.4380***
	(0.025)	(0.048)	(0.055)	(0.015)	(0.022)	(0.050)
Volatility	8.5772***	7.9260***	15.0928***	8.8671***	12.1497***	6.4817**
	(0.807)	(1.536)	(1.101)	(0.780)	(1.186)	(2.514)
Beta	-0.1029	0.2532	-0.1619	-0.4601***	-0.8408***	0.8871***
	(0.119)	(0.203)	(0.156)	(0.098)	(0.153)	(0.290)
IVOL	-11.2720*	-27.7123**	-9.6967	-16.5478***	8.8048	-125.3228***
	(6.016)	(10.905)	(6.660)	(4.548)	(7.298)	(14.339)
Analyst Bias	0.1167	0.9298***	-0.4049***	-0.2765***	-0.3717***	0.2080
	(0.075)	(0.155)	(0.068)	(0.057)	(0.093)	(0.187)
Analyst FERR	16.9980***	34.7914***	22.4331***	1.1897	-1.1262	-0.9000
	(2.544)	(5.402)	(1.167)	(1.026)	(1.739)	(3.091)
CEO age	-0.0010	0.0018	0.0070	-0.0041	0.0034	-0.0028
	(0.012)	(0.022)	(0.013)	(0.008)	(0.013)	(0.029)
Male CEO	-0.7955***	-1.1165***	-1.1949***	-0.5319*	-0.1899	-0.2455
	(0.263)	(0.362)	(0.436)	(0.271)	(0.453)	(0.706)
CEO ownership	-1.5725	2.7883	-3.2833	-1.4285	-1.8519	0.2372
	(1.219)	(1.774)	(2.205)	(1.226)	(1.855)	(6.089)
CEO tenure	0.0174*	0.0137	0.0239*	0.0107	0.0140	0.0204
	(0.010)	(0.015)	(0.014)	(0.009)	(0.011)	(0.030)
CEO overconfidence	0.1119	0.4210	-0.1579	0.0800	-0.0431	-0.8045**
	(0.147)	(0.281)	(0.184)	(0.111)	(0.157)	(0.345)
Constant	-18.5203***	-23.6679***	-18.6682***	-15.4831***	-18.5393***	-4.9821
	(2.074)	(3.689)	(2.265)	(1.186)	(1.758)	(4.040)
Firm & Year FE	Yes	Yes	Yes	Yes	Yes	Yes
# observations	10,084	10,084	9,558	10,084	9,485	5,234

# firms	1,579	1,579	1,565	1,579	1,555	1,318
R^2	76.9%	73.8%	67.8%	64.0%	54.3%	58.6%

Table XII – Robustness Test, Realized Stock Returns

This table reports average performance of portfolio sorted on CEO Extraversion. In June of each year we sort all stock in our sample into quintiles based on the CEO Extraversion. We hold these portfolios for 12 months from July of year t until June of year t+1. We calculate average return for each portfolio and for a strategy that is long stocks with high-Extraversion CEOs and short stocks with low-Extraversion CEOs. We report time series average of cross-sectional monthly returns (Ret). In addition, we regress the monthly time series of returns on Fama and French 3 factors (Fama and French, 1993) and momentum and report the resulting 4-factor Alpha. Standard errors (in parentheses) are adjusted for heteroscedasticity and one-lag autocorrelation using Newey-West (1987) adjustment.

	EW returns		VW returns	
	Ret (%)	4-factor Alpha (%)	Ret (%)	4-factor Alpha (%)
Extraversion^{LOW}	1.116**	0.058	0.842	-0.024
	(0.551)	(0.085)	(0.468)	(0.101)
Extraversion^{HIGH}	1.461***	0.387***	1.015***	0.220***
	(0.552)	(0.092)	(0.397)	(0.080)
Extraversion^{HIGH} - Extraversion^{LOW}	0.345***	0.329**	0.172***	0.244*
	(0.119)	(0.130)	(0.158)	(0.138)

Figure 1 – CEO Extraversion and Cost of Capital Evolution over CEO's Tenure
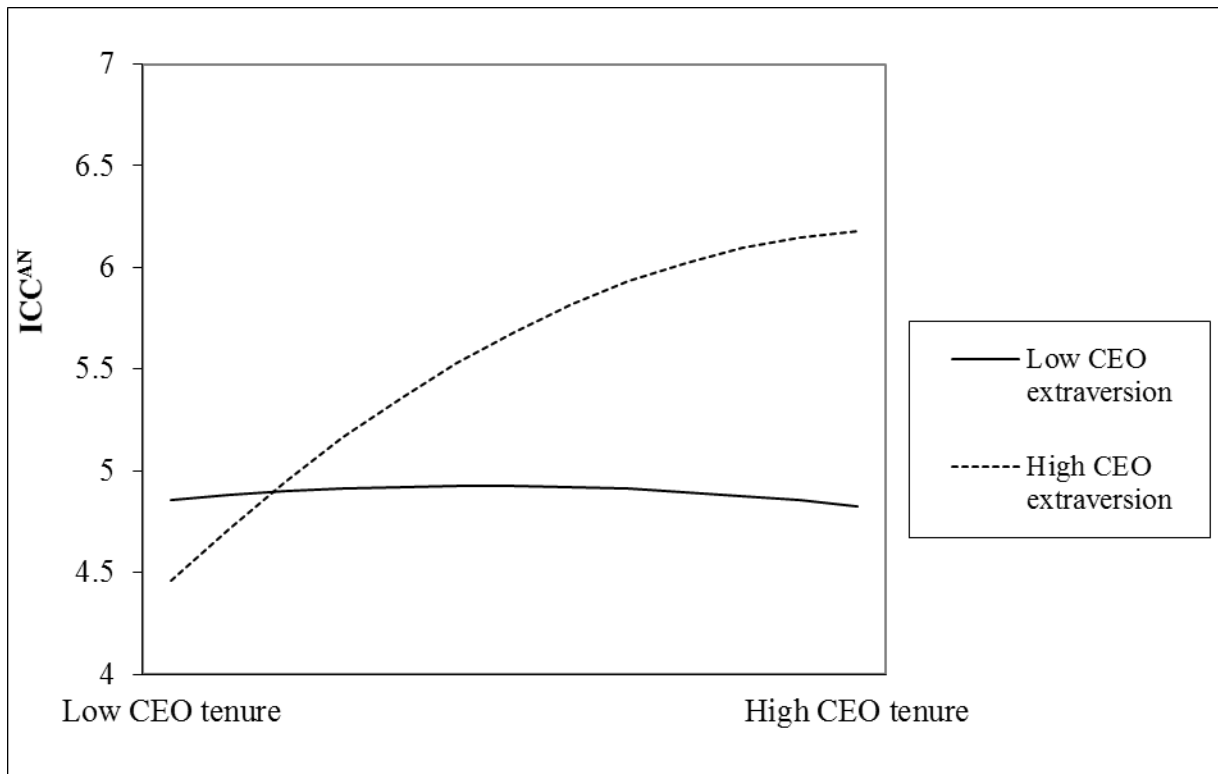
Figure 2 – Propensity score distribution of treatment sample and control sample before and after the matching
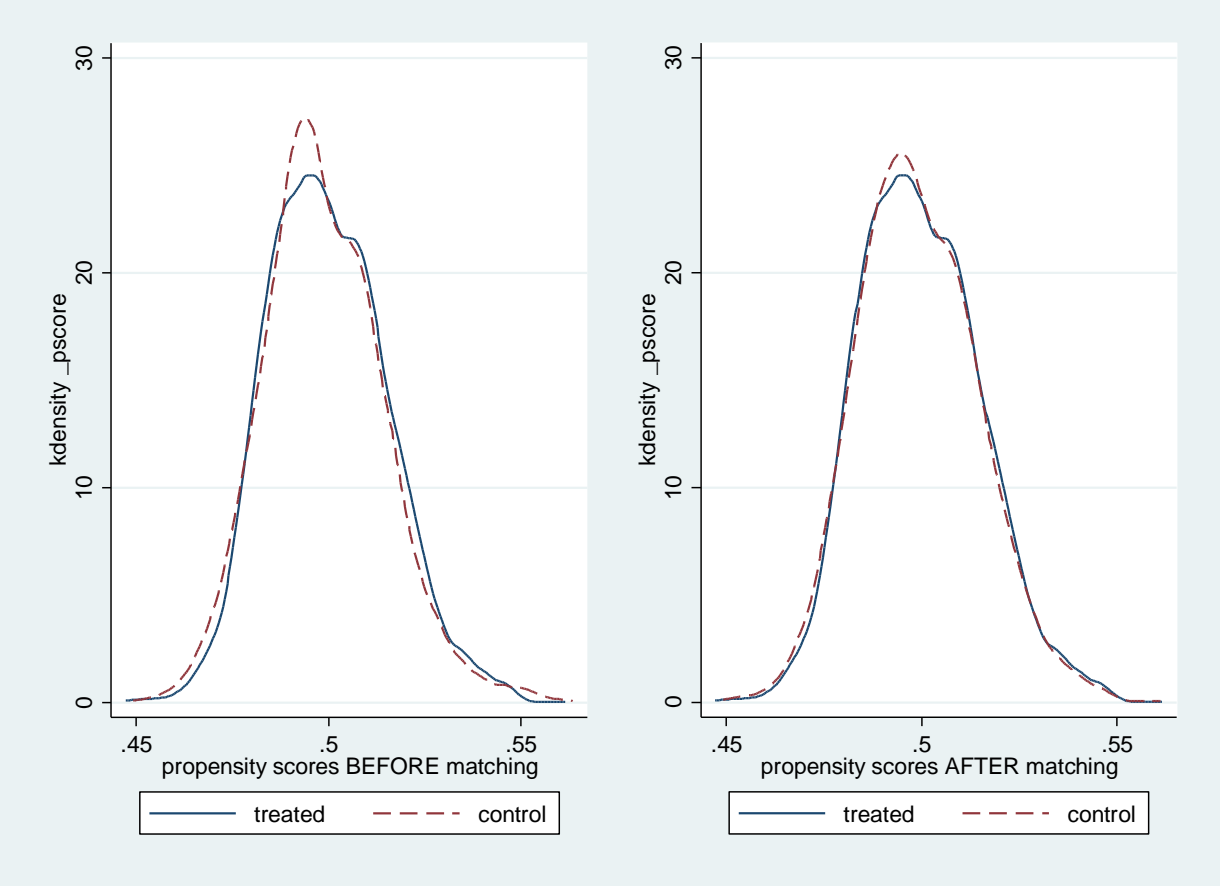
Figure 3 – Value of $10,000 Invested High- and Low-Extraversion Firms

This figure shows cumulative value of $10,000 invested in top 20% of firms with most Extraverted CEOs (High Extraversion) and in bottom 20% of firms with least Extraverted CEOs (Low Extraversion). The portfolio is rebalanced annually, in June of each year. Portfolios invest in firms in equal weights.