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ABSTRACT

We administer psychometric tests to senior executives to obtain evidence on their underlying psychological traits and attitudes. We find US CEOs differ significantly from non-US CEOs in terms of their underlying attitudes. In addition, we find that CEOs are significantly more optimistic and risk-tolerant than the lay population. We provide evidence that CEOs' behavioral traits such as optimism and managerial risk-aversion are related to corporate financial policies. Further, we provide new empirical evidence that CEO traits such as risk-aversion and time preference are related to their compensation.

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1. Introduction

What causes firms to behave the way they do? The answers to this important question are not well understood. Traditional economic theory suggests companies should simply pursue positive net present value projects to maximize shareholder wealth. However, firms around the globe seem to behave differently, leading some to speculate that heterogeneous objective functions are being maximized (see, e.g., Allen, 2005). Even within the US, firms in the same industry, of similar size and facing similar investment opportunities behave differently.

To what extent do personality characteristics vary among US managers and non-US firms? What is the importance of individual heterogeneity in corporations? The idea that individual heterogeneity matters in corporate finance/governance has recently become a primary

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* Corresponding author at: Fuqua School of Business, Duke University, Durham, NC 27708, USA. Tel.: +1 919 660 7657; fax: +1 919 660 8030. E-mail address: mpuri@duke.edu (M. Puri).

focus in behavioral finance. Recent papers suggest that managers matter—there are findings on managerial fixed effects (Bertrand and Schoar, 2003); on managerial overconfidence proxies relating to firm behavior (Malmendier and Tate, 2005, 2008); and on Chief Executive Officer (CEO) characteristics in private equity firms being related to outcome success (Kaplan, Klebanov, and Sorensen, 2012).

We use a survey-based approach to provide new insight into the people and processes behind corporate decisions. This method allows us to address issues that traditional empirical work based on large archival data sources cannot. For example, we are able to administer psychometric personality tests, gauge risk-aversion, and measure other behavioral phenomena. Our mode of inquiry is similar to those of experimental economists (who often administer gambling experiments) and psychologists (who administer psychometric tests). As far as we are aware, no other study attempts to measure attitudes of senior management directly through personality tests to distinguish CEOs from others and U.S. top level executives from non-US top level executives. We also relate CEO attributes to firm-level policies.

Our survey quantifies behavioral traits of senior executives and also harvests information related to career paths, education, and demographics. We ask these same questions of chief executives and chief financial officers, among public and private firms, and in both the US and overseas. We can thus compare traits and attitudes for US and non-US CEOs to see if there is indeed a significant difference in attitudes. We also ask questions related to standard corporate finance decisions such as leverage policy, debt maturity, and acquisition activity. This allows us to relate attitudes and managerial attributes to corporate actions. We also examine how managerial attributes such as risk-aversion and time preference relate to compensation at the firm level.

We use the survey responses to address the following broad questions. How do US CEOs differ from lay people, and also how do they differ from Chief Financial Officers (CFOs) and non-US CEOs in terms of behavioral and other characteristics? Are managerial psychological traits, career experiences, or education correlated with corporate decision-making? Do behavioral traits such as risk-aversion and time preference explain compensation packages (e.g., is risk-aversion related to lower pay-performance sensitivity as predicted by theory)?

We compare CEOs to CFOs and others in terms of personality traits and career characteristics, as well as make attitude comparisons of CEOs to established norms in the psychology literature. We find that CEOs are much more risk-tolerant than the lay population of similar age profile (studied in Barsky, Kimball, Juster, and Sharpio, 1997). It is notable that CEOs are also much more optimistic than the lay population as compared to the norms in the psychology literature (Scheier, Carver, and Bridges, 1994). We find, as might be expected, that CEOs and CFOs have different personal characteristics and career paths. Interestingly, we also find significant differences between CEOs and CFOs in terms of attitudes. In particular, our psychometric tests suggest that CEOs

are much more optimistic than CFOs. Our results also suggest that US-based CEOs and CFOs are more optimistic than their non-US counterparts. This provides evidence on one channel through which US and non-US firms differ: their executives differ in terms of attitudes and traits, perhaps a reflection of firms outside the US having different norms or maximizing different objective functions (Allen, 2005).

Our paper focuses on CEOs because they are the principal corporate decision-makers. In particular, we focus on two key areas that CEOs feel they have the most influence on: mergers and acquisitions (M&A) and capital structure (see Graham, Harvey, and Puri, 2012). We investigate which factors and experiences (e.g., personality traits or career path) of the decision-maker (CEO) affect capital structure and acquisition decisions. We show that these corporate policies are significantly related to the personality traits of executives. For example, we find that companies initiate more mergers and acquisitions when their chief executive is more risk-tolerant. Beyond risk tolerance, one might expect that the level of a chief executive's optimism might be related to the corporate decisions her company makes. For example, optimistic CEOs might expect that recent profitability will continue into the future, or that the future will be better than the recent past. Consistent with this view and the arguments of Landier and Thesmar (2009), we find evidence that optimistic CEOs use more short-term debt than do firms led by less optimistic CEOs. There is also a growing literature that suggests that males tend to be more overconfident than females (see, e.g., Barber and Odean, 2001). Correspondingly, we find that male CEOs are more likely to have higher debt ratios, and in particular, higher short-term debt ratios than their female counterparts.

We find that firms with high historical or future rates of growth are more likely to be run by risk-tolerant CEOs. These chief executives are likely to be younger. They are also more likely to be taller than average. To the extent that height corresponds to confidence (as suggested elsewhere; see, e.g., Persiciao, Postlewaite, and Silverman (2004) and Deaton and Arora (2009)), these results are consistent with more confident, more risk-tolerant, younger CEOs being more likely to run growth companies.

We cannot determine the direction of causality between corporate growth and executive personality. Managers may self-select into companies (or companies may hire managers) who have the “right” personality traits for the particular company. What we document is that there is a significant relationship between CEO characteristics and company characteristics.

We also examine the CEOs' target compensation in terms of the proportion due to fixed salary, and separately, the part that is performance-dependent, i.e., bonus, stock, and options. We find that risk-averse CEOs are significantly more likely to be compensated by salary and less likely to be compensated with performance-related packages. We further find that CEOs who are impatient (i.e., have a high rate of time preference) are more likely to be paid proportionately more in salary. These results are intuitive. Standard agency theory, including both

screening/adverse selection models and moral hazard models, predicts a fundamental trade-off between increasing incentives and risk, i.e., the more risk-averse the agent, the more costly it is to provide pay-performance incentives. Despite this, it has been very hard to find support for this prediction in the empirical literature (see, e.g., [Prendergast, 2002](#)). Our finding that pay-performance sensitivity actually decreases with risk-aversion is, to our knowledge, one of the first direct pieces of evidence consistent with this theoretical prediction. Further, our findings that differences in time preference are also important for explaining compensation patterns is consistent with standard agency theory but is a prediction that has largely been ignored in the literature. Our results that CEOs are, on average, much less risk-averse than the general population also fits well with this framework. Risk aversion makes incentive pay costly, and increases the participation constraint of the manager. As a result, firms prefer to hire less risk-averse agents as managers, all else equal.

While the survey approach allows us to ask many unique questions, it is not without potential problems. Surveys measure beliefs, not necessarily actions. Perhaps some of the survey questions are misunderstood or otherwise produce noisy measures of the desired trait or characteristic. Moreover, at least for some questions, executives can potentially parrot explanations that they think researchers want to hear, rather than state their true beliefs. In addition, field studies may face the objection that market participants do not necessarily have to understand the reason they do what they do in order to make (close to) optimal decisions. It is also possible that the respondents are not representative of the underlying population, an issue that we investigate below. Given that we conduct our survey at one point in time, it is not possible to determine causation for the most part. For example, we cannot say for sure whether risk-tolerant CEOs use less short-term debt or whether firms that have a policy of using short-term debt attract less risk-tolerant employees. Likewise, in most cases, it is not possible for us to distinguish whether the personality trait causes the corporate policy from whether an executive “learns” a trait on the job, nor can we separate a managerial fixed effect from a company fixed effect. In the latter case, a company might optimally seek out an executive with certain traits due to the needs of the business. Indeed, our results are consistent with such an interpretation.

Even with these considerations, our study provides new insights and contributes to several different research streams. First, we administer the first-ever psychometric tests of sitting executives and provide evidence that US CEOs differ significantly from non-US CEOs in terms of attitudes and attributes, from CFOs, and also from the lay population. The differences in attitudes help provide one possible rationale for differences in firm behavior across countries. Second, we contribute to the literature that investigates whether executives’ characteristics and psychological traits are related to corporate decisions. Third, our results provide direct evidence on a role for risk-aversion and time preference in executive compensation—a result predicted by standard agency theory but one on which direct evidence has been scarce.

The rest of the paper is organized as follows. [Section 2](#) describes the survey instrument that we use, and explains the design of the questions and delivery mechanism. [Section 3](#) presents our analysis of who makes which decision within the firm, how managerial traits correspond to corporate actions, whether there is matching between companies and managers, and the differences between CEOs and others. Some conclusions are offered in the final section.

2. Method

2.1. Survey mechanism

A common approach used in prior work is to infer executive attitudes from observed executive actions. While this is a laudable technique, questions arise about the validity of the action as a broad-based proxy, and samples are limited to companies for which such managerial actions are observable. We adopt a different approach in which we gauge managers’ personality traits and attitudes using well-established questions that have been shown in psychology and economics to be valid measures of peoples’ attitudes.

To assess risk-aversion, we examine managers’ responses to a series of gambles similar to [Barsky, Kimball, Juster, and Sharpio \(1997\)](#), who administer such questions in the Health and Retirement Survey. To assess optimism, we borrow from well-established psychology literature using standard psychometric tests ([Scheier, Carver, and Bridges, 1994](#) Life Orientation Test-Revised or LOT-R test) that have been widely used in psychology research. To measure time preferences, we assess time predilection for gains and losses. To gauge sure loss aversion, we present managers with a gamble that, if rejected, indicates that they are averse to sure losses.

As far as we are aware, no other study attempts to measure attitudes of senior management directly through such personality tests and relate them to firm-level policies. In addition, because the survey is anonymous, we also gather information on other measures and variables thought to be important, as described below.

2.2. Survey design

Our survey is wide-ranging, our hope being to capture many facets of corporate decision-making. Our survey was designed to address multiple issues, including how attitudes of senior management relate to firm-level policies.¹ Below we focus on the key variables that we use in this study and how they are created.

2.2.1. Measuring attitudes

Personal risk-aversion: We follow the approach in [Barsky, Kimball, Juster, and Sharpio \(1997\)](#) to measure personal risk-aversion. In their paper, Barsky et al. use survey methods to measure risk-aversion in the Health and

¹ In a companion paper ([Graham, Harvey, and Puri, 2012](#)), we examine how capital is allocated, and decision-making authority is delegated, within firms, and use several questions from the survey that are not studied in this paper.

Retirement Survey, which involves over 11,000 responses from adults aged 51 to 61. The principal requirement for a question aimed at measuring risk-aversion is that it must involve gambles over lifetime income. The nature of the questions in Barsky et al. is as follows:

Suppose that you are the only income earner in your family, and you have a good job guaranteed to give you your current (family) income every year for life. You are given the opportunity to take a new and equally good job, with a 50–50 chance it will double your (family) income and a 50–50 chance that it will cut your (family) income by a third. Would you take the new job?

Barsky, Kimball, Juster, and Sharpio (1997) caution that because changing jobs is costly, there may be a status quo bias that would predispose an individual to reject the risky alternative. This is also discussed in Shefrin (2005). Accordingly, we modify the Barsky et al. approach, rewording the question as a choice between two alternative new jobs, one with a safe income stream, the other being risky. The series of questions that we use is:

Suppose you are the only income earner in your family. Your doctor recommends you move because of allergies. You have to choose between two possible jobs (choose one):

- (a) 100% chance that the job pays your current income for life.
- (b) 50% chance that the job pays twice your current income for life and 50% chance that the job pays 2/3 of your current income for life.

If the respondent picked (a), the survey continues to ask:

Which job would you choose if the choices were instead:

- (c) 100% chance that the job pays your current income for life.
- (d) 50% chance that the job pays twice your current incomes for life and 50% chance that the job pays 4/5 of your current income for life.

If the respondent picked (b), the survey continues to ask:

Which job would you choose if the choices were instead:

- (e) 100% chance that the job pays your current income for life.
- (f) 50% chance that the job pays twice your current income for life and 50% chance that the job pays 1/2 of your current income for life.

In our analysis, we classify people who answer (a) and (c) as being the least risk-tolerant.

2.2.1.1. Optimism. We measure optimism using psychometric tests specifically designed to gauge optimism. In particular we, use the Life Orientation Test—Revised

(LOT-R), as devised by Scheier, Carver, and Bridges (1994). The LOT-R has been used extensively in the psychology literature;² it has the advantages that it is a very credible measure in psychology, it is brief and easy to use, and has a well-established interpretation. Its brevity makes it ideal for use in a survey such as ours where questionnaire length is an important consideration.

In this test, respondents are asked to answer a number of questions on a 0–4 point scale ranging from “I agree a lot,” “I agree a little,” “I neither agree nor disagree,” “I disagree a little,” and “I disagree a lot.” There are ten questions: six pertinent questions with four filler questions. The six scored questions are:

1. In uncertain times, I usually expect the best.
2. If something can go wrong for me, it will.
3. I'm always optimistic about my future.
4. I hardly ever expect things to go my way.
5. I rarely count on good things happening to me.
6. Overall, I expect more good things to happen to me than bad.

Coding is done so that high values indicate optimism. Thus, questions 1, 3 and 6 are numerically coded with a 4 if the respondent answers “I agree a lot” and zero if they answer “I disagree a lot.” Questions 2, 4, and 5 are coded as 4 if the respondent answers “I disagree a lot,” and zero if the respondent answers “I agree a lot.” This gives us a range of mean responses from 0–4. We classify as optimistic respondents who average 3 or higher for these questions.

2.2.1.2. Time preference. We ask the following question to measure time preference for gains (see, e.g., Loewenstein, Read, and Baumeister, 2003):

Would you rather win US\$10,000 now or win US\$13,000 a year from now?

If the respondent answers that s/he would rather win US\$10,000 today, s/he is categorized as being impatient because s/he has an implicit discount rate of more than 30%.

2.2.1.3. Aversion to sure losses. If an executive is averse to sure losses, then this may lead her/him to undertake actions such as “throwing good money after bad” in hopes of turning around what appears to be a sure loss. We pose the following question to measure aversion to sure losses:

Last year your company invested \$5 million US in a project that was expected to generate cash flows of \$10 million US after one year. A year has passed and the project yielded nothing.

Now you have the opportunity to invest an additional sum in this same project. There is a 20% chance that the project will generate a \$10 million US cash flow in a year's time and nothing thereafter. There is an 80%

² References to articles that use LOT-R can be found at <http://www.psy.miami.edu/faculty/ccarver/sci/LOT-R.html> and in Puri and Robinson (2007).

chance that the new investment will generate nothing at all. How much would you be willing to invest today?

\$ _____ million dollars US.

If the respondent replies \$2 million or more we classify her/him as averse to sure losses because this action indicates a willingness to overpay to continue the project in order to avoid the “sure loss” of terminating the project today.

2.2.2. Demographics/career related variables

This is an anonymous survey, hence we gather information on the personal characteristics of the executives, their past career/education, and related demographics, since past work suggests they can be important, and we therefore incorporate them as controls. We collect information on height, gender, age, past experience, whether they obtained an MBA, and whether they graduated from a prestigious college. We briefly describe the rationale behind these variables and their construction below.

Height: Economists have documented a height-wage disparity that is almost of the same magnitude as the gender, wage disparity (see, e.g., Persicao, Postlewaite, and Silverman, 2004). One explanation given for this disparity is that height, especially in the adolescent years, is important in developing confidence, which ultimately translates into the wage disparity. (For example, the (tall) star athlete has his confidence built up during his youth, as coaches and other adults laud his accomplishments; this confidence carries over into other aspects of the athlete’s life.) This literature would suggest that height might be a reasonable proxy for confidence. Case and Paxson (2008) suggest that height might proxy for cognitive ability. Accordingly, height might capture something that our behavioral questions do not. We define a male to be tall if he is 5 feet 10 inches or above, and a woman is tall if she is 5 feet 4 inches and above, both of which are one inch greater than the average adult height among US residents.

Male: There is a growing literature that suggests that the degree of confidence differs between men and women, and that men tend to be more overconfident (see, e.g., Barber and Odean, 2001).

MBA: An MBA degree can signal many things. It can represent valuable knowledge gleaned from a good business education. On the other hand, it might indicate conservatism as those who really want to shoot for the stars early on might decide that an MBA is not necessary.³

Age: An executive’s age can potentially affect decisions in important ways. Younger CEOs may be bolder. On the other hand, age can reflect experience and perspective, allowing executives to take more risks. Some evidence suggests that personal risk-aversion appears to increase with age till age 70 and then decline (see Shefrin, 2005). There is also some evidence that the sophistication of financial decisions varies with age (see Agarwal, Driscoll, Gabaix, and Laibson, 2009).

Past experience: The executive’s career path (whether their background is from finance, accounting, legal, sales/marketing, or other routes) could affect outlook and comfort level in certain kinds of decisions. Accordingly, we ask the respondent whether his/her work experience prior to becoming an executive was primarily in operations, legal, sales/marketing, accounting, finance/treasury, research, or other.

Prestigious college: Graduating from a college with high SAT scores can be a sign of innate intelligence. It is also possible that graduating from a prestigious college endows certain expectations on the kind of work that one does and the kind of company that one joins. Accordingly, we use SAT scores of the colleges that the executives attend to gauge how prestigious the school is. The methodology we employ is similar to Chevalier and Ellison (1999).⁴

2.2.3. Company characteristics

We collect information on a number of company characteristics. We are unable to match to Compustat data since the survey does not require companies to identify themselves; hence, we collect company-specific data in the survey itself. The purpose is to determine whether we can identify a relation between personal or demographic information and corporate actions. Additionally, we search for evidence consistent with a matching of executives and companies. Accordingly, we gather the following information.

Size: The size of the firm can be important for a variety of reasons. Large size can imply a certain amount of stability and has implications for growth. Research suggests that large firms typically have more debt (Frank and Goyal, 2007). Hence, we control for size in our tests. Large firms are defined as those with sales revenues exceeding \$1B.

Operating segments: The number of operating segments of the company tells us something about diversification. Accordingly, one of the questions in the survey is how many

⁴ Ideally, we would like to know the SAT score of the school at the time that the CEO attended; our computed SAT scores are an approximation for this. We follow Chevalier and Ellison (1999) methodology, which briefly, is as follows. We use Lovejoy’s *College Guide* as our main source for SAT scores. Where there is a range of SAT scores, we take the midpoint of the middle 50% of freshmen scores as reported in Lovejoy’s *College Guide*. If the middle 50% is not available, we take the average SAT scores or ACT scores at the university. For 64% of our sample, the scores are calculated directly. For the rest, we approximate: if only mean SAT scores are available then we use the sum of the mean math and verbal scores. Some schools report ACT mid-50% range only. For these we construct predicted values from a regression of SAT math high on ACT math low, ACT math high, ACT math low squared, and ACT math high squared. If only the average ACT math and reading scores are reported, then we rerun similar regressions using the midpoint of the SAT 50% ranges as the dependent variable and the midpoint of the ACT 50% ranges and the midpoint squared as independent variables. If only composite ACT scores are reported, then we use them as if they represent only reading and math scores and rerun the above regressions. If only selectivity scores are reported, then we assign to these schools the mean SAT score of the schools with the same selectivity index. Insofar as in mid-tier schools the CEO is likely to be in the right tail of the distribution, the median SAT scores from such schools are likely to understate CEO’s personal SAT score.

³ In contrast, Chevalier and Ellison (1999) find that fund managers with MBAs tend to take on more systematic risk.

operating segments (i.e., distinct operating divisions like autos, food, and retail) does your company have?

Public or private: We ask respondents to indicate whether their firm is public or private. This is an important characteristic of the company in its own right, and can be related to some corporate decisions, e.g., acquisition activity.

Debt ratio: The amount of debt that a company uses is the subject of much discussion in finance and behavioral economics. One consideration important to our analysis is that using more debt “levers up” the firm, producing more risk and higher expected returns, a preference which might be related to executive personality traits. Some theories (e.g., Heaton, 2002; Hackbarth, 2008) argues that managers’ behavioral traits affect the use of debt. Hence, we ask respondents to indicate the total debt/total assets ratio for their companies.

Short-term debt ratio: Some theories suggest that behavioral characteristics matter more for short term debt as opposed to the total debt undertaken by the firm (see, e.g., Landier and Thesmar, 2009). Accordingly, we ask for the short-term debt/total debt ratio for the firm.

Number of acquisitions: Dating back to Roll’s (1986) Hubris Hypothesis on takeovers, many argue that acquisitions are often driven by managerial characteristics as opposed to being purely value-maximizing transactions. The large literature on bidder returns, which are near zero or negative on average, is consistent with such a story (see, e.g., Andrade, Mitchell, and Stafford, 2001). Accordingly, one of our objectives is to investigate whether managerial characteristics are related to acquisition activity. Hence, we ask about number of acquisitions as well as amongst the management team, who has most of the input in mergers and acquisitions. The survey design allows us to identify the subset of CEOs who believe they are the dominant M&A decision-maker. For this purpose we use the question: “Amongst the management team, who has most of the input in mergers and acquisitions.” The CEO answers based on a 7-point scale, where 1 represents “I make decision without help from others,” 7 represents “others make decisions,” and the midpoint is “share decision equally with others.”

Historic growth: We are interested in investigating the types of companies for which different sorts of managers work. If there is some matching of managerial traits to company characteristics, rapidly growing companies would be a logical place to see such matching. Hence, we ask the executives to report average annual sales revenue growth rate for their company over the last three years.

Expected growth: Presumably, it is not just historical growth that is important but future anticipated growth as well. Hence, we also ask managers to project the annual growth rate in sales for their companies over the next three years.

Compensation: Executives arguably have some discretion about the composition of their compensation packages. All else equal, managers with certain characteristics (e.g., high risk-aversion) would prefer compensation packages with a larger salary component and a smaller variable component. In any given year, these components

might vary. Hence, we ask managers about the target percentage of their total compensation that is in the form of salary, bonus, stock and options awards, and other.

2.3. Survey delivery

We created an initial survey instrument based on existing theoretical and empirical research. We then solicited feedback from a number of academics, practitioners, and CEOs on the initial version of the survey. Based on this feedback, we shortened and focused the survey. We also sought and incorporated the advice of marketing research experts on the survey’s design and execution. A copy of the faxed English language version of the final survey instrument can be found at <http://faculty.fuqua.duke.edu/~jgraham/CEOCFO.pdf>. For most of the participants, rather than a fax, the version of the survey they were administered consisted of a series of linked web pages.

We survey both CEOs and CFOs. We contacted three groups of CEOs. The largest group was approximately 10,000 executives who subscribe to *Chief Executive* magazine. *Chief Executive* has more than 70,000 subscribers, and we emailed an invitation to participate in the survey to the CEO subscribers who work at the largest 10,000 companies (among their 70,000 subscribers). There was a bounceback rate of about 2.3% on the emails, meaning that approximately 9,770 executives received the invitation. We also reached out to readers of *Chief Executive* with an advertisement in the magazine that invited them to go to an Internet link to participate in the experiment. This printed advertisement attracted fewer than two dozen participants, and if we were to delete these CEOs from the sample, our results do not change. Due to their small number, we do not separate out these CEOs for the remainder of the paper but instead merge them in with the other *Chief Executive* respondents.

The second group of CEOs we contacted is 800 (net of bounced emails) chief executive readers of *CFO* magazine. We emailed the same survey invitation to these executives. The third group of CEOs attended the World Economic Forum in Davos during January 2005. We faxed surveys to 142 Davos’ executives and received seven responses. If we were to delete these responses, it would not alter our results. Due to their small number, we do not separate out these CEOs for the remainder of the paper.

In total, we surveyed approximately 10,700 CEOs, once improper email addresses are eliminated. All of these invitations were issued on approximately February 1, 2006. We sent a reminder to all those emailed on February 14. Across all these groups, 1,180 CEOs responded, for a response rate of approximately 11%, which is typical of recent survey response rates.⁵ In the

⁵ Graham, Harvey, and Rajgopal (2005) obtain a response rate of 10%, Trahan and Gitman (1995) 12%, Graham and Harvey (2001) 9%, and Brav, Graham, Harvey, and Michaely (2005) 16%. In addition, Slemrod and Venkatesh (2002) survey tax preparers (12% response rate) and corporate taxpayers (9% response rate) about compliance costs. The referenced quarterly CFO survey can be found at <http://www.cfosurvey.org>.

analysis below, we focus primarily on the 1,017 CEOs who work for firms headquartered in the United States.

During the first two weeks of February 2006, we also invited four groups of US CFOs to participate.⁶ The largest group of surveyed CFOs consists of subscribers to *CFO* magazine. On our behalf, the magazine emailed 6,800 invitations (net of bounced emails) to subscribers of the US version of its primary publication, *CFO* magazine. Separately, Duke University emailed 2,000 (net of bounced emails) CFOs who had participated in previous quarterly *CFO* Global Business Outlook surveys conducted by researchers at Duke and *CFO* (see <http://www.cfosurvey.org>). The response rate for the quarterly survey is typically 5% to 6%. The third group was 253 CFOs who participated in the Forum on Corporate Finance. Finally, 107 financial officers who are alumni of Duke University were faxed a survey instrument (the results do not change if faxed responses are ignored). All total, approximately 9,000 US-based CFOs were surveyed. We received 549 responses, for a response rate of approximately 6%.

We also surveyed Asian and European chief financial officers. In particular, we invited subscribers to *CFO* Europe and *CFO* Asia magazines to participate. In the demographic questions, we verify that these respondents in fact work in firms that are headquartered in these geographic regions. *CFO* Europe sent approximately 5,600 email invitations and *CFO* Asia 4,500, both figures net of emails that bounced. A total of 396 European CFOs responded, as did 264 Asian CFOs, yielding response rates of approximately 7% and 6%, respectively. The Asian group was not sent an email reminder because the reminder date fell near the Chinese New Year. The European response rate may be a little higher because we gave the executives the opportunity to take the survey in any of four languages: English, French, German, or Dutch. The Asian survey was only available in English. Overall, we had 1,276 CFOs respond across different regions. In this paper, the non-US executives and CFOs are primarily included as a comparison group for executive personality traits and characteristics.

2.4. Summary statistics

Table 1, Panel A contains self-reported summary information about the characteristics of sample firms. In our sample, 11.5% of the firms are public, with mean sales revenue of \$551 million. While much research studies public firms, one advantage of our sample is that we learn a great deal about private firms. This is important because little private-firm research is conducted even though 87% of US firms with assets greater than \$10 million are private.⁷ At the same time, it is important to interpret our results with the public/private breakdown in mind.

We gather a number of demographic characteristics of the CEOs relating to personality traits as well as career and education. Some summary statistics about CEOs are given in Table 2. In our sample, 9.8% of US CEOs have low

risk tolerance. Thus, most CEOs seem willing to take on risk, which is perhaps a necessary ingredient of the job that CEOs undertake. Or, perhaps risk-takers that succeed are the “winners” who ultimately rise to the CEO position.

In our sample, 80.2% of the CEOs are very optimistic as gauged by the LOT-R test. CEOs are very optimistic in absolute terms, and also as compared to CFOs and as benchmarked against the norms in the psychology literature (see Scheier, Carver, and Bridges, 1994). We discuss the differences further in Section 3 below.

More than one-third of CEOs have an MBA degree. They are predominantly male (92.3%). The median male height is 71 inches while the median female height is 66 inches. One-third are impatient in terms of having a discount rate greater than 30%. In terms of career path, 16% of the sample comes from a finance/accounting background. The mean CEO is 54 years old and attended a university with a mean SAT score of 1160.

3. CEO characteristics

In this section, we compare the personality traits of CEOs to other people. For example, how similar are they to CFOs or to the general population?

3.1. Comparisons between US CEOs, US CFOs, and non-US executives

For risk-aversion, we have a benchmark from the Barsky, Kimball, Juster, and Sharpio (1997) study. Our survey uses similar questions to Barsky et al. on risk-aversion but we find very different results. Barsky et al. posed these questions in the Health and Retirement Survey (HRS), which had a mean respondent age of 55.6 years. Our mean CEO age is roughly similar at 54.1 years. In Barsky et al., over 64% of the respondents are reported to display low risk tolerance. In sharp contrast, we find that only 9.8% of our CEOs display low risk tolerance.

CEOs are likely to have larger wealth than the lay population, which could affect some measures of risk tolerance. However, as Barsky, Kimball, Juster, and Sharpio (1997) show, one can back out the coefficient of relative risk-aversion from the questions, and this measure of risk-aversion should not be a function of wealth. For the very risk-averse, on which we focus, the coefficient of relative risk-aversion is greater than 3.76.⁸ Our results suggest that 9.8% of CEOs have a relative risk-aversion greater than 3.76 as compared to 64% of a similar-aged lay population. CEOs are often perceived to be visionaries and risk-takers. Our results of very large differences in the degree of risk-aversion between CEOs and the lay population support this popular wisdom.

We are also able to benchmark the dispositional optimism of US CEOs against a number of measures. The US CEOs in our sample are highly optimistic. They have a mean LOT-R score of 20.34 (standard deviation of 3.50).

⁶ Most of those surveyed have the job title CFO. Some have the title of Treasurer, Assistant Treasurer, VP Finance, Comptroller, or a similar title. We refer to this group collectively as CFOs.

⁷ <http://spccapital.com/FAQS.1.6-1.htm#FAQ12>.

⁸ As explained in Section 2, our question is slightly different from that in Barsky, Kimball, Juster, and Sharpio (1997). Our very risk-averse category corresponds to Category I in Table I in Barsky et al.

Table 1

Firm characteristics summary statistics.

This table reports the summary statistics of specific firm characteristics used in the analysis. All variables reflect the survey responses of participating US CEOs. Firm sales (size) is determined based on survey question categorizing firm sales into seven size groups. Category midpoints are used to create the firm-size variable reported here. Category 1 includes firms with sales less than \$25 M, category 2 includes firms with sales between \$25 M and \$99 M, category 3 includes firms with sales between \$100 M and \$499 M, category 4 includes firms with sales between \$500 M and \$999 M, category 5 includes firms with sales between \$1B and \$4.9B, category 6 includes firms with sales between \$5B and \$9.9B, and category 7 includes firms with \$10B or above in sales. Historical and expected growth reflect growth in sales. Number of operating segments refers to the number of segments in which the reporting executive has experience in prior to current position. Number of acquisitions reflects the number of acquisitions the firm has made over the past two years. Executive compensation variables (stocks, options, bonuses, and salary) are percentages of total compensation.

	Observations	Mean	Std. dev.	Minimum	Median	Maximum
<i>Panel A: All firms</i>						
Public (%)	785	11.5	N/A	N/A	N/A	N/A
Sales (size) revenue (\$M)	961	551.0	1,819.3	12.5	62	12,500
# Operating segments	1,001	2.2	1.4	1.0	2	12
Historical growth (%)	948	22.2	45.4	-30.0	12	500
Expected growth (%)	952	18.6	19.2	-5.0	12	99
Debt-to-assets ratio (%)	811	26.6	25.2	0.0	20	100
Short-term Debt to Total Debt Ratio (%)	805	25.0	29.6	0.0	11	100
Number of acquisitions	872	0.7	1.5	0.0	0	9
Stocks, options, and bonuses (%)	793	36.7	26.2	0.0	35.0	100
Salary (%)	795	57.1	26.4	0.0	60.0	100
Stock ownership (%)	788	33.9	36.5	0.0	17.5	100
<i>Panel B: Public firms only</i>						
Public (%)	90	100.0	N/A	N/A	N/A	N/A
Sales (size) revenue (\$M)	90	2,378.6	3,810.4	12.5	299.5	12,500
# Operating segments	88	2.5	1.3	1.0	3	6
Historical growth (%)	90	15.2	18.9	-10.0	8.5	125
Expected growth (%)	90	13.5	12.5	1.0	10	75
Debt-to-assets ratio (%)	79	28.3	26.1	0.0	25.0	100
Short-term debt to total debt ratio (%)	79	20.5	25.5	0.0	10.0	100
Number of acquisitions	88	1.2	1.6	0.0	1.0	9
Stocks, options, and bonuses (%)	87	52.4	23.3	0.0	55.0	98
Salary (%)	87	44.6	22.9	0.0	40.0	100
Stock ownership (%)	88	5.4	14.80	0.0	1.0	100

Table 2

Personal characteristics of corporate executives.

This table reports the summary statistics of personal characteristics of US CEOs. Highly risk-averse is a dummy variable for executives that prefer a job that pays with certainty their current salary against jobs that pay twice their current income with 50% chance and 80% of their current income with 50% chance. MBA degree is a dummy variable for executives with MBA degrees. Very optimistic is a dummy variable for an executive that has reported an average of 4 or higher in the LOT-R Test. Averse to sure losses is a dummy for executives who avoids sure losses now by hedging. Focused in fin. & acc. is a dummy for executives who have experience focused in financial and/or accounting fields. Tenure is the number of years the executive has been in current position. Impatient is a dummy variable for executives who prefer money now over money a year later at an interest rate of 30%. Stock ownership measures the fraction of a firm's stock that the executive will own if all stock options are exercised.

<i>Summary statistics</i>						
	Observations	Mean	Std. dev.	Minimum	Median	Maximum
Highly risk-averse (%)	1,008	9.8	29.8	0	0	100
MBA Degree (%)	916	34.9	47.7	0	0	100
Male (%)	1,009	92.3	26.7	0	100	100
Male Height (inches)	881	71.2	2.8	52	71	82
Female Height (inches)	78	65.7	2.4	58	66	71
Very Optimistic (%)	992	80.2	39.8	0	100	100
Averse to sure losses (%)	861	8.5	27.9	0	0	100
Impatient (%)	996	32.9	47.0	0	0	100
Focused in Fin. & Acc. (%)	986	16.0	36.7	0	0	100
Age	992	54.1	9.4	25	54	89
University SAT Score	842	1,159.8	156.6	750	1,140	1,485
Tenure	1,011	10.4	8.4	0.5	8	56
Stock Ownership (%)	788	33.9	36.5	0	17.5	100

Benchmarking this against the norms in the psychology literature, Scheier, Carver, and Bridges, 1994 find a mean LOT-R score of 14.33–15.15 (standard deviation of 4.05–

4.33). Of our CEOs, 80% are very optimistic (mean score of 18 or more, or average score of 3 or more on a 0–4 range), well above the mean in the psychology literature norms.

Interestingly CEOs are much more optimistic than CFOs, with only 65% of CFOs being classified as very optimistic. (See Table 3, Panel A.)

Given our results that CEOs are optimists as per psychometric tests, a related question is whether others also perceive CEOs to be optimistic. In order to assess this,

Table 3

Comparison of executive characteristics across samples.

This table reports the summary statistics of specific personal characteristics of participating executives used in the analysis. Panels A–C compare the characteristics of US CEOs against those of US CFOs, US CEOs with Non-US CEOs and US CFOs with Non-US CFOs, respectively, based on three sampling methods. The first, unconditional, uses the entire sample. The second sampling method matches firms one-on-one based on public/private status, randomly sampling when the number of observations are uneven. The third sample method matches firms one-on-one based on size categories. Panel A compares US CEOs to US CFOs using the three sampling methods described above, while Panel B compares the characteristics of US CEOs against those of non-US CEOs in the same way. Panel C compares the characteristics of US CFOs against those of non-US CFOs for the three sampling methods. Variables are defined as in Table 2. Summary statistics reflect means where applicable. Significance at the 10% level is denoted by *, 5% by **, and 1% by ***. The number of observations is included in the panel header.

<i>Panel A: Comparisons between US CEOs and US CFOs based on three sampling methods</i>							
	(1) Unconditional~1011 CEOs/534 CFOs		(2) Public/private matching~383			(3) Size matching~417	
	US CEOs	vs US CFOs	US CEOs	vs US CFOs	US CEOs	vs US CFOs	US CEOs
Highly risk-averse (%)	9.8	8.4	10.8	7.0*	10.6	8.7	
MBA degree (%)	34.9	51.8***	34.1	49.3***	32.8	49.5***	
Male (%)	92.3	90.4	93.7	93.0	95.7	90.1***	
Male height (inches)	71.2	71.0	71.1	70.9	71.2	70.9	
Female height (inches)	65.7	65.1	66.2	64.5**	66.4	64.7**	
Very optimistic (%)	80.2	65.3***	83.5	65.7***	79.7	66.3***	
Averse to sure losses (%)	8.5	13.2***	8.8	11.7	7.8	11.6*	
Impatient (%)	32.8	26.4***	30.4	24.9*	28.0	26.8	
Focused in fin. & acc. (%)	15.6	86.7***	15.9	85.2***	16.8	87.7***	
Age	54.1	48.6***	54.0	49.0***	55.0	48.7***	
University SAT score	1159.8	1113.5***	1165.8	1109.0***	1145.2	1106.3***	
Tenure (years)	10.4	6.8***	9.9	7.1***	10.3	6.9***	
Stock ownership (%)	33.9	3.8***	28.7	4.5***	20.0	3.8***	
<i>Panel B: Comparisons between US CEOs and non-US CEOs based on three sampling methods</i>							
	(1) Unconditional~1011 US/162 Non-US		(2) Public/private matching~120			(3) Size matching~153	
	US CEOs	vs Non-US CEOs	US CEOs	vs Non-US CEOs	US CEOs	vs Non-US CEOs	US CEOs
Highly risk-averse (%)	9.8	16.7***	5.8	17.6***	9.2	17.1**	
MBA degree (%)	34.9	48.2***	33.9	51.9***	39.9	48.9	
Male (%)	92.3	94.4	92.5	95.0	94.7	94.7	
Male height (inches)	71.2	69.3***	70.9	69.7***	71.1	69.2***	
Female height (inches)	65.7	56.9***	67.1	53.1	66.8	55.7	
Very optimistic (%)	80.2	54.1***	80.7	57.6***	78.7	53.1***	
Averse to sure losses (%)	8.5	19.7***	4.3	17.9***	8.6	19.7***	
Impatient (%)	32.8	41.4**	28.3	38.7*	36.2	41.1	
Focused in fin. & acc. (%)	15.6	25.3***	18.3	26.9	19.0	25.0	
Age	54.1	50.0***	54.9	49.7***	52.9	49.7**	
University SAT score	1159.8	1208.7	1154.2	1189.6	1157.5	1201.5	
Tenure (years)	10.4	9.0*	10.0	8.0*	10.3	8.5*	
Stock ownership (%)	33.9	33.6	31.7	33.4	40.2	33.6	
<i>Panel C: Comparisons between US CFOs and non-US CFOs based on three sampling methods</i>							
	(1) Unconditional~534 US/ 707 Non-US		(2) Public/private matching~431			(3) Size matching~430	
	US CFOs	vs Non-US CFOs	US CFOs	vs Non-US CFOs	US CFOs	vs Non-US CFOs	US CFOs
Highly risk-averse (%)	8.4	13.9***	7.1	13.9***	7.7	14.9***	
MBA degree (%)	51.8	33.6***	52.0	31.7***	52.3	34.3***	
Male (%)	90.4	87.6	92.6	90.0	90.2	89.3	
Male height (inches)	71.0	69.1***	70.9	68.7***	71.0	69.2***	
Female height (inches)	65.1	63.4	64.9	64.4	65.1	63.9**	
Very optimistic (%)	65.3	47.9***	65.1	47.7***	64.9	51.6***	
Averse to sure losses (%)	13.2	13.9	13.3	14.1	13.6	12.8	
Impatient (%)	26.4	37.9***	24.5	38.8***	26.8	35.3***	
Focused in fin. & acc. (%)	86.7	85.3	85.5	85.2	86.4	87.0	
Age	48.6	43.3***	48.8	43.5***	48.8	43.5***	
University SAT score	1113.5	1118.8	1117.6	1100.0	1115.1	1093.0	
Tenure (years)	6.8	5.9***	6.9	5.8***	6.7	5.5***	
Stock ownership (%)	3.8	6.1**	4.0	6.4*	3.9	5.3	

we conduct another survey in March 2007. In this survey, we ask CFOs about their perception of CEO optimism. The specific question we ask is, “Compared to your level of optimism, is the CEO of your company more or less optimistic about the financial prospects of your own company?” CFOs can respond whether their CEO is more optimistic, less optimistic, or about the same as the CFO’s optimism. Of 453 CFOs who responded to this question, only 5.1% of the CFOs say they are more optimistic than their CEOs. The next question follows up and asks “Why do you think your CEO’s optimism differs from yours?” We have 292 responses to this question from CFOs. The predominant responses, 35.7%, say that CEOs are more optimistic about almost everything i.e., CEOs are more optimistic about all aspects of life, above and beyond the CEO’s extra optimism about business prospects. The results of this second survey deepen our earlier finding. Not only are CEOs more optimistic as per psychometric tests, they are also perceived to be more optimistic by their CFO colleagues. Taking these results together, this suggests that CEOs are indeed special in terms of their personality characteristics, in particular, being more risk-tolerant as well as more optimistic than others.

We are able to use data that we collected from the survey to further compare a number of characteristics of CEOs to CFOs (see Table 3, Panel A). We first examine differences in US CEOs and CFOs. It can be seen that CEOs are much less likely to have MBA degrees than are CFOs. CEOs are also likely to be older, and to have attended more prestigious universities. CEOs are less averse to sure losses and their main career path is less likely to be finance/accounting, relative to CFOs. CEOs tend to be more impatient than CFOs: there are a significantly larger proportion of CEOs with a high rate of time preference as compared to CFOs.

We need to be careful about drawing conclusions from these comparisons because they are unconditional, not having first matched the executives by firm characteristics. Hence, we recalculate the differences in characteristics of CEOs and CFOs after matching for whether the company is public or private. Panel A of Table 3, column 2 shows that the results are similar when matching by public versus private status. We separately match by size in column 3. After matching, we find similar results with the only exception being that the differences in time preference no longer robustly significant. The results suggest that CEOs not only have different career paths from CFOs but importantly, differ in terms of their attitudes.

Next, we examine how US CEOs and CFOs differ from executives from other parts of the world (Panels B and C in Table 3). We find both CEOs and CFOs from the United States tend to be more risk-tolerant than executives whose companies are not located in the United States.⁹ They are also more optimistic, and older.

Further, non-US CEOs and CFOs tend to be less patient, as indicated by their higher rate of time preference, relative to their US counterparts. Foreign CEOs also have a higher aversion to sure losses than US CEOs. The only place that

we find significant difference between US and non-US CEOs that does not hold in CFOs relates to educational background. US CEOs are less likely to have an MBA than their non-US counterparts, but US CFOs are more likely to have an MBA than their non-US counterparts.

Again, we need to be careful in drawing conclusions since these comparisons are unconditional. Hence, we recalculate the differences in characteristics of US CEOs to non-US CEOs after matching for whether the company is public or private. Panel B of Table 3, column 2 shows that the results are similar when matching by public versus private status. We separately match by size in column 3. After matching, we find the results that are robust to all three sampling methods are that US CEOs are less risk-averse, more optimistic, and less averse to sure losses. The results suggest that US CEOs tend to be very different in terms of their attitudes from non-US CEOs.

We conduct a similar exercise in Panel C of Table 3 where we examine the differences in US CFOs as compared to non-US CFOs matching by private/public status and by size. We find that similar to the difference in attitudes between US CEOs and non-US CEOs, US CFOs are less risk-averse, more optimistic, and more patient than their non-US counterparts. In addition US CFOs are more likely to have an MBA degree.

In all, our results suggest that CEOs, particularly in the US, tend to possess certain personal traits, which may well be an integral part of having what it takes to become a CEO and/or to operate effectively as a chief executive. Our results suggest the importance of personality traits in occupational choice, an area where there has been relatively little evidence [an exception is Puri and Robinson (2007, in press)]. Further, the differences we find in US CEOs, and non-US CEOs’ attitudes may help explain why corporate objectives and behavior differ across countries, a subject of some debate (see, e.g., Allen, 2005).

3.2. Firm characteristics

The summary statistics indicate that the median firm has two operating segments and has experienced median historical sales growth of 12%. The median debt-to-assets ratio is 20%, and the short-term debt to total debt ratio is 11%.¹⁰ The mean (median) number of acquisitions over the past two years is 0.7 (0). Performance-sensitive compensation (stock, options, bonus) accounts for about 37% of the total compensation of the average executive in our sample, and salary accounts for about 57%, with the rest composed of ‘other’ compensation. Note that our analysis is based primarily on self-reported survey data. Table 1, Panel B reports the same information for public firms only. Since we have only 90 public firms, the sample

⁹ US CEOs and CFOs both tend to be taller (though this could be because of a native population height differential).

¹⁰ We examine the data for internal consistency and typographical errors. As a result, one entry with negative debt/assets and two entries with short-term debt ratio exceeding 100% are dropped; entries with a fraction of debt ratio are changed to percentages; number of acquisitions at 100 (next highest is 26) are dropped (three observations); and where the total of stock, option, bonus, salary, and other compensation is outside the range of 90–110% of total compensation (15 observations), we treat these as missing.

is somewhat sparse. As expected, the public companies are bigger with mean sales revenue of \$2.37 billion, 2.5 operating segments, median sales growth of 8.5%, and median debt-to-assets ratio of 25%. Performance-sensitive compensation accounts for about 52% of compensation for these public firms. Given that companies do not have to identify themselves in our survey, we cannot directly match all these 90 public firms with Compustat. Nonetheless, we do some benchmarking of our companies to the universe of companies in Compustat.

Table 4 reports the correlations between both firm and executive characteristics for the US CEOs. Some of the correlations are interesting, and some are intuitive. For example, older CEOs are less risk-tolerant. CEOs with MBAs are younger and tend to have a career path in finance or accounting. As might be expected, older CEOs tend to work in larger firms, the prestige of the college from which they graduate matters less, and they are more likely to be male.

We also look at whether there are differences in the way CEOs of private firms are compensated as compared to CEOs of public firms. Breaking down our data, we observe that CEOs of private firms obtain, on average, 57.1% of their compensation from salary, as compared to 44.6% received by CEOs of public firms (as shown in Table 1). In general, though, CEOs of private firms have a larger equity stake in their firm. In response to the question, “if all options were vested and exercised, what percent of your company’s common stock would you own (e.g., 5%),” CEOs of private firms have an average ownership of 33.9% as compared to 5.4% held by CEOs of public firms.

Following the recommendation by List (2007), we benchmark to Compustat, a frequently used database for corporate finance research. We examine sales, debt-to-assets, and other variables as shown in Appendix Table A1. Briefly, our sales comparison indicates that our sample firms are smaller than the typical Compustat firm, with two-fifths of our sample falling in the smallest Compustat quintile. This is not surprising given that 88.5% of our sample is comprised of private firms, while Compustat only contains public firms. When we restrict the comparison to public firms in our sample only (see Table A2), the size discrepancy is less marked, with only 11.4% of sample firms falling in the smallest Compustat quintile. With this subset, 58.2% of our publicly listed sample firms fall within the third and fourth largest Compustat quintile. The survey response sample is fairly representative of the Compustat universe in terms of debt/assets, debt maturity, and historical growth.

We also check the self-reported responses of companies against the actual entries in Compustat for the firms that we can identify. There are 64 Compustat firms that we can identify in our data with self-reported leverage ratio. We find that the average self-reported debt/asset ratio for publicly listed firms was 24.4% with a standard deviation of 22.8. Average Compustat total debt/asset ratio for the same set of firms is 28.2% with a standard deviation of 26.7. The mean difference (self-reported minus Compustat debt ratio) is -3.8%, with a *t*-stat of

Table 4

Correlation Table.

This table reports the correlations between both firm and executive characteristics for our main analysis sample of US CEOs. Old is a dummy variable for executives older than the median of the survey executives. Tenure is considered long if the executive has been in the position for longer than the median length of office in the sample of US CEOs. Prestigious college is a dummy for executives who studied at a US university with average SAT scores in the fourth quartile of the survey sample. Large firm is a dummy for firms reported to have more than \$1B in sales. Tall is a dummy variable for male executives over 5 feet 10 inches and female executives over 5 feet 4 inches. Other variables are defined as in Table 2. Significance at the 10% level is denoted by *, 5% by **, and 1% by ***.

	Highly risk-averse	Very optimistic	Averse to sure losses	Impatient	MBA	Male	Tall	Focused in fin. & acc.	Old	Public	Prestigious college	Prestigious college	Historical growth
Very optimistic	-0.013												
Averse to sure losses	0.002	0.038											
Impatient	0.039	-0.017	0.083***										
MBA	-0.041	0.010	-0.073***	-0.050									
Male	-0.004	-0.047	-0.006	-0.093***	0.048								
Tall	-0.031	0.034	0.036	0.013	0.020	0.006							
Focused in fin. & acc.	0.036	-0.036	-0.014	0.082**	0.172***	0.064**	-0.020						
Old	0.124***	0.014	-0.068**	-0.040	-0.139***	0.081**	-0.013						
Public	0.015	0.001	0.007	-0.041	0.005	-0.000	0.000	-0.012	0.020	-0.075**	0.007		
Prestigious college	-0.011	-0.014	-0.027	-0.066	0.042	-0.119***	0.003	-0.040	0.050	0.387***	-0.042		
> \$1B Firm	-0.006	0.021	0.007	-0.011	-0.024	0.037	-0.015	0.005	0.050	-0.062***	-0.026		
Historical growth	-0.024***	0.005	0.035	0.058	0.065	-0.019	0.023***	-0.051**	-0.153***	-0.062***	-0.026	-0.056*	
Stock ownership	0.046	0	-0.005	0.08**	0.042	-0.076**	0.043	-0.053	0.002	-0.291***	0.107***	-0.195***	0.109***

–1.00. Therefore, the difference between self-reported and Compustat debt ratios is not statistically significant.¹¹

3.3. Are CEO traits related to corporate decisions?

We now study the traits of managers and whether they relate to corporate actions. We also analyze how managers' traits correlate with the compensation packages that they receive.

We first investigate whether CEO characteristics are associated with capital structure choices. Table 5, Panel A examines univariate correlations between capital structure and CEO traits as well as company characteristics. In terms of what is related to the debt ratio (total debt/total assets), in the univariate comparisons the only significant characteristics are the past career path of the CEO and whether the CEO is male. If the CEO's past experience is primarily in the finance/accounting arena, then the firm uses significantly more total debt. In particular, of the CEOs who have prior experience in finance/accounting, 52% lead companies that have a high debt ratio (i.e., above the sample mean). Of the CEOs with nonfinancial backgrounds, only 37% lead in companies with a high debt ratio.

Next, we examine debt maturity. As can be seen in the univariate analysis in Table 5, Panel A, males, optimists, and executives from private companies are more likely to use a higher proportion of short-term debt. Theories such as Landier and Thesmar's (2009) suggest that optimists are more likely to take on short-term debt. Our results are consistent with this implication and the optimism effect is highly significant. Similarly, if the male gender corresponds to being overconfident (Barber and Odean, 2001), the relation we find between short-term debt and gender is consistent with overconfidence leading to more short-term debt usage.

We next examine debt ratios and debt maturity in a multivariate setting (see Table 5, Panel B). In the regressions, we include executive behavioral characteristics as well as controls for demographic and career-related variables. We also include firm controls for size and public/private as well as industry controls, as these can potentially affect leverage choices. The results are similar to those seen in the univariate analysis, though the significance is not always as strong. In particular, the multivariate regressions show that behavioral characteristics matter for total debt as well as debt maturity. We find debt maturity is significantly related to optimism, after controlling for other factors. As can be seen in column 2, Table 5, Panel B, optimism is highly significant at 5%. The results suggest that if a firm has a highly optimistic CEO, it is likely to have more debt, in particular more short-term debt; the increased marginal impact of a very optimistic CEO on short-term debt ratio is 3.6%.

¹¹ We also check for the same company for which both the CEO and CFO respond whether they give the same response for "how many material acquisitions have you had in the last 2 years?" There were two companies in the database where we had both CEO and CFOs responding. For both of these companies, both the CEO and CFO report zero acquisitions.

CEO traits have often been thought to be important in merger and acquisition activity. CEOs themselves claim to be the dominant decision-maker in M&A decisions (Graham, Harvey, and Puri, 2012). Accordingly, we first examine whether the number of acquisitions made by a company is related to managerial characteristics. There is a large literature characterizing the effects of acquisitions, but much of this literature pertains to public companies, whereas our sample consists largely of private companies. It is not necessary that the motivation for public companies is the same as that for private companies. Table 5, Panel A examines whether a company makes any acquisitions over the previous two years. The univariate analysis suggests that CEOs who are more risk-tolerant are more likely to make acquisitions. In addition, we find that large firms and public firms are more likely to make such acquisitions, which is intuitive. We also find that when the CEO displays aversion to sure losses, then s/he is more likely to make acquisitions.

Table 5, Panel B, column 3 presents the results of a logit analysis in which the dependent variable equals one if the company makes any acquisitions and zero otherwise. Among the behavioral characteristics, we find that the effect of the CEO's personal risk-aversion is very significant. More risk-tolerant CEOs are more likely to make acquisitions.¹² From the coefficients in Table 5, Panel B, the marginal effect is a 24.6% lower probability of making an acquisition for highly risk-averse CEOs. This interesting result is consistent with the idea that CEO characteristics matter in acquisition activity, which has been theorized since Roll (1986) (see also Malmendier and Tate, 2008).

We additionally perform an ordered logit analysis. Table 5, Panel B, column (4) presents the results when a single acquisition is made, and when multiple acquisitions are made. We also perform the regression using ordinary least squares (OLS) and a continuous dependent variable: log of the number of acquisitions (Table 5, Panel B, column 5). Given our question asks whether CEOs have made any material acquisitions in the last two years, it makes sense to restrict our regressions to CEOs with at least two years of tenure. Very few CEOs in our sample have tenure of less than two years. The number of observations for the full sample is 545 compared to 509 for CEOs with at least two years of tenure. We perform the regression for the full sample of CEOs as well as for those with at least two years of tenure and find very similar results. For brevity, we report only the results with CEOs of greater than two years tenure in the tables. As can be seen from Table 5, the ordered logit yields very similar results to the earlier tests. Risk-tolerant CEOs are more

¹² The survey design allows us to test whether these results hold for the subset of CEOs who believe they are the dominant M&A decision-maker. For this purpose, we use the question "Amongst the management team, who has most of the input in mergers and acquisitions?" The CEO is given a 7-point scale, where 1 represents "I make decision without help from others," 7 represents "others make decisions," and the midpoint is "share decision equally with others." In unreported analysis, we rerun our previous regressions using only the subset of CEOs who scored themselves highly on making the decisions by themselves. We find qualitatively similar results in this subsample.

Table 5

Do CEO and/or firm characteristics affect corporate policies?

Panel A looks at how certain executive and firm characteristics affect corporate policies on capital structure and M&A in the sample of US CEO survey respondents. Debt ratio and short-term debt are defined to be high if they are above the mean of the survey sample of US CEOs. Mergers and acquisitions reflect the merger and acquisition behavior within the last two years for firms which have US CEO survey representation. Acquisitions ≥ 1 is an indicator for firms with M&A activity. Numbers in each column reflect the percentage of US CEOs, among the ones displaying / not displaying the trait at the top, who also reflect the characteristic at the left. For example, of those with available data, 41% of males and 29% of females were associated with high debt ratios. Other variables are defined as in Table 2. Significance is between the sample that exhibits firm/executive trait and the sample that does not exhibit the trait. Significance at the 10% level is denoted by *, 5% by **, and 1% by ***.

Panel B reports the regression analysis of firm/executive characteristics on corporate decisions with respect to M&A and capital structure for CEOs with at least 3 years of tenure. Specification 3 uses a binary dependent variables and therefore uses both a logit and a marginal effect logit specification to calculate the contribution of each firm/executive characteristic to the probability of the left-hand side event. Specification 4 uses a categorical variable on acquisitions that distinguishes firms with no acquisitions (acqcat=0), one acquisition (acqcat=1), and more than one acquisition (acqcat=2), and runs an ordered logit model. Industry dummy variables are used. The ten industry classifications used in the survey are: Retail / Wholesale, Mining/Construction, Manufacturing, Transportation/Energy, Communications/Media, Tech, Banking, Service/Consulting, Healthcare, and Others. For debt regressions, debt ratio and short-term debt are defined to be high if they are above the mean of the survey sample of US CEOs. Only US CEOs are included in the regressions. All specifications include the following controls: binary indicator variables for gender, height, whether the CEO has an MBA, finance/accounting background, age, whether the firm is public, whether the CEO went to a prestigious college, firm size $> \$1$ B, and past three years revenue growth of the firm. A constant term is also included in all relevant specifications. Significance at the 10% level is denoted by *, 5% by **, and 1% by ***, with z-stats reported in parentheses.

Panel A: Firm/executive traits and corporate policies

	Highly risk averse		Very optimistic		Averse to sure losses		Impatient		MBA		Gender		Tall		Fin / acc focused		Old		Firm type		Prestigious college		Small firm	
	High	Low	Yes	No	Yes	No	Yes	No	Yes	No	Male	Female	Yes	No	Yes	No	Yes	No	Public	Private	Yes	No	Yes	No
	High debt ratio # Observations	33 808	41	41 797	35	38 794	40	38 808	41	39 735	39	41 809	29*	39 806	42	52 796	37***	39 809	40	47 713	40	39 682	42	39 809
High short-term debt # Observations	26 802	34	35 792	24***	28 788	33	34 802	33	30 731	34	34 804	17***	32 801	36	36 790	32	35 803	30	25 711	34*	29 677	35	33 803	28
Acquisition=0 # Observations	74 869	65*	65 857	66	56 849	67*	65 869	66	68 790	65	66 870	65	66 865	65	70 856	65	66 868	66	47 765	67***	71 728	65*	68 867	40***
Acquisitions ≥ 1 # Observations	26 869	35*	35 857	34	44 849	33*	35 869	34	32 790	35	34 870	35	34 865	35	30 856	35	34 868	34	53 765	33***	29 728	35*	32 867	60***

Panel B: Regression Analysis of corporate policies on executive traits

	OLS		Logit		Ordered Logit		OLS
	1	2	3		4		5
	All CEOs for debt regressions		CEO Tenure at least 2 years for acquisition regressions				
	High debt ratio Coefficients	High short term debt ratio Coefficients	Made acquisitions Coefficients		No acquisitions vs. 1 acquisition vs. more than 1 acquisition Coefficients		Ln (Acq+1) Coefficients
				Marginal effects		Marginal effects (acqcat=1/acqcat=2)	
Highly risk-averse	0.004 (0.09)	-0.016 (0.69)	-1.108** (2.44)	-0.246** (2.46)	-1.160** (2.44)	-0.257 **/ -0.275**	-0.168** (1.99)
Very optimistic	0.049* (1.80)	0.036** (2.36)	0.152 (0.56)	0.034 (0.56)	0.120 (0.43)	0.035/0.038	0.027 (0.45)
Averse to sure losses	0.043 (1.13)	0.045 (1.39)	0.386 (1.15)	0.085 (1.15)	0.591 (1.63)	0.089/0.096	0.143 (1.56)
Impatient	0.029 (1.10)	0.016 (1.14)	-0.173 (0.76)	-0.039 (0.76)	-0.137 (0.63)	-0.040/ -0.043	-0.051 (1.01)

Table 5 (continued)

		OLS		Logit		Ordered Logit		OLS	
		1	2	3	4	5			
Panel B: Regression Analysis of corporate policies on executive traits									
All CEOs for debt regressions									
High debt ratio	Coefficients	Yes	Yes	Made acquisitions	Marginal effects	No acquisitions vs. 1 acquisition vs. more than 1 acquisition	Coefficients	Marginal effects (acqcat = 1/acqcat = 2)	Ln (Acq + 1)
Control variables	Yes	Yes	Yes	Coefficients	Coefficients	Coefficients	Coefficients	Coefficients	Coefficients
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	507	503	504	504	504	504	504	504	504
χ^2 (df) for Logit / R-squared for OLS	11.94%	7.26%	39.82 (21)	39.82 (21)	50.78 (21)	50.78 (21)	50.78 (21)	13.05%	13.05%
P-value	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pseudo R-squared	11.94%	7.26%	8.1%	8.1%	7.30%	7.30%	7.30%	13.05%	13.05%

likely to undertake an acquisition. We find similar results in the OLS regression. Our main result is that CEOs who are more risk-loving are more likely to make acquisitions, and a larger number of acquisitions.

Overall, our results suggest that capital structure actions, both total debt and debt maturity, as well as acquisition activity are associated with CEO traits and the kind of career experience that managers have had in the past.

3.4. CEO traits and firm growth

Caution needs to be exercised when interpreting the results in Section 3.3 because of potential reverse causality. There are two kinds of issues. First, do traits persist over time or does previous performance affect traits? Given the cross-sectional nature of our data, it is hard to address this directly, though to the extent possible, we introduce controls for past performance (historical growth) in our regressions. More broadly, however, other studies have found that optimism, in particular, is a trait that persists across time within individuals. Landier and Thesmar (2009) use panel data on French entrepreneurs to show (among other things) that optimism persists over time. Similarly, Kaniel, Massey, and Robinson (2010) report findings from LOT-R results taken among a sample of US MBA students at two points in time: once at the beginning of the educational program and again towards the end of the two-year degree and find little change in LOT-R results over this time horizon. These and other studies suggest that at least a component of the psychological variables we measure is likely to be fixed (or changing very slowly) over time. A second issue is that we are unable to distinguish whether managers with particular characteristics take certain corporate actions from whether managers with such characteristics select (or, are selected into) companies with prevalent debt or acquisition activity. Our results are consistent with either explanation.

Table 6, Panel A examines the historical annual sales growth, as well as the future annual sales growth as anticipated by the CEO. The univariate tests indicate that risk-tolerant CEOs are more likely to work in companies with high historical and high expected growth. Further, young CEOs, tall “confident” chief executives, and CEOs who do not have finance/accounting backgrounds are more likely to work for high-growth companies. The chief executives who work in firms with high historic growth are less likely to have attended prestigious colleges. CEOs with an MBA are more likely to work for companies with high anticipated growth. If we interpret height as a measure of confidence, our results are consistent with a matching story in which young, confident, risk-tolerant CEOs are more likely to work for high-growth companies. Similar patterns hold for firms with high anticipated future growth. These intriguing results are generally consistent with these kinds of CEOs choosing to work for growth companies, or at least companies with potential for future growth.

Table 6, Panel B, column 1, presents the results of a logit regression in which the dependent variable is one if

the company has high expected future growth, and zero otherwise. The estimates suggest that risk-tolerant CEOs are more likely to be employed at growth companies; we find a marginal effect of a highly risk-averse CEO having an 8% reduced probability of working in a growth company. Similar results are found when we examine a logit in which the dependent variable is one if the historical growth rates are high, and zero otherwise. Once again, we find that risk-tolerant CEOs are more likely to be in growth firms. These results are consistent with some self-selection or matching occurring between certain kinds of CEOs and certain kinds of companies. Of course, it is also possible that risk-tolerant CEOs drive high growth in their companies. Clearly, this would be an issue worth investigating in future research with a design that allows one to differentiate between matching and causation.

3.5. CEO traits and compensation

We next examine policies which impact the CEOs directly by affecting their wealth, in particular, compensation. Standard agency theory, regardless of whether based on screening/adverse selection or moral hazard, predicts a fundamental trade-off between increasing incentives and risk, i.e., the more risk-averse the agent, the more costly it is to provide pay-performance incentives. Despite this, there has been little direct evidence to support this prediction in empirical analysis (see, e.g., Prendergast, 2002).

Accordingly, we investigate the target compensation of the CEO. In particular, we ask whether CEOs are likely to be paid with a larger proportional share from a fixed component, such as salary, or from a performance-based component such as stock, options, and bonuses. Table 6, Panel A presents univariate statistics. The results are striking. Risk-takers are much more likely to be paid with proportionately more stock, options, and bonuses and much less likely to be compensated via salary. The same holds for young, tall, and male CEOs. Executives who are impatient (with a high rate of time preference) receive proportionately more in salary. Executives from prestigious colleges, public firms, and from finance/accounting tracks receive relatively less of their compensation in the form of salary. As might be expected, executives in small firms receive proportionately more in salary, and less in the form of stocks, options, and bonuses.

We next investigate whether these results hold in multivariate specifications. Table 6, Panel B, columns 2 and 3 present the regression results. We include all the controls, including for firm size and industry.¹³ We also control for equity ownership. In this multivariate analysis, the two personal characteristics that are significant are risk-taking, and rate of time preference. The results suggest that risk-tolerant CEOs are more likely to receive proportionately larger remuneration via stock/bonus/

¹³ The regressions have a control for large firms but as a robustness check, we rerun the regressions using ln(firm size). Our results for risk-aversion are very similar though the significance of impatience reduces.

Table 6
Do CEO and/or firm characteristics affect corporate policies?
Panel A looks at how certain executive and firm characteristics affect corporate policies in terms of firm sales growth and managerial compensation in the sample of US CEO survey respondents. Historical growth is high if it is above 5% and expected growth is high if it is above 6%. Stock, options, and bonus and salary are considered high if above the mean of all respondents. Numbers in each column reflect the percentage of US CEOs, among the ones displaying/ not displaying the trait at the top, who also reflect the characteristic at the left (example provided in Table 5). Significance is between the sample that exhibits firm/executive trait and the sample that does not exhibit the trait. Significance at the 10% level is denoted by *, 5% by **, and 1% by ***.

	Highly risk averse		Very optimistic		Averse to sure losses		Impatient		MBA		Gender		Tall		Fin / acc focused		Old		Firm type		Prestigious college		Small firm	
	High	Low	Yes	No	Yes	No	Yes	No	Yes	No	Male	Female	Yes	No	Yes	No	Yes	No	Public	Private	Yes	No	Yes	No
High historical growth	64	77**	76	76	76	76	77	75	78	74	76	70	79	68***	68	78**	71	83***	66	78**	68	78***	76	72
# Observations	945		933		847		945		862		946		942		927		944		772		791		945	
High expected growth	62	81***	80	73*	80	78	82	77*	83	76**	79	71	80	75*	72	80*	74	85***	66	81***	78	78	80	63***
# Observations	949		937		851		949		864		950		945		931		948		775		795		949	
High stock, options, bonus	35	53***	51	51	63	59	42	56***	53	50	52	32***	54	46**	56	50	48	57***	81	59***	52	50	52	72***
# Observations	1008		992		861		996		916		1009		989		986		992		785		842		961	
High salary	69	51***	54	48	48	53	58	50**	50	53	52	65*	52	53	44	54**	56	47**	30	56***	44	56***	55	25***
# Observations	793		781		784		792		723		794		791		779		792		749		660		790	

Panel A: Firm/executive traits and corporate policies

Table 6 (continued)

Panel B reports the regression analysis of firm/executive characteristics on corporate decisions in terms of firm sales growth and managerial compensation. Expected growth is high if it is above 6%. Specifications 1–3 use binary dependent variables and therefore use both a logit and marginal effect logit specification to calculate the contribution of each firm/executive characteristic to the probability of the left-hand side event. Industry dummy variables are used. Only US CEOs are included in the regressions. All specifications include the following controls: binary indicator variables for gender, height, whether the CEO has an MBA, finance / accounting background, age, whether the firm is public, whether the CEO went to a prestigious college, firm size > \$1B, past three years revenue growth of the firm, and executive stock ownership. A constant term is also included in all relevant specifications. Significance at the 10% level is denoted by *, 5% by **, and 1% by ***, with z-stats and t-stats reported in parentheses.

	1 High expected growth		2 High stock, options, and bonus		3 High salary	
	Coefficients	Marginal effects	Coefficients	Marginal effects	Coefficients	Marginal Effects
Highly risk-averse	−0.834* (1.96)	−0.080 (1.26)	−0.900** (2.15)	−0.223** (2.15)	1.152*** (2.81)	0.287*** (2.81)
Very optimistic	0.421 (1.14)	0.040 (1.02)	0.027 (0.11)	0.007 (0.11)	0.126 (0.51)	0.031 (0.51)
Averse to sure losses	0.207 (0.45)	0.002 (0.43)	0.527 (1.53)	0.131 (1.53)	−0.316 (0.94)	−0.079 (0.94)
Impatient	0.282 (0.88)	0.003 (0.83)	−0.452** (2.03)	−0.112** (2.03)	0.166 (0.78)	0.041 (0.78)
Control variables	Yes		Yes		Yes	
Industry dummies	Yes		Yes		Yes	
N	513.0		506.0		506.0	
χ^2 (df)	112.3 (22)		60.0(22)		40.9 (22)	
p-value	< 0.01		< 0.01		< 0.01	
Pseudo R-squared (%)	39.5		10.2		7.05	

options and less via salary. Coefficient estimates from column 2 show the marginal effect of a highly risk-averse CEO is a decrease of 22.3% of having a high proportion of stock options and bonuses in total compensation. Executives who display high levels of impatience, demanding a high return to defer gains, are much more likely to be compensated with a proportionately smaller stock/options/bonus component.

These results are intuitive and are consistent with executives who possess certain characteristics matching with companies that offer the kind of compensation packages they prefer. Whether executives choose their package or the company tailors it to the kind of individual they are trying to recruit, the evidence is consistent with some matching that focuses on certain managerial and firm characteristics. This is an important result for a number of reasons. First, in the context of the compensation literature, firms typically undertake costly incentive schemes to induce managers to take on risk. The cost of giving appropriate risk-taking incentives is higher if the CEO is risk-averse (Ross, 2004). Our results are consistent with there being a match of CEO risk-aversion to the compensation package in a way that might make the compensation incentive components less costly, by giving performance-based pay to those CEOs who are more willing to take on risk. Second, standard contracting models predict that the amount of risk the CEO bears in the optimal contract and the expected wage payment depends on his or her risk-aversion. While there is a large compensation literature examining the determinants of compensation structure, this literature has typically examined firm-level variables, such as firm size and industry, to explain compensation structure (see, e.g., Murphy, 1999). Our results provide new evidence relating risk-aversion of managers to compensation.

As mentioned above, there is scarce empirical evidence of a trade-off between incentives and risk in compensation contracts, despite the strong theoretical predictions (see, e.g., Prendergast, 2002). In several studies, firms with higher volatility are even found to have higher pay-performance sensitivity, i.e., the opposite of the prediction from theory (see, e.g., Core and Guay (2002) or Kaplan and Stromberg (2004)). Our finding that pay-performance sensitivity decreases with risk-aversion is, to our knowledge, one of the first direct pieces of evidence in favor of this theory. In addition, our findings suggest that differences in time preferences are also important for explaining compensation patterns, which is consistent with standard agency theory but is a prediction that is largely ignored in the literature. Finally, our finding that CEOs are, on average, much less risk-averse than the general population, fits nicely within this framework. Risk-aversion makes incentive pay costly, and increases the participation constraint of the manager. As a result, firms would prefer to hire less risk-averse agents as managers, everything else equal.

We conduct several robustness tests to clarify interpretation of our results. For example, it is possible that certain kinds of CEOs, such as more optimistic CEOs, are more likely to respond to our survey. First, we conduct another survey in which we ask CFOs how they perceive

CEOs (described in more detail in Section 3.3). CFOs overwhelmingly perceive CEOs to be more optimistic than themselves, consistent with what we find in psychometric tests of CEOs. Second, in other studies, e.g., Brav, Graham, Harvey, and Michaely et al. (2005), there were two samples—a conference participant (in-person) sample with a high response rate, and an Internet survey with a typical, lower response rate. Both samples show very similar results, suggesting that selection bias is not a dominant issue in surveys such as ours. Further, while we find CEOs are generally more optimistic, within the sample we have a lot of cross-sectional variation in corporate policies and behavioral characteristics of CEOs which we exploit in our tests. Finally, we have variables such as past growth as a control variable in the capital structure, acquisitions, and compensation regressions. This does not alter our results for the behavioral variables, in particular, for optimism and risk-aversion which are robust.

4. Conclusions

We examine how US CEOs differ from the lay population, CFOs, and non-US chief executives. We assemble a unique database on sitting business executives in which we assess managers' personality traits and attitudes using well-established methods that have been validated in psychology and experimental economics as providing a good gauge of peoples' attitudes. Our psychometric survey not only quantifies behavioral traits of senior managers but also gathers information related to the career path, education, and demographic characteristics of the managers.

We offer evidence that CEOs differ from both the lay population and CFOs. Interestingly, US-based CEOs also differ in significant ways from their non-US counterparts, both in terms of career paths and attitudes, tending to be more optimistic and less risk-averse, among other things. These differences in attitudes suggest one possible explanation for why US firms behave in some ways quite differently from non-US firms.

We focus on the two corporate decisions that CEOs feel they have the most control over—acquisitions and capital structure. We find evidence that links psychological traits such as risk-aversion and optimism to corporate policies, in ways advocated by some theories. For example, more risk-tolerant CEOs make more acquisitions and more optimistic CEOs use more short-term debt.

We also find an empirical link between managerial traits such as risk-aversion with compensation structure, and pay-performance sensitivity. This result is consistent with the theoretical work from standard agency theory but direct evidence on this has been scarce. We also find that managerial impatience and time preference also affect their compensation structure in a way that might be expected by theory but which has received little attention. Our results provide new evidence of a role for specific behavioral traits, in particular, risk-aversion and time-preference in the determination of compensation structure.

Appendix A

Table A1

Comparison of the survey sample of the firms with US CEOs to the Compustat sample.

The survey data are matched against the 2005 annual Compustat data for consistency as our survey is conducted in early 2006, which should reflect 2005 financials. Sales is surveyed by seven size categories. Category 1 includes firms with sales less than \$25 M, category 2 includes firms with sales between \$25 M and \$99 M, category 3 includes firms with sales between \$100 M and \$499 M, category 4 includes firms with sales between \$500 M and \$999 M, category 5 includes firms with sales between \$1B and \$4.9B, category 6 includes firms with sales between \$5B and \$9.9B, and category 7 includes firms with \$10B or above in sales. Debt-to-assets ratio, short-term debt ratio, dividend yield, and historical growth are reported by US CEO survey respondent.

Credit rating is the Standard and Poors (S&P) long-term domestic issuer credit rating grouped into ten categories in order of increasing credit ratings. Category 1 includes firms with credit ratings of D or suspended, category 2 includes firms with ratings of C, or Cl, category 3 includes firms with ratings of CC, category 4 includes firms with ratings of CCC-, CCC, or CCC+, category 5 includes firms with ratings of B-, B, or B+, category 6 includes firms with ratings of BB-, BB, or BB+, category 7 includes firms with ratings of BBB-, BBB, or BBB+, category 8 includes firms with ratings of A-, A, or A+, category 9 includes firms with ratings of AA-, AA, or AA+, and category 10 includes firms with ratings of AAA- or AAA.

Variable	Sample average	Sample median	Compustat breakpoint quintiles				
			1	2	3	4	5
<i>Sales</i>							
Universe avg.			1.0	1.7	2.8	3.9	5.7
Sample avg.	2.2	2.0	1.0	2.0	3.0	4.5	6.6
Sample %			40.6	26.8	20.4	9.3	2.9
<i>Debt/assets</i>							
Universe avg.			0.0	0.0	0.2	0.3	1.0
Sample avg.	0.3	0.2	0.0	0.1	0.2	0.3	0.7
Sample %			19.8	17.2	16.3	22.7	24.1
<i>Short-term debt/total debt</i>							
Universe avg.			0.0	0.0	0.2	0.4	0.9
Sample avg.	0.3	0.1	0.0	0.0	0.2	0.4	0.9
Sample %			25.9	11.7	28.2	18.7	15.5
<i>Payout ratio</i>							
Universe avg.					0.0		55.6
Sample avg.	21.3	0.0			0.0		41.7
Sample %					50.2		49.8
<i>Credit rating</i>							
Universe avg.			4.7	5.8	6.8	7.3	8.4
Sample avg.	8.4	9.0	3.6	6.0	7.0	8.0	9.6
Sample %			7.5	8.4	7.8	16.5	59.8
<i>Historical growth</i>							
Universe avg.			-0.2	0.0	0.1	0.2	1.7
Sample avg.	0.3	0.1	-0.2	0.0	0.1	0.2	1.0
Sample %			1.0	26.6	33.3	25.2	13.9

Table A2

Public Sample Firms.

Comparison of the survey sample of publicly listed firms under management of US CEOs to the Compustat sample using survey variable definitions. Variable definitions as in Table A1.

	Sample average	Sample median	Compustat breakpoint quintiles				
			1	2	3	4	5
<i>Sales</i>							
Universe avg.			1.0	1.7	2.8	3.9	5.7
Sample avg.	3.5	3.0	1.0	2.0	3.0	4.7	6.6
Sample %			11.4	17.7	27.8	30.4	12.7
<i>Debt/assets</i>							
Universe avg.			0.0	0.0	0.2	0.3	1.0
Sample avg.	0.3	0.3	0.0	0.1	0.2	0.3	0.7
Sample %			18.8	18.8	11.6	30.4	20.3
<i>Short-term debt/total debt</i>							
Universe avg.			0.0	0.0	0.2	0.4	0.9
Sample avg.	0.2	0.2	0.0	0.0	0.2	0.4	0.9
Sample %			24.3	11.4	35.7	15.7	12.9
<i>Payout ratio</i>							
Universe avg. (%)					0.0		46.2
Sample avg. (%)	19.1	5.0			0.0		36.7
Sample %					53.2		46.8
<i>Credit rating</i>							
Universe avg.			4.7	5.8	6.8	7.3	8.4
Sample avg.	7.9	8.0	4.5	6.0	7.0	8.0	9.6
Sample %			7.7	17.3	13.5	23.1	38.5
<i>Historical growth</i>							
Universe avg.			-0.2	0.0	0.1	0.2	1.7
Sample avg.	0.2	0.1	-0.1	0.0	0.1	0.2	0.7
Sample %			3.0	36.7	24.1	26.6	10.1

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