Managerial Conservatism and Corporate Policies

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Abstract

This paper investigates how conservative managers make corporate decisions. Motivated by psychology research, we use handwritten signatures (i.e., emotionally restraint disclosure styles) as a proxy for CEO conservatism. We find that firms with conservative CEOs engage more with safer investments (capital expenditures), engage less with risky policies (Research & Development expenses and debt financing), hold more cash, are less likely to pay cash dividends, and more likely to use stock repurchase schemes. We use the same proxy for CFO conservatism. We find that CFO conservatism is a better determinant than CEO conservatism for cash holding and financing policies, but the reverse is true for investment policies. Conservative CFOs prefer long-term debt to short-term debt.

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1. Introduction

Fisher (1930) argues that we can separate individuals' preferences from corporate decision-making. Specifically, the aggregate preferences of the capital market should dictate corporate decisions. However, there is extensive literature on the influence of decision-makers' personal and behavioral characteristics on corporate policies.[4] This paper investigates one such trait, conservatism, which is measured by a signature proxy. Personality traits measured by survey data can be affected by self-selection bias, as responding to a survey can be correlated with the personality trait itself.[5] Recent finance research mainly relies on measures based on compensation data that is endogenous to firms' policies. For instance, CEO risk preferences measured by the sensitivity of the executive's wealth to the change in stock price (delta) or stock return volatility (vega), and inside debt (pensions and deferred compensation) are themselves affected by corporate investments and financing choices (Cassell et al., 2012; Chava and Purnanandam, 2010; Coles et al., 2006). These measures suffer from endogeneity problems as compensation packages may drive, as well as reflect, managerial conservatism.[6] This paper extends the research on managerial conservatism's effect on corporate policies, using the signature proxy alongside CEO compensation data.

Psychology defines conservative personality as the clustering of certain behavioral patterns. Conservative individuals have resistance to change, a need for "playing it safe," and a need for conformity (Wilson, 1973). Conservative individuals tend to be risk-averse, uncertainty-averse, have a fear of change, and follow traditional social ideologies (Feather, 1979; Glasgow et al., 1985; Jost et al., 2003; McAllister and Anderson, 1991; Verhulst et al., 2012). We note that conservatism is not the same as political orientation alone: an individual who for a long time has been left-wing may resist a switch to a conservative political party because it

[4] The literature documents the influence of age and tenure (e.g., Berger et al., 1997; Serfling, 2014; Yim, 2013); gender (e.g., Berger et al., 2014; Huang and Kisgen, 2013); voice and facial masculinity (e.g., Jia et al., 2014); executive education (e.g., Bertrand and Schoar, 2003); career experience (e.g., Schoar and Zuo, 2017); military background (e.g., Benmelech and Frydman, 2015); political orientation (e.g., Hong and Kostovetsky, 2012; Hutton et al., 2014); overconfidence/optimism (e.g., Campbell et al., 2011; Hirshleifer et al., 2012; Malmendier and Tate, 2005); narcissism (e.g., Ham et al., 2017); and risk preferences (e.g., Cain and McKeon, 2016; Graham et al., 2013).

[5] Conservative individuals may be particularly prone to selection bias as we would expect that more conservative individuals are also less likely to participate in surveys. CEOs are also usually busy individuals, so they may be particularly prone to opting out of surveys.

[6] There is an obvious endogeneity problem using data of this kind: corporate policies may drive the executive compensation plans, we do not know whether the manager adopts risk-averse behaviour because of the compensation package on offer, or whether the compensation package on offer reflects the manager's risk aversion. Coles et al. (2006), for example, use three-stage least square estimation in their models to deal with the reverse causality between compensation proxies and corporate policies.

represents a significant change. While conservative individuals may be both risk-averse and affiliate themselves with right-wing political parties, neither risk-aversion nor right-wing affiliation implies conservatism (Verhulst et al., 2012, 2010; Wang, 2016). Also, we expect that conservatism is not the same as risk-aversion alone: an individual may be reluctant to embrace new life-changing technology, for instance, even if it reduces uncertainty or risk.

Graphology is a strand of psychology literature that argues that handwriting styles reflect personality (Chaudhari and Thakkar, 2019). A more narrow strand studies the link between signature style and personality. For instance, Boshier (1973a), Hartman (1958), Strunk (1958), and Zweigenhaft (1975) argue that conservative individuals sign their names in a particular way. For instance, Hartman (1958) finds that the individuals who habitually fail to disclose their first names appear more conservative. Boshier (1973a) supports this finding and finds that the experiment participants who most frequently sign both first and last names are more likely to be liberal.[7] The first name's omission implies restraint or emotional constriction and a wish to escape notice from others, consistent with the psychological definition of conservatism. Recent finance research has also provided further evidence for the validity of using handwritten signatures to capture individual personalities. Studies such as Ham et al. (2018, 2017), Kettle and Häubl (2011), and Shu et al. (2012) focus on the signature's size and position to capture personality traits such as narcissism and self-identity. To the best of our knowledge, no finance study explores the effects of managerial conservatism measured by a signature style proxy (i.e., avoiding disclosing first name).

Motivated by the above psychology research (i.e., Boshier, 1973a, 1973b, 1968; Hartman, 1958), we use the signature styles of S&P500 CEOs as a proxy for conservatism. We hand-collect the handwritten signatures on firms' financial statements (e.g., 10-K, proxy filings, scanned documents) from the Securities and Exchange Commission (SEC)'s and firms' websites from 2002 to 2017. We associate the signature styles with only initials or missing the first name with conservatism and those with full names (first and last name) with liberalism. The signature proxy for conservatism avoids the bias from survey data as the CEOs are not likely to foresee an analysis of their signatures on the firms' public domains. Moreover, CEO handwritten signatures are unique to the individuals and not likely to be affected by corporate policies.[8]

[7] Note that Boshier (1973a) and Hartman (1958) refer "liberal" to a psychological personality trait, instead of political belief.
[8] Individuals develop their name styles from their young age; attitude to self is related to attitude towards one' name (Boshier, 1969, 1968).

To reinforce the experimental results from the psychology research, we first document a correlation between our signature style proxy and existing risk-aversion proxies in the literature. Then, to determine the association between CEO conservatism and corporate decisions, we estimate our signature-style proxy's impact on different corporate policies. Our main results show that firms with conservative CEOs are more likely to engage with investments in capital expenditures, less likely to engage with *R&D* investments, more likely to hold cash, less likely to pay cash dividends, more likely to engage with stock repurchase schemes, and less likely to fund their operations by debt. Our results are consistent with prior research, which regards capital expenditures and cash hoarding as defensive and low-risk strategies, while *R&D* expenditures and high debt financing are considered offensive and high-risk investment strategies (Bhagat and Welch, 1995; Cassell et al., 2012; Coles et al., 2006; Hutton et al., 2014). We include compensation measures alongside our signature proxy in our regressions to control for CEO risk preferences through the alignment of CEO incentives to firm strategies (as suggested by Cassell et al. (2012), Chava and Purnanandam (2010), and Coles et al. (2006)), and we find that our proxy remains robust while the compensation measures display an inconsistent impact on different corporate policies.

We further conduct a number of sensitivity tests. Our results are robust when we control for boardroom characteristics and CEO power (i.e., more than 3-year tenure and a chairman position). Our results also hold under two-stage least square estimations and the propensity score matching method. In firm fixed-effect regressions, our signature-style variables explain capital expenditure, cash holdings, market debt ratio, and cash dividend payments. We also address a concern that a manager who signs the full name is likely to be narcissistic or overconfident rather than liberal, our proxy of signatures may represent traits different from conservatism. We therefore include additional controls such as managerial narcissism (i.e., signature size proposed by Ham et al. (2017)) and overconfidence (i.e., an option-based proxy proposed by Campbell et al. (2011), Hirshleifer et al. (2012) and Malmendier and Tate (2005)). Next, to provide more evidence that our proxy captures the psychological conservatism trait rather than political conservatism ideology (Hong and Kostovetsky, 2012; Hutton et al., 2014), we also include a variable indicating CEO Republican affiliation. Psychology and politics research show that personality traits and individual political ideologies correlate, but conservative individuals support liberal parties and vice versa (Verhulst et al., 2012, 2010; Wang, 2016). Our results still hold after controlling for narcissism, overconfidence, and political affiliation.

Lastly, we extend our focus to CFOs. We collect CFO handwritten signatures and create a proxy for CFO conservatism. We document that conservative CFOs are more likely to engage in capital expenditures and cash holding but less likely to use debt. We find that firms with conservative CFOs prefer long-term debt to short-term debt. As prior literature suggests that CEO and CFO characteristics have different impacts on corporate policies (e.g., Chava and Purnanandam, 2010; Graham et al., 2015), we examine the impact of CEO conservatism and CFO conservatism together on corporate policies. We document that CEO conservatism is more likely to be significant in determining investment policies, but CFO conservatism is more likely to be significant in determining corporate cash holding, debt financing, and debt maturity. We also find evidence in a logistic regression that there is a higher likelihood for firms with a conservative CEO also to have a conservative CFO. Our results support prior literature that CEOs have greater authority on corporate investments than CFOs, and CEOs tend to appoint CFOs who do not have conflicting personalities (Landier et al., 2012; Shivdasani and Yermack, 1999). We also create two residual signature-style variables (*CEO Sigs Resid* and *CFO Sigs Resid*) from the raw signature style's OLS regressions on the CEO (or CFO) demographics and compensation characteristics. The two sets of the raw and residual variables show similar signs and significance.[9]

Our paper makes two main contributions to the literature. First, we provide a new measure to capture managerial personalities with fewer concerns about selection bias from survey data and endogeneity issues from finance proxies. This paper adds to the recent economic literature using handwritten signatures to measure managerial traits such as Ham et al. (2018, 2017), Kettle and Häubl (2011), and Shu et al. (2012).[10] Individuals' handwritten signatures are a "powerful symbolic representation of the self" (Hartman, 1958; Jorgenson, 1977; Zweigenhaft, 1975, 1977), so using CEO handwritten signatures derived from the firms' domains can bypass the bias from survey data. Psychology research provides a more distinct definition of conservatism than finance studies, which often use the terms "conservative" and "risk-averse" interchangeably. Our measure displays robust results even under the inclusion of other proxies of conservatism/risk preference proposed by prior finance studies (i.e., executive compensation proxies, narcissism, and Republican Party affiliation). Second, the paper adds to a small but

[9] We are thankful to the suggestions of an anonymous referee for these variable. They are created based on the CEO (or CFO) compensation proxies that do not include CEO (or CFO) Indebt for the period from 2002 to 2005 due to data unavailability.

[10] Unlike prior research using signature size and the disclosure at the beginning or the end of a document, we use the signature styles (i.e. whether a CEO or CFO habitually discloses her first name). Prior research studies traits such as narcissism and self-identity, rather than conservatism trait.

growing literature on the division of labor between CEOs and CFOs, and finds that CFOs have less influence than CEOs on investment policy but more influence on financial policy (Chava and Purnanandam, 2010; Graham et al., 2015). We also provide evidence that conservative CFOs have preferences for long-term maturity debt, which is an area that has few and mixed results (Chava and Purnanandam, 2010; Freund et al., 2017).

We organize the rest of this paper as follows. The next section presents related literature to explain why our psychology proxy matters and develops the hypotheses. We present the data sample, variable construction, and the methodology in Section 3. We analyze the empirical results in Section 4. In Section 5, we conclude.

2. Literature Review and Hypothesis Development

2.1. Why should the proxy of handwritten signatures matter?

Agency theory (Jensen and Meckling, 1976), stewardship theory (Donaldson and Davis, 1991), and the upper echelons theory (Hambrick, 2007; Hambrick and Mason, 1984) all suggest that managerial personality traits influence corporate decisions. Empirical research also provides evidence to advocate for the importance of personal executive traits on firm decisions (e.g., Benmelech and Frydman, 2015; Bertrand and Schoar, 2003; Graham et al., 2015; Hutton et al., 2014; Malmendier and Tate, 2005).

However, seeking an appropriate proxy to capture managerial personality is still a challenge. Scholars frequently employ surveys, but survey data's success depends on sampling strategies, response rates from participants, and time management (Ham et al., 2018; Rossi et al., 2013). Specifically, conducting surveys on CEOs and any directors of large corporations requires high costs. Finance research widely uses proxies retrieved from executive compensation packages as measures of risk preferences (Campbell et al., 2011; Chava and Purnanandam, 2010; Coles et al., 2006; Malmendier and Tate, 2005), which are subject to endogeneity to corporate policies. For example, the proxy of overconfidence proposed by Malmendier and Tate (2005) is constructed based on CEO over-exposure to their own firms' idiosyncratic risk, which is driven by corporate strategies. Coles et al. (2006) find that their compensation proxies have reverse causality with corporate investments and debt borrowing. Hong and Kostovetsky (2012) and Hutton et al. (2014) attempt to gauge managerial conservatism by calculating the directors' political donations toward Republican Party, assuming that directors who do not donate are non-conservative ones. However, evidence suggests that Republican donors do not

wholly consider themselves as conservative individuals.[11] Their proxy is more likely to capture the political belief rather than the psychological trait of conservatism.

We introduce a new measure proposed by psychology research. As behavioral finance builds on psychology, seeking an original definition of conservatism and measuring it as developed from psychological perspectives can help finance scholars better understand the study's personality trait. Wilson (1973) defines the trait of conservatism as resistance to change, "playing it safe," and conformity. Feather (1979) and Glasgow et al. (1985) find that conservative individuals are less engaged in seeking stimulus and more worried about making significant life changes. McAllister and Anderson (1991) argue that conservative individuals have a greater aversion to ambiguity, uncertainty, risk, and complexity. Some subsequent research relies on these definitions to measure conservatism. We follow the strand of the literature from Boshier (1973b, 1973a), Hartman (1958), Patterson and Wilson (1969), which finds that conservative people tend to abbreviate or skip signing their first name rather than disclosing the full names as our main proxy. These studies rely on the science of graphology, which argues that handwritten signatures represent the self (Stewart, 1977; Zweigenhaft, 1977, 1970; Zweigenhaft and Marlowe, 1973). For instance, Boshier (1973a) experiments with seventy participants and requires them to disclose their signature styles in different situations. His results support the hypothesis that individuals with missing or abbreviated first names are more likely emotionally restrained and "reserved in disposition."

Our conservatism proxy has several features. First, as finance and economic research often utilize terminologies such as "risk aversion" and "conservatism" interchangeably, our proxy is broader. Conservatism includes many aspects of risk, such as life changes, complexity, and social conformity. Existing notions of conservatism build on specific aspects such as political orientation (Hong and Kostovetsky, 2012; Hutton et al., 2014) and a specific risk-taking behavior (e.g., CEOs operating small aircraft (Cain and McKeon, 2016)). Second, since we use handwritten signatures of executives written on their firms' public filings, we do not require any participants to answer direct questions about their personalities. CEO signatures are readily observable, and CEOs are likely to be unaware that their personality would impact something as simple as their signatures (Rudman et al., 2007). Recent research has provided evidence for

[11] See https://news.gallup.com/poll/120857/conservatives-single-largest-ideological-group.aspx. Moreover, there is evidence to associate conservatism with political affiliation that individuals consistently supporting a political party tend to avoid risks, fear losses, resist change and prefer familiarity (Jost et al., 2007; Verhulst et al., 2012). So, it could be the case that individuals with a faithful Democratic affiliation can be also conservative. Additionally, the database used by Hong and Kostovetsky (2012) and Hutton et al. (2014) is from FEC (the Federal Election Commission), which does not provide data for any donations below $200, so they do not observe the directors contributing smaller donation amounts and assume they are non-conservative.

the validity of using handwritten signatures to capture individual personalities such as Kettle and Häubl (2011) and Shu et al. (2012), and to specifically identify managerial personalities in Ham et al. (2018, 2017). Finally, unlike proxies of executive compensation, which may frequently change to align with firm risk (Coles et al., 2006; Malmendier and Tate, 2005), CEO handwritten signatures, formed early in life, are not affected by firms' strategies. Given the link between signature styles and conservatism, we expect CEOs who are cautious and reserved in revealing their first names to make more conservative corporate decisions. We provide several univariate and validation tests to validate our psychology proxy in Section 4.1 and 4.6.4.

2.2. Hypothesis development

We expect that CEOs who only disclose the initials of their first name or sign without their first name to be more conservative than those who sign their full name. Furthermore, we expect CEO conservatism to impact their firms' policies, including investments, cash holding, payouts, and borrowing. As suggested from the literature, investing in capital expenditures is more defensive than *R&D* as the outcomes of capital expenditures are less risky than the ones of *R&D* (Bhagat and Welch, 1995; Cassell et al., 2012; Coles et al., 2006; Kothari et al., 2002). Note that not making any investments is not necessarily a low-risk strategy, as this strategy can erode the firm's competitive advantage. Low leverage is also considered a defensive and low-risk funding method for firms as higher debt financing increases financial distress (Coles et al., 2006; Hutton et al., 2014; Low, 2009; Nam et al., 2003). Literature also documents that conservative CEOs hoard more cash as a cushion to mitigate the likelihood of bankruptcy and increase their financial strength (Cassell et al., 2012; Chava and Purnanandam, 2010). Therefore, they are less likely to make decisions to pay cash dividends and more likely to repurchase shares (i.e., using funds from the sale of common and preferred shares).

Following this literature, we hypothesize that conservative CEOs reserved in disclosing their first names are more likely to invest in capital expenditures and hoard more cash but less likely to engage in *R&D* investments, cash dividends, and debt financing. Our hypotheses are consistent with the theories and evidence from the empirical behavioral corporate finance, which highlights the impact of idiosyncratic managerial traits on corporate policies (e.g., Benmelech and Frydman, 2015; Bertrand and Schoar, 2003; Chava and Purnanandam, 2010; Ham et al., 2018; Hambrick and Mason, 1984; Hutton et al., 2014; Malmendier and Tate, 2005). Our hypotheses are as follows:

Hypothesis 1 ("Safer versus risky investment" hypotheses): There is a positive relationship between managerial conservatism and capital expenditures. Conversely, there is a negative relation between managerial conservatism and *R&D* investments.

Hypothesis 2 ("Cash hoarding versus dividend payout" hypotheses): Conservative CEOs are more likely to hoard cash. Conservative CEOs are less likely to pay cash dividends for their firms, but they tend to be more likely to repurchase shares.

Hypothesis 3 ("Leverage reduction" hypothesis): More conservative CEOs adopt lower leverage ratios.

The alternative hypothesis is that investment policy is unrelated to CEO traits (Fisher, 1930) and that financing policy is also unrelated to CEO personalities (Modigliani and Miller, 1958). Shareholders may expect managers to hold less cash and make more investments (Jensen, 1986); managers also may face pressure from activist investors to reduce cash hoarding and pay more cash dividends. Finally, managers may be perfect substitutes for one another, implying that personality traits have no impact on corporate outcomes (Bertrand and Schoar, 2003; Fee et al., 2013).

3. Data and Methodology

3.1. Sample

We focus on CEOs of S&P500 constituents over the period between 2002 and 2017.[12] We restrict our analysis to the U.S. firms as we aim to avoid any cultural differences that may affect signature styles (Hartman, 1958; Zweigenhaft, 1975). We obtain S&P500 constituents from the Compustat database. We extract information on CEOs' first names, middle names, and last names from the ExecuComp database along with printed names on the firms' public domains to identify signature styles. We exclude financial institutions (Standard Industrial Classification (SIC) codes 6000-6999) and utilities (SIC codes 4900-4999) as these industries have a different valuation in accounting principles and are subject to regulation. We use financial reports from the firms' websites and the firms' filings (e.g., scanned documents, 10-K, and proxy statements) from the U.S. Securities and Exchange Commission (SEC) to collect CEO handwritten signatures. On June 27, 2002, the SEC issued an order for hand-signed certifications from both CEOs and CFOs of publicly traded firms with revenues greater than

[12] We start in 2002 since almost the scanned/PDF documents are available on SEC (Securities and Exchange Commission)'s website after 2002. Before 2002, the documents are text files without handwritten signatures.

$1.2 billion to certify their financial statements' accuracy.[13] We use these certifications to supplement the firms' public filings if there are missing handwritten signatures. From 2002 to 2017, we obtain 6,385 firm-year observations, in which there are 1,295 unique CEOs and 607 unique firms.[14]

The ExecuComp database also provides annual CEO title data, compensation (salary, bonus, equity, and option grants), age, tenure (the dates when CEOs take office), and gender. However, data for inside debt (accumulated pensions and deferred compensation) is not available on the ExecuComp before 2005, so in models with inside debt, we lose approximately 1,000 firm-year observations. We manually collect information on managers holding a bachelor's degree, a Master's (MBA), and a Ph.D./Doctorate from Bloomberg and the firms' financial documents. We merge the data on signature styles and executive compensation with accounting data on investments, debt ratios, dividends and firm characteristics from Compustat and CRSP (Center for Research in Security Prices) databases for the same period. We calculate the Black-Scholes option pricing formula's delta and vega using the three-month Treasury bill rate from the Federal Reserve's website. All continuous variables are winsorized at 1% and 99% levels to mitigate the influence of outliers.

3.2. Variables

In this section, we outline how we construct the variables for our study. More details are in the appendices.

3.2.1. Self-disclosure of managerial signatures

Following the psychology literature, we employ signatures as a proxy for conservatism. As an example of our coding of signatures, we take the name "John David Smith." All actual names and signatures of non-financial and non-utility S&P500 CEOs are kept anonymous. For "John David Smith," "John" is the first name, "Smith" is the last name (surname), and "David" is the middle name. We define a "restraint" signature style as one with the omission or only the initial of the first name such as "J David Smith," "J Smith," or "Smith." Figure 1 illustrates our sampling strategy.

[13] Only 939 firms submitted the certifications. Note that these scanned certifications are submitted in response only to the order (File No. 4-460) of SEC in 2002. After this order, firms only submit certifications through online EDGAR system without handwritten signatures.

[14] A few firms are members of S&P500 Index only in some years, we track the firms/CEOs over the years to obtain the full picture on how their personality impacts corporate policies.

[Figure 1 about here.]

We then construct a dummy variable for managerial conservatism (*CEO Sigs*) that takes the value of one if the CEO has a "restraint" signature style, and zero otherwise. We classify managers who disclose their full (first and last) names as liberal. We exclude all illegible signatures and signatures signed entirely differently from the names.[15] For instance, the styles "J. D. S." and other variations such as "D.S.," "J. J. H. Smith," or "J. T. S. Smith" may capture other personality characteristics than conservatism (Hartman, 1958).

Signature styles are generally stable over time. Out of a total of 1,295 CEOs in our sample, only 15 CEOs change their signature styles over the years. Removing the CEOs who have changed their signature styles from the sample does not affect the results, so we have kept them as they are. These CEOs will, therefore, appear as conservative in some periods and liberal in others. We make sure to sample the signatures retrieved from the firms' financial-related documents rather than sources linked to the CEO's personal life.[16] We observe that CEOs' signature styles are similar across different documents (10-K, proxy statements, or scanned files). We find 9 CEOs who change their signature styles in different documents, affecting the classification of our proxy of conservatism. In these cases, we compare the signature styles in as many documents as possible to identify the most common style. Finally, to isolate the impact of CEO demographics and CEO compensation on CEO conservatism trait, we create another proxy for conservatism: *CEO Sigs Resid* obtained by taking the residuals from OLS regressions of *CEO Sigs* on CEO demographics and CEO compensation measures.

3.2.2. Executive compensation

We include executive compensation measures alongside our signature proxy to control for the impact of executive incentives on CEO risk-aversion and allow us to evaluate how our proxy performs against these measures. Following Caliskan and Doukas (2015) and Cassell et al. (2012), we calculate cash compensation (*CEO Cash*) as the sum of CEO salary and bonuses. We construct an inside debt measure (*CEO Indebt*) as the sum of the manager's accumulated pensions and deferred compensation, divided by the equity compensation holding, in line with Caliskan and Doukas (2015), Cassell et al. (2012), Dang and Phan (2016), Edmans and Liu (2010), and Sundaram and Yermack (2007). Equity compensation (*CEO Equity*) is the sum of

[15] There are only seven CEOs whose handwritten signatures are totally different from their printed names. The exclusion of these handwritten signatures does not impact our main results since there are very few instances where it happens.
[16] However, we observe that the signatures of some famous CEOs in the media are the same as the ones we observe in their firms' filings.

the manager's common stock, stock options, and unvested stock dollar value. The common stock value equals stock price multiplied by the number of shares outstanding, while the unvested stock value equals stock price multiplied by the number of restricted stocks. Managers' stock options value is estimated by the Black-Scholes option pricing model using the modified model proposed by Guay (1999). We estimate delta (i.e., the sensitivity of managerial equity compensation to stock price) by taking the partial derivative of the Black-Scholes option pricing model with respect to the stock price. We estimate vega (i.e., the sensitivity of managerial equity compensation to stock return volatility) by taking the partial derivative of the Black-Scholes option pricing model with respect to the stock standard deviation. This paper follows Core and Guay (2002) modification procedure for the delta and vega formula. In line with Caliskan and Doukas (2015) and Cassell et al. (2012), we create a variable as the ratio of vega to delta (*ve/del*). Appendices A and B give further details on the definitions and construction of these variables.

3.2.3 Corporate policy

Following Coles et al. (2006) and Hutton et al. (2014), this paper utilizes two proxies for firm investments, which are capital expenditures (*Capex*) and research and development expenses (*R&D*). *Capex* equals the ratio of capital expenditure to total net property, plant, and equipment, while *R&D* is the ratio of research and development expenses to total sales.

We define three measures of debt ratios: the market leverage ratio (*MLR*), the alternative market leverage ratio (*AMLR*), and the book leverage ratio (*BLR*) (Flannery and Rangan, 2006). We calculate *MLR* as the total liabilities divided by the sum of total liabilities and market equity value. *AMLR* equals the sum of long-term debt and short-term debt divided by the sum of total debt, market value of equity plus liquidation value of preferred stock minus deferred taxes and investment tax credit. Finally, *BLR* equals the sum of long-term and short-term debt to the total assets.[17] Cash holdings (*Firm Cash*) is the ratio of cash and cash equivalents to the total assets (Cassell et al., 2012; Chava and Purnanandam, 2010).

Following Fenn and Liang (2001) and Grullon et al. (2011), we consider both cash dividends and stock repurchases as payouts. Cash dividend (*Div*) equals the total regular cash dividends on common stock divided by the market value of equity. Stock repurchases (*Repur*) are the net stock buyback, which equals the purchases of common and preferred stock minus the sales of

[17] If data of total debt (short-term debt plus long-term debt) is missing, the total debt is calculated as the total assets minus total common equity or as the total liabilities (Cassell et al., 2012).

common and preferred stocks scaled by equity's market value. We calculate the net stock repurchases rather than only the stock purchases to account for firms funding their stock repurchases by selling common and preferred stocks (Grullon et al., 2011).[18]

3.2.4 Control variables

We employ a set of control variables following the literature for each corporate policy's model specification. Our appendices provide more details of variable calculation.

In our investment (*Capex* and *R&D)* models, we include firm-level control variables that capture corporate investments' benefits and costs. In particular, we include book leverage (*BLR*) and operating cash flow (*Cash Flow*), as higher debt levels are associated with lower *R&D* expenditures (Bhagat and Welch, 1995) while operating cash flow is positively associated with capital and *R&D* expenditures (Bhagat and Welch, 1995). Moreover, higher investment expenditures (*Capex*) are associated with higher sale growth (Coles et al., 2006; Custódio and Metzger, 2014) and market-to-book ratio (*Market to Book*) (Coles et al., 2006). We include stock return volatility (*Volatility*), firm size (*Firm Size*), firm age (*Firm Age*), and return on assets (*ROA*) to control for information asymmetry effects, which can cause financial constraints that affect investment behavior (Bhagat and Welch, 1995; Cassell et al., 2012; Coles et al., 2006; Custódio and Metzger, 2014; Hutton et al., 2014). Finally, we include retained earnings (*Retained earnings*) as an additional control for financial constraints.

In our cash holding model, we include control variables related to firms' propensity to hold cash. Firms' investment in liquid assets is positively related to the cost of external financing (Kim et al., 1998). As smaller firms with higher growth opportunities face higher external financing costs, they are more likely to hold cash. Thus, we employ firm size and the market to book ratio as determinants of cash holdings (Dittmar et al., 2003; Foley et al., 2007; Kim et al., 1998; Opler et al., 1999). Moreover, we include a dummy for dividend payout (*Div Dummy*) as firms that pay dividends tend to hold less cash (Foley et al., 2007; Opler et al., 1999). Also, higher cash holdings are associated with higher cash flow (Dittmar et al., 2003; Gao et al., 2013; Opler et al., 1999), lower leverage (Foley et al., 2007; Opler et al., 1999), sales growth (Gao et al., 2013), and fewer acquisitions (*Acquisitions*) (Gao et al., 2013; Opler et al., 1999). Higher financial distress costs measured by *R&D* expenses are also associated with higher cash

[18] We also calculate an alternative measure of net stock repurchase, which equals the change in the value of treasury stocks divided by market value of equity (Fama and French, 2001; Grullon et al., 2011). The view here is that firms can make stock repurchases by increasing or decreasing their firms' common stocks held in treasury. We obtain similar results as our main proxy of net stock repurchase.

holdings (Dittmar et al., 2003; Foley et al., 2007; Hovakimian et al., 2001). We follow Opler et al. (1999) and control also for capital expenditures. Finally, we include net working capital (*Working capital*) to measure cash substitutes' availability (Dittmar et al., 2003; Opler et al., 1999). We use stock return volatility, firm age, and ROA as controls for information asymmetry, which can cause financial constraints. More expensive access to external funding can lead to higher cash holdings (Opler et al., 1999).

In our payout model, we include control variables related to firms' propensity to pay dividends. In particular, we include variables that capture firms' investment opportunities since firms with higher investment opportunities have higher cash requirements and lower payout (Fama and French, 2002; Grullon et al., 2011). They are the market-to-book ratio, capital (*Capex*) expenses, and research and development (*R&D*) expenses. Moreover, as greater asset profitability is associated with larger dividend payouts, we include the return on asset ratio (ROA) (Grullon et al., 2011; Sharma, 2011) and retained earnings (DeAngelo et al., 2006; Fama and French, 2002, 2001; Grullon et al., 2011) in our specification. Also, higher dividend payouts are associated with larger firms (Fama and French, 2002; Grullon et al., 2011), lower sales growth (Grullon et al., 2011), and older firms (Grullon et al., 2011). Firms with higher cash flow uncertainty are less likely to pay out dividends. Thus we follow the literature (Chay and Suh, 2009; Grullon et al., 2011) and employ stock return volatility to capture cash flow uncertainty. Finally, we include book leverage, as firms with higher leverage are less likely to pay out dividends (Fama and French, 2002; Sharma, 2011). We use cash flow, working capital, and acquisitions as controls for financial constraints (Grullon et al., 2011). More expensive access to external funding can lead to lower payouts.

We follow the literature and include in our leverage model widely-used determinants of firms' capital structure choice. To control for firms' asset structure, we include tangible assets (*Tangibility PPE*) because the literature has shown that firms with a larger share of tangible assets have greater collateral availability and receive more credit (Flannery and Rangan, 2006; Rajan and Zingales, 1995; Titman and Wessels, 1988). Also, we include firm size as larger firms present higher leverage (Fama and French, 2002; Rajan and Zingales, 1995). Firms with higher profitability tend to exhibit lower leverage levels to avoid debt financing (Rajan and Zingales, 1995). As a measure of firms' profitability, we include the return on assets (Rajan and Zingales, 1995) and retained earnings (Flannery and Rangan, 2006). As greater investment opportunities are associated with lower leverage, we include the market to book ratio and *R&D* expenditures as proxies for expected growth opportunities (Fama and French, 2002; Flannery

and Rangan, 2006; Rajan and Zingales, 1995). *R&D* expenditures, together with depreciation (*Depreciation*), account for non-debt tax shields (Fama and French, 2002; Flannery and Rangan, 2006; Titman and Wessels, 1988). We include stock return volatility and firm age to control for information asymmetry (pecking order theory). We include cash flow and *Z score* to control for financial distress costs (trade-off theory).

In all corporate policies' specifications, we include manager-level characteristics comprising of CEO age (*CEO Age*), tenure (*CEO Tenure*) (i.e., number of years in the position), gender (*CEO Male*), and education (*CEO Edu*) (i.e., a dummy that equals to one if a manager holds Master (MBA) or Ph.D./ Doctorate, and zero otherwise) (Coles et al. (2006), Huang and Kisgen (2013), Prendergast and Stole (1996) and Serfling (2014)).

3.3 Empirical models

To determine the impact of managerial conservatism on corporate policies, we estimate the following ordinary least square (OLS) estimation model:

$$Y_{i,t+1} = \alpha + \beta_1 \, CEO\ Sigs_{it} + \beta' X_{it} + \theta' Z_{it} + \sum_t Year_t + \sum_j Industry_j + \varepsilon_{it} \quad (1)$$

The dependent variable $Y_{i,t+1}$ denotes, in turn, the firm investment policies (*Capex* and *R&D*), the firm's cash holdings (*Firm Cash*), the firm's payout policy (*Div* and *Repur*), and the firm's leverage (*MLR*, *AMLR,* and *BLR*). We take one lead of all dependent variables in our models to avoid any reverse causality. $CEO\ Sigs_{it}$ represents our handwritten signature style proxy that measures CEO conservatism trait. The vector X_{it} includes firm-level control variables. The vector Z_{it} includes manager-level characteristics, including executive compensation measures. We use year and industry dummies to control for a time trend and industry (2-digit SIC code) fixed effects. We calculate robust standard errors clustered at two-way (firm and year) levels to account for cross-sectional and time-series dependence in the residuals (Petersen, 2009).

3.4 Descriptive statistics

Table 1, Panel A, presents descriptive statistics for our total sample. Overall, 42.3% of the non-financial and non-utility S&P500 firms have CEOs who are conservative. On average, firms hold 10.3% of cash plus cash equivalents to total assets, pay 1.4% cash dividends to the market value of equity, and carry out 2% stock repurchases to equity's market value. *Capex* and *R&D*'s means are about 21.7% and 4.5%, respectively, while the mean leverage ratios *MLR*, *AMLR,* and *BLR* are 46.7%, 19.4%, and 55.4%, respectively. S&P500 CEOs receive

Cash compensation of $1.527 million and equity compensation of $100.387 million, on average. Our sample shows a slightly higher mean of CEO compensation than the samples from Cassell et al. (2012), Chava and Purnanandam (2010), and Coles et al. (2006), which is likely to be due to our more extended sample period. The average *CEO Age* is 56 years, and the average *CEO Tenure* is about 7.4 years. 50% of firms have CEOs with high educational attainment. Consistent with prior research (e.g., Liu, 2018), our sample shows a low gender-diversity, with 97% of CEOs being male.

Panel B of Table 1 reports descriptive statistics for two subsamples based on CEO conservatism (*CEO Sigs*). The mean differences in *Capex* (0.007) and *R&D* (-0.006) between the two subsamples are significant. Although there is no significant difference in mean cash holdings, the mean differences in cash dividends and leverage are significant. The mean difference in *CEO ve/del* is negative and significant. In line with the literature regarding *CEO ve/del* as a proxy of CEO risk-taking behavior (Chava and Purnanandam, 2010; Coles et al., 2006), the significant difference in *CEO ve/del* between the two subsamples suggests a negative correlation between *CEO Sigs* and *CEO ve/del*. There are also significant differences in the mean *CEO Age, Edu, Male,* and *Tenure*. Descriptive statistics of firm-level variables are in line with prior research.

[Table 1 around here]

4. Empirical Results

4.1. Univariate tests

First, we present Pearson correlations between CEO conservatism (*CEO Sigs*) and our primary dependent variables in Table 2, Panel A. As expected, *CEO Sigs* correlates positively with capital expenditures (*Capex*) and stock repurchases (*Repur*). By contrast, there is a significant negative correlation with *R&D*, cash dividends (*Div*), and leverage ratios (*MLR*, *AMLR*, and *BLR*), and an insignificant correlation between *CEO Sigs* and cash holdings (*Firm Cash*).

[Table 2 around here]

Before using the conservatism proxy to study the relation between CEO conservatism and corporate policies, we perform several univariate tests of correlation between the proxy (*CEO Sigs*) and CEO demographic characteristics (i.e., age, education attainment, female gender, and tenure). The literature argues that the age dimension can lead to conservative corporate policies

(Hirshleifer and Thakor, 1992; Holmström, 1999; Scharfstein and Stein, 1990; Zwiebel, 1995). Young executives are less prone to making risky investments as they do not yet have a reputation, while longer tenure managers are less prone to making long-term value-increasing policies. Consistently, we document significant negative correlations between our proxy and CEO demographic characteristics (including *CEO Age*, *Edu*, and *Tenure*), as shown in Table 2, Panel B. We find that *CEO Sigs* correlates positively with *CEO Male*.

We also relate our proxy of conservatism to the existing proxies of CEO risk preference derived from executive compensation packages. As shown in Panel B of Table 2, we find that the conservatism proxy (*CEO Sigs*) weakly correlates negatively with *CEO ve/del*, with a correlation coefficient of -0.025, suggesting that the two proxies capture different CEO risk preference aspects. CEO inside debt (*CEO Indebt*) is a proxy for CEO risk aversion used in the literature (Caliskan and Doukas, 2015; Cassell et al., 2012; Dang and Phan, 2016; Freund et al., 2017). This variable correlates positively but insignificantly with *CEO Sigs*.[19] Prior studies also document mixed results of the impact of CEO inside debt on firm conservative policies. We later show that CEO inside debt's effect on corporate policies is inconsistent across our regression models using our psychology proxy as the primary explanatory variable.

CEO Sigs correlates negatively and significantly with a proxy of overconfidence (i.e., an option-based proxy proposed by Campbell et al. (2011), Hirshleifer et al. (2012), and Malmendier and Tate (2005)), at -0.053. We also find a significant negative correlation (-0.066) between *CEO Sigs* and CEO narcissism (Ham et al., 2018, 2017). Overall, the correlation coefficients are relatively small, suggesting that the conservatism proxy and the other proxies do not capture the same personality traits. Thus, being conservative does not necessarily mean being under-confident, while not being conservative (liberal) does not necessarily mean being narcissistic.[20] Our proxy applies to any CEO, but the overconfidence proxy requires the firm to grant the CEO stock options.[21] CEOs' stock options are more likely to align with the firms' risk level and endogenous to corporate strategies.

[19] We also use an inside debt dummy that take a value of 1 if the ratio of CEO Inside debt/CEO Equity is greater than the ratio of firm debt (total firm debt divided by total market value of equity) (Cassell et al., 2012; Sundaram and Yermack, 2007), and zero otherwise. The Inside debt dummy is positively (0.021 and p-value=0.126) correlated with our signature proxy.

[20] Narcissist individuals are more likely to require admiration and recognition for themselves (Morf and Rhodewalt, 2001; Wink, 1991). Overconfident individuals tend to underestimate risk (Malmendier and Tate, 2005).

[21] Other measures of overconfidence such as press citation (Malmendier and Tate, 2008) and the prevalence of CEO photographs in annual reports (Schrand and Zechman, 2010) may be also subject to endogeneity. We do not know whether the press citation and showing CEO photographs on annual reports are part of the firm marketing strategies.

Hong and Kostovetsky (2012) suggest that Republican managers are financially more conservative. We use the data from Hutton et al. (2014), which calculates CEO Republican affiliation by using managers' political donations. The correlation between our conservativism proxy and their proxy is positive (0.003) and insignificant. Our data sample overlaps with their sample for a short period, from 2002 to 2008, so we obtain a large number of missing entries when merging the data sets.[22] To overcome this issue, we re-collect data of CEO political donations from the U.S. Federal Election Commission (fec.gov) and follow Hong and Kostovetsky (2012) and Hutton et al. (2014) to calculate CEO political affiliation. We find that the correlation between *CEO Sigs* and CEO Republican affiliation is now negative (-0.005) and still insignificant. We also hand-collect information about political orientation from The Notable Names Database (NNDB.com), which provides individuals' biographical details, including their birthplace, profession, organizations, and political affiliation. If the individuals do not self-disclose their political orientation, there is missing information on the profiles on NNDB. We find that our signature proxy correlates positively and significantly with self-disclosure of Republican affiliation at 0.217. In conclusion, the univariate tests suggest that Republicans may not be necessarily conservative psychologically, and conservative individuals may not reveal their political orientation. The literature also finds that a psychologically conservative individual may not necessarily be politically conservative (Verhulst et al., 2012, 2010; Wang, 2016).

4.2. Managerial conservatism and corporate investments

This section examines Hypothesis 1 for managerial conservatism's effect on capital expenditures (*Capex*) and research and development expenses (*R&D*).[23] Following Bhagat and Welch (1995), Cassell et al. (2012), Coles et al. (2006), Custódio and Metzger (2014) and Hutton et al. (2014), we control for *Firm Size*, *Firm Age*, *Market to Book*, *Volatility*, *Sale Growth*, *Cash Flow*, *ROA*, *BLR* and *Retained earnings*. Table 3 presents our results.

[Table 3 around here]

Our first three models show a positive and significant relation between CEO conservatism (*CEO Sigs*) and *Capex* investments. We run the first model (Model 1) without the demographic

[22] Hutton et al. (2014) use computer-based matching algorithm to match the names of donators on FEC (Federal Election Commission (fec.gov)) with the directors' name from ExecuComp, so the matching techniques may result in losses in observations. Data from FEC is also not available for any donations below $200 prior to 2008.

[23] We also estimate the impact of *CEO Sigs* on Acquisitions in unreported tests, but we find no clear results. However, our main interests are *Capex* and *R&D* as we follow prior literature which argues that *R&D* is riskier than *Capex* (Bhagat and Welch, 1995; Cassell et al., 2012; Coles et al., 2006; Kothari et al., 2002).

and compensation proxies, and then include them in the following two models (Models 2 and 3). The inclusion of compensation proxies adds around 0.6% to the R-squared. In the models for the *R&D* policy (Models 4 to 6), we find significant and negative coefficients for *CEO Sigs*.

Overall, our results are consistent with the first hypothesis that conservative CEOs are more likely to engage in safer investments (*Capex*) and less likely to engage in riskier investments (*R&D*).[24] The results are economically significant. In Model 3, for instance, we find that a conservative CEO increases *Capex* by approximately 4.61% relative to the mean *Capex* in the sample. This increase corresponds to 8% of one standard deviation of the *Capex* distribution. In Model 6, we find that a conservative CEO reduces *R&D* investments by about 11.11% relative to the mean *R&D* in the sample. This reduction corresponds to about 5.68% of one standard deviation of the *R&D* distribution.

Table 3 also shows that the impact of compensation proxies is not robust across the models, except for *CEO ve/del*. The small magnitude of coefficients of *CEO Indebt* and *CEO vel/del* are in line with Cassell et al. (2012) and Coles et al. (2006). High educational attainment is likely to induce CEOs to take more risks. We find mixed results for the effect of *CEO Age*, *CEO Male*, and *CEO Tenure*.

4.3. Managerial conservatism and cash holdings

We next test Hypothesis 2, where we hypothesize that conservative CEOs are more likely to hoard cash. Following Dittmar et al. (2003), Foley et al. (2007), Gao et al. (2013), Kim et al. (1998), and Opler et al. (1999), the control variables include *Firm Size*, *Firm Age*, *Market to Book*, *Volatility*, *Sale Growth*, *Cash Flow*, *ROA*, *Div Dummy*, *BLR*, *R&D*, *Capex*, *Working Capital*) and *Acquisitions*. Table 4 presents our results.

[Table 4 around here]

We find that the conservativism proxy's impact on firm cash holdings is positive and significant. Holding cash is regarded as a form of hedging activity (Cassell et al., 2012; Chava and Purnanandam, 2010). Hence, we expect conservative CEOs to hoard more cash as a cushion for any unanticipated risks. The coefficient of *CEO Sigs* in Model 3 of Table 4 is 0.006, indicating that a firm with a conservative CEO holds about 5.83% more cash than the mean

[24] We also examine the net effect of CEO conservatism on *total investment* (i.e., the total of Capex, R&D, and Acquisitions) and *net investment* (i.e., Capex minus the total of R&D and Acquisitions). The results are available in our Online Appendix. We find CEO conservatism (*CEO Sigs*) impacts negatively on the *total investment* and positively on the *net investment*, significantly at 1% level, suggesting that conservative CEOs prefer conservative investments (*Capex*) to other investmens (*R&D* and *Acquisitions*).

Firm Cash in the sample. Compared to *Firm Cash*'s median in our sample, a conservative CEO increases *Firm Cash* by approximately 7.89%. This increase corresponds to approximately 6.32% of one standard deviation of the *Firm Cash* distribution.

4.4. Managerial conservatism and dividend payout

Next, we run Equation (1) on cash dividends (*Div*) and stock repurchases (*Repur*) separately. As conservative CEOs are more likely to hoard more cash, we expect them to also reduce the firms' cash dividends. Firms can repurchase their stocks using funds from their stock sales, so we hypothesize that conservative CEOs also have a higher propensity to repurchase stocks. Following Chay and Suh (2009), Custódio and Metzger (2014), DeAngelo et al. (2006), Fama and French (2002, 2001), Grullon et al. (2011) and Sharma (2011), our control variables include *Firm Size*, *Firm Age*, *Market to Book*, *Volatility*, *Sale Growth*, *Cash Flow*, *ROA*, *BLR*, *Retained earnings*, *R&D*, *Capex*, *Working Capital* and *Acquisitions*. Table 5 presents our results for the payout policy.

[Table 5 around here]

The coefficients of *CEO Sigs* in the first three models in Table 5 are negative and significant, suggesting that conservative CEOs are less likely to pay cash as dividends. A conservative CEO reduces cash dividends by approximately 7.14% relative to a non-conservative CEO in economic terms. By contrast, in our last three models in Table 5, a conservative CEO increases stock repurchases by 10% compared to the average *Repur* in the sample.

Our findings are robust across the models, while we find inconsistent impacts of compensation proxies on firm cash holdings and payout policy. For example, *CEO ve/del* has significant positive coefficients in all models of *Firm Cash*, *Div,* and *Repur*. Similarly, *CEO Indebt* and *CEO Equity* show insignificant and mixed conclusions on whether holding a higher level of inside debt and equity compensation induces CEOs to take fewer risks. There is a positive effect of better educational attainment on *Firm Cash* but a negative impact on stock repurchase policy. These results cast doubt about the impact of executive education on conservative corporate policy choices, as these educational attainment effects contradict the conclusions from the models of *Capex* and *R&D* investments.

4.5. Managerial conservatism and debt financing

We examine Hypothesis 3 for the firms' debt policy using three different proxies of debt ratios (Flannery and Rangan, 2006). Our control variables are *Firm Size*, *Firm Age*, *Market to*

Book, Volatility, Sale Growth, Cash Flow, ROA, Retained earnings, R&D, Tangibility PPE, Depreciation and *Z score* (Coles et al., 2006; Fama and French, 2002; Flannery and Rangan, 2006; Rajan and Zingales, 1995; Titman and Wessels, 1988). Table 6 presents the results of the leverage regressions.

[Table 6 around here]

We obtain negative coefficients for our proxy (*CEO Sigs*) across the leverage regressions, implying that conservative CEOs tend to reduce debt financing. For instance, the coefficient for *CEO Sigs* in Model 6 of Table 6, where the dependent variable is *AMLR*, is -0.012, indicating that a conservative CEO reduces leverage by about 6.2% compared to the median of *AMLR* in our sample. This reduction corresponds to a decline of 6% of one standard deviation of the *AMLR* distribution. The coefficients for *CEO Sigs* on market leverage (*MLR)* and book leverage (*BLR)* are also negative, with a reduction of approximately 3.9% and 2.5%, respectively.

We find a negative impact of *CEO Indebt* and a positive impact of *CEO ve/del* on debt ratios, which are consistent with the literature of Coles *et al.* (2006) and Cassell *et al.* (2012). However, the coefficients of *CEO vel/del* is not statistically significant in several models. *CEO Age*, *Edu,* and *Tenure* again provide mixed inferences, whereas female CEOs appear more conservative in the use of debt to finance their firms' operations.

4.6. Robustness Tests

4.6.1. Endogeneity: corporate governance omissions

In the main analysis, we deal with endogeneity by including industry and year fixed effects to control for time-invariant unobservable variables within industry and year. This section asks whether any other firm-level characteristics may drive the imprint of CEO personalities on corporate policies. First, we use several corporate governance characteristics to mitigate the endogeneity due to omitted variables, including board size, board independence, and institutional holdings, as the board of directors and institutional shareholders can involve themselves in policy making. Also, executive compensation is directly affected by the board and the remuneration committee, which may drive the results. Board size (*Board Size*) is the total number of directors on the board, board independence (*Board Ind*) is the percentage of independent directors on the board, and institutional holdings (*Instit*) is the percentage of institutional shareholders' ownership. We collect data of *Board size*, *Board Ind,* and *Instit* from

Thomson Reuters Datastream and Asset4 ESG. We lose roughly 300 firm-year observations when merging our sample with the data of corporate governance. Table 7 shows similar statistical and economic results as in our baseline regressions when we include the corporate governance variables. Conservative CEOs with "restraint" signature styles increase *Capex* investments, reduce *R&D* investments, hoard more cash, lower cash dividends, increase stock repurchases, and lower leverage. As our proxy has a strong impact on different leverage ratios, we only use *BLR* as the primary variable for these robustness tests. Our results also show that corporate governance has different impacts on different policies but does not affect CEO conservatism's impact on firm policies. The inclusion of corporate governance variables weakens the impact of all executive compensation proxies.

[Table 7 around here]

4.6.2. The independence of manager-style effects on corporate policies

Another strand of literature argues that the manager's personality affects corporate policy but that a new CEO may not be independent enough to make their own decisions until they have been in power a few years (Hirshleifer et al., 2012; Hutton et al., 2014). We thus restrict our sample to firms with *CEO Tenure* of at least three years (Hutton et al., 2014) and re-examine the relation between CEO conservatism and corporate policies. In unreported results, we find that all coefficients (except for CEO Sigs in the *R&D* and *Repur* models) remain expected signs and present similar economic magnitude to the baseline regressions. [25] Overall, we confirm that conservative CEOs prefer *Capex*, hoard more cash, pay less cash dividends, and reduce leverage.

We further conjecture that CEOs with more power (*CEO-chairman duality*) may have more independence in corporate decision-making (Krause et al., 2014). We run Equation (1) based on the subsample of firms where the CEOs are also chairmen/chairwomen. Our inferences still hold. In unreported results, we observe negative coefficients for *CEO Sigs* in the models of leverage, and positive coefficients in the *Capex* and *Firm Cash* models.[26] The results suggest that managers can impose their personality on corporate policies if they have more power (more entrenchment and duality). However, CEOs cannot imprint their traits on all corporate policies, which is when the power (longer tenure and CEO-chairman duality) is also associated with

[25] The results are unreported for brevity, but they are available in the Online Appendix.
[26] The results are unreported for brevity, but they are available in the Online Appendix.

more ethical accountability and responsibility. Our results in this section support the manager-style effects from the literature.

4.6.3. The impact of CEO conservatism and firm-level variation

One may argue that we should consider within-firm variations to explain the firm effects instead of industry effects. In this section, we run our Equation (1) with firm fixed effects. As we aim to observe CEO conservatism's impact at firm-level variations, we restrict our sample to firms with at least five observations. Table 8 presents the results.

[Table 8 around here]

Our findings suggest that the impact of *CEO Sigs* is positive on *Capex* and *Firm Cash* and negative on *Div* and the leverage ratios. The economic impact of *CEO Sigs* in Model 1, for example, remains similar to the baseline regressions. A conservative CEO increases *Capex* by approximately 3.22%. A conservative CEO is more likely to reduce cash dividends (*Div*) and leverage *(AMLR*) by approximately 14.28% and 5.67%, respectively. We find, however, insignificant coefficients on *R&D, Repur, MLR,* and *BLR.* Coles et al. (2006) and Hutton et al. (2014) also find an insignificant impact of the CEO traits of their interest on corporate policies with firm fixed-effect specifications. Custódio and Metzger (2014) and Hutton et al. (2014) suggest that it can be due to low CEO turnover. Indeed, CEO turnover happens in only 9.6% of the firms in our sample.

4.6.4. CEO conservatism versus CEO narcissism, overconfidence, and Republican affiliation

The signature proxy for managerial conservatism may reflect narcissism or non-narcissism. For example, Hartman (1958) conjectures that an individual using a signature with full names may be narcissistic and requires admiration and recognition. So, to test this concern, we use signature size as a narcissism proxy, as evidenced by Ham et al. (2018, 2017) and Zweigenhaft (1977). Following these studies, we draw a rectangle around every signature with every edge touching the most extreme ending points. The width and height of the rectangle determine the area. We then use the logarithm of the area, standardized by the number of letters in the signature, as a narcissism proxy.

Similarly, one could argue that the full-name signature styles represent managerial overconfidence; in other words, managers who avoid signing their first names may be under-confident rather than conservative. Therefore, we also include a proxy of overconfidence in

our models. Campbell et al. (2011), Hirshleifer et al. (2012), and Malmendier and Tate (2005) all propose an option-based overconfidence proxy, with an overconfidence dummy variable equal to one if the managers retain their non-exercised vested options over 67% in the money, and zero otherwise.

Further, our signature proxy may capture political conservatism (Hong and Kostovetsky, 2012; Hutton et al., 2014) rather than psychological conservatism. We hand-collect political orientation data on NNDB and construct a dummy that equals one if CEOs self-disclose themselves as Republicans, and zero otherwise.[27] The literature suggests that psychological conservatism correlates with political conservatism but that one does not imply the other (Verhulst et al., 2012, 2010; Wang, 2016).

Our results remain robust with similar economic magnitudes as in our baseline regressions.[28] As shown in Section 4.1, the correlations between these proxies and our proxy are relatively low; hence, they are unlikely to capture the same personality trait. Interestingly, CEO narcissism, overconfidence, and Republican affiliation have an inconsistent impact across the models.[29]

4.6.5. Endogeneity: instruments and matching method

In this section, we turn to other potential endogeneity issues with our signature proxy. The signature styles could be endogenous to the first name's length as it is more likely that a CEO with a long first name would abbreviate it. Therefore, our first instrument is the natural logarithm of the length of the first name. Also, a CEO who habitually uses a short name/nicknames (for example, "William" as "Will" or "Bill") can adopt different signature styles for that reason rather than personality. We include the short-named CEO as our second instrument variable.[30]

We employ two-stage least square estimations with the two instrumental variables and report the results in Table 9. Our estimations do not suffer from either the issue of weak instruments (Cragg–Donald Wald F-statistics with p-value=0.000) or overidentification as

[27] We also use the data from Hutton et al. (2014) and the data that we re-collect to expand the data set of Hutton et al. (2014), and obtain the same results.

[28] The results are unreported for brevity, but they are available in the Online Appendix.

[29] We find a negative coefficient of CEO overconfidence on the *R&D* and leverage regression, which is not in line with prior research. To shed more light on why this may be the case, in unreported tests, we also examine the relation between CEO overconfidence and long-term maturity (more than 3, 4 and 5 years) debt and find negative coefficients, suggesting overconfident CEOs prefer short-term debt, which is considered riskier than long-term debt.

[30] We also attempt to employ the length of middle name, the length of last name and the names with suffices such as "I", "II", or "Jr" in our two-stage estimation. However, the tests show that they are invalid instruments.

Hansen J statistics are insignificant in all the Models, except the ones of *Div* and *BLR*. We acknowledge that seeking appropriate instruments is challenging; significant Hansen J statistics in the Model of *Div* and *BLR* may suggest that our instruments are not valid. However, F-statistics are high in the first-stage estimations, and the results of other corporate policies still support the validity of our instruments. We find CEOs with longer first names and CEOs with short names/nicknames are more likely to sign their signatures more conservatively.[31] After dealing with the endogeneity issue by employing instrument estimations, our results from baseline regressions still hold. Specifically, there is an increase in *Capex* by 10.6% and a decline in *BLR* by 10.3% due to managerial conservatism.

[Table 9 around here]

Given that CEO conservatism's impact may be endogenous to firm-level/boardroom and other CEO-level characteristics, we use a matching method for robustness. This method considers firms with conservative CEOs as a treatment group and firms with non-conservative CEOs as a control group. We first estimate the probabilities (propensity scores) of how likely a firm hires a conservative CEO. To obtain the propensity scores, we run a logistic regression (*Pre-Match* Models) where the dependent variable is *CEO Sigs*, using the same controls as in our OLS regressions for each corporate policy. The results of propensity scores (*Pre-Match* Models) are reported in Models 1, 3, 5, and 7 in Panel A of Table 10. The *Pre-Match* results show that the firms that are older, have smaller board size, and grant smaller cash incentives, are more likely to appoint conservative CEOs.

Next, we employ the nearest neighbor matching method to match the control group's firms with the treatment group's firms with exact matching for firms in the same industries. To ensure the firms in the treatment groups and controls groups are sufficiently similar in terms of the control variables (i.e., CEO demographics and firm-level controls), we require the maximum gap between each treatment firm's propensity score and that of its match not to exceed 0.01 in absolute value.

[Table 10 around here]

[31] In our full sample, the signatures signed as "W" or missing first name are considered as conservatism, regardless of short names or nicknames. If CEOs have short names or nicknames but sign as "Will" and "Bill", we consider them as "restraint" styles if their printed names on the annual report do not show their short names. If we further exclude the signatures signed as "Will" or "Bill" (if the CEOs have nick names or short names), we find that CEOs who have short names/nicknames still tend not to reveal their first names.

After matching, we conduct diagnostic tests to verify that the treatment firms and the matched control firms are not distinguishable in the observable controls. Our first diagnostic test re-conducts the *Pre-Match* logistic estimations and presents the results in *Post-Match* Models 2, 4, 6, and 8 in Panel A, Table 10. Our *Post-Match* models re-estimate how likely a firm hires a conservative CEO but we rely on the matched sample obtained from our neighbor matching method. The *Post-Match* models' coefficients are not statistically significant, suggesting no distinguishable differences in the observable firm-level and CEO-level characteristics in appointing conservative CEOs between the two groups. The *Post-Match* models also display much smaller estimated coefficients and Pseudo R-squared, indicating that our matching method has successfully removed all observable differences other than the difference in the impact of CEO conservatism. Our second diagnostic test examines the differences in the observable characteristics (i.e., CEO-level and firm-level controls) between the treatment firms and the matched control firms (i.e., the matched control firms obtained from our neighbor matching method). We obtain the differences (i.e., the average treatment effects) in firm-level and CEO-level controls for our six corporate policies' models based on the matched samples. For brevity, we do not report the results of these differences in the control variables.[32] We find that the differences in the observable characteristics are again insignificant. Overall, our diagnostic tests suggest that the differences in corporate policies between the treatment and control groups are only due to CEO conservatism rather than the observable characteristics.

We next report the differences in corporate policies (i.e., the average treatment effects) in Panel B of Table 10 based on our matched samples. Consistent with our main findings, we find conservative CEOs are more likely to engage in *Capex, Firm Cash,* and *Repur* but less likely to engage in *R&D*, *Div,* and *BLR*.

Finally, we use the matched samples to re-estimate our OLS baseline regressions and report the results in Panel C of Table 10. The results remain similar and robust in terms of the statistical and economic impact as in our OLS baseline regressions.

4.7. The validity of signature proxy on CFO conservatism

4.7.1. CFO conservatism and corporate policies

[32] As we use different sets of controls, each corporate policy model generates a bulk of the differences ((i.e., the average treatment effects) based on the matched sample. For brevity, the results are provided upon requests.

We study CFO conservatism (*CFO Sigs*) by hand-collecting handwritten CFO signatures of non-financial and non-utility S&P500 firms from the filings on the SEC's firms' websites.[33] U.S. firms do not often keep their CFO handwritten signatures on their firms' domains, so our CFO conservatism sample is limited to 3,750 firm-year observations.[34]

In unreported results, we find that conservative CFOs increase *Capex* and *Firm Cash* by 3.7% and 7.8%, respectively, and reduce *BLR* by 4.5%.[35] As evidenced by Chava and Purnanandam (2010), CFOs are more sensitive to the debt-maturity structure. We find CFO conservatism to be positively associated with long-term (over 3, 4, and 5 years) debt. For instance, the long-term debt ratio (5-year maturity debt - *LTD5*) increases by approximately 5.3%, compared to the mean of *LTD5* in our sample. We consider short-term debt to be riskier than long-term debt, as it exposes the firm to higher refinancing and interest rate risk. Short-term debt financing also leads to higher liquidation risk and a need for improvements in credit quality by the lenders (Chava and Purnanandam, 2010, 2007; Diamond, 1991). To further control for financial constraint, we include another variable, the KZ score (Baker et al., 2003), in the models of leverage ratios.[36]

4.7.2. CEO conservatism versus CFO conservatism

As suggested by Landier et al. (2012) and Shivdasani and Yermack (1999), CEOs have greater authority when the CFOs are appointed after the CEOs since CEOs tend to influence the board to select CFOs who will not cause internal conflicts. We restrict our sample to include only firms where *CEO Tenure* is higher than three years and higher than the *CFO Tenure*. The tenure of 3 years allows CEOs to gain independent decision-making power and to influence the board. We find a higher likelihood (7%) for a conservative CEO to appoint a CFO who is also conservative.[37]

[33] We also obtain the residuals of the regressions of *CFO Sigs* on CFO demographics and CFO compensations to create *CFO Sigs Resid*. The results are quantitatively and economically similar to the ones of *CFO Sigs*. The results are not reported but will be provided upon requests.

[34] In our regressions with CFO conservatism, we continue to lose more observations when we include *CFO Indebt* and take one lead of dependent variables. There are 2,090 firm-year observations with inclusion of *CFO Indebt* and one lead of dependent variables.

[35] The results are available in the Online Appendix.

[36] We also employ the propensity score matching method, using CFO Sigs to identify the treatment group (i.e., firms with conservative CFOs) and control group (i.e., firms without conservative CFOs). However, our observations decline significantly when we match treatment firms with control firms exactly in the same industries and use the nearest neighbor matching, making the matching method is not feasible.

[37] The results are not tabulated. They will be provided upon requests.

We follow Chava and Purnanandam (2010) to examine both CEO and CFO conservatism's effects in the same models. As suggested by Graham et al. (2015), there is an allocation in decision-making authority between CEOs and CFOs within firms. In unreported results, we find that CEO conservatism has a greater impact on corporate investment (*Capex*) than CFO conservatism (the coefficient of *CEO Sigs* is 0.012 compared to that of *CFO Sigs* of 0.009, significant at 1% and 5%).[38] Similarly, *CEO Sigs*' economic magnitude is greater than *CFO Sigs* in the *Repur* model (an increase of 25% in stock repurchases if the CEO is conservative). However, conservative CFOs have higher decision-making authority on *Firm Cash* and debt financing (i.e., *CEO Sigs*' economic magnitudes are greater than *CFO Sigs*). There is no impact of CEO conservatism on debt maturity, while conservative CFOs prefer long-term debt to short term debt. For example, a firm with a conservative CFO raises *LTD5* (i.e., 5-year maturity debt) approximately 4.7% higher than the one with a non-conservative CFO. Our proxies do a better job than the CEO and CFO compensation proxies, as *CEO ve/del* and *CFO ve/del* have insignificant coefficients and provide mixed results.

Finally, we re-estimate our regressions, using *CEO Sigs Resid* and *CFO Sigs Resid*, which are the variables obtained by taking the residuals by regressing *CEO Sigs* (or *CFO Sigs*) on CEO (or CFO) demographics and CEO (or CFO) compensation measures. Although in Section 4.1, the correlations among our conservatism proxy, demographics, and compensation measures are not high, we create *CEO Sigs Resid* and *CFO Sigs Resid* to further isolate their impact. Our results hold in all models with *CEO Sigs Resid* and *CFO Sigs Resid*, where conservative CEOs have more imprints on investments and dividend policies, while conservative CFOs are more likely to use less debt financing and prefer long-term debt to short-term debt.[39]

5. Conclusions

This paper examines managerial conservatism's effect on corporate investment, cash holding, dividend, and financing policies. We use a signature proxy for conservatism motivated by psychology research that is not affected by self-selection bias, which is likely to be present in survey data, or endogeneity problems, which are likely to arise in executive compensation measures. Therefore, the research contributes to the research strand that analyzes managerial personality traits' effects on corporate decision-making. We find that firms with conservative

[38] The results are unreported for brevity but they are available in the Online Appendix.
[39] The results are unreported for brevity but they are available in the Online Appendix.

managers (CEOs and CFOs) are more likely to make low-risk investment choices (*Capex* expenditures and cash holdings) and less likely to engage with high-risk investment and financing choices (cash dividend payout, *R&D*, and debt borrowing). Our proxy provides more consistent results than CEO demographical characteristics (age, tenure, gender, and education), CEO compensation proxies (ve/del and Indebt), and proxies for CEO overconfidence, narcissism, and political orientation.

The paper also contributes to the literature by studying the relative importance of CEO and CFO characteristics on corporate decision-making. This paper supports Chava and Purnanandam's (2010) and Graham et al.'s (2015) findings by evidencing a striking difference in the impact of personality traits on corporate decision making between CEOs and CFOs. CEO personality traits tend to have a stronger association with investment choices than CFO's personality traits. CFO personality traits have a stronger association with cash holdings and financing choices. In particular, conservative CFOs prefer long-term debt over short-term debt (Chava and Purnanandam, 2010; Diamond, 1991). CEOs tend to influence the board of directors to appoint CFOs who have similar personalities as theirs (Landier et al., 2012; Shivdasani and Yermack, 1999).

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Appendix A. Variable definitions

This Appendix presents all variables including corporate policies, manager-level and firm-level characteristics with the definitions, formulae and data sources.

Variable	Definition	Source
Corporate policies		
Capex	Ratio of capital expenditures to total net property, plant and equipment.	Compustat
R&D	Ratio of research and development expenditures to total sales. Missing values are set to zero.	Compustat

Firm Cash	Ratio of cash and cash equivalents to total assets.	Compustat
Div	Ratio of cash dividends to the market value of equity.	Compustat
Repur	Ratio of net stock repurchases (the purchases of common and preferred stock minus the sales of common and preferred stocks) to the market value of equity	Compustat
MLR	Firm market leverage ratio, which is the ratio of total liabilities to the sum of total liabilities and market value of equity.	Compustat
AMLR	Alternative market leverage ratio, which is the ratio of the total of short-term debt and long-term debt to the sum of short-term debt, long-term debt and market value of equity plus liquidation value of preferred stock minus deferred taxes and investment tax credit.	Compustat
BLR	Book leverage ratio, which is the ratio of the total of short-term debt and long-term debt to total assets.	Compustat
LTD3	Long-term debt maturing in more than 3 years, which is the ratio of total debt less debt in current liabilities less debt maturing in two and three years to total debt.	Compustat
LTD4	Long-term debt maturing in more than 4 years, which is the ratio of total debt less debt in current liabilities less debt maturing in two, three and four years to total debt.	Compustat
LTD5	Long-term debt maturing in more than 5 years, which is the ratio of total debt less debt in current liabilities less debt maturing in two, three, four and five years to total debt.	Compustat
Manager-level (CEO & CFO) characteristics		
CEO Sigs	A psychology proxy of conservatism, which is a dummy that equals one if CEOs do not sign or only sign the initial(s) names, and zero otherwise.	Hand-collected
CFO Sigs	A psychology proxy of conservatism, which is a dummy that equals one if CFOs do not sign or only sign the initial(s) names, and zero otherwise.	Hand-collected
CEO Sigs Resid	The residuals of regressing CEO Sigs on CEO demographics (CEO Age, CEO Edu, CEO Male and CEO Tenure) and CEO compensation (CEO Cash, CEO Indebt, CEO Equity and CEO ve/del).	Self calculation
CFO Sigs Resid	The residuals of regressing CFO Sigs on CFO demographics (CFO Age, CFO Edu, CFO Male and CFO Tenure) and CFO compensation (CFO Cash, CFO Indebt, CFO Equity and CFO ve/del).	Self calculation
CEO Cash	CEO cash compensation, which equals the CEO salary plus CEO bonus.	Execucomp
CFO Cash	CFO cash compensation, which equals the CFO salary plus CFO bonus.	ExecuComp
CEO Inside debt	The total of CEO deferred compensation plans at fiscal year and the present value of accumulated pension benefits from all pension plans.	ExecuComp
CFO Inside debt	The total of CFO deferred compensation plans at fiscal year and the present value of accumulated pension benefits from all pension plans.	ExecuComp

CEO Equity	Equals to CEO common stock value plus CEO unvested stock value plus CEO stock options value (Appendix B)	ExecuComp
CFO Equity	Equals to CFO common stock value plus CFO unvested stock value plus CFO stock options value (Appendix B)	ExecuComp
CEO Indebt	Equals to CEO Inside debt divided by CEO Equity	ExecuComp, Compustat
CFO Indebt	Equals to CFO Inside debt divided by CFO Equity	ExecuComp, Compustat
CEO option	Value of CEO options (Appendix B)	ExecuComp
CFO option	Value of CFO options (Appendix B)	ExecuComp
CEO ve/del	Equals to CEO vega divided by CEO delta (Appendix B)	ExecuComp
CFO ve/del	Equals to CFO vega divided by CFO delta (Appendix B)	ExecuComp
CEO Tenure	Number of years of service as CEO.	ExecuComp
CFO Tenure	Number of years of service as CFO.	Bloomberg
CEO Edu	A dummy which equals to one if CEO holds Master/Doctorate/PhD degrees, zero otherwise	Bloomberg
CFO Edu	A dummy which equals to one if CFO holds Master/Doctorate/PhD degrees, zero otherwise	Bloomberg
CEO Age	Age of CEO in years	ExecuComp
CFO Age	Age of CFO in years	ExecuComp
CEO Male	A dummy which equals to one if CEO is male, zero otherwise	ExecuComp
CFO Male	A dummy which equals to one if CFO is male, zero otherwise	ExecuComp
CEO first name	The natural logarithm of the length of CEO first name	ExecuComp
CEO middle name	The natural logarithm of the length of CEO middle name	ExecuComp
CEO last name	The natural logarithm of the length of CEO last name	ExecuComp
CEO short name	A dummy with a value equals to one if the CEO has short names or nicknames such as “Bill” or Will” for “William”, and zero otherwise.	ExecuComp, Bloomberg
CEO Duality	A dummy which equals to one if a CEO also holds a chairman/chairwoman position on board, and zero otherwise.	Execucomp
CEO Rep	CEO Republican affiliation. A dummy with a value equal to one if the CEO is Republican, otherwise zero (NNDB). Alternatively, it is a continuous variable equal to the monetary donation of managers (Hutton et al., 2014).	NNDB, FEC, Hutton et al., (2014)
CEO Conf	CEO Overconfidence. A dummy with a value equals to one if the CEO average moneyness of the options is at least 67%, and zero otherwise. Average moneyness of the options equals to value per vested option scaled by the average strike price less the value per vested option).	ExecuComp
CEO Narcis	CEO Narcissism. The area of letters in the CEO signature scaled by the number of letters in the CEO signature. Rectangles are drawn around the letters with every edge touching the most extreme ending point of the	Hand-collected & Self calculation

	signature. The width and the height of the rectangle are obtained to compute the area.	
Firm-level characteristics		
Firm Size	The natural logarithm of total assets	Compustat
Market to Book	The ratio of total assets minus book value of assets plus dividends to total assets	Compustat
ROA	Ratio of earnings before interest, taxes, depreciation and amortization to total assets	Compustat
Volatility	Standard deviation of daily stock returns in the fiscal year	CRSP
Cash Flow	The operating income before depreciation minus interest expense minus income taxes and the change in deferred tax and investment tax credits, scaled by total assets	Compustat
Retained earnings	Ratio of retained earnings to total assets	Compustat
Working Capital	Net current assets minus current liabilities divided by total assets	Compustat
Acquisitions	Value of acquisitions divided by total assets	Compustat
Z score	1.0*(Net sales/Total assets)+ 1.2*(Working capital/Total assets)+ 1.4*(Retained earnings/Total assets) + 3.3*(Earnings before interest and taxes/Total assets)] (Altman, 1977; Mackie-Mason, 1990)	Compustat
KZ score	KZ score = −1.002*(cash flows/total Assets) −39.368*(Dividends/Total Assets) −1.315*(Cash balance/total assets) +3.139*(Total debt/Total Assets) +0.283*Market-to-book ratio	Compustat
Div Dummy	A dummy with a value equals to one if firms has paid dividens in the fiscal year, and zero otherwise.	Compustat
Sale Growth	The ratio of total sales in year t to total sales in year t-1	Compustat
Tangibility PPE	Total property, plant and equipment divided by total assets	Compustat
Depreciation	Total depreciation and amortization divided by total assets	Compustat
Firm Age	Number of years between fiscal year and listing year	CRSP
Board Size	Number of directors on the board	Asset4 ESG
Board Ind	The percentage of independent directors on the board	Asset4 ESG
Instit	The percentage of institutional shareholders' ownership	Datastream

Appendix B. Options, vega, and delta calculation

This paper follows Black and Scholes (1973), Guay (1999) and Merton (1973) to calculate stock option values, and Caliskan and Doukas (2015), Cassell et al. (2012), and Core and Guay (2002) to estimate the value of delta (the sensitivity of CEO or CFO equity to stock price) and vega (the sensitivity of CEO

or CFO equity to stock return volatility). The formulae for evaluating European call options, delta and vega are as follows:

$$\text{Option value} = S\ e^{-dT} N(Z) - X\ e^{-rT} N(Z - \sigma T^{(\frac{1}{2})}$$

$$\text{Delta} = \frac{\partial \mathrm{V}}{\partial \mathrm{S}} = \mathrm{e}^{-\mathrm{dT}}\mathrm{N}(\mathrm{Z}) * (\mathrm{S}/100)$$

$$\text{Vega} = \frac{\partial \mathrm{V}}{\partial \sigma} = \mathrm{e}^{-\mathrm{dT}}\mathrm{N}'(\mathrm{Z})\mathrm{ST}^{(1/2)} * (0.01)$$

where

S: stock price at time t

T: time until the maturity of the option in years

d: natural logarithm of the expected dividend yield over the life of the option, which is $\ln(1 + (\sum_{t=-3}^{-1} D_t \div 3))$ where D_t is the dividend yield at time t

X: strike price

N: cumulative probability function for the normal distribution

N': normal density function

$$\mathrm{Z} = [\ln(\mathrm{S}/\mathrm{X}) + \mathrm{T}(\mathrm{r} - \mathrm{d} + (\sigma/2)]/\sigma\mathrm{T}^{(\frac{1}{2})}$$

σ: expected stock return over the life of the option, which equals to annualized monthly return volatility over the past 60 months $\left(\sqrt{\frac{\sum_{t=-60}^{-1}(\mathrm{r_t}-\bar{\mathrm{r}})^2}{59}}\right)*\sqrt{12}$, where r=$\ln(S_t/S_{t-1})$

r: risk-free rate, which is calculated as $\ln(1 + \mathrm{R_f})$, where R_f is the three-month U.S. Treasury Bills from https://www.federalreserve.gov/releases/h15/data.htm.

Figure 1: Examples of executive signatures for all levels of conservatism trait

This figure uses Microsoft Word fonts to simulate handwritten signatures, a. Liberal (Rage Italic font), b. Liberal (Mistral font), c. Conservative (Palace script font), d. Conservative (Vladimir script font), e. Illegible (simulated by Paint program), and f. Illegible (Gigi font).

a. Liberal
(Signature with full name)

b. Liberal
(Signature with first name and last name)

c. Conservative
(Signature with the initials of the first name)

d. Conservative
(Signature without a first name)

e. Illegible
(Unreadable signature)
(Excluded from the sample)

f. Illegible
(Signature is entirely different from the name)
(Excluded from the sample)

Table 1. Descriptive statistics

The table presents the descriptive statistics of the variables of interest. Panel A reports the descriptive statistics for the full sample. Variable definitions are reported in Appendices A and B. Data for executive inside debt are not available prior to 2006, so the statistics of inside debt (CEO Indebt) exclude the period 2002-2005. Panel B presents descriptive statistics which are sorted by CEO conservatism dummy (*CEO Sigs*). The mean differences between the subsamples sorted by *CEO Sigs* are also reported, with standard errors in the parentheses, and *, ** and *** denote significance at 10%, 5% and 1% levels, respectively.

Panel A: Full Sample

	N	Mean	Q1	Median	Q3	Std.
$Capex_{t+1}$	6,385	0.217	0.132	0.191	0.271	0.125
$R\&D_{t+1}$	6,385	0.045	0.000	0.005	0.050	0.088
Firm $Cash_{t+1}$	6,385	0.103	0.031	0.076	0.146	0.095
Div_{t+1}	6,385	0.014	0.000	0.009	0.022	0.018
$Repur_{t+1}$	6,385	0.020	-0.001	0.008	0.035	0.046
MLR_{t+1}	6,385	0.467	0.227	0.380	0.618	0.359
$AMLR_{t+1}$	6,385	0.194	0.040	0.146	0.280	0.198
BLR_{t+1}	6,385	0.554	0.431	0.561	0.679	0.194
CEO $Sigs_t$	6,385	0.423	0.000	0.000	1.000	0.494
CEO $Cash_t$ ($m)	6,385	1.527	0.906	1.142	1.602	1.375
CEO $Equity_t$ ($m)	6,385	100.387	12.486	31.377	70.665	319.583
CEO ve/del_t	6,385	0.423	0.086	0.352	0.641	0.404
CEO $Indebt_t$	5,410	2.063	0.000	0.114	1.219	11.052
CEO Age_t (years)	6,385	56.088	52.000	56.000	60.000	6.637
CEO Edu_t	6,385	0.500	0.000	0.000	1.000	0.500
CEO $Male_t$	6,385	0.970	1.000	1.000	1.000	0.169
CEO $Tenure_t$ (years)	6,385	7.361	2.753	5.507	9.759	6.560
Firm $Size_t$	6,385	8.960	8.064	8.866	9.766	1.242
Firm Age_t	6,385	18.067	3.654	18.989	31.074	14.227
Market to $Book_t$	6,385	2.137	1.353	1.781	2.511	1.222
$Volatility_t$	6,385	0.021	0.014	0.018	0.025	0.012
Sale $Growth_t$	6,385	0.059	-0.010	0.060	0.133	0.210
ROA_t	6,385	0.152	0.102	0.147	0.195	0.085
Cash $Flow_t$	6,385	0.117	0.075	0.112	0.156	0.069
Div $dummy_t$	6,385	0.659	0.000	1.000	1.000	0.474
Retained $earnings_t$	6,385	0.317	0.082	0.284	0.470	0.276
Tangibility PPE_t	6,385	0.268	0.099	0.188	0.379	0.222
$Depreciation_t$	6,385	0.040	0.025	0.035	0.049	0.022
Working $capital_t$	6,385	0.167	0.042	0.137	0.265	0.175
$Acquisitions_t$	6,385	0.025	0.000	0.001	0.021	0.054
Z $score_t$	6,385	1.799	1.093	1.827	2.544	1.415

Panel B: Sub-samples by CEO Sigs

	Sub-sample (CEO Sigs=0)		Sub-sample (CEO Sigs=1)		Difference between sub-samples (CEO Sigs=1) versus (CEO Sigs=0)	
	N	Mean	N	Mean	Mean Difference	Std. Error
$Capex_{t+1}$	3,682	0.214	2,703	0.221	0.007**	0.003
$R\&D_{t+1}$	3,682	0.048	2,703	0.042	-0.006***	0.002
Firm $Cash_{t+1}$	3,682	0.103	2,703	0.104	0.001	0.003
Div_{t+1}	3,682	0.015	2,703	0.013	-0.002***	0.001
$Repur_{t+1}$	3,682	0.018	2,703	0.022	0.004***	0.001
MLR_{t+1}	3,682	0.484	2,703	0.445	-0.038***	0.009
$AMLR_{t+1}$	3,682	0.202	2,703	0.182	-0.020***	0.005
BLR_{t+1}	3,682	0.559	2,703	0.547	-0.012**	0.005
CEO $Cash_t$ ($m)	3,682	1.575	2,703	1.461	-0.114***	0.003
CEO $Equity_t$ ($m)	3,682	98.736	2,703	102.635	3.899	8.095
CEO ve/del_t	3,682	0.433	2,703	0.410	-0.023**	0.010
CEO $Indebt_t$	3,103	1.915	2,307	2.262	0.347	0.304
CEO Age_t (years)	3,682	56.293	2,703	55.807	-0.486***	0.168
CEO Edu_t	3,682	0.515	2,703	0.480	-0.035***	0.013
CEO $Male_t$	3,682	0.958	2,703	0.988	0.030***	0.005
CEO $Tenure_t$ (years)	3,682	7.687	2,703	6.917	-0.770***	0.166
Firm $Size_t$	3,682	8.949	2,703	8.975	0.026	0.032
Firm Age_t	3,682	17.335	2,703	19.064	1.731***	0.359
Market to $Book_t$	3,682	2.113	2,703	2.170	0.057*	0.031
$Volatility_t$	3,682	0.021	2,703	0.020	-0.001	0.001
Sale $Growth_t$	3,682	0.056	2,703	0.063	0.007	0.005
ROA_t	3,682	0.149	2,703	0.155	0.006***	0.002
Cash $Flow_t$	3,682	0.115	2,703	0.120	0.005**	0.002
Div $Dummy_t$	3,682	0.680	2,703	0.631	-0.049***	0.012
Retained $earnings_t$	3,682	0.312	2,703	0.324	0.011*	0.007
Tangibility PPE_t	3,682	0.264	2,703	0.273	0.009	0.005
$Depreciation_t$	3,682	0.040	2,703	0.040	0.000	0.001
Working $Capital_t$	3,682	0.169	2,703	0.164	-0.005	0.005
$Acquisitions_t$	3,682	0.025	2,703	0.024	-0.001	0.002
Z $score_t$	3,682	1.758	2,703	1.855	0.097***	0.036

Table 2. Pearson correlations

The table reports the Pearson correlations for the variables of interest. Panel A presents the correlations among CEO conservatism (*CEO Sigs*) and corporate policies, including *Capex* (capital expenditures), *R&D* (Research and development expenses), *Firm Cash* (Cash holdings), *Div* (cash dividend payout), *Repur* (stock repurchase), *MLR* (market leverage ratio), *AMLR* (alternative leverage ratio) and *BLR* (book leverage ratio). Panel B presents the correlations among CEO conservatism (*CEO Sigs*), CEO compensation proxies (*CEO Cash* (salary + bonus), *Equity* (equity compensation), *ve/del* (vega/delta) and *Indebt* (CEO inside debt (pensions + deferred compensation)/*CEO Equity*)), CEO demographical characteristics (age, education, gender and tenure), CEO overconfidence (*CEO Conf*), CEO Narcissism (*CEO Narcis*) and CEO Republican affiliation (*CEO Rep*). p-values are reported in parentheses. *, ** and *** denote significance at 10%, 5% and 1% levels, respectively.

Panel A: Correlations among CEO conservatism and corporate policies

	$CEO\ Sigs_t$	$Capex_{t+1}$	$R\&D_{t+1}$	$Firm\ Cash_{t+1}$	Div_{t+1}	$Repur_{t+1}$	MLR_{t+1}	$AMLR_{t+1}$
$Capex_{t+1}$	0.030**							
	(0.012)							
$R\&D_{t+1}$	-0.030**	0.215***						
	(0.010)	(0.000)						
$Firm\ Cash_{t+1}$	0.010	0.291***	0.356***					
	(0.394)	(0.000)	(0.000)					
Div_{t+1}	-0.044***	-0.192***	-0.152***	-0.127***				
	(0.000)	(0.000)	(0.000)	(0.000)				
$Repur_{t+1}$	0.034***	0.030**	-0.051***	-0.002	0.071***			
	(0.004)	(0.012)	(0.000)	(0.861)	(0.000)			
MLR_{t+1}	-0.049***	-0.279***	-0.238***	-0.219***	0.176***	-0.038***		
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)		
$AMLR_{t+1}$	-0.046***	-0.293***	-0.212***	-0.290***	0.190***	-0.071***	0.676***	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
BLR_{t+1}	-0.036***	-0.231***	-0.227***	-0.241***	0.216***	0.018	0.522***	0.514***
	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.124)	(0.000)	(0.000)

Table 2. Pearson correlations (cont'd)

Panel B: Correlations among CEO conservatism, characteristics, and compensation											
	CEO $Sigs_t$	CEO $Cash_t$	CEO $Equity_t$	CEO ve/del_t	CEO $Indebt_t$	CEO Age_t	CEO Edu_t	CEO $Male_t$	CEO $Tenure_t$	CEO $Conf_t$	CEO $Narcis_t$
CEO $Cash_t$	-0.052***										
	(0.000)										
CEO $Equity_t$	-0.020	0.043***									
	(0.131)	(0.001)									
CEO ve/del_t	-0.025*	0.015	-0.187***								
	(0.059)	(0.252)	(0.000)								
CEO $Indebt_t$	0.013	-0.026*	-0.034**	0.038***							
	(0.329)	(0.051)	(0.010)	(0.004)							
CEO Age_t	-0.064***	0.138***	0.143***	-0.130***	0.041***						
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)						
CEO Edu_t	-0.011	0.038***	-0.044***	0.068***	-0.017	0.008					
	(0.405)	(0.004)	(0.001)	(0.000)	(0.189)	(0.558)					
CEO $Male_t$	0.100***	-0.012	0.038***	-0.004	-0.011	0.039***	0.019				
	(0.000)	(0.371)	(0.004)	(0.766)	(0.392)	(0.004)	(0.152)				
CEO $Tenure_t$	-0.073***	0.041***	0.268***	-0.241***	-0.017	0.386***	-0.004	0.101***			
	(0.000)	(0.002)	(0.000)	(0.000)	(0.210)	(0.000)	(0.746)	(0.000)			
CEO $Conf_t$	-0.053***	0.008	0.137***	-0.187***	0.028**	0.111***	-0.008	0.065***	0.262***		
	(0.000)	(0.529)	(0.000)	(0.000)	(0.034)	(0.000)	(0.568)	(0.000)	(0.000)		
CEO $Narcis_t$	-0.066***	-0.024*	-0.012	0.000	-0.026**	0.038***	-0.006	0.015	0.025*	-0.020	
	(0.000)	(0.074)	(0.352)	(0.973)	(0.048)	(0.005)	(0.677)	(0.254)	(0.060)	(0.132)	
CEO Rep_t	0.217***	-0.016	-0.042	-0.035	0.048*	0.105***	0.059**	0.118***	0.023	0.065**	-0.147***
	(0.000)	(0.557)	(0.126)	(0.206)	(0.082)	(0.000)	(0.034)	(0.000)	(0.402)	(0.018)	(0.000)

Table 3. Managerial conservatism personality and investments (*Capex and R&D*)

The table presents the results of regressions in which the dependent variables are *Capex* ratio (Models 1-3) and *R&D* ratio (Models 4-6). The main independent variable of interest is *CEO Sigs*. All models include intercepts, industry and year fixed effects which are not reported. All variables are defined in Appendices A and B. Models 1 and 4 do not include CEO compensation and CEO demographics. Data for *CEO Indebt* are not available prior to 2006, so Models 3 and 6 exclude the period 2002-2005. *CEO Cash*, *CEO Equity*, *CEO ve/del*, *CEO Tenure*, and *CEO Age* are in logs. Robust standard errors (in parentheses) are clustered at firm and year level to adjust for heteroscedasticity. *, ** and *** denote significance at 10%, 5% and 1% levels, respectively.

	Capex			R&D		
	(1)	(2)	(3)	(4)	(5)	(6)
CEO $Sigs_t$	0.007***	0.007***	0.010***	-0.005***	-0.005***	-0.005***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)
CEO $Cash_t$		-0.000	0.001		0.002**	0.002***
		(0.002)	(0.002)		(0.001)	(0.001)
CEO $Equity_t$		0.001			0.001*	
		(0.001)			(0.000)	
CEO ve/del_t		-0.002*	-0.002*		0.003***	0.003***
		(0.001)	(0.001)		(0.001)	(0.001)
CEO $Indebt_t$			-0.001			0.001
			(0.002)			(0.001)
CEO Age_t		-0.090***	-0.104***		-0.031***	-0.021**
		(0.014)	(0.015)		(0.009)	(0.009)
CEO Edu_t		-0.004*	-0.003		0.010***	0.009***
		(0.002)	(0.003)		(0.002)	(0.002)
CEO $Male_t$		-0.008	-0.010		-0.000	0.001
		(0.007)	(0.007)		(0.004)	(0.004)
CEO $Tenure_t$		0.004**	0.006***		0.005***	0.004***
		(0.002)	(0.002)		(0.001)	(0.001)
Firm $Size_t$	-0.005***	-0.004***	-0.002*	0.000	-0.000	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Firm Age_t	0.000***	0.000***	0.000***	0.000***	0.000***	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Market to $Book_t$	0.024***	0.023***	0.023***	0.017***	0.017***	0.017***
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
$Volatility_t$	0.005	-0.064	-0.253	0.314***	0.305***	0.142
	(0.154)	(0.158)	(0.160)	(0.104)	(0.106)	(0.096)
Sale $Growth_t$	0.082***	0.079***	0.075***	0.003	0.002	0.011
	(0.010)	(0.010)	(0.011)	(0.008)	(0.008)	(0.007)
ROA_t	0.025	0.032	-0.004	-0.193***	-0.189***	-0.175***
	(0.034)	(0.034)	(0.036)	(0.032)	(0.032)	(0.030)
Cash $Flow_t$	0.047	0.046	0.107***	0.053*	0.055*	0.097***
	(0.034)	(0.034)	(0.036)	(0.032)	(0.031)	(0.028)
Retained $earnings_t$	-0.014**	-0.013*	-0.011	0.016***	0.014***	0.012***
	(0.007)	(0.007)	(0.007)	(0.004)	(0.004)	(0.004)
BLR_t	-0.039***	-0.040***	-0.033***	-0.065***	-0.066***	-0.065***
	(0.008)	(0.008)	(0.009)	(0.006)	(0.006)	(0.005)
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	6,385	6,385	5,410	6,385	6,385	5,410
Adj. R^2	0.409	0.415	0.429	0.448	0.455	0.480

Table 4. Managerial conservatism personality and cash holdings (*Firm Cash*)

The table presents the results of Equation (1) in which the dependent variable is *Firm Cash*. The independent variables of interest is *CEO Sigs*. All models include intercepts, industry and year fixed effects which are not reported. All variables are defined in Appendices A and B. Model 1 does not include CEO compensation and CEO demographics. Data for *CEO Indebt* are not available prior to 2006, so Model 3 excludes the period 2002-2005. *CEO Cash*, *CEO Equity*, *CEO ve/del*, *CEO Tenure*, and *CEO Age* are in logs. Robust standard errors (in parentheses) are clustered at firm and year level to adjust for heteroscedasticity. *, ** and *** denote significance at 10%, 5% and 1% levels, respectively.

	Firm $Cash_{t+1}$		
	(1)	(2)	(3)
CEO $Sigs_t$	0.005**	0.005**	0.006***
	(0.002)	(0.002)	(0.002)
CEO $Cash_t$		0.002*	0.002
		(0.001)	(0.001)
CEO $Equity_t$		-0.000	
		(0.000)	
CEO ve/del_t		0.004***	0.004***
		(0.001)	(0.001)
CEO $Indebt_t$			-0.002
			(0.002)
CEO Age_t		0.028***	0.037***
		(0.010)	(0.011)
CEO Edu_t		0.008***	0.009***
		(0.002)	(0.002)
CEO $Male_t$		-0.009*	-0.005
		(0.005)	(0.005)
CEO $Tenure_t$		-0.002	-0.004**
		(0.001)	(0.001)
Firm $Size_t$	-0.008***	-0.008***	-0.009***
	(0.001)	(0.001)	(0.001)
Firm Age_t	-0.000***	-0.000*	-0.000
	(0.000)	(0.000)	(0.000)
Market to $Book_t$	0.011***	0.012***	0.011***
	(0.001)	(0.001)	(0.002)
$Volatility_t$	0.355***	0.421***	0.389***
	(0.120)	(0.122)	(0.132)
Sale $Growth_t$	-0.010	-0.008	-0.014**
	(0.007)	(0.007)	(0.007)
ROA_t	-0.125***	-0.128***	-0.109***
	(0.022)	(0.022)	(0.022)
Cash $Flow_t$	0.183***	0.189***	0.182***
	(0.027)	(0.027)	(0.027)
Div $Dummy_t$	-0.011***	-0.012***	-0.010***
	(0.003)	(0.003)	(0.003)
BLR_t	0.022***	0.022***	0.027***
	(0.007)	(0.007)	(0.007)
$R\&D_t$	0.155***	0.146***	0.208***
	(0.021)	(0.021)	(0.020)
$Capex_t$	-0.002	0.003	0.006
	(0.011)	(0.011)	(0.012)
Working $Capital_t$	0.167***	0.168***	0.169***
	(0.009)	(0.009)	(0.010)
$Acquisitions_t$	-0.098***	-0.090***	-0.084***
	(0.017)	(0.017)	(0.018)
Industry effects	Yes	Yes	Yes
Year effects	Yes	Yes	Yes
Obs.	6,385	6,385	5,410
Adj. R^2	0.435	0.439	0.455

Table 5. Managerial conservatism personality and dividend payout (*Div and Repur*)

The table presents the results of regressions in which the dependent variables are cash dividends (*Div*) (Models 1-3) and stock repurchases (*Repur*) (Models 4-6). The independent variables of interest is *CEO Sigs*. All models include intercepts, industry and year fixed effects which are not reported. All variables are defined in Appendices A and B. Models 1 and 4 do not include CEO compensation and CEO demographics. Data for *CEO Indebt* are not available prior to 2006, so Models 3 and 6 exclude the period 2002-2005. *CEO Cash*, *CEO Equity*, *CEO ve/del*, *CEO Tenure*, and *CEO Age* are in logs. Robust standard errors (in parentheses) are clustered at firm and year level to adjust for heteroscedasticity. *, ** and *** denote significance at 10%, 5% and 1% levels, respectively.

	Div_{t+1}			$Repur_{t+1}$		
	(1)	(2)	(3)	(4)	(5)	(6)
CEO $Sigs_t$	-0.001**	-0.001***	-0.001**	0.002*	0.002**	0.002*
	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
CEO $Cash_t$		0.000	0.000		0.002***	0.004***
		(0.000)	(0.000)		(0.001)	(0.001)
CEO $Equity_t$		0.000			0.001***	
		(0.000)			(0.000)	
CEO ve/del_t		0.001***	0.001***		0.001*	-0.001
		(0.000)	(0.000)		(0.000)	(0.000)
CEO $Indebt_t$			0.000			0.000
			(0.000)			(0.001)
CEO Age_t		0.001	0.002		-0.002	-0.000
		(0.002)	(0.003)		(0.006)	(0.006)
CEO Edu_t		0.001	0.001		-0.003***	-0.001
		(0.000)	(0.001)		(0.001)	(0.001)
CEO $Male_t$		-0.002	-0.002		-0.003	0.003
		(0.001)	(0.001)		(0.003)	(0.003)
CEO $Tenure_t$		-0.000	-0.000		-0.000	0.000
		(0.000)	(0.000)		(0.001)	(0.001)
Firm $Size_t$	0.003***	0.002***	0.003***	0.003***	0.003***	0.001
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Firm Age_t	-0.000***	-0.000***	-0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Market to $Book_t$	-0.002***	-0.001***	-0.002***	-0.005***	-0.005***	-0.003***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
$Volatility_t$	-0.105***	-0.091***	-0.091***	-0.394***	-0.437***	-0.191***
	(0.025)	(0.026)	(0.029)	(0.072)	(0.073)	(0.068)
Sale $Growth_t$	-0.006***	-0.006***	-0.005***	-0.010***	-0.010***	0.004
	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.003)
ROA_t	0.018***	0.018***	0.013***	0.065***	0.061***	-0.015*
	(0.004)	(0.004)	(0.005)	(0.011)	(0.011)	(0.009)
Cash $Flow_t$	0.024***	0.025***	0.034***	0.065***	0.065***	0.043***
	(0.005)	(0.005)	(0.005)	(0.013)	(0.013)	(0.012)
Retained $earnings_t$	0.003***	0.003***	0.003***	0.015***	0.014***	0.023***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.003)
BLR_t	0.009***	0.008***	0.009***	-0.008**	-0.009**	0.001
	(0.001)	(0.001)	(0.002)	(0.004)	(0.004)	(0.005)
$R\&D_t$	-0.006**	-0.007***	-0.010***	0.008	0.008	-0.013*
	(0.003)	(0.003)	(0.003)	(0.008)	(0.008)	(0.008)
$Capex_t$	-0.007***	-0.007***	-0.008***	-0.006	-0.007	0.005
	(0.002)	(0.002)	(0.003)	(0.006)	(0.006)	(0.006)
Working $Capital_t$	0.004**	0.005***	0.005**	0.008*	0.011**	0.006
	(0.002)	(0.002)	(0.002)	(0.005)	(0.005)	(0.005)
$Acquisitions_t$	-0.008**	-0.006	-0.005	-0.049***	-0.049***	-0.017**
	(0.004)	(0.004)	(0.004)	(0.010)	(0.010)	(0.008)
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	6,385	6,385	5,410	6,385	6,385	5,410
Adj. R^2	0.258	0.264	0.248	0.172	0.177	0.181

Table 6. Managerial conservatism personality and leverage (*MLR, AMLR and BLR*)

The table presents the results of regressions in which the dependent variables are *MLR* – Market leverage (Models 1-3), *AMLR* – Alternative market leverage (Models 4-6) and *BLR* – Book leverage (Models 7-9). The independent variables of interest is *CEO Sigs*. All models include intercepts, industry and year fixed effects which are not reported. All variables are defined in Appendices A and B. Models 1, 4 and 7 do not include CEO compensation and CEO demographics. Data for *CEO Indebt* are not available prior to 2006, so Models 3, 6 and 9 exclude the period 2002-2005. *CEO Cash, CEO Equity, CEO ve/del, CEO Tenure*, and *CEO Age* are in logs. Robust standard errors (in parentheses) are clustered at firm and year level to adjust for heteroscedasticity. *, ** and *** denote significance at 10%, 5% and 1% levels, respectively.

	MLR_{t+1}			$AMLR_{t+1}$			BLR_{t+1}		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CEO $Sigs_t$	-0.016***	-0.019***	-0.018***	-0.011***	-0.012***	-0.012***	-0.011***	-0.009**	-0.014***
	(0.006)	(0.006)	(0.007)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
CEO $Cash_t$		0.007	0.004		-0.001	-0.003		0.016***	0.018***
		(0.005)	(0.005)		(0.003)	(0.003)		(0.003)	(0.003)
CEO $Equity_t$		-0.001			-0.001			0.002**	
		(0.002)			(0.001)			(0.001)	
CEO ve/del_t		0.013***	0.014***		0.001	0.002		0.000	-0.000
		(0.002)	(0.002)		(0.002)	(0.002)		(0.002)	(0.002)
CEO $Indebt_t$			-0.018***			-0.026***			-0.009**
			(0.005)			(0.002)			(0.003)
CEO Age_t		0.030	0.038		-0.013	0.007		-0.034*	-0.021
		(0.031)	(0.034)		(0.019)	(0.022)		(0.020)	(0.022)
CEO Edu_t		0.024***	0.022***		0.002	-0.001		0.006	0.004
		(0.007)	(0.007)		(0.004)	(0.004)		(0.004)	(0.005)
CEO $Male_t$		-0.025	-0.028		0.023**	0.024**		-0.013	-0.009
		(0.017)	(0.018)		(0.011)	(0.011)		(0.013)	(0.014)
CEO $Tenure_t$		-0.025***	-0.022***		-0.003	-0.004		-0.007**	-0.007**
		(0.004)	(0.005)		(0.003)	(0.003)		(0.003)	(0.003)
Firm $Size_t$	0.025***	0.023***	0.022***	0.006***	0.007***	0.009***	0.022***	0.018***	0.021***
	(0.003)	(0.003)	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Firm Age_t	-0.003***	-0.003***	-0.003***	0.000	0.000	-0.000	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Market to $Book_t$	-0.053***	-0.049***	-0.048***	-0.026***	-0.025***	-0.025***	-0.016***	-0.014***	-0.012***
	(0.004)	(0.004)	(0.004)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
$Volatility_t$	4.132***	4.470***	5.449***	1.310***	1.380***	2.095***	0.198	0.093	0.674**
	(0.577)	(0.580)	(0.639)	(0.415)	(0.418)	(0.491)	(0.300)	(0.313)	(0.344)
Sale $Growth_t$	-0.102***	-0.087***	-0.097***	-0.025**	-0.024**	-0.023*	-0.058***	-0.055***	-0.043***
	(0.019)	(0.019)	(0.021)	(0.012)	(0.012)	(0.012)	(0.013)	(0.013)	(0.015)
ROA_t	-0.332***	-0.354***	-0.302***	0.022	0.023	0.022	-0.059	-0.084*	-0.116**
	(0.084)	(0.085)	(0.089)	(0.046)	(0.046)	(0.049)	(0.051)	(0.051)	(0.053)
Cash $Flow_t$	-0.932***	-0.903***	-0.991***	-0.498***	-0.495***	-0.536***	-0.322***	-0.321***	-0.350***
	(0.087)	(0.087)	(0.096)	(0.054)	(0.054)	(0.061)	(0.055)	(0.055)	(0.058)
Retained $earnings_t$	-0.231***	-0.233***	-0.226***	-0.045***	-0.046***	-0.040***	-0.115***	-0.118***	-0.103***
	(0.016)	(0.016)	(0.016)	(0.009)	(0.009)	(0.010)	(0.013)	(0.013)	(0.013)
$R\&D_t$	-0.678***	-0.686***	-0.748***	-0.274***	-0.275***	-0.342***	-0.287***	-0.288***	-0.391***
	(0.052)	(0.053)	(0.061)	(0.031)	(0.031)	(0.035)	(0.046)	(0.046)	(0.045)
Tangibility PPE_t	0.195***	0.198***	0.178***	0.223***	0.221***	0.210***	0.101***	0.114***	0.041**
	(0.028)	(0.029)	(0.031)	(0.020)	(0.020)	(0.023)	(0.019)	(0.019)	(0.020)
$Depreciation_t$	0.476**	0.439*	0.543**	0.169	0.161	0.297*	0.153	0.157	0.042
	(0.239)	(0.238)	(0.255)	(0.157)	(0.156)	(0.172)	(0.152)	(0.150)	(0.164)
Z $score_t$	0.011**	0.013***	0.014**	-0.016***	-0.015***	-0.012***	0.008**	0.009**	0.007*
	(0.005)	(0.005)	(0.005)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	6,385	6,385	5,410	6,385	6,385	5,410	6,385	6,385	5,410
Adj. R^2	0.516	0.523	0.527	0.429	0.429	0.441	0.313	0.320	0.304

Table 7. Corporate governance impact

The table examines the impact of CEO conservatism (*CEO Sigs*) on *Capex* (Model 1), *R&D* (Model 2), *Firm Cash* (Model 3), *Div* (Model 4), *Repur* (Model 5) and *BLR* (Model 6) with additional control variables: board size (*Board Size*), board independence (*Board Ind*) and institutional ownership (*Instit*). All models include intercepts, industry and year fixed effects which are not reported. For brevity, the estimated coefficients of firm-specific controls are not reported. All variables are defined in Appendices A and B. Data for inside debt are not available prior to 2006, so all models exclude the period 2002-2005. *CEO Cash*, *CEO Equity*, *CEO ve/del*, *CEO Tenure*, and *CEO Age* are in logs. Robust standard errors (in parentheses) are clustered at firm and year level to adjust for heteroscedasticity. *, ** and *** denote significance at 10%, 5% and 1% levels, respectively.

	$Capex_{t+1}$	$R\&D_{t+1}$	Firm $Cash_{t+1}$	Div_{t+1}	$Repur_{t+1}$	BLR_{t+1}
	(1)	(2)	(3)	(4)	(5)	(6)
CEO $Sigs_t$	0.007***	-0.005**	0.008***	-0.001*	0.003**	-0.015***
	(0.003)	(0.002)	(0.002)	(0.001)	(0.001)	(0.005)
CEO $Cash_t$	0.002	0.003***	0.001	0.000	0.004***	0.021***
	(0.002)	(0.001)	(0.002)	(0.000)	(0.001)	(0.003)
CEO ve/del_t	-0.001	0.003***	0.004***	0.001***	0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.002)
CEO $Indebt_t$	-0.002	-0.002	-0.001	0.000	-0.000	-0.010***
	(0.002)	(0.001)	(0.002)	(0.000)	(0.001)	(0.004)
CEO Age_t	-0.099***	-0.015	0.028**	0.003	0.003	-0.032
	(0.015)	(0.009)	(0.011)	(0.002)	(0.006)	(0.023)
CEO Edu_t	-0.003	0.010***	0.009***	0.001***	-0.003**	-0.001
	(0.003)	(0.002)	(0.002)	(0.000)	(0.001)	(0.005)
CEO $Male_t$	-0.007	0.009**	-0.009	-0.001	0.001	-0.007
	(0.006)	(0.004)	(0.005)	(0.002)	(0.003)	(0.016)
CEO $Tenure_t$	0.007***	0.003**	-0.003**	-0.001**	-0.001	-0.007**
	(0.002)	(0.001)	(0.001)	(0.000)	(0.001)	(0.003)
Board $Size_t$	0.000	0.001***	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Board Ind_t	-0.010	0.007	0.006	0.005**	0.017***	0.111***
	(0.012)	(0.008)	(0.010)	(0.002)	(0.006)	(0.024)
$Instit_t$	-0.073***	0.007	0.021	-0.003	-0.026***	-0.023
	(0.016)	(0.011)	(0.013)	(0.003)	(0.007)	(0.029)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	5,030	5,030	5,030	5,030	5,030	5,030
Adj. R^2	0.432	0.458	0.453	0.299	0.190	0.321

Table 8. Firm fixed effects

The table re-examines the impact of CEO conservatism (*CEO Sigs*) on *Capex* (Model 1), *R&D* (Model 2), *Firm Cash* (Model 3), *Div* (Model 4), *Repur* (Model 5), MLR (Model 6), AMRL (Model 7) and *BLR* (Model 8) with firm fixed effects. All models include intercepts, firm and year fixed effects which are not reported. For brevity, the coefficients of firm-specific controls are not reported. All variables are defined in Appendices A and B. Data for inside debt are not available prior to 2006, so all models exclude the period 2002-2005. *CEO Cash*, *CEO Equity*, *CEO ve/del*, *CEO Tenure*, and *CEO Age* are in logs. Robust standard errors (in parentheses) are clustered at firm and year level to adjust for heteroscedasticity. *, ** and *** denote significance at 10%, 5% and 1% levels, respectively.

	$Capex_{t+1}$	$R\&D_{t+1}$	$Firm\ Cash_{t+1}$	Div_{t+1}	$Repur_{t+1}$	MLR_{t+1}	$AMLR_{t+1}$	BLR_{t+1}
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$CEO\ Sigs_t$	0.007*	0.001	0.007**	-0.002***	0.002	-0.003	-0.011*	0.003
	(0.003)	(0.001)	(0.003)	(0.001)	(0.002)	(0.009)	(0.006)	(0.006)
$CEO\ Cash_t$	-0.001	-0.001	-0.002	-0.001*	0.001	-0.011**	-0.010***	0.001
	(0.003)	(0.001)	(0.002)	(0.000)	(0.001)	(0.005)	(0.003)	(0.003)
$CEO\ ve/del_t$	-0.001	-0.000	-0.000	0.001***	-0.000	0.013***	0.004***	-0.002
	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.002)	(0.002)	(0.002)
$CEO\ Indebt_t$	0.001	0.001	-0.000	-0.000	-0.001	0.008	-0.002	0.002
	(0.002)	(0.001)	(0.002)	(0.000)	(0.001)	(0.005)	(0.003)	(0.003)
$CEO\ Age_t$	-0.032*	-0.010	0.002	-0.006	0.010	0.040	-0.024	-0.039
	(0.018)	(0.006)	(0.017)	(0.005)	(0.012)	(0.049)	(0.032)	(0.030)
$CEO\ Edu_t$	-0.001	0.001	0.008***	0.001	-0.000	-0.017*	-0.004	-0.009
	(0.003)	(0.001)	(0.003)	(0.001)	(0.002)	(0.009)	(0.006)	(0.007)
$CEO\ Male_t$	0.001	0.003	0.008	0.001	-0.006	0.016	0.021	0.002
	(0.010)	(0.004)	(0.007)	(0.002)	(0.004)	(0.024)	(0.015)	(0.014)
$CEO\ Tenure_t$	0.004**	0.002**	-0.001	0.001	-0.002	-0.007	0.001	0.004
	(0.002)	(0.001)	(0.002)	(0.000)	(0.001)	(0.005)	(0.003)	(0.003)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	5,030	5,030	5,030	5,030	5,030	5,030	5,030	5,030
Adj. R^2	0.712	0.925	0.842	0.532	0.315	0.786	0.696	0.704

Table 9. Two-stage least square estimation

The table re-examines the impact of CEO conservatism (*CEO Sigs*) on *Capex* (Model 1), *R&D* (Model 2), *Firm Cash* (Model 3), *Div* (Model 4), *Repur* (Model 5) and *BLR* (Model 6) under two-stage least square estimations with instrument variables. The instruments are the natural logarithm of the length of first name (*CEO first name*) and short names (e.g. "Will" or "Bill" for "William") (*CEO short name*). Panel A presents the results of the first-stage estimations, which regress *CEO Sigs* on the instruments and our sets of controls. Because the set of controls for *Capex* and *R&D* are the same, we report the first-stage estimations for *Capex* and *R&D* in Model 1 in Panel A. Similarly, because of the same set of controls for *Div* and *Repur*, we report the first-stage estimations for *Div* and *Repur* in Model 3 in Panel A. Models 2 and 4 report the first-stage estimations for *Firm Cash* and *BLR*, respectively. Panel B presents the second-stage regressions, where we regress corporate policies on the fitted *CEO Sigs* from the first-stage estimations. All models include intercepts, industry and year fixed effects which are not reported. For brevity, the coefficients of firm-specific controls are not reported. All variables are defined in Appendices A and B. Data for inside debt are not available prior to 2006, so all models exclude the period 2002-2005. *CEO Cash*, *Equity*, *ve/del*, *Tenure*, and *Age* are in logs. Robust standard errors (in parentheses) are clustered at firm and year level to adjust for heteroscedasticity. *, ** and *** denote significance at 10%, 5% and 1% levels, respectively.

Panel A: First-stage regressions
(Dependent variable: CEO Sigs)
(Instrumental variables: CEO first name and CEO short name)

	For Models of $Capex_{t+1}$ and $R\&D_{t+1}$	For Models of $Firm\ Cash_{t+1}$	For Models of Div_{t+1} and $Repur_{t+1}$	For Models of BLR_{t+1}
	(1)	(2)	(3)	(4)
CEO first name	0.044**	0.044**	0.043**	0.039*
	(0.021)	(0.021)	(0.021)	(0.021)
CEO short name	0.380***	0.374***	0.377***	0.378***
	(0.016)	(0.017)	(0.016)	(0.016)
CEO & Firm Controls	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
Obs.	5,410	5,410	5,410	5,410
F-statistics	276.97***	264.17***	272.33***	272.47***

Panel B: Second-stage regressions

	$Capex_{t+1}$	$R\&D_{t+1}$	$Firm\ Cash_{t+1}$	Div_{t+1}	$Repur_{t+1}$	BLR_{t+1}
	(1)	(2)	(3)	(4)	(5)	(6)
CEO Sigs	0.023***	-0.019***	0.048***	-0.011***	0.008*	-0.057**
	(0.008)	(0.006)	(0.009)	(0.002)	(0.004)	(0.024)
CEO $Cash_t$	0.002	0.002**	-0.003*	0.004***	0.004***	0.002
	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.005)
CEO ve/del_t	-0.002*	0.003***	0.003***	0.001	-0.001*	0.015***
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.002)
CEO $Indebt_t$	-0.002	-0.002	-0.008***	0.005***	0.000	-0.018***
	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.005)
CEO Age_t	-0.101***	-0.020**	0.007	0.020***	-0.000	0.031
	(0.015)	(0.009)	(0.012)	(0.006)	(0.006)	(0.034)
CEO Edu_t	-0.003	0.009***	0.010***	-0.001	-0.001	0.022***
	(0.003)	(0.002)	(0.002)	(0.001)	(0.001)	(0.007)
CEO $Male_t$	-0.011	0.007*	-0.014**	0.000	0.001	-0.019
	(0.007)	(0.004)	(0.006)	(0.003)	(0.003)	(0.019)
CEO $Tenure_t$	0.006***	0.002*	0.001	-0.000	0.000	-0.023***
	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.005)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	5410	5410	5410	5410	5410	5410
R^2	0.424	0.442	0.631	0.387	0.072	0.527
Hansen J-statistics	1.71	0.87	0.53	3.10*	0.07	8.24***
Cragg-Donald F-statistics	251.69***	251.69***	243.36***	247.66***	247.66***	248.30***

Table 10. Matching method (*CEO Sigs*)

This table re-examines the impact of CEO conservatism (*CEO Sigs*) on corporate policies by using propensity score matching method. We use *CEO Sigs* to conduct the matching for the treatment group (firms with conservative CEOs) and control group (firms without conservative CEOs). In Panel A, we report the propensity scores in logistic regressions, where the dependent variable is *CEO Sigs*, under Pre-Match columns. We use the estimated propensity scores to conduct the nearest-neighbour matching with a caliper value of 0.01 and exact industry matching. Under Post-Match columns, we report the results of the logistic regressions based on the matched samples suggested by the Pre-match regressions. Because the set of controls for Models of *Capex* and *R&D* is the same, we reports Pre-Match and Post-Match estimations for *Capex* and *R&D* in Models 1 and 2. We report Pre-Match and Post-Match for *Div* and *Repur* in Models 5 and 6 as of the same set of controls. Panel B reports estimates of the average treatment effects for corporate policies. In Panel C, we re-estimate our OLS baseline regressions based on the matched samples. All variables are defined in Appendices A and B. Data for inside debt are not available prior to 2006, so all models exclude the period 2002-2005. *CEO Cash*, *CEO Equity*, *CEO ve/del*, *CEO Tenure*, and *CEO Age* are in logs. Robust standard errors (in parentheses) are clustered at firm and year level to adjust for heteroscedasticity. *, ** and *** denote significance at 10%, 5% and 1% levels, respectively.

Panel A: Propensity score regressions (Pre-Match) and Diagnostic regressions (Post-Match)
(Dependent variables: CEO Sigs)

	For Models of $Capex_{t+1}$ and $R\&D_{t+1}$		For Models of Firm $Cash_{t+1}$		For Models of Div_{t+1} and $Repur_{t+1}$		For Models of BLR_{t+1}	
	Pre-Match	Post-Match	Pre-Match	Post-Match	Pre-Match	Post-Match	Pre-Match	Post-Match
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CEO $Cash_t$	-0.206***	0.069	-0.132***	0.014	-0.144***	0.071	-0.219***	0.059
	(0.042)	(0.063)	(0.045)	(0.061)	(0.044)	(0.061)	(0.042)	(0.068)
CEO ve/del_t	0.132***	-0.018	0.133***	-0.019	0.129***	-0.025	0.140***	-0.001
	(0.027)	(0.038)	(0.028)	(0.039)	(0.027)	(0.038)	(0.027)	(0.037)
CEO $Indebt_t$	-0.017	0.036	0.010	0.064	-0.002	0.059	-0.009	0.089
	(0.049)	(0.052)	(0.050)	(0.056)	(0.050)	(0.057)	(0.049)	(0.055)
CEO Age_t	-0.146	-0.256	-0.137	0.167	-0.134	0.304	-0.131	0.110
	(0.325)	(0.399)	(0.334)	(0.415)	(0.333)	(0.419)	(0.324)	(0.411)
CEO Edu_t	-0.052	0.030	-0.065	0.022	-0.063	-0.013	-0.040	-0.014
	(0.065)	(0.079)	(0.066)	(0.083)	(0.066)	(0.082)	(0.065)	(0.080)
CEO $Male_t$	0.945***	-0.428	0.976***	-0.153	0.977***	-0.440	0.953***	-0.417
	(0.217)	(0.341)	(0.226)	(0.325)	(0.226)	(0.311)	(0.220)	(0.340)
CEO $Tenure_t$	-0.225***	0.010	-0.269***	-0.059	-0.272***	-0.048	-0.214***	-0.018
	(0.043)	(0.055)	(0.045)	(0.058)	(0.045)	(0.057)	(0.044)	(0.056)
CEO Duality	0.185**	0.052	0.220***	0.077	0.205***	0.063	0.150**	-0.056
	(0.074)	(0.090)	(0.077)	(0.095)	(0.077)	(0.095)	(0.075)	(0.092)
Firm $Size_t$	0.042	-0.009	0.075**	-0.104	0.068*	-0.007	0.028	-0.056
	(0.034)	(0.042)	(0.035)	(0.044)	(0.035)	(0.044)	(0.034)	(0.043)
Firm Age_t	0.008***	-0.002	0.008***	0.001	0.010***	-0.000	0.008***	-0.001
	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)	(0.003)
Market to $Book_t$	0.345*	0.016	0.286	0.008	0.313	-0.195	-0.019	0.190
	(0.195)	(0.242)	(0.196)	(0.261)	(0.199)	(0.236)	(0.164)	(0.204)
$Volatility_t$	6.005	2.431	-0.063	5.315	2.688	4.597	7.586	3.635
	(4.586)	(5.818)	(4.866)	(5.968)	(4.789)	(5.837)	(4.658)	(6.031)
Sale $Growth_t$	0.044	-0.223	0.002	-0.172	0.056	-0.090	0.096	-0.250
	(0.160)	(0.206)	(0.167)	(0.221)	(0.168)	(0.205)	(0.159)	(0.224)
ROA_t	0.508	0.187	0.059	0.160	-0.196	0.281	0.483	0.324
	(0.617)	(0.719)	(0.627)	(0.768)	(0.639)	(0.757)	(0.659)	(0.835)
Cash $Flow_t$	-0.140	0.114	0.085	0.863	-0.104	0.240	0.510	-0.531
	(0.739)	(0.879)	(0.769)	(0.948)	(0.768)	(0.935)	(0.751)	(0.942)
Retained $earnings_t$	0.141	-0.156			0.181	-0.172	0.241	-0.056
	(0.139)	(0.165)			(0.144)	(0.176)	(0.156)	(0.192)
BLR_t	-0.661***	0.037	-0.750***	0.158	-0.750***	-0.104		
	(0.236)	(0.290)	(0.240)	(0.312)	(0.241)	(0.299)		
Div $Dummy_t$			-0.209**	0.071				
			(0.087)	(0.109)				
$R\&D_t$			-1.327**	1.162	-1.097**	0.136	-1.846***	1.270
			(0.520)	(0.662)	(0.515)	(0.626)	(0.504)	(0.671)
$Capex_t$			0.574*	-0.620	0.665**	-0.625		
			(0.319)	(0.411)	(0.318)	(0.403)		
Working $Capital_t$			0.531**	-0.521	0.485*	0.067		
			(0.265)	(0.339)	(0.266)	(0.344)		
$Acquisitions_t$			0.786	-0.586	0.719	-0.420		
			(0.586)	(0.757)	(0.587)	(0.729)		
Tangibility PPE_t							-1.004***	-0.301
							(0.323)	(0.401)
$Depreciation_t$							3.313	-1.331
							(2.137)	(2.554)
Z $score_t$							-0.054	-0.019
							(0.040)	(0.052)
Board $Size_t$	-0.033***	0.002	-0.032***	0.016	-0.032***	0.005	-0.031***	-0.009
	(0.011)	(0.013)	(0.011)	(0.014)	(0.011)	(0.014)	(0.011)	(0.014)
Board Ind_t	-0.256	-0.159	-0.173	0.314	-0.224	-0.162	-0.315	-0.294
	(0.300)	(0.357)	(0.301)	(0.385)	(0.301)	(0.378)	(0.299)	(0.358)
$Instit_t$	0.067	-0.072	0.068	-0.484	0.082	-0.074	0.188	-0.395

	(0.379)	(0.463)	(0.383)	(0.477)	(0.382)	(0.489)	(0.379)	(0.469)
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	4,945	2,924	4,916	2,686	4,916	2,712	4,945	2,822
Pseudo R^2	0.080	0.003	0.097	0.009	0.097	0.007	0.082	0.005

Panel B: Average treatment effects based on the propensity score matching estimator

	Sub-sample (CEO Sigs=0)		Sub-sample (CEO Sigs=1)		Average treatment effects (Mean difference between sub-samples)	
	N	Mean	N	Mean	Mean Difference	t-statistic
$Capex_{t+1}$	1,462	0.217	1,462	0.224	0.007*	1.695
$R\&D_{t+1}$	1,462	0.058	1,462	0.052	-0.005*	-1.698
Firm Cash	1,343	0.107	1,343	0.115	0.008**	2.126
Div_{t+1}	1,356	0.071	1,356	0.067	-0.004**	-2.107
$Repur_{t+1}$	1,356	0.024	1,356	0.027	0.003**	2.218
BLR_{t+1}	1,411	0.558	1,411	0.546	-0.012*	-1.659

Panel C: OLS re-estimation based on the matched samples

	$Capex_{t+1}$	$R\&D_{t+1}$	Firm $Cash_{t+1}$	Div_{t+1}	$Repur_{t+1}$	BLR_{t+1}
	(1)	(2)	(3)	(4)	(5)	(6)
CEO Sigs	0.008**	-0.005*	0.007**	-0.004***	0.003**	-0.012**
	(0.003)	(0.003)	(0.003)	(0.001)	(0.001)	(0.005)
CEO $Cash_t$	-0.005	-0.002	-0.000	0.001	0.006***	0.018***
	(0.005)	(0.002)	(0.003)	(0.001)	(0.001)	(0.004)
CEO ve/del_t	-0.001	0.004***	0.004***	0.002***	0.000	-0.007***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
CEO $Indebt_t$	-0.001	-0.000	0.001	0.004***	-0.002**	-0.006
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.004)
CEO Age_t	-0.081***	-0.013	0.019	0.014*	0.011	-0.054**
	(0.020)	(0.014)	(0.016)	(0.008)	(0.009)	(0.025)
CEO Edu_t	-0.001	0.016***	0.007**	-0.004***	-0.004**	-0.011*
	(0.004)	(0.003)	(0.003)	(0.001)	(0.002)	(0.006)
CEO $Male_t$	-0.009	0.027***	-0.013	-0.008*	0.007	0.026
	(0.013)	(0.009)	(0.011)	(0.004)	(0.007)	(0.037)
CEO $Tenure_t$	0.007***	0.003*	0.001	0.000	-0.003**	0.002
	(0.003)	(0.002)	(0.002)	(0.001)	(0.001)	(0.004)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	2,924	2,924	2,686	2,712	2,712	2,822
Adj. R^2	0.387	0.403	0.469	0.423	0.189	0.460