CEOs' Personal Portfolio and Corporate Policies*

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Abstract

Using a unique dataset of personal wealth and sociodemographic characteristics for all Norwegian CEOs, we find a negative association between CEOs' personal risk taking and risk taking at their firm. When managers increase risky asset in their personal portfolio in the previous year, corporate leverage and R&D expenditures go down and cash holding goes up this year. These relations hold not only in the cross-section of firms, but also within a firm following a CEO turnover and within a firm-CEO match, and they are robust to using different measures of CEOs' personal risk taking. Moreover, these relations are much stronger in firms that the CEO has more power, i.e, when the CEO has high ownership or she is also the chairman of the board. Overall, the results suggest that CEOs use their firm to hedge part of their personal risk.

JEL Classifications: G30, M52

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1 Introduction

What are the major determinants of corporate finance decisions? Classical theories emphasize firm-, industry-, and market-related factors whereas recent studies find relatively weak support to these theories and suggest that further research is needed (Graham and Harvey, 2001). A new trend in corporate finance research emphasizes the role of managers and their individual preferences and beliefs (see Bennedsen, Perez-Gonzales, and Wolfenzon, 2013; Bertrand and Schoar, 2003; Kaplan, Klebanov, and Sorensen, 2012; Custodio and Metzger, 2013, 2014; Falato, Li, and Milbourn, 2015; Cronqvist, Makhija, and Yonker, 2012; Graham, Harvey, and Puri, 2013; Ben-David, Graham, and Harvey 2013). However, due to the lack of data, this literature often relies on ad hoc assumptions or proxies for important inputs; for example, using CEOs who grew up in the Great Depression (Malmendier, Tate, G., Yan J. 2011) or fly small aircraft (Cain and McKeon, 2015) as a proxy for managerial risk aversion .

In this paper, we measure the CEO's personal risk taking from his non-firm portfolio holding in risky assets and link it to corporate risk taking. Specifically, we take the share of risky assets in total portfolio of the CEO as her personal risk taking. After controlling for all relevant variables at the firm and CEO level, we find that the lagged personal holdings in risky assets are negatively associated with firm leverage and R&D expenditures and positively associated with firm cash holdings. The same relations hold not only across firms, but also within a firm following a CEO turnover, within a firm over time, and within a firm-CEO match. These findings are consistent with predictions from the hedging hypothesis that the CEO who holds risky assets is already bearing a lot of risk in his personal portfolio and thus engages in less risky firm policies to hedge himself. If this is the case, we should find that the relation is stronger when the manager has more power at the firm so he can affect firm policies easier. Indeed, we find that a stronger effect when managers have high ownership at the firm or when they are also the chairman of the board. In addition, we show that our measure of CEOs' holdings in risky assets explains the variation in firm leverage beyond the mere CEO fixed effect (Bertrand and Schoar, 2003) and CEO-firm fixed effect. We also show that CEOs' holding in risky assets do not simply capture the persistence in firm policies. In

fact, CEOs' holding in risky assets varies significantly over time and the measure taken in 1995, for example, would not explain the firm policy today. Finally, we demonstrate that the results hold when controlling for past firm performance and when using alternative measures of CEO's personal risk taking.

We contribute to the literature in the following three aspects. First, we provide more empirical evidence on the role of managers in corporate behaviors. Recent papers suggest that managers matter using managerial fixed effects (Bertrand and Schoar, 2003), over-confidence proxies (Malmendier and Tate, 2005, 2008), and characteristics from CEO assessment (Kaplan, Klebanov, and Sorensen, 2012) and psychometric tests (Graham, Harvey, and Puri, 2013). This paper measures CEOs' revealed preferences for risk-taking from their portfolio holdings in risky assets outside the firms and relates it to the firm policies. Specifically, we measure a CEO's holding of risky assets as the value of equity, bonds and funds held outside the firm divided by the total value of his non-firm wealth. Our unique data set consists of CEO wealth (both in and outside the firm), liabilities, as well as other CEO characteristics, which are considered unobservable in most of countries in the world. In addition, we also have data on CEO characteristics even before they were appointed as a CEO, which are important in terms of identification strategy. This rich data set provides us relatively accurate measures for managers' exposure to risk than using experiment data or proxies. We find that CEO's holdings in risk assets and firm risk strategies are correlated.

Second, recent studies are limited to the cross-sectional analyses and suffer from the potential endogenous matching of CEOs and firms (see for example, Edmans and Gabaix, 2011). In contrast, we have a panel data of about 20 years that allows us to investigate how changes in CEO's holding in risky assets shape firm policies. To deal with potential endogenous matching of CEOs and firms, we construct a CEO-firm paired panel and include firm fixed effect to capture the changes within a firm due to CEO turnovers. If indeed firms have some preferences over certain type of CEOs and tend to choose the type of CEOs that best implement their firm policies, then we would expect different CEOs work in the same firm should also have similar risk preference. Our identification strategy helps us capture

the changes among CEOs within the same firm, given the CEO-firm match. In addition, we run panel data regressions using firm-year observations to study the within-firm impact of the changes in the risk preference of the same CEO on firm policies, where firm-, year-, and firm-CEO-paired-fixed effects are included. Besides, we interact CEO risk preference with corporate governance measures to pin down the channel through which CEO risk preference and firm policies are connected. These identification strategies reduce concerns related to endogenous matching or other issues that complicate establishing causality.

Third, in addition to public firms, our data set also covers private firms and full ownership that are both ignored in most of the literature due to data availability. Since private firms usually face more information asymmetry problems and financial constraints, we also account for interactions between managerial personal traits, real investment, financing and corporate governance. It is worth noting that the corporate policies of private firms in itself is of great interest to financial economists due to the limited data available to researcher. We join a recent surge of papers using data on private companies to draw new insights into public company behavior (e.g., Bargeron, Schlingemann, and Stulz, 2008; Brav, 2009; Maksimovic, Phillips, and Yang, 2015; Michaely and Robert, 2013; and Gao, Harford, and Li, 2013).

This paper proceeds as follows. The next section briefly reviews the literature, Section 3 derives our hypotheses, Section 4 describes the data set and variables, Section 5 presents our methodology and empirical findings, and Section 6 concludes.

2 Literature

Previous literature has looked at the impact of manager's characteristics and personal preference on firm policies. Bertrand and Schoar (2003) find that a significant extent of the heterogeneity in investment, financial, and organizational practices of firms can be explained by the presence of manager fixed effects. Malmendier and Tate (2005, 2008) find that overconfident CEOs have higher investment-cash flow sensitivities and are more likely to engage in value-destroying mergers.

Some studies focus on risk-related personal traits and find risk-loving CEOs are related

to riskier firm policies. For example, Malmendier et al. (2011) find CEOs who grew up during the Great Depression are averse to debt and lean excessively on internal finance. They also find CEOs with military experience pursue more aggressive policies. Cronqvist, Makhija, and Yonker, (2012) show that corporate leverage is positively associated with CEOs' leverage in their most recent home purchase. Graham, Harvey, and Puri (2013) use survey data to find that more risk tolerant CEOs are initiating more M&As. Cain and McKeon (2015) find that CEOs who possess private pilot's licenses are associated with higher leverage and more acquisitions.

Some other studies focus on managers' exposures to firm risk. For instance, some empirical evidence suggests CEOs who are exposed to large firm risk tend to engage in less risky firm policies. Amihud and Lev (1981) show that managers might engage in mergers to reduce their undiversifiable employment risk. May (1995) provides evidence that CEOs who have more wealth vested in their firm equity tend to diversify more at their firm. Finally, Tufano (1996) finds that in North American gold mining industry firms whose managers hold more options (more stocks) manage less (more) gold price risk, suggesting that managerial risk-aversion may affect corporate risk management policy. On the other hand, managers may adjust their outside portfolio to hedge some of their exposure to firm risk. For example, (Heaton and Lucas (2001) find households with high and variable business income hold less wealth in stocks than other similarly wealthy households. With our novel data, we could potentially test for the direction the causality run. Besides, Faccio, Marchica, and Mura (2011) find that firms controlled by diversified large shareholders undertake riskier investment than firms controlled by nondiversified large shareholders. Our paper adds to the literature by focusing on CEOs who arguably have more say in firms' operations than large shareholders.

In addition, CEOs' wealth data have been used to address other questions not directly related to firm policies. For example, Becker (2006) uses aggregate yearly data on the level of wealth of Swedish CEOs and show that CEOs' non-firm wealth has a positive effect on their incentive strength. Liu and Yermack (2007) study the relation between CEOs buying expensive real estate and firm performance. They find a negative effect, consistent with

CEO entrenchment. We add to this literature by using CEOs' non-firm wealth to address a different set of questions, namely the interaction of CEO wealth with firm capital structure and investment policies. Moreover, unlike the previous studies using only the aggregated wealth, we have access to detailed components of of managers non-firm wealth, such as their holdings in equity, bonds, and funds, as well as other demographic characteristics, which enable us to better address the endogeneity issues.

3 Hypotheses

There are two hypotheses on how CEOs' personal traits affect firm policies. It should be noted, however, these two hypotheses are not mutually exclusive.

A. Behavior consistency hypothesis Following the discovery of the concept of traits (Allport 1927 and Allport 1931), a large number of psychology studies demonstrated that traits can be captured empirically (Allport 1966; Epstein 1979; Epstein 1980) and behaviors exhibit consistency across different situations (Funder and Colvin 1991). The behavior consistency hypothesis predicts a positive relation between CEO's personal and corporate investment and financing decisions.

B. Hedging hypothesis The hedging hypothesis predicts a negative relation between personal and corporate investment and financing decisions. Despite many theoretical works that implicitly assume that CEOs cannot trade, recent evidence suggests that managers do adjust their outside portfolio holdings to hedge some of their exposure to firm risk (Heaton and Lucas, 2000) . In addition, managers also engage in corporate risk reduction strategies to reduce private risk (Amihud and Lev 1981; May 1995; Tufano 1996).

4 Data set

Our data set is based on the population of all limited liability firms, both public and private, in Norway and the individuals who were CEOs for at least one year.[1] We obtain accounting information for years 1994-2013 and corporate governance related variables for years 2000-2013 from the Center of Corporate Governance Research. In addition, we have sociodemographic information, compiled by Statistics Norway, for all individuals over the period of 1993-2013, including detailed information on wealth and income as well as gender, age, education, marital status, and number of kids.[2] We exclude financial and utility firms to avoid the impact of their regulatory capital requirements, ownership restrictions, and accounting rules. We also exclude firms with fewer than five employees. We require firms to have at least three annual observations to be included in our sample. Our final sample consists of 25,773 CEO-firm pairs and 93,363 firm-year observations.

[Insert Table 1 about here]

Table 1 reports summary statistics for all the main variables used in our analyses, including CEO characteristics, firm characteristics, and corporate governance. To deal with potential outliers, we winsorized our variables at the 1% and 99% tails. Panel A summarizes all variables for the CEO-firm paired panel with 25,774 observations, where each observation is a unique CEO-firm match. Our main variable, CEO risky assets, is measured as the value of CEO holdings of equity, bonds and funds at the year-end divided by the total value of

[1] In Norway, the law mandates a standardized set of accounting statements certified by a public auditor for every firm regardless of its listing status, size, and industry. Failure to submit this information within 17 months from the end of the fiscal year triggers automatic liquidation by the court. Due to the wealth tax, the government's statistical agency, Statistics Norway, collects annual data on wealth and income at the individual level from a variety of sources, including the Norwegian Tax Agency, welfare agencies, and the private sector. Financial institutions supply information to the tax agency on their customers' deposits, interest paid or received, security investments, and dividends. Employers supply statements of wages paid to their employees. Earnings and wealth figures are public information in Norway. This transparency is generally believed to make tax evasion more difficult and, hence, our data more reliable.

[2] In Norway, wealth tax is levied at both municipal and central government level. Norwegians are required to submit a detailed annual overview of their assets to the tax authorities. The data are relatively reliable, because earnings and wealth figures are public information in Norway and this transparency makes tax evasion more difficult.

non-firm wealth. [3]On average, CEOs invest 21% of their total non-firm wealth in risky assets (including equity, bonds and funds). They have total liabilities of 1.7 times of their annual income, possess a gross wealth of 5 million Norwegian krone (approximately 600,000 U.S. dollars), an annual income of 0.9 million Norwegian krone (approximately 150,000 U.S. dollars), and 1.9 million Norwegian krone in financial assets (risky assets plus money market funds). About 85% of CEOs are male and 71% of them are married. The average CEO age is 56. The education, on average, is equivalent to a bachelor degree, with 11% of them having a degree in business related studies.

Our sample firms have, on average, 50.5 million Norwegian krone (approximately 6 million U.S. dollars) in total assets and 13.6 employees. On average, they take 66% leverage, measured as total liabilities over total assets. The leverage may seem to be high, but the number is reasonable given that more than 90% of our sample are private firms that are restricted to the equity issuance. In our sample, firms hold an average of 29% of their total assets in cash. On average, they invest 1% of the total assets in research and development (R&D). This number seems to be low, but it is mainly due to no investment in R&D for majority of firms. If we take the subset of firms that have positive R&D expenditure, the average R&D expenditure would be about 10% of the total assets. On average, firms have 16% of tangible assets and have about 15 years of history. Majority of firms do pay out dividends and the average dividend/earnings ratio is 0.4. Panel B reports the main variables for the firm-year long panel with 93,363 observations. The numbers are similar to those for the CEO-firm paired panel.

In addition, we use CEO ownership and the CEO-chair duality as proxies for corporate governance. CEO ownership is percentage of stock held in the firm. CEO chair is a dummy variable that equals one if the CEO also serves as the Chair of the board. Our sample CEOs own on average 36% of the firm and 42% of them also hold a position as the Chair of the board.

[3]Ideally, we would like to distinguish between equity and bonds and between corporate bonds and government bonds. However, our data does not allow us to separate these items.

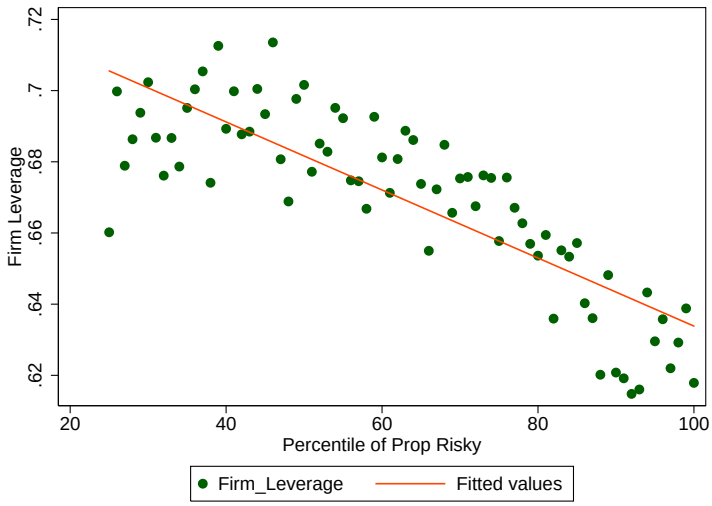

Figure 1: Leverage across percentiles of the proportion of CEO risky assets

Prop risky is the value of CEO holdings of equity, bonds and funds at the year end divided by the total value of non-firm wealth, lagged one year. Firm leverage is total liabilities divided by total assets. Each dot presents the average leverage for each percentile sorted according to the proportion of CEO risky assets.

Prior to investigating the relation between the proportion of CEO risky assets and corporate policies in a regression framework, it is useful to look for a relation in the raw data. We sort firms according to the proportion of CEO risky assets and aggregate the leverage within each percentile. The plot is shown in Figure 1. The horizontal axis shows the proportion of CEO risky assets, ranging from 20% to 100%, and the vertical axis show the level of firm leverage. By construction, each percentile has an equal number of firms. The plot depicts a negative relation between CEO risky assets and firm leverage in raw data: the higher the proportion of CEO risky assets, the lower the firm leverage.

5 Empirical analysis

5.1 CEO-firm paired panel analysis

Our first step is to investigate the cross-section correlation between CEO risky assets and financial policies, such as leverage, cash ratio, and R&D expenditures. To do so, we first construct a CEO-firm paired panel, where each observation is a unique CEO-firm match. For

example, if a firm had three different individuals served as a CEO during our sample years, there will be three observations in the CEO-firm paired panel; if there is no change in CEO in the firm, then we only have one observation. In total, we obtained 25,773 such CEO-firm pairs. For each variable, we take the average over the years that an individual served a CEO. We run the regressions as follows:

$$\overline{FirmPolicy_{i,j}} = \beta' \overline{CEO\ Risky\ Assets_{i,j}} + \gamma' \overline{X_{i,j}} + \mu' Ind_k + \varepsilon_{i,j} \tag{1}$$

$$\overline{FirmPolicy_{i,j}} = \beta' \overline{CEO\ Risky\ Assets_{i,j}} + \gamma' \overline{X_{i,j}} + \mu' Firm_i + \varepsilon_{i,j} \tag{2}$$

where i, k, and j denote firm i, industry k, and CEO j. $\overline{FirmPolicy}$ is a set of firm's average investment and financing policies measured as firm leverage, cash ratio, and R&D expenditures, in different regressions. $\overline{CEO\ Risk\ Assets}$ is the average proportion of non-firm wealth (or financial wealth, total wealth in the robustness check in section 5.6.3) invested in risky assets, lagged one year. $\overline{X}$ is a set of firm-level control variables that are used in the literature to explain firm policies such as CEO personal leverage, the number of employees, total assets, tangibility, firm age, CEO wealth, CEO income, CEO gender, CEO married dummy, CEO age, CEO education level, and CEO education in business.

We especially control for CEO personal leverage, because Cronqvist, Makhija, and Yonker (2012) find a positive relation between CEO personal leverage and firm leverage in the cross-section. In Cronqvist et al. (2012), CEO personal leverage is measured as CEOs' leverage in their most recent primary home purchase. Since we have more extensive information on CEOs' total liability and wealth, we measure CEO personal leverage as CEOs' total liability divided by CEOs' annual income.

In regression estimation (1), we include industry fixed effects to account for the omitted variables that are associated with industry conditions. Specifically, we study the link between the variation in average CEO risky assets and firm policies for CEO-firm matched pairs within an industry.

In the regression estimation (2), we include firm fixed effect to filter out all omitted

variables that are constant within a firm across different CEOs. Therefore, we focus on the association between the variation in average CEO risky assets and firm policies within a firm. In other words, we capture changes in CEO risky assets due to CEO turnovers, which better addresses the firm-CEO matching concerns relative to prior literature that only uses data from one point in time. Suppose indeed that firms have some preferences over certain type of CEOs and tend to choose the type of CEOs that best implement their firm policies. Then we would expect different CEOs work in the same firm should also have similar risk preference, assuming firms and CEOs are always well matched and firms' preferences do not change over our sample period. The regression estimation (2) helps us to identify the changes among CEOs within the same firm, which arguably reduces our concerns over the endogenous matching of firms and CEOs.

[Insert Table 2 about here]

The results are shown in Table 2. The odd columns report results for the regression estimation (1) where industry fixed effect is added while the even columns are results for the regression estimation (2) where firm fixed effects are included. The first two columns shows the results for leverage, the third and fourth columns for cash holdings, and the last two columns for the investment in R&D. The table reports standard errors which are clustered at firm level.

As the results show, the lagged proportion of CEO risky assets are negatively associated with firm leverage, both across CEO-firm pairs within an industry and among CEOs within a same firm. The economic significance is also noticeable. Within a firm, a one-standard deviation increase in the proportion of CEO risky assets is associated with 0.9 ($= -0.044 \times 17\%$) percentage point decrease in firm leverage, which is about 1.4% decrease in firm leverage for a median firm in our sample. The table also shows that the lagged proportion of CEO risky assets is positively associated with firm cash holdings, both across CEO-firm pairs within an industry and among CEOs within a same firm. Within a firm, a one-standard deviation increase in the proportion of CEO risky assets is associated with 0.5 ($= 0.023 \times 21\%$) percentage point increase in firm leverage, which is about 1.7% increase in firm cash holdings

for a median firm in our sample. The results for R&D expenditure are only negative and significant for the estimation with industry fixed effect but not for the estimation with firm fixed effect. One of the reasons may be that majority of our sample firms do not have investment in R&D and thus lack variations in the dependent variable to detect the effect of CEO risky assets.

In sum, we find that the proportion of CEO risky assets is negatively associated with firm leverage, positively related to firm cash holdings, and negatively correlate with R&D expenditures. These findings are consistent with predictions from the hedging hypothesis that the CEO who holds risky portfolios is already bearing a lot of risk in his personal portfolio and thus engage in less risky firm policies to hedge himself. The findings are, however, inconsistent with the behavior consistency hypothesis that predicts a positive relation between CEO's personal and corporate investment and financing decisions.

5.2 Firm-year panel data analysis

The previous section show a negative association between firm policies and personal risk preference, which supports the hedging hypothesis. To fully exploit the unique feature of our relatively long panel data set, we switch to the panel data which have more variations over the time rather than just the variations when there is a change in CEO. Essentially, the hedging hypothesis posits that within a CEO-firm match over the time there is a negative correlation between the riskiness of the CEO' personal portfolio and her firm's policies. Therefore, our test of the hedging hypothesis below use the panel data of 93,363 firm-year observations. Specifically, we run the following regressions with pooled OLS regressions and panel data regressions with firm fixed effects, respectively:

$$FirmPolicy_{i,t} = \beta' CEO\ Risky\ Assets_{i,t-1} + \gamma' X_{i,t} + \lambda' Year_t + \mu' Ind_k + \varepsilon_{i,t} \qquad (3)$$

$$FirmPolicy_{i,t} = \beta' CEO\ Risky\ Assets_{i,t-1} + \gamma' X_{i,t} + \lambda' Year_t + \mu' Firm_i + \varepsilon_{i,t} \qquad (4)$$

where i , k, and t stand for firm, industry, and time, respectively. Again, $FirmPolicy$ is a set

of firms' investment and financing policies measured as firm leverage, cash ratio, and R&D expenditures, in different regressions. $CEO\,Risky\,Assets$ is the proportion of non-firm wealth invested in risky assets, lagged one year. X is a set of firm-level control variables including CEO personal leverage, the number of employees, total assets, tangibility, firm age, CEO wealth, CEO income, CEO gender, CEO married dummy, CEO age, CEO education level, and CEO education in business. Industry fixed effect is included in the pooled OLS regression and firm fixed effect is added to the panel data regression. A negative (positive) β for leverage and R&D (cash ratio) would be a support for the hedging hypothesis, showing that changes in the riskiness of a CEO's personal portfolio is negatively related with the riskiness of her firm policy.

[Insert Table 3 about here]

Table 3 summarizes the estimates for above regressions. The odd columns report the results for the pooled OLS regression while the even columns are the results for the panel where firm fixed effects are included. The first two columns show the results for leverage, the third and fourth columns for cash holdings, and the last two columns for the investment in R&D. The standard errors are clustered at firm level. We exclude variables married, CEO age, education level, and education in business in the regressions with the firm fixed-effect, due to the lack of variations within the firm.

As shown in the table, the one-year lagged CEO risky assets is negatively related to firm leverage and R&D investment and positively related to cash holdings, all being statistically significant. The results hold both within an industry and within a firm. The effects are also economically significant. For example, a one-standard-deviation increase in the proportion of CEO risky assets is associated with 0.9 ($= -0.044 \times 17\%$) percentage point increase in firm leverage, 0.1 ($= -0.006 \times 21\%$) percentage point increase in firm leverage, and 9 ($= -0.002 \times 4\%$) percentage point increase in firm leverage, which translate to a 1.4% decrease in firm leverage, a 0.5% increase in cash holdings, and a 4.2% decrease in R&D expenditures for an average firm in the sample.

To sum up, our panel data analysis indicates that within a firm the higher the risk a CEO

takes for his personal portfolio in the previous year the lower the risk he takes in the firm he manages this year. This finding is consistent with predictions from the hedging hypothesis and contradicts with the behavior consistency hypothesis.

5.3 CEO risky assets and CEO power

So far, we have shown a negative association between the CEO risky assets and the firm risk strategies. This negative relation is consistent with two interpretations. First, CEOs may adjust their outside portfolios to hedge some of their exposure to firm risk. Second, CEOs may engage in corporate risk reduction strategies to reduce private risk. Arguably, the CEO's impact through second channel is more likely when the firm's corporate governance is poor so that he has power to change the firm policy at his wish and CEO's stake in the firm is large so that he has incentive to do so.

To distinguish through which channels the negative relation between the CEO risky assets and the firm risk strategies hold, we now include CEO power and its interaction with the CEO risky assets into the regressions using the CEO-firm matched pairs. Specifically, we identify CEOs who are also the chair of the board and use this CEO-chair dual role to indicate CEO power.

We also include CEO ownership as another measure of CEO power. We are aware that CEO ownership may also capture the CEO incentives: the high ownership can align the interests of CEOs with the shareholders. However, the recent research shows that high CEO ownership entrenches CEOs with power and thus impose agency costs on firms (see for example, Kim and Lu, 2011). For our sample, the majority are private firms where the CEO ownership is high (the average is 36% and the median is 30%). We cut CEO ownership into high (above the median) and low (below the median).

Thus we focus on cross-section variations within an industry and estimate the following

regression:

$$\begin{aligned}\overline{FirmPolicy_{i,j}} &= \beta' \overline{CEO\ Risky\ Assets_{i,j}} + \theta' \overline{CEO\ Power_{i,j}} \\ &+ \delta' \overline{CEO\ Risky\ Assets_{i,j}} * \overline{CEO\ Power_{i,j}} + \gamma' \overline{X_{i,j}} + \mu' Ind_k + \varepsilon_{i,j}\end{aligned} \tag{5}$$

where i, k, and j denote firm i, industry k, and CEO j. $\overline{FirmPolicy}$ is a set of firm's average investment and financing policies measured as firm leverage, cash ratio, and R&D expenditures, in different regressions. $\overline{CEO\ Risky\ Assets}$ is the average proportion of non-firm wealth (or financial wealth, total wealth in the robustness check in section 5.6.3) invested in risky assets, lagged one year. $\overline{Corp\,Gov}$ is either CEO ownership or CEO-chair dual role, in different regressions. $\overline{X}$ is a set of firm-level control variables that are used in the literature to explain firm policies such as CEO personal leverage, the number of employees, total assets, tangibility, firm age, CEO wealth, CEO income, CEO gender, CEO married dummy, CEO age, CEO education level, and CEO education in business.

[Insert Table 4 about here]

Table 4 reports the results with the interaction terms of CEO high ownership and CEO-chair duality. CEO high ownership equals one if the percentage of stock held in the firm is higher than the median CEO ownership which is 30% in our sample. CEO-chair is a dummy variable that equals one if the CEO also serves as the Chair of the board. For the sake of space, the estimation coefficients for all the control variables are not tabulated in the table. The first two columns of the table shows that when CEOs have a high ownership or high power (when they are also the chair of the boards), the effect of the CEO risky assets is even stronger on firm leverage. So holding all other things equal, an increase in CEOs' holdings of risky assets in their personal portfolio is associated with a larger decrease in firm leverage for CEOs who have high ownership or are also served as the chair of the board. Similarly, the third and fourth columns show that, ceteris paribus, an increase in CEO risky assets is correlated with a larger increase in cash holdings in the firms with high CEO ownership or CEO being the chair of the board than otherwise. In the last two columns, the coefficients

for the interaction terms are both negative, but is only statistically significant for CEO high ownership and not for the CEO-chair duality.

In short, we find some evidence that the changes in the risky portfolio holdings of CEOs who have high ownership and hold the position as the chair of the board tend to have stronger effects on the firm risk policies. This is consistent with the second channel of the hedging story that powerful CEOs may engage in corporate risk reduction strategies to reduce their own risk.

5.4 Does CEO risky asset capture more than the CEO fixed effect?

We have shown that CEO risky assets can explain some variations in firm financing and investment policies. However, one may argue that the CEO risky assets simply capture some kind of CEO characteristics that are similar to the CEO fixed effect as showed in Bertrand and Schoar (2003). To investigate if our CEO risky assets variable capture anything more than the CEO fixed effect, we incorporate CEO and CEO-firm fixed effects in the panel of 93,363 firm-year observations and run the following regressions:

$$FirmPolicy_{i,j,t} = \beta' CEO\ Risky\ Assets_{i,j,t-1} + \gamma' X_{i,t} + \lambda' Year_t + \mu' CEO_j + \varepsilon_{i,j,t} \quad (6)$$

$$FirmPolicy_{i,j,t} = \beta' CEO\ Risky\ Assets_{i,j,t-1} + \gamma' X_{i,t} + \lambda' Year_t + \mu' CEOFirm_{i,j} + \varepsilon_{i,j,t} \quad (7)$$

where i, j and t stand for firm, CEO and time, respectively. For $FirmPolicy$, we focus on firm leverage for this analysis. $CEO\ Risky\ Assets$ is the proportion of non-firm wealth invested in risky assets, lagged one year. X is a set of firm-level control variables including CEO personal leverage, the number of employees, total assets, tangibility, firm age, CEO wealth, CEO income, and CEO gender. CEO is the dummy variable to capture the CEO fixed effect and $CEOfirm$ is the CEO-firm matched dummy to capture the fixed effect of the unique CEO-firm combination. A negative β would be a support for the hedging hypothesis, showing that changes in the riskiness of a CEO's personal portfolio is negatively related with the riskiness of her firm policy.

[Insert Table 5 about here]

The results are shown in Table 5. The coefficients of CEO risky assets and the standard errors that clustered at firm level are reported in the table. The coefficients and standard errors for control variables are not tabulated. The first two columns of the table summarize the regression estimates for pool OLS and the panel data regressions using firm fixed effect as described in equations 3 and 4. The last two columns show the regression results that include CEO fixed effects and CEO-firm fixed effects, respectively. As shown in the table, the negative relation between CEO risky assets and firm leverage hold for all specifications. For example, in the fourth column where CEO-firm fixed effects are included, the negative and significant sign on CEO risky assets shows that, within a CEO-firm match, the higher the proportion of CEO risky assets last year the lower the firm leverage this year.

The analysis above demonstrates that the variable CEO risky assets explains the variation in firm leverage beyond the CEO fixed effect and CEO-firm fixed effect.

5.5 Persistence in the firm policies

There is evidence in the literature that corporate investment and financing policies, such as leverage, are relatively persistent (for example, Leary and Roberts (2005) and Lemmon, Roberts, and Zender (2008)). One may argue that the CEO risky assets simply captures a persistent effect in corporate policies. To test if this concern is valid, we replace the one-year lagged average CEO risky assets with the CEO risky assets measure in year 1995, way before firms' financing decisions and before some individuals were appointed as CEOs. We run the following regressions using the CEO-firm paired panel:

$$\overline{FirmPolicy_{i,j}} = \beta' CEO\ Risky\ Assets\ 1995_{i,j} + \gamma' \overline{X_{i,j}} + \mu' Ind_k + \varepsilon_{i,j} \tag{8}$$

$$\overline{FirmPolicy_{i,j}} = \beta' CEO\ Risky\ Assets\ 1995_{i,j} + \gamma' \overline{X_{i,j}} + \mu' Firm_i + \varepsilon_{i,j} \tag{9}$$

where i, k, and j denote firm i, industry k and CEO j. $\overline{FirmPolicy}$ is a set of firm's average investment and financing policies measured as firm leverage, cash ratio, and R&D

expenditures, in different regressions. *CEO Risky Assets* 1995 is the proportion of non-firm wealth invested in risky assets measured in 1995. $\overline{X}$ is a set of firm-level control variables that are used in the literature to explain firm policies such as CEO personal leverage, the number of employees, total assets, tangibility, firm age, CEO wealth, CEO income, CEO gender, CEO married dummy, CEO age, CEO education level, and CEO education in business. A negative (positive) and significant β for leverage and R&D (cash ratio) would confirm the concern indeed CEO risky assets simply capture the persistence in the corporate policies. An insignificant β would indicate that the CEO risky assets held in 1995 can not explain the changes in firm policies later on. Thus the effect on the one-year lagged CEO risky assets does not simply capture the persistence in firm policies.

[Insert Table 6 about here]

Table 6 reports the results. We focus on the coefficients and standard errors of CEO risky assets 1995 and do not report those for the control variables. The odd columns show the specifications with industry fixed effects while the even columns are results with firm fixed effects. The first two columns show the results for leverage, the third and fourth columns for cash holdings, and the last two columns for the investment in R&D. The table shows that the CEO risky assets in 1995 is only associated with cash ratio when firm fixed effect is not include and not significant for any other specifications. This finding contradicts with the concern that our variable CEO risky assets simply captures a persistent effect in corporate policies.

The overall conclusion is that CEO risky assets explains leverage beyond a persistent corporate policy effect.

5.6 Robustness check

5.6.1 Separating professional CEOs and family CEOs

So far, we have not distinguished between professional CEOs and family CEOs. However, we are aware that the matching of the CEOs to the firms are likely to be different for these

two types of CEOs. Arguably, the matching for the family CEOs is more problematic for our hypotheses because family CEOs who are the heirs of founders may have already known (before they become CEO) that they will inherit the firm and thus will choose their financial portfolios accordingly. Therefore, in this subsection, we exclude all family CEOs and repeat panel data analysis as in Table 3.

[Insert Table 7 about here]

The results are shown in Table 7. We include all the control variables as in Table 3 but only tabulate the coefficients and standard errors of CEO risky assets for the sake of space. The results are qualitatively the same as those in Table 3: the share of CEOs' risky assets (which is lagged one year) is negatively related to firm leverage and R&D investment and positively related to cash holdings. All coefficients are statistically significant except for the cash ratio regression with firm fixed effects.

In sum, for the sample of professional CEOs, we again find evidence that is consistent with hedging hypothesis; a higher risk a CEO takes for his personal portfolio in the previous year is associated with a lower firm risk this year.

5.6.2 Controlling for the past performance

One may also be concerned that our corporate policies are functions of current and past firm performance and profitability. For instance, after a good firm performance, firm leverage tends to be lower and cash holdings higher. At the same time, good firm performance is associated with increases in CEO wealth and job security, which might cause the CEO to invest more aggressively. Although we already lagged CEO personal portfolio risk, one may still argue that our findings are driven by expected firm performance. To address this concern, we include both past and current performance measured by return on assets (ROA) in the regression equations (3) and (4) and rerun the analysis as in Table 3.

[Insert Table 8 about here]

Table 8 reports the results. We focus on the coefficients and standard errors of CEO risky assets and the performance measures and do not report those for the control variables. We find exactly the same signs and similar magnitude as the coefficients in Table 3, suggesting that our previous results are not driven by firm performance.

5.6.3 Alternative measures for CEO risky assets

Until now, we measure CEO risky assets as the proportion of non-firm wealth invested in risky assets. However, there is a concern that variations in CEO risky assets are due to changes in CEO non-firm wealth rather than in the investment in risky assets itself. To address this concern, we use different denominators such as CEOs' financial capital and total wealth. We repeat the analysis as in the specification (1) and (2) using the CEO-firm paired panel, with alternative measures of CEO risky assets.

[Insert Table 9 about here]

Table 9 summarizes the regression results for firm leverage. Only the coefficients and standard errors of the CEO risky assets variables are reported in the table. Panel A shows the results for leverage, Panel B for cash holdings, and Panel C for the R&D expenditures. The odd columns show the specifications with industry fixed effects while the even columns are results with firm fixed effects. The first two columns summarize the regression estimates using CEO financial capital as a denominator while the last two columns show the regression results using CEO total wealth as a denominator. Again, we find that CEO risky assets is negatively related to firm leverage and R&D expenditures and positively correlated with cash holdings for the alternative measures of CEO risky assets.

Overall, the main finding of a negative association between the proportion of CEO risky assets and firm risk policies is robust to alternative measures of CEO risky assets.

5.7 Discussion on the endogeneity issues

One of the major challenges for the empirical corporate finance literature is the possibility of endogenous matching of CEOs and firms (see for example, Edmans and Gabaix (2011)).

Particularly in our case, CEOs who have preferences for high leverage may be demanded by firms whose expected optimal leverage is high. Note, however, that since we control for firm characteristics, the results would not simply reflect the tendency of high risk CEOs to be matched with riskier firms. More importantly, our panel data regressions with CEO (and firm) fixed effects allows us to essentially investigate time series correlation within each match to test the hedging hypothesis. Specifically, to address this concern, we construct CEO-firm paired panel and include firm fixed effect to capture changes in CEO risky assets due to CEO turnovers. We apply this strategy for all our main analyses, exploiting the variation within each firm-CEO match, which reduces our concern on the endogenous matching problem.

Another potential concern about the previously mentioned methodology is that it does not establish causality. For example, CEOs may adjust their outside portfolios to hedge some of their exposure to firm risk; they may also engage in corporate risk reduction strategies to reduce their own private risk. We address this concern in section 5.3, where we include corporate governance variables and their interaction with CEO risky assets into the regressions with CEO-firm matched pairs. We argue that the CEO's impact through second channel is more likely when the firm's corporate governance is poor so that he has power to change the firm policy at his wish and CEO's stake in the firm is large so that he has incentive to do so. We indeed find that the changes in the risky portfolio holdings for CEOs with high ownership and hold the position as the chair of the board have stronger effects on the firm risk policies.

6 Conclusion

This paper studies to what extend firm policies are affected by CEOs' personal asset allocation. We look at a CEO's non-firm wealth holdings to glean his risk preferences and correlate these risk preferences with firm policies. If the CEO holds risky portfolios, it may be that (a) the CEO is risk-loving, and so will engage in risky firm policies, or (b) since the CEO is already bearing a lot of risk in his personal portfolio, he will engage in less risky firm policies to hedge himself. First, we find that CEOs' portfolio holdings in risky assets are negatively associated with firm leverage and R&D expenditures and positively associated with firm cash holdings,

within a firm across different CEO and over the time. These findings are consistent with predictions from the hedging hypothesis that a CEO who holds risky portfolios is already bearing a lot of risk in his personal portfolio and thus engage in less risky firm policies to hedge himself. Second, we further investigate through which channels are CEOs' holdings in risky portfolio related to firm risk strategies. We find that the changes in the risky portfolio holdings of CEOs who have high ownership and hold the position as the chair of the board tend to have stronger effects on the firm policies. This is consistent with the story that powerful CEOs and those in the poor corporate governance firms may engage in corporate risk reduction strategies to reduce their own risk. Third, we show that our measure of CEOs' holdings in risky assets explains the variation in firm leverage beyond the mere CEO fixed effect (Bertrand and Schoar, 2003) and CEO-firm fixed effect.

We contribute to the literature by providing empirical evidence on the role of managers in corporate policies. In addition, our comprehensive data set allow us to alleviate endogeneity concerns by investigating how changes in CEO's personal risk preference shapes firm policies within CEO-firm pairs. Specifically, we construct a CEO-firm paired panel and include firm fixed effect to capture the changes within a firm due to CEO turnovers. We also run panel data regressions using firm-year observations to study the within-firm impact of the changes in CEO risk preference on firm policies, where firm-, year-, and firm-CEO-paired-fixed effects are included. Besides, we interact CEO risk preference with corporate governance measures to pin down the channel through which CEO risk preference and firm policies are connected. These identification strategies diminish concerns related to endogenous matching or other issues that complicate establishing causality.

Our research improves our understanding of the determinants of firm policies. Our findings for the hedging hypothesis provide a deeper insight on managerial incentives and corporate governance design that ensures corporate resources are used to maximize stakeholder value instead of CEOs' personal risk management.

References

Amihud, Y., and Lev. B, 1981. Risk reduction as a managerial motive for conglomerate mergers. Bell Journal of Economics 12, 605–617.

Bargeron, L.L., Schlingemann, F.P., Stulz, R.M., Zutter, C.J., 2008. Why do private acquirers pay so little compared to public acquirers? Journal of Financial Economics 89, 375–390.

Bennedsen, M., Perez-Gonzales, F., Wolfenzon, D., 2013. Estimating the Value of the Boss: Evidence from CEO Hospitalization Events. Working paper.

Ben-David, I., Graham, J.R., and Harvey, C.R., 2013. Managerial Miscalibration, The Quarterly Journal of Economics, 1547–1584.

Bertrand, M., Schoar, A., 2003. Managing with style: the effect of managers on corporate policy. Quarterly Journal of Economics 118, 1169–1208.

Becker, B., 2006. Wealth and Executive Compensation. Journal of Finance 61, 379-397.

Becker, T.A and R.Shabani, 2010. Outstanding debt and the household portfolio. Review of Financial Studies 23, 2900–2934.

Burnham, T.C, J.Flynn Chapman, P.B Gray, M.H McIntyre, S.F Lipson, and P.T Ellison, 2003, Men in committed, romantic relationships have lower testosterone, Hormones and Behavior 44, 119 – 122.

Brav, O., 2009. Access to capital, capital structure, and the funding of the firm. Journal of Finance 64, 263–308.

Caine, M., and S. McKeon, CEO Personal Risk-Taking and Corporate Policies. Journal of Financial and Quantitative Analysis, forthcoming Cocco, J.F, 2005. Portfoio choice in the presence of housing. Review of Financial Studies 18, 535–567.

Cronqvist, H. Makhija, A.K., Yonker, S.E., 2012. Behavioral consistency and corporate finance: CEO personal and corporate leverage. Journal of Financial Economics 103, 20–40.

Custodio, C. and Metzger, D. 2013, How do CEOs matter? The effect of industry expertise on acquisition returns, Review of Financial Studies 26, 2008–2047.

Custodio, C. and Metzger, D. 2014, Financial expert CEOs: CEO's work experience and firm's financial policies, Journal of Financial Economics 114, 125–154.

Edmans, A. and X. Gabaix, 2011. The effect of risk on the CEO market. Review of Financial Studies 24, 2822–2863.

Epstein, S., 1979. The stability of behavior: on predicting most of the people much of the time, Journal of Personality and Social Psychology 37. 1097–1126.

Epstein, S., 1980. The stability of behavior. American Psychologist 35, 790–806.

Falato, A., Li, D., Milbourn, T.2015, Which skills matter in the market for CEOs? Evidence from pay for CEO credentials, Management Science, Articles in Advance, 1–25.

Funder, D.C., Colvin, C.R., 1991. Explorations in behavioral consistency: properties of persons, situations, and behaviors. Journal of Personality and Social Psychology 60, 773–794.

Gao, H., J. Harford, K. Li, 2013. Determinants of corporate cash policy: Insights from private firms. Journal of Financial Economics 109, 623–639.

Granham, J.R., Harvey, C.R., Puri, M., 2013. Managerial attitudes and corporate actions. Journal of Financial Economics 109,103–121.

Grossman, J. Hart, O.D., 1983. An analysis of the principal-agent problem. Econometrica 51, 7–45.

Heaton, J. and D. Lucas, 2000. Portfolio Choice and Asset Prices: The Importance of Entrepreneurial Risk, Journal of Finance 55, 1163–1198.

Kaplan, S.N., Klebanov, M.M., Sorensen, M., 2012. Which CEO characteristics and abilities matter? Journal of Finance 67, 973–1007.

Kim, E.H, and Y. Lu, 2011. CEO ownership, external governance, and risk-taking, Journal of Financial Economics 102, 272–292.

Leary, M.T., Roberts, M.R., 2005. Do firms rebalance their capital structures? Journal of Finance 60, 2575–2619.

Lemmon, M.L., Roberts, M.R., Zender, J.F., 2008. Back to the beginning: persistence and the cross-section of corporate capital structure. Journal of Finance 63, 1575–1608.

Liu, C.H., Yermack,D., 2007.Where are the shareholders' mansions? CEOs' home purchases, stock sales, and subsequent company performance. Unpublished working paper, Cornell University and New York University.

Love, David A., 2010, The Effects of Marital Status and Children on Savings and Portfolio Choice, Review of Financial Studies 23, 385–432.

Maksimovic, V., Phillips, G., Yang, L., 2013. Private and public merger waves. Journal of Finance 68, 2177–2217.

Malmendier, U., Tate, G., 2005. CEO overconfidence and corporate investment. Journal of Finance 60, 2661–2700.

Malmendier, U., Tate, G., 2009. Superstar CEOs. Quarterly Journal of Economics 124, 1593–1638.

Malmendier, U., Tate, G., Yan J. 2011. Overconfidence and Early-Life Experiences: The Effect of Managerial Traits on Corporate Financial Policies. Journal of Finance LXVI, 1677-1833.

May, D.O., 1995. Do managerial motives influence firm risk reduction strategies? Journal of Finance 50, 1275–1290.

Michaely, R., Roberts, M.R., 2012. Corporate dividend policies: Lessons from private firms. Review of Financial Studies 25, 711–746.

Miller, M.H., 1977. Debt and taxes. Journal of Finance 32, 261-275.

Myers, S.C., Majluf, N., 1984. Corporate financing and investment decisions when firms have information that investors do not have. Journal of Financial Economics 13, 187-224.

Roussanov, N., Savor P., 2012, Status, Marriage, and Managers's Attitudes to Risk, Management Science, forthcoming.

Sapienza, Paola, Luigi Zingales, and Dario Maestripieri, 2009, Gender differences in financial risk aversion and career choices are affected by testosterone, Proceedings of the National Academy of Sciences.

Tufano, P., 1996. Who manages risk? An empirical examination of risk management practices in gold mining industry. Journal of Finance 51, 1097–1137.

Table 1: Descriptive Statistics

This table shows the mean and median (in parentheses) of variables used in the empirical analysis. Panel A summarizes all variables for the CEO-firm paired panel. Panel B reports the main variables for the firm-year long panel. CEO risky assets is the value of CEO holdings of equity, bonds and funds at the year end divided by the total value of non-firm wealth. CEO leverage is personal total liabilities divided by income. Annual wealth, income, and assets are as reported in million Norwegian krones. Male, married, and business eduacation are dummy variables that equal one if the CEO is male, is married, and has education in business, respectively. Education is a scale measure which equal one for CEOs with a university degree and zero otherwise. Leverage is total liabilities divided by total assets. Cash ratio is cash divided by total assets. R&D is the research and development expenditures scaled by total assets. Tangibility is tangible assets divided by total assets. CEO ownership is percentage of stock held in the firm. CEO chair is a dummy variable that equals one if the CEO is also the Chair of the board. The variables are winsorized at the 1% and 99% tails.

Panel A: CEO-firm paired panel (25,774 observations)

Variable	Mean	Std Dev	Median
CEO Characteristics			
CEO risky assets	21%	21%	15%
Total liability/income	1.7	1.5	1.4
Total wealth (in million NOK)	5.0	7.5	3.3
Salary (in million NOK)	0.6	0.5	0.5
Income (in million NOK)	0.9	0.9	0.7
Financial assets (in million NOK)	1.9	5.6	0.8
Male	85%	36%	100%
Married	71%	45%	100%
CEO age	56	10	56
Education level	1.3	0.8	1.0
Business education	11%	32%	0%
Firm Characteristics			
Assets (in million NOK)	50.5	636	5.6
Number of employees	13.6	2.2	11.0
Firm leverage	0.66	0.17	0.70
Cash ratio	0.29	0.21	0.25
R&D	0.01	0.04	0.00
Tangiblity	0.16	0.18	0.09
Firm age	15.2	13.1	12.0
Log dividend	7.0	6.4	10.7
Dividend/earnings	0.4	7.7	0.1
Corporate Governance			
CEO ownership	36%	34%	30%
CEO chair	0.42	0.49	0

Panel B: Firm-year long panel data (93,363 observations)

CEO risky assets	21%	23%	15%
Firm leverage	0.66	0.19	0.69
Cash ratio	0.29	0.23	0.25
R&D	0.01	0.04	0

Table 2: CEO risky assets and corporate policies (CEO-firm matched pairs)

This table reports the coefficient estimates for the regression estimations (1) and (2) for the CEO-firm matched pairs. The odd columns report results for the regression estimation (1) where industry fixed effect is added while the even columns are results for the regression estimation (2) where firm fixed effects are included. The first two columns shows the results for leverage, the third and fourth columns for cash holdings, and the last two columns for the investment in R&D. CEO risky assets is the value of CEO holdings of equity, bonds and funds at the year end divided by the total value of non-firm wealth, lagged one year. The table reports standard errors which are clustered at firm level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	Leverage		Cash Holdings		R&D	
	(1)	(2)	(3)	(4)	(5)	(6)
	Ind FE	Firm FE	Ind FE	Firm FE	Ind FE	Firm FE
CEO risky assets	-0.074***	-0.044***	0.043***	0.023***	-0.008***	-0.002
	(0.013)	(0.013)	(0.005)	(0.007)	(0.001)	(0.002)
CEO leverage	0.011***	0.002	-0.024***	-0.004***	0.001*	0.000
	(0.001)	(0.002)	(0.001)	(0.001)	(0.000)	(0.001)
log_Employees	0.045***	0.013	0.007	-0.021	0.040***	0.010
	(0.007)	(0.018)	(0.010)	(0.016)	(0.008)	(0.019)
log_Assets	-0.031***	0.005	-0.044***	0.001	-0.029***	0.012
	(0.004)	(0.016)	(0.005)	(0.011)	(0.005)	(0.019)
Tangiblity	0.041**	0.141**	-0.319***	-0.423***	0.027	0.154*
	(0.019)	(0.061)	(0.042)	(0.089)	(0.018)	(0.077)
Firm_age	-0.002***	-0.008***	-0.000	0.001	-0.000***	-0.000
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)
log_Wealth	-0.006**	0.001	0.024***	0.002	0.000	0.000
	(0.003)	(0.002)	(0.003)	(0.003)	(0.000)	(0.000)
log_Income	0.001	-0.000	0.002**	0.000	0.000	0.000
	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)
Male	0.017*	0.009	-0.035***	0.000	-0.002	-0.000
	(0.008)	(0.008)	(0.004)	(0.008)	(0.001)	(0.002)
Married	0.000	0.003	-0.010***	-0.000	0.001	-0.002
	(0.002)	(0.005)	(0.002)	(0.008)	(0.001)	(0.002)
CEO age	0.000	-0.000	-0.001***	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Education level	-0.011**	-0.004	0.003	0.000	0.003**	-0.001
	(0.004)	(0.003)	(0.003)	(0.003)	(0.001)	(0.001)
Education busines	-0.000	0.008	-0.013***	-0.003	0.004	0.000
	(0.005)	(0.008)	(0.003)	(0.005)	(0.004)	(0.002)
Indurstry FE	Yes	NO	Yes	No	Yes	No
Firm FE	No	Yes	No	Yes	No	Yes
Observations	25,773	25,773	25,773	25,773	25,773	25,773
R-squared	0.112	0.919	0.302	0.943	0.049	0.864

Table 3: CEO risky assets and corporate policies (panel data)

This table reports the coefficient estimates for the regression equations (3) and (4). The odd columns report results for the pooled OLS regression as described in regression estimation (3) added while the even columns are results for the panel where firm fixed effects are included. The first two columns shows the results for leverage, the third and fourth columns for cash holdings, and the last two columns for the investment in R&D. CEO risky assets is the value of CEO holdings of equity, bonds and funds at the year end divided by the total value of non-firm wealth, lagged one year. The table reports standard errors which are clustered at firm level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	Leverage		Cash Holdings		R&D	
	(1)	(2)	(3)	(4)	(5)	(6)
	Ind FE	Firm FE	Ind FE	Firm FE	Ind FE	Firm FE
CEO risky assets	-0.043***	-0.044***	0.015***	0.006**	-0.003***	-0.002***
	(0.003)	(0.004)	(0.003)	(0.003)	(0.001)	(0.001)
CEO leverage	0.003***	0.000	-0.005***	-0.002***	0.000**	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
log_Employees	0.013***	0.002	-0.021***	-0.032***	0.004***	0.002*
	(0.002)	(0.003)	(0.002)	(0.003)	(0.001)	(0.001)
log_Assets	0.003	0.053***	-0.009***	0.043***	-0.027***	0.000***
	(0.002)	(0.003)	(0.002)	(0.003)	(0.006)	(0.000)
Tangiblity	0.072***	0.101***	-0.419***	-0.500***	0.021	0.000
	(0.007)	(0.010)	(0.006)	(0.010)	(0.018)	(0.000)
Firm_age	-0.002***	-0.001	-0.001***	0.001**	-0.000***	-0.000
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)
log_Wealth	-0.004***	-0.007***	0.008***	0.002	0.000	-0.000
	(0.001)	(0.002)	(0.001)	(0.001)	(0.000)	(0.000)
log_Income	-0.001	-0.002	-0.000	-0.000	0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)
Male	0.000	0.001	-0.004*	-0.002	0.000	0.001
	(0.002)	(0.004)	(0.002)	(0.004)	(0.001)	(0.001)
Married	0.006		-0.069***		-0.000	
	(0.004)		(0.004)		(0.001)	
CEO age	-0.001***		0.000***		-0.000**	
	(0.000)		(0.000)		(0.000)	
Education level	-0.020***		0.005***		0.003***	
	(0.002)		(0.002)		(0.001)	
Education busines	0.004		-0.031***		0.004***	
	(0.005)		(0.005)		(0.001)	
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Indurstry FE	Yes	NO	Yes	No	Yes	No
Firm FE	No	Yes	No	Yes	No	Yes
Observations	93,363	93,363	93,363	93,363	93,363	93,363
R-squared	0.125	0.147	0.271	0.031	0.0441	0.0251

Table 4: CEO risky assets and CEO power

This table reports the results with the interaction terms of CEO power as described in the regression equation (5). The first two columns shows the results for leverage, the third and fourth columns for cash holdings, and the last two columns for the investment in R&D. CEO high ownership equals one if the percentage of stock held in the firm is higher than the median CEO ownership which is 30% in our sample. CEO chair is a dummy variable that equals one if the CEO is also the Chair of the board. CEO risky assets is the value of CEO holdings of equity, bonds and funds at the year end divided by the total value of non-firm wealth, lagged one year. Control variables include CEO leverage, CEO wealth, male CEO (dummy), married CEO (dummy), CEO age, Education, Business Education, log total assets, number of employees, and tangibility. The table reports standard errors which are clustered at firm level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	Leverage		Cash holdings		R&D	
	(1)	(2)	(3)	(4)	(5)	(6)
CEO risky assets	-0.187***		0.082***		-0.009*	
* CEO high ownership	(0.016)		(0.013)		(0.005)	
CEO risky assets		-0.170***		0.077***		-0.007
* CEO-Chair		(0.028)		(0.025)		(0.004)
CEO risky assets	-0.009	0.003	0.007	0.003	-0.005	-0.005**
	(0.011)	(0.013)	(0.009)	(0.016)	(0.003)	(0.002)
CEO high ownership	0.121***		-0.016*		0.005***	
	(0.011)		(0.008)		(0.001)	
CEO-Chair		0.070***		0.002		0.003
		(0.011)		(0.008)		(0.002)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	25,774	25,774	25,774	25,774	25,774	25,774
R-squared	0.148	0.124	0.333	0.330	0.053	0.053

Table 5: Do CEO risky assets capture more than the CEO fixed effect?

This table reports the results with various fixed effects for panel data regression equations described in regression estimate (3), (4), (6), and (7). In the first four columns, we summarize the regression estimates for the panel data using industry fixed effect, firm fixed effect, CEO fixed effect and CEO-firm fixed effect. The dependent variable is firm leverage. CEO risky assets is the value of CEO holdings of equity, bonds and funds at the year end divided by the total value of non-firm wealth, lagged one year. Control variables include CEO leverage, wealth, male CEO (dummy), log total assets, number of employees, and tangibility. The table reports standard errors which are clustered at firm level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	Dependent Variable: Leverage			
	(1)	(2)	(3)	(4)
	Ind FE	Firm FE	CEO FE	CEO-Firm
CEO risky assets	-0.045***	-0.044***	-0.039***	-0.044***
	(0.003)	(0.003)	(0.004)	(0.004)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Indurstry FE	Yes	No	No	No
Firm FE	No	Yes	No	No
CEO FE	No	No	Yes	No
CEO-Firm FE	No	No	No	Yes
Observations	93,363	93,363	93,363	93,363
R-squared	0.12	0.157	0.818	0.171

Table 6: Do CEO risky assets simply capture the persistence in firm policies?

This table reports the results with the CEO risky assets measure in 1995 as described in estimations (8) and (9). The odd columns report results with industry fixed effects while the even columns are results for with firm fixed effects. The first two columns shows the results for leverage, the third and fourth columns for cash holdings, and the last two columns for the investment in R&D. CEO risky assets_1995 is the value of CEO holdings of equity, bonds and funds at the year end of 1995 divided by the total value of non-firm wealth in 1995. Control variables include CEO wealth, male CEO (dummy), married CEO (dummy), CEO age, Education, Business Education, log total assets, number of employees, and tangibility. The table reports standard errors which are clustered at firm level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	Leverage		Cash Ratio		R&D	
	(1)	(2)	(3)	(4)	(5)	(6)
	Ind FE	Firm FE	Ind FE	Firm FE	Ind FE	Firm FE
CEO risky assets_1995	0.006	-0.010	0.047***	0.009	-0.005	-0.002
	(0.007)	(0.025)	(0.011)	(0.026)	(0.003)	(0.005)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Indurstry FE	Yes	No	Yes	No	Yes	No
Firm FE	No	Yes	No	Yes	No	Yes
Observations	22,771	22,771	22,771	22,771	22,771	22,771
R-squared	0.104	0.925	0.311	0.952	0.049	0.873

Table 7: CEO risky assets and firm leverage (excluding family CEOs)

This table reports the results with various fixed effects for panel data regression equations described in regression estimate (3), (4), (6), and (7) for the subgroup of CEOs who are not a member of the family. In the first four columns, we summarize the regression estimates for the panel data using industry fixed effect, firm fixed effect, CEO fixed effect and CEO-firm fixed effect. The dependent variable is firm leverage. CEO risky assets is the value of CEO holdings of equity, bonds and funds at the year end divided by the total value of non-firm wealth, lagged one year. Control variables include CEO leverage, wealth, male CEO (dummy), log total assets, number of employees, and tangibility. The table reports standard errors which are clustered at firm level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	Leverage		Cash Ratio		R&D	
	(1)	(2)	(3)	(4)	(5)	(6)
	Ind FE	Firm FE	Ind FE	Firm FE	Ind FE	Firm FE
CEO risky assets	-0.025***	-0.035***	0.012**	0.009	-0.004**	-0.004*
	(0.006)	(0.006)	(0.006)	(0.007)	(0.002)	(0.002)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Indurstry FE	Yes	No	Yes	No	Yes	No
Firm FE	No	Yes	No	Yes	No	Yes
Observations	33,962	33,962	33,962	33,962	33,962	33,962
R-squared	0.0819	0.091	0.287	0.134	0.0598	0.012

Table 8: CEO risky assets and firm policies (controling for performance)

This table reports the results that are similar to Table 3 except for adding Return on assets and the Lagged return on assets as the control for the current and past performance. The odd columns report results with industry fixed effects while the even columns are results for with firm fixed effects. The first two columns shows the results for leverage, the third and fourth columns for cash holdings, and the last two columns for the investment in R&D. CEO risky assets is the value of CEO holdings of equity, bonds and funds at the year end divided by the total value of non-firm wealth, lagged one year. Control variables include CEO wealth, male CEO (dummy), married CEO (dummy), CEO age, Education, Business Education, log total assets, number of employees, and tangibility. The table reports standard errors which are clustered at firm level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	Leverage		Cash Ratio		R&D	
	(1)	(2)	(3)	(4)	(5)	(6)
	Ind FE	Firm FE	Ind FE	Firm FE	Ind FE	Firm FE
CEO risky assets	-0.045***	-0.045***	0.018***	0.009***	-0.003***	-0.003***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.001)	(0.001)
Return on assets	-0.029***	-0.044***	0.142***	0.109***	-0.010***	-0.010***
	(0.006)	(0.007)	(0.007)	(0.007)	(0.002)	(0.002)
Lagged return on assets	-0.024***	-0.033***	0.051***	0.025***	-0.005***	-0.004**
	(0.006)	(0.006)	(0.005)	(0.006)	(0.001)	(0.001)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Indurstry FE	Yes	No	Yes	No	Yes	No
Firm FE	No	Yes	No	Yes	No	Yes
Observations	93,363	93,363	93,363	93,363	93,363	93,363
R-squared	0.112	0.160	0.270	0.130	0.0550	0.0261

Table 9: Alternative measures of CEO risky assets on firm policies

This table reports the coefficient estimates for the regression equations (2) using alternative measures of CEO risky assets. The sample consists of CEO-firm matched pairs. Panel A shows the results for leverage, Panel B for cash holdings, and Panel C for the investment in R&D. The odd columns include industry fixed effect while the even columns include firm fixed effects are included. The dependent variable is firm leverage. In the first two columns, CEO risky assets is measured as the value of CEO holdings of equity, bonds and funds at the year end divided by personal financial capital, lagged one year. In the third and fourth columns, CEO risky assets is calculated as the value of CEO holdings of equity, bonds and funds at the year end divided by the total wewalth, lagged one year. The table reports standard errors which are clustered at firm level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

Panel A: Leverage

Risky assets as a share of:	Financial Capital		Total Wealth	
	(1)	(2)	(3)	(4)
CEO risky assets	-0.022**	-0.022**	-0.059***	-0.035***
	(0.009)	(0.009)	(0.013)	(0.010)
Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	No	Yes	No
Firm FE	No	Yes	No	Yes
Observations	25,774	25,774	25,774	25,774
R-squared	0.110	0.918	0.122	0.926

Panel B: Cash holding

CEO risky assets	0.004**	0.003	0.036***	0.020*
	(0.002)	(0.005)	(0.007)	(0.010)
Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	No	Yes	No
Firm FE	No	Yes	No	Yes
Observations	25,774	25,774	25,774	25,774
R-squared	0.329	0.948	0.282	0.947

Panel C: R&D

CEO risky assets	-0.007***	-0.004***	-0.008***	-0.003
	(0.001)	(0.001)	(0.001)	(0.003)
Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	No	Yes	No
Firm FE	No	Yes	No	Yes
Observations	25,774	25,774	25,774	25,774
R-squared	0.040	0.870	0.044	0.876