IMPACT OF INTERNAL GOVERNANCE ON A CEO'S INVESTMENT CYCLE

Abstract

This paper examines the impact of internal governance on a CEO's investment cycle. Extant literature defines internal governance as the mechanism by which senior executives help discipline the CEO to maximize shareholder value. Pan, Wang and Weisbach (2016) find evidence of a CEO's investment cycle, in which investment increases over a CEO's tenure, whereas disinvestment decreases. They suggest that the older CEOs exhibit agency problems due to private benefits that accrue over her tenure. We find that good internal governance helps reduce older CEOs underinvesting before their exit, whereas bad governance does not. For younger CEOs we do not find any relationship between internal governance and investment. We find that good internal governance has no impact on asset disposal rates for the incoming CEOs. However, when firms have good internal governance, we find that asset disposal is profitable when the previous CEO who acquired these assets is older. These findings suggest that the outgoing CEOs of firms with good internal governance made appropriate acquisitions during her tenure, but the asset mix does not match well with the skill set of the incoming CEO. The above results are not driven by the endogeneity of CEO turnover and to performance-related forced turnover.

I. Introduction

Many papers (see, for example, Friedman (1970), Jensen and Meckling (1976), Fama and Jensen (1983a, 1983b) and Jensen (2000)) have suggested that value-maximization for the residual claimant, namely shareholders, is the preferred efficient goal of public corporations. Managerial agency theory has posited that CEOs who own less than 100% in their firm deviate from shareholder wealth maximization because any suboptimal decision that personally benefits the CEO costs the CEO less than the value loss to shareholders. Moreover, the CEO-shareholder problem can become more acute if the investment horizon of the CEO is shorter when compared to the investment horizon of their stockholders. This is more likely to be case when the CEO approaches retirement, given that the CEO obtains immediate benefits from increasing current earnings at the expense of future earnings. Murphy and Zimmerman (1993) find CEO turnover-related changes in R&D, advertising, capital expenditures, and accounting accruals are due to poor firm performance. Weisbach (1995) find that a year or two before the CEO retires, the firm experiences a decrease in total investment. He suggests that this decrease reflects the agency costs of the replaced CEO -- who is sacrificing future cash flows in order to realize immediate increased cash flows. In a more recent and relevant paper, Pan, Wang and Weisbach (2016; from now on referred to as PWW) find that investment increases over a CEO's tenure, whereas disinvestment decreases. They call this pattern a CEO's investment cycle, which results in significant asset growth and employment over the CEO's tenure. The authors suggest that the CEO agency problems are reduced with the arrival of a new CEO, who does not enjoy the same private benefits as her predecessor. The CEO's horizon problem has also been shown to be an important factor affecting firm performance (see, for example, Brickley, Linck, and Coles (1999), and Jain, Jiang, and Mekhaimer (2016).

Landier, Sraer, and Thesmar (2009) and Acharya, Myers and Rajan (2011) theorize that internal governance may mitigate the CEO horizon problem. The potential CEO successor of the company, they argue, should have a longer horizon than the current CEO. If the current CEO puts in place policies that destroy the capital and reputational stock of the firm, then the successor will find herself when named CEO running a diminished firm. Accordingly, lower level managers who hope to succeed the current CEO will oppose CEO policies that do not maximize the value of the firm. The current CEO is "forced" to abide by the wishes of the lower management, since the current CEO needs the assistance of the lower level manager to produce current earnings that support the current stock price, which is an important factor in the level of the CEO's current compensation.

This paper examines the impact of internal governance on a CEO's investment cycle. We define internal governance by the degree to which the other members in the top management team assist in the decisions with the CEO. According to Acharya, Myers, and Rajan (2011) internal governance works best when neither the CEO nor the subordinate managers are dominant. Accordingly, they define a variable δ = f/f+g, which is the relative contribution of the CEO (f) to cash-flow generation when compared to the cash-flow contribution of her management team (g). A fully decentralized team would have δ =0, and one where the CEO makes all the contribution is where δ =1. To operationalize this metric, we calculate the number of executive titles of the CEO (f) scaled by the total number of executive titles carried by the entire top management team of five executives (f+g).[1] We use the regular expression (*regex*) procedure in R to calculate the number of titles for each executive.[2]

[1] The exact procedure in explained in detail in Section of this paper.

[2] See Section for a detailed explanation of our methodology,

A number of empirical papers have found that internal governance is beneficial in other (non-investment related) contexts. For example, Landier, et. al (2012) measures good internal governance by the number of executives appointed before the current CEO and finds that firm's profitability increases with that number. Jain, Jiang, and Mekhaimer (2016), measure internal governance as the difference in horizons between a CEO and his immediate subordinates and finds that firms with better internal governance have lower information asymmetry and higher liquidity. Finally, Cheng, Lee and Shevlin (2016) uses the number of years to retirement to capture key subordinate executives' horizon incentives and their compensation relative to CEO compensation to capture their influence within the firm. They find that the extent of real earnings management decreases with key subordinate executives' horizon and influence. In all of these papers, there appears to be a linear relationship between the internal governance metric and the output performance metric (profitability, information asymmetry and liquidity, earnings management). Our results are consistent with Acharya, Myers, and Rajan's (2011) model that suggests that there is an internal optimum for the level of influence of the immediate CEO subordinates. In doing so, we examine how internal governance impacts a CEO's investment cycle.

We find the following results. First, we find that firm performance as measured by industry-adjusted ROA and market-to-book ratios are increasing and then decreasing in δ for older CEO's (whose age is greater than or equal to the median CEO age of 56 years). No statistically significant relationship is found for younger CEOs. These results are consistent with the theoretical argument of Acharya, Myers, and Rajan (2011) and empirically found in Aggarwal, Fu and Pan (2017)). Second, we then replicate PWW's results of CEOs underinvesting before turnover without regard to the level of internal governance of the firm. We define a dummy

variable IG that is set to unity when δ falls within the deemed optimal range of our parametrization. We find that good internal governance (i.e., IG=1) helps reduce PWW's agency problem of old CEOs underinvesting before turnover, whereas bad governance does not. Third, we examine the disinvestment policy after CEO turnover. We find that good governance has no impact on asset disposal rates by incoming CEOs. However, we find that the asset disposal itself is profitable if the internal governance is good when older predecessors acquired those assets. These findings suggest that the outgoing CEOs of firms with appropriate internal governance made appropriate acquisitions during her tenure, but the asset mix does not match well with the skill set of the incoming CEO. Fourth, we understand that CEO turnover is endogenously determined. Using sudden CEO deaths and normal CEO retirements (i.e., not performance-related forced CEO turnover), we find that older CEOs with good governance underinvest less, which is consistent with our main results.

This paper proceeds as follows. Section II reviews the related literature and Section III describes our data, variable construction, and sample characteristics. The empirical results are reported in Section IV, and Section V presents our conclusions.

II. Literature Review

A number of papers have shown that CEOs have a large and significant impact on investment and financial policies of the firms as well as firm performance. Bertrand and Schoar (2003) document that managerial styles represented by biographical characteristics of individual executives have significant effect upon the financial outputs of the firm. They find that CEO fixed-effects can substantially explain the heterogeneity in firm investment, financing and organization strategies, and firm performance. Palia (2000) finds that CEOs of lower quality (that graduated from lower-ranked universities) are more likely to be CEOs of regulated companies than

manufacturing firms who attract CEO with higher quality (that graduated from higher-ranked universities). Additionally, he finds that the regulated industries offer their CEOs a lower pay-performance sensitivity than manufacturing CEOs. This suggests that labor markets sort lower (higher) quality CEOs into more regulated (non-regulated) industries. Heaton (2002) argues that overoptimistic managers believe that capital markets undervalue their firm's risky securities, and may decline to invest in positive net present value projects that are externally financed. Malmendier and Tate (2005) find that managerial overconfidence can account for corporate investment distortions. Overconfident managers overestimate the returns to their investment projects and view external funds as unduly costly. Thus, they overinvest when they have abundant internal funds, but curtail investment when they require external financing. Baker and Wurgler (2013), show that managerial biases and nonstandard preferences can have a significant impact on the firm's financing and investment decisions.

A number of studies find significant changes in firm policies and performance surrounding CEO turnover. Coughlan and Schmidt (1985), Warner, Watts and Wruck (1988), Weisbach (1988), and Huson, Malatesta, and Parrino (2004) find strong evidence that accounting earnings and market value of the firm decline before CEO turnover. Weisbach (1988) shows that the inverse relation is pronounced for firms with a higher proportion of independent directors on the board. Huson, Malatesta, and Parrino (2004) find that the extent to which the firm performance improves following the CEO dismissal is positively related to the appointment of an outsider CEO and the presence of a monitoring board. Strong and Meyer (1987), Elliott and Shaw (1988), Dechow and Sloan (1991), Murphy and Zimmerman (1993), and Weisbach (1995), demonstrate that during the transition period, there are significant asset divestures and write-offs, as well as reduction in capital expenditures resulting in overall investment downsizing. Strong and Meyer (1987), Elliott and

Shaw (1988), Weisbach (1995), Dechow and Sloan (1991) find that the outgoing CEO tends to constrain discretionary expenditures such as R&D development and advertising to boost earnings-based compensations, resulting in declining R&D in the final years of the CEO's tenure[3]. Pan, Wang and Weisbach (2016) find that the investment rate increases over a CEO's tenure, whereas disinvestment decreases.

It is well known that public corporations suffer from agency problems because of conflict of interest between CEOs and shareholders. Jensen and Meckling (1976) argues that CEOs who own less than 100% of the firm deviate from maximizing shareholder wealth by consuming a suboptimal level of perquisites since the cost to the CEO is less than the loss in value to shareholders. The managerial agency problem can become more acute if the investment horizon of the CEO is short compared to the stockholders of the firm. This is likely to be the case as CEOs approach retirement since the CEO obtains immediate benefits from increasing current earnings/cash flows at the expense of future earnings. Age has been widely used as a proxy for the executives' employment horizon (see, for example, Brickley et al. (1999), Dechow and Sloan, (1991), Gibbons and Murphy (1992), Matějka et al. (2009) and Jain, Jiang and Mekhaimer (2016).

Landier, Sraer, and Thesmar (2009) and Acharya, Myers and Rajan (2011) suggest that the internal governance may mitigate the CEO horizon problem. The potential CEO successor of the company should have a longer horizon than the current CEO. If the current CEO puts in place policies that destroy the capital and reputational stock of the firm, then the successor will find herself when named CEO running a diminished firm. Accordingly, lower level managers who hope to succeed the current CEO will oppose CEO policies that do not maximize the value of the

[3] Butler and Newman (1989) find contrary evidence.

firm. The current CEO is "forced" to abide by the wishes of the lower management, since the current CEO needs the assistance of the lower level manager to produce current earnings that support stock price which is an important factor in the level of CEO current compensation.

To achieve optimal results, as shown by Acharya, Myers and Rajan, (2011) and Landier, Sauvagnat and Thesmar (2012), the CEO must allow other members of the top management team to take part in making decisions. The level of sharing of executive responsibilities among top management is referred to as the internal governance of the firm. Therefore, if CEO's power is optimally limited by effective internal governance mechanisms by the executive subordinates, the finalized decisions regarding corporate activities are collective agreements and products of compromise between CEO and other top subordinates. In contrast, if the internal corporate governance is not effective and if the CEO is sufficiently powerful , then decision making is centralized and ex post performance should be much more variable (Adams, Almeida and Ferreira, 2005). This is especially the case when the influential CEO shares the human resources role of the board and has strong voice on determining her successor and on career future of her subordinates, given competitive conditions of managerial labor market. On the other hand, if most administrative duties regarding the firm's business operation are conducted by the subordinates, they are no longer willing to follow the leadership of the CEO in achieving her stated goal of investments. That is, the success of the company is so dependent on the effort exerted by the subordinates, they may not have the incentive to expend the effort to maximize the value of the firm and optimally invest on behalf of the shareholders. Consequently, the optimal internal governance should be such that the responsibilities of the running the firm should be shared as opposed to be run solely by the CEO or only by key top management subordinates.

III. Data, Variable Construction and Sample

We begin by obtaining the job titles and employment history of the CEO and the other top four subordinate managers of S&P 1500 firms from ExecuComp for the years 1996 to 2017. This substantially extends the data employed by Pan, Wang and Weisbach (2016) and Aggarwal, Fu and Pan (2017) who end their sample in 2009. We use ExcecuComp's variables TITLEANN and CEOAN to help identify the executive's job title and CEO annual flag, respectively. We also obtain the CEO's tenure in each fiscal year and clean up the data to ensure that only one CEO is identified for any fiscal year.

According to Acharya, Myers, and Rajan (2011) internal governance works best when neither the CEO nor their subordinate managers are dominant. The authors define a variable δ = f/(f+g), which is the relative contribution of the CEO (f) to cash-flow generation when compared to the cash-flow contribution of her management team (g). A fully decentralized team would have δ =0, and one where the CEO makes all the contribution is where δ =1. To operationalize this metric, we follow the procedure used by Aggarwal, Fu and Pan (2017). In particular, we first calculate the number of executive titles of the CEO (f) scaled by the total number of executive titles carried by the entire top management team of five executives (f+g).[4] We use the regular expression (*regex*) procedure in R to calculate the number of titles for each executive.

*** Appendix***

To determine the optimal level of internal governance, we need suitable performance metrics. Since the main channel through which internal governance mitigates agency problem is

[4] For a detailed explanation of this procedure see the Appendix.

to effectively constrain the CEO's myopic motives of under-investing in the firm's capital stock, our performance proxy should be able to efficiently recognize the growth potential rather than only focus on current cash earnings. Following the convention of the extant literature, we use proxies for both accounting performance (ROA) and market performance (M/B). Specifically, we define the firm's return-on-assets ROA as earnings before interest and depreciation (EBITDA) scaled by the total assets at the beginning of the fiscal year. We define M/B as market value of equity divided by the book value of equity. Both ROA and M/B is winsorized at the 1% level for all Compustat firms. According to Chakravarthy (1986), M/B is an ideal measure for the success of strategic management, which ensures the firm's long-term adaption to its business environment, given that it faces potential distortions from management. Additionally, M/B is a more forward looking measure than ROA, as it incorporates the market's perception of the firm's growth opportunities. Given that both performance measures, ROA and M/B, are also strongly associated with the condition of the industry in which it operates, we use industry-adjusted performance measures (*ROA, M/B*) at the two-digit SIC level.

We empirically estimate the following regression specification.

$$OutcomeVariable_{it} = \beta_0 + \beta_1\delta_{it} + \beta_2\delta_{it}^2 + \beta' x_{it} + \gamma_i + \lambda_t + \varepsilon_{it} \quad (1)$$

The dependent variables are the industry-adjusted firm performance variables (*ROA, M/*B). We include a linear and squared term for δ given that the optimal internal governance as measure by the fraction of titles held by the CEO as posited by the theory should be non-linear. More specifically, according to Acharya, Myers, and Rajan (2011), β_1 should be positive and β_2 should be negative, and the optimal $\delta^* = -\beta_1/(2\beta_2)$. We include x_{it} a vector of firm level covariates, and γ_i and λ_t are firm and year fixed-effects, respectively. The standard errors of all the fixed-effects

models in the paper are two-way clustered by firm and year. Accordingly, companies of relatively effective internal governance can be defined with a dummy variable (*IG*) that takes the value of unity if the firm's δ is within the confidence interval of

$$\left(\delta^* - \frac{1}{2}\sigma_\delta, \delta^* + \frac{1}{2}\sigma_\delta\right) \qquad (2),$$

in which σ_δ denotes the sample standard deviation of δ ; and companies with relatively ineffective governance are defined as zero when δ falls outside the confidence intervals.

To determine if optimal internal governance mitigates agency cost related to the shortening of the investment horizon of the CEO, we will examine the relationship between the investment rate and our internal governance dummy variable as described above. Consistent with Pan, Wang and Weisbach (2016), we use *Investment rate* as our proxy for the level of corporate investment, which is defined as the sum of the capital expenditures and acquisitions at the end of the period divided by total assets at the beginning of the period. We calculate the investment rate variable from Compustat.

Our multivariate regressions will include other control variables as well. All financial statement variables are obtained from Compustat. The first control variable is firm size, and to mitigate any skewness issues, we take the natural logarithm of the total assets (*Log(assets*)). In order to take care of any non-linear relationships with firm size, we also include the squared term (*Log(assets*))^2. We include the variable *Leverage* defined as the sum of long-term debt plus short-term debt in current liabilities divided by beginning period total assets. We also control for external governance as characterized by board characteristics, which is hypothesized to play an important role of constraining the discretionary power of CEO and is a potential substitute for internal

governance. In order to do so, we collect data from ISS on board characteristics such as the number of directors and the percentage of outside directors on the board. We hence merge Execucomp, Compustat and ISS to construct our sample. Since the data in ISS legacy database starts in 1996, our sample starts from 1996. Table 1 summarizes the definitions of each of our variables used.

*** Table 1***

The final sample consists of 32,114 firm-year observations. For the purpose of this empirical study, we omit any observations from the sample if we cannot construct an internal governance measure (δ) for the firm. The sample spans fiscal years 1996 to 2017, covers 3,529 CEO turnovers, and 3,343 distinct firms, for a total of 6,612 unique CEO-firm combinations. Note that in some cases, a company can have multiple turnover events in one fiscal year, which usually involves at least one interim CEO who occupies the office for several months. We ignore the interim CEOs in the transition and only count one turnover event with the initial predecessor and the final official successor who took the helm for more than one year, since we only have fiscal annual data for internal governance measure (δ).[5] Detailed summary statistics of our sample are shown in Table 2. Specifically, the average fraction of corporate titles of the CEO is 0.261, which is 7% greater compared to that in Aggarwal et al (2017). The increase in sample means may either reflect the structural changes since the 2008 financial crisis or the result of our improvement on the specification of internal governance measure (δ) using the regular expression ReGex technique (see the Appendix for more details). The sample distribution of δ is quite symmetric with extreme values ranging from smallest 0.055 to largest 0.643, 1% values of 0.111, 99% values of 0.428, median values of 0.25 which is very close to average values of 0.26. With reference to

[5] Our turnover sample size is somewhat smaller than Pan, Wang and Weisbach (2016). One reason is that our paper does not include the interim CEOs. We do this because the tenure of interim CEOs is usually less than a year.

both internal governance and other corporate financial variables, we have roughly similar means, medians and standard deviations to those in Pan,Wang and Weisbach (2016), and Aggarwal, Fu and Pan (2017).

*** Table 2***

IV. Empirical Results

IV.1. Proxy for Internal Governance

We begin by estimating the relationship between internal governance and firm performance for each firm-year observation, utilizing the quadratic model specification introduced by Aggarwal, Fu and Pan (2017). The panel regressions employ firm and year fixed-effects as described in Equation (1). The regressions use our entire sample, including non-transition years. The theory of Acharya, Myers and Rajan (2011) suggests that internal governance works best to motivate the older myopic manager's under-investment problem.

We split the sample into firms wherein the CEO's age is below the median CEO age of 56 years, and where the CEO's age is greater than the median CEO age of 56 years. Panel A of Table 3, presents the results for younger CEOs, and Panel B presents the results for the older myopic CEOs. According to the theory, we would expect to find that the coefficient on the linear δ to be significantly positive and the coefficient for the square term should be significantly negative only when CEOs are myopic. Following the empirical specifications of Aggarwal, Pan and Wang (2017), age is considered as an important variable to measure the executive horizons of CEOs. As an originally far-sighted CEO become older, her executive horizons will naturally become shorter and the executive may turn myopic. Assuming the original population of CEOs are a combination of far-sighted and myopic executives due to different preferences and career plans, splitting the sample by CEO age might give us a better sample of myopic executives.

*** Table 3***

We run regressions wherein the dependent variables are either industry-adjusted M/B or industry-adjusted ROA. We also include as independent variables δ, δ^2 and the lagged control variables firm size ((*Log(assets*)), (*Log(assets*))^2), board characteristics (*Dirsum* and *Outpercn*), leverage (*Leverage*) and R&D (*R&D*), respectively. In Panel A, we find no statistically significant relationship between firm performance and the coefficients of δ and δ^2. In Panel B, there is a statistically significant positive relationship between firm performance and δ, followed by a statistically negative relationship with δ^2. These results are consistent with the theory of Acharya, Myers and Rajan (2011) and with the empirical results of Aggarwal, Fu and Pan (2017).

In the next section, we need to define an optimal region wherein there is effective internal governance. Using the estimates reported in column (4), we find that the optimal level of internal governance measure is 0.33. Next, we set the range of effective internal governance as 0.33 plus and minus half of the standard deviation of δ in sample. In all our subsequent tests, firms of the outgoing CEO that have a δ within this range will be deemed as having good internal governance. The empirical results indicate that internal governance is most important when the CEO ages. We also perform the sensitivity of these results for age above 56, and our results are generally analogous (results not reported but available from the authors).

IV.2 Impact of Internal Governance on a CEO's Investment Cycle

We perform univariate analysis to examine the trend of *Investment rate* during the transition period of CEO in Table 4. We examine the change in the investment rate for the entire sample to check whether we have similar results to those in PWW (2016). The change in the investment rate is the difference between the investment rate two years prior to the turnover and

year *t*, where *t* = -1, 0, 1 and 2. Table 4 and its accompanying figure summarizes the univariate results. For the entire sample, we observe a decreasing investment rate from *t* = -2 to t = 0 and 1. This result is consistent with the results reported by PWW (2016).

*** Table 4***

Table 5 and its accompanying figure summarizes the change in the investment rate if the age of the outgoing CEO two years prior to leaving the firm is 56 or above and the firm has good internal governance. The results indicate that we no longer see a decreasing investment rate from t = -2 to t = 0 and 1 if the CEO optimally shares executive duties with her management team. In the case of bad internal governance, the under-investment problem still occurs. These empirical findings confirm that internal governance ameliorates the under-investment concerns in myopic CEOs as raised by Landier, Sraer, and Thesmar (2009) and Acharya, Myers and Rajan (2011).

*** Table 5***

While both Tables 4 and 5 shows that internal governance reduces the under-investment problem in the transition period for myopic CEOs only, we further examine if these results are robust to the inclusion of other firm-specific variables. In order to do so, we used lagged controls for industry-adjusted M/B, logarithm of the firm's total assets, firm leverage, R&D, number of directors and the percentage of outside directors. Note that in these regressions a significantly negative regression coefficient on *IG* implies that good internal governance mitigates the under-investment problem. We also include firm and year fixed-effects in the following specification, and the standard errors are two-way clustered, by firm and year

$$\Delta InvestmentRate = \beta_0 + \beta_1 IG + \beta_2' x_{it-1} + \gamma_i + \lambda_t + \varepsilon_{it} \qquad (3)$$

In order to examine the variation of investment policy during the transition period, we construct the econometric model in which the dependent variable is the change of investment rate between two years prior to turnover year (Table 6) and from turnover year to year 2 (Table 7). For both tables, the sample for columns (1) and (2) are those firms with CEOs whose age was less than 56 two years prior to leaving, whereas the sample for columns (3) and (4) are those firms with CEOs whose age was at least 56 two years prior to leaving. The internal governance variable, IG, is significantly negative, indicating the general trend of decreasing investment rate for the two years prior to the departure of the older CEO is greatly mitigated. In contrast, internal governance seems to be much less important for younger CEOs who presumably have a longer investment horizon or for new CEOs.

*** Tables 6 and 7***

IV.3 Impact of Internal Governance on a the Profitability of Asset Divestitures

The flip side to understanding the under-investment problem is that CEOs might dispose of assets. We use as our dependent variable property sales (Compustat item SPPE) that is scaled by beginning period assets and internal governance defined for the poutgoing CEO. All other control variables are same as before and the regression results are given in Table 8. We find no statistically significant relationship between the property sales rate and the internal governance variable.

*** Table 8***

There are two possible explanations for this negative result. One is that the new CEO recognizes that the old CEO made poor investment decisions and the new CEO is correcting the course of the firm. If this were the case, we would expect that the firm would recognize losses upon the disposal of these assets. Second, it is possible that the outgoing CEO made appropriate

acquisitions during her tenure, but the asset mix does not match well with the skill set of the incoming CEO. If this were the case, then the disposed assets should not incur any loss and perhaps even a gain. To examine this possibility, we regress the gains/losses of property sales (Compustat item SPPIV) that is scaled by the beginning period assets. Note that when SPPIV is a positive number, it represents the losses incurred from an asset disposal. The regressions results are presented in Table 9. The coefficient on IG is only statistically negative for the older CEOs who depart the firm and not for younger predecessor CEOs. This indicates that good internal governance reduces the probability that the new CEO is disposing assets at a loss.

*** Table 9***

IV.4. Robustness

It is reasonable that our results are influenced by CEO turnover being endogenously determined. For instance, without controlling the specific causes of CEO dismissals, it is possible that rather than serving as the antecedent of investment policy changes, CEO turnover is a consequence of unsatisfying investment decisions preceding the eventually realized transition to the new CEO. Therefore, when we focus our empirical analysis on the CEO transition period, the statistical inference about the effect of internal governance upon firm investment policy could be distorted given the correlation between the internal governance measure and CEO turnover, and the reverse casualty between investment policy and CEO turnover.

One way to solve the potential endogeneity issues once for all is to replace the shock of CEO turnover, which is probably an outcome of miscellaneous reasons and thus considered as bad control, with clean cut experimental shocks. To identify a natural interference upon the business operation and decision making process of the firm and management, we utilize sudden CEO deaths. As a sudden loss and a natural experimental shock to the firm and management team, the

announcement of executive death should in itself elicit disturbances on the strategic implementation of the investment policy and is exogenous to our explanatory variables of interest. We collect data of news report via Factiva ranging from 1988 to 2018 and identify sudden death event based on the news contend and the criterion in the extant literature (see for example, Worrell, Davidson and Garrison, 1986). Specifically, notwithstanding rational expectation, we regard the death events due to the cause of accident, sudden health catastrophe and death owed to unlikely fatal illness as surprise events. We use R API of SEC Edgar to process 10-K and DEF-14 filings for titles of CEO and her subordinates who were employed early than 1992 and are not covered by EXECUCOMP. Due to the limited amount news report available that satisfy our criterion of sudden death, we confine our control variables to basic fundamentals of the firm related to investment, such as logarithmic total assets, leverage ratio and R&D expenditures. The regression results of the relationship between investment policy changes and internal governance in face of top executive sudden death is in Table 10. The main dependent variable is the change of investment rate from 2 years before the event to the end of the fiscal year in which the death is announced. Additionally, utilizing the exogenous nature of the natural experiment sample, we run regressions on the two components of *investment*, namely capital expenditures (*CAPX*) and *acquisitions*, to further reveal the channels through which good internal governance mitigate the cyclical turbulences of investment policy. We use the robust estimator to run the econometric model, which accounts for the heterogeneity of outliners and is by design the most efficient estimator for small sample analysis. In column 1, the coefficient of good internal governance dummy is negative and significant at five-percent based on small sample *t*-statistics. In column (2), the statistical significance of the coefficient of good internal governance dummy is at one-percent, indicative of a more salient effect of good internal governance on acquisitions in particular. Taken together in

column (3), we estimate the robust regressions on the investment policy as a whole and the revealed negative relationship between internal governance and change in investment rates for older myopic CEOs is extremely significant at one-percent with a t-statistic around 10. Notwithstanding the limited sample size, these results indicate that internal governance helps reduce the investment problem for older myopic CEOs when turnover is assumed to be exogenous (columns (3) and (4) of Table 6), and where turnover is exogenous (Table 10).

*** Table 10***

In addition, one might expect reverse causality between CEO turnover and internal governance due to poor firm performance. For example, there might be a positive correlation between the need to hire an outside successor and the extent of shared responsibility among the executive team. If the executive team is dominated by the CEO, the board of directors may very well want to hire an outsider to correct the imbalance. Since the outsider is more likely to change firm policies (see, for example, Cragun, Nyberg and Wright, 2016), we will find that the change of investment policy is greater for outside CEO replacements and (poorly internally governed) firms. Alternatively, if the firm is beginning to formulate a CEO succession plan, the board of directors would want greater coordination between the retiring CEO and her executive team so that the Board can evaluate potential successor from within. This would result in more shared responsibility between the CEO and her executive team and a less drastic change in investment policy during the transition period. To reduce these concerns, in Table 11 we re-estimated our basic regression equation by including a dummy variable if CEO successor is an outsider. We define a new CEO as an outsider if the new CEO had less than two years of employment as an executive in the firm before being appointed (as opposed to serving on the board of directors). We

do not count service on the board because as a board member, she may have wanted to change the direction of the firm.

The results are summarized in all columns of Table 11, but for now we discuss only the first two columns. Note that the coefficients for IG are negative indicating that despite including a dummy variable (*Outside Successor*) that is equal to unity when an outside new CEO is appointed. Further note that when we do not include board governance variables, the outsider dummy is negatively significant which implies that such firms do not decrease the investment rate of the firm. However, once we include the governance variables, the dummy is no longer remarkably significant, implying the choice of replacing the CEO with an outside CEO does not affect our results.

Table 11

It is possible that firms with poor firm performance are more likely to oust the CEO (see, for example, Hatfield, Worrell, Davidson and Bland, 1999, Huson, Parrino, and Starks, 2001). Furthermore, it is possible that firms that experience forced turnovers are more likely to have unbalance internal governance and therefore it is not the internal governance of the firm that affects the investment policy transition but rather it is the poor skills of the CEO. To mitigate this last concern, we re-estimated the regression of columns (1) and (2) by removing from the sample all forced turnovers. In order to distinguish between the events of voluntarily turnover and forced turnover, we, in principle, follow the criteria proposed in Parrino (1997) to determine if the turnover was forced. According to Parrino (1997), the forced departure of CEO can be identified through three steps. First, forced departure is identified if the public business news release explicitly announces that the individual leaves office due to forced termination of contract, policy differences or any other reasons related to firm's activities. Secondly, if the direct messages of

termination are not disclosed publicly, we believe, with one exception as noted below, that the individuals, who are above age 60, leave office voluntarily due to normal retirement. The classification of individuals, who are under age 60, is subject to the following two criterions. Those turnover are considered as forced if the public information either do not disclose reasons such as death, poor health or the acceptance of another position (inside the firm or elsewhere, including governmental agency), or do not release the message of retirement at least six months before the succession. Finally, the cases of forced departure classified in the second procedure are reinvestigated using extensive information surrounding the transition period and records in the individual's biography. The turnover is classified as voluntary if it turns out that the individual takes a comparable position elsewhere or departs for the ex-ante undisclosed reasons unrelated to firm's policy and performance, such as personal interest confirmed by the departing CEO biography or subsequent press release. The CEO's age and the date of departure can be obtained from EXECUCOMP, which also provides fragmentary information about reasons of departure for references. The business news and reports from various sources such as newspaper, journal articles, company financial reports, analyst reviews and etc., were searched using the database of Factiva. The extensive information such as CEO biography, awards and company history are obtained via internet resources from Bloomberg Executive Profile & Biography, Wikipedia, and SEC filings. The last two columns of Table 11 present the results when we eliminate the forced turnovers and again, the coefficient of the IG dummy variable shows that investment activity does not decrease for firms with good internal governance.

V. Conclusions

Pan, Wang and Weisbach (2016) argue that older CEOs exhibit agency problems due to private benefits that accrue over her tenure They find evidence of a CEO's investment cycle, in

which disinvestment decreases over a CEO's tenure, whereas investment increases -- leading to differences in growth in assets and employment over the CEO's tenure. A number of papers (for example, Acharya, Myers, and Rajan (2011)) have theorized that the power dynamics between senior executives and the CEO might help in the CEO make shareholder wealth-maximizing decisions. Accordingly, this paper examines the impact of internal governance on the CEO's investment cycle.

We find that good internal governance helps reduce older CEOs under-investing before their exit, whereas bad governance does not. For younger CEOs we do not find any relationship between internal governance and investment. We also find that good governance has no impact on asset disposal rates for both old and new CEOs, whereas good governance helps older CEOs get rid of less profitable investments. The above results are not driven by the endogeneity of CEO turnover and to performance-related forced turnover. In sum, good internal governance helps ameliorate the agency problems of older CEOs underinvesting in less-profitable projects.

These results are consistent with the argument of and empirically found in Aggarwal, Fu and Pan (2017)). We also find that good governance does not help over- or under-investment two years after turnover for young and old CEOs. We also examine the disinvestment policy after CEO turnover. We find that good governance has no impact on asset disposal rates for both old and new CEOs. However, we find that good governance helps older CEOs get rid of less profitable investments. Finally, we acknowledge that CEO turnover is endogenously determined. We therefore examine sudden CEO deaths in a small sample of 17 events. We find that older CEOs with good governance underinvest less, a result that is consistent with the results of above.

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Appendix: Construction of the Internal Governance, δ, Measure

As implemented in Aggarwal, Fu and Pan (2017), δ is calculated by the number of executive titles of CEO scaled by the total number of executive titles carried by the entire top management team of five executives. We split the title string of each executives using four delimiters or words: 1) ",", 2) ";", 3) "&", 4) "and". Then the number of pieces split from the title string is the number of corporate titles held by the executive. Furthermore, as is done by Aggarwal et al (2017), we eliminate terms such as "R&D", ", LLC", ", U.S.", and etc., which can cause a bias in counting the titles. However, according to the result of our manual checking, the above data processing procedures still are incapable of generating a clean measure of CEO's fraction of corporate titles, leading to serious measurement errors and misspecifications. For instance, in fiscal year 2004, the executive title of Mark McDonald of AAR Corp. is recorded as "group vp-structures & systems, maintenance, repair and overhaul". Rather than mechanically apply the aforementioned method and split the title string into 5 parts, we should in fact consider this manager as the group vice president of a certain division, and with only 1 corporate title. As illustrated in this example, when dealing with our comprehensive sample from 1996 to 2017 with a wide variety of records in the title field, the above computer programmatic method would result in quadrupling or quintupling number of titles, resulting in a substantial bias on the primary proxy. Faced with such an empirical challenge, we develop a more intelligent framework of title screening, utilizing the features and functions associated with *regular expression* built in R for string manipulation.

Regular expression or *regex,* is a special string representation abstracting and describing a certain common pattern of multiple strings. R, as a powerful statistical computing language, provides us with a sufficient capability of string manipulation using regex balanced with strong

power of data processing and thus is chosen as the primary environment to build the screening system in our paper. Based on intensive experiment, sampling and manual checking, we recognize five most common patterns, which are the building blocks for the more complex titles triggering the miss-counting: 1) "of … and …", 2) "of… ,… and", 3) " of … and … and", 4) "of … and … of", 5) "… and … officer or head". Each of above regex describes one pattern in a set of title strings, resulting in a particular type of problem and requiring certain treatments. The first regex is to identify the title strings in which the string contains "of" following with at least one "and". For instance, in fiscal year 2003, Alan J. Black of GREAT ELM CAPITAL GROUP INC carried executive title recorded as "senior vp; managing director of Europe, Middle East and Africa", which is clearly captured by the first pattern. To fix the problem, we need to know whether or not, or if so, how many commas or/and "and" appear in that structure. Thus, we need further utilize the second and third regex to figure out the detailed composition of the first regular expression. Given the fact that the regular pattern of title string in the above example only contains one comma between "of" and "and", the correct number of titles can be calculated programmatically as the number of split parts minus the sum of one and the number of commas, generating the result of 2 titles. Similar to the second and third regular patterns, the fourth pattern is also closely associated with the first regex. The fourth regex flags titles such as "Chairman, Chief Executive Officer, President, Chairman of American Airlines Inc, Chief Executive Officer of American Airlines Inc and President of American Airlines Inc", held by Gerard J. Arpey of AMERICAN AIRLINES GROUP INC, in fiscal year 2009. The fourth pattern identifies title stings in which the word "and" connects multiple independent corporate titles, such as "Chief Executive Officer of American Airlines Inc" and "President of American Airlines Inc." Thus, in face of this situation, we should stick with the method of pure delimiters which implies the the CEO Arpey had 6 distinct titles.

The last regular expression captures the corporate titles whose name contains the word "and" or symbol "&". For example, "executive vp, general counsel, chief ethics & compliance officer" held by Paul R. Shlanta of SOUTHERN CO GAS in 2005 falls in this last category. The fifth level regex adjusts the word "and" or & in the title of "chief ethics & compliance officer" as one corporate title. Thus, working with the above five regular expressions, we could develop the screening system which identifies all the problematic patterns and automatically fix the majority of the miscounting.

Although regex is useful in minimizing misspecification, some highly complex titles, can be identified by the system but can't be resolved programmatically, and therefore relies on manual correction.[6] For instance, D. Bryan Jordan carries the executive title "Chairman, Chief Executive Officer, President, Member of Credit Policy & Executive Committee, Member of Executive & Risk Committee, Chief Executive Officer of First Tennessee Bank, President of First Tennessee Bank and Director of First Tennessee Bank", which is a mixture of patterns one, two, three and four. Furthermore, throughout the entire time frame from 1992 to 2017, we observe two distinct styles of recording CEO's title in general. In early data, especially before 2000, the title field of executives commonly uses symbols and abbreviations, such as using "-", "&", "offr." and "vp" to represent "of", "and", "officer" and "vice president"; in most current data, especially after 2007, the title field primarily use full words and expressions to record annual title. Our title screening framework is able to deal with two styles of records simultaneously. We also use the program to identify and eliminate individuals who only held advisory positions, membership of committees

[6] We still had to manually check 1,000 titles.

and nonexecutive titles such as chairman. The specific definition, example and variation of the above mentioned regular expressions are addressed in details in the following table:

	Fiscal Year	CEO name	Company Name	Title String	Title Number
[1] "of … and …"	1996	John P. Jones, III	AIR PRODUCTS & CHEMICALS INC	"exec. v-p-gases & equip."	1
	2004	Gary F. Kennedy, Esq.	AMERICAN AIRLINES GROUP INC	"senior vp, general counsel & chief compliance officer-AMR and American"	3
	2012	Carlos Alban	ABBOTT LABORATORIES	"Senior Vice President of Proprietary Pharmaceutical Products and Global Commercial Operations"	1
[2] "of… [,]… and"	2003	Alan J. Black	GREAT ELM CAPITAL GROUP INC	"senior vp;managing director of Europe, Middle East and Africa"	2
	2013	Paul H. Grazewski	AMERICAN SCIENCE ENGINEERING	"Senior Vice President of Product Management, Marketing & Strategy"	1
	2017	Thomas P. Gibbons	BANK OF NEW YORK MELLON CORP	"Vice Chairman & CEO of Clearing, Markets and Client Management"	2
[3] " of … and … and"	2006	Susan L. Decker	ALTABA INC	"head of advertiser and Publisher group & chief finance officer"	2
	2007	Steven E. Buller, CPA	BLACKROCK INC	"managing director, head of accounting policy and controls & former chief finance officer"	2
	2012	Guy H. Kerr	BELO CORP -SER A COM	"Executive Vice President of Law & Government and Secretary"	2
	2009	Gerard J. Arpey	AMERICAN AIRLINES GROUP INC	"Chairman, Chief Executive Officer, President, Chairman of American Airlines Inc, Chief Executive Officer of American Airlines Inc and President of American Airlines Inc"	6
[4] " of … and … of"	2013	Gary F. Kennedy, Esq.	AMERICAN AIRLINES GROUP INC	"Chief Compliance Officer, Senior Vice President, General Counsel, Chief Compliance Officer of American Airlines Inc, Senior Vice President of American Airlines Inc and General Counsel of American Airlines Inc"	6
	2016	Donald E. Brandt, CPA	PINNACLE WEST CAPITAL CORP	"Chairman, Chief Executive Officer, President, Chairman of Arizona Public Service Company, Chief Executive Officer of Arizona Public Service Company and President of Arizona Public Service Company"	6
[5] "… and … officer or head"	2000	Robert R. Herb	ADVANCED MICRO DEVICES	"executive vp, chief sales and marketing officer"	2
	2007	Paul R. Shlanta	SOUTHERN CO GAS	"executive vp, general counsel & chief ethics and compliance officer"	3
	2014	David W. Meline	AMGEN INC	"Executive VP, CFO and Principal Financial & Accounting Officer"	3
	2011	Steven Jackson Sell	HEALTH NET INC	"President of Western Region Health Plan, Health Net, Inc. and President of Health Net of California, Inc."	2
[1] + [2] + [4]	2013	Jonathan David Kantor	CNA FINANCIAL CORP	"Executive Vice President, Secretary, General Counsel, Executive Vice President of CNA Insurance Companies, General Council of CNA Insurance Companies and Secretary of CNA Insurance Companies"	6
	2015	Valrie Hermann	RALPH LAUREN CORP	"Global Brand President of Luxury, Women's Collections, and World of Accessories"	1
[1]+[2]+[3]+[4]	2012	P. Kelly Tompkins	CLEVELAND-CLIFFS INC	"Executive Vice President of Legal, Government Affairs and Sustainability and President of Cliffs China"	2
	2013	John J. Tracy	BOEING CO	"Chief Technology Officer, Senior Vice President of Operations, Engineering & Technology and Member of Executive Council"	3
	2012	D. Bruce Sewell	APPLE INC	"Senior Vice President of Legal & Government Affairs, General Counsel and Secretary"	3
[1]+[2]+[3]	2014	Peter W. Quigley	KELLY SERVICES INC -CL A	"Senior Vice President of Employment Law & Litigation, Contracts Administration, Government Affairs & Risk Management and General Counsel"	2
	2017	Susan Louise Spradley	VIAVI SOLUTIONS INC	"Executive Vice President, General Manager of Business Operations & P&L and General Manager Product Line Management & Design, Network Enablement & Service Enablement"	3

Table 1: Variable Definitions

This table reports the variables used in our empirical analysis and their definitions.

Variable	***Description***
ROA	Industry-adjusted ROA is defined as ROA minus the industry median level ROA. The median level is calculated at the two-digit SIC industry level using the entire Compustat universe
M/B	The industry adjusted market-to-book ratio is defined as the firm's market-to-book ratio minus the industry's median market-to-book ratio . The median level is calculated at the two-digit SIC industry-year using the Compustat universe
δ	Denotes the fraction of executive titles held by the CEO and proxies for the relative contribution of the CEO to the entire cash flow of the firm. It is calculated as the number of executive titles of CEO scaled by the total number of titles carried by the top management team of top five managers, including the CEO. The number of titles is calculated using our screening method built upon ReGex.
IG	Indicator of effective internal governance, and is defined as a dummy variable that takes the value of one if δ falls within the optimal range. The optimal range is defined as optimal value minus a quarter of sample standard deviation of δ, and optimal value plus a quarter of sample standard deviation of δ.
Investments	Capital expenditures rate (capital expenditures/ beginning of period assets) + acquisition rate (acquisitions/ beginning of period assets)
Sppe	Property sales/ beginning of period assets
Sppiv	Gains or losses of property sales / beginning of period assets
Leverage	One-year lagged values of: (long term debt + debt in current liabilities)/ beginning of period assets
Size	One-year lagged values of: natural logarithm of assets
Size2	One-year lagged values of: (natural logarithm of assets)^2
R&D	One-year lagged values of: research and development expenditures/ beginning of period assets
Directors	Total number of directors serving on the board
Outsiders	Percentage of outside directors serving on the board

Table 2: Descriptive Statistics

This table reports the descriptive statistics of our sample for the period 1996 to 2017. See Table 1 for variable definitions.

	N	Mean	Median	p25	p75	Std. Dev.	Skewness	Kurtosis
δ	32114	0.262	0.250	0.222	0.300	0.069	0.551	3.787
δ^2	32114	0.073	0.063	0.049	0.090	0.039	1.520	7.197
ROA	29778	0.067	0.038	-0.004	0.121	0.176	-10.083	357.560
M/B	29245	1.172	0.422	-0.238	1.680	4.166	2.018	37.561
Leverage	31703	0.246	0.222	0.071	0.359	0.246	14.685	878.622
Size	29480	7.738	7.633	6.516	8.861	1.722	0.365	3.270
Size2	29480	62.839	58.256	42.462	78.524	28.062	1.079	5.087
R&D	29317	0.033	0.000	0.000	0.032	0.080	7.114	101.603
Directors	22506	9.484	9.000	8.000	11.000	2.510	0.963	6.301
Outsiders	22506	0.715	0.778	0.600	0.875	0.196	-1.013	3.302
Investments	17073	0.102	0.058	0.026	0.117	0.172	8.588	160.441
Age	29658	55.644	56.000	51.000	60.000	7.136	0.244	3.758
Sppe	20722	0.004	0.000	0.000	0.002	0.033	75.747	8372.471
Sppiv	26879	-0.003	0.000	-0.001	0.000	0.048	-73.912	7332.092

Table 3: Regression of Firm Performance on Internal Governance for Younger and Older CEOs

This table summarize the results of regressing firm performance variables (current year's industry-adjusted ROA and market-to-book ratios) on the internal governance variable δ and other control variables. See Table 1 for variable definitions. Panel A presents the results for younger CEOs (defined as those whose age is less than the median CEO age of 56 years), and Panel B presents the results for older CEOs (defined as those whose age is greater than or equal to the median CEO age of 56 years. Our sample period is 1996 to 2017. *t*-statistics are given in parentheses and all standard errors are clustered at the firm-level. ***, ** and * denotes statistical significance at the 1%, 5% and 10% levels, respectively.

	(1) ROA	(2) ROA	(3) M/B	(4) M/B
Panel A: Younger CEOs				
δ	0.130*	0.056	-0.854	-1.640
	(1.91)	(0.84)	(-0.22)	(-0.33)
δ^2	-0.183*	-0.069	3.204	4.156
	(-1.65)	(-0.64)	(0.51)	(0.52)
ROA	0.282***	0.434***		
	(4.49)	(8.66)		
M/B			0.243***	0.258***
			(6.00)	(4.59)
Size	-0.059***	-0.068***	-2.041***	-0.967*
	(-3.84)	(-4.31)	(-4.43)	(-1.84)
Size²	0.002*	0.002*	0.089***	0.020
	(1.71)	(1.70)	(3.11)	(0.64)
Leverage	0.007	0.002	-1.670**	-1.684**
	(0.54)	(0.21)	(-2.55)	(-2.15)
R&D	0.024	0.004	0.665	0.303
	(0.66)	(0.05)	(0.73)	(0.22)
Directors		0.001		-0.037
		(1.15)		(-1.15)
Outsiders		-0.004		0.512*
		(-0.50)		(1.80)
Year fixed-effects	yes	yes	yes	yes
Firm fixed-effects	yes	yes	yes	yes
R^2	0.816	0.844	0.495	0.548
Adj.R^2	0.717	0.796	0.360	0.409
N	10691	7736	10650	7756
Panel B: Older CEOs				
δ	0.211***	0.060	5.057**	7.836***
	(3.85)	(1.13)	(2.05)	(3.06)
δ^2	-0.320***	-0.066	-8.696**	-12.037***
	(-3.57)	(-0.75)	(-2.02)	(-2.79)
ROA	0.377***	0.489***		
	(7.03)	(23.03)		
M/B			0.327***	0.375***
			(6.72)	(5.88)
Size	-0.001	-0.050***	-0.687*	-0.424
	(-0.03)	(-4.42)	(-1.87)	(-0.96)
Size²	-0.002	0.000	0.007	-0.010
	(-0.83)	(0.67)	(0.32)	(-0.35)
Leverage	-0.023*	-0.001	-1.301***	-1.283*
	(-1.95)	(-0.05)	(-2.90)	(-1.78)
R&D	0.082	-0.136***	4.483	1.437
	(0.95)	(-3.00)	(1.60)	(0.84)
Directors		0.000		-0.051
		(0.01)		(-1.62)
Outsiders		-0.001		0.448
		(-0.17)		(1.44)
Year fixed-effects	yes	yes	yes	yes
Firm fixed-effects	yes	yes	yes	yes
R^2	0.814	0.847	0.556	0.607
Adj.R^2	0.780	0.817	0.475	0.529
N	11470	8822	11391	8812

Table 4: Changes in Investment Rates Around CEO Turnover

This table presents differences in the average investment rates surrounding CEO turnover. The year the incoming CEO leads the firm is designated as year zero. Time interval (in years) in which the test of difference is performed is indicated in the headers. *Investments* is defined in Table 1. Panel A presents means and standard deviations of differences in *Investment* for the various years surrounding CEO turnover, whereas Panel B presents average *Investment* by year. Our sample period is 1996 to 2017. *t*-statistics are given in parentheses and all standard errors are clustered at the firm-level. ***, ** and * denotes statistical significance at the 1%, 5% and 10% levels, respectively.

	(-2,-1)	(-2,0)	(-2,1)	(-2,2)
Investments	0.009*	0.016***	0.013**	0.007
	(1.71)	(3.15)	(2.46)	(1.21)

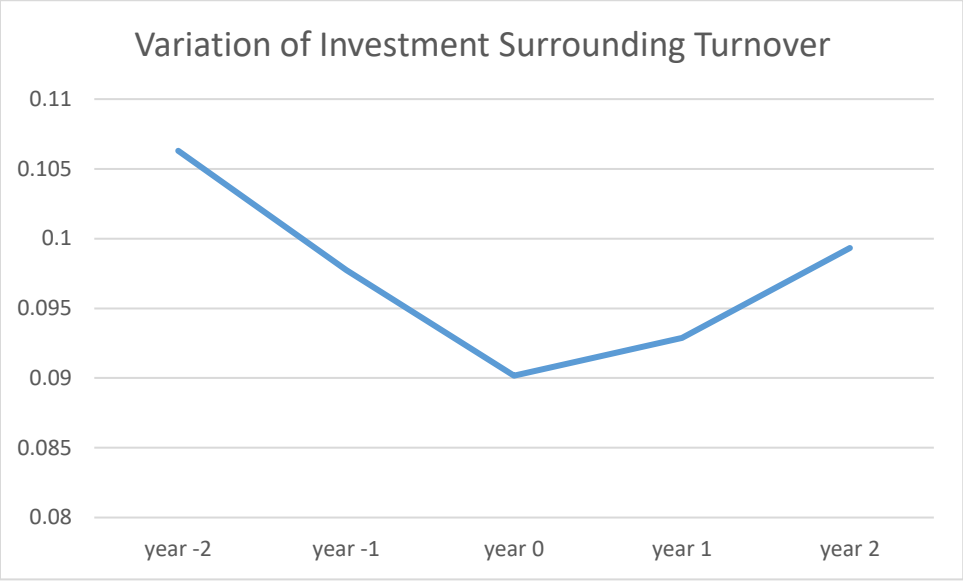

Table 5: Changes in Investment Rates Around CEO Turnover For Older/Younger CEOs and Firms with Good/Bad Internal Governance

This table presents differences in the average investment rates surrounding CEO turnover. The year the incoming CEO leads the firm is designated as year zero. Time interval (in years) in which the test of difference is performed is indicated in the headers. CEO age is measure two years before CEO turnover, and *Investments* and *IG* are defined in Table 1. Panel A presents means and standard deviations of differences in *Investments* for the various years surrounding CEO turnover, whereas Panel B presents average *Investments* by year. Our sample period is 1996 to 2017. *t*-statistics are given in parentheses and all standard errors are clustered at the firm-level. ***, ** and * denotes statistical significance at the 1%, 5% and 10% levels, respectively.

	(-2,-1)	(-2,0)	(-2,1)	(-2,2)
Older CEOs and Good Internal Governance (*IG*=1)				
Investment	0.004	0.021	0.007	0.014
	(0.294)	(1.657)*	(0.458)	(1.199)
Younger CEOs and Bad Internal Governance (*IG*=0)				
Investment	0.027**	0.038***	0.028**	0.027*
	(2.09)	(3.00)	(2.10)	(1.87)

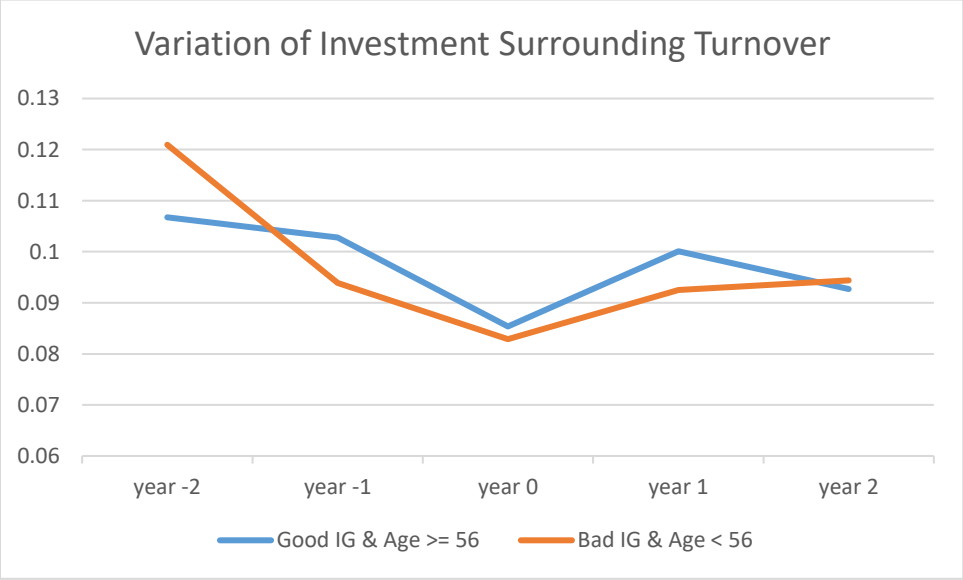

Table 6: Regressions of Changes in Investment Rates Around CEO Turnover (-2,0) on Internal Governance for Older/Younger CEOs

This table reports the results of the regression whereby the dependent variable is the change in investments rate from two years before CEO turnover compared to the turnover year. The main explanatory variable is the Internal Governance dummy variable *(IG*) which equals one if the internal governance is within the optimum range as determined by Table 3, column (4) for the M/B performance variable. Younger (older) CEOs are those whose age two years before the CEO turnover year is less than or equal to (greater than) the median age of 56 years All other variables are defined in Table 1. Our sample period is 1996 to 2017. *t*-statistics are given in parentheses and all standard errors are clustered at the firm-level. ***, ** and * denotes statistical significance at the 1%, 5% and 10% levels, respectively.

	Change in Investments (-2,0)			
	Younger CEOs		Older CEOs	
	(1)	(2)	(3)	(4)
IG	-0.085**	-0.049	-0.123***	-0.132***
	(-2.24)	(-1.15)	(-3.57)	(-3.16)
Lagged M/B	0.015**	0.007	0.002	0.003
	(2.58)	(1.24)	(0.69)	(1.22)
Size	0.073	0.055	0.093***	0.120***
	(1.51)	(0.73)	(3.15)	(2.92)
Leverage	0.299	0.739***	0.370***	0.472***
	(1.19)	(2.64)	(2.58)	(3.80)
R&D	0.189	-2.725*	-0.239	0.779
	(0.77)	(-1.67)	(-0.26)	(1.15)
Directors		0.072***		-0.017*
		(3.39)		(-1.77)
Outsiders		0.230		0.083
		(0.95)		(0.68)
Year fixed-effects	yes	yes	yes	yes
Firm fixed-effects	yes	yes	yes	yes
R^2	0.766	0.862	0.716	0.764
Within R^2	0.334	0.418	0.180	0.222
Within adj.R^2	0.306	0.377	0.160	0.195
N	577	394	1042	767

Table 7: Regressions of Changes in Investment Rates Around CEO Turnover (0,+2) on Internal Governance for Older/Younger CEOs

This table reports the results of the regression whereby the dependent variable is the change in investments rate from the year of CEO turnover to two years after the turnover year. The main explanatory variable is the Internal Governance dummy variable *(IG*) which equals one if the internal governance is within the optimum range as determined by Table 3, column (4) for the M/B performance variable. Younger (older) CEOs are those whose age two years before the CEO turnover year is less than or equal to (greater than) the median age of 56 years All other variables are defined in Table 1. Our sample period is 1996 to 2017. *t*-statistics are given in parentheses and all standard errors are clustered at the firm-level. ***, ** and * denotes statistical significance at the 1%, 5% and 10% levels, respectively.

	Change in Investments (0, 2)			
	Younger CEOs		Older CEOs	
	(1)	(2)	(3)	(4)
IG	-0.000	0.022	0.016	0.031
	(-0.02)	(0.62)	(0.71)	(1.18)
M/B	0.007	-0.009	-0.002*	-0.007*
	(0.88)	(-0.71)	(-1.76)	(-1.87)
Size	0.119***	0.064	0.022	-0.022
	(3.04)	(1.30)	(0.97)	(-0.60)
Leverage	0.161	0.385*	0.208***	0.202*
	(1.22)	(1.96)	(2.60)	(1.68)
R&D	0.008	-0.011	0.639	0.501
	(0.17)	(-0.19)	(1.38)	(1.23)
Directors		0.059**		-0.008
		(2.05)		(-1.12)
Outsiders		-0.198		0.142
		(-1.50)		(1.48)
Year fixed-effects	yes	yes	yes	yes
Firm fixed-effects	yes	yes	yes	yes
R^2	0.855	0.855	0.837	0.859
Within R^2	0.260	0.339	0.177	0.214
Within adj.R^2	0.231	0.294	0.154	0.179
N	584	584	782	573

Table 8: Regressions of Property Sales on Internal Governance for Older/Younger CEOs

This table reports the results of the regression whereby the dependent variable is the ratio of dollar property sales to beginning period assets (*Sppe*) in the year of CEO turnover. The main explanatory variable is the Internal Governance dummy variable *(IG*) which equals one if the internal governance is within the optimum range as determined by Table 3, column (4) for the M/B performance variable. Younger (older) CEOs are those whose age two years before the CEO turnover year is less than or equal to (greater than) the median age of 56 years All other variables are defined in Table 1. Our sample period is 1996 to 2017. *t*-statistics are given in parentheses and all standard errors are clustered at the firm-level. ***, ** and * denotes statistical significance at the 1%, 5% and 10% levels, respectively.

	Sppe at t=0			
	Younger CEOs		Older CEOs	
	(1)	(2)	(3)	(4)
IG	0.001	-0.003*	0.005	0.009
	(0.81)	(-1.73)	(1.23)	(1.56)
M/B	-0.000	-0.000**	0.001**	0.001
	(-0.19)	(-2.08)	(2.25)	(1.58)
Size	0.002	0.001	0.002	0.002
	(0.62)	(0.21)	(0.53)	(0.35)
Leverage	-0.014	0.025***	0.041***	0.061**
	(-0.98)	(2.63)	(3.24)	(2.17)
R&D	0.059	0.043	-0.009	0.070
	(1.50)	(1.50)	(-0.14)	(0.85)
Directors		-0.000		-0.002
		(-0.29)		(-0.91)
Outsiders		0.047***		-0.023
		(2.97)		(-1.53)
Year fixed-effects	yes	yes	yes	yes
Firm fixed-effects	yes	yes	yes	yes
R^2	0.899	0.989	0.649	0.649
Within R^2	0.143	0.555	0.145	0.208
Within adj.R^2	0.095	0.514	0.117	0.170
N	457	308	762	568

Table 9: Regressions of Gains or Losses on Property Sales on Internal Governance for Older/Younger CEOs

This table reports the results of the regression wherein the dependent variable is the ratio of dollar gains or losses on property sales to beginning period assets (*Sppiv*) in the year of CEO turnover. The main explanatory variable is the Internal Governance dummy variable *(IG*) which equals one if the internal governance is within the optimum range as determined by Table 3, column (4) for the M/B performance variable. Younger (older) CEOs are those whose age two years before the CEO turnover year is less than or equal to (greater than) the median age of 56 years All other variables are defined in Table 1. Our sample period is 1996 to 2017. *t*-statistics are given in parentheses and all standard errors are clustered at the firm-level. ***, ** and * denotes statistical significance at the 1%, 5% and 10% levels, respectively.

	Sppiv at t=0			
	Younger CEOs		Older CEOs	
	(1)	(2)	(3)	(4)
IG	0.003	0.003	-0.008***	-0.008***
	(1.21)	(0.59)	(-3.60)	(-3.14)
M/B	0.000	-0.000	-0.000	-0.000
	(0.39)	(-0.46)	(-0.29)	(-0.29)
Size	-0.001	-0.007	0.005***	0.008***
	(-0.72)	(-1.54)	(3.48)	(3.49)
Leverage	0.004	0.018	-0.003	-0.004
	(0.47)	(0.82)	(-0.55)	(-0.33)
R&D	0.008	0.121	0.051	-0.046
	(0.71)	(1.13)	(0.94)	(-0.74)
Directors		0.000		-0.001
		(0.01)		(-1.18)
Outsiders		0.018		0.021*
		(0.59)		(1.79)
Year fixed-effects	yes	yes	yes	yes
Firm fixed-effects	yes	yes	yes	yes
R^2	0.875	0.729	0.753	0.774
Within R^2	0.193	0.251	0.090	0.127
Within adj.R^2	0.157	0.198	0.069	0.097
N	572	390	1079	804

Table 10 (Robustness Test 1): Regressions of Changes in Investment Rates Around Sudden CEO Deaths

This table reports regression results of the relationship wherein the dependent variable is the difference in long term investment from two years before to the end of the fiscal year in which the sudden CEO death event is announced. The main explanatory variable is the Internal Governance dummy variable *(IG*) which equals one if the internal governance is within the optimum range as determined by Table 3, column (4) for the M/B performance variable. All other variables are defined in Table 1. Our sample period is 1996 to 2017 and only includes older CEOs (age $\geq$ 56 years two years before their sudden death is announced) in 1996. t-statistics are given in parentheses and all standard errors are clustered at the firm-level. ***, ** and * denotes statistical significance at the 1%, 5% and 10% levels, respectively.

	Robust Regressions		
	CAPX	Acquisitions	Investments
	(1)	(2)	(3)
IG	-0.061	-0.016	-0.120
	(-2.745)**	(-3.215)***	(-10.779)***
Size	-0.001	0.006	0.015
	(-0.140)	(3.816)***	(4.382)***
Leverage	0.071	-0.004	-0.012
	(1.074)	(-0.292)	(-0.364)
R&D	-0.006	-0.001	0.015
	(-0.025)	(-0.028)	(0.129)
R^2	0.475	0.642	0.922
Adj. R^2	0.300	0.523	0.895
N	17	17	17

Table 11 (Robustness Test 2): Regressions of Changes in Investment Rates Around CEO Turnover (-2,0) Controlling for whether an Outsider or Insider was appointed CEO

This table reports the results of the regression whereby the dependent variable is the change in investments rate from two years before CEO turnover compared to the turnover year. The main explanatory variable is the Internal Governance dummy variable *(IG*) which equals one if the internal governance is within the optimum range as determined by Table 3, column (4) for the M/B performance variable. *Outsider Successor* is a dummy variable that is set to unity if the new CEO had less than two years of employment as an executive in the firm before being appointed CEO. All other variables are defined in Table 1. Our sample period is 1996 to 2017 and only includes older CEOs (age $\geq$ 56 years two years before CEO turnover). *t*-statistics are given in parentheses and all standard errors are clustered at the firm-level. ***, ** and * denotes statistical significance at the 1%, 5% and 10% levels, respectively.

	Change in Investments (-2,0)			
	All turnover		Voluntary turnover only	
	(1)	(2)	(3)	(4)
Outsider Successor	-0.068***	-0.057**	-0.094***	-0.054*
	(-2.84)	(-2.42)	(-3.02)	(-1.73)
IG	-0.111***	-0.119***	-0.090***	-0.096***
	(-3.40)	(-2.92)	(-2.79)	(-2.67)
M/B	0.001	0.003	-0.001	0.001
	(0.36)	(1.06)	(-0.29)	(0.35)
Size	0.084***	0.122***	0.069***	0.095***
	(3.01)	(2.99)	(2.79)	(2.87)
Leverage	0.388***	0.476***	0.363**	0.483***
	(2.74)	(3.95)	(2.40)	(3.88)
R&D	-0.154	0.770	-1.275	1.241
	(-0.17)	(1.12)	(-0.96)	(1.36)
Directors		-0.017*		-0.011
		(-1.73)		(-1.41)
Outsiders		0.076		0.009
		(0.64)		(0.07)
Year fixed-effects	yes	yes	yes	yes
Firm fixed-effects	yes	yes	yes	yes
R^2	0.720	0.768	0.739	0.831
Within R^2	0.197	0.237	0.247	0.286
Within adj.R^2	0.177	0.209	0.226	0.257
N	1042	767	927	683