An Empirical Investigation of Internal Governance*

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Abstract

Acharya, Myers, and Rajan (2009) theorize that self-serving actions and rent extraction by CEOs can be constrained by subordinate managers when the managers' efforts are needed in production. This force, which they call internal governance, works best when the CEO and the managers are both important to firm output, in the sense that their relative contributions to firm value are balanced. We empirically examine the effects of internal governance on firm investment and performance. We develop a measure of internal governance that captures the relative contribution of the CEO compared to non-CEO executives in firm value creation. Consistent with the theory, we find that there is a hump-shaped relation between relative contributions and corporate investment measured as either capital expenditures or R&D spending. We also find a hump-shaped relation between relative contributions and several measures of firm performance: Tobin's Q, ROA, and free cash flow. This relation is driven by firms in the top and bottom quartiles of the distribution of relative contributions, suggesting that the firms in the tails of the distribution are engaging in disequilibrium behavior. The hump-shaped relations between investment and relative contributions and between firm performance and relative contributions are more evident for firms with young managers and firms with a greater age difference between the CEO and the managers. These results are consistent with divergences in career horizons between CEOs and managers being a crucial determinant of the strength of internal governance. However, neither external governance nor board governance diminishes the importance of internal governance. Overall, our results are strongly supportive of the theory.

1 Introduction

A self-interested chief executive officer (CEO) may want to benefit himself at the expense of the shareholders. However, unless the CEO is a singular productive figure in the company, he needs the collaboration of his subordinates. His subordinates, in turn, may very well have a long-run interest in the company's prospects, especially if they see sufficient scope for career development within the firm. In other words, subordinates who think they could one day be CEO may have different horizons relative to the preservation of firm value than does the incumbent CEO. Because the CEO needs his subordinates for current production and needs to keep them motivated, the CEO will commit to investing now to preserve value for the future. This bottom-up incentive scheme to preserve long-term firm value and increase capital stock to induce effort from subordinates is called internal governance (see Acharya, Myers, and Rajan (2009) and Morrison and Wilhelm (2004)).

We empirically examine the effect of internal governance and find support for some of the theory's key predictions. We proxy for the relative contribution of the CEO (in value creation) by the difference in abnormal compensation for the CEO relative to the median of non-CEO executives.[1] Consistent with Acharya, Myers, and Rajan (2009), we find that there is a hump-shaped relation between our measure of this relative contribution and corporate investment. At low levels of CEO's relative contribution, when the CEO is paid relatively less well than executives below the CEO (whom we dub managers), managers have little incentive to learn or exert effort and the CEO has little incentive to invest for the long-run. At very high levels of relative contribution, when the CEO is paid quite highly relative to the managers and the CEO is therefore dominant, the CEO again has little incentive to invest for the long-run. Intermediate levels of relative contribution maximize long-term investment incentives, as in Acharya, Myers, and Rajan (2009), and this is what we find empirically.

Further, we find a similar hump-shaped relation between our measure of relative contribution and industry-adjusted operating performance, measured as Tobin's Q, return on assets, operating income, and free cash flow. These results are robust to fixed effects and controls for external governance (institutional ownership) and the strength of board governance, as well as other controls. In addition, results from subsample analysis show that the hump-shaped relation is driven by firms in the tails of the distribution of the measure of relative contribution, suggesting that these firms are engaging in disequilibrium behavior.

Our results also shed some light on the opposing results of Kale, et. al., (2009) and Bebchuk, et. al., (2009). These papers find a linear yet opposite relation between a measure

[1] We use the median instead of the maximum because we assume the non-CEO senior executives have equal probabilities of contributing to cash flow generation and being promoted to be the next CEO.

similar to our relative contribution measure and short-term firm performance. Kale, et. al., (2009) interpret their measure as a measure of tournament incentives (the difference between CEO pay and other executives' pay), and find that firm performance is increasing in the pay differential. Bebchuk, et. al., (2009) interpret their measure as a measure of CEO dominance or centrality relative to the other executives (again looking at the difference between CEO pay and other executives' pay) and find that firm performance is decreasing in the pay differential. These contrasting findings disappear when we investigate the relation between our measure of internal governance and long-term firm performance. A nonlinear, hump-shaped relation is better able to explain the pattern of the data, and is consistent with the internal governance theory of Acharya, Myers, and Rajan (2009).

In addition, we find that internal governance is more effective when managers are younger, CEOs are close to retirement, and when there is a larger difference in the relative ages of the CEO and the managers. We also find that internal governance is more effective when firm-specific skills or effort are more important for managers and when managers are more likely to become the CEO eventually. These results provide support for the internal governance theory.

Much of the corporate governance literature focuses on how boards can curb CEOs taking actions that are detrimental to shareholders. However, the current literature provides little consensus that the independence of boards improves profitability or firm value, although some research does find that boards can be efficient tools of corporate governance when it comes to CEO turnover or compensation. One rationale behind these two seemingly opposing findings is that strong or independent boards could be valuable in times of crises, but are too far away from day-to-day operations to add much value to a firm.

By contrast, a firm's junior managers are critically important to a firm's day-to-day operations. Further, their potentially longer time horizon can be a useful governance mechanism. Acharya, Myers, and Rajan (2009) argue that junior managers' different horizons relative to CEOs will result in different preferences in investment, payout, and other corporate policies. This paper looks at the impacts of managers' different horizons on corporate investment and firm performance. The paper is organized as follows. In Section 2, we present our hypotheses. In Section 3, we describe our data and measure of internal governance. In Section 4, we present our results. Section 5 concludes.

2 Hypothesis Development

Kale, et. al., (2009) show that tournament incentives are positively related to firm performance. From the corporate governance perspective, this suggests that tournament incen-

tives (e.g., promotion to CEO) could effectively elicit effort from managers. At the same time though, it is important to note that the effectiveness of such incentives comes from promising future payoffs to the next generation leader of the company. Therefore, the incumbent CEO will have to preserve firm value and even increase capital stock, which he may have incentives to do if he needs the cooperation of his subordinates (other members of the executives team). This second strand of disciplinary force coming from the different appropriation horizons may serve as an effective (internal) governance mechanism to reduce CEO's agency costs (as in Acharya, Meyers, and Rajan (2009)) and have important implications for the firm's dividend payout/investment policies as well. According to Acharya, Myers, and Rajan (2009), internal governance works best when both CEO and other key employees are important to firm value creation and neither the CEO nor the managers are dominant. If the CEO is very powerful, he does not need his subordinates' cooperation and internal governance will not constrain the CEO's extraction of rents. If the incumbent CEO is weak (in the sense of being relatively unimportant for production), then the internal governance effect is also weak because the CEO will not invest and the manager will therefore not exert a lot of effort to learn about the firm's specific issues. If the power is balanced, internal governance will have an impact on firm performance.

Further, for the internal governance mechanism to work effectively in practice, there must be a real divergence between CEO's and the manager's appropriation horizon: it is exactly the prospect of the manager's future career that gives rise to the bottom-up internal disciplinary force to increase capital stock and preserve firm value. Since age serves as a proxy for appropriation horizon, internal governance should be more effective in firms with younger managers, and in firms where there is a clear age difference between the CEO and the managers.[2] The same logic applies to firms with elderly CEOs, who are presumably close to retirement. Other governance forces aside from internal governance, such as career or reputational concerns, may be more operative for younger CEOs. Elderly CEOs will have few external checks on their behavior, and internal governance may be more operative in these situations.

Another key component for the effectiveness of internal governance is how much firm-specific learning or effort the manager engages in prior to becoming CEO. In industries in which general skills dominate firm-specific skills, internal governance is unlikely to be effective because the manager has the option to exit. Further, independent of industry, managers who do not possess firm-specific skills are unlikely to effectively pressure CEOs to

[2]It is important to note that the Acharya, Myers, and Rajan (2009) model does not imply that there is a hump-shaped relation between the difference in appropriation horizon (proxied by the age difference between CEOs and managers) and investment or performance. The non-linear relation is between the relative importance of the CEO and investment or performance.

invest. Finally, for firms in industries in which CEO succession is more likely to happen from outside of the firm, internal governance is unlikely to be effective since managers are unlikely to be induced to exert effort for no reward.

In sum, we hypothesize the following.

Hypothesis 1: There is a hump-shaped relation between the difference in the CEO's and manager's abnormal compensation ("compensation gap") and long-term corporate investments, conditional on the strength of external governance.

Hypothesis 2: There is a hump-shaped relation between the compensation gap and firm performance (both short-term and long-term), conditional on the strength of external governance.

Hypothesis 3: In firms with young managers, the hump-shaped relations between investment and gap and firm performance and gap are more pronounced (internal governance is more effective).

Hypothesis 4: In firms with elderly CEOs, the hump-shaped relations between investment and gap and firm performance and gap are more pronounced

Hypothesis 5: In firms with larger differences in the CEO's age relative to the managers' ages, the hump-shaped relations between investment and gap and firm performance and gap are more pronounced.

Hypothesis 6: Firms in heterogeneous industries (those industries in which skills are not transferable) will have more pronounced hump-shaped relations between investment and gap and firm performance and gap.

Hypothesis 7: Firms with managers with high firm-specific skills will have more pronounced hump-shaped relations between investment and gap and firm performance and gap.

Hypothesis 8: Firms in industries that rely on internal succession will have more pronounced hump-shaped relations between investment and gap and firm performance and gap.

3 Data and Sample Construction

The data on executives used in this study come primarily from ExecuComp. The financial data for the firms come from Compustat and CRSP. Data on institutional holdings are provided by Thomson Reuters's CDA/Spectrum database. Information on corporate boards is obtained from the RiskMetrics database. All data used are annual. Both ExecuComp and RiskMetrics cover S&P 500, S&P MidCap 400, and S&P SmallCap 600 firms. All institutional money managers filing 13F reports with the Securities and Exchange Commission are covered in the CDA/Spectrum database.

The sample period for our main analysis starts from 1992, as that is the starting point

for the ExecuComp database, which provides information on the identity and compensation packages of the top five executives in 1,500 publicly traded US firms each year. This information is crucial for the construction of the internal governance measure, as explained further below. In robustness tests described later, we add board characteristics that are provided by RiskMetrics starting from 1996. The sample size is reduced for those tests.

3.1 Institutional Holdings, Board Characteristics, and Performance Measures

To capture the proportion of institutional investors in the overall shareholders, we define our measure of external governance to be:[3]

$$Institutional = \frac{\text{Number of shares owned by institutional investors}}{\text{Total number of shares outstanding}}$$

Board characteristics (size and independence in particular) are added as control variables in the robustness checks. The variables that capture board characteristics are: Dir_{sum}, which measures the number of directors on the board (in logarithm) and $Outdir_{pcnt}$, which measures the percentage of outside directors.

We use standard measures of firm-year level investment and performance. For investment, we use capital expenditures and R&D expenditures. Both variables are scaled by beginning of period capital stock (property, plant, and equipment). For firm performance, we use Tobin's Q, return on assets (ROA), and free cash flow. We winsorize the firm level performance measures at the left and right tail (1%, 99%). One-year performance measures are contemporaneous and industry-adjusted based on the industry median. Three year performance measures are three-year averages and industry-adjusted based on the industry median. Table 1 lists descriptive statistics for the variables used in this study.

3.2 Measure of Internal Governance

A crucial parameter in Acharya, Myers, and Rajan (2009) is the relative contribution measure α, which denotes the strength of the relative importance of CEO's contribution compared to the manager's in generating cash flow. More specifically,

$$\alpha = \frac{f}{g}$$

[3]We have also examined institutional investors decomposed into transient and dedicated institutional investors as in Bushee (1998, 2001). Our results are generally unaffected by using either transient or dedicated institutional investors as a control for external governance, so for brevity, those results are omitted.

where f and g are functions of CEO's and the manager's contribution to cash flow generation given their effort/learning, respectively. A primary empirical challenge is in estimating the parameter α. Because we do not directly observe the contributions of the CEO and manager to cash flow, we must infer their contributions from other observable data. A natural candidate is the relative compensation of the CEO and the manager, since in a neoclassical model, compensation will reflect marginal productivity. However, in the Acharya, Myers, and Rajan (2009) model, compensation is endogenously determined, so we must extract the portion of compensation that is determined by relative productivity.

We do so by empirically modeling compensation as follows. The CEO's wage consists of a rent (Δ), a return to firm-specific skill (f from above), and a return to general skill (λ_{CEO}). The manager's wage consists of a return to firm-specific skill (g from above) and a return to general skill (λ_{MGR}). The wage equations are:

$$\begin{aligned} w_{CEO} &= \Delta + f + \lambda_{CEO} \\ w_{MGR} &= g + \lambda_{MGR}. \end{aligned}$$

In the Acharya, Myers, and Rajan (2009) model, the manager earns no rent–she only earns rent if she becomes CEO. The CEO consumes any surplus cash flow and this is the CEO's rent.

From the wage equations, we need to extract f and g. To do so, we first eliminate the general components of compensation, λ_{CEO} and λ_{MGR}, by calculating abnormal managerial compensation. Abnormal compensation is not portable and is not priced in the outside labor market (Berk, Stanton, and Zechner (2009), Graham et al. (2009)), and so should only comprise firm-specific skills and rents. We split the sample into two sub-groups: the CEO group and the non-CEO group. For each group, we construct abnormal compensation (AC) for each executive using the residual of regressing total compensation on firm size, the market-to-book ratio, year dummies, and industry dummies. The residuals eliminate those components of compensation that are general and generally observed (λ_{CEO} and λ_{MGR}) leaving:

$$\begin{aligned} AC_{CEO} &= \Delta + f \\ AC_{MGR} &= g. \end{aligned}$$

Since we wish to extract the firm-specific components of compensation (f and g), we only need to eliminate the CEO's rent from abnormal compensation. In the Acharya, Myers, and Rajan (2009) model, the CEO's rent is in the form of a non-pecuniary rent (e.g., perquisites

consumption, empire-building, etc.), such that in compensation, $\Delta = 0$. In this case, the CEO's contribution relative to the manager's or gap is defined as:

$$Gap = AC_{CEO} - AC_{MGR} = f - g,$$

and serves as a proxy for α in the empirical work that follows. We take the difference instead of the fraction because abnormal compensation for the CEO and the manager could have opposite signs.[4]

While the assumption that the CEO's rent is non-pecuniary is analytically quite tractable, the work of Bebchuk and Fried (2004) suggests that, at least in some cases, some of the rents for the CEO do indeed come in the form of compensation, $\Delta > 0$. In this case, we have:

$$Gap = \Delta + f - g.$$

The underlying parameter for which we wish to proxy is $f - g$. Thus we need to show that Gap is increasing in $f - g$. This implies that:

$$\begin{aligned} \frac{\partial Gap}{\partial(f-g)} &= \frac{\partial \Delta}{\partial(f-g)} + 1 > 0, or \\ \frac{\partial \Delta}{\partial(f-g)} &> -1. \end{aligned}$$

In Acharya, Myers, and Rajan (2009), Δ is endogenously determined and is equal to the firm's cash flow. Using their benchmark parameters ($\frac{1}{1+r} = 0.95, \gamma = 0.2, \frac{b-1}{b} = 0.3, a = 0, \theta^{SS} = 1$), we find that for $\alpha^* > 1.185$, the change in cash flow for a change in the relative contribution is greater than -1. In other words, as long as the CEO contributes 18.5% more to firm cash flow than does the manager, then our measure of Gap will be increasing in the underlying relative contribution of the CEO to the manager. This seems to be empirically plausible. As a final robustness check, later on we will instrument for Gap to further ensure endogeneity of our measure is not contaminating our estimates.

To empirically implement Gap, for each firm-year, we calculate the difference between the CEO's abnormal compensation and the median abnormal compensation of the non-CEO executives. We follow prior literature and monotonically transform all observations by adding to each observation a constant equal to the absolute value of the minimum gap. This enables us to use the log transformation even for observations with negative gaps.

[4] An alternative interpretation of abnormal compensation is the ability of each individual to extract rents. In this case, the gap measure is still consistent with a CEO dominance or power interpretation, but the Acharya, Myers, and Rajan (2009) theory's intuition would have to be interpreted less strictly.

With the measure of *Gap* in hand, note that internal governance is strongest when neither the CEO nor his subordinates dominate. On the one hand, if the CEO is too strong (i.e., a high gap of abnormal compensation), then the CEO does not need the cooperation of his subordinates and bottom-up internal governance does not work. If the managers are too strong, i.e., the pay gap is low, then the managers do not have incentives to exert effort or learn.

It is worth contrasting *Gap* with two similar measures used previously in the literature. Kale, et. al., (2009) argue that the pay differential between the CEO and his subordinates measures the strength of tournament incentives. The larger the differential, the stronger the incentives, and the better is firm performance. The tournament explanation yields the same prediction as the internal governance model when the differential or gap is small - incentives are weak for the managers. However, the tournament explanation predicts that incentives are very strong for large differentials, while the internal governance model predicts that again incentives will be weak. Only differentials or levels of gap in the middle, where the relative contributions are balanced, provide strong internal governance.[5]

Bebchuk, et. al., (2009) argue that the amount of compensation that a CEO receives relative to the non-CEO executives is a measure of CEO dominance and is indicative of a CEO's ability to engage in rent extraction. This CEO dominance and rent extraction explanation would predict that at high levels of dominance, firm performance would be poor, consistent with the internal governance model. Here, high levels of dominance would be consistent with the gap in abnormal compensation being too large. However, the rent extraction explanation predicts that firm performance will be strong for low levels of CEO dominance (low gap), while the internal governance model predicts that if gap is too low, again performance will be poor. Only levels of gap in the middle of the distribution, where the relative contributions are balanced, provide strong internal governance.

Table 2 reports correlations of the variables and their significance levels. The three measures used in the literature that are similar to our internal governance measure are: pay gap between CEO and the median non-CEO executive (in log, as defined in Kale, et. al.), CEO's pay slice (as defined in Bebchuck, et. al.), and the Gini index. All three measures are positively correlated with each other and our measure of Gap by construction. However, their correlations with the Q measure tell us that they are associated with this performance measure in opposite ways, as previously shown in Kale, et. al., and Bebchuk, et.al.

[5]One issue worth noting in the comparison between tournament incentives and internal governance is that, because of the future-oriented nature of tournament incentives, the prize size should depend on the differential of future payoffs to the executive when she becomes the CEO of the company and her current pay, not the pay gap between the compensation for the current CEO and the manager.

4 Results

4.1 Long Term Investment and Firm Performance

Our initial empirical specification, which tests Hypothesis 1, is as follows:

$$LongTermInvestment_i = \alpha + \beta_1 Gap_i + \beta_2 Gap_i^2 + \gamma ExternalGov_i + covariates + \varepsilon_i \quad (1)$$

where the independent variables of interest are *Gap* (the logarithm of the differential between abnormal CEO compensation and abnormal managers' compensation), Gap^2, and *ExternalGov* (institutional ownership). We include both *Gap* and Gap^2 to test for the hypothesized nonlinear (hump-shaped) relation between investment and the CEO's and manager's relative contributions. In all specifications, we include year and firm fixed effects.

Table 3 reports regression results for long-term investment measured as either R&D spending or capital expenditures. Both measures of investment are scaled by beginning of period property plant and equipment (PPE). Delta is a measure of the variation in non-CEO executive compensation, which we include as a covariate following Kale, et. al. In both specifications, the coefficient on *Gap* is positive and significant while the coefficient on Gap^2 is negative and significant. Thus, we find support for a hump-shaped or inverted U-shaped relation between relative contributions (*Gap* and Gap^2) and long-term investment, measured as R&D or capital expenditures. We find somewhat weaker statistical significance for the relation between relative contributions and R&D spending, perhaps because R&D spending is missing for a number of firms in Compustat. Further, including firm fixed effects implies that our identification only comes from within firm changes.

Next we test Hypothesis 2 by examining firm performance using several variations of the following empirical specification:

$$Performance_i = \alpha + \beta_1 Gap_i + \beta_2 Gap_i^2 + \gamma ExternalGov_i + covariates + \varepsilon_i. \quad (2)$$

Table 4, Panel A, examines short-run (one-year) performance and Table 4, Panel B, examines long-run (three-year) performance. Performance is measured as Tobin's Q, return on assets, and free cash flow. In both panels, the coefficient on *Gap* is positive and significant while the coefficient on Gap^2 is negative and significant. This is strong support for the hump-shaped relation between relative contributions and performance, both short-run and long-run, and suggests that internal governance may indeed be an important determinant of firm performance.[6]

[6] As a robustness check, we also examined three-year performance but started measuring performance one year later. In other words, we examined performance from time t+1 to t+4. In this specification, the

In both Tables 3 and 4, we find that the coefficient on *Gap* is greater than the coefficient on Gap^2 by an order of magnitude. We find for most of our specifications that investment and firm performance are maximized around the average value of *Gap* in the data, 4.93. As is clear from the small standard deviation (0.05) of *Gap* from Table 1, most of our observations cluster around the central compensation gap. This clustering suggests that most firms exhibit optimizing behavior in terms of compensating the CEO relative to non-CEO executives. Since the variation in firm performance and long-term investments is not explained by the compensation gap around the peak point, we test the internal governance hypothesis by spline regressions. In particular, we are interested in the subsample of the firms that are away from the center or peak of the gap distribution.

The results in Table 5, Panel A, show that the hump-shaped pattern in investment is only present for firms with compensation gaps in the bottom and top quartiles, ranges of [0, 25%] and [75%,100%].[7] In these quartiles, the coefficients for *Gap* are positive and significant, while the coefficients for Gap^2 are negative and significant. The hump-shaped pattern is absent for the firms in the middle two quartiles, where the firms cluster at the center of the gap distribution. The coefficients for *Gap* and Gap^2 are not significant, and switch sign, suggesting there is no relation between relative contributions and investment in the middle of the distribution. Panel B examines the hump-shaped relation between compensation gaps and our measures of firm performance. Again, we find that the coefficients for *Gap* are positive and significant, while the coefficients for Gap^2 are negative and significant only in the top and bottom quartiles. In the middle two quartiles, the coefficients are insignificant. For the firms in the bottom and top quartiles, the strong hump-shaped or concave relation suggests that these firms are engaging in disequilibrium behavior. In unreported results, this finding also holds for the outliers - compensation gaps in the [0, 5%] and [95%,100%] range. The results are robust to other cut-offs (e.g., middle 20%) as well. Only firms away from the central compensation gap exhibit the predicted hump-shaped relation between the relative contributions measure and long-term investment or firm performance. Around the central gap, firms appear to be optimizing and the relation between compensation gaps and investment and firm performance is essentially flat.

4.2 Age Distribution of the Executive Team

The difference in appropriation horizons of the CEO versus the manager is the fundamental

results for *Gap* and Gap^2 are quite similar to those reported in Table 4.

[7] In this and subsequent tables, we focus on institutional investor participation as our main variable for external governance. Using either the fraction of dedicated or transient institutional investors does not change the qualitative results for internal governance, and the results for dedicated and transient investors are similar to those reported in Tables 3 and 4.

source driving internal governance. This suggests that internal governance is more effective in firms with young managers, as noted by Acharya, Myers, and Rajan (2009). Further, internal governance is more likely to be effective in firms with larger differences between the CEO's and the manager's age.

We first test Hypothesis 3, whether the hump-shaped relation between compensation gaps and investment or firm performance is more pronounced for young managers (low median age) relative to older managers (high median age). Second, we test Hypothesis 4, whether the hump-shaped relation between compensation gaps and investment or firm performance is more pronounced for elderly CEOs (those who are age 60 years or older), who are presumably close to retirement, relative to younger CEOs (those who are age 50 years or younger). Then we test Hypothesis 5, whether the hump-shaped relation between compensation gaps and investment or firm performance is more pronounced for high relative age differences between the CEO and the managers as compared to low relative age differences.

Table 6, Panel A, presents regressions for investment based on subsamples split at the median age of non-CEO executives (managers). To perform this split, we compare the median age of a manager at a given firm to the overall median age of all of the managers in the sample. A firm is classified as "low median" if the median age of a manager at that firm is less than the overall sample median, and implies that the firm has young managers. A firm is classified as "high median" if the median age of a manager at that firm is greater than the overall sample median, and implies that the firm has old managers. For low median firms, the coefficient on *Gap* is positive and significant and the coefficient on Gap^2 is negative and significant for both R&D and capital expenditures. For high median firms, the coefficients are insignificant for R&D expenditures, and only the coefficient on *Gap* is significant for capital expenditures. For both measures of investment, the coefficients are larger in magnitude for the low median firms than for the high median firms, signifying that the hump-shaped pattern is more pronounced for the low median firms.

Table 6, Panel B, examines performance consequences when the sample is split by managers' ages. For all three performance measures, the coefficient on *Gap* is positive and significant and the coefficient on Gap^2 is negative and significant for the low median firms. For the high median firms, the coefficients are generally insignificant except for positive coefficients on *Gap* for return on assets and free cash flow as measures of firm performance. In terms of magnitudes, the coefficients are larger for low median firms except for free cash flow as the measure of firm performance. These results are consistent with internal governance being more effective in firms with young managers.

Table 7, Panel A, presents regressions for capital expenditures based on subsamples split by whether the CEO is age 60 or over and age 50 or younger. Those CEOs over age 60

are presumed to be near retirement, and so internal governance is more likely to be an important form of incentives for these CEOs. For firms with elderly CEOs, the coefficient on *Gap* is positive and significant and the coefficient on Gap^2 is negative and significant for capital expenditures, but both coefficients are insignificant for R&D. The coefficients are insignificant and smaller in magnitude for firms with younger CEOs. Panel B examines firm performance. Again, for firms with elderly CEOs, the coefficient on *Gap* is positive and significant and the coefficient on Gap^2 is negative and significant for the measures of firm performance. The coefficients are insignificant and smaller in magnitude for firms with younger CEOs. These results are consistent with internal governance being more effective in firms with CEOs who are close to retirement.[8] There is also some evidence that external governance (institutional ownership) plays a role in investment and firm performance in firms with younger CEOs.

Table 8, Panel A, sorts firms based on differences in age between the CEO and the median of the non-CEO managers at his own firm. Firms with a difference in age between the CEO and his managers above the sample median are classified as "high difference," while those below the sample median are classified as "low difference." For high difference firms, the coefficient on *Gap* is positive and significant and the coefficient on Gap^2 is negative and significant for both R&D and capital expenditures. For low difference firms, the coefficients are insignificant. Further, for both measures of investment, the coefficients are larger in magnitude for the high difference firms than for the low difference firms, signifying that the hump-shaped pattern is more pronounced for the high difference firms. Panel B examines firm performance. For high difference firms, the coefficient on *Gap* is positive and significant and the coefficient on Gap^2 is negative and significant for all three measures of firm performance. For low difference firms, the coefficients are insignificant. These results are consistent with internal governance being more effective in firms with larger age differences, signifying greater divergences in appropriation horizons.

4.3 Firm-Specific Effort

Another key component for the effectiveness of internal governance is how much firm-specific learning or effort the manager engages in prior to becoming CEO. If the manager does not engage in firm-specific effort, then the CEO has no incentive to invest. Managers whose skills are general or transferable can always exit the firm, eliminating the CEOs incentive to invest. Finally, if the manager has a low probability of becoming CEO (perhaps because the firm is likely to hire externally), then the manager has no incentive to acquire firm-specific skills and the CEO has no incentive to invest.

[8]These results are robust to the use of other age cutoffs for the CEO (e.g., those older than 62 or 65).

We first test Hypothesis 6, whether firms in heterogeneous industries (those industries in which skills are not transferable) have more pronounced hump-shaped relations between investment and gap and firm performance and gap. We measure industry heterogeneity using Parrino's (1997) measure of the correlation between stock returns within 2-digit SIC industries. Table 9, Panel A, presents the results for investment. For firms in heterogeneous industries, the coefficient on *Gap* is positive and significant and the coefficient on Gap^2 is negative and significant for both R&D and capital expenditures. The coefficients are insignificant and smaller in magnitude for firms in homogeneous industries. Panel B examines firm performance. Again, for firms in heterogeneous industries, the coefficient on *Gap* is positive and significant and the coefficient on Gap^2 is negative and significant for the measures of firm performance. The coefficients are insignificant (although not always smaller in magnitude) for firms in homogeneous industries. These results are consistent with internal governance being more effective in firms in which managers' skills are not portable and there is less of an exit option.

Second, we test Hypothesis 7, whether firms with managers with high firm-specific skills relative to general skills have more pronounced hump-shaped relations between investment and gap and firm performance and gap. We use our decomposition of manager compensation into firm-specific and general components for this test. Table 10, Panel A, presents the results for investment. For firms with managers with high firm-specific skills, the coefficient on *Gap* is positive and significant and the coefficient on Gap^2 is negative and significant for both R&D and capital expenditures. The coefficients are insignificant and smaller in magnitude for firms with managers with low firm-specific skills. Panel B examines firm performance. Again, for firms with managers with high firm-specific skills, the coefficient on *Gap* is positive and significant and the coefficient on Gap^2 is negative and significant for the measures of firm performance. The coefficients are insignificant and smaller in magnitude for firms with managers with low firm-specific skills. These results are again consistent with internal governance being more effective in firms in which managers' skills are not portable and there is less of an exit option.

Finally, we test Hypothesis 8, whether firms in industries that rely on internal succession have more pronounced hump-shaped relations between investment and gap and firm performance and gap. We use Cremers and Grinstein's (2009) 48 industry classification of predominantly inside versus outside successions. We construct two subsamples with firms in the top 10 inside succession industries and bottom 10 inside succession (i.e., top 10 outside succession) industries. Table 11, Panel A, presents the results for investment. For firms in industries that rely more on internal succession, the coefficient on *Gap* is positive and significant and the coefficient on Gap^2 is negative and significant for both R&D and

capital expenditures. The coefficients are insignificant for firms in industries that rely more on external succession. Panel B examines firm performance. For firms in industries that rely more on internal succession, the coefficient on *Gap* is positive and significant and the coefficient on Gap^2 is negative and significant for the measures of firm performance. The coefficients are insignificant and smaller in magnitude for firms in industries that rely more on external succession. These results are consistent with internal governance being more effective when managers have a higher probability of eventually becoming CEO.

4.4 Robustness

Our results are consistent with the importance of internal governance. However, other factors could also be relevant, which we now explore. Thus far, we have only considered internal and external governance and ignored the importance of the board of directors in corporate governance. To rectify this, in Table 12, we add board characteristics (board size and fraction of outside directors) to the investment and performance regressions. In these regressions, our sample size is reduced as RiskMetrics board data begins in 1996.

In Panel A, we find that our internal governance results are generally unaffected - there continues to be a hump-shaped relation between the compensation gap and investment. We find no relation between the board variables and investment. In Panel B, we add the same board characteristics to the performance regressions. Again, our internal governance results are unaffected–there remains a hump-shaped relation between the compensation gap and measures of firm performance. Consistent with Yermack (1996), we find that larger boards of directors are associated with worse firm performance, and somewhat surprisingly, a larger fraction of outside directors is negatively associated with free cash flow. The key point, however, is that our results with respect to internal governance are unaffected by the inclusion of board characteristics.

Our compensation gap measure uses the logarithm of the difference in abnormal compensation between the CEO and the managers. There are two potential concerns here. First, does the logarithmic transformation induce spurious findings? To examine this, in Table 13, Panel A, we use the raw difference in abnormal compensation between the CEO and the managers as our compensation gap measure in our main specifications. As before, the coefficients for *Gap* are positive and significant, while the coefficients for Gap^2 are negative and significant. Again, there remains a hump-shaped relation between the compensation gap and measures of firm performance and investment.

Second, our gap measure relies on two components: abnormal compensation of the CEO and abnormal compensation of the managers. It is possible that only one of these components (e.g., abnormal CEO compensation) actually drives the relation with investment and

firm performance. To test this, we study separately the relation between the abnormal compensation measures for the CEO and the managers, res_{ceo} and res_{non} respectively, and investment and firm performance. Table 13, Panel B, includes abnormal CEO compensation and its square in our main specifications. Neither res_{ceo} nor res_{ceo}^2 is significant in any specification except that res_{ceo} is positive and significant for free cash flow. Panel C includes abnormal manager compensation and its square in our main specifications. Neither res_{non} nor res_{non}^2 is significant in any specification except that res_{non} is positive and significant for capital expenditures. Moreover, in Panels B and C, the linear terms are generally positive, but the squared terms are not consistently negative. These results suggest that neither abnormal CEO compensation nor abnormal manager compensation (nor their squared terms) have any consistent relation with either investment or firm performance. We conclude that it is indeed the difference in abnormal compensation or the compensation gap that gives rise to the hump-shaped pattern we have found.[9]

4.5 Handling Endogeneity in Non-linear Models

Another concern is that the compensation gap is endogenously determined. A common approach to address this issue is to use instrumental variables and two stage least squares. However, our model is nonlinear and so we must be careful with identification.

In order to correctly estimate our model, let y_1 denote the dependent variable (for example, firm performance), y_2 the endogenous explanatory variable (*Gap* in this case), and X the vector of exogenous variables (size, external governance measures, etc.). The original specification can be written as:

$$y_1 = X'\beta + \alpha_1 y_2 + \alpha_2 y_2^2 + \varepsilon \tag{3}$$

Suppose z_1 is a subvector of instruments, which are not included in the original regressions. The whole set of exogenous variables is: $Z = \{X, z_1\}$. In order to be valid instruments, z_1 satisfy the orthogonality condition:[10]

$$E(\varepsilon | z_1) = 0. \tag{4}$$

[9]The findings are also robust to whether we use total or just cash compensation as the dependent variable in our predicted compensation regression.

[10]This is stronger than the zero covariance condition and needed to identify the non-linear specification above.

We follow the usual first-stage procedure and regress the endogenous variables y_2 and y_2^2 on all of the exogenous variables in the model, Z. The endogenous variables can then be written as:

$$\begin{aligned} y_2 &= E[y_2|Z] + v_1 \\ &= \widehat{y_2} + v_1, \end{aligned} \tag{5}$$

$$\begin{aligned} y_2^2 &= E[y_2^2|Z] + v_2 \\ &= \widehat{y_2^2} + v_2. \end{aligned} \tag{6}$$

Where $\widehat{y_2}$ is the first-stage predicted value of y_2. In the second-stage, we then have:

$$\begin{aligned} E[y_1|Z] &= X'\beta + \alpha_1 E[y_2|Z] + \alpha_2 E[y_2^2|Z] \\ &= X'\beta + \alpha_1 \widehat{y_2} + \alpha_2 \widehat{y_2^2}. \end{aligned} \tag{7}$$

It is worth noting that since we use more than one instruments in z_1, we can ignore the stochastic correlation between y_2 and y_2^2 and treat them as two unrelated variables in the first-stage regressions. The first-stage coefficients on the instruments pick up this correlation, which will then not affect the second-stage estimates $\widehat{\alpha_1}$ and $\widehat{\alpha_2}$.

It is also important to notice that using $(\widehat{y_2})^2$ instead of $\widehat{y_2^2}$ in the second-stage will yield biased estimates. To see this, note that:

$$y_2 = E[y_2|Z] + v_1 \tag{8}$$

$$y_2^2 = (E[y_2|Z])^2 + 2v_1 E[y_2|Z] + v_1^2. \tag{9}$$

Then:

$$\begin{aligned} E[y_2^2|Z] &= (E[y_2|Z])^2 + E[v_1^2|Z] \\ &= (\widehat{y_2})^2 + E[v_1^2|Z]. \end{aligned} \tag{10}$$

Since the last term on the right hand side is generally not equal to 0, $E[y_2^2|Z] \neq (\widehat{y_2})^2$.

A second approach is to use a control function. Endogeneity of y_2 arises if and only if v_1 is correlated with ε. We can write the linear projection of the structural error ε on

reduced-form error v_1, as

$$\varepsilon = \rho v_1 + e. \tag{11}$$

Then under standard assumptions we have:

$$\begin{aligned} E[\varepsilon|Z, y_2] &= E[\varepsilon|Z, v_1] \\ &= E[\varepsilon|v_1] \\ &= \rho v_1. \end{aligned}$$

Therefore,

$$E[y_1|Z, y_2] = X'\beta + \alpha_1 y_2 + \alpha_2 y_2^2 + \rho v_1. \tag{12}$$

We implement the control function approach by regressing y_1 on X, y_2, y_2^2, and the reduced-form residuals $\widehat{v_1}$. Obviously, the control function estimates are not the same as the 2SLS estimates due to the non-linearity of the model. One of the advantage of using the control function is that we can then test the exogeneity of the explanatory variables y_2 and y_2^2 ($H_0 : \rho = 0$). The control function approach, while likely more efficient than the instrumental variables approach, is less robust. Therefore, we report results for both approaches in the next subsection.

4.6 Results from Instrumental Variables and Control Functions

In our analysis, we use four year back lagged *Gap* (*Lag*), the contemporaneous industry median of *Gap* ($IndMedian$), and their squared terms (Lag^2 and $IndMedian^2$) as instruments for *Gap* and Gap^2 (i.e, the z_1 vector in the last section consists of these four variables.) These variables are natural instruments in that by construction they are correlated with the potentially endogenous variables. However, these instruments are unrelated to the original specification based on the Acharya, Myers, and Rajan (2009) model. Thus, they provide reasonable exogenous variation to identify the impact of internal governance on firm performance.

The instrumental variable results are in Table 14. We test these instruments for their relevance, strength, and validity using several standard statistics. For both *Gap* and Gap^2, the coefficients on the instruments in the first-stage are all significant. This show that our instruments are individually relevant. The first-stage F statistics show that the instruments are jointly relevant.

In Panel A, when we instrument for *Gap* and Gap^2, we continue to find a hump-shaped relation between the two measures of investment and *Gap*, although the coefficients in the

R&D specification are not significant. In Panel B, we also continue to find the hump-shaped relation between all three measures of firm performance and *Gap*. The Cragg-Donald Wald F statistic tests for weak identification. The IV estimates are less biased than OLS to the extent that identification is strong. In the limit of weak instruments, there would be no improvement over OLS in terms of bias and the bias would be 100% of OLS. In the other limit, the bias would be zero percent. To see where approximately the estimates are on that spectrum, Stock and Yogo (2005) provide rule of thumb critical values for limiting the bias to a certain percentage for a given number of endogenous variables and instruments. The Cragg-Donald Wald F statistics presented in Table 14 show that our identification is strong as the bias relative to OLS is less than 5%.

To test the validity of instruments, we use the Hansen-Sargan J-statistics. In all performance regressions, results from this over-identification test are unable to reject the null hypothesis (p-values above 0.20) that the instruments are valid and orthogonal to the residuals of the main equation. In the investment regressions, for capital expenditures we find a p-value of 0.08, suggesting some concern with the validity of the instruments for this one specification. Taken together, the above tests show that we have relevant, strong, and valid instruments.

In Table 15, we use the control function approach. We again find a hump-shaped relation between the two measures of investment and *Gap*, although the coefficients in the R&D specification are not significant. For firm performance, we also continue to find the hump-shaped relation between all three measures of firm performance and *Gap*. At the same time, the estimated coefficients on the reduced-form residuals Res_{FS} are insignificant in all specifications in the control function approach.[11] Thus we cannot reject the null hypothesis that *Gap* and Gap^2 are jointly exogenous to investment and to firm performance. Therefore, the endogeneity of the main variables in our analysis does not seem to be a major concern.

Finally, to relax the restriction of linearity between reduced-form and structural errors, we add both first-stage residuals and their square terms as additional controls. The estimated coefficients and the F-statistics that test the joint significance of these residual variables also show that there is no consistent evidence that the gap measures are endogenous.

4.7 System of Equations - SUR and SEM

As is well-known, investment and firm performance are likely to be jointly determined or driven by multiple common factors. Our results suggest that internal governance is one of such common factors. We capture this observable common factor by measuring it (non-linearly) with the relative contribution measure *Gap*. However, there could be other un-

[11] Since H_0 is not rejected, the robust standard errors reported in Table [13] are valid.

observable common factors that are not captured by our *Gap* measure, yet also drive the performance and investment equations simultaneously. One example from the Acharya, Myers, and Rajan (2009) model is business conditions. To check this, we calculate the correlation between the residuals from the performance and investment equations. We find that there is a statistically significant correlation (0.22) between the errors in the two equations. This suggests that performance and investment may have similar underlying determinants (governance, business conditions, etc.).

One way to deal with this issue is to use a system of equations. In the Acharya, Myers, and Rajan (2009) model, investment is the channel through which internal governance impacts firm performance. Therefore, for each of the endogenous regressors ($performance$, *investment*, *Gap*, Gap^2), we specify a set of structural equations:

$$Performance_i = \beta_1 Investment_i + Controls_i + \varepsilon_{i1} \tag{13}$$

$$Investment_i = \beta_2 Gap_i + \gamma_2 Gap_i^2 + Controls_i + \varepsilon_{i2} \tag{14}$$

$$Gap_i = \beta_3 Lag_i + \gamma_3 Lag_i^2 + \lambda_3 IndMedian_i + \phi_3 IndMedian_i^2 + \varepsilon_{i3} \tag{15}$$

$$Gap_i^2 = \beta_4 Lag_i + \gamma_4 Lag_i^2 + \lambda_4 IndMedian_i + \phi_4 IndMedian_i^2 + \varepsilon_{i4} \tag{16}$$

More efficient estimation is possible by exploiting cross-equation correlation of errors. By providing IVs for *Gap* and Gap^2 (as well as excluding them from the performance regressions), we ensure that the performance and investment equations are over-identified so that we can use 3SLS (Zellner and Theil (1962)).

The idea is to first carry out 2SLS and get $\hat{X}$, and then regress y on $\hat{X}$ and form:

$$\hat{\theta}_{3SLS} = [\hat{X}'(\hat{\Omega}^{-1} \otimes I_N)\hat{X}]^{-1}\hat{X}'(\hat{\Omega}^{-1} \otimes I_N)y$$

where $\hat{\Omega} = N^{-1}\Sigma_i \hat{u}_i \hat{u}_i{}'$ with $\hat{u}_i$ being the residual vectors calculated using the 2SLS estimates.

3SLS assumes homoscedasticity. We bootstrap to mitigate the heteroscedasticity problem. It resamples over firms and provides standard errors that are valid under the weaker assumption

$$E(\varepsilon_{ij}\varepsilon_{ij'}|X) = \sigma_{i,jj'}$$

while maintaining the assumption of independence over firms.

Table 16 reports the estimation results for the equations in the system.[12] Estimates for the first equation show that there is indeed a positive relation between all three measures of firm performance and investment. Estimates for the second equation confirm the prediction of a U-shaped relation between investment (capital expenditures) and compensation gaps. The third and fourth equations in the system use lagged gap and industry median gap and their squared terms to provide exogenous variation for Gap and Gap^2. These results are consistent with the prediction that internal governance channels through investment to improve firm performance.

5 Conclusion

We examine the impact of stakeholders' different horizons on investment and firm performance. Stakeholders, such as firms' critical employees, can be a strong force of governance when these employees or managers care about their own future and interact with the CEO on a daily basis. These employees and managers, due to their power to withdraw their contributions to the firm, can force a self-interested myopic CEO to act in a far-sighted way.

We empirically examine the effect of this internal governance. We find that there is a hump-shaped relation between internal governance and corporate investment. At low levels of relative contribution, when the CEO is paid relatively less well than managers, managers have little incentive to learn or exert effort and the CEO has little incentive to invest for the long-run. At very high levels of relative contribution, when the CEO is paid quite highly relative to the managers and the CEO is therefore dominant, the CEO again has little incentive to invest for the long-run. Intermediate levels of relative contribution maximize long-term investment incentives, and this is what we find empirically.

Further, we find a similar hump-shaped relation between relative contribution and industry-adjusted operating performance, measured as Tobin's Q, return on assets, and free cash flow. The hump-shaped relation is driven by firms in the tails of the distribution of internal governance, suggesting that these firms are engaging in disequilibrium behavior. In addition, we find that internal governance is more effective when managers are younger, CEOs are closer

[12] The R^2 are suppressed because they have no statistical meaning in this context - the model's residuals $(Y - X\hat{\beta})$ are computed over a set of regressors (X) different from those used to fit the model (the instrumented $\hat{X}$ from the first-stage regression). At the extreme, one can easily develop simulations where the parameter estimates from 2SLS or 3SLS are quite good while the residual sum of squares (RSS) is larger than the total sum of squares (TSS). Therefore, (finite-sample) R^2 calculated as $\frac{TSS-MSS}{TSS}$ is not related to the asymptotic feature of the 3SLS estimates. On the other hand, by fitting the three-stage model, we are interested in the parameters of the structural equation (e.g., Cash flow - Investment sensitivity), not the strict projection of the dependent variable.

to retirement, and when there is a larger difference in the relative ages of the CEO and the managers. We also find that internal governance is more effective when firm-specific skills or effort are more important for managers and when managers are more likely to become the CEO eventually.

Collectively, these results provide strong support for the power of internal governance. Especially as there is no current consensus as to the efficacy of board governance, our results on both internal and external governance suggest that alternative governance mechanisms may be as or more important than the more heavily studied traditional board governance mechanisms.

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Table 1: Summary Statistics

Gap_{raw} (in million Dollars) measures the difference between CEO's and manager's abnormal compensation. *Gap* is the transformed measure of compensation gap (in logarithm, see the section of "data and sample construction" for more details). Financial variables are annual and in billion Dollars. Size is measured by logarithm of total asset, and Delta is measured by the volatility (std. dev.) in excess compensations of non-CEO executives of a firm. RD and CapEx are scaled by begin-of-period PPE. Transient, Dedicated, Indexer measure the percentage of the three different types of institutional investors, respectively, out of total shares outstanding. Dir_{sum} measures the number of directors on the board (in logarithm). $Outdir_{pcnt}$ measures the percentage of outside directors.

Variable	Obs	Mean	Std. Dev.	Min	Max
Gap_{raw}	27,595	0.16	8.93	-138.94	644.08
Gap	27,594	4.93	0.05	3.94	6.66
Transient	20,134	0.17	0.13	0.00	0.96
Indexer	20,166	0.33	0.16	0.00	0.98
Dedicated	17,259	0.11	0.10	0.00	0.92
Institutional	17,246	0.60	0.19	0.05	1.00
Size	27,786	7.33	1.81	-6.21	14.60
RD	13,664	0.33	1.64	0.00	137.71
CapEx	23,992	0.18	0.93	-0.13	135.47
Q	26,740	0.48	2.33	-6.04	25.34
ROA	26,740	0.04	0.12	-0.72	0.60
CF	26,740	0.02	0.18	-0.64	0.86
Median Age	23,838	50.9	6.7	25.0	93.0
Age Gap	23,705	1.1	0.2	0.5	2.1
Dir_{sum}	15,224	2.22	0.29	1.10	3.66
$Outdir_{pcnt}$	15,193	0.66	0.17	0.08	1.00

Table 2: Correlation Table

This table presents correlations of the pay gap measure in Kale et al. (2009), the centrality measure in Bebchuck et al. (2007), Gini index, the *Gap* measure used in this paper, and various financial measures of the firm. The significance measures and number of observations are also listed.

	PayDiff	Gini	CPS	Gap	Size	RD	CapEx	Q	ROA
PayDiff	1								
	22,162								
Gini	0.20	1							
	0.00								
	22,161	27,791							
CPS	0.25	0.52	1						
	0.00	0.00							
	19,618	24,165	24,165						
Gap	0.58	0.28	0.33	1					
	0.00	0.00	0.00						
	21,985	27,553	24,019	27,553					
Size	0.13	0.11	0.12	0.02	1				
	0.00	0.00	0.00	0.01					
	22,156	27,785	24,160	27,553	27,786				
RD	0.01	0.00	-0.04	0.01	-0.14	1			
	0.38	0.58	0.00	0.13	0.00				
	10,982	13,664	11,903	13,575	13,664	13,664			
CapEx	0.01	0.01	-0.02	0.01	-0.07	0.75	1		
	0.48	0.24	0.00	0.05	0.00	0.00			
	19,200	23,992	20,828	23,795	23,992	13,521	23,992		
Q	0.02	0.03	-0.04	0.06	-0.21	0.17	0.13	1	
	0.01	0.00	0.00	0.00	0.00	0.00	0.00		
	19,220	24,134	20,897	24,095	24,135	12,346	22,072	24,135	
ROA	0.00	-0.02	0.03	-0.01	0.06	-0.06	0.01	-0.18	1
	0.90	0.01	0.00	0.24	0.00	0.00	0.02	0.00	
	22,145	27,774	24,153	27,546	27,775	13,662	23,985	24,128	27,775

Table 3: Level of Long-term Investment

Size is measured by logarithm of total asset, and Delta is measured by the volatility (std. dev.) in excess compensations of non-CEO executives of a firm. RD and CapEx are one period forward than the governance measures (i.e., *Gap*, Gap^2, Institutional) and scaled by beginning of period PPE. Year dummies and firm fixed effects are included. All Standard errors are clustered by firms. +, *, and ** denote significance levels at 10%, 5%, and 1%, respectively.

	RD	CapEx
Gap	4.783+	3.352*
	(2.78)	(1.41)
Gap^2	-0.443+	-0.302*
	(0.27)	(0.14)
Size	-0.069+	-0.096**
	(0.04)	(0.02)
Delta	-0.002	0
	(0.00)	(0.00)
Institutional	0.154	0.093**
	(0.10)	(0.02)
Adjusted- R^2	0.67	0.45
Obs	8,917	15,247

Table 4: Firm Performance

Performance measures are annually and industry-adjusted. One-year performance measures are one period forward than the governance measures (i.e., *Gap*, Gap^2, Institutional). Three year performance measures are 3-year (t to t+3) averages, industry-adjusted, and scaled by the beginning-of-period (t) assets. Year dummies and firm fixed effects are included. All Standard errors are clustered by firms. +, *, and ** denote significance levels at 10%, 5%, and 1%, respectively.

Panel A			
	Q(1yr)	ROA(1yr)	CF(1yr)
Gap	27.877*	1.779**	1.351**
	(11.33)	(0.48)	(0.36)
Gap^2	-2.635*	-0.160**	-0.126**
	(1.07)	(0.05)	(0.03)
Size	-1.544**	-0.039**	-0.030**
	(0.09)	(0.00)	(0.01)
Delta	0.036**	0	0.002*
	(0.01)	(0.00)	(0.00)
Institutional	0.916**	0.053**	0.019
	(0.26)	(0.01)	(0.01)
Adjusted- R^2	0.584	0.613	0.715
Obs	17,087	17,087	17,087
Panel B			
	Q(3yr)	ROA(3yr)	CF(3yr)
Gap	19.51*	1.196**	0.903**
	(9.96)	(0.32)	(0.30)
Gap^2	-1.913*	-0.109**	-0.085**
	(0.97)	(0.03)	(0.03)
Size	-1.32**	-0.036**	-0.027**
	(0.08)	0.00	0.00
Delta	0.019*	0	0.001*
	(0.01)	0.00	0.00
Institutional	0.493*	0.012	0.01
	(0.20)	(0.01)	(0.01)
Adjusted- R^2	0.723	0.739	0.787
Obs	17,087	17,087	17,087

Table 5: Subsample Analysis

This table presents results for the subsample of observations with *Gap* in the middle two quartiles ("peak" firms) and for the subsample of observations with *Gap* in the top and bottom two quartiles ("off peak" firms). Panel A reports results with long-term investments as independent variables. Panels B reports results with one year performance performance as independent variables. Year dummies and firm fixed effects are included. All Standard errors are clustered by firms. +, *, and ** denote significance levels at 10%, 5%, and 1%, respectively.

Panel A				
	Gap [0,0.25] & [0.75,1]		Gap (0.25,0.75)	
	CapEx	RD	CapEx	RD
Gap	0.367+	4.501**	-450.252	-482.28
	(0.22)	(1.35)	(338.04)	(383.49)
Gap^2	-0.032+	-0.413**	45.76	49.113
	(0.02)	(0.12)	(34.25)	(38.86)
Size	0.018*	0.183**	-0.069**	0.086**
	(0.01)	(0.02)	(0.01)	(0.01)
Delta	0.001	0.007*	0.002	0.005
	(0.00)	(0.00)	(0.00)	(0.00)
Institutional	0.026	0.442**	0.097**	0.121**
	(0.02)	(0.06)	(0.02)	(0.02)
Adjusted- R^2	0.767	0.83	0.639	0.805
Obs	7,623	4,458	7,623	4,458

Panel B						
	Gap [0,0.25] & [0.75,1]			Gap (0.25, 0.75)		
	Q	ROA	CF	Q	ROA	CF
Gap	28.718*	1.578**	1.115**	-11170	-242.563	-600.922
	(11.90)	(0.47)	(0.33)	(7088.32)	(317.71)	(450.00)
Gap^2	-2.735*	-0.142**	-0.105**	1134.615	24.724	61.02
	(1.15)	(0.05)	(0.03)	(718.98)	(32.23)	(45.64)
Size	-1.794**	-0.043**	-0.036**	-1.450**	-0.033**	-0.013*
	(0.11)	(0.00)	(0.00)	(0.14)	(0.00)	(0.01)
Delta	0.028+	0	0.001+	0.069	0.001	0.003+
	(0.01)	(0.00)	(0.00)	(0.04)	(0.00)	(0.00)
Institutional	0.970**	0.048**	0.017	1.000**	0.050**	0
	(0.30)	(0.01)	(0.01)	(0.32)	(0.02)	(0.02)
Adjusted- R^2	0.656	0.669	0.752	0.595	0.664	0.746
Obs	8,542	8,542	8,542	8,542	8,542	8,542

Table 6: Manager Age

This table reports results for the subsamples based on the age distribution of the executive team. "Low/High Median" indicates whether the median age of the non-CEO executive team for the firm-year observation is under or above the sample median. The performance measures are one year forward of governance measures and scaled by the beginning of period assets. Year Dummies and Firm fixed effects are included. All Standard errors are clustered by firms. +, *, and ** denote significance levels at 10%, 5%, and 1%, respectively.

Panel A				
	RD[Low Median]	RD[High Median]	CapEx[Low Median]	CapEx[High Median]
Gap	13.873*	5.421	7.277**	2.648+
	(5.89)	(4.45)	(2.38)	(1.61)
Gap^2	-1.327*	-0.49	-0.695**	-0.232
	(0.57)	(0.41)	(0.23)	(0.15)
Size	-0.142*	-0.08	-0.063**	-0.129**
	(0.07)	(0.07)	(0.01)	(0.04)
Delta	0.003	-0.009	0.002	0
	(0.00)	(0.01)	(0.00)	(0.00)
Institutional	0.064	0.228	0.054**	0.123**
	(0.13)	(0.18)	(0.02)	(0.04)
Adjusted- R^2	0.71	0.666	0.476	0.474
Obs	5,132	5,380	8,760	9,119

Panel B						
	Low Median Age			High Median Age		
	Q	ROA	CF	Q	ROA	CF
Gap	77.544***	5.438*	1.440+	28.95	1.669*	4.447+
	(16.95)	(2.06)	(0.75)	(21.29)	(0.84)	(2.32)
Gap^2	-7.470***	-0.224*	-0.060*	-2.689	-0.066	-0.183
	(1.65)	(0.09)	(0.03)	(1.94)	(0.04)	(0.14)
Size	-1.402***	-0.035*	-0.040*	-2.073***	-0.048*	-0.032*
	(0.10)	(0.01)	(0.00)	(0.15)	(0.01)	(0.01)
Delta	0.048***	0	0.000+	0.013	0	0
	(0.01)	(0.00)	(0.00)	(0.03)	(0.00)	(0.00)
Institutional	0.909***	0	0.000*	1.322**	0.001*	0
	(0.23)	(0.00)	(0.00)	(0.40)	(0.00)	(0.00)
Adjusted-R^2	0.61	0.701	0.762	0.594	0.668	0.777
Obs	7,598	7,598	7,598	7,077	7,077	7,077

Table 7: CEO Age near Retirement

This table reports results for the subsamples when CEO's age is close to retirement vs. when the CEO is young. The performance measures are one year forward of governance measures and scaled by the beginning of period assets. Year Dummies and Firm fixed effects are included. All Standard errors are clustered by firms. +, *, and ** denote significance levels at 10%, 5%, and 1%, respectively.

	Panel A			
	CEO Age >= 60		CEO Age <= 50	
	CapEx	RD	CapEx	RD
Gap	5.045**	16.552	3.053	0.032
	(1.17)	(12.03)	(1.98)	(2.18)
Gap^2	-0.482**	-1.631	-0.254	-0.017
	(0.11)	(1.18)	(0.19)	(0.20)
Size	-0.045**	-0.337	-0.180**	0.265
	(0.01)	(0.26)	(0.06)	(0.18)
Delta	0.003*	0.023	-0.002	-0.003
	0.00	(0.02)	(0.01)	(0.01)
Institutional	0.05	-0.113	0.182**	0.408
	(0.05)	(0.36)	(0.05)	(0.35)
Adjusted-R^2	0.54	0.3	0.47	0.28
Obs	5,325	3,094	4,469	2,848

	Panel B					
	CEO Age >= 60			CEO Age <= 50		
	Q	ROA	CF	Q	ROA	CF
Gap	69.412**	2.996*	2.209*	29.113	0.505+	1.578
	(21.27)	(0.93)	(1.12)	(21.20)	(0.30)	(1.12)
Gap^2	-6.515**	-0.277*	-0.205*	-2.668	-0.047+	-0.149
	(2.01)	(0.09)	(0.10)	(1.97)	(0.03)	(0.11)
Size	-1.376**	-0.048*	-0.034*	-2.723**	-0.018*	-0.026*
	(0.18)	(0.01)	(0.01)	(0.30)	(0.01)	(0.01)
Delta	0.01	0	0.001	0.035	0	0.001
	(0.02)	(0.00)	(0.00)	(0.04)	(0.00)	(0.00)
Institutional	0.866+	0.056*	0.035	1.386*	-0.009	0.006
	(0.45)	(0.02)	(0.03)	(0.60)	(0.01)	(0.02)
Adjusted-R^2	0.67	0.64	0.84	0.61	0.6	0.76
Obs	5,975	5,975	5,975	4,843	4,843	4,843

Table 8: CEO-Manager Age Difference

This table reports results for the subsamples based on the age distribution of the executive team. "Low/High Diff" indicates whether the difference between the CEO's age and the median age of the non-CEO executive team for the firm-year observation is under or above the sample median. The performance measures are one year forward of governance measures and scaled by the beginning of period assets. Year Dummies and Firm fixed effects are included. All Standard errors are clustered by firms. +, *, and ** denote significance levels at 10%, 5%, and 1%, respectively.

Panel A				
	RD[High Diff]	RD[Low Diff]	CapEx[High Diff]	CapEx[Low Diff]
Gap	10.257*	4.292	8.962**	1.802
	(4.80)	(3.79)	(2.90)	(1.18)
Gap^2	-1.020*	-0.373	-0.868**	-0.146
	(0.48)	(0.34)	(0.28)	(0.11)
Size	-0.135*	-0.103*	-0.103**	-0.108**
	(0.06)	(0.05)	(0.03)	(0.03)
Delta	-0.002	-0.003	0	-0.001
	(0.00)	(0.01)	(0.00)	(0.00)
Institutional	0.079	0.029	0.084**	0.112**
	(0.13)	(0.14)	(0.03)	(0.03)
Adjusted- R^2	0.654	0.787	0.426	0.542
Obs	5,206	5,306	9,011	8,868

Panel B						
	High Age Difference			Low Age Difference		
	Q	ROA	CF	Q	ROA	CF
Gap	67.276**	1.779*	1.507*	19.398	2.172	1.812
	(22.45)	(0.77)	(0.73)	(16.63)	(1.45)	(1.60)
Gap^2	-6.369**	-0.070*	-0.061*	-1.868	-0.088	-0.076
	(2.20)	(0.03)	(0.03)	(1.52)	(0.06)	(0.07)
Size	-1.581***	-0.034*	-0.023*	-1.867***	-0.054*	-0.046*
	(0.10)	(0.00)	(0.00)	(0.16)	(0.00)	(0.01)
Delta	-0.023	0	0.000*	0.054*	0	0
	(0.02)	(0.00)	(0.00)	(0.02)	(0.00)	(0.00)
Institutional	0.706*	0.000*	0	1.239***	0.001*	0.001*
	(0.28)	(0.00)	(0.00)	(0.37)	(0.00)	(0.00)
Adjusted-R^2	0.629	0.698	0.763	0.583	0.71	0.796
Obs	7,330	7,330	7,330	7,336	7,336	7,336

Table 9: Heterogeneous vs. Homogeneous Industries

This table reports results for the subsamples based on the heterogeneity of the industries. Columns with [Homog] are results for the subsample with homogenous industries. Columns with [Heterog] are results for the subsample with Heterogenous industries. Year Dummies and Firm fixed effects are included. All Standard errors are clustered by firms. +, *, and ** denote significance levels at 10%, 5%, and 1%, respectively.

Panel A				
	RD[Homog]	RD[Heterog]	CapEx[Homog]	CapEx[Heterog]
Gap	-1.878	7.592*	1.49	2.124*
	(1.73)	(2.99)	(1.21)	(0.97)
Gap^2	0.18	-0.664**	-0.132	-0.175*
	(0.17)	(0.25)	(0.11)	(0.09)
Size	0	-0.122**	-0.014	-0.085**
	(0.01)	(0.04)	(0.01)	(0.01)
Delta	0	0.006	0.001	0.001
	(0.00)	(0.01)	(0.00)	(0.00)
Institutional	0.033	0.264*	0.109**	0.152**
	(0.03)	(0.10)	(0.04)	(0.03)
Adjusted-R^2	0.63	0.67	0.39	0.46
Obs	1,723	2,232	3,242	3,225

Panel B						
	Homogenous Industries			Heterogenous Industries		
	Q	ROA	CF	Q	ROA	CF
Gap	12.552	0.906	1.116	22.181**	0.894**	0.755**
	(10.56)	(0.61)	(0.87)	(7.00)	(0.30)	(0.27)
Gap^2	-1.234	-0.083	-0.104	-2.096**	-0.079**	-0.069**
	(0.97)	(0.06)	(0.08)	(0.66)	(0.03)	(0.02)
Size	-1.572**	-0.022**	-0.026**	-0.528**	-0.049**	-0.063**
	(0.14)	(0.00)	(0.01)	(0.06)	(0.00)	(0.00)
Delta	0.011	0	0	0.014+	0	0.001
	(0.01)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
Institutional	1.007*	0.003	-0.004	0.219	0.028**	0.049**
	(0.39)	(0.01)	(0.02)	(0.21)	(0.01)	(0.01)
Adjusted-R^2	0.71	0.68	0.74	0.75	0.71	0.84
Obs	3,242	3,242	3,242	3,225	3,225	3,225

Table 10: Manager-Firm Specific Skills vs. General Skills

This table reports results for the subsamples based on the dominance of manager-firm specific vs. general skills. Year Dummies and Firm fixed effects are included. All Standard errors are clustered by firms. +, *, and ** denote significance levels at 10%, 5%, and 1%, respectively.

Panel A				
	High Firm-specific		Low Firm-specific	
	Capx	RD	Capx	RD
Gap	4.882**	14.888*	0.267	-3.404
	(1.33)	(6.78)	(0.44)	(3.31)
Gap^2	-0.481**	-1.482*	-0.013	0.301
	(0.13)	(0.63)	(0.04)	(0.28)
Size	-0.105**	0.075	-0.058*	-0.107
	(0.04)	(0.23)	(0.03)	(0.08)
Delta	0.003	0.012	0.001	0.001
	(0.00)	(0.01)	(0.00)	(0.00)
Institutional	0.237**	-0.139	0.002	-0.137
	(0.06)	(0.36)	(0.06)	(0.31)
Adjusted-R^2	0.79	0.73	0.6	0.68
Obs	3,780	2,139	4,034	2,414

Panel B						
	High Firm-specific			Low Firm-specific		
	Q	ROA	CF	Q	ROA	CF
Gap	59.066+	1.560*	2.544**	10.111	0.704+	0.561
	(30.95)	(0.66)	(0.91)	(9.62)	(0.41)	(0.38)
Gap^2	-5.842*	-0.139*	-0.242**	-0.949	-0.059	-0.052
	(2.96)	(0.06)	(0.09)	(0.85)	(0.04)	(0.03)
Size	-2.276**	-0.039**	-0.030*	-1.008**	-0.034**	-0.030**
	(0.32)	(0.01)	(0.01)	(0.18)	(0.01)	(0.01)
Delta	0.067	0	0.004*	0.016	0	0
	(0.05)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
Institutional	1.548*	0.067+	0.039	0.549	0.044+	-0.036
	(0.72)	(0.04)	(0.03)	(0.46)	(0.02)	(0.03)
Adjusted-R^2	0.7	0.71	0.75	0.62	0.7	0.73
Obs	3,950	3,950	3,950	4,898	4,898	4,898

Table 11: Internal Succession

This table reports results for the subsamples based on the dominance of internal vs. external succession in the industry. Year Dummies and Firm fixed effects are included. All Standard errors are clustered by firms. +, *, and ** denote significance levels at 10%, 5%, and 1%, respectively.

Panel A				
	RD[Ext.]	RD[Int.]	CapEx[Ext.]	CapEx[Int.]
Gap	-40.957	14.984*	11.49	2.697*
	(49.52)	(7.26)	(15.72)	(1.28)
Gap^2	4.158	-1.294*	-1.09	-0.227*
	(5.01)	(0.63)	(1.59)	(0.11)
Size	0	0.157	-0.031**	-0.027+
	(0.01)	(0.15)	(0.01)	(0.01)
Delta	0	0.009	0.002	-0.002
	(0.00)	(0.01)	(0.00)	(0.00)
Institutional	0.016	0.865	-0.004	0.145**
	(0.02)	(0.66)	(0.03)	(0.04)
Adjusted-R^2	0.63	0.67	0.39	0.46
Obs	1,230	1,672	3,156	3,424

Panel B						
	External			Internal		
	Q	ROA	CF	Q	ROA	CF
Gap	6.657	0.221	0.272	239.198*	9.883**	13.481*
	(8.04)	(0.29)	(0.37)	(93.38)	(3.14)	(5.52)
Gap^2	-0.696	-0.02	-0.028	-23.687*	-0.969**	-1.339*
	(0.71)	(0.03)	(0.03)	(9.36)	(0.31)	(0.55)
Size	-1.616**	-0.010*	-0.007	-0.498**	-0.036**	-0.020*
	(0.11)	(0.01)	(0.01)	(0.06)	(0.01)	(0.01)
Delta	0.012	0	0.001	0.009	0	-0.001
	(0.01)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
Institutional	1.440**	0.061**	0.076**	0.625**	0.035**	0.003
	(0.35)	(0.02)	(0.02)	(0.14)	(0.01)	(0.02)
Adjusted-R^2	0.7	0.59	0.61	0.74	0.78	0.78
Obs	3,156	3,156	3,156	3,424	3,424	3,424

Table 12: Robustness Check 1

The following tables report results when board characteristics are added in the investment and (short-term) performance regressions. Year and firm effects are included. All Standard errors are clustered by firms. +, *, and ** denote significance levels at 10%, 5%, and 1%, respectively.

Panel A		
	RD	CapEx
Gap	3.209+	3.816*
	(1.84)	(1.85)
Gap^2	-0.281+	-0.326+
	(0.17)	(0.17)
Size	-0.001	0.189**
	(0.04)	(0.02)
Delta	0	0.001
	(0.00)	(0.00)
Institutional	0.212	0.208**
	(0.15)	(0.04)
Dir_{sum}	0.068	-0.047
	(0.10)	(0.03)
$Outdir_{pcnt}$	0.019	-0.035
	(0.03)	(0.04)
Adjusted- R^2	0.723	0.912
Obs	6,554	11,834

Panel B			
	Q	ROA	CF
Gap	21.445*	1.448**	0.887**
	(9.94)	(0.43)	(0.32)
Gap^2	-2.043*	-0.130**	-0.084**
	(0.94)	(0.04)	(0.03)
Size	-1.572**	-0.042**	-0.027**
	(0.14)	(0.01)	(0.01)
Delta	0.031*	0	0.001+
	(0.01)	(0.00)	(0.00)
Institutional	1.708**	0.058**	0.012
	(0.33)	(0.02)	(0.02)
Dir_{sum}	-0.340*	-0.016+	-0.045**
	(0.16)	(0.01)	(0.02)
$Outdir_{pcnt}$	-0.188	-0.006	-0.046**
	(0.22)	(0.01)	(0.02)
Adjusted- R^2	0.607	0.677	0.729
Obs	12,397	12,397	12,397

Table 13: Robustness Checks 2

This Table reports results using excess compensation measures Res_{CEO} and Res_{non}, as well as the raw (unlogged) relative contribution measure Gap_{raw}. The performance measures are one year forward of governance measures and scaled by the beginning of period assets. Year dummies and firm effects are included. All Standard errors are clustered by firms. +, *, and ** denote significance levels at 10%, 5%, and 1%, respectively.

Panel A					
	RD	CapEx	Q	ROA	CF
Gap_{raw}	0.003**	0.002**	0.010+	0.001**	4.86E-04**
	(9.09E-04)	(5.76E-04)	(0.01)	(2.28E-04)	(1.99E-04)
Gap^2_{raw}	-6.14E-06**	-2.87E-06*	-2.8E-05+	-2.01E-06**	-1.33E-06*
	(1.83E-06)	(1.37E-06)	(1.65E-05)	(5.78E-07)	(5.03E-07)
Size	0.128**	-0.096**	-1.644**	-0.038**	-0.026**
	(0.01)	(0.02)	(0.10)	(0.00)	(0.00)
Delta	0.005*	-0.001	0.022	0	0.001*
	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
Institutional	0.275**	0.092**	1.069**	0.056**	0.012
	(0.03)	(0.02)	(0.25)	(0.01)	(0.01)
Adjusted- R^2	0.824	0.449	0.561	0.615	0.715
Obs	8,917	15,247	17,087	17,087	17,087

Panel B					
	RD	CapEx	Q	ROA	CF

Table 14: IV

The following tables report the results from both the first- and second-stage using the 2SLS approach. Both the (short-term) performance measures and investment measures are one year forward of the governance measures and scaled by the beginning-of-period assets/capital stock, respectively. Year and firm effects are included. All Standard errors are clustered by firms. +, *, and ** denote significance levels at 10%, 5%, and 1%, respectively.

Panel A				
	First-stage		**Second-stage**	
Dependent Variable	*Gap*	*Gap*^{2}	RD	CapEx
Endogenous Variables				
Gap			500.608	17.274**
			(339.55)	(4.71)
Gap^2			-47.747	-1.601**
			(30.95)	(0.44)
Control Variables				
Size	1.90E-04	1.50E-03	-1.726	-0.014+
	(2.21E-03)	(0.02)	(1.64)	(0.01)
Delta	5.27E-03*	0.056**	0.134	0.001
	(1.95E-03)	(0.02)	(0.16)	(0.00)
Institutional	-0.013+	-0.14+	-2.688	0.101**
	(0.01)	(0.08)	(3.46)	(0.01)
Instrument Variables				
Lag	0.95**	10.70**		
	(0.33)	(3.43)		
IndMedian	-315.42+	-3138.93+		
	(160.33)	(1730.35)		
Lag^2	-0.11**	-1.19**		
	(0.03)	(0.33)		
IndMedian^2	32.12*	319.67+		
	(16.26)	(175.49)		
Year Dummies and Firm F.E.	x	x	x	x
Obs	9,707	9,707	5,126	9,707
Tests of Endogeneity, Relevance, and Validity of Instruments				
First-stage F-statistic	16.28**	16.66**		
Cragg-Donald Wald F statistic			11.65	21.316
Hansen J-statistic (p-value)			0.92(0.63)	5.19(0.08)

Panel B					
	First-stage		**Second-stage**		
Dependent Variable	*Gap*	*Gap*^{2}	Q	ROA	CF
Endogenous Variables					
Gap			295.317**	9.498*	8.531*
			(87.10)	(4.75)	(3.65)
Gap^2			-27.405**	-0.896*	-0.811*
			(8.39)	(0.45)	(0.34)
Control Variables					
Size	1.90E-04	1.50E-03	-1.346**	-0.042**	-0.050**
	(2.21E-03)	(0.02)	(0.11)	(0.00)	(0.01)
Delta	5.27E-03*	0.056**	0.005	0.001	0.002
	(1.95E-03)	(0.02)	(0.06)	(0.00)	(0.00)
Institutional	-0.013+	-0.14+			

Table 15: Control Function

This table reports the results using control function approach. Res_{FS1} are the first-stage residuals in 2SLS. The performance measures are one year forward of governance measures and scaled by the beginning of period assets. Year dummies and firm fixed effects are included. All Standard errors are clustered by firms. +, *, and ** denote significance levels at 10%, 5%, and 1%, respectively.

	RD	CapEx	Q	ROA	CF
Gap	2.682	7.326*	17.236+	1.139**	1.433**
	(2.07)	(2.94)	(9.58)	(0.44)	(0.51)
Gap^2	-0.26	-0.637*	-1.084*	-0.101**	-0.136**
	(0.18)	(0.27)	(0.53)	(0.04)	(0.04)
Res_{FS}	0.353	-0.13	-6.382	-0.019	0.029
	(0.48)	(0.78)	(6.52)	(0.13)	(0.17)
Size	0.081	0.196**	-1.194**	-0.042**	-0.050**
	(0.06)	(0.03)	(0.12)	(0.01)	(0.01)
Delta	0.002	-0.002	-0.017	0	0.002
	(0.00)	(0.01)	(0.04)	(0.00)	(0.00)
Institutional	0.175	-0.221**	0.960**	0.043**	0.049**
	(0.13)	(0.08)	(0.27)	(0.02)	(0.02)
Adjusted- R^2	0.687	0.906	0.739	0.692	0.772
Obs	5,126	9,707	9,707	9,707	9,707

Table 16: System of Equation

This table reports the results using SEM. Year dummies and industry fixed effects are included. All Standard errors are clustered by firms. +, *, and ** denote significance levels at 10%, 5%, and 1%, respectively.

	Panel A		
	Q	ROA	CF
CapEx	11.300**	0.373**	0.222*
	(1.83)	(0.10)	(0.09)
Size	0.643**	0.033**	0.023**
	(0.14)	(0.01)	(0.01)
Delta	-0.133*	-0.006**	-0.003
	(0.06)	(0.00)	(0.00)
Institutional	2.711**	0.165**	0.117**
	(0.61)	(0.03)	(0.02)
Obs.	17,087	17,087	17,087
	Panel B		
	CapEx		
Gap	2.761*	770.186+	982.222*
	(1.33)	(396.25)	(397.67)
Gap^2	-0.517+	-76.850+	-97.545*
	(0.27)	(39.39)	(39.53)
Size	-0.073**	-0.067**	-0.062**
	(0.01)	(0.02)	(0.02)
Delta	0.038*	0.239*	0.263*
	(0.02)	(0.10)	(0.10)
Institutional	0.227*	0.572**	0.650**
	(0.11)	(0.21)	(0.21)
Obs.	11,366	11,366	11,366

	Panel C		
	Gap		
Lag	1.494**	1.555**	1.554**
	(0.15)	(0.15)	(0.15)
Lag^2	-0.135**	-0.141**	-0.141**
	(0.01)	(0.01)	(0.01)
IndMedian	-0.837**	-0.823**	-0.822**
	(0.21)	(0.21)	(0.21)
$IndMedian^2$	0.205**	0.195**	0.195**
	(0.03)	(0.03)	(0.03)
Size	-0.001*	-0.001*	-0.001*
	(0.00)	(0.00)	(0.00)
Delta	0.007**	0.007**	0.007**
	(0.00)	(0.00)	(0.00)
Institutional	-0.004+	-0.004+	-0.004+
	(0.00)	(0.00)	(0.00)
Obs.	11,366	11,366	11,366
	Panel D		
	Gap^2		
Lag	14.944**	15.616**	15.606**
	(1.55)	(1.58)	(1.58)
Lag^2	-1.349**	-1.417**	-1.414**
	(0.15)	(0.15)	(0.15)
IndMedian	dropped	dropped	dropped
$IndMedian^2$	1.219**	1.134**	1.133**
	(0.13)	(0.15)	(0.15)
Size	-0.007*	-0.007*	-0.007*
	(0.00)	(0.00)	(0.00)
Delta	0.075**	0.075**	0.075**
	(0.00)	(0.00)	(0.00)
Institutional	-0.044+	-0.044+	-0.044+
	(0.02)	(0.02)	(0.02)
Obs.	11,366	11,366	11,366