

CEO Investment Cycles

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Abstract

This paper documents the existence of a *CEO Investment Cycle*, in which disinvestment decreases over CEO tenure while investment increases, leading to “cyclical” firm growth in assets as well as in employment. The CEO investment cycle is present for both firings and non-performance related CEO turnovers. Its magnitude is substantial: the estimated difference in investment rate between the first three years of a CEO’s tenure and subsequent years is of the same order of magnitude as the differences caused by business cycles or financial constraints. This investment cycle appears to be best explained by agency-based arguments in which a CEO’s preference for investment growth leads to increasing investment quantity and decreasing investment quality over time as the CEO gains more control over his board. The poor investment decisions tend to be reversed only after the CEO steps down and the new CEO takes over. There is no evidence that the investment cycles occur because of shifting CEO skills or productivity shocks occurring at the time of CEO turnover.

JEL classification: G32, G34, M12, M51

Key words: Investment, disinvestment, non-performance motivated CEO turnover, CEO control of the board, overinvestment.

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1. Introduction

A central question in both economics and management concerns the extent to which the CEO and top management actually make a difference in the fortunes of companies. The literature has adopted a variety of viewpoints about the role of the CEO and top management, ranging from a first-best world in which the CEO always picks value-maximizing projects, to a principal-agent framework that allows for a variety of types of agency concerns.¹ While any model of the firm is by definition an approximation, how bad of an approximation is it to ignore management and to assume investment is first best? If in fact management does affect firm behavior, does it do so because of agency problems or an efficient allocation of resources? More generally, how can one determine the quantitative importance of management to our understanding of corporate investment decisions?

One way to measure the extent to which CEOs matter is to estimate the way that firms' activities vary over their time in office. While there are numerous differences across CEOs and firms, a CEO's incentives and power inside the firm vary systematically over his career, so systematic differences in firm behavior over CEO tenure are likely to reflect these changes.

In this paper, we document striking patterns in corporate investment and disinvestment activities over the "CEO cycle" in a large sample of publicly traded U.S. firms. Disinvestments are fairly common in the early years of a CEO's tenure and decrease over time. Investments, on the other hand, are relatively low in the early years of a CEO's tenure and increase over time. The overall effect is "cyclical" firm growth in assets as well as in employment over CEO tenure, with the firm growth rate being lower in early years of a CEO's tenure than in his later years. Both disinvestment and investment vary systematically over the CEO cycle irrespective of the way we measure them, using information from firm-level financial statements, corporate announcements, acquisition data, or segment-level data.

¹ In the literature on principal-agent problems, CEOs have been accused of providing too little effort, overinvesting, underinvesting, enjoying the "quiet life", investing in projects that maximize their own human capital, delaying recognition of mistakes, building empires that maximize their utility rather than firm value, etc. See Jensen and Murphy (1990), Jensen and Meckling (1976), Myers (1977), Bertrand and Mullinathan (2003), Shleifer and Vishny (1989), Boot (1992), Yermack and Shivdasani (1999), and Bebchuk and Fried (2004).

Cyclical behavior of investment and growth over CEO tenure appears to be a general phenomenon in publicly traded corporations.

The magnitude of the changes in firm investment and growth over the CEO cycle is substantial. For example, the annual investment rate (investment-to-capital-stock ratio) tends to be 4.6 percentage points lower and the asset growth rate tends to be 5.3 percentage points lower in the first three years of a CEO's tenure than in his later years in office. Given that the median investment rate in our sample is 24% and the median asset growth rate is 7.6%, the differences in investment and growth between the earlier and the later parts of the CEO cycle are clearly non-trivial. The effect of the CEO cycle on investment is of the same order of magnitude as the effects of other factors known to influence investment such as the business cycle, political uncertainty, and financial constraints.

The correlation between the CEO cycle and firm investment could occur either because the CEO's choices about investment vary over the CEO cycle, or because CEO turnovers tend to occur during periods of high disinvestment and low investment. To evaluate the possibility that the timing of CEO changes explains the CEO investment cycle, we consider several subsamples of turnovers with timing unlikely to be correlated with investment shocks—when the departing CEO leaves his job because of death or illness, when the departing CEO retires following above-median firm stock return performance, when there is no top management shakeup other than the change of CEO, and when the CEO leaves following above industry median stock and accounting returns together with below median stock return volatility. CEO investment cycles exist in each of these subsamples and are of comparable magnitude as in the full sample. Further, the CEO investment cycles are present regardless of the new CEO's succession origin, the CEO's time in office, and the industry conditions at the time of turnover. The CEO investment cycle also does not merely reflect changes occurring around CEO turnover, but characterizes investment over the entire CEO tenure.

Since the CEO investment cycle does not appear to be driven by the timing of CEO turnovers, it seems likely that changes in CEO cause the observed changes in investment over the CEO cycle. However, new management could affect investment in different ways: investment decisions could deviate

from the first best because of agency conflicts, or management changes could lead to efficient investment that varies over the CEO cycle. We perform a series of tests to evaluate these explanations. However, regardless of whether investment is efficient or inefficient, the existence of economically important variation in investment over the CEO cycle implies that, inconsistent with traditional economic models that ignore the roles of managers, management has a large impact on firms' investments.

One possible explanation for the investment cycle is based on agency conflicts with the CEO. For many reasons, CEOs usually prefer their firms to grow, potentially at the expense of shareholder value maximization. The board of directors is an important constraint on CEOs' ability to deviate from the shareholders' interest. However, as a CEO becomes more powerful in the firm over time, he will have more sway over his board and will be able to undertake investments that maximize his utility at the expense of firm value. At the same time, the CEO is reluctant to divest assets that he has acquired, even if the firm is no longer the optimal owner of the assets. CEO turnover can facilitate re-optimization of these bad assets, since the incoming CEO does not necessarily enjoy the same private benefit from assets established by the predecessor. Eventually, the process is repeated during each CEO cycle.

We confirm that a number of predictions of this agency explanation hold in the data. First, since an uncaptured board of directors is an important factor that limits the CEO's ability to overinvest, the agency explanation implies that more direct measures of the CEO's control over the board should be more powerful at explaining the investment increases than the CEO's tenure in office. We measure the CEO's capture of the board by the fraction of the board appointed during his tenure, and find that the increasing CEO influence on the board over his tenure explains the positive relation between CEO tenure and investment, even when the CEO power comes exogenously through changes in the fraction of directors reaching retirement age over time.

Second, we find that the quality of a firm's investments, measured by the market reaction to acquisition announcements, decreases with CEO tenure and is almost 50% more likely to be negative during the later portion of his time in office. This deteriorating investment quality also appears to be a function of the CEO's control of the board. These findings suggest that the increases in the quantity and

the decreases in the quality of investments over the CEO cycle is likely driven by the CEO's preference for growth, which becomes more relevant when the CEO gains more control over his board and can exercise more discretion over the firm's investments.

Third, using segment-level data, we show that the poor investment decisions tend to be reversed only after the original CEO steps down and the new CEO takes office. The degree of reversal negatively depends on the prior management's residual influence on the new CEO, even when the residual influence occurs for exogenous reasons.

Alternatively, CEO investment cycles could exist even if investment over CEO tenure is efficient at all times. Suppose, for example, a CEO's ability to identify positive NPV projects improves over time, so an optimal investment policy would entail increasing investment over tenure. However, this explanation is not consistent with the deteriorating investment quality (to negative NPV) over CEO tenure. Further, we find that the increase in the CEO's capture of the board due to director aging, which is unrelated to CEO ability, still leads to an increase in investment level and a decrease in investment quality. Consequently, it appears that the CEO investment cycle is not driven by changes in CEO ability over time.

In addition, efficient changes in investment could occur following turnovers if they reflect the match between the new CEO's skills and firm assets. Such matching predicts high disinvestment right after CEO turnover, since the assets that match well with the outgoing CEO's skills do not necessarily match well with the incoming CEO's. However, it does not predict increasing investment over the entire CEO tenure. In addition, in contrast to this view, we find that the magnitudes of post-turnover disinvestment are similar in situations in which the new CEO's skills are more likely to fit the firm's asset structure (e.g., when single-industry firms hire insider CEOs, when conglomerates hire generalist CEOs) and in situations in which they are less likely to fit (e.g., when conglomerates hire specialist CEOs, when CEO turnovers are preceded by industry productivity shocks).

The existence of an economically meaningful CEO investment cycle has a number of implications. First, there has been much work on external factors that affect investment, such as the business cycle, political uncertainty, and conditions of the financial markets. Our results suggest that the

impact of management-related factors on investment is quantitatively as important as these external factors. Second, our results provide insights on the types of agency problems that are likely to be important for understanding the investment decisions in public companies; they suggest that the empire-building preference is likely an important factor leading to investment inefficiencies in public companies. Although the literature arguing that managers tend to build “empires” is enormous and dates back to Baumol (1959), Marris (1964), Williamson (1964), and Donaldson (1984), its empirical relevance has been debated. Third, the results imply that a policy of regular management turnover in public corporations potentially can be valuable. Such a policy will likely minimize overinvestment resulting from a CEO’s growing capture of his board, and facilitate re-optimization of investments.

This work is related to the literature that aims to establish and quantify systematic managerial influences on firm policies and value. Several influential studies examine whether CEO-specific styles affect firm policies (see Bertrand and Schoar (2003), and Fee, Hadlock and Pierce (2013)). The literature also has drawn inferences about the value of CEOs based on rare events such as CEO death (Johnson et al. 1985, Bennesen et al. 2007) and hospitalization (Bennesen et al. 2012). Finally, using an approach based on systematic changes in stock return volatility after the CEO takes office, Pan, Wang, and Weisbach (2014) estimate that CEOs contribute a nontrivial amount to firm values. Documenting the way in which firm policies vary over the CEO cycle is an alternative approach to identify and quantify potential systematic managerial effects.

This work also extends a literature on firm behavior around CEO turnovers. Using a much earlier sample than ours, Murphy and Zimmerman (1993) document systematic changes in a number of accounting variables around CEO turnover, which the authors conclude are mainly driven by poor pre-turnover firm performance. In addition, there is a large literature in accounting documenting that CEOs manage earnings for career concerns using both accrual manipulation and investments in R&D and advertisement, especially around CEO turnovers (see Dechow, Ge, and Schrand (2010) for detailed discussion and references).

Our results extend Weisbach (1995), who finds that the likelihood of divesting poorly performing deals to be unusually high immediately following CEO turnovers based on a small sample of large acquisitions. Our analysis not only shows that disinvestment early in a CEO's career is a general phenomenon in publicly traded companies, but also provides a comprehensive analysis on what is driving such disinvestment pattern.

Our study complements these earlier studies, but differs from this literature in a number of ways. In particular, we find that the CEO investment cycle is not just a turnover-year phenomenon. Instead, it describes the way in which investment systematically varies over a CEO's career. By estimating the magnitude of variations in investment and growth over the CEO cycle, our paper highlights the quantitative importance of managerial effects on firms' overall investment levels and suggests that managerial factors are an important factor affecting firms' investment decisions.

2. Data

2.1. CEO Turnover and Tenure

Our sample includes 5,420 CEO turnovers in 2,991 firms between 1980 and 2009. We identify CEOs based on the information in the *ExecuComp* database. We use the information on job title, the year becoming CEO, and the CEO annual flag provided in *ExecuComp* to identify CEOs at the firm-year level. For each firm, we compare the designated CEO in each fiscal year with the CEO in the previous year to identify whether there is a CEO turnover in that year.

Panel A of Table 1 describes the distribution of turnovers over time. Although *ExecComp's* coverage starts in 1992, some of the CEOs in the database took office before 1992, leading to some CEO turnovers from the 1980s being in our sample. For each new CEO, the variable "Tenure" equals 0 for the fiscal year in which the CEO takes office, and increases with each year the CEO is in office. The average CEO tenure length (including the turnover year) is about seven years and the median is six years. The average age of the incoming CEO at the time of turnover is 51.

To interpret the relation between firm investment (disinvestment, growth) and CEO tenure, it is important to understand the reasons for CEO turnovers. It is usually not possible to know the reason for any particular departure with complete certainty. However, we can still identify turnovers that are likely to be regular, non-performance-driven turnovers, which, according to the interviews in Vancil (1987) (pp. 82-83), constitute the vast majority of turnovers. One group of turnovers that are likely to be exogenously occurring is those caused by illness, death, or retirement of the departing CEOs. We use *Factiva* news search to identify such a subsample of likely exogenous turnovers.² To mitigate the incidence of “suspicious retirements,” we additionally require that the firm’s stock performance in the year prior to the turnover be above the industry-year median for the turnover to be classified as due to retirement.

A second group of turnovers that are unlikely to coincide with investment shocks are those for which the CEO change is not accompanied by any shakeup in the top management team. Therefore, we consider the subsample for which the top four most highly paid non-CEO executives do not change in the year when the CEO is changed. Third, because forced turnovers tend to be preceded by high stock return volatility or poor stock and accounting performances, we consider turnovers that are preceded by both good performance (both stock return and ROA above industry-year median) as well as low idiosyncratic volatility (below industry-year median).

Panel A of Table 1 reports the number of turnovers in each subsample. We have 162 turnovers occurring because of death or health issues of outgoing CEOs, 243 because of death or health issues or retirements following good performance, 1032 turnovers that are not accompanied by top management shakeups, and 880 turnovers preceded by good performance and low volatility. The union of these subsamples accounts for 34% of the entire turnover sample. Pan, Wang, and Weisbach (2014) document that there is no abnormal performance or return volatility prior to these subsamples of turnovers.

2.2. Corporate Investment

We consider two major forms of corporate investment: capital expenditures and acquisitions. We define *Capx Rate* as capital expenditures scaled by the net value of the firm’s property, plants, and

² We thank Edward Fee, Charles Hadlock, and Joshua Pierce for kindly providing us with their classification of illness, death related, and outright forced turnovers.

equipment (PP&E) at the beginning of the year, and *Acquisition Rate* as the value of acquisitions scaled by the net value of PP&E at the beginning of the year. Acquisitions include completed deals covered in the SDC database, either acquisition of assets or equity interests. For each sample firm, we include both domestic and international acquisitions with disclosed transaction values above \$1 million over the sample period.³ *Investment Rate* is defined to be the sum of *Capx Rate* and *Acquisition Rate*. Panel B of Table 1 reports that the average *Capx Rate* is 33% (median 20%), the average *Acquisition Rate* is 34% (median 0%), and the average total *Investment Rate* is 67% (median 24%).

We also examine the intensity of corporate announcements about expansion or acquisition over CEO tenure. The business expansion news includes “Event 3” (“Seeking Acquisitions/ Investment”) and “Event 31” (“Business Expansion”) from the “Key Developments” database from *Capital IQ*. We further augment these announcements with the acquisition announcements from the *SDC Platinum*. Based on the announcement date of each event, we define a monthly investment indicator variable $I_{\{ \text{investment announcement(s)} \text{ in the month} \}}$ that equals one if the company has either expansion or acquisition announcements in the month. Panel B of Table 1 documents that 8% of firm-months contain investment announcements.

Further, we identify new business units by examining whether a new segment ID appears in a given year (provided it is not the first year the company appears in the segment data base) and exists for at least 2 years. About 16% of our firm-segment-year observations consist of newly initiated segments.

We also measure the combined effect of disinvestment and investment on a firm. Since both disinvestment and investment can affect the size of the firm’s physical asset and labor, we construct *Asset Growth Rate* as the annual growth rate of the firm’s book assets and *Employment Growth Rate* as the annual growth rate in the number of employees. The average *Asset Growth Rate* is about 20% (median 8%). The average *Employment Growth Rate* is 9% (median 3%).

2.3. Corporate Disinvestment

To identify corporate disinvestment activities in a given fiscal year, we use data on both discontinued operations from *COMPUSTAT* and asset sales from *SDC Platinum Mergers & Acquisitions*

³ We exclude leveraged buyouts, exchange offers, repurchases, spinoffs, minority stake purchases, recapitalizations, self-tenders, and privatizations.

Database. We consider the firm to have discontinued operations ($I_{\{\text{discontinued operations}>0\}}=1$) if the firm reports income or loss from discontinued operations (“DO” in *COMPUSTAT*), and asset sales ($I_{\{\text{asset sales}>0\}}=1$) if the firm is indicated by *SDC* as the target company in transactions of “Acquisitions of Assets” or “Acquisitions of Certain Assets”. Panel B of Table 1 reports that about 9% of the firm-year observations have asset sales, about 16% have discontinued operations, and 21% have at least one of these types of disinvestment activities.

An alternative way to identify disinvestment activities is to use corporate announcements obtained from the “Key Developments” database from the *Capital IQ* database (coverage starting in 2001): “Event 1” contains announcements of “Seeking to Sell/Divest” and “Event 21” captures announcements related to “Discontinued Operation/Downsizing”.⁴ Based on the announcement date of each event provided by *Capital IQ*, we define a monthly disinvestment indicator variable $I_{\{\text{downsizing announcement(s) in the month}\}}$ that equals one if the company announces either Event 1 or Event 21 or both in a month. Panel B of Table 1 documents that 4% of firm-months contain disinvestment announcements.

Further, we use information from *COMPUSTAT* “historical segment” data to measure the divestiture or discontinuation of investments at the segment level. We start with all operating/business segments with positive sales over the sample period, and track them through time using the unique segment ID provided by *COMPUSTAT*. We identify divestitures or discontinuations of segments ($I_{\{\text{segment termination}\}}=1$) when a distinct segment ID disappears in a particular year and does not reappear in the sample subsequently. The likelihood a segment will be terminated in a particular years is about 10%. We measure segment performance using segment-year level operating profit/loss scaled by sales.⁵

2.4. Other Firm Characteristics

To control for other factors that potentially affect investment or disinvestment intensity, we also include a set of firm characteristics in our econometric specifications. Panel C of Table 1 contains

⁴ Both Event 1 and Event 21 appear to capture ongoing or intended disinvestment activities. Sample headlines for these events: “ADC Telecommunications to close LeSueur facility”; “BSQUARE Corp. intends to close its information division in San Diego”.

⁵ The *COMPUSTAT* segment data is an imperfect measure of firms’ lines of business and their profitability (see Maksimovic and Philips (2007)). However, the concerns about the use of segment data to measure segment profitability are unlikely to be systematically correlated with CEO tenure.

summary statistics of these variables. The average firm in our sample has book assets of about \$1.2 billion, 24% of leverage (total debt divided by total assets), and market-to-book equity ratio of 2.9. The average industry-adjusted ROA is 5.7% (median 3.3%), and the average industry-adjusted stock return is 14.7% (median 3.9%). Slightly more than half of the firms pay dividends.⁶ All variables described in Sections 2.2-2.4 are winsorized at the top and bottom 1% of the distribution in the *COMPUSTAT* universe. Appendix A presents definitions of all variables.

3. Measuring the CEO Investment Cycle

3.1. Investment and CEO Tenure

We first consider the way in which corporate investment varies with CEO tenure from three years prior to turnover (year 0) until 6 years following the turnover. Panel A of Figure 1 reports the median investment rate by tenure year. This figure suggests that there is no obvious declining trend in the investment rate prior to the CEO turnover. During the turnover year, however, the investment rate drops by more than 3 percentage points and then increases continuously over CEO tenure. The total investment rate, which is defined as the sum of capital expenditures and acquisition values divided by the lagged capital stock, increases from 20.5% in year 0 to 24.5% in year 6, a 20% increase.

In Panel A of Table 2, we estimate equations predicting the investment rate as a function of CEO tenure, controlling for firm characteristics that potentially affect investment. We include firm-CEO fixed effects in each equation, so that the estimates can be interpreted as representing the change in investment within a particular CEO's career. The within-firm-CEO variation also helps to mitigate the survivorship bias in the estimation. We first consider a specification that measures the effect of CEO tenure using an indicator variable that equals one for the first three years of a CEO's tenure (i.e., years 0, 1, 2). The estimated coefficient using this specification in Column (1) indicates that the annual investment is 4.6 percentage points lower in the first three years than during the rest of the CEO's tenure. If we take the

⁶ The average industry-adjusted performance measures are different from zero because we construct the industry averages using the *COMPUSTAT* universe, not just our sample firms.

median investment rate in our sample (24%) as the “normal” rate,⁷ then this implies that the investment rate tends to be 19% below the normal rate in the early years of a CEO’s tenure.

In Column (2) we include tenure linearly, estimating the change on investment from a change in “*Tenure (in years)*,” which counts the CEO’s time in office up to the year of the observation. The estimates presented indicate that in the full sample, the investment rate increases by 2.9 percentage points per year of CEO tenure.

3.1.1. Subsamples of Turnovers Unlikely to be Caused by Performance

An important issue in interpreting the relatively low investment rates in the early years of a CEO’s tenure is the extent to which they reflect endogenous timing of turnovers at times when it is desirable for firms to cut investment. For this reason, we present estimates of the specification used in Column (2) on the subsamples of turnovers that we have identified in Section 2.1 as unlikely to coincide with periods of low investment: turnovers caused by the death or health of the outgoing CEO (Column (3)), caused by death, health, or retirements of the outgoing CEO (Column (4)), turnovers not accompanied by any top management shakeup (Column (5)), and those preceded by good performance as well as low stock return volatility (Column (6)).

The coefficient on *Tenure* is positive and statistically significant in all subsamples. Further, the magnitudes of the estimated CEO cycle effect in these subsamples of likely non-performance-driven turnovers are all close to the estimate obtained using the full sample of turnovers in Column (2), suggesting that changes in the investment rates over a CEO’s tenure are unlikely to be driven by shocks in investment opportunities coinciding with the departures of the outgoing CEOs.

3.1.2. Alternative Measures of Investment

We next estimate corporate investment using two different data sources: corporate announcements of business expansion and acquisitions and establishment of new segments. The results using corporate announcements are presented in Columns (1) and (2) of Panel B of Table 2. The

⁷ The average investment rate of 66.6% is not a representative figure, as it is driven by some large acquisitions. Table B.5 of Appendix B shows robustness of our CEO investment cycle estimates using different investment measures.

likelihood of a company announcing expansion or acquisition increases by 0.1 percentage point per month or 1.2 percentage points per year during a CEO's tenure, consistent with the results reported in Panel A using financial statement information. The same pattern holds after turnovers due to death, illness or retirement of the outgoing CEO. In Columns (3) and (4) of Panel B of Table 2, we estimate the likelihood of starting a new segment in a particular year. Again, the probability of establishing a segment is significantly lower in the early years of a CEO's tenure than in his later years.⁸

3.2. Disinvestment and Growth over CEO Tenure

Panel B of Figure 1 plots the average probability of disinvestment by tenure years. There is no obvious trend in the likelihood of disinvestment prior to year 0. The disinvestment probability jumps up by 4.5 percentage points in the turnover year, becoming as high as 21.2% in year 1, and monotonically decreases subsequently. By year 6, the likelihood of disinvestment decreases to 15.5%, a 27% reduction relative to year 1.

Panel A of Table 3 presents estimates of multivariate equations predicting the likelihood of disinvestment as a function of CEO tenure and CEO and firm characteristics. We first present an estimate of the specification using a dummy variable that indicates whether the CEO is in his first three years in Column (1). The estimate on the early tenure dummy implies that the likelihood of disinvestment is 2.3 percentage points higher in the first three years of a CEO's tenure than during the rest of the CEO's tenure. In Column (2), we include tenure linearly, and the coefficient on tenure is negative and statistically significant, implying that the probability of disinvestment decreases over the CEO's tenure.

Columns (3)–(6) present estimates of this equation for the various subsamples of likely non-performance-driven turnovers. In each case, the disinvestment probability appears to be higher in the early years of the CEO's tenure than in later years. These findings suggest that the empirical finding of decreasing likelihood of corporate disinvestment over the CEO's tenure does not occur because of CEO turnovers coinciding with other factors that lead to high disinvestment.

⁸ There was a change in how segments were reported in 1997-1999 (SFAS 131). This rule could potentially have led some firms to disaggregate segment data, which would have looked like an expansion in our specification. In unreported analysis, we reestimate the equations reported here on the subsample of turnovers occurring after 1999, and obtain results similar to those reported here.

Panel B of Table 3 considers the likelihood of downsizing related news announcements and the segment termination/reorganization over CEO tenure. Consistent with the decreasing likelihood of disinvestment over tenure documented in Panel A, we find that the probability of downsizing related corporate news and the likelihood that a segment is terminated or reorganized are also significantly higher in a CEO's earlier years in office than in the later years, both in the full sample and after turnovers due to death, illness, or retirement of the departing CEOs.

An implication of changing investment and disinvestment behavior is that the firm's total asset and employment will also grow over CEO tenure. Table 4 documents that both growth rates do indeed increase over CEO tenure. The estimates in this table indicate that the asset growth rate is on average 5.3 percentage points lower and the employment growth rate is 2.1 percentage points lower in the first three years of CEO tenure than in later years. Given that the median asset growth rate is 7.6% and the median employment growth rate is 3%, the difference in these growth rates over CEO tenure is clearly substantial. The behavior of the growth rates in assets and employment over the CEO cycle is likely reflective of the cyclical disinvestment and investment documented above.

3.3. Robustness

The estimates in Tables 2-4 suggest that the CEO investment cycle is an important characteristic of firms' investments. We next document the robustness of these results to a number of alternative specifications and samples.

3.3.1 Alternative Firm-CEO Samples

To ensure that our results are not driven by the way we selected our sample, we estimate the CEO investment cycles using an alternative firm-CEO sample from Fee et al. (2013), which includes all *Compustat* firms with identifiable CEOs from 1990 to 2006. This sample has a larger cross section of firms but a shorter time period than our *Execucomp* sample. Table B.1 of Appendix B shows that the CEO investment cycle exists in this alternative sample as well, and the magnitudes are somewhat larger than in our sample.

Firms that moved into the S&P 1500 Index and thus became covered by *ExecuComp* during our sample period could potentially have experienced abnormal investment and growth. To ensure that our results do not occur because of firms that are added to *ExecuComp* during our sample period, we reestimate our equations using just CEOs who started their tenures after the firm already appeared on *ExecuComp* in Table B.2 of Appendix B. The estimates suggest that the CEO investment cycle in this subsample is approximately the same magnitude as in the full sample.

3.3.2. Non-Classified Turnovers, Forced Turnovers, Insider Successions

In Tables 2-4 we document that CEO investment cycles exist in the full sample and in the subsamples of turnovers that are unlikely to coincide with investment shocks. In Appendix B.3, we further show that the CEO investment cycle occurs regardless of the turnover reason. Panel A reports the results using the subsample for which the turnover reason is unclassified, Panel B for the subsample of turnovers that appear to be outright forced, and Panel C for insider successions. The estimated CEO investment cycle effects on the non-classified subsample and insider succession are similar to that in the full sample and those in the various subsamples of likely non-performance-driven turnovers. The CEO disinvestment cycle effect on the forced subsample is larger, while the investment cycle is smaller compared to the full sample, suggesting that forced turnovers are distinct from the rest of the turnovers.

3.3.3. Excluding Turnover Years

There is a literature in finance and accounting that studies abnormal firm behaviors around CEO turnovers. While related to this literature, the CEO investment cycle we document is not solely a function of behavior surrounding CEO turnovers, but a phenomenon that occurs throughout the CEO's tenure. In Appendix B.4, we present estimates of our equations excluding the turnover year and the subsequent year. Consistent with the notion that the CEO investment cycle is not merely a turnover year occurrence, the estimated magnitudes of CEO investment cycles are comparable to those in the full sample.

3.3.4. Alternative Investment Measures

In most of our analyses, we combine capital expenditures and acquisitions. In Panel A of Table B.5 in Appendix B, we estimate the CEO investment cycle using capital expenditures and acquisitions

separately, and scale acquisition by PPE or book assets. The results suggest that capital expenditure and acquisition rates each increase significantly over CEO tenure. However, the magnitude of the increase for acquisitions is larger than that for capital expenditures.

A possible alternative interpretation of the increasing investment rate over CEO tenure is that it occurs because of high disinvestment in the early years of CEO tenure, reducing the capital stock and thus the denominator for the investment rate. To address this concern, in Panel B of Table B.5, we re-estimate the investment equations scaling the investment throughout the CEO's tenure by the PP&E *before* the turnover year. This specification leads to an investment level that increases at an even faster rate over the CEO cycle than the estimates reported in the main specifications, suggesting that the observed increasing investment rate over CEO tenure does not occur because of changing denominators used to scale investments.

3.3.5. CEO Career Cycle vs. CEO Life Cycle and Firm Life Cycle

Firm investment and growth also can vary with a CEO's age and a firm's age, as Yim (2013) finds that younger CEOs are more likely to engage in acquisitions than older CEOs, and younger firms tend to have higher investment and growth rates than do older firms. Because we include firm-CEO fixed effects in the main specifications, we cannot identify the effects of a CEO's age or the firm's age on investment. For this reason, we present estimates of our main equations in Table B.6 of Appendix B, controlling for both CEO age and firm age but no firm-CEO fixed effects or firm fixed effects. Instead, we include industry-year fixed effects to capture industry-level shocks. The results suggest that the CEO tenure effect is the opposite of the life cycle effects: investment and growth rates increase with CEOs' time in office, but decrease with CEO age and firm age.

3.4. Benchmarking the Magnitude of the CEO Investment Cycle

The CEO investment cycle leads to variation in investment likely caused by forces internal to the firm. As a benchmark to assess the magnitude of the CEO investment cycle, it is useful to compare its size to estimates of other factors that are known to affect investment. In particular, the literature has argued that external factors such as the business cycle, political uncertainty due to the election cycle and

financial constraints can affect a firm's investment. Appendix C surveys estimates of the extent to which these factors affect investment. To estimate the effect of business cycles on investment, we re-estimate equations from Tables 2-4, including an indicator variable for recession years. These estimates are presented in Appendix Table C. For estimates of the effect of political uncertainty on investment, we rely on Julio and Yook (2012), and for estimates of the effect of financial constraints on investment, on Hoberg and Maksimovic (2014). The detailed discussion is in Appendix C.

Because each of the comparison studies normalizes investment differently, we re-estimate the CEO cycle effect using three different definitions of investment rate: capital expenditures over lagged PPE, over lagged book assets, and over sales, and then compare the effect of the CEO cycle to these other factors. The estimates are summarized in Table 5. They indicate that the incremental effect on investment from being in a CEO's first three years is of the same order of magnitude as being in recession or being in an election year or facing financial constraints during the latest financial crisis. These numbers suggest that the effect of the CEO investment cycle is substantial in magnitude, comparable to other factors that are commonly accepted to be important determinants of investment.

4. Potential Reasons for the CEO Investment Cycle

Because the CEO investment cycle is substantial in magnitude and present in public firms regardless of the circumstances of the turnover, it is important to consider the alternative theories that could explain the existence of this cycle and to distinguish between them empirically. One view that clearly is *not* consistent with the CEO investment cycle is the traditional economic view of the firm as a collection of physical assets that always chooses profit-maximizing actions. Since management plays no role, this view implies that firm investment and growth should not depend on the CEO's time in office.

To explain the CEO investment cycle, one must incorporate an explicit role for management, and the CEO in particular. This role could exist because the CEO is entrusted by the owners to make decisions about the way the firm's resources will be used. However, since the CEO is himself self-interested, he will sometimes make decisions that maximize his utility rather than firm value. As we discuss below,

such non-value-maximization leads naturally to an agency-based explanation for the CEO investment cycle. Alternatively, the CEO himself can be viewed as an asset, who provides skills to the firm that can be used to maximize profits. If a new CEO arrives with a different set of skills than his predecessor or the CEO's ability to invest improves over time, it could be optimal for the firm to change its assets so as to better complement the new CEO's skills. These views are not mutually exclusive and both probably are relevant to some extent. To evaluate their relative importance, we discuss the implications of each for the CEO investment cycle and test these predictions on our sample. We summarize the alternative explanations for the CEO Investment Cycle and their implications in Table 6, as well as the empirical evidence presented below that evaluates these implications.

4.1. Management as a Decision-Making Agent: Implications for the CEO Investment Cycle

For many reasons, CEOs usually prefer to grow their firms rather than to shrink them. A CEO's pay and prestige are generally positively correlated with firm size, adding units that diversify the firm can lower the risk of a CEO's personal financial position in the firm and his human capital, a CEO can purchase "glamorous" divisions that are fun to manage, a CEO can create new positions for favorite employees through growth, or a CEO could have "hubris" and overestimate his ability to add value to a line of business.⁹ These arguments imply that a CEO is likely to prefer the firm to grow more than is optimal from the shareholders' perspective. Consequently, factors that constrain management from taking as many investments as it wants are important contractual elements of the firm. For example, Jensen (1986) focuses on the role of debt in constraining managers' propensity to overinvest. Another source of constraints on management's ability to invest as it chooses is the board of directors.

The board of directors is particularly relevant for understanding CEO investment cycles, since the CEO's influence over the board is likely to increase over time. As emphasized by Hermalin and Weisbach (1998), so long as a CEO is infra-marginal relative to a potential replacement, he will have some influence over the director selection process and will have incentives to use this influence to appoint directors who are less likely to oppose his will. Over time, boards will evolve towards ones that are loyal

⁹ The literature arguing that managers tend to build "empires" is enormous and (partly) summarized in the introduction. See also Roll (1986), Morck, Shleifer and Vishny (1990), and Jensen (1993).

to the CEOs that appoint them, and thus less likely to constrain the CEOs from undertaking whichever investments they want. Therefore, the dynamics of the board and its loyalty to the CEO, together with the CEO's preference for investments even if they are not value-maximizing, could potentially lead to the increase in investment with CEO tenure that we document in Table 2.

Implication 1: CEO Power and Investment. Holding other factors constant, the increase in investment over CEO tenure should come through the CEO's control over the board of directors. Therefore, controlling for the CEO's influence on the board should lessen the estimated effect of CEO tenure on investment.

Implication 2: Quality of Investments over CEO tenure. Holding other factors constant, the quality of firms' investments should decrease with the CEO's tenure, and should also be related to the CEO's control of the board.

If CEOs enjoy private benefit from growing the firm and tend to overinvest as they gain more control of the board, then they are unlikely to divest the assets that they have acquired, even if the assets turn out to be less profitable than expected.¹⁰ In addition, the market sometimes views divestitures as essentially an admission of a mistake and divesting poorly performing assets can reflect poorly on the CEO (see Kanodia, Bushman, and Dickhaut (1989) and Boot (1992)). When a new CEO arrives, he does not necessarily enjoy the same private benefits from these assets and could be less averse to admitting his predecessor's mistakes. Therefore, a new CEO is likely to sell poorly performing assets at a higher rate than the outgoing CEO. Moreover, a natural additional testable implication of this agency view of post-turnover disinvestment is as follows.

Implication 3: The Influence of Prior Management. The influence that the old management has on the new CEO after turnover should negatively affect his willingness to divest poorly performing assets acquired by the prior management.

This view of the CEO as a decision-making agent who sometimes puts his personal agenda ahead of the firm's, can therefore explain both portions of the CEO investment cycle. When a new CEO takes

¹⁰ Discussion of private benefits of control goes back at least to Berle and Means (1932) and private benefits have become a key element of many models of corporate governance (see Tirole (2006), pp. 16-17 for example).

office, he will tend to disinvest poorly performing assets established by the predecessor. As the CEO becomes more powerful over time, he will have more sway over his board and will be able to undertake and hold onto investments that maximize his own utility. When this CEO steps down, the pattern of investments is repeated over the next CEO's tenure.

4.2. Management as an Asset: Implications for the CEO investment Cycle

When a CEO is viewed as an asset rather than just a decision-maker, his ability should be an important determinant of not only the level of the firm's investment but also the composition of its assets. Maksimovic and Phillips (2002) provide a skill-based explanation for the high disinvestment rate following management changes. In this model, conglomerate firms choose their asset structure based on the relative productivity of its business segments, which in turn depends on the CEO's relative skill in managing assets in different industries. In such a world, if the CEO changes and the incoming CEO has different skills from the outgoing one, then it is possible that the optimal set of assets the firm should own will change, leading to divestitures. Applying the Maksimovic and Phillips (2002) logic to CEO turnover has the following implication:

Implication 4: The Fit of the Incoming CEO's skills with the Firm's Assets. Holding other factors constant, the more that the new CEO's skills differ from the firm's current asset structure, the more divestitures will be observed after CEO turnover.

The skill-based arguments, however, do *not* predict that divested units should have unusually bad performance beyond being hit by negative shocks outside of the management's control, because the firm should be the optimal owner of the asset prior to the CEO change. In addition, the arguments based on changes in CEO skills at CEO turnovers also do *not* predict increasing investment levels over CEO tenure, nor do they predict that the CEO's control of the board should explain the investment over CEO tenure. To explain the increase in investment over CEO tenure in a world in which all investment is first best, something like the CEO's ability to identify positive NPV projects must systematically improve over time, possibly through learning by doing. But in contrast to the agency explanation, investment quality should not deteriorate (to negative) over time, since investment is always efficient under this view.

5. Distinguishing between the Explanations for the Existence of CEO Investment Cycles

5.1. CEO Power and Investment

5.1.1. The CEO's Capture of the Board and Investment

To test *Implication 1*, that the increase in investment over CEO tenure is a function of the CEO's growing power over his board, we construct a variable that is likely to be highly correlated with the CEO's power over the board as well as his tenure, and evaluate the extent to which this variable explains the relation between CEO tenure and corporate investment. Specifically, we calculate the fraction of "co-opted" directors, who are appointed after the CEO takes office ("*% of New Directors*"). The idea, formalized in Hermalin and Weisbach (1998), is that the CEO will use his influence to ensure that the firm appoints directors who are unlikely to oppose any actions he wishes to take. Existing empirical studies also provide evidence that co-opted boards are indeed associated with less board monitoring.¹¹

We construct this variable using data from *RiskMetrics*, which provides the starting and ending years for each director in the S&P 1500 firms during 1996 to 2011. For each firm-year in our sample, we count the number of directors who start their directorship since the current CEO took office, and scale it by the total number of directors on the board in that year. By construction, *% of New Directors* is highly correlated with the CEO's time in office: The correlation between the two is 0.68, which is much higher than the correlations between CEO tenure and other proxies of CEO power (e.g., 0.22 with CEO ownership, and 0.20 with CEO being Chairman).

In Panel A of Table 7, we test *Implication 1* by including *% of New Directors* in our investment equations. Even though tenure and *% of New Directors* are highly correlated with one another, *% of New Directors* directly reflects the CEO's control over the board. Therefore, if the effect of tenure on investment only occurs because of the increase in the CEO's power inside the firm over his tenure, then the tenure effect should be picked up by *% of New Directors*. Alternatively, if there is some other reason

¹¹ Morse et al. (2011) and Coles et al. (2013) document that board cooption is associated with a higher level of managerial pay, but less incentives provided to managers, and a lower level of turnover-performance sensitivity. In addition, similar to some of the results reported below, Coles et al. independently find that a firm's capital expenditures rate is increasing with the level of the board's cooption.

why tenure is related to investment, then estimates of the effect of tenure on investment should be relatively unaffected by including *% of New Directors* into the equation.

Since the inclusion of *% of New Directors* reduces the sample size, in Column (1) of Panel A we first reproduce the baseline results in the relevant subsample and obtain similar estimates to those reported above. In Column (2), we control for *% of New Directors* and find that CEO tenure no longer has any effect on investment, suggesting that the channel through which CEO tenure affects investment is indeed the control over the board that the CEO acquires over time.¹² The estimate implies that a one-standard-deviation increase in *% of New Directors* would lead to an increase in the investment rate by about 11 percentage points ($=0.318*0.341$), which suggests that a CEO's control over his board has a substantial effect on a firm's investment decisions. Columns (3)-(4) estimate the effect of *% of New Directors* on capital expenditures and acquisitions separately. These estimates suggest that the effect of *% of New Directors* is stronger on acquisition (coefficient = 0.266) than on capital expenditures (coefficient = 0.075), but the effect on each is significantly positive. The larger effect for acquisitions than on capital expenditures likely reflects that large and non-recurring investments such as acquisitions are more subject to the board scrutiny than routine capital expenditures.

5.1.2. Instrumental Variable Estimates

One potential concern is that our measure of the CEO's capture of the board is jointly endogenous with the firm's investment because a CEO's ability could affect both investment and his capture of the board. Such endogeneity would lead the coefficients reported in Panel A of Table 7 to be biased. In particular, if a CEO's ability were positively related to both his control over the board and the level of investment, then the OLS estimate would be biased upwards.

To address this concern, we rely on the custom of directors resigning when they reach a predetermined retirement age to identify the demand for new directors that is not a function of CEO ability or the firm's conditions. Most companies have a mandatory retirement age of 72 for outside

¹² In unreported analysis, we find that CEO ownership or CEO being the chairman of the board does not explain the effect of CEO tenure on investment and disinvestment. We also include all three measures of CEO power in one equation, and obtain results similar to those reported in Panel A of Table 7. These findings suggest that measures of *growing* CEO power over time can better explain the CEO investment cycles than other more static/dichotomous measures of CEO power.

directors, and inside directors' mandatory retirement age is usually around 65 (see Larcker (2011) for a discussion of directors' retirement policies). The fraction of directors that have reached the retirement age in a given year ("*% of Directors Reaching Retirement Age*") is unlikely to be correlated to the CEO's ability or the firms' investment policies and therefore would represent a valid instrument for *% of New Directors*.¹³

Panel B of Table 7 reports the estimates of the instrumental variable specification. The first stage results as well as the F-statistics indicate that our instrument is positively and significantly related to *% of New Directors*. The second stage results suggest that the exogenous variation in *% of New Directors* due to director aging still leads to higher corporate investment. Consequently, there appears to be a causal effect of CEO capture over the board on investment and growth, and the increase in investment over CEO tenure is not driven by improvement in CEO ability over time.

5.2. *Investment Quality over CEO Tenure*

An implication of the agency-based interpretation of the CEO investment cycle is that the quality of the firm's investments should decrease (to negative NPV) over the CEO cycle (*Implication 2*). We evaluate this implication using the stock market reaction to announcements of the firm's acquisitions as a measure of the firm's investment quality. The quality of acquisitions is particularly relevant to our tests for two reasons. First, the acquisition rate doubles in the first eight years of CEO tenure, accounting for a large fraction of the investment increases over the CEO cycle. Second, much literature argues that corporate mergers and acquisitions are often motivated by non-value maximizing reasons (e.g., Jensen (1993), Grinstein and Hribar (2004), Harford and Li (2007)).

¹³ This instrument is valid since it is highly correlated with the number of directors who actually retire and thus the fraction of new directors appointed by the CEO. In our sample, among the directors who have reached the retirement age, about 75% of them indeed resign around the mandatory age. This percentage is calculated as the fraction of directors who left the company in a one-year window around the retirement age (65 for inside directors and 72 for outside directors). This instrument also satisfies the exclusion restriction because changes in the instrumented *% of New Directors* over CEO tenure is driven solely by the aging of directors, which is unrelated to changes in the CEO's ability, and director aging should predict increasing investment only through the channel of CEO capture of the board. Note that we do not condition on a director's actual departure (due to retirement), as departure is a choice while aging is not.

Panel A of Table 8 documents the fraction of acquisitions with negative three-day cumulative market-adjusted returns around acquisition announcements. During the first three years of a CEO's tenure, the fraction of acquisitions with negative announcement returns is 39%, rising to 58% after the third year. This pattern suggests that the quality of acquisitions declines with CEO tenure, and that a larger fraction of the deals made in the later portion of a CEO's tenure are likely to be non-value maximizing.

Panel B of Table 8 tests this idea formally, presenting equations predicting the three-day market-adjusted return to acquisition announcements. Column (1) documents that acquisition announcement returns decrease with CEO tenure. However, in Column (2) when we include *% of New Directors* into the equation, CEO tenure does not affect announcement returns any more. These results suggest a CEO's ability to undertake value-decreasing acquisitions comes through his influence over the board of directors.

However, if *% of New Directors* partially reflects the CEO's ability and higher ability corresponds to both higher investment quality and more CEO power over the board, then the OLS estimate in Column (2) is biased upwards. For this reason, in Column (3) we use *% of Directors Reaching Retirement Age* as an instrument for *% of New Directors*. The estimates in Column (3) imply that the instrumented *% of New Directors* still negatively predicts the acquisition announcement returns, suggesting that the CEO's capture of the board, which increases over time, is the reason for the decline in acquisition quality over CEO tenure. The estimates imply that if *% of New Directors* changes from 0 to 1 purely due to directors reaching retirement age, then the 3-day acquisition announcement return would decrease by 2.4 percentage points. This effect is large in magnitude, given that the average 3-day acquisition announcement return is only 0.5% (median 0.2%). This drop implies a value decline of \$252 million for the average sized acquirer in our sample, which has a market capitalization of \$10.5 billion.

Overall, the results in subsections 5.1 and 5.2 are consistent with *Implications 1 and 2* of the agency view, which states that as a CEO's power grows in a firm, he will tend to increase corporate investment, and that the incremental investments tend to be of lower quality. Both the increase in investment level and the decrease in investment quality appear to be more related to a direct measure of the CEO's control of the board than simply his time in office. The findings that exogenous variation in

CEO tenure that is unrelated to CEO ability leads to increasing investment levels and deteriorating investment quality are not consistent with the efficiency-based view in which a CEO's time in office reflects improvement in the CEO's ability.

5.3. Residual Influence of the Old Management and Disinvestment

To evaluate *Implication 3*, that the disinvestment of poorly performing assets by the new CEO is negatively affected by the residual influence of the prior management, we construct four measures of the residual influence of the previous CEO (or management) on the new CEO. The first measure is “*Staggered Board*”, which is a dummy variable equal to one if the company has a staggered board. The existence of staggered board is determined historically, rather than at the discretion of the current management. Thus, the cross-sectional variation in *Staggered Board* provides variation in the residual influence from prior management that is unrelated to the firm's current conditions. In addition, we define “*Prior CEO Stays As Chairman*” to be a dummy variable equaling one if the outgoing CEO serves as the Chairman of the Board during the first year of the new CEO's tenure, “*% of Prior Mgmt. On Board*” as the fraction of the four most highly paid non-CEO executives under the previous management who sit on the board after turnover, and “*Outsider Succession*” as a dummy variable equaling one if the new CEO comes from outside the company.¹⁴ We expect the residual influence from the old management to be stronger if the firm has a staggered board, or the old CEO stays as the Chairman of the board, or a larger fraction of the old management stays on the board after turnover, or the new CEO is an insider (likely on the prior management team before the promotion).

We use *COMPUSTAT* (historical) segment data to measure the performance of the divested assets, which offers two advantages. First, the segment data allow us to identify the CEO and year when a segment is established and when it is divested or discontinued. Second, they allow us to capture industry- or firm-specific productivity shocks that could affect disinvestment intensity by including (segment) industry-year or firm-year fixed effects. We define “*Underperforming Segment*” to be an indicator variable that equals one if the industry-adjusted segment profitability (operating profits/loss over sales) is

¹⁴ We classify CEOs who have been with the firm for less than three years when becoming CEO as outsider CEOs. Based on this classification, about 32% of new CEOs in our sample are considered as outsider CEOs.

in the bottom tercile of the sample distribution for two consecutive years right before the CEO turnover. Panel C of Table 1 reports the summary statistics of this indicator. Using segment performance benchmarked on its industry-year median performance filters out industry-wide shocks. Measuring segment performance before the CEO turnover ensures that the performance reflects decisions made by the prior management rather than the new, and mitigates the concern that the new CEO manipulates the performance of the terminated segment downward to justify the decision or to blame his predecessor.

In this analysis, we consider only the segments established during the outgoing CEO's tenure, and examine the probability of them being divested or reorganized immediately following CEO turnover (i.e., during the first three years of the incoming CEO's tenure). The estimates on "*Underperforming Segment*" reported in Table 9 show that segments that were established but persistently underperformed their industry peers under the old management are significantly more likely than other segments to be divested or reorganized immediately after CEO turnover, even after controlling for firm-specific productivity shocks. The result implies that new CEOs reverse poor prior investment decisions, consistent with Weisbach (1995). These results, however, are based on a much larger sample than in the earlier study and include controls for many more factors that could affect both asset performance and divestiture probabilities. Therefore, these results constitute a substantial extension of Weisbach (1995).

The estimate on "*Staggered Board x Underperforming Segment*" in Column (1) implies that the probability of downsizing a poorly performing segment is reduced by 52% ($=0.036/0.069$) in the presence of a staggered board. Staggered boards are determined historically but do increase the residual influence of the prior management on the new CEO, since an incoming CEO cannot change the board composition quickly. The finding that a staggered board reduces the likelihood of a new CEO divesting a poorly performing segment is consistent with the agency explanation for the high disinvestment rate in the early years of a CEO's tenure. However, it is not consistent with the skill-based explanation, which argues that the post-turnover disinvestment intensity depends on the match between the new CEO's skills and the firm's existing assets (*Implication 4*), because the historically determined staggered board is unlikely to

be correlated with current productivity shocks or the quality of match between the CEO's skills and the firm's assets.

The results in Table 9 also suggest that the post-turnover disinvestment of poorly performing assets negatively depends on the residual influence of the prior leadership, regardless of how we measure such influence, by the existence a staggered board, by whether the departing CEO remains as the chairman of the board, by whether other executives from the previous leadership remain on the board, and by whether the incoming CEO is an insider. All these findings are consistent with *Implication 3* of the agency arguments, that the residual influence of the outgoing management has a substantial effect on the magnitude of post-turnover disinvestment.

5.4. The Fit of the Incoming CEO's Skills with the Firm's Assets

The final set of tests concerns *Implication 4*, which states that the rate of post-turnover divestitures will be higher when the incoming CEO's skills differ more from the firm's asset structure. To test this implication, one should ideally observe the incoming CEO's human capital and measure the extent to which it fits with the firm's asset structure. However, such a measure requires detailed information about the CEO's background and the firm for which we do not have access. Instead, our approach is to identify situations in which the new CEO's skills are more likely to fit (or do not fit) the firm's assets, and compare the magnitude of the post-turnover disinvestment in these situations with that in the full sample.

One such situation is when the outgoing CEO departs because of death, illness, or retirement. Presumably, since the board did not fire the CEO, it was satisfied with the departing CEO's skills and would be happy to find a new CEO with a similar set of skills. The fact that we find a similar investment cycle after these turnovers as in the full sample suggests that the changing management skills are not a main driver of the CEO investment cycle.

In addition, single-industry firms are less likely to have an incoming CEO with different skills from his predecessor than are conglomerates, so skill-motivated divestitures following turnovers are less likely in single-industry firms than in conglomerates. In addition, a replacement CEO who is a company

or industry insider is likely to have a similar set of skills to the outgoing CEO in these firms. Therefore, a comparison of whether there is less post-turnover disinvestment in single-industry firms than in conglomerates, and even less if these firms hire firm or industry insiders as CEOs, would represent a test of *Implication 4*.

We classify firms as operating in a single industry using the *COMPUSTAT* historical segment database and four-digit SIC. Column (1) of Table 10 presents estimates of the equations from Table 3 using the subsample of single-industry firms. These estimates indicate that the CEO investment cycle for these firms is comparable to that for the full sample. Column (2) further restricts the sample to be single-industry firms that hired company or industry insiders.¹⁵ The estimated magnitude of the CEO investment cycle for this subsample is again similar to those reported in Column (1) and the full sample.

In Column (3) we examine whether the magnitude of the CEO investment cycle in conglomerates¹⁶ depends on whether the new CEO is a generalist or a specialist. Relative to specialist CEOs, CEOs with more general skills often have experiences in multiple industries, and are thus more likely to fit with the diverse assets in conglomerates. As a measure of the generality of a CEO's skills, we rely on the General Ability Index developed in Custodio, Ferreira, and Matos (2013).¹⁷ The coefficient on the interaction between the General Ability Index and CEO tenure is small and not statistically significant, suggesting that in conglomerates, the magnitude of post-turnover disinvestment does not significantly differ across CEOs with more general skills and those with more specialized skills. Overall, the results in Table 10 do not support *Implication 4* and therefore suggest that the skill-matching explanation is unlikely to be a main driver for the abnormally high disinvestment rate immediately following CEO turnover.

¹⁵ The data on industry backgrounds of CEOs is taken from Camelia Kuhnen's website, <http://public.kenan-flagler.unc.edu/faculty/kuhnenc/>.

¹⁶ We define a conglomerate as a firm that operates across multiple four-digit SIC industries. However, defining conglomerate using three-digit SIC or two-digit SIC leads to similar results as those reported in Table 10 Column (3).

¹⁷ This is an index established in Custodio, Ferreira, and Matos (2013) to measure how general a CEO's skills are. It is the first factor of applying principal component analysis of: past number of positions, number of firms, number of industries, CEO experience dummy, and conglomerate experience dummy.

The model of Eisfeldt and Kuhnen (2013) provides additional predictions of the skill-matching-based explanation for post-turnover disinvestment. In this model, a shock to the productivity of physical capital can change the optimal set of managerial skills, leading to management turnovers. Thus, CEO turnovers that follow significant industry shocks are more likely to have incoming CEOs possessing different skills from outgoing CEOs, and are also more likely to be followed by significant changes in investment and disinvestment. Consequently, this argument predicts that there should be larger CEO investment cycles when CEO turnovers follow industry shocks.

However, this argument cannot explain the existence of the CEO investment cycles after exogenous CEO turnovers, which are unlikely to coincide with industry productivity shocks. We further provide direct tests of the impact of industry productivity shocks on the magnitudes of the CEO cycles in Appendix D. These tests suggest that the existence and the magnitudes of the CEO investment cycles are not sensitive to the industry conditions at the time when new CEOs take office.

In summary, while skills that differ between incoming and outgoing CEOs could potentially lead to post-turnover disinvestment pattern in some firms, our results suggest that it is not the predominate explanation for the majority of our sample.

6. Summary and Implications

One of the most important things we study in business schools is the role of management in public companies. Much of what we teach presumes that managerial decisions make a difference, and that firms in reality are *not* in the “first-best” world described by many economic models. Yet, identifying systematic influences of management empirically is challenging because of heterogeneity across CEOs and firms, as well as the endogenous matching between CEOs and firms.

Our paper addresses this issue by documenting a systematic relation between CEO tenure and the firm’s investment and growth, which we refer to as the *CEO Investment Cycle*. Shortly after a new CEO takes office, the firm’s disinvestment rate rises sharply and investment and growth rate are relatively low. As the CEO’s tenure lengthens, the disinvestment rate declines while the investment rate and growth rate

increase continuously and substantially. The cyclical pattern of investment over CEO tenure exists regardless of the reasons for the predecessor CEO's departure, and regardless of the background of the incoming CEO. The CEO cycle effect on investment is of the same order of magnitude as the effects of other well-known factors such as the business cycle, political uncertainty, and financial constraints.

Our analysis suggests that the CEO investment cycle is best explained by a combination of agency-related factors. CEOs have many reasons to prefer more investment than is optimal from a value-maximization perspective. As a CEO acquires more influence over the board, his ability to overinvest increases, leading to increasing investment quantity but decreasing quality over the CEO's tenure. The poor investment decisions tend to be reversed only after the CEO steps down and his successor takes office, and the intensity of the reversal is negatively affected by the residual influence of the old management on the new CEO. Eventually, the process is repeated during each CEO cycle.

In contrast, arguments based on differing CEO skills, productivity shocks, or CEO tenure endogenously reflecting the firm's investment opportunities or CEO ability do not explain the nature and magnitude of the CEO investment cycles. One may not definitively rule out that investment changes over the CEO cycle could occur in *some* firms because the first-best set of investments varies systematically with the identity and tenure of the CEO. However, all the evidence presented in this paper favors the view that in *most* firms, the change in investment over the CEO cycle occurs because of agency problems.

The evidence in this paper implies that factors internal to the firm appear to affect investment in a consequential way. Much attention in the economics literature has been paid to the effect of economy-wide variables such as tax policies, business cycles, and financial constraints on firms' investments. Yet, the governance-related effects that we document in this paper are of the same order of magnitude as these often-studied external factors. While much attention has been given to corporate governance in the academic literature lately, its impact on investment likely has been understated, and should be incorporated into models of investment.

Analysis of changes in investment over the CEO cycle provides a way to identify the role of management in corporations. While the results we present here favor agency-based explanations for

investment, much more remains to be done. It is likely that whatever inefficiencies implied by the existence of the CEO investment cycle understate the inefficiencies due to agency problems. Our analysis focuses mainly on the quantity and quality of investment, ignoring other factors as its risk, horizon, etc. There are a number of theories that characterize the manner in which principal-agent problems can lead to distortions away from the first-best investments along these dimensions. Quantifying the nature of these distortions is likely to be a fruitful direction for future research. In addition, more sophisticated theories in which management cycles interact with productivity could lead to different empirical interpretations, potentially reconciling the results presented here with first-best investment, or with other types of agency problems. The existence of large changes in investment over the CEO cycle is an empirical regularity likely to stimulate much more research.

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Table 1: Summary Statistics

Panel A: CEO Turnovers

This panel reports the distribution of CEO turnovers in our sample period as well as across different reasons. Turnover year is identified as the year of “becameceo” for each new CEO in ExecuComp. Although ExecuComp’s coverage starts in 1992, some of the CEOs in the database took office before 1992, leading to some CEO turnovers from the 1980s being in our sample. “CEO Total Time in Office” is the entire length of a CEO’s tenure. This is different from the variable “Tenure”, which counts the t-th year that the CEO is in office. “Generalist Ability” is the generalist ability index from Custodio, Ferreira, and Matos (2013), which is available from 1993 to 2007.

Turnover Year Distribution

Became CEO Year	1980-1989	1990-1994	1995-1999	2000-2004	2005-2009	Total
Freq.	867	978	1,284	1,226	1,065	5,420
Percent	16	18.04	23.69	22.62	19.65	100

CEO Age and Time in Office

CEO Attribute	Obs	Mean	25 th percentile	Median	75 th percentile
CEO Age (at turnover)	5,172	51.280	46	51	56
CEO Total Time in Office	5,420	6.989	3	6	10
Generalist Ability	2,515	0.139	-0.622	-0.003	0.706

Reasons of Turnovers

	Freq.	% of Sample
(1): Turnovers due to death, illness	162	3
(2): Turnovers due to death, illness or retirement of departing CEO at good performance	243	4
(3): Turnovers with o management shakeup	1,032	19
(4): Turnovers with good pre-turnover performance	880	16
(5): (2) or (3) or (4)	1,863	34
(6): Not classified	3,238	60
(7): Outright forced turnover	319	6
Total from (5), (6), (7)	5,420	100

Panel B: Disinvestment and Investment Variables

This table reports summary statistics of the disinvestment and investment variables. “Discontinued operations” is the absolute value of the income from discontinued operations (item “DO” in Compustat). “Acquisition Rate” is the value of acquired assets divided by lagged net PPE. “Capx Rate” is capital expenditures divided by lagged net PPE. “Investment Rate” is the sum of acquisition and capital expenditures scaled by lagged net PPE. “Asset Growth Rate” is the annual growth rate of book assets, and “Employment Growth Rate” is the annual growth rate of the firm’s number of employees. The two indicator variables related to announcements are constructed at the firm-month level, the two indicator variables related to segment start and termination are constructed at the firm-segment-year level, while other variable at the firm-year level. Downsizing and expansion announcements are from the Capital IQ database with coverage starting after 2000. Segment variables are constructed using Compustat (historical) segment database. Our sample includes S&P 1,500 firms with available data on total assets and identifiable CEOs from *Execucomp*, over the period 1980-2011.

Investment	Obs	Mean	25 th percentile	Median	75 th percentile
Capx Rate	36,901	0.327	0.113	0.203	0.363
Acquisition Rate	36,901	0.338	0	0	0
Investment Rate	36,901	0.666	0.126	0.239	0.497
$I_{\{\text{expansion announcement(s) in the month}\}}$	245,677	0.081	0	0	0
$I_{\{\text{segment start}\}}$	216,569	0.161	0	0	0
Disinvestment					
$I_{\{\text{asset sales}>0 \text{ or discontinued operations}>0\}}$	39,292	0.210	0	0	0
$I_{\{\text{downsizing announcement(s) in the month}\}}$	245,677	0.040	0	0	0
$I_{\{\text{segment termination}\}}$	196,717	0.095	0	0	0
Net Effects					
Asset Growth Rate	38,460	0.203	-0.004	0.076	0.208
Employment Growth Rate	36,575	0.094	-0.033	0.030	0.134

Panel C: Other Firm Level Control Variables

This table reports summary statistics for firm-year level financial attributes, governance related variables, segment-level variables, and deal-specific variables (in acquisitions). “% On Board [prior mgt.]” is the percentage of prior management (top-4 highest paid executives except for the CEO) from the previous regime that still serves as directors on the board during the first year of the new CEO’s tenure. “Stay As Chairman [prior CEO]” is an indicator variable that equals one if the prior CEO stays as the Chairman of the Board during the first year of the new CEO’s tenure. All variable definitions are provided in Appendix A. Firm attributes are constructed using data from Compustat. Governance variables are constructed using data from RiskMetrics (which starts from 1996) and Execucomp. Segment variables are constructed using Compustat’s (historical) segment data. Deal-specific variables are constructed using data from SDC Platinum. Mkt-adj. announcement day returns are constructed using CRSP data.

<i>Firm Attribute (by firm-year)</i>	Obs	Mean	25 th percentile	Median	75 th percentile
Ind-adj.ROA	37,223	0.057	-0.008	0.033	0.114
Ind-adj. Return	36,580	0.147	-0.158	0.039	0.28
MB	37,680	2.877	1.327	2.042	3.333
Leverage	39,069	0.241	0.065	0.213	0.355
Div. Payer	39,292	0.522	0	1	1
Log(Assets)	39,291	7.108	5.814	7.085	8.425
# of Segments	36,460	2.282	1	2	3
Firm Age	39,193	18.626	7	16	30
Cash Ratio	43,391	0.093	0.015	0.046	0.122
% of New Directors	16,220	0.52	0.25	0.5	0.778
% of Directors Reaching Retirement Age	16,220	0.132	0	0	0.182
<i>Manager Attribute (by turnover)</i>					
% On Board [prior mgt.]	3,248	0.214	0	0.25	0.5
Stay As Chairman [prior CEO]	3,402	0.277	0	0	1
Outsider Succession	5,201	0.325	0	0	1
<i>Segment Attribute (by segment-year)</i>					
Segment Performance	65,390	0.038	0.037	0.099	0.182
Underperforming Segment (right before turnover)	36,880	0.095	0	0	0
Segment Age	128,961	6.261	3	5	8
<i>Deal Attribute (by deal)</i>					
CAR [-1,1] around Acquisition Announcements (in percentage)	15,749	0.517	-1.811	0.217	2.556
Public Target	15,749	0.23	0	0	0
log(Deal Value)	14,761	3.753	2.681	3.848	5.011
% of Stock	15,678	0.185	0	0	0.155

Table 2: Investment Rate and CEO Tenure

Panel A: Investment Rate and CEO Tenure

This table reports the trend in the investment rate over CEO tenure. “Year [0, 2]” indicates the first 3 years of a CEO’s tenure. A constant term is included in all models but omitted for brevity. All control variables are lagged. The definitions of all variables are in Appendix A. The standard errors are clustered by firm. ***, ** and * indicate significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Full Sample		Death/Illness	Death/Illness/Ret. at Good Performance	No Mgt Shakeup	Good Pre-turnover Performance
	<i>Investment Rate</i>					
Years [0,2]	-0.046** (0.022)					
Tenure (in years)		0.029*** (0.006)	0.024* (0.013)	0.024** (0.012)	0.031*** (0.008)	0.032*** (0.008)
Ind-adj. ROA	1.212*** (0.160)	1.398*** (0.209)	0.894 (0.582)	0.713 (0.553)	1.589*** (0.554)	1.287** (0.543)
Ind-adj. Return	0.093*** (0.019)	0.116*** (0.025)	0.154 (0.162)	0.121 (0.099)	0.001 (0.035)	0.077 (0.077)
MB	0.016*** (0.004)	0.018*** (0.004)	0.004 (0.012)	-0.008 (0.008)	0.004 (0.007)	0.004 (0.008)
Leverage	0.108*** (0.041)	0.128*** (0.050)	0.453 (0.463)	0.217 (0.200)	0.206** (0.101)	-0.058 (0.085)
Div. Payer	-0.798*** (0.097)	-0.919*** (0.124)	-0.936 (0.712)	-0.290 (0.580)	-0.246 (0.251)	-0.427* (0.226)
log(Assets)	-0.283*** (0.035)	-0.348*** (0.045)	-0.272 (0.246)	-0.281 (0.171)	-0.341*** (0.089)	-0.320*** (0.083)
Firm-CEO F.E., Year F.E.	x	x	x	x	x	x
Obs	33,559	33,559	927	1,688	7,516	7,176
Adj. R-sqr.	0.245	0.218	0.225	0.249	0.227	0.249

Panel B: Expansion Announcements and Segment Starts

In Columns (1) and (2), the dependent variables are the expansion announcement indicator $I_{\{ \text{expansion announcement(s) in the month} \}}$, and the observations are at the firm-month level. Expansion announcements are from the Capital IQ database and acquisition announcements are from SDC Platinum. The sample period is 2001-2009, since the Capital IQ coverage begins after 2000. In Columns (3) and (4), the dependent variables are the segment start indicator $I_{\{ \text{segment start} \}}$. The data source is Compustat "historical segment" database. In columns (2) and (4), we use the subsample of turnovers due to death, illness, or retirement of the departing CEOs. The definitions of all variables are in Appendix A. The Huber-White robust standard errors are clustered by firm and reported in parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% levels respectively.

	$I_{\{ \text{expansion announcement(s) in the month} \}}$		$I_{\{ \text{segment start} \}}$	
	(1)	(2)	(3)	(4)
	Full Sample	Death/Illness/Retirement	Full Sample	Death/Illness/Retirement
Tenure (in months)	0.001*** (0.0001)	0.001*** (0.0002)		
Tenure (in years)			0.004** (0.002)	0.001** (0.0005)
Ind-adj. ROA	0.021* (0.011)	0.018 (0.025)	0.037 (0.033)	0.080 (0.089)
Ind-adj. Return	0.002* (0.001)	0.007** (0.003)	-0.004 (0.003)	-0.028*** (0.009)
MB	0.000 (0.000)	0.001 (0.001)	-0.001 (0.001)	0.004 (0.003)
Leverage	-0.032*** (0.012)	-0.031 (0.026)	0.019* (0.010)	0.028 (0.031)
Div. Payer	0.015*** (0.005)	0.020* (0.011)	-0.043** (0.019)	0.119 (0.091)
log(Assets)	0.011*** (0.004)	0.010 (0.013)	0.009 (0.006)	-0.038 (0.028)
# of Segments			-0.047*** (0.003)	-0.093*** (0.014)
Firm-CEO F.E., Year F.E.	x	x	x	x
Obs.	223,482	44,112	144,287	16,007
Adj. R-sqr.	0.148	0.135	0.110	0.254

Table 3: Disinvestment Probability and CEO Tenure

Panel A: Disinvestment Probability and CEO Tenure

The dependent variables are the disinvestment indicator variable $I_{\{\text{asset sales}>0 \text{ or discontinued operations}>0\}}$. “Year [0,2]” indicates the first 3 years of a CEO’s tenure. A constant term is included in all models but omitted for brevity. All control variables are lagged. The definitions of all variables are in Appendix A. The standard errors are clustered by firm. ***, ** and * indicate significance at the 1%, 5% and 10% levels respectively.

	(1) Full Sample	(2)	(3) Death/Illness	(4) Death/Illness/Ret. at Good Performance	(5) No Mgt Shakeup	(6) Good Pre-turnover Performance
	$I_{\{\text{asset sales}>0 \text{ or discontinued operations}>0\}}$					
Years [0,2]	0.023** (0.011)					
Tenure (in years)		-0.015*** (0.005)	-0.018*** (0.006)	-0.010* (0.006)	-0.008* (0.005)	-0.009* (0.005)
Ind-adj. ROA	-0.145*** (0.024)	-0.158*** (0.022)	-0.610*** (0.124)	-0.548*** (0.122)	-0.217*** (0.070)	-0.253*** (0.059)
Ind-adj. Return	-0.006** (0.003)	-0.007** (0.003)	-0.026 (0.023)	0.013 (0.022)	-0.004 (0.008)	0.001 (0.008)
MB	-0.001 (0.001)	-0.001 (0.001)	0.003 (0.002)	-0.002 (0.004)	-0.002 (0.002)	-0.003 (0.002)
Leverage	-0.023 (0.014)	-0.022* (0.012)	-0.034 (0.098)	-0.055 (0.061)	0.021 (0.036)	-0.033 (0.029)
Div. Payer	0.077*** (0.026)	0.076*** (0.021)	0.133 (0.199)	0.075 (0.105)	0.128* (0.069)	0.146*** (0.057)
log(Assets)	0.017** (0.007)	0.012** (0.006)	0.038 (0.041)	0.033 (0.031)	0.043* (0.022)	0.046*** (0.014)
Firm-CEO F.E., Year F.E.	x	x	x	x	x	x
Obs	34,067	34,067	928	1,692	7,626	7,279
Adj. R-sqr.	0.356	0.356	0.358	0.388	0.376	0.342

Panel B: Downsizing Announcements and Segment Termination

In Columns (1) and (2), the dependent variables are the downsizing announcement indicator $I_{\{\text{downsizing announcement(s) in the month}\}}$. Observations are at the firm-month level. Downsizing announcements are from the Capital IQ database with coverage starting after 2000. In Columns (3) and (4), the dependent variables are the segment termination indicator $I_{\{\text{segment termination}\}}$. Observations are at the segment-year level. The data is from Compustat “historical segment” database, and we only include multi-segment firm-years. “Segment Performance” measures the operating performance of the segment (segment-year level operating profit or loss scaled by segment-year level sales). “Segment Age” is the number of years since the establishment of the segment. “# of Segments” is the number of segments with unique segment IDs. In models (2) and (4), we use the subsample of turnovers due to death, illness, or retirement of the departing CEOs. The definitions of all variables are in Appendix A. Regressions include but do not report the constant term. The Huber-White robust standard errors are clustered by firm and reported in parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% levels respectively.

	$I_{\{\text{downsizing announcement(s) in the month}\}}$		$I_{\{\text{segment termination}\}}$, <i>Multi-Segment</i>	
	(1) Full Sample	(2) Death/Illness/ Retirement	(3) Full Sample	(4) Death/Illness/ Retirement
Tenure (in months)	-0.001*** (0.0001)	-0.001** (0.0005)		
Tenure (in years)			-0.003** (0.001)	-0.013*** (0.004)
Ind-adj. ROA	-0.011** (0.005)	-0.002 (0.011)	-0.034 (0.044)	-0.090 (0.111)
Ind-adj. Return	-0.003*** (0.001)	-0.005** (0.002)	-0.003 (0.004)	-0.016 (0.011)
MB	-0.001** (0.000)	-0.000 (0.000)	0.000 (0.001)	0.001 (0.003)
Leverage	-0.002 (0.006)	-0.012 (0.019)	0.005 (0.014)	0.068** (0.029)
Div. Payer	0.013*** (0.004)	0.014** (0.007)	0.009 (0.028)	0.136 (0.091)
log(Assets)	0.015*** (0.002)	0.013** (0.005)	0.009 (0.009)	0.014 (0.026)
Segment Performance			-0.024*** (0.005)	-0.007 (0.013)
# of Segments			-0.021*** (0.005)	-0.006 (0.013)
Segment Age			0.008*** (0.001)	0.009*** (0.002)
Firm-CEO F.E., Year F.E.	x	x	x	x
Obs.	223,482	44,112	42,208	4,483
Adj. R-sqr.	0.148	0.147	0.134	0.137

Table 4: Net Effects CEO Tenure on Disinvestment and Investment

Panel A reports the trend in the asset growth rate over CEO tenure. Panel B reports the trend in the employment growth rate over CEO tenure. The usual set of control variables (lagged): Industry-adj. ROA and Return, MB, Leverage, Div. Payer, log(Assets), firm-CEO fixed effects and year fixed effects, as well as a constant term is included in all models but omitted for brevity. The definitions of all variables are in Appendix A. The standard errors are clustered by firm and reported in parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% levels respectively.

Panel A: Asset Growth Rate and CEO Tenure

	(1)	(2)	(3)	(4)	(5)	(6)
	Full Sample		Death/Illness	Death/Illness/Ret. at Good Performance	No Mgt Shakeup	Good Pre-turnover Performance
<i>Asset Growth Rate</i>						
Years [0,2]	-0.053** (0.026)					
Tenure (in years)		0.025*** (0.002)	0.028*** (0.009)	0.032*** (0.007)	0.026*** (0.004)	0.025*** (0.003)
Firm-CEO F.E., Year F.E.	x	x	x	x	x	x
Obs	34,067	34,067	928	1,692	7,626	7,279
Adj. R-sqr.	0.239	0.239	0.130	0.089	0.306	0.265

Panel B: Employment Growth Rate and CEO Tenure

	(1)	(2)	(3)	(4)	(5)	(6)
	Full Sample		Death/Illness	Death/Illness/Ret. at Good Performance	No Mgt Shakeup	Good Pre-turnover Performance
<i>Employment Growth Rate</i>						
Years [0,2]	-0.021** (0.010)					
Tenure (in years)		0.011*** (0.001)	0.020*** (0.007)	0.020*** (0.004)	0.015*** (0.002)	0.015*** (0.002)
Firm-CEO F.E., Year F.E.	x	x	x	x	x	x
Obs	33,232	33,232	916	1,672	7,494	7,063
Adj. R-sqr.	0.209	0.209	0.146	0.160	0.164	0.180

Table 5: Comparing the Magnitude of the CEO Cycle with Other Factors Affecting Investment (Capital Expenditures)

This table compares the estimation coefficients of the CEO cycle effect (*First 3 years vs. later*, using the specification as in column (1) of Table 2, Panel A) with the effects of other external factors that affect firm’s capital expenditure: business cycle (*Recession vs. non-recession*, see results presented in Appendix Table C, Column (2)), political cycle (*Election vs. non-election*, see Julio and Yook, 2012), and financial constraints (*One std. dev. increase in financial constraint during 2008-2009*, see Hoberg, and Maksimovic, 2014). I/K, I/A, and I/S are Capital Expenditures scaled by lagged (beginning-of-period) PPE, lagged Assets, and Sales, respectively.

Business cycles: Firm level and aggregate corporate investment rates tend to vary substantially between expansions and recessions. In Appendix Table C, we compare the magnitude of the business cycle effect to the CEO investment cycle effect. To do so, we define *Recession* as an indicator variable that equals one for years 1980-1982, 1990-1991, 2001, 2008-2010 and include this variable into the specification predicting changes in disinvestment, investment, and firm growth. Columns (1)-(3) in Appendix Table C show that the effects of CEO tenure and the business cycle on corporate investment rates are comparable in magnitude. Column (4) shows that disinvestment is actually less likely to occur in recession years than in expansion years, and thus the business cycle effect on disinvestment intensity is very different from the CEO cycle effect. Columns (5)-(6) show that the effects of CEO tenure and the business cycle on asset growth and employment growth are comparable in magnitude as well. The CEO cycle effect on corporate investment is non-trivial compared to the effect of the business cycle.

Political uncertainty: Julio and Yook (2012) estimate the extent to which corporate investment varies over the political election cycle. These authors find that the corporate investment rate (capital expenditures scaled by the beginning-of-year book assets) is on average 0.4 percentage point lower in national election years than in non-election years, or a 5% reduction relative to the sample median rate (=5.1%). If we use the same definition of investment rate as in their study, then our estimates indicate that the investment rate is 0.5 percentage point lower in early CEO tenure years than in later years with firm-CEO fixed effects and 1 percentage point lower with firm fixed effects (as in their study). Thus, the CEO investment cycle is comparable to the election cycle effect documented by Julio and Yook (2012).

Financial constraints: If firms face financial constraints, meaning that their cost of finance exceeds the appropriate risk-adjusted rate of return, then firms’ investment is likely to be reduced. Using a text-based approach to measure the existence of financial constraints, Hoberg and Maksimovic (2014) estimate that during the 2008-2009 Financial Crisis, a one standard-deviation increase in financial constraint is associated with a decrease in the annual corporate investment rate (CAPX scaled by sales) in the range of 0% to 0.8%, depending on the measure of financial constraint they use. In other years, the estimated effect of financial constraints on investment is smaller than during the Financial Crisis. If we convert our estimates to comparable units, our estimates imply that the difference in investment rate between early and late years of the CEO cycle is about 0.7%, in the range that Hoberg and Maksimovic find for the Financial Crisis and larger than what they find in other periods.

	I/K	I/A	I/S
CEO’s first 3 years vs. later	-1.6 pts	-0.5 pts	-0.7 pts
Recession vs. non-recession	-2.6 pts		
Election vs. non-election (Julio and Yook, 2012)		-0.4 pts	
One std. dev. increase in financial constraint during 2008-2009 (Hoberg and Maksimovic, 2014)			0 to -0.8 pts

Table 6: Summary of Explanations for CEO Investment Cycles and their Empirical Support

This table summarizes three explanations for CEO investment cycles and their empirical implications. It also summarizes the main findings that either support or contradict the implications of each explanation.

Explanation	Empirical Implications	Empirical Findings about Investment	Empirical Findings about Disinvestment
<p>Management Irrelevance: Management plays no role in determining firms' investments.</p>	<p>CEO investment cycles could exist in this world if CEO turnovers happen to coincide with investment shocks that lead to high disinvestment and low investment.</p>	<p>[Inconsistent]: CEO investment cycles exist even after turnovers due to death or illness of the departing CEOs, which are unlikely to be related to investment shocks.</p> <p>[Inconsistent]: CEO investment cycles exist following other turnovers that are also unlikely to coincide with periods of high disinvestment and low investment:</p> <ul style="list-style-type: none"> - Turnovers due to normal retirement of the departing CEOs - Turnovers with no shakeups in the top management team - Turnovers preceded by good pre-turnover performance and low pre-turnover volatility 	<p>[Inconsistent]: The same as those listed in the previous column.</p>
<p>Agency Explanation: CEO investment cycles reflect the changing equilibrium in a world in which managers' incentives are not perfectly aligned with shareholders.</p> <p>CEOs prefer their firms to grow, potentially at the cost of shareholders. This preference leads to overinvestment in the later part of CEO tenure as the CEO becomes more powerful over the board.</p> <p>The private benefits from growth make CEOs reluctant to divest</p>	<p>Increasing investment over CEO tenure:</p> <ul style="list-style-type: none"> - Holding other factors constant, the increase in investment over CEO tenure should come through the CEO's power over the board. - Investment quality decreases with CEO tenure, and is also related to the CEO's power over the board. <p>Decreasing disinvestment over CEO tenure:</p> <ul style="list-style-type: none"> - The residual influence of the prior management negatively affects the post-turnover disinvestment intensity of poorly performing assets. 	<p>[Consistent]: Investment quality (measured by acquisition announcement returns) decreases over CEO tenure, and are significantly more likely to be negative in later periods of CEO tenure.</p> <p>[Consistent]: Both the increase in the investment level and the decrease in quality are driven by the CEO's increasing capture of the board over time, even when the board capture results exogenously from directors reaching retirement age.</p>	<p>[Consistent]: The residual influence of the prior management negatively affects the disinvestment intensity of poorly performing assets post turnover, even when the residual influence occurs for exogenous reasons (in the presence of a staggered board).</p>

<p>assets they have established, even if the firm is no longer the optimal owner of the assets. CEO turnover facilitate investment re-optimization, leading to high disinvestment after turnover.</p>			
<p>Efficiency Explanations:</p> <p>The CEO's ability to identify positive NPV projects improves over his tenure, leading to increasing investment.</p> <p>The new CEO's skills do not fit with the firm's existing asset structure, leading to high disinvestment immediately after turnover.</p>	<p>Increasing investment over CEO tenure:</p> <ul style="list-style-type: none"> - Increasing investment level is not associated with a change in investment quality. <p>Decreasing disinvestment over CEO tenure:</p> <ul style="list-style-type: none"> - The intensity of post-turnover disinvestment negatively depends on the fit between the new CEO's skills and the firm's assets. 	<p>[Inconsistent]: Variation in CEO power due to factors unrelated to CEO ability (i.e., director aging) still leads to increase in investment.</p> <p>[Inconsistent]: Investment quality decreases (to negative) over CEO tenure.</p>	<p>[Inconsistent]: The CEO investment cycles exist even after turnovers due to death or illness of the departing CEOs (when the boards do not necessarily have desire to select new CEOs with different skills).</p> <p>[Inconsistent]: The magnitudes of the CEO investment cycles when single-industry firms hire insider CEOs (when the new CEOs' skills are more likely to fit firms' assets) are comparable to those in the full sample.</p> <p>[Inconsistent]: In multi-industry firms, the magnitudes of the CEO investment cycles are similar no matter whether the firm hires a generalist CEO or a specialist CEO.</p> <p>[Inconsistent]: The magnitude of the CEO investment cycle is similar regardless of whether there is an industry productivity shock at the time of the turnover (when the new CEO's skills are less likely to fit the firm's assets) or not.</p>

Table 7: Agency Explanations for the Investment Cycle

Panel A: CEO Capture of the Board and Investment

This table reports the effect of the percentage of directors appointed during the incumbent CEO's tenure on firm investment. All control variables are lagged. Firm-CEO fixed effects and year fixed effects are included in all models. The definitions of all variables are in Appendix A. The Huber-White robust standard errors are clustered by firm and reported in parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)	(4)
	Investment Rate		CapEx Rate	Acquisition Rate
Tenure	0.029*** (0.007)	0.014 (0.010)	-0.003 (0.002)	0.017 (0.012)
% of New Directors		0.341*** (0.123)	0.075*** (0.025)	0.266** (0.116)
Ind-adj. ROA	1.433*** (0.292)	1.424*** (0.290)	0.483*** (0.071)	0.941*** (0.254)
Ind-adj. Return	0.064 (0.041)	0.062 (0.041)	0.037*** (0.009)	0.025 (0.037)
MB	0.011** (0.005)	0.011** (0.005)	0.007*** (0.002)	0.004 (0.004)
Leverage	-0.868*** (0.193)	-0.872*** (0.193)	-0.080 (0.050)	-0.792*** (0.182)
Div. Payer	0.105** (0.048)	0.120** (0.048)	0.015 (0.010)	0.105** (0.046)
log(Assets)	-0.608*** (0.072)	-0.597*** (0.072)	-0.071*** (0.014)	-0.526*** (0.066)
Firm-CEO F.E., Year F.E.	x	x	x	x
Obs	15,478	15,478	15,478	15,478
Adj. R-sqr.	0.275	0.276	0.459	0.214

Panel B: Instrumental Variables Estimates of the Effect of CEO Power on Investment

This table reports the results with the instrumented “% of New Directors”, using the cumulative number of directors reaching retirement age during the incumbent CEO’s tenure until the current fiscal year, scaled by the current board size. All control variables are lagged. Firm-CEO fixed effects and year fixed effects are included. The definitions of all variables are in Appendix A. The Huber-White robust standard errors are clustered by firm and reported in parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% levels respectively. The F-statistics for the first-stage and the Anderson-Rubin Wald tests are reported at the bottom of the table.

	First-Stage % of New Directors	Second-Stage Investment Rate
% of Directors Reaching Retirement Age	0.101*** (0.019)	
% of New Directors		0.244** (0.115)
Ind-adj. ROA	-0.003 (0.028)	0.325*** (0.044)
Ind-adj. Return	0.009*** (0.002)	0.010 (0.006)
MB	-0.000 (0.000)	0.002** (0.001)
Leverage	0.010 (0.024)	-0.339*** (0.037)
Div. Payer	-0.041*** (0.013)	0.022* (0.013)
log(Assets)	0.0001 (0.008)	-0.173*** (0.012)
Firm-CEO F.E., Year F.E.	x	x
Obs	15,112	15,112
First-Stage F-Statistics	36.88***	
Anderson-Rubin Wald test		3.10**

Table 8: Investment Quality

Panel A: Quality and Timing of Investment

This panel reports the % of negative announcement abnormal returns for deals made in the first three years of a CEO's tenure vs. in later years. ***, ** and * indicate significance at the 1%, 5% and 10% levels respectively.

	Deals made in years[0,2]	Deals made after years[0, 2]	Difference
% of CAR [-1, 1] around Acq. Announcements<0	39%	58%	-19%**

Panel B: Market Reaction to Acquisitions and CEO Power

This table reports the effect of CEO's capture of board on the three-day cumulative market-adjusted return (in percentage points) around acquisition announcements. The market return is constructed using the value-weighted market portfolio. Models (1) and (2) report the results using OLS. Models (3) and (4) report the 2nd-stage results of the instrumental variable approach, in which the measure for CEO power (% of New Director) is instrumented using the cumulative number of directors reaching retirement age during the incumbent CEO's tenure until the current fiscal year, scaled by the current board size. Control variables include deal-specific variables (deal size, % of stock as the source of the fund, and an indicator variable for public target) and lagged firm-specific variables (cash ratio, M/B, firm size). Year fixed effects and a constant term are included in all models. The Huber-White robust standard errors are clustered by firm and reported in parenthesis.

	CAR [-1, 1] around Acquisition Announcements		
	OLS		IV 2 nd Stage
	(1)	(2)	(3)
Tenure	-0.042** (0.021)	0.004 (0.031)	
% of New Directors		-0.981** (0.482)	-2.396** (1.200)
Public Target	-0.390** (0.186)	-0.389** (0.186)	-0.449*** (0.154)
log(Deal value)	0.019 (0.046)	0.021 (0.046)	0.058* (0.034)
% of stock	-1.471*** (0.357)	-1.467*** (0.358)	-1.474*** (0.274)
Cash Ratio	0.582 (1.425)	0.627 (1.422)	-1.481* (0.789)
MB	0.019 (0.031)	0.019 (0.030)	0.024 (0.019)
log(Assets)	-0.739*** (0.253)	-0.785*** (0.252)	-0.158*** (0.043)
Year F.E.	x	x	x
Obs.	8,533	8,533	8,533
Adj. R-sqr.	0.044	0.045	

Table 9: Agency Explanations for the Disinvestment Cycle

The analysis in this table uses the segment data from Compustat “historical segment” data base, for multi-segment firms in our sample. The dependent variable is an indicator variable that equals 1 if a segment established during the outgoing CEO’s tenure is divested or discontinued during the first three years of the incoming CEO’s tenure. We only include segments that are established during the departing CEO’s tenure. “Underperforming Segment” is a dummy variable that equals 1 if the industry-adjusted segment performance is in the bottom tercile of the sample distribution for two consecutive years right before the CEO turnover. Information on “Staggered Board” is from the governance (and governance-legacy) database from RiskMetrics, which starts from 1990. Information on “% of Prior Mgt. On Board” is from the director (and director-legacy) database from RiskMetrics, which starts from 1996. The observations are at the segment-year level. In all models, we control for firm-year fixed effects and use the first three years after the original CEO was replaced (“under new regime”). All variables definitions are in Appendix A. The Huber-White robust standard errors are clustered by firm and reported in parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% levels respectively.

	$I_{\{segment\ termination\}}$			
	Under new regime in years [0,2]			
	(1)	(2)	(3)	(4)
Underperforming Segment	0.069*** (0.014)	0.056*** (0.010)	0.062*** (0.012)	0.042*** (0.008)
Staggered Board x Underperforming Segment	-0.036** (0.016)			
Prior CEO Stay as Chairman x Underperforming Segment		-0.015* (0.008)		
% of Prior Mgt. On Board x Underperforming Segment			-0.026* (0.015)	
Outsider Succession x Underperforming Segment				0.036** (0.016)
Segment Age	-0.003*** (0.000)	-0.004*** (0.000)	-0.004*** (0.000)	-0.004*** (0.000)
Constant	0.076*** (0.003)	0.085*** (0.003)	0.086*** (0.003)	0.093*** (0.003)
Firm-Year F.E.	x	x	x	x
Obs.	26,223	29,516	30,090	42,118
Adj. R-sqr.	0.279	0.276	0.282	0.292

Table 10: CEO Investment Cycles in Single- vs. Multi-Industry Firms

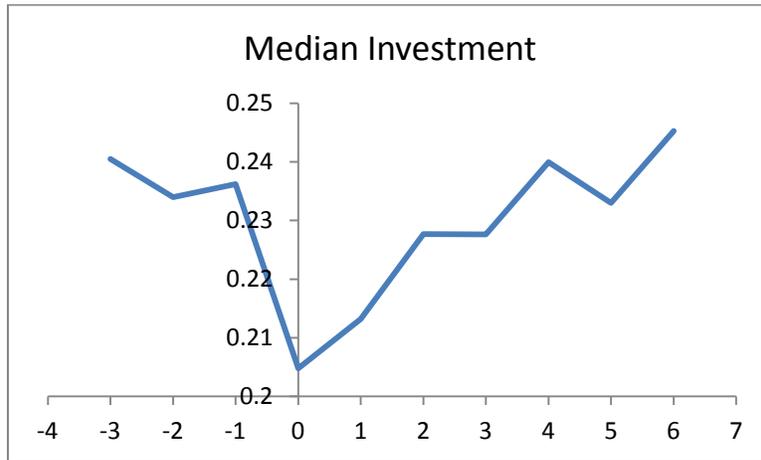
This table reports the trend in probability of disinvestment over CEO tenure for single- vs. multi-industry (defined by four-digit segment SIC in Compustat (historical) segment data base) firms. Firms that did not report segment data is classified as single-industry firms. Models (1) reports results for the subsample of firms with segment(s) in only one industry at the CEO turnover year. Models (2) reports results for single-industry firms that hired company insiders or industry insiders as the CEOs. Models (3) reports results for the subsample of firms with segments in more than one industry at the CEO turnover year. “General Ability” is an index established in Custodio, Ferreira, and Matos (2013) to measure how general a CEO’s skills are. All explanatory variables except for Tenure and General Ability are lagged by one year. The definitions of all variables are in Appendix A. The Huber-White robust standard errors are clustered by firm and reported in parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)
	$I_{\{asset\ sales>0\ or\ discontinued\ operations>0\}}$		
	Single-Industry Firms	Single-Industry Firms/Industry Insider Succession	Multi-Industry Firms
Tenure	-0.012** (0.005)	-0.016** (0.006)	-0.020** (0.009)
General Ability*Tenure			0.003 (0.002)
Ind-adj. ROA	-0.129*** (0.024)	-0.134*** (0.034)	-0.348*** (0.096)
Ind-adj. Return	-0.008** (0.003)	-0.009** (0.005)	0.005 (0.010)
MB	-0.000 (0.001)	-0.001 (0.001)	-0.002 (0.002)
Leverage	-0.018 (0.016)	-0.020 (0.020)	-0.018 (0.036)
Div. Payer	0.051* (0.028)	0.052 (0.040)	0.220*** (0.072)
log(Assets)	0.011 (0.008)	0.001 (0.011)	0.066*** (0.021)
Firm-CEO F.E., Year F.E.	x	x	x
Obs	24,331	16,645	8,209
Adj. R-sqr.	0.361	0.367	0.305

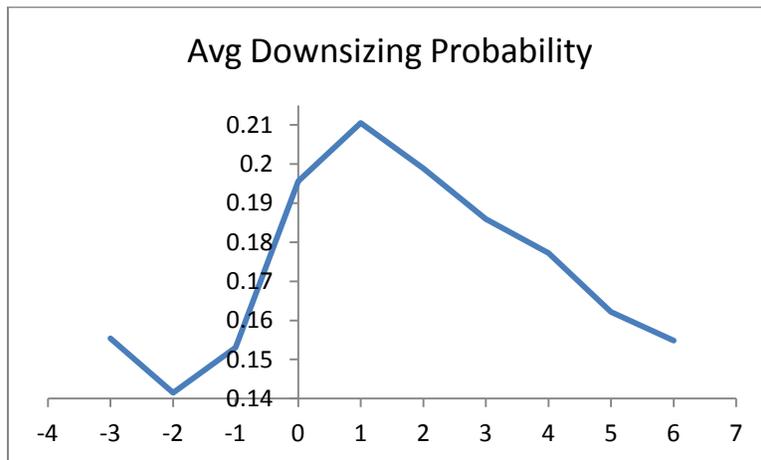
Figure 1: CEO Investment Cycle

The figures below graph the median investment rate (Panel A) and the average downsizing probability (Panel B) by tenure years from -3 to 6 ($t=0$ is the turnover year). We exclude the forced turnovers and do not double count a firm-year as multiple event years.

Panel A



Panel B



Appendix A: Variable Definitions

Tenure (in years) or (in months)	CEO's tenure is the number of years (or months) starting from the year (or month) when he took office (based on the variable <i>becameceo</i> in <i>Execucomp</i>), that is, (year-became CEO year).
Years [0,2]	An indicator variable that equals 1 if CEO is his tenure between year 0 (the year he became CEO) and year 2, and 0 otherwise.
CEO Age	The age of the CEO in the fiscal year.
Generalist Ability	An index established in Custodio, Ferreira, and Matos (2013) to measure how general a CEO's skills are. It is the first factor of applying principal component analysis of: past number of positions, number of firms, number of industries, CEO experience dummy, and conglomerate experience dummy.
Turnovers due to death/illness	Include turnovers where a) news searches revealed that the CEO departure was related to a health condition or death, or b) turnover reason provided in <i>Execucomp</i> is "deceased".
Turnovers due to death/illness/retirement at good performance	This sample includes turnovers cases where a) the turnovers are due to death/illness of the departing CEOs, or b) departing CEOs older than 65 years. We exclude the "suspicious" retirements by focusing on retirements at good performance. This means that the cumulative monthly industry-adjusted stock return during the 12-months before the new CEO's inauguration month (see the variable definition for <i>Cum. Industry-adj. Return month[-12,-1]</i> below) is no less than 0.
Turnovers with no management shakeup	CEO turnovers not accompanied by management (top-4 highest paid non-CEO executives) changes during the turnover year.
Cum. ind.-adj. return month[-12,-1]	Cumulative industry (Fama-French 49)-adjusted return during the 12 months before the inauguration month
Median monthly IVOL month[-12,-1]	The median of the monthly industry (Fama-French 49)-adjusted idiosyncratic volatility during the 12 months before the inauguration month
Turnovers with good pre-turnover performance	Turnovers that satisfy the following three conditions: 1) the median of the monthly industry-adjusted idiosyncratic volatility during the 12-months before the inauguration month (see the variable definition for <i>Median Monthly IVOL month[-12,-1]</i> above) is less or equal to 0. 2) the cumulative monthly industry-adjusted stock return during the 12-months before the inauguration month (see the variable definition for <i>Cum. Industry-adj. Return month[-12,-1]</i> above) is no less than 0, 3) the ind-adj. ROA in the fiscal year prior to the inauguration month is no less than 0. ROA is defined as the earnings before interest, tax, and depreciation scaled by the beginning of fiscal year total book assets.
Acquisition Rate	Value of acquisitions/lagged PPE (net). Acquisitions include completed deals covered in <i>SDC</i> with the deal form of "Acquisitions of Assets", "Acquisitions of certain Assets", "Acq. Maj. Int.", "Acq. Part. Int.", "Acq. Rem. Int.", "Acquisition" or "Merger" (as the acquirer).
Capx Rate	Capital expenditure/lagged PPE (net), with missing or negative Capx set to 0.
Investment Rate	(Value of acquisitions + Capital expenditure)/lagged PPE (net)
$I_{\{\text{expansion announcement(s) in the month}\}}$	An indicator variable that equals to one if the company makes

	expansion announcements (Events 3 or 31 in Capital IQ) in a month.
$I_{\{\text{segment start}\}}$	An indicator variable that equals 1 if the segment is newly established in the fiscal year, 0 otherwise.
$I_{\{\text{asset sales}>0 \text{ or discontinued operations}>0\}}$	An indicator function that equals 1 if the firm either has asset sales or reports discontinued operations (inflow/outflow of funds due to discontinuation of operations (item “DO” in <i>Compustat</i>) in the fiscal year.
$I_{\{\text{downsizing announcement(s) in the month}\}}$	An indicator variable that equals to one if the company makes downsizing announcement (Events 1, 21 in Capital IQ) in a month.
$I_{\{\text{segment termination}\}}$	An indicator variable that equals to one if the segment is divested or discontinued in the fiscal year, and 0 otherwise.
Asset Growth Rate	Total assets in the fiscal year – total assets last fiscal year/total assets last fiscal year.
Employment Growth Rate	Total employment in the fiscal year – total employment last fiscal year/total employment last fiscal year.
Ind-adj. Return	Industry (Fama-French 49)-adjusted return
Ind-adj. ROA	Industry (Fama-French 49)-adjusted ROA. ROA is defined as the earnings before interest, tax, and depreciation scaled by the beginning of fiscal year total book assets.
M/B	Market value of equity (closing price at the fiscal year end times shares outstanding) divided by book value of equity
Leverage	(Long-term debt + debt in current liabilities)/total assets
Div. Payer	An indicator variable that equals 1 if the firm pays out dividend to common stock holders in a year
Log(Assets)	Logarithm of the total book assets
# of Segments	The number of segments (defined by segment id) in a firm-year
Firm Age	Age of the firm since IPO, using the first day appear in <i>CRSP</i> (or the IPO date in <i>Compustat</i> if missing)
Cash Ratio	Cash divided by total assets
% of New Directors	The percentage of directors appointed during the incumbent CEO’s in the board, using <i>RiskMetrics</i> ’ director database.
% of Directors Reaching Retirement Age	The cumulative number of directors reaching retirement age (72 or above when service ends for outsider directors; 65 for insider directors) during the incumbent CEO’s tenure up until the current fiscal year, scaled by the current board size, using <i>RiskMetrics</i> ’ director database.
Staggered Board	An indicator variable that equals to 1 if the board of directors is divided, for the purpose of election, into separate classes. In most instances there are three classes, with the directors in each class serving overlapping three-year terms. With a classified board, also known as a staggered board, the change in the makeup of the board is limited because it would take at least two elections to replace a majority of the board. This variable is constructed using <i>RiskMetrics</i> ’ governance database.
Prior CEO Stay As Chairman	An indicator that equals 1 if the prior CEO stays as the Chairman of the Board during the first year of the new CEO’s tenure
% of Prior Mgmt. On Board	the % of the prior management (top-4 highest paid executives besides CEO) that serves as directors on the board during the first year of the new CEO’s tenure
Outsider Succession	An indicator variable that equals 1 if the incoming CEO comes from another company.

Segment Performance	Segment operating performance, measured as segment-year level operating profit or loss scaled by segment-year level sales.
Underperforming Segment	An indicator variable that equals 1 if the industry-adjusted segment performance is in the bottom tercile of the distribution for two consecutive years right before the CEO turnover.
Segment Age	Time (in years) since the segment was established
CAR [-1,1] around Acquisition Announcement	3-day cumulative market-adjusted return around acquisition announcements. The market-adj. Return is calculated as daily stock return minus the (value-weighted) market return on the same day.
Public Target	An indicator variable that equals one if the target is a public target, using <i>SDC Platinum</i> data.
Log(Deal Size)	Logarithm of the value of transaction (in Millions, from <i>SDC Platinum</i>).
% of stock	Percentage of stock used to fund an acquisition, using “ofstock” from <i>SDC Platinum</i> if non-missing, and replaced with 1-“ofcash” if the previous variable is unavailable, and then replaced with 0 if SDC indicated that the source of fund is neither from common stocks nor from preferred stocks.
Recession	An indicator variable that equals 1 if the fiscal year falls into one of the recession years: 1980, 1981, 1982, 1990, 1991, 2001, 2008, 2009, 2010.

Appendix B: Various Other Robustness Checks for the CEO Investment Cycle

In Appendix B, we report results for additional robustness checks that we did, but not reported in the main tables.

Table B.1: Alternative Firm-CEO Sample

In this table, we report robustness of the CEO investment cycle with the turnover sample based on news search in Fee et al. (2013). This sample consists of turnovers in all COMPUSTAT firms from 1990 to 2006, and thus is a larger cross-section of firms in a shorter time period compared to our sample. In columns (1) and (3), we use their full sample (7,085 turnovers). In columns (2) and (4), we use the 208 death/illness related turnovers in their sample, plus 32 death/illness related turnovers for 1980-1989 and 2007-2009 based on the news search using the same list of key words. Among the 240 turnovers, 162 are associated with ExecuComp firms that are in our main sample, and the rest are associated with non-ExecuComp firms.

	(1)	(2)	(3)	(4)
	<i>Investment Rate</i>		<i>I{asset sales>0 or discontinued operations>0}</i>	
	Full Sample	Death/illness	Full Sample	Death/illness
Tenure (in years)	0.061*** (0.020)	0.029** (0.014)	-0.010*** (0.002)	-0.006* (0.004)
Ind-adj. ROA	0.040 (0.155)	0.252 (0.199)	-0.022* (0.013)	-0.148** (0.058)
Ind-adj. Return	0.107*** (0.020)	0.043 (0.045)	-0.008*** (0.002)	-0.027 (0.017)
MB	0.009* (0.005)	0.004 (0.009)	-0.000 (0.001)	0.003 (0.003)
Leverage	0.082 (0.055)	0.118 (0.102)	-0.023 (0.019)	0.010 (0.036)
Div. Payer	-0.633*** (0.130)	-0.697*** (0.230)	0.046** (0.020)	0.002 (0.051)
log(Assets)	-0.394*** (0.054)	-0.274** (0.108)	0.034*** (0.007)	0.051*** (0.009)
Firm-CEO F.E., Year F.E.	x	x	x	x
Observations	28,383	1,848	28,570	1,858
Adjusted R-squared	0.164	0.162	0.333	0.099

Table B.2: CEOs Starting After the Firm Appeared in ExecuComp

This table reports how the investment rate, disinvestment probability, asset and growth rates change over CEO tenure, for the sample of CEOs who took office *after* the firm appeared in Execucomp. All control variables are lagged. We control for firm-CEO fixed effects and year fixed effects in all the regressions in this table. A constant term is also included in all models but omitted for brevity. The definitions of all variables are in Appendix A. The standard errors are clustered by firm. The Huber-White robust standard errors are clustered by firm and reported in parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% levels respectively.

	(1) Investment Rate	(2) $I_{\{\text{asset sales} > 0 \text{ or discontinued operations} > 0\}}$	(3) Asset Growth Rate	(4) Employment Growth Rate
Tenure (in years)	0.027*** (0.007)	-0.017*** (0.006)	0.027*** (0.003)	0.014*** (0.002)
Ind-adj. ROA	0.769*** (0.219)	-0.147*** (0.040)	0.168* (0.089)	0.139** (0.061)
Ind-adj. Return	0.050** (0.024)	-0.013*** (0.005)	0.031*** (0.006)	0.019*** (0.004)
MB	0.006* (0.004)	-0.000 (0.001)	0.006*** (0.002)	0.002 (0.001)
Leverage	0.123** (0.051)	-0.029 (0.024)	0.024 (0.019)	0.012 (0.017)
Div. Payer	-0.563*** (0.147)	0.088* (0.045)	-0.215*** (0.063)	-0.119*** (0.045)
log(Assets)	-0.353*** (0.053)	0.026* (0.014)	-0.344*** (0.024)	-0.162*** (0.015)
Firm-CEO F.E., Year F.E.	x	x	x	x
Obs	16,987	17,237	17,237	16,966
Adj. R-sqr.	0.249	0.387	0.302	0.204

Table B.3: Different Turnover Reasons and Types

Panel A reports how the investment rate, disinvestment probability, asset and growth rates change over CEO tenure, for a subsample of 3,238 CEO turnovers for which the reason for the turnover is unclassified. Pan, Wang, and Weisbach (2013) show that in terms of pre-turnover stock performance and volatility, these turnovers are more similar to the turnovers that we have identified as unlikely to be performance-driven than to the turnovers identified as forced. Panel B reports the results for a subsample of 319 outright forced CEO turnovers based on Factiva news search. This subsample represents only 6% of the turnover sample, and exhibit significantly lower industry-adjusted return as well as higher industry-adjusted return volatility in the 12 months prior to the turnover. Panel C reports the results for a subsample of 3,475 insider successions, that is, the new CEO has been with the firm for at least three years when becoming CEO. The standard errors are clustered by firm. The Huber-White robust standard errors are clustered by firm and reported in parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% levels respectively.

Panel A: Non-classified Turnovers

	(1)	(2)	(3)	(4)
	Investment Rate	$I_{\{asset\ sales>0\ or\ discontinued\ operations>0\}}$	Asset Growth Rate	Sales Growth Rate
Tenure (in years)	0.027** (0.013)	-0.013** (0.006)	0.026*** (0.004)	0.006** (0.003)
Firm-CEO F.E., Year F.E.	x	x	x	x
Observations	18,559	18,882	18,882	18,844
Adj. R-sqr.	0.205	0.347	0.223	0.170

Panel B: Outright Forced Turnovers

	(1)	(2)	(3)	(4)
	Investment Rate	$I_{\{asset\ sales>0\ or\ discontinued\ operations>0\}}$	Asset Growth Rate	Sales Growth Rate
Tenure (in years)	0.001 (0.015)	-0.044* (0.023)	0.019** (0.008)	0.009** (0.004)
Firm-CEO F.E., Year F.E.	x	x	x	x
Obs	1,720	1,701	1,720	1,688
Adj. R-sqr.	0.354	0.223	0.193	0.193

Panel C: Insider Successions

	(1)	(2)	(3)	(4)
	Investment Rate	$I_{\{asset\ sales>0\ or\ discontinued\ operations>0\}}$	Asset Growth Rate	Sales Growth Rate
Tenure (in years)	0.024*** (0.007)	-0.012** (0.006)	0.024*** (0.002)	0.010*** (0.002)
Firm-CEO F.E., Year F.E.	x	x	x	x
Obs	22,698	22,995	22,995	22,482
Adj. R-sqr.	0.250	0.350	0.196	0.196

Table B.4: Excluding the Turnover Year and the Year After

This table reports how the investment rate, disinvestment probability, and growth rates change over CEO tenure, excluding the turnover year and the year after. All control variables are lagged. We control for firm-CEO fixed effects and year fixed effects in all the regressions in this table. A constant term is also included in all models but omitted for brevity. The definitions of all variables are in Appendix A. The standard errors are clustered by firm. The Huber-White robust standard errors are clustered by firm and reported in parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% levels respectively.

	(1) Investment Rate	(2) $I_{\{\text{asset sales}>0 \text{ or discontinued}$ $\text{operations}>0\}}$	(3) Asset Growth Rate	(4) Employment Growth Rate
Tenure (in years)	0.016*** (0.003)	-0.013** (0.006)	0.025*** (0.003)	0.013*** (0.002)
Ind-adj. ROA	0.612*** (0.072)	-0.135*** (0.028)	0.262*** (0.095)	0.177*** (0.043)
Ind-adj. Return	0.035*** (0.008)	-0.005 (0.003)	0.052*** (0.008)	0.028*** (0.004)
MB	0.007*** (0.002)	-0.000 (0.001)	0.013*** (0.002)	0.003*** (0.001)
Leverage	0.034 (0.021)	-0.022 (0.016)	0.054** (0.022)	0.015 (0.014)
Div. Payer	-0.612*** (0.061)	0.084*** (0.031)	-0.385*** (0.042)	-0.214*** (0.032)
log(Assets)	-0.211*** (0.017)	0.014 (0.008)	-0.288*** (0.019)	-0.138*** (0.010)
Firm-CEO F.E., Year F.E.	x	x	x	x
Obs	27,338	27,338	27,338	26,653
Adj. R-sqr.	0.317	0.365	0.215	0.190

Table B.5: Different Investment Measures

Panel A: CapX and Acquisition

This table reports how the Capx rate and acquisition rate change over CEO tenure, separately. Column (1) uses capital expenditure scaled by lagged PPE as the dependent variable. Column (2) uses acquisition amount (total transaction value in a firm-year) scaled by lagged PPE as the dependent variable. Column (3) uses acquisition amount scaled by lagged total book assets as the dependent variable. The control variable $\log(\text{Assets})$ is replaced by $\log(\text{PPE})$ in this specification. Column (1) uses capital expenditure scaled by lagged PPE as the dependent variable. All control variables are lagged. We control for firm-CEO fixed effects and year fixed effects in all the regressions in this table. A constant term is also included in all models but omitted for brevity. The definitions of all variables are in Appendix A. The standard errors are clustered by firm. The Huber-White robust standard errors are clustered by firm and reported in parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% levels respectively.

	(1) <i>Capx Rate</i> <i>(scaled by PPE)</i>	(2) <i>Acquisition Rate</i> <i>(scaled by PPE)</i>	(3) <i>Acquisition Rate</i> <i>(scaled by assets)</i>
Tenure (in years)	0.005*** (0.001)	0.019*** (0.005)	0.002*** (0.000)
Ind-adj. ROA	0.275*** (0.071)	0.943*** (0.124)	0.078*** (0.011)
Ind-adj. Return	0.045*** (0.005)	0.048*** (0.017)	0.004** (0.002)
MB	0.007*** (0.001)	0.009*** (0.003)	0.001*** (0.000)
Leverage	0.006 (0.009)	0.101*** (0.039)	0.009** (0.004)
Div. Payer	-0.242*** (0.033)	-0.557*** (0.089)	-0.083*** (0.010)
$\log(\text{Assets})$	-0.082*** (0.010)	-0.204*** (0.032)	
$\log(\text{PPE})$			-0.020*** (0.003)
Firm-CEO F.E., Year F.E.	x	x	x
Obs	33,558	33,558	33,558
Adj. R-sqr.	0.359	0.187	0.142

Panel B: Scaling Investment by PP&E before the Turnover Year

This table reports how the Capx rate and acquisition rate, both scaled by Property, Plant, and Equipment before CEO turnover, change over CEO tenure. All control variables are lagged. We control for firm-CEO fixed effects and year fixed effects in all the regressions in this table. A constant term is also included in all models but omitted for brevity. The definitions of all variables are in Appendix A. The standard errors are clustered by firm. The Huber-White robust standard errors are clustered by firm and reported in parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)
	Capx/PPE before Turnover	Acquisition/PPE before Turnover
Tenure (in years)	0.009** (0.005)	0.047*** (0.015)
Ind-adj. ROA	0.476*** (0.127)	0.609*** (0.103)
Ind-adj. Return	0.031*** (0.008)	0.028** (0.011)
MB	0.011*** (0.002)	-0.000 (0.002)
Leverage	0.021 (0.046)	0.055 (0.035)
Div. Payer	-0.355*** (0.088)	-0.374*** (0.075)
log(Assets)	0.737*** (0.038)	0.061** (0.027)
Firm-CEO F.E., Year F.E.	x	x
Obs	27,790	27,790
Adj. R-sqr.	0.803	0.255

Table B.6: CEO Career Cycle vs. Life Cycle Effects

This table reports how the investment rate, disinvestment probability, asset and growth rates change over CEO tenure, controlling for CEO age and firm age. Note that to identify the effects of CEO age and firm age, we cannot control for firm-CEO fixed effects or firm fixed effects. Thus, instead we include industry-year fixed effects to control for the effect of industry shocks on investment and growth. A constant term is also included in all models but omitted for brevity. The definitions of all variables are in Appendix A. The standard errors are clustered by firm. The Huber-White robust standard errors are clustered by firm and reported in parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)	(4)
	Investment Rate	$I_{\{\text{asset sales}>0 \text{ or discontinued operations}>0\}}$	Asset Growth Rate	Employment Growth Rate
Tenure	0.006**	-0.005***	0.002***	0.002***
(in years)	(0.002)	(0.001)	(0.001)	(0.000)
CEO Age	-0.009***	0.001	-0.002***	-0.002***
	(0.002)	(0.001)	(0.000)	(0.000)
Firm Age	-0.007***	0.004***	-0.002***	-0.002***
	(0.001)	(0.000)	(0.000)	(0.000)
Ind-adj. ROA	0.599***	-0.198***	0.162***	0.160***
	(0.108)	(0.026)	(0.050)	(0.026)
Ind-adj. Return	0.134***	-0.005	0.082***	0.042***
	(0.018)	(0.003)	(0.007)	(0.004)
MB	0.020***	-0.002***	0.014***	0.005***
	(0.004)	(0.001)	(0.002)	(0.001)
Leverage	-0.076***	-0.009	-0.018***	-0.025***
	(0.026)	(0.010)	(0.007)	(0.005)
Div. Payer	-0.302***	0.122***	-0.086***	-0.054***
	(0.060)	(0.024)	(0.019)	(0.014)
log(Assets)	-0.078***	0.038***	-0.022***	-0.011***
	(0.008)	(0.003)	(0.002)	(0.002)
Constant	1.737***	-0.150***	0.422***	0.307***
	(0.106)	(0.034)	(0.026)	(0.019)
Industry-year F.E.	x	x	x	x
Obs	32,722	33,186	33,186	32,370
Adj. R-sqr.	0.107	0.122	0.134	0.110

Appendix C: The Effect on Investment and Disinvestment: Business Cycles vs. CEO Cycles

This table compares the effect of a recession dummy with the dummy “Years [0, 2]” capturing the effect of the CEO cycle on various (dis)investment variables. A constant term is included in all models but omitted for brevity. Other control variables are lagged. Firm-CEO Fixed effects are included in all models. The definitions of all variables are in Appendix A. The Huber-White-Sandwich robust standard errors are clustered by firm and reported in parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Investment Rate</i>	<i>Capx Rate</i>	<i>Acquisition Rate</i>	$I_{\{\text{asset sales}>0 \text{ or discontinued operations}>0\}}$	<i>Asset Growth Rate</i>	<i>Employment Growth Rate</i>
Recession	-0.132*** (0.018)	-0.026*** (0.005)	-0.106*** (0.017)	-0.028*** (0.006)	-0.047*** (0.006)	-0.039*** (0.004)
Years [0,2]	-0.089*** (0.019)	-0.016*** (0.005)	-0.073*** (0.018)	0.020*** (0.008)	-0.072*** (0.006)	-0.033*** (0.005)
Ind-adj. ROA	1.180*** (0.157)	0.271*** (0.070)	0.908*** (0.122)	-0.148*** (0.023)	0.180** (0.072)	0.172*** (0.037)
Ind-adj. Return	0.095*** (0.019)	0.044*** (0.006)	0.051*** (0.017)	-0.007** (0.003)	0.058*** (0.007)	0.029*** (0.004)
MB	0.018*** (0.004)	0.007*** (0.001)	0.011*** (0.003)	-0.001 (0.001)	0.013*** (0.002)	0.004*** (0.001)
Leverage	-0.806*** (0.096)	-0.252*** (0.032)	-0.554*** (0.087)	0.076*** (0.025)	-0.331*** (0.041)	-0.179*** (0.027)
Div. Payer	0.122*** (0.040)	0.017** (0.008)	0.105*** (0.038)	-0.021 (0.014)	0.050*** (0.017)	0.025** (0.012)
log(Assets)	-0.213*** (0.027)	-0.074*** (0.007)	-0.139*** (0.024)	0.023*** (0.007)	-0.192*** (0.010)	-0.101*** (0.006)
Firm-CEO F.E.	x	x		x	x	x
Obs	33,558	33,558	33,558	34,066	34,066	33,231
Adj. R-sqr.	0.242	0.354	0.185	0.349	0.218	0.198

Appendix D: Industry Productivity Shocks and CEO Investment Cycles

In Appendix Table D, we examine the impact of industry productivity shocks on the magnitudes of the CEO (dis)investment cycles. We use a variety of measures to capture the changes in industry conditions as of the CEO turnover year. We examine changes in the industry median of ROA, sales growth rate, employment growth rate, and in the industry total factor productivity. The industry total factor productivity is constructed following Jorgenson and Griliches (1976). For each industry shock measure, we also capture the changes over different horizons: year-to-year changes and three-year cumulative changes. Then we classify the nature of the shock by dividing turnover-year industry conditions into negative, neutral, or positive shocks based on the tercile distribution (bottom, middle, top) of each industry shock measure. This procedure generates 24 categories of industry conditions at the time of CEO turnover: 4 (performance measures) * 2 (horizons) * 3 (types) =24. Finally, within each of the 24 categories, we estimate the magnitudes of the CEO investment cycle (Panel A) and the disinvestment cycle (Panel B) using the baseline regressions in Tables 2 and 3. We report the coefficient estimate for the CEO tenure variable and its standard error under each category.

The results in Table D show that both the CEO (dis)investment cycle exists regardless of the industry condition in which the CEO takes office. Moreover, even the magnitudes of the cycles are similar across industry conditions. These results suggest that the CEO (dis)investment cycle does not occur because of productivity shocks coinciding with the CEO changes.

Table D: Industry Shocks and CEO Investment Cycle

This table reports the coefficient estimates on the CEO tenure variable in the investment and disinvestment regressions, for subsamples based on various industry shocks. For example, “Shock based on Industry ROA, 1 (3) year” measures the year-to-year change (the 3-year cumulative change) in the industry median of firm-year level ROA. Shocks based on Sales Growth and Employment Growth are constructed using changes in the industry medians sales growth and employment growth. Shocks based on Total Factor Productivity measures the changes (rate of growth) in total factor productivity, following Jorgenson and Griliches (1967). We then define negative (neutral, positive) shock to be the bottom (middle, top) tercile of the sample distribution for each industry shock measure. The Huber-White robust standard errors are clustered by firm. ***, ** and * indicate significance at the 1%, 5% and 10% levels.

Panel A: Coefficients of Regressing Investment Rate on CEO Tenure (in years)

Shock Based on Industry	Horizon of Shock	Negative Shock	Neutral	Positive Shock
ROA	1 year	0.019*	0.029***	0.013***
		(0.010)	(0.008)	(0.004)
	3 year	0.028*	0.021**	0.035***
		(0.015)	(0.009)	(0.010)
Sales Growth	1 year	0.023**	0.021***	0.013**
		(0.010)	(0.008)	(0.006)
	3 year	0.027**	0.036**	0.021**
		(0.013)	(0.014)	(0.009)
Employment Growth	1 year	0.029***	0.025***	0.023**
		(0.011)	(0.008)	(0.012)
	3 year	0.029***	0.010*	0.022**
		(0.009)	(0.006)	(0.009)
Total Factor Productivity	1 year	0.014*	0.025*	0.035***
		(0.008)	(0.014)	(0.012)
	3 year	0.021**	0.026	0.025**
		(0.010)	(0.022)	(0.011)

Panel B: Coefficients of Regressing Disinvestment Probability on CEO Tenure (in years)

Shock Based on Industry	Horizon of Shock	Negative Shock	Neutral	Positive Shock
ROA	1 year	-0.014**	-0.015***	-0.014***
		(0.006)	(0.006)	(0.005)
	3 year	-0.017*	-0.024***	-0.024***
		(0.009)	(0.007)	(0.005)
Sales Growth	1 year	-0.027***	-0.022***	-0.014**
		(0.009)	(0.006)	(0.006)
	3 year	-0.023**	-0.021***	-0.020**
		(0.010)	(0.007)	(0.009)
Employment Growth	1 year	-0.021**	-0.018**	-0.023***
		(0.009)	(0.008)	(0.008)
	3 year	-0.029***	-0.012*	-0.021**
		(0.010)	(0.007)	(0.009)
Total Factor Productivity	1 year	-0.014*	-0.014**	-0.016***
		(0.008)	(0.007)	(0.008)
	3 year	-0.016**	-0.015**	-0.018**
		(0.008)	(0.007)	(0.009)