CEO Investment Cycles

Yihui Pan
University of Utah

Tracy Yue Wang
University of Minnesota

Michael S. Weisbach
Ohio State University, NBER, and SIFR

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Abstract

This paper documents the existence of a *CEO Investment Cycle*, in which firms disinvest early in a CEO's tenure and increase investment subsequently, leading to "cyclical" firm growth in assets as well as in employment over CEO tenure. The CEO investment cycle is present for both firings and non-performance related CEO turnovers, and its magnitude is substantial: The estimated difference in investment rate between the first three years of a CEO's tenure and subsequent years is close to the differences caused by business cycles or financial constraints. This investment cycle appears to be best explained by a combination of agency-based theories. Early in his tenure the CEO disinvests poorly performing assets that his predecessors established and was unwilling to sell. Subsequently, the CEO overinvests when he gains more control over his board. There is no evidence that the investment cycles occur because of shifting CEO skill or productivity shocks. Overall, the results imply that public corporations' investments deviate substantially from the first-best, and that governance-related factors internal to the firm are as important as economy-wide factors in explaining firms' investments.

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Contact information: Yihui Pan, Department of Finance, David Eccles School of Business, University of Utah, email: yihui.pan@business.utah.edu; Tracy Yue Wang, Department of Finance, Carlson School of Management University of Minnesota: email: wangx684@umn.edu; Michael S. Weisbach, Department of Finance, Fisher College of Business, Ohio State University, Columbus, OH 43210, email: weisbach@fisher.osu.edu. We would like to thank Shan Ge and Jongsik Park for excellent research assistance and Murillo Campello, Sergey Chernenko, Charlie Hadlock, Brandon Julio, Kathy Kahle, Jonathan Leonard, Karl Lins, Merih Sevilir, Andrei Shleifer, as well as seminar participants at Berkeley, Harvard Business School, Minnesota, Ohio State, Stanford, Utah, the 2013 FMA Meeting, the 2013 Conference on Financial Economics and Accounting, and the 2013 China International Conference on Finance for helpful comments on an earlier draft.

1. Introduction

Much of what we study in business schools concerns the role of the CEO and his management team. Yet, there is still substantial uncertainty about the right economic model for understanding the role of the CEO. The literature has adopted a variety of viewpoints, 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] It is unclear what is the right way to view the role of CEOs in firms, or even how one would go about addressing this issue. Moreover, while the popular press typically ascribes many important actions firms take to CEOs, it is difficult to verify systematically the extent to which top management actually matters.

One way to measure the extent to which CEOs make a difference is to estimate the way in which 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), Kanodia et al. (1989), Boot (1992), Demsetz and Lehn (1985), Yermack (1999), and Bebchuk and Fried (2004).

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 about 6 percentage points lower and the asset growth rate tends to be 3.2 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 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 CEO investment cycle does not appear to be a consequence of the endogenous timing of CEO turnovers. We estimate our equation on a number of subsamples for which it is unlikely that the CEOs were forced out of office: when the outgoing CEO leaves due to death or poor health, when the CEO retires following above-median 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 time period, the CEO's time in office, and the industry conditions at the time of turnover. The existence of the CEO investment cycle regardless of the circumstances under which the incoming CEO takes office or his background suggests that this cyclical behavior of investment is a general phenomenon in publicly traded corporations.

We argue that the cyclical behavior of investment over CEO tenure is best understood through a combination of agency explanations. First, when a CEO takes office, he will have incentives to divest poorly performing assets that the previous CEO established and was unwilling to abandon. Second, 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 the 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. Eventually, when the CEO steps down, the process is repeated by the next CEO.

We test a number of predictions of this agency explanation of the CEO investment cycle. First, if the incremental disinvestments early in a CEO's career reflect bad decisions made by the outgoing CEO/management, then the performance of disinvested assets should be poor. Using segment-level data, we document that the unusually large disinvestment rate in the first three years of a CEO's tenure is made up of segments established by the previous CEO and in the bottom 10% of the distribution when ranked in terms of operating performance. Second, any residual influence the outgoing management has subsequent to the turnover should negatively affect the post-turnover disinvestment intensity. Our estimates indicate that the tendency of CEOs to disinvest poorly performing assets acquired by their predecessors is lower when the incoming CEO had a role in the outgoing management or if the prior management maintains a strong presence on the board of directors after turnover.

Third, since an uncaptured board of directors is an important factor that limits the CEO's ability to overinvest, the agency explanation for increasing investment with CEO tenure 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 that is 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 instrumented using the exogenous variation in director turnovers. In addition, we find that the quality of a firm's investments, measured by the market reaction to acquisition announcements, decreases with CEO tenure and is 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. Further, segments established in the later years of a CEO's tenure are significantly more likely than those established in early years to be divested immediately after CEO turnover. These findings suggest that the increases in the quantity and decreases in the quality of investments over the CEO cycle occur because the CEO acquires more control over his board over time.

An alternative way of interpreting the relation between CEO tenure and firms' investments is that for some reason, changes in investment are efficient at all times. Efficient changes in investment could occur following turnovers if they reflect the match between the new CEO's skills and firm assets. However, in contrast to this view, we find that the magnitudes of the CEO investment cycles are similar in situations in which the new CEO's skills are likely to fit the firm's asset structure (e.g., when single-segment firms hire an insider CEO) and in situations in which they potentially do not (e.g., in multi-divisional firms, CEO turnovers preceded by industry productivity shocks).

Alternatively, a CEO's tenure could be a function of his ability (either innate or learned on the job) or his firm's investment opportunities, both of which could be positively related to the firm's investments. However, this explanation is not consistent with the deteriorating investment quality over CEO tenure. In addition, the instrumental variable estimates imply that the CEO's control of the board due to director retirement, which is likely to be exogenous to the CEO's ability or the firm's investment opportunities, explains both the increase in investment level and the decrease in investment quality over tenure. Consequently, it appears that the CEO investment cycle is not driven by CEO tenure reflecting CEO ability or the firm's growth opportunities.

The existence of an economically meaningful CEO investment cycle occurring for agency-related reasons has a number of important 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 governance-related factors internal to the firm are likely to be equally important. Second, the existence of the CEO investment cycle together with the additional tests presented in this paper suggests that investment in publicly-traded corporations deviates from the first-best level in important ways. Movement towards the first-best investment is likely one reason why private equity partnerships can pay large premiums to acquire public companies and nonetheless offer high returns to their investors. Third, our results provide insights on the types of agency problems that affect firms' investment decisions; they suggest that the empire-building preference plus the unwillingness to re-optimize on past investment decisions are important factors leading to investment inefficiencies in public

companies. Fourth, 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 correction of errors he is unwilling to acknowledge. Finally, given the recent asset pricing literature suggesting that investment is a determinant of expected equity returns, our results imply that expected equity returns potentially vary systematically over the CEO cycle.

More broadly, this study contributes to the on-going debate about whether managers have systematic influences on firm policies and firm value, and more generally the implication for the role of management in the firm. Particularly important related work is the literature on whether CEO-specific styles affect firm policies (see Bertrand and Schoar (2003), Cunha and Ribas (2012) 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, Bennedsen et al. 2007) and hospitalization (Bennedsen et al. 2012). Finally, using an approach based on systematic changes in stock return volatility after the CEO takes office, Pan, Wang, and Weisbach (2013) estimate that CEOs contribute a nontrival amount to firm values. Documenting the way in which firm policies vary over the CEO cycle as we do here is an alternative approach to identify potential systematic managerial effects.

Using an earlier sample, Murphy and Zimmerman (1993) document systematic changes in a number of accounting variables around CEO turnover. These authors argue that changes around turnovers are mainly driven by poor firm performance. Another closely related study is Weisbach (1995), which considers a sample of large acquisitions, and finds that the likelihood of divesting poorly performing deals to be unusually high immediately following CEO turnover.[2] Our study complements these earlier studies, documenting systematic patterns in disinvestment and investment over the CEO cycle, and providing additional evidence on the reasons for this cycle.

2. Data

[2] Our paper shows that this effect holds using a much larger sample of turnovers and investments; even though it was an abnormally high rate of divestitures, Weisbach (1995) had only 10 deals that were divested subsequent to turnovers (see Table 7 of Weisbach (1995)).

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 median CEO in our sample spends six years (including the turnover year) in office, and the average CEO tenure length is about seven years. Both the average and the median age of the incoming CEO at the time of turnover are 51.

To interpret the relation between firm investment (disinvestment, growth) and CEO tenure, it is important for us to understand the reasons for CEO turnovers. Unfortunately, firms are generally secretive about the true reasons for CEO changes, so 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, "exogenous" turnovers, which, according to the interviews in Vancil (1987) (p. 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 an exogenous subsample of turnovers.[3] 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 likely to be exogenously occurring are those for which the CEO change is not accompanied by any shakeup in the top management team. Therefore, we consider the

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

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 or accounting performances, we consider the subsample of 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). Finally, we use the *Factiva* news search to identify turnovers that appear to be overtly forced (e.g., *Factiva* reported that the CEO was forced to leave or left under pressure).

Panel A of Table 1 reports the number of turnovers in each subsample. We have 130 turnovers occurring because of death or health issues of outgoing CEOs, 211 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. In contrast, outright forced turnovers (319 of them) represent only 6% of the turnover sample. The turnovers that do not fall into one of the "likely exogenous" subsamples and do not fall into the outright forced subsample comprise the remaining 60% of the sample; 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.

2.2. 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 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, and about 16% of the firm-year observations have discontinued operations,

and 21% of the firm-year observations have at least one of these types of disinvestment activities. The correlation between these two types of disinvestment activities is 0.22.[4]

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".[5] 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.

2.3. Corporate Investment

We consider two major forms of corporate investment: capital expenditures and acquisitions. Since firms always have some investment in every year, we do not focus on identifying the existence of investment, but instead focus on its magnitude. We define *Capx Rate* as capital expenditures scaled by the net value of the firm's property, plants, and equipment (PP&E) at the beginning of the year, and *Acquisition Rate* as the value of acquisitions scaled by the net value of the firm's PP&E at the beginning

[4] In a previous draft we also measure the magnitude of disinvestment as the sum of the value of asset sales and the value of discontinued operations scaled by lagged PP&E. Conditional on disinvestment occurring, the average disinvestment rate is 23%, and the median is 5%.

[5] 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".

of the year. Acquisitions include completed deals covered in the SDC database, either acquisition of assets or equity interests. *Investment Rate* is defined to be the sum of *Capx Rate* and *Acquisition Rate*. Panel B of Table 1 shows that the investment rates are skewed, since the average *Capx Rate* is 33%, and the median is 20%. The average *Acquisition Rate* is 34%, and the median is 0%. The average total *Investment Rate* is 67%, and the median is 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") or "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*. For each sample firm, we identify both domestic and international acquisitions with disclosed transaction values above $1 million, over the sample period. We exclude leveraged buyouts, exchange offers, repurchases, spinoffs, minority stake purchases, recapitalizations, self-tenders, and privatizations. Based on the announcement date of each event, we define a monthly investment indicator variable $I_{\{\text{ investment announcement(s) in the month}\}}$ 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%, although the median is only 7.6%. The average *Employment Growth Rate* is 9.4%, and the median is 3%.

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

summary statistics of these variables. The average firm in our sample is about 19 years old, has book assets of about $1.2 billion, 24% leverage (the sum of long-term debt and short-term debt divided by total assets), and market-to-book equity ratio (MB) 2.9. The average industry-adjusted ROA is 5.7% (median 3.3%), and the average industry-adjusted stock return is 14.7% (median is 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

There are two main components of the CEO investment cycle: the disinvestment cycle and the investment cycle. We first consider the two components separately, and then examine their combined effect on the firm's asset and employment growth over the CEO cycle.

3.1. Disinvestment and CEO Tenure

Panel (a) in Figure 1 plots the average probability of disinvestment by tenure years 0 to 8, with year 0 being year of turnover. The likelihood of disinvestment is on average as high as 21.2% in year 1, and then it monotonically decreases over the CEO tenure. By year 8, the likelihood of disinvestment decreases to 13.7%, a 36% reduction relative to year 1.

Panel A of Table 2 presents estimates of multivariate equations predicting the likelihood of disinvestment as a function of CEO tenure, controlling for the CEO's age,[7] the firm's age, relevant firm characteristics, as well as firm and year fixed effects. "*Tenure (in years)*" counts the CEO's time in office up to the year of the observation. The estimates presented in Column (1) indicate that in the full sample, the disinvestment likelihood decreases by 0.5 percentage points per year of CEO tenure. The estimated per-year decline is small because it is the average over the entire tenure length, including some CEOs who stay on the job for very long periods (e.g., more than 10 years).

[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.
[7] See Yim (2013) and Li, Low and Makhija (2011) for estimates of the way in which CEO age affects corporate investment.

A possible concern is that the estimate in Column (1) is driven by "turnaround specialists," who are hired to cut costs and then leave the company quickly. For this reason, in Column (2) we examine the pattern of disinvestment in the first six years of tenure for CEOs who are in office for at least seven years. The estimate in this subsample implies an even sharper decline of disinvestment probabilities with tenure, about 1.7 percentage points per year during the first six years. In Column (3), instead of using a linear function of tenure, we create an indicator variable that equals one for the first three years of a CEO's tenure (i.e., years 0, 1, 2). The coefficient of this variable provides an estimate of the average difference in the disinvestment probability between the first three years and the rest of the CEO's tenure. The estimated coefficient of 0.032 for this variable indicates that the annual disinvestment probability is 3.2 percentage points higher in the first three years than during the rest of the CEO's tenure.

3.1.1. Subsamples of Turnovers Unlikely to be Caused by Performance

An important issue in interpreting post-turnover disinvestment is the extent to which they reflect endogenous timing of turnovers at times when it is desirable for firms to sell assets. For this reason, we present estimates of the specification in Column (3) on the subsamples of turnovers that we have identified in Section 2.1 as likely to be exogenously occurring: turnovers caused by the death or health of the outgoing CEO (Column (4)), caused by death, health, or retirements of the outgoing CEO (Column (5)), turnovers not accompanied by any top management shakeup (Column (6)), and those preceded by good performance as well as low stock return volatility (Column (7)). The coefficient on the early tenure dummy variable is positive in all subsamples, and is statistically significant in all but the death/health subsample, which contains only 130 turnovers (2% of the sample). Further, the magnitudes of the estimated CEO cycle effect in these subsamples of likely exogenous turnovers are all close to the 0.032 estimate obtained using the full sample of turnovers (Column (3)).

In Column (8), we present estimates of this equation on the subsample of turnovers that are not classified as either exogenous or outright forced. The estimated CEO cycle effect on this subsample is again similar to that in the full sample and those in the various subsamples of likely exogenous turnovers. Finally, in Column (9) we estimate the CEO cycle effect on the subsample containing the 319 turnovers

we classified as "forced". The annual likelihood of disinvestment is about 5 percentage points higher immediately following a forced turnover relative to later tenure years, which is significantly higher than the estimated effect in the both the full sample and in the 94% of turnovers not classified as "forced."

Overall, these results suggest that changes in investment over the CEO cycle are unlikely to be driven by the endogenous timing of CEO turnovers.

3.1.2. Alternative measures of disinvestment

We next estimate the likelihood of corporate disinvestment using two different data sources: corporate announcements of downsizing and segment termination. The results using corporate announcements are presented in Columns (1) and (2) of Panel B of Table 2, and are consistent with the results reported in Panel A using financial statement information. The likelihood of a company announcing a disinvestment in a particular month is about 1 percentage point higher on average in the first 24 months than during the rest of the tenure. 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 that a segment is terminated in a particular year. In these equations, the unit of observation is a segment-year. In addition to firm-level controls, we also include a set of segment-level controls such as a measure of segment performance (whether the segment operating profit/loss over sales is below the bottom 10% of the sample distribution), the number of segments in the firm, and the segment age. Consistent with the earlier findings, the probability of terminating a segment is significantly higher in the early years of a CEO's tenure than in his later years.

3.2. Investment and CEO Tenure

We next consider the way in which corporate investment varies with CEO tenure. Panel (b) of Figure 1 reports the median investment rate by tenure year. This figure suggests that there is an increasing trend in investment 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% in year 0 to 27% in year 8, a 30% increase.

In Panel A of Table 3, we estimate equations predicting the investment rate as a function of CEO tenure, controlling for firm characteristics that potentially affect investment. We first include tenure linearly and use the full sample of turnovers in Column (1), and then the first 6 years for CEOs that stayed on the job for at least 7 years in Column (2). In each case, the coefficient on tenure is positive and statistically significant, implying that investment increases over the CEO's tenure. The coefficient is substantially larger in Column (2), which is estimated using just the first 6 years of the long-term CEOs, suggesting that the result is not driven by CEOs who invest little initially and then are soon out of office.

Column (3) presents an estimate of the specification using a dummy variable that indicates whether the CEO is in his first three years. The estimates indicate that the investment rate is about 6 percentage points lower in the first three years of a CEO's tenure than in his later years in office. If we take the median investment rate in our sample (24%) as the "normal" rate, then this implies that the investment rate tends to be 25% lower than the normal rate in the early years of a CEO's tenure. Columns (4)–(7) present estimates of this equation for the various subsamples of likely exogenous turnovers. In each case, the investment rate appears to be lower in the early years of the CEO's tenure than in later years. This effect is also statistically significant in each equation except Column (4), which uses the small sample of turnovers due to health/death of the outgoing CEO. Column (8) reports the result for the un-classified turnovers, and the result is similar to that for the full sample. Column (9) presents the result for the subsample of forced turnovers: the investment rate is 12.4 percentage points lower immediately following a forced turnover, which is substantially larger than in the overall sample. These findings suggest that the phenomenon of investment increasing over the CEO cycle is a general one, and not exclusive to certain types of turnovers or CEOs.

Panel B of Table 3 considers the likelihood of business expansion and acquisition related news announcements and the establishment of new segments over CEO tenure. Consistent with the increasing investment rate over tenure documented in Panel A, we find that the probability of an expansion or acquisition related corporate news and the probability of starting a new segment are also significantly

higher in a CEO's later years in office than in the first three years, both in the full sample and after exogenous turnovers due to death, illness, or retirement of the departing CEOs.[8]

An implication of changing investment and disinvestment behavior is that the firm's asset and employment growth will also increase over the CEO cycle. Table 4 documents that both growth rates do indeed increase over the CEO cycle. The estimates in this table indicate that the asset growth rate is on average 3.2 percentage points lower and the employment growth rate is 2.2 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 and 3 are representative of a number of alternative specifications and sampling approaches. Because of the possibility that our results are picking up variation across CEOs in the same firm, we have estimated these equations using CEO-firm fixed instead of firm fixed effects with similar estimates to those reported above.[9] Another potential concern is that the increasing investment rate over CEO tenure simply results from the high disinvestment in the early years of CEO tenure, reducing the capital stock and thus the denominator for the investment rate. For this reason, we reestimate the investment equations scaling the investment throughout the CEO's tenure by the PP&E in the turnover year. This specification leads to an investment level that increases at a faster rate over the CEO cycle than the estimates reported above. Finally, we have also obtained estimates for subsamples of more recent turnovers (since 1996 when the *ExecuComp* information became more complete), in long-term

[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 exclude this period and obtain results similar to those reported here.

[9] In particular, the disinvestment likelihood is on average 2 percentage points higher, and the investment rate is 4.5 percentage points lower, in the first three years of CEO tenure relative to later years. All unreported estimates are available from the authors on request.

CEOs with at least seven years of tenure, and after insider successions. CEO investments cycles are present and similar in magnitude to those reported above in each of these subsamples.

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 B surveys estimates of the extent to which these factors affect investment. To estimate the effect of business cycles on investment, we reestimate equations from Tables 2-4, including an indicator variable for recession years. These estimates are presented in Appendix Table B. 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 Ball, Hoberg and Maksimovic (2013). The detailed discussion is in Appendix B.

Because each of the comparison studies normalizes investment differently, we reestimate 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 3 years is approximately the same as being in recession or facing financial constraints during the latest financial crisis, and more than twice the effect of being in an election year. 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

There are two types of explanations why CEO investment cycles could exist. The CEO cycle could reflect deviations from optimal investment because of agency–related reasons, or, alternatively, it could occur because of efficiency-based reasons in which investment is always at the first best. In this

section, we discuss potential explanations for the disinvestment and investment components of the CEO investment cycle, emphasizing testable implications from both agency and efficiency based theories.

4.1. Reasons for high disinvestment following CEO turnover

One explanation for high disinvestment shortly after turnover is that post-turnover divestitures reflect the departing CEOs' reluctance to divest bad investments that they have made. There are several reasons why a CEO would knowingly hold onto poorly performing assets that they personally were responsible for establishing. First, the CEO could extract private benefits from these assets at the expense of the shareholders.[10] Second, a divestiture could be viewed as essentially an admission of a mistake and reflect poorly on the CEO (e.g., Kanodia, Bushman, and Dickhaut (1989) and Boot (1992)). When management changes, the new managers do not necessarily enjoy the same private benefits from these assets and are less averse to admitting their predecessors' mistakes.

In addition, it is possible that the incoming managers could sell assets that are generating losses, even if they are worth more to the firm than to a potential buyer, so as to attribute blame for the asset's poor performance on the outgoing management. This phenomenon is commonly referred to in the accounting literature as the "Big Bath" hypothesis, and implies that the agency problem is with the incoming rather than outgoing managers.[11]

These agency explanations for post-turnover divestitures predict that the new management is likely to sell assets at a higher rate than the incumbent management. These post-turnover divestitures should occur even in regular, non-performance based turnovers. There are two additional testable implications of the agency view of post-turnover disinvestment:

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

[11] Observationally equivalent to the agency interpretation of these patterns is a behavioral one. In particular, outgoing management could have a "sunk cost fallacy" or "escalation of commitment bias" and refuse to recognize that their investments are not performing well. This behavioral bias has been used to explain the increased write-off of bad loans after loan officer turnovers (Staw et al. (1997)) and the increased sale of poorly-performing stocks after mutual fund manager turnovers. (Jin and Scherbina (2011)).

Implication 1: Performance of divested assets. The assets that are sold after turnover should have performed poorly, and the poor performance should be due to mismanagement or a bad fit with the firm rather than exogenous productivity shocks, which would presumably affect potential purchasers as well.

Implication 2: Influence of outgoing management. The influence that the old management has on the new CEO after turnover should affect his willingness to sell the assets subsequent to the turnover. When outgoing management has more influence on the new CEO, there should be fewer divestitures following CEO turnover.

In contrast to agency-based reasons, the model of Maksimovic and Phillips (2002) provides a skill-based explanation for the high disinvestment rate following management changes in which investment is always at the first-best level. 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.

The skill-based arguments do *not* predict that divested units should have unusually bad performance, because the firm should be the optimal owner of the asset prior to the CEO change. Instead, these arguments imply that post-turnover divestitures reflect the change in the skills of the outgoing and incoming CEOs. Therefore, the prior performance of the divested assets provides a way to distinguish between the explanations for the post-turnover disinvestment. Further, the Maksimovic and Phillips (2002) model also does not predict that the residual influence of the old CEO on the new CEO should matter for the firm's asset structure choice after the turnover. Instead, applying the Maksimovic and Phillips (2002) logic to CEO turnover has the following implication:

Implication 3: Fit of the new CEO's skill to firm 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.

4.2. Reasons why investment could increase with CEO tenure

For many reasons, CEOs usually prefer to grow their firms rather than to shrink them. CEOs' pay and prestige are generally positively correlated with firm size, adding units that diversify their firms can lower the risk of their personal financial positions in the firm and their human capital, they can purchase "glamorous" divisions that are fun to manage, they can create new positions for favorite employees through growth, or they could have "hubris" and overestimate their ability to add value to a line of business.[12] These arguments imply that a CEO's preferences for growth could differ from those of the shareholders. Consequently, the 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 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 3.

Implication 4: 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. In addition, the agency argument predicts that the quality of firms' investments should decrease with the CEO's tenure, and also be related to the CEO's control of the board.

[12] The literature arguing that managers tend to build "empires" is enormous and dates back to Baumol (1959), Marris (1964), Williamson (1964), and Donaldson (1984). See also Roll (1986), Morck, Shleifer and Vishny (1990), and Jensen (1993).

In contrast to the agency arguments, the arguments based on differing CEO skills do not predict increasing investment over CEO tenure. They do predict that a new CEO will increase investment in segments that he has comparative advantage in managing, but there is no reason why the quantity of investment should increase and the quality decrease over his career.

In addition, there are also several other non-agency-based reasons that potentially explain the observed increase in investment over CEO tenure. First, the CEO's time in office could reflect the CEO's ability (either innate or learned on the job) or the firm's prospects. Second, it is possible that investors are reluctant to provide capital to a firm for which they know little about the firm's new management, and such reluctance decreases as the CEO and his team stay in office for longer time. A way to differentiate these alternative explanations from the agency explanation described above is to examine the quality of the firm's investments over time: The agency explanation predicts that the firm's investment quality should decline over CEO tenure, while these alternative explanations predict that it should be increasing (or at least non-decreasing) with the CEO's tenure.

Finally, a behavioral explanation for the increase in investment over tenure is that a CEO's overconfidence is likely to grow over time (see Gervais and Odean (2001)). This explanation predicts that the quantity of a firm's investments will increase with tenure and the quality will decrease, similar to the agency arguments. However, unlike the agency arguments, increasing overconfidence is unlikely to be related to exogenous variation in the fraction of directors a CEO appoints.

5. Distinguishing between Explanations for CEO Investment Cycles

5.1. Performance of Divested Assets After Turnover

To evaluate the performance of the divested assets, we rely on *COMPUSTAT* (historical) segment data, which offers two advantages over other potential data sources. First, these 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 shocks that could affect disinvestment intensity by including (segment) industry-year or firm-year fixed effects. The inclusion of these fixed effects implies that any

measured segment underperformance does not occur because of industry-wide or firm-specific economic shocks, but instead reflects (idiosyncratic) decisions by the previous management.

The agency explanation for disinvestment implies that the post-turnover divestiture is concentrated in assets with very poor performance, i.e., assets that likely reflect mistakes by the prior leadership. For this reason, we define "*Underperforming Segment*" to be an indicator variable equal to one if a segment has lagged industry-adjusted profitability in the bottom 10% of the sample distribution.[13] In addition, "*Original CEO Replaced*" is an indicator variable that equals one for all firm-year observations after the CEO who established the segment steps down. We use these two indicator variables as well as their interaction to predict the likelihood that a given segment is terminated in a given year. We also control for the segment's age and segment industry or firm-specific shocks by including industry-year or firm-years fixed effects. This specification allows us to evaluate *Implication 1*, which suggests that the coefficient on the interaction term should be positive. In contrast, the skill-based arguments imply that the main predictor of segment termination should be direct effect of CEO turnover and not the interaction effect with segment performance.

Panel A of Table 6 contains estimates of this equation both for the full sample and the subsample of turnovers due to death, illness, or retirement of the departing CEOs. The results indicate that CEO turnover and unusually poor segment performance do not lead to higher disinvestment individually, but the interaction of the two does. This positive coefficient implies that CEO turnover facilitates the disinvestment of poorly performing units established by the previous leadership. Since *only* substantially underperforming segments established by the previous management are divested at an abnormally high rate following CEO turnover, post-turnover disinvestment does not appear to reflect the change in the CEOs' skill. In addition, because we control for industry-specific shocks in Columns (1) and (3) and firm-specific shocks in Columns (2) and (4), the poor segment performance likely reflects mismanagement by the previous leadership rather than exogenous shocks to segment productivity.

[13] The results are similar under different threshold choices such as the bottom 5% or bottom 15%.

The fact that it took a CEO change to induce the divestiture of a poorly performing segment suggests that the firm's disinvestment decisions were not optimal from the shareholders' perspective. Either prior to the management change, the firm did not hold the optimal set of assets, or if the assets were optimal at the time of the change, the poorly-performing ones were sold at a disproportionately high rate by the new management, presumably to "blame" the old management for any poor performance.

5.2. The Influence of the Outgoing Management

To evaluate *Implication 2*, we construct four measures of the residual influence of the previous CEO (or management) on the new CEO. We define "*Old 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 Old 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, *"Outsider New CEO"* as a dummy variable equaling one if the new CEO comes from outside the company,[14] and "*Staggered Board*" as a dummy variable equaling one if the company has a staggered board. With a staggered board, the new CEO's ability to change the board composition established under the previous regime during early years of his tenure is limited, because it would take at least two elections to replace a majority of the board. Moreover, whether the company has a staggered board is usually determined historically, rather than at the discretion of the current management. Thus, the cross-sectional variation in *Staggered Board* provides exogenous variation in the outgoing management's residual influence on the new CEO.

We estimate the extent to which these variables affect the likelihood that the underperforming segments established by the departing CEO get terminated in the first three years of the new CEO's tenure. Panel B of Table 6 reports estimates of these equations. In Column (1), the coefficient on the interaction between *Old CEO Stay as Chairman* and *Underperforming Segment* is -0.027 and statistically significant. This result suggests that if the old CEO stays as the Chairman of the Board, then the likelihood of an underperforming segment established by the old CEO being divested in the first three

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

years of the new CEO's tenure decreases by 23% (=0.027/0.115), relative to if the old CEO does not stay.[15] While departing CEOs can certainly play an important advisory role when they are chairmen of the board, this finding suggests that there is also a negative side to this practice in that it can hinder error correction subsequent to CEO turnover.

The remaining columns in Panel B of Table 6 document that when more executives from the previous leadership remain on the board, when the new CEO is an outsider, and when the firm has a staggered board, there is less disinvestment after the new CEO takes office.[16]

Overall, these results suggest that when the outgoing management team has a larger influence on the incoming team, there will be less disinvestment of poorly performing assets subsequent to the management change. These results are consistent with the increase in disinvestment following management changes reflecting the reluctance of previous management to divest projects for which they are personally responsible for undertaking, or the new management wishing to blame outgoing management for investments that appear to have been mismanaged.

5.3. The Fit of the New CEO's Skills with the Firm's Assets

Ideally, to test *Implication 3* one should 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 its fit with the firm's assets. Instead, our approach is to identify situations in which the CEO's skills likely fit (or not fit) the firm's assets, and compare the magnitude of the post-turnover disinvestment in these situations with that in the full sample.

Unlike conglomerates, single-segment firms provide little opportunity for the new CEO to divest assets that do not match his skills. If a single-segment firm further hires a company insider or industry

[15] The direct effect of *Underperforming Segment* is larger than in the previous panel because this model is estimated using only the first three years of the new CEO's tenure, when disinvestment is more common.

[16] The decisions as to how many executives from the outgoing management team remain on the board, and whether the company chooses an outside CEO are all endogenously determined and are often related to firm performance. However, using the segment data allows us to control for industry and firm-specific performance shocks that may affect both disinvestment intensity and segment performance. In addition, the existence of staggered board is determined historically and thus likely exogenous to any disinvestment decisions.

insider CEO who possesses firm- or industry-specific skills that match the current assets, the need to change the asset structure to match the CEO's skills is likely to be minimal. Therefore, *Implication 3* suggests that there should be less post-turnover disinvestment in single-segment firms and even less if these firms hire firm or industry insiders as CEOs.

We classify firms as single-segment using information in the *COMPUSTAT* historical segment database. Table 7 presents estimates of the equations from Tables 2 and 3 using the subsample of single-segment firms. The estimates in Columns (1) and (2) confirm statistically significant CEO investment cycles for single segment firms, with the cycles' magnitudes comparable to those for the full sample. Columns (3) and (4) further restrict the sample to be single-segment firms that hired company or industry insiders.[17] Again, the estimated magnitudes of the CEO investment cycles are similar to those in Columns (1) and (2) and to those in the full sample. These results are inconsistent with *Implication 3* and therefore the skill-based explanation for the CEO investment cycles.

A special case of the Maksimovic and Phillips (2002) is the model presented in Eisfeldt and Kuhnen (2013). In this model, managerial turnovers are accompanied by significant changes in managerial skills. A shock to the productivity of physical capital may change the desired 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 C. 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.

[17] The data on industry backgrounds is taken from Camelia Kuhnen's website, http://public.kenan-flagler.unc.edu/faculty/kuhnenc/.

5.4. CEO Power and Investment

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

To test *Implication 4*, 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 directors that 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.[18]

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 8, we test *Implication 4* by including *% of New Directors* in our investment and disinvestment 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 occurs because of the fact that tenure is correlated with the CEO's power inside the firm, then the tenure effect should be picked up by *% of New Directors.* Alternatively, if there is some

[18] 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 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.

other reason 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.

Columns (1)-(4) of Panel A of Table 8 show that *% of New Directors* is positively related to both capital expenditures and acquisitions, and also the asset growth rate. The effect of *% of New Directors* on acquisition intensity (0.27) is much stronger than on capital expenditures (0.07). Large and non-recurring investments such as acquisitions are more subject to the board scrutiny than routine capital expenditures, so the larger coefficient on acquisitions than on capital expenditures suggests that our measure indeed reflects the CEO's capture of the board. Potentially more important, once we control for *% of New Directors*, CEO tenure no longer has any effect on investment intensity, which suggests that the channel through which CEO tenure affects investment is indeed through the control over the board that the CEO acquires over time.

In contrast, Columns (5) and (6) show that controlling for *% of New Directors* does not mitigate the effect of CEO tenure on employment growth rate or on disinvestment intensity. The result on employment growth is puzzling, since the CEO's preference for growing the firm is likely to be reflected in the size of both physical capital and labor. One potential explanation is that corporate hiring could be subject to less board scrutiny than corporate investment. The fact that the increasing CEO capture of the board over time does not explain the CEO disinvestment cycle is consistent with our hypothesis that the disinvestment cycle is explained by CEO turnover facilitating error correction and re-optimization than the CEO's preference for firm size and growth.[19]

5.4.2. Instrumental Variable Estimates

One potential concern is that director turnover is endogenous and could depend on the firm's performance, investment strategies, growth opportunities, which could be correlated with the level of investment. To address this concern, we follow Fracassi and Tate (2012) and use the retirement of

[19] In unreported analysis, we find that CEO ownership or CEO's 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 8. 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 to identify the demand for new directors that is not a function of the firm's conditions. Most companies have a mandatory retirement age of 72 for outside directors (see, e.g., Larcker 2011), and inside directors' mandatory retirement age is usually around 65. Using these conventions, we count a director departure as retirement if the departing director is an outside director and is at least 72 years old or is an inside director and is at least 65. Fracassi and Tate (2012) provide a battery of validity tests for this identification strategy. In particular, they find that director retirement does not appear to be correlated with firm performance and investment opportunities.[20] Our instrument for *% of New Directors* is the cumulative number of retired directors since the current CEO takes office scaled by the board size ("*Retired Directors*"). The average value of the instrument is 12.4%.

Panel B of Table 8 reports 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 the endogenous variable *% of New Directors*. The second stage results suggest that the exogenous variation in *% of New Directors* due to director retirements still leads to more corporate investment and higher firm growth rate (including employment growth rate). Consequently, there appears to be a causal effect of growing CEO capture of the board over time on investment and growth.

5.5. Investment Quality over CEO Tenure

An important implication of the agency-based interpretation of the CEO investment cycle is that the quality of the firm's investments decreases over the CEO cycle. In Section 5.1, we document that the segments that experience disproportionately high probabilities of being divested immediately after CEO turnovers tend to be the bottom performers in the segments' industries. Since post-turnover divestitures do not appear to reflect differing CEO skills, the probability of being divested by the new CEO immediately after turnover provides useful information about the segment's quality. Panel A of Table 9 documents that the segments established in the later years of a CEO's tenure are significantly more likely than those established in the first three years to contribute to post-turnover divestiture (13% vs. 8%). This

[20] Larcker (2011) also documents that directors tend to retire voluntarily, and only 2% of director departures occur because of dismissals or failure to be re-elected.

pattern is consistent with the argument that investments made in the later years of a CEO's tenure have lower quality than those made in the earlier years.

Our main measure of the quality of the firm's investments is the stock market reaction to announcements to the firm's acquisitions. The quality of acquisitions is relevant to our tests of the agency hypothesis 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, the existing literature documents that corporate mergers and acquisitions are often motivated by non-value maximizing incentives (e.g., Jensen (1993), Grinstein and Hribar (2004), Harford and Li (2007)).

Panel A of Table 9 documents the fraction of acquisitions with negative three-day cumulative market-adjusted returns around acquisition announcements. During the first 3 years of a CEO's tenure, only 39% of acquisitions have negative announcement returns, while during the later years of his tenure, 58% do. This pattern suggests that the quality of acquisitions declines with CEO tenure, and more of the deals made in the later part of the tenure are likely to be non-value maximizing.

Panel B of Table 9 tests this idea more formally, presenting equations predicting the three-day market-adjusted return to acquisition announcements. The estimates in Column (1) imply that acquisition returns are on average 20 basis points higher if the acquisition is announced in the first three years of a CEO's tenure than in later years, after controlling for deal and firm characteristics. Column (2) shows that the market reaction is negatively associated with *% of New Directors*, suggesting that the CEO's growing influence over the board is associated with deteriorating acquisition quality. The estimate suggests that if *% of New Directors* changes from 0 to 1, then the acquisition announcement return decreases by about 1 percentage point. This drop implies a value decline of $105 million for the average acquirer in our sample with a market capitalization of $10.5 billion. In Column (3) we include firm-CEO fixed effects, and in Column (4) we restrict the sample to long-term CEOs who were in office for at least six years. In each case, the estimated effect of CEO's control of the board on acquisition announcement returns becomes

even stronger.[21] Column (5) uses *Retired Directors* as an instrument for the percent of new directors, and suggests the CEO's capture of the board causally affects acquisition quality.

Overall, the results in subsections 5.4 and 5.5 are consistent with the view that as a CEO's power grows in a firm, he will tend to increase his investment, and that the incremental investments will tend to be of lower quality. This increase appears to be more related to a direct measure of the CEO's control of the board than simply his time in office. The deteriorating investment quality over CEO tenure is not consistent with the non-agency based views in which a CEO's time in office reflects the firm's investment opportunity, the CEO's ability, or a potential financing constraint caused by the change of leadership. CEO overconfidence that increases with tenure is consistent with the quality of investments declining over tenure, but not with the decrease in quality occurring through the CEO's control of the board, particularly the control gained through director retirements.

We also emphasize that not all agency theories are consistent with our results. For example, the "quiet life" arguments of Bertrand and Mullanaithan (2003) suggest the opposite: their hypothesis implies that as managers acquire power, they do whatever they can to make their job easier. Our results are inconsistent with this view. Instead, they imply that as CEO's power grows in a firm, he will use it to overcome whatever constraints the board imposes and to invest in the projects he prefers.

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 management 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.

[21] In a previous draft, we present estimates of this equation using the subsample of cash-only deals; similar to those presented here, they indicate that the abnormal return to acquisition announcements is declining over CEO tenure.

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

We argue that the most plausible explanation for the CEO investment cycle is a combination of two agency-based effects: First, CEOs are reluctant to divest or re-optimize on bad investments that they have made due to private benefits or career concerns. It often takes a new CEO to enforce optimal disinvestment, leading to high disinvestment intensity shortly after CEO turnover. Second, CEOs have many reasons to prefer more investment than is optimal from a value-maximization perspective. As the 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. Eventually, when the CEO steps down, the process is repeated by the next CEO. We provide a series of tests that support this interpretation of the observed investment behavior over the CEO cycle.

In contrast, arguments based on differing CEO skills, exogenous productivity shocks, or CEO tenure endogenously reflecting the firm's investment opportunities do not explain the nature and magnitude of the CEO investment cycles. It is impossible to rule out definitively 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 the change in investment over the CEO cycle occurs because of a combination of agency problems.

This agency interpretation has a number of important implications. First, 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 in the academic literature to corporate governance lately, its impact on investment likely has been understated, and should be incorporated into models of investment.

Second, the existence and magnitude of the CEO investment cycle highlights the limitations of public corporations as a vehicle of ensuring optimal investment. A related puzzle concerns the way in which private equity firms are able to pay large (30%) premiums for target companies, charge high fees, and still create enough value in those companies to earn positive returns for their investors. When asked, private equity general partners often emphasize the improvements in governance that they are able to enact in target companies; the existence of such large and systematic pattern in investment over the CEO cycle in public corporations suggests that this argument is credible. In addition, recent studies show that CEO turnovers are less frequent in private companies than in public companies (Cornelli and Karakas 2013, Gao, Harford, and Li 2013). An implication of our results is that in public companies, such regular turnover is potentially important, because it is part of the process of controlling agency problems.

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 seems 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 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.

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

Reasons of Turnovers

	Freq.	% of Sample
(1): Turnovers due to death, illness	130	2
(2): Turnovers due to death, illness or retirement of departing CEO at good performance	211	4
(3): No Mgt Shakeup	1,032	19
(4): Pre-turnover Ind-adj. IVOL<=0 & stock return>=0 & ROA>=0	880	16
(5): (2) or (3) or (4)	1,831	34
(6): Not classified	3,270	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.

Disinvestment	Obs	Mean	25th percentile	Median	75th percentile
$I_{\{\text{asset sales}>0\}}$	39,292	0.089	0	0	0
$I_{\{\text{discontinued operations}>0\}}$	39,292	0.157	0	0	0
$I_{\{\text{asset sales}>0 \text{ or discontinued operations}>0\}}$	39,292	0.210	0	0	0
$I_{\{\text{If there is downsizing announcement(s) in the month}\}}$	245,677	0.040	0	0	0
$I_{\{\text{segment termination}\}}$	196,717	0.095	0	0	0
Investment					
$I_{\{\text{expansion announcement(s) in the month}\}}$	245,677	0.081	0	0	0
$I_{\{\text{segment start}\}}$	216,569	0.161	0	0	0
Acquisition Rate	36,901	0.338	0	0	0
Capx Rate	36,901	0.327	0.113	0.203	0.363
Investment Rate	36,901	0.666	0.126	0.239	0.497
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, and deal-specific variables (in acquisitions). "% On Board [old mgt.]" is the percentage of old 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 [old CEO]" is an indicator variable that equals if the old 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. Deal-specific variables are constructed using data from SDC Platinum. Mkt-adj. announcement day returns are constructed using CRSP data.

Firm Attribute	Obs	Mean	25^{th} percentile	Median	75^{th} percentile
Firm Age	39,193	18.626	7	16	30
Ind-adj.ROA	37,223	0.057	-0.008	0.033	0.114
Ind-adj. Return	36,580	0.147	-0.158	0.039	0.280
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
Cash Ratio	43,391	0.093	0.015	0.046	0.122
% of New Directors	16,220	0.520	0.250	0.500	0.778
Retired directors	16,220	0.124	0	0	0.167
% On Board [old mgt.]	3,248	0.214	0	0.250	0.500
Stay As Chairman [old CEO]	3,402	0.277	0	0	1
Deal Attribute	**Obs**	**Mean**	25^{th} **percentile**	**Median**	75^{th} **percentile**
CAR [-1,1] around Acquisition Announcements	15,749	0.002	-0.011	0	0.014
Public Target	15,749	0.230	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: Disinvestment Probability and CEO Tenure

Panel A: Disinvestment Probability and CEO Tenure

The dependent variables are the disinvestment indicator variable $I_{\{\text{asset sales>0 or discontinued operations>0}\}}$. "Year [0,2]" indicates the first 3 years of a CEO's tenure. Models (1) to (9) present results for the full sample as well as various turnover subsamples. "Years [0,5], long-term CEO" means the first 6 years of tenure for CEOs who are in office for at least 7 years. A constant term is included in all models but omitted for brevity. All control variables but age-related ones are lagged. Firm and year fixed effects are included. The definitions of all variables are in Appendix A. The standard errors are clustered by firm.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Full Sample	Years[0, 5], long-term CEO	Full Sample	Death/Illness	Death/Illness /Ret.at Good Performance	No Mgt Shakeup	Good Pre-turnover Performance	Not classified	Outright Forced
	$I_{\{\text{asset sales>0 or discontinued operations>0}\}}$								
Tenure (in years)	-0.005***	-0.017***							
	(0.001)	(0.004)							
Years [0,2]			0.032***	0.028	0.032*	0.025*	0.039*	0.036***	0.049**
			(0.006)	(0.026)	(0.017)	(0.015)	(0.022)	(0.008)	(0.022)
CEO Age	0.000	0.000	-0.001*	0.001	0.003	0.001	0.001	-0.002**	-0.003
	(0.001)	(0.002)	(0.001)	(0.005)	(0.003)	(0.001)	(0.002)	(0.001)	(0.003)
Ind-adj. ROA	-0.165***	-0.102**	-0.164***	-0.562***	-0.348***	-0.359***	-0.129	-0.145***	-0.193**
	(0.024)	(0.041)	(0.024)	(0.106)	(0.125)	(0.091)	(0.085)	(0.027)	(0.092)
Ind-adj. Return	-0.006**	-0.006	-0.006**	0.003	0.053**	0.012	-0.012	-0.007**	-0.006
	(0.003)	(0.005)	(0.003)	(0.025)	(0.027)	(0.010)	(0.010)	(0.003)	(0.013)
MB	-0.001	0.001	-0.001	0.002	-0.003	-0.002	0.003**	-0.001	-0.007**
	(0.001)	(0.001)	(0.001)	(0.002)	(0.004)	(0.002)	(0.001)	(0.001)	(0.003)
Leverage	-0.025**	-0.036	-0.027**	0.046	0.009	0.026	-0.025	-0.019	0.004
	(0.012)	(0.028)	(0.012)	(0.081)	(0.054)	(0.026)	(0.038)	(0.015)	(0.041)
Div. Payer	0.070***	0.103**	0.070***	0.176	-0.019	0.061	0.074	0.068**	0.038
	(0.021)	(0.050)	(0.022)	(0.189)	(0.110)	(0.060)	(0.079)	(0.027)	(0.100)
log(Assets)	0.013**	0.018	0.010*	0.060	0.042	0.044***	0.033	0.009	0.032**
	(0.006)	(0.014)	(0.006)	(0.042)	(0.028)	(0.008)	(0.024)	(0.007)	(0.014)
Firm and Year F.E.	x	x	x	x	x	x	x	x	x
Obs	33,186	9,089	33,186	648	1,238	6,360	5,964	20,299	1,720
Adj. R-sqr.	0.273	0.292	0.273	0.398	0.304	0.344	0.329	0.290	0.353

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. "Months [0,24]" is an indicator variable that equals 1 for the first 24 months of a CEO's tenure, and 0 for later months. In Columns (3) and (4), the dependent variables are the segment termination indicator $I_{\{segment\ termination\}}$. In models (2) and (4), we use the subsample of turnovers due to death, illness, or retirement of the departing CEOs. Observations are at the segment-year level. The data is from Compustat "historical segment" database, and we only include multi-segment firm-years. "Years [0, 2]" is an indicator variable that equals 1 for the first 3 years of a CEO's tenure, and 0 for later years. "Underperforming Segment" is an indicator variable that equals 1 if the lagged segment operating profits/losses over sales is at the bottom 10% of the sample distribution (less than -7.4%). Segment Age is the number of years since the establishment of the segment. 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.

	$I_{\{\text{downsizing announcement(s) in the month}\}}$		$I_{\{segment\ termination\}}$	
	(1)	(2)	(3)	(4)
	Full Sample	Death/Illness/ Retirement	Full Sample	Death/Illness/ Retirement
Months [0,24]	0.011***	0.007*		
	(0.002)	(0.004)		
Years [0,2]			0.005***	0.012**
			(0.002)	(0.006)
CEO Age	0.0001	0.00003	0.0001	-0.0002
	(0.0001)	(0.0002)	(0.0002)	(0.001)
Ind-adj. ROA	-0.014***	-0.002	0.015	-0.008
	(0.005)	(0.011)	(0.013)	(0.039)
Ind-adj. Return	-0.004***	-0.005**	-0.0002	-0.008***
	(0.001)	(0.002)	(0.001)	(0.003)
MB	-0.001***	-0.001	-0.0002	0.0004
	(0.000)	(0.001)	(0.0002)	(0.001)
Leverage	0.006	-0.004	0.006*	0.014*
	(0.005)	(0.017)	(0.003)	(0.008)
Div. Payer	0.016***	0.016**	-0.018**	0.016
	(0.003)	(0.007)	(0.008)	(0.033)
log(Assets)	0.019***	0.014**	0.011***	0.008
	(0.002)	(0.006)	(0.002)	(0.008)
Underperforming Segment			0.109***	0.088***
			(0.005)	(0.013)
# of Segments			-0.002**	0.005
			(0.001)	(0.003)
Segment Age			-0.002***	-0.002***
			(0.0001)	(0.0003)
Firm and Year F.E.	x	x	x	x
Obs.	209,736	42,072	120,379	13,688
Adj. R-sqr.	0.134	0.144	0.076	0.094

Table 3: 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. Models (1) to (9) present results for the full sample as well as various turnover subsamples. "Years [0,5], long-term CEO" means the first 6 years of tenure for CEOs who are in office for at least 7 years. A constant term is included in all models but omitted for brevity. All control variables but age-related ones are lagged. Firm and year fixed effects are included. The definitions of all variables are in Appendix A. The standard errors are clustered by firm.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Full Sample	Years[0, 5], long-term CEO	Full Sample	Death/Illness	Death/Illness /Ret. at Good Performance	No Mgt Shakeup	Good Pre-turnover Performance	Not classified	Outright Forced
					Investment Rate				
Tenure (in years)	0.005*	0.020**							
	(0.003)	(0.010)							
Years [0,2]			-0.059***	-0.073	-0.059*	-0.028**	-0.082***	-0.057***	-0.124**
			(0.016)	(0.112)	(0.031)	(0.014)	(0.028)	(0.020)	(0.060)
CEO Age	-0.005***	-0.005	-0.005***	0.003	-0.018***	0.002	-0.003	-0.001	-0.003
	(0.002)	(0.005)	(0.002)	(0.010)	(0.006)	(0.003)	(0.004)	(0.002)	(0.006)
Ind-adj. ROA	1.030***	1.180***	1.023***	0.565	0.771**	1.073***	1.027***	0.927***	-0.185
	(0.133)	(0.348)	(0.133)	(0.388)	(0.310)	(0.305)	(0.242)	(0.114)	(0.569)
Ind-adj. Return	0.093***	0.125***	0.093***	0.077	0.046	0.027	0.029	0.073***	0.105*
	(0.017)	(0.042)	(0.017)	(0.157)	(0.045)	(0.024)	(0.030)	(0.017)	(0.054)
MB	0.017***	0.018***	0.017***	0.011	-0.001	0.005	0.006	0.018***	-0.004
	(0.003)	(0.007)	(0.003)	(0.007)	(0.006)	(0.005)	(0.006)	(0.004)	(0.009)
Leverage	-0.606***	-0.915***	-0.603***	0.101	0.105	0.036	-0.027	0.075**	-0.762*
	(0.073)	(0.201)	(0.073)	(0.278)	(0.084)	(0.054)	(0.070)	(0.034)	(0.439)
Div. Payer	0.095***	-0.007	0.097***	-0.751	0.380	-0.425**	-0.503***	-0.879***	0.289***
	(0.031)	(0.078)	(0.031)	(0.560)	(0.393)	(0.193)	(0.175)	(0.090)	(0.101)
log(Assets)	-0.238***	-0.295***	-0.234***	-0.302**	-0.173***	-0.336***	-0.343***	-0.297***	-0.109*
	(0.024)	(0.053)	(0.024)	(0.116)	(0.042)	(0.046)	(0.048)	(0.024)	(0.056)
Firm and Year F.E.	x	x	x	x	x	x	x	x	x
Obs	32,722	8,973	32,722	647	1,235	6,306	5,909	20,000	1,701
Adj. R-sqr.	0.242	0.318	0.242	0.231	0.235	0.345	0.279	0.208	0.163

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. "Months [0,24]" is an indicator variable that equals 1 for the first 24 months of a CEO's tenure, and 0 for later months. In Columns (3) and (4), the dependent variables are the segment start indicator $I_{\{segment\ start\}}$. In columns (2) and (4), we use the subsample of turnovers due to death, illness, or retirement of the departing CEOs. The data source is Compustat "historical segment" database. "Years [0,2]" is an indicator variable that equals 1 for the first three years of a CEO's tenure, and 0 for later years. 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) Full Sample	(2) Death/Illness/ Retirement	(3) Full Sample	(4) Death/Illness/ Retirement
Months [0,24]	-0.013*	-0.008*		
	(0.007)	(0.005)		
Years [0,2]			-0.008*	-0.006*
			(0.005)	(0.003)
CEO Age	-0.0001*	0.0001	0.001	0.0001
	(0.0001)	(0.0004)	(0.001)	(0.001)
Ind-adj. ROA	0.001	0.013	0.038*	0.027
	(0.006)	(0.017)	(0.021)	(0.069)
Ind-adj. Return	0.002***	0.007***	0.005	0.029***
	(0.001)	(0.002)	(0.004)	(0.008)
MB	-0.0001	-0.001	-0.0002	0.002
	(0.0002)	(0.001)	(0.001)	(0.002)
Leverage	-0.023***	-0.030	0.007	0.045**
	(0.005)	(0.019)	(0.013)	(0.021)
Div. Payer	0.001	0.003	-0.018	0.164**
	(0.004)	(0.010)	(0.022)	(0.077)
log(Assets)	0.010***	0.006	0.013*	-0.025
	(0.002)	(0.007)	(0.007)	(0.018)
# of Segments			-0.032***	-0.089***
			(0.003)	(0.008)
Firm and Year F.E.	x	x	x	x
Obs.	209,736	42,072	144,287	15,484
Adj. R-sqr.	0.173	0.198	0.136	0.277

Table 4: Net Effects CEO Tenure on Disinvestment and Investment

Pane A reports the trend in the asset growth rate over CEO tenure. Pane B reports the trend in the employment growth rate over CEO tenure. Models (1) to (9) present results for the full sample as well as various turnover subsamples. The usual set of control variable: CEO Age, Industry-adj. ROA and Return, MB, Leverage, Div. Payer, log(Assets), as well as a constant term is included in all models but omitted for brevity. Control variables except for age-related ones are lagged. Firm and year fixed effects are included in all models. 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)	(7)	(8)	(9)
	Full Sample	Years[0, 5], long-term CEO	Full Sample	Death/ Illness	Death/ Illness/ Ret. at Good Perf.	No Mgt Shakeup	Good Pre-turnover Perf.	Not classified	Outright Forced
					Asset Growth Rate				
Tenure (in years)	0.006***	0.018***							
	(0.001)	(0.004)							
Years [0,2]			-0.032***	-0.025**	-0.034**	-0.022	-0.022*	-0.033***	-0.028*
			(0.006)	(0.011)	(0.016)	(0.019)	(0.012)	(0.010)	(0.016)

Panel B: Employment Growth Rate and CEO Tenure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Full Sample	Years[0, 5], long-term CEO	Full Sample	Death/ Illness	Death/ Illness/ Ret. at Good Perf.	No Mgt Shakeup	Good Pre-turnover Perf.	Not classified	Outright Forced
					Employment Growth Rate				
Tenure (in years)	0.004***	0.007***							
	(0.001)	(0.003)							
Years [0,2]			-0.022***	-0.010*	-0.020*	-0.017*	-0.022*	-0.022*	-0.016*
			(0.004)	(0.005)	(0.011)	(0.009)	(0.012)	(0.012)	(0.010)

Table 5: Comparing the Magnitude of the CEO Cycle with Other Factors Affecting Investment

This table compares the estimation coefficients of the CEO cycle effect (*First 3 years vs. later*) with the effects of other external factors that affects firm's investment: business cycle (*Recession vs. non-recession*, see results presented in Appendix Table B), 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 Ball, Hoberg, and Maksimovic, 2013). I/K, I/A, and I/S are Capital Expenditures scaled by lagged (beginning-of-period) PPE, lagged Assets, and Sales, respectively.

	I/K	I/A	I/S
CEO's first 3 years vs. later	-2.3 pts	-1.0 pts	-0.4 pts
Recession vs. non-recession (Table B1)	-2.8 pts		
Election vs. non-election (Julio and Yook, 2012)		-0.4 pts	
One std. dev. increase in financial constraint during 2008-2009 (Ball, Hoberg, and Maksimovic, 2013)			0 to –0.8 pts

Table 6: Agency Explanations for the Disinvestment Cycle

Panel A: Segment Termination

This table reports the OLS estimation of the probability of a segment being terminated, using the segment data from Compustat "historical segment" data base, for multi-segment firm(-year)s in our sample. The dependent variable is an indicator variable that equals 1 if the segment is divested or discontinued in a given year. The observations are at the segment-year level for the entire life of each segment. In model (1) and (3), we control for industry-year fixed effects. In models (2) and (4), we control for firm-year fixed effects. In models (3) and (4), we use the subsample with original CEOs replaced (if replaced) after turnovers due to death, illness, or retirement of the departing CEOs. All variables definitions are in Appendix A. The estimated coefficients are reported first, followed by the standard errors, then the marginal effects (in square brackets). ***, ** and * indicate significance at the 1%, 5%, and 10% levels respectively.

	$I_{\{segment\ termination\}}$			
	(1)	(2)	(3)	(4)
			Death/Illness/Retirement	
Original CEO Replaced	-0.004	-0.013	-0.003	-0.012
	(0.003)	(0.010)	(0.009)	(0.010)
Original CEO Replaced	0.073***	0.060***	0.076*	0.082**
x Underperforming Segment	(0.023)	(0.021)	(0.045)	(0.032)
Underperforming Segment	0.021	0.016	-0.025	0.022
	(0.018)	(0.016)	(0.031)	(0.021)
Segment Age	-0.001***	-0.001***	-0.002***	-0.003***
	(0.0001)	(0.0001)	(0.0003)	(0.0004)
Constant	0.044***	0.058***	0.069***	0.079***
	(0.003)	(0.005)	(0.007)	(0.006)
Industry-Year F.E.	x		x	
Firm-Year F.E.		x		x
Obs.	128,961	128,961	14,186	14,186
Adj. R-sqr.	0.070	0.290	0.197	0.255

Panel B: Residual Influence of Old CEO on Post-Turnover Downsizing

This table reports the effect of residual influence from old management on segment termination, using the segment data from Compustat "historical segment" data base, for multi-segment firm(-year)s in our sample. The dependent variable is an indicator variable that equals 1 if the segment is divested or discontinued. We only include segments that are established during the departing CEO's tenure. The sample consists of firm-years during the first 3 years of the new CEO's tenure. Information on "% On Board [old mgt.]" is from the director (and director-legacy) data base from RiskMetrics, which starts from 1996. Information on "Staggered Board" is from the governance (and governance-legacy) data base from RiskMetrics, which starts from 1990. The observations are at the segment-year level for the entire life of each segment. 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	0.115***	0.117***	0.085***	0.096***
	(0.011)	(0.015)	(0.007)	(0.009)
Stay as Chairman x Underperforming Segment	-0.027*			
	(0.015)			
% of Old Mgmt. On Board x Underperforming Segment		-0.094**		
		(0.041)		
Outsider Succession x Underperforming Segment			0.039**	
			(0.016)	
Staggered Board x Underperforming Segment				-0.018**
				(0.009)
Segment Age	-0.003***	-0.003***	-0.003***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.082***	0.076***	0.076***	0.063***
	(0.003)	(0.004)	(0.003)	(0.002)
Firm-Year F.E.	x	x	x	x
Obs.	22,250	18,733	42,123	31,627
Adj. R-sqr.	0.295	0.269	0.298	0.283

Table 7: CEO Investment Cycles in Single-Segment Firms

This table reports the trend in probability of disinvestment and the rate of investment over CEO tenure for single segment firms. "Year [0,2]" indicates the first 3 years of a CEO's tenure. Models (1) and (2) report results for the subsample of firms with only one segment (defined by segment ID in Compustat (historical) segment data base) at the CEO turnover year. Models (3) and (4) report results for single-segment firms that hired company insiders or industry insiders as the CEOs. All explanatory variables except for time/age related variables 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)	(4)
	$I_{\{asset\ sales>0\ or\ discontinued\ operations>0\}}$	Investment Rate	$I_{\{asset\ sales>0\ or\ discontinued\ operations>0\}}$	Investment Rate
	Single-Segment		Single-Segment, Company/Industry Insider Succession	
Years [0,2]	0.022**	-0.062*	0.027**	-0.046*
	(0.010)	(0.033)	(0.012)	(0.025)
CEO Age	-0.001	-0.007	0.001	-0.007
	(0.001)	(0.005)	(0.001)	(0.005)
Ind-adj. ROA	-0.132***	1.011***	-0.171***	1.262***
	(0.028)	(0.220)	(0.041)	(0.246)
Ind-adj. Return	-0.002	0.107***	0.002	0.066**
	(0.004)	(0.029)	(0.005)	(0.033)
MB	-0.000	0.019***	-0.001	0.006
	(0.001)	(0.006)	(0.001)	(0.005)
Leverage	-0.026	-0.020	-0.033	-0.034
	(0.021)	(0.065)	(0.026)	(0.064)
Div. Payer	-0.009	-0.657***	-0.003	-0.867***
	(0.031)	(0.135)	(0.040)	(0.153)
log(Assets)	0.016	-0.272***	0.012	-0.304***
	(0.010)	(0.051)	(0.012)	(0.055)
Firm and Year F.E.	x	x	x	x
Obs	10,826	10,685	8,219	8,111
Adj. R-sqr.	0.235	0.256	0.223	0.250

Table 8: 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 various investment, growth, and disinvestment variables. "Year [0,2]" indicates the first 3 years of a CEO's tenure. Control variables except for age-related variables are lagged. Firm 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) Investment Rate	(2) CapEx Rate	(3) Acquisition Rate	(4) Asset Growth Rate	(5) Employment Growth Rate	(6) $I_{\{\text{asset sales}>0 \text{ or discontinued operations}>0\}}$
Years [0,2]	-0.003	-0.008	0.005	-0.004	-0.016**	0.034***
	(0.037)	(0.007)	(0.036)	(0.011)	(0.007)	(0.012)
% of New Directors	0.333***	0.066***	0.267**	0.076***	0.009	-0.004
	(0.129)	(0.024)	(0.124)	(0.025)	(0.016)	(0.022)
CEO Age	0.005	-0.003*	0.008	-0.0002	-0.0002	-0.0002
	(0.016)	(0.002)	(0.016)	(0.001)	(0.001)	(0.001)
Ind-adj. ROA	1.418***	0.487***	0.930***	0.504***	0.227***	-0.201***
	(0.291)	(0.072)	(0.255)	(0.077)	(0.045)	(0.046)
Ind-adj. Return	0.060	0.037***	0.023	0.036***	0.031***	-0.006
	(0.042)	(0.009)	(0.038)	(0.009)	(0.006)	(0.006)
MB	0.011**	0.007***	0.004	0.012***	0.003***	0.001
	(0.005)	(0.002)	(0.004)	(0.002)	(0.001)	(0.001)
Leverage	-0.892***	-0.083	-0.810***	-0.302***	-0.129***	0.069
	(0.193)	(0.051)	(0.182)	(0.052)	(0.036)	(0.043)
Div. Payer	0.117**	0.014	0.102**	0.050***	0.021*	-0.018
	(0.048)	(0.010)	(0.046)	(0.017)	(0.012)	(0.020)
log(Assets)	-0.601***	-0.071***	-0.531***	-0.339***	-0.155***	0.035***
	(0.072)	(0.014)	(0.066)	(0.023)	(0.012)	(0.013)
Firm and Year F.E.	x	x	x	x	x	x
Obs.	15,261	15,261	15,261	15,442	15,233	15,442
Adj. R-sqr.	0.265	0.457	0.202	0.235	0.179	0.335

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 retired directors during the incumbent CEO's tenure until the current fiscal year, scaled by the current board size. Control variables except for age-related variables are lagged. Firm 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. 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	(1) Investment Rate	(2) Asset Growth Rate	(3) Employment Growth Rate
Retired Directors	0.237***			
	(0.029)			
% of New Directors		0.555*	0.323***	0.216***
		(0.314)	(0.102)	(0.067)
CEO Age	0.021***	-0.020**	-0.006**	-0.004***
	(0.001)	(0.008)	(0.002)	(0.002)
Ind-adj. ROA	0.140***	1.234***	0.470***	0.202***
	(0.040)	(0.215)	(0.078)	(0.047)
Ind-adj. Return	0.006	0.075**	0.035***	0.030***
	(0.004)	(0.034)	(0.008)	(0.006)
MB	0.000	0.014***	0.011***	0.003***
	(0.001)	(0.005)	(0.002)	(0.001)
Leverage	0.011	-0.689***	-0.306***	-0.132***
	(0.037)	(0.136)	(0.051)	(0.036)
Div. Payer	-0.043**	0.126***	0.059***	0.028**
	(0.018)	(0.047)	(0.019)	(0.014)
log(Assets)	-0.027**	-0.483***	-0.334***	-0.152***
	(0.011)	(0.047)	(0.022)	(0.011)
Firm and Year F.E.	x	x	x	x
Obs	15,033	15,033	15,206	14,997
First-Stage F-Statistics	74.45***			
Anderson-Rubin Wald test		3.18*	10.13***	11.07***

Table 9: Investment Quality

Panel A: Quality and Timing of Investment

The top panel of this table reports the % of segments divested during the first three years of a new CEO's regime among all segments established in the previous CEO's first three years, vs. among those established in the later part of previous CEO's tenure. The bottom 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.

	Segment estab. in years[0,2]	Segment estab. after years[0, 2]	Difference
% of segments divested by next CEO in years[0,2]	8%	13%	-5%**
	Deals made in years[0,2]	Deals made after years[0, 2]	
% of CAR [-1, 1] around Acq. Announcements<0	39%	58%	-19%**

Panel B: Market Reaction to Acquisitions and CEO Power

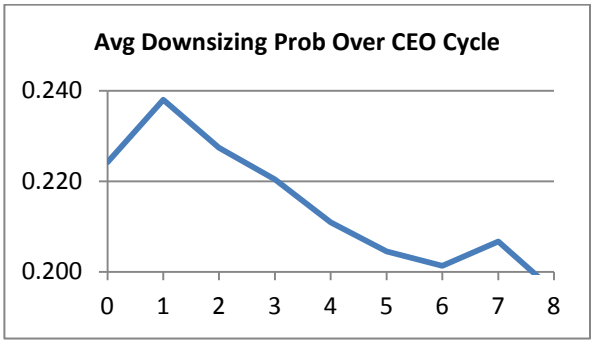
This table reports the effect of CEO power on the three-day cumulative market-adjusted return around acquisition announcements. The market return is constructed using the value-weighted market portfolio. "Year [0,2]" indicates the first 3 years of a CEO's tenure. Models (1) and (2) report the results for the full sample. Models (3) and (4) report the results for cash deals only. Model (5) reports 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 retired directors 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 firm-specific variables (cash ratio, M/B, firm size) which are lagged. 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				
		Full Sample		Long-term CEO	IV 2nd Stage
	(1)	(2)	(3)	(4)	(5)
Years [0,2]	0.002**				
	(0.001)				
% of New Directors		-0.009**	-0.016*	-0.012**	-0.043*
		(0.004)	(0.009)	(0.006)	(0.023)
Public Target	-0.008***	-0.004**	-0.004*	-0.004*	-0.004**
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
log(Deal value)	0.001***	0.0002	0.000	0.000	0.001*
	(0.0003)	(0.0005)	(0.001)	(0.001)	(0.0003)
% of stock	-0.008***	-0.015***	-0.014***	-0.015***	-0.006
	(0.002)	(0.004)	(0.004)	(0.004)	(0.005)
Cash Ratio	-0.006	0.006	0.014	0.008	0.003
	(0.008)	(0.014)	(0.017)	(0.016)	(0.013)
MB	0.0003	0.0002	0.000	0.000	0.0003
	(0.0002)	(0.0003)	(0.000)	(0.000)	(0.0002)
log(Assets)	-0.004***	-0.008***	-0.008**	-0.008***	-0.004***
	(0.0004)	(0.003)	(0.003)	(0.003)	(0.001)
Firm-CEO F.E.			x		
Obs.	14,846	8,533	8,533	6,188	8,533
Adj. R-sqr.	0.029	0.044	0.127	0.053	

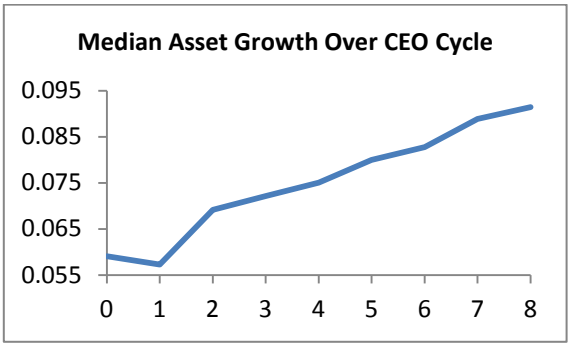
Figure 1: CEO Investment Cycle

The figures below graph the average downsizing probability (Panel a), the median investment rate (Panel b), the median asset growth rate (Panel c), and the median employment rate (Panel d), all calculated by tenure years (t=0 is the turnover year).

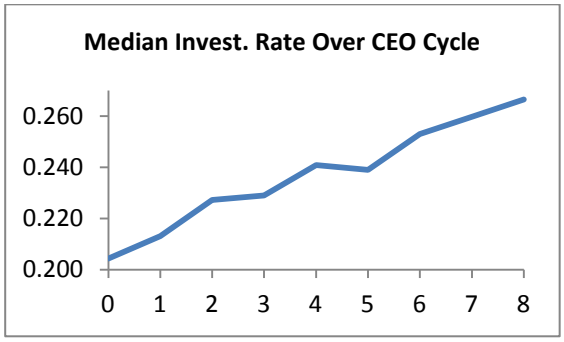
Panel a



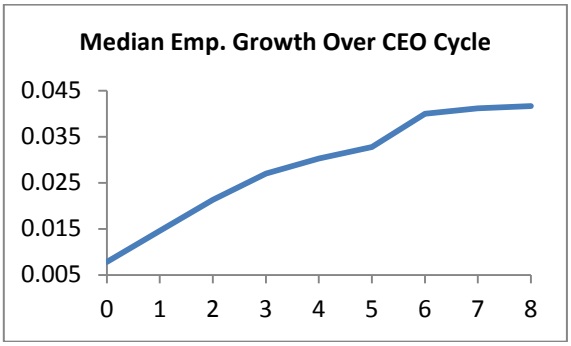
Panel b



Panel c



Panel d



Appendix A: Variable Definitions

Tenure (in years)	CEO's tenure is the number of years starting from the year when he took office (based on the variable *becameceo* in *Execucomp*), that is, (year-became CEO year).
Tenure (in months)	CEO's tenure is the number of months starting from the month when he took office (based on the variable *becameceo* in *Execucomp*)
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, 0 otherwise.
Months [0,24]	An indicator variable that equals 1 if CEO is his tenure between month 0 and month 24, 0 otherwise.
CEO Age	The age of the CEO in the fiscal year.
Death/Illness	Include turnovers where a) news searches revealed that the CEO departure was related to a health condition or death (from Fee et al. 2013), or b) turnover reason provided in Execucomp is "deceased".
Death/Illness/Retirement	This sample includes turnovers cases where a) news searches revealed that the CEO departure was related to a health condition or death (from Fee et al. 2013), b) turnover reason provided in Execucomp is "deceased", c) departing CEOs older than 65 years. In the main analysis specifications, we drop 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 *Cum. Industry-adj. Return month[-12,-1]* below) is no less than 0.
No Mgt 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
Good Pre-turnover Perf.	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 *Median Monthly IVOL month[-12,-1]* 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 *Cum. Industry-adj. Return month[-12,-1]* 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.
Forced Turnover	Forced turnovers include the "overtly forced" group from Fee et al. (2013) with cases for which news searches indicated that the CEO was forced to leave or left under pressure.
Not Classified	Turnovers that are not classified as due to death, illness, or forced, and do not fall into the "no management shakeup" or "good pre-turnover performance" subsamples.
$I_{\{\text{discontinued operations}>0\}}$	An indicator function that equals 1 of the firm reports discontinued

	operations (inflow/outflow of funds due to discontinuation of operations (item "DO" in *Compustat*) in the fiscal year.
$I_{\{\text{asset sales>0 or discontinued operations>0}\}}$	An indicator function that equals 1 of the firm either had asset sales or discontinued operations 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, 0 otherwise.
$I_{\{\text{expansion announcement(s) in the month}\}}$	An indicator variable that equals to one if the company makes expansion announcements (Events 3 or 31 in Capital IQ) in a month
$I_{\{\text{new segment}\}}$	An indicator variable that equals 1 if the segment is newly established in the fiscal year, 0 otherwise.
Acquisition Rate	Value of acquisitions/lagged PPE (net). Acquisitions include completed deals covered in *SDC* 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)
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
Firm Age	Age of the firm since IPO, using the first day appear in *CRSP* (or the IPO date in *Compustat* if missing)
Leverage	(Long-term debt + debt in current liabilities)/total assets
M/B	Market value of equity (closing price at the fiscal year end times shares outstanding) divided by book value of equity
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
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.
Cash Ratio	Cash divided by total assets
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.
Original CEO Replaced	An indicator variable that equal 1 if the reigning CEO is different from the original CEO who established the segment
Underperforming Segment	An indicator variable that equals 1 if the lagged segment performance was at the bottom 10% of the sample distribution (segment operating profits/loss scaled by sales less than -7.4%)
# of Segments	The number of segments (defined by segment id) in a firm-year
Segment Age	Time (in years) since the segment was established
Old CEO Stay As Chairman	An indicator that equals if the old CEO stays as the Chairman of the Board during the first year of the new CEO's tenure
% of Old Mgmt. On Board	the % of the old 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
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 *RiskMetrics'* governance database.
% of New Directors	The percentage of directors appointed during the incumbent CEO's in the board, using *RiskMetrics'* director database.
Retired Directors	The cumulative number of retired directors (72 or above when service ends) during the incumbent CEO's tenure up until the current fiscal year, scaled by the current board size, using *RiskMetrics'* director database.
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 *SDC Platinum* data.
% of stock	Percentage of stock used to fund an acquisition, using "ofstock" from *SDC Platinum* 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.
Log(Deal Size)	Logarithm of the value of transaction (in Millions, from *SDC Platinum*)

Appendix B: Comparing the CEO Investment Cycle with Other Investment Determinants

Business cycles: Firm level and aggregate corporate investment rates tend to vary substantially between expansions and recessions. In Appendix Table B1, we compare the magnitude of the business cycle effect to the CEO 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) and (2) of Appendix Table B show 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 (3)-(5) show that the corporate investment rate is much lower in recession years than in non-recession years. The CEO cycle effect on investment is about half the magnitude of the effect of the business cycle: the total investment rate is 13 percentage points lower in recessions than in other years, and it is about 6 percentage points lower in early CEO tenure years than in later years (42% of the recession effect). Columns (6)-(7) show that the effects of CEO tenure and the business cycle on asset growth and employment growth are comparable in magnitude. 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 1.0 percentage point lower in early CEO tenure years than in later years, an almost 20% reduction relative to the sample median of 5.2%. This estimate is more than double 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, Ball, Hoberg and Maksimovic (2013) 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 0.4%, in the range that Ball, Hoberg and Maksimovic find for the Financial Crisis and larger than what they find in other periods.[22]

[22] A previous draft of this paper included estimates of increases to corporate income taxes on investment; we dropped this discussion because the estimates differed so dramatically. For example, contrast the very large estimates of taxes on investments in Summers et al. (1980) with the much smaller ones in Desai and Goolsbee (2004).

Table B: 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 except for Firm Age are lagged. Firm 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)	(7)
	$I_{\{\text{asset sales}>0 \text{ or discontinued operations}>0\}}$	*Disinvestment Rate*	*Acquisition Rate*	*Capx Rate*	*Investment Rate*	*Asset Growth Rate*	*Employment Growth Rate*
Recession	-0.032***	-0.010***	-0.103***	-0.028***	-0.132***	-0.060***	-0.044***
	(0.005)	(0.002)	(0.015)	(0.004)	(0.016)	(0.005)	(0.004)
Years [0,2]	0.039***	0.009***	-0.032**	-0.023***	-0.055***	-0.032***	-0.024***
	(0.006)	(0.003)	(0.015)	(0.005)	(0.016)	(0.006)	(0.004)
CEO Age	-0.002**	-0.000	-0.003**	-0.002***	-0.005***	-0.000	-0.001***
	(0.001)	(0.000)	(0.002)	(0.000)	(0.002)	(0.001)	(0.000)
Firm Age	0.013***	0.003***	0.013***	0.002***	0.015***	0.011***	0.004***
	(0.001)	(0.000)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)
Ind-adj. ROA	-0.170***	-0.041***	0.730***	0.296***	1.026***	0.268***	0.217***
	(0.023)	(0.012)	(0.104)	(0.059)	(0.133)	(0.065)	(0.032)
Ind-adj. Return	-0.007**	-0.003	0.049***	0.044***	0.092***	0.055***	0.027***
	(0.003)	(0.002)	(0.015)	(0.005)	(0.017)	(0.007)	(0.004)
MB	-0.001	0.000	0.010***	0.008***	0.019***	0.014***	0.004***
	(0.001)	(0.000)	(0.003)	(0.001)	(0.003)	(0.002)	(0.001)
Leverage	0.069***	0.040***	-0.389***	-0.211***	-0.601***	-0.260***	-0.148***
	(0.021)	(0.011)	(0.063)	(0.026)	(0.072)	(0.031)	(0.022)
Div. Payer	-0.029**	-0.004	0.093***	0.013**	0.106***	0.050***	0.024**
	(0.012)	(0.005)	(0.029)	(0.007)	(0.030)	(0.013)	(0.009)
log(Assets)	0.013**	-0.005	-0.153***	-0.077***	-0.230***	-0.205***	-0.103***
	(0.006)	(0.004)	(0.021)	(0.007)	(0.024)	(0.010)	(0.006)
Obs.	33,186	32,722	32,722	32,722	32,722	33,186	32,370
Adj. R-sqr.	0.267	0.092	0.186	0.333	0.239	0.190	0.168

Appendix C: Industry Productivity Shocks and CEO Investment Cycles

In Appendix Table C, we examine the impact of industry productivity shocks on the magnitudes of the CEO 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). [23] 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 disinvestment cycle (Panel A) and the investment cycle (Panel B) using the baseline regressions in Tables 2 and 3. We report the coefficient estimate for the "Years [0,2]" indicator variable and its standard error under each category.

The results in Table C show that both the CEO disinvestment cycle and the investment cycle exist 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 cycle does not occur because of productivity shocks coinciding with the CEO changes.

[23] Dale Jorgenson provides data on industry input and output for 35 sectors (see ind.comm.detail.doc) for 1960 – 2005. In this data set, he provides the price and quantity of industry output, as well as the price and quantity of inputs, including capital, labor, (intermediate use of) energy, materials, agriculture, metallic materials, non-metallic materials, services materials, textile-apparel, wood paper, other services, Fab-other metals, machinery materials, and equipment.

Table C: Industry Shocks and CEO Investment Cycle

This table reports the coefficient estimates on the CEO cycle indicator Years [0, 2] in the disinvestment and investment regressions, for subsamples based on various definitions of 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 reported in parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% levels respectively.

Panel A: Coefficients of Regressing Disinvestment Probability on the CEO Cycle Indicator

Shock Based On Industry	Horizon of Shock	Negative Shock	Neutral	Positive Shock
ROA	1 year	0.002	0.043***	0.039***
		(0.014)	(0.013)	(0.013)
	3 year	0.018*	0.043***	0.047***
		(0.010)	(0.013)	(0.014)
Sales Growth	1 year	0.038**	0.020*	0.030**
		(0.016)	(0.012)	(0.014)
	3 year	0.021*	0.025*	0.034***
		(0.012)	(0.013)	(0.013)
Employment Growth	1 year	0.022*	0.024*	0.046***
		(0.013)	(0.013)	(0.014)
	3 year	0.020*	0.038***	0.034**
		(0.011)	(0.012)	(0.013)
Total Factor Productivity	1 year	0.020*	0.029**	0.024*
		(0.011)	(0.014)	(0.014)
	3 year	0.029*	0.015	0.032**
		(0.015)	(0.016)	(0.015)

Panel B: Coefficients of Regressing Investment Rate on the CEO Cycle Indicator

Shock Based On Industry	Horizon of Shock	Negative Shock	Neutral	Positive Shock
ROA	1 year	-0.046*	-0.045**	-0.041*
		(0.027)	(0.018)	(0.022)
	3 year	-0.097***	-0.033*	-0.023*
		(0.025)	(0.018)	(0.013)
Sales Growth	1 year	-0.021*	-0.045**	-0.058**
		(0.013)	(0.022)	(0.024)
	3 year	-0.073*	-0.023	-0.071**
		(0.038)	(0.023)	(0.036)
Employment Growth	1 year	-0.042*	-0.050**	-0.041*
		(0.022)	(0.024)	(0.023)
	3 year	-0.075***	-0.035*	-0.045**
		(0.026)	(0.020)	(0.022)
Total Factor Productivity	1 year	-0.066*	-0.036*	-0.049*
		(0.037)	(0.020)	(0.028)
	3 year	-0.052*	-0.055**	-0.044*
		(0.030)	(0.024)	(0.023)