Good and Bad CEOs

Finance Working Paper N° 935/2023
October 2023

Dirk Jenter
London School of Economics and Political Science, CEPR and ECGI

Egor Matveyev
Massachusetts Institute of Technology

Lukas Roth
University of Alberta and ECGI

ECGI Working Paper Series in Finance

Good and Bad CEOs

Working Paper N° 935/2023

October 2023

Dirk Jenter
Egor Matveyev
Lukas Roth

This paper has benefited from comments and suggestions by Heitor Almeida (discussant), Laurent Bach (discussant), Andreas Barth, Jeff Coles, Mircea Epure, Rüdiger Fahlenbrach, Charles Hadlock, Joe Hong Zou (discussant), Lena Jaroszek, Peter Limbach (discussant), Karl Lins, Erwan Morellec, Kasper Meisner Nielsen (discussant), Francisco Pérez-González, Jan Schneemeier, Carlos Serrano, Henri Servaes (discussant), Onur Tosun, Rick Townsend (discussant), and Shan Zhao, by seminar participants at Aalto University and Hanken School of Economics, Cheung Kong GSB, EPFL, Frankfurt School of Finance & Management, HEC Paris, Imperial College, INSEAD, LSE, Lancaster University, Maastricht University, MIT, Pompeu Fabra University, Stanford University, Tilburg University, the University of Birmingham, the University of Bonn, the University of Frankfurt, the University of Mannheim, the University of Surrey, the University of Swansea, the University of Warwick, and the University of Utah, and by conference participants at the 2016 Financial Intermediation Research Society Annual Conference, the 2016 City University of Hong Kong International Finance Conference, the 2016 Conference of the Swiss Society for Financial Market Research, the 2016 London Business School Summer Finance Symposium, the 2016 CEPR Gerzensee European Summer Symposium in Financial Markets, the 2017 American Finance Association Annual Meeting, the 2017 European Winter Finance Summit, the 2017 BI Conference on Corporate Governance, and the 2018 Empirical Management Conference at Harvard Business School. We are grateful to the Social Sciences and Humanities Research Council of Canada for financial support.

Abstract

This paper analyzes changes in firm value, performance, and behavior caused by CEO deaths. Many deaths trigger large stock price changes—shareholders believe that some CEOs add shareholder value, but others are seen as not optimally matched or overpaid. These value changes are correlated with CEO and firm characteristics (e.g., deaths of old CEOs tend to add value), but much of the variation remains unexplained. The stock price reactions predict changes in operating performance, indicating that shareholders know which CEOs improve performance and which do not. The evidence suggests that CEOs are important, but also that many reduce shareholder value.

Keywords: CEO, Firm Performance, Firm Policies, Sudden Death

Dirk Jenter*
Professor of Finance
London School of Economics and Political Science, Department of Finance
Houghton Street
London WC2A 2AE, United Kingdom
phone: +44 20 7955 6948
e-mail: d.jenter@lse.ac.uk

Egor Matveyev
Visiting Assistant Professor of Finance
Massachusetts Institute of Technology
100 Main Street, E62-621
Cambridge, MA 02142, USA
e-mail: matveyev@mit.edu

Lukas Roth
Associate Professor of Finance
University of Alberta
2 -32E Business Building
Edmonton, Alberta T6G 2R6, Canada
phone: +1 780 492 4431
e-mail: lukas.roth@ualberta.ca

*Corresponding Author

Good and Bad CEOs

Dirk Jenter, Egor Matveyev, and Lukas Roth*

July 2023

Abstract

This paper analyzes changes in firm value, performance, and behavior caused by CEO deaths. Many deaths trigger large stock price changes—shareholders believe that some CEOs add shareholder value, but others are seen as not optimally matched or overpaid. These value changes are correlated with CEO and firm characteristics (e.g., deaths of old CEOs tend to add value), but much of the variation remains unexplained. The stock price reactions predict changes in operating performance, indicating that shareholders know which CEOs improve performance and which do not. The evidence suggests that CEOs are important, but also that many reduce shareholder value.

* Jenter is at the London School of Economics (d.jenter@lse.ac.uk), Matveyev is at MIT Sloan School of Management (matveyev@mit.edu), and Roth is at the University of Alberta (lukas.roth@ualberta.ca). This paper has benefited from comments and suggestions by Heitor Almeida (discussant), Laurent Bach (discussant), Andreas Barth, Jeff Coles, Mircea Epure, Rüdiger Fahlenbrach, Charles Hadlock, Joe Hong Zou (discussant), Lena Jaroszek, Peter Limbach (discussant), Karl Lins, Erwan Morellec, Kasper Meisner Nielsen (discussant), Francisco Pérez-González, Jan Schneemeier, Carlos Serrano, Henri Servaes (discussant), Onur Tosun, Rick Townsend (discussant), and Shan Zhao, by seminar participants at Aalto University and Hanken School of Economics, Cheung Kong GSB, EPFL, Frankfurt School of Finance & Management, HEC Paris, Imperial College, INSEAD, LSE, Lancaster University, Maastricht University, MIT, Pompeu Fabra University, Stanford University, Tilburg University, the University of Birmingham, the University of Bonn, the University of Frankfurt, the University of Mannheim, the University of Surrey, the University of Swansea, the University of Warwick, and the University of Utah, and by conference participants at the 2016 Financial Intermediation Research Society Annual Conference, the 2016 City University of Hong Kong International Finance Conference, the 2016 Conference of the Swiss Society for Financial Market Research, the 2016 London Business School Summer Finance Symposium, the 2016 CEPR Gerzensee European Summer Symposium in Financial Markets, the 2017 American Finance Association Annual Meeting, the 2017 European Winter Finance Summit, the 2017 BI Conference on Corporate Governance, and the 2018 Empirical Management Conference at Harvard Business School. We are grateful to the Social Sciences and Humanities Research Council of Canada for financial support.

Do individual CEOs matter for firm performance and value? A large part of the cross-sectional variation in firm performance is unexplained by observable factor and technology inputs. CEO ability is one potential explanation. Measuring the importance of individual executives is, however, difficult. Managers are not randomly allocated to firms, and their turnover is likely to be correlated with other changes that affect productivity. This makes it difficult to assess whether variation in performance is due to differences in leadership.

Whether individual CEOs matter depends on the importance of managerial inputs in firms' production process, on the scarcity of managerial talent, on the degree to which top executives differ, and on whether there are frictions in the assignment of managers to firms. If managerial inputs are not important, or if there is a large supply of all types of managerial talent, and if the assignment of managers to firms is free of frictions, shocks to individuals should have little effect. If, however, managerial inputs are important and talent is scarce, or if there are frictions in the matching of managers to firms, shocks to managers might have important consequences.

This paper analyzes changes in firm value, performance, and behavior caused by deaths of incumbent CEOs. This allows us to measure the contribution of the deceased CEO relative to that of their successor. Unlike other CEO turnovers, CEO deaths are mostly randomly allocated to firms and are not a decision made by the board of directors.[1] Hence, any effects of CEO deaths on firms should be due to scarce CEO talent, changes in the division of rents between shareholders and CEOs, or frictions in the matching of CEOs to firms.

Through a search of corporate press releases, news reports, SEC filings, and other sources, we identify 449 CEO deaths in publicly traded US firms between 1980 and 2012. There are 152 sudden deaths and 297 non-sudden deaths. A sudden death is unexpected and not preceded by an

[1] We discuss and test mechanisms through which CEO deaths might be endogenous to firm performance in Section III.C.

illness—examples are car accidents or plane crashes. A non-sudden death is preceded by at least some indication that the CEO suffered from ill health, such as deaths due to cancer.

Our results show that CEOs are an important determinant of shareholder value. While the average stock price reaction to CEO deaths is small, the reactions vary widely, with large negative stock price reactions to some deaths and large positive ones to others. We focus first on sudden deaths, which permit measuring stock price reactions in a short window around their announcements. The average abnormal announcement return is negative but moderate: a significant −1.72% on the announcement day, and an insignificant cumulative abnormal return of −1.02% in the 4-day window around the announcement (CAR [-1;+2]).

These average returns, however, hide wide variation. Both the cross-sectional standard deviation of daily abnormal returns and average absolute abnormal returns rise on announcement days and stay elevated for several days. In the four days around announcements, stock prices move on average by an additional ±3.6%. In ten percent of cases, stock prices drop by at least 13%, while in another 10%, stock prices rise by at least 11%. Since CEO deaths cause the postponement of other value relevant news, this increase in return variability is likely to be an underestimate.

The large heterogeneity in stock price reactions is in part explained by CEO and firm characteristics, such as CEO age, tenure, and firm size. Stock prices tend to fall sharply when the deceased CEOs are young, but tend to rise when they are old, and especially old and long-tenured. Average four-day CARs are −3.38% for CEOs in the bottom third of the age distribution (< 59 years) compared to 4.39% for CEOs in the top third (> 65 years). This difference is even larger for founder CEOs—average 4-day CARs for young and old founders are −5.92% and 7.04%, respectively. This might be explained by founders having more control or being more entrenched, amplifying the effects of both high and low ability.

Stock price reactions to sudden deaths are negative in firms in which CEOs are likely to be more important or difficult to replace, such as small and newly listed firms. Four-day CARs are −6.7% in the bottom third of the size distribution, compared to 1.6% in the top third, possibly because CEOs' span of control reaches further inside small firms (Williamson, 1967). Firms that went public in the last six years suffer CARs of −4.0%, compared to 0.7% for more seasoned firms, likely because newly listed firms tend to be run by unusually good, and thus more difficult to replace, CEOs. However, all CEO and firm characteristics together explain only a small fraction of the variation in returns, so shareholders' reactions are mostly based on other information.

In sum, we observe striking heterogeneity in the shareholder value effects of sudden CEO deaths. The large losses associated with some deaths suggest that these firms are worth more under the incumbent than the successor, and that a large part of the match surplus accrues to shareholders. The large value gains associated with other deaths show that these shareholders prefer the expected successor. In a frictionless world, this should never happen, as firms are always matched with their value-maximizing CEO. In reality, however, shareholders welcome many CEO deaths, which suggests that CEOs were not optimally matched or overpaid.

Next, we explore the real effects of sudden CEO deaths. The initial stock price reactions suggest that shareholders expect large negative effects in some firms and large positive ones in others. However, investors may overestimate the importance of CEOs in general (as suggested by Khurana, 2002), or they may be wrong about the contributions of specific CEOs.

Sudden deaths cause no significant changes in average operating performance, and there is only modest evidence of changes in average operating policies. We find, however, unusually wide dispersion in performance changes, suggesting again that negative and positive effects are cancelling out. While average ROA and profit margins decline by only −0.1% and −0.5%, sudden

deaths increase the average dispersion of their changes by ±1.3% and ±3.9%, respectively.[2] Thus, consistent with the stock price reactions, some deaths have large positive and others large negative effects. There are also unusually large changes in sales growth, dividends, and cash holdings, so at least some new CEOs change operating policies.

Next, we show that shareholders successfully predict the real consequences of sudden deaths, suggesting that they know which CEOs improve performance and which do not. Announcement returns in the bottom tercile predict decreases in control-firm adjusted ROA and profit margins and increases in SG&A expenses, while returns in the top tercile predict the opposite. Bottom-tercile announcement returns are also followed by more dispersed changes in performance and policies than top-tercile returns, consistent with more uncertainty about the consequences of CEO deaths.

We find only limited evidence that the real effects of sudden deaths can be explained by CEO or firm characteristics. There is unusually large dispersion in operating performance changes after deaths of founder CEOs, consistent with the stock price reactions and with founders being more influential. Also in line with the announcement returns, average operating performance improves after deaths of old and long-tenured CEOs and deteriorates after deaths of young and short-tenured ones. These differences are, however, mostly insignificant.

Finally, we examine whether sudden CEO deaths affect the probability that firms fail (defined as going bankrupt, being delisted, or liquidated) or are acquired. We find no effects on average failure or acquisition rates compared to matched control firms. However, failure rates are predicted by the initial stock price reactions to sudden deaths. Over three years, firms with bottom-tercile announcement returns fail 8.5 percentage points more often than control firms, while firms

[2] Dispersion is measured as absolute values of demeaned and control-firm adjust changes. See Section V.A for details.

with top-tercile returns fail 5.7 percentage points less, a difference of 14.2 percentage points. Thus, CEOs' effects are again heterogeneous and predicted by shareholders' initial reactions.

So far, we have ignored non-sudden deaths. There are good reasons to expect their effects to differ. Non-sudden deaths affect firms over a period of time, starting from the onset of the CEO's illness and ending with the CEO's death or departure. In principle, the total effect on shareholder value can be measured over this entire period. In practice, the exact illness start is often unknown, and the arrival of other idiosyncratic news during the illness period makes the measurement noisy. Moreover, the interpretation of any value effects is more difficult, for two reasons: First, they include any long-lasting effects of the CEO's illness, such as missed investment opportunities, and do not simply capture the effect of replacing one CEO by another. Second, the longer the illness, the more the CEO's decision to stay in office becomes a choice, which might be correlated with other drivers of performance, such as governance quality.[3]

For the relatively small number of cases with a known illness start, the shareholder value effects of non-sudden deaths are broadly similar to those of sudden deaths. The valuation effects are again modest on average but heterogeneous—large value losses for some firms and significant gains for others. As with sudden deaths, shareholders tend to react negatively to non-sudden deaths of young and short-tenured CEOs, and positively to those of old and long-tenured ones. However, even though the differences are large, most of them are not statistically significant, likely due to the small sample and noise accumulating over the illness period.

Turning to real effects, we find no unusual changes in the level or dispersion of operating performance after non-sudden deaths. There are some changes in average operating policies, as well as evidence that the dispersion of those changes is unusually large for some policies and

[3] The mean (median) length of the illness period is 192 (137) days for non-sudden deaths with known illness start.

unusually small for others. Interpreting these effects is difficult—on the one hand, the illness period before a non-sudden death might enable a smoother transition, causing less disruption. On the other hand, the illness itself might be disruptive. We have no success predicting operating changes using illness period stock returns, CEO characteristics, or firm characteristics. Overall, our results suggest that non-sudden deaths are different and should be analyzed separately.

In sum, our results show that many CEOs have first-order effects on their firms and, crucially, that these effects are highly heterogenous. This has implications for interpreting CEO pay. Its rapid rise since the 1980s has led to a contentious debate about whether pay levels can be justified by CEOs' contributions to firm value.[4] Our evidence adds to both sides of this debate: The stock price declines associated with many CEO deaths suggest that their firms are worth more under the incumbent, and that these CEOs are not extracting all the surplus they generate. On the other hand, the stock price gains associated with many other deaths suggest that those CEOs lower shareholder value, either because they are not the right match or because they are overpaid.[5]

I. Contribution and Prior Literature

This paper is far from the first to examine CEO deaths. A small literature, starting with Johnson, Magee, Nagarajan, and Newman (1985), uses event studies to measure the announcement effects of sudden CEO deaths on stock prices.[6] Most papers find average announcement returns that are close to zero and statistically insignificant. Cross-sectional analyses tend to be constrained

[4] See, for example, Bebchuk and Fried (2004), Gabaix and Landier (2008), Kaplan (2008), and the surveys by Frydman and Jenter (2010), Murphy (2013), and Edmans, Gabaix, and Jenter (2017).

[5] Consistent with our evidence, Nguyen and Nielsen (2014) use stock price reactions to executive deaths to conclude that many US executives are overpaid. Bandiera, Prat, Hansen, and Sadun (2020) use a structural model and diary data to measure leadership styles and conclude that many firms in six countries are matched to the wrong CEO.

[6] See, among others, Worrell, Davidson, Chandy, and Garrison (1986), Chandy and Garrison (1991), Slovin and Sushka (1993), Hayes and Schaefer (1999), Larson (1999), Combs and Skill (2003), Borokhovich, Brunarski, and Skill (2004), Behn, Riley, and Yang (2005), Borokhovich, Brunarski, Donahue, and Harman (2006), Salas (2010), Nguyen and Nielsen (2014), Betzer, Lee, Limbach, and Salas (2020), and Boguth, Newton, and Simutin (2022).

by small sample sizes, which many studies try to alleviate by combining CEO deaths with those of other top executives.[7] Given CEOs' unique role, this is likely to underestimate their effects.

Few papers examine the real effects of CEO deaths. Bennedsen, Pérez-González, and Wolfenzon (2010) study CEO deaths in (mostly private) Danish companies and find declines in operating profitability, investment, and growth.[8] In Becker and Hvide (2022) and Choi, Goldschlag, Haltiwanger, and Kim (2022), deaths of entrepreneurs have large negative effects on the survival, growth, and profitability of Norwegian and US startups. Huber, Lindenthal, and Wandinger (2021) find that forcing out Jewish executives in Nazi Germany reduced firms' stock prices, dividends, and return on assets. In contrast, Fee, Hadlock, and Pierce (2013), who analyze 109 CEO deaths in US public firms, find no evidence of unusual changes in operating performance and policies. Thus, US public firms might weather CEO deaths without serious consequences.

We improve on the prior literature in several ways. Using a larger sample of sudden CEO deaths, we show that *average* shareholder value effects in US firms are close to zero because positive and negative effects cancel out. The effects are economically large, with, for example, a 13 percentage point difference between the average stock price reactions to deaths of old vs. young founder CEOs, and they are correlated with proxies for CEO ability, importance, and entrenchment. We also observe directionally similar (but less significant) patterns in the illness period abnormal returns of non-sudden deaths.

[7] Typical sample sizes are 33 CEOs and 20 other executives in Johnson et al. (1985), 61 CEOs and 63 chairmen in Worrell et al. (1986), 30 CEOs in Slovin and Sushka (1993), 28 CEOs in Hayes and Schaefer (1999), 24 CEOs and 14 other executives in Larson (1999), 77 CEOs, presidents, and chairmen in Combs and Skill (2003), 54 CEOs and 56 other executives in Borokhovich et al. (2004), 75 CEOs and 86 other executives in Borokhovich et al. (2006), 195 CEOs, presidents, and chairmen in Salas (2010), 81 CEOs and 68 other executives in Nguyen and Nielsen (2014), and 51 CEOs in Boguth, Newton, and Simutin (2022). An exception is Graham, Kim, and Leary (2020), who observe 149 sudden CEO deaths and find significantly higher announcement returns for more powerful CEOs (defined as long-tenured, chairmen, or founders), broadly consistent with our evidence. Quigley, Crossland, and Campbell (2017) observe 240 sudden CEO deaths but focus entirely on how the announcement return dispersion evolves over time.

[8] Sauvagnat and Schivardi (2023) find consistent evidence after executive deaths in Italian firms, but only if the local labor market is thin.

Turning to real effects, we confirm the Fee et al. (2013) finding of no impact of CEO deaths on *average* operating performance. However, using our larger sample, we again show that this is because positive and negative effects cancel out. We also show that shareholders' initial stock price reactions predict subsequent changes in operating performance and firm survival, and that they are better predictors of the real consequences of CEO deaths than CEO and firm characteristics. Finally, we observe substantial differences between the effects of sudden and non-sudden deaths, which both Bennedsen et al. (2010) and Fee et al. (2013) combine.

Our results contribute to a broader literature that has found mixed evidence on whether CEOs have important effects on their firms. Bertrand and Schoar (2003) use executives who switch firms to estimate CEO fixed effects and find large effects of CEOs on operating performance and policies.[9] Fee at al. (2013) are, however, unable to replicate this result in a larger sample. Bennedsen, Pérez-González, and Wolfenzon (2020) use Danish data to examine hospitalizations, which distract CEOs while keeping the CEO-firm match intact. Profitability and investment decline and financial distress becomes more likely, suggesting that reduced CEO effort is costly.

Finally, our results are consistent with the many studies that document differences in CEOs' skills, beliefs, and preferences and link those to firm behavior and performance.[10] While such differences are a precondition for CEO deaths to affect firms, they do not imply it. If there is a large supply of top executives of different types, and if firms frictionlessly match with their

[9] Other studies have estimated executive fixed effects in managerial pay (Graham, Li, and Qiu, 2012), voluntary financial disclosures (Bamber, Jiang, and Wang, 2010), corporate tax avoidance (Dyreng, Hanlon, and Maydew, 2010), and systematic risk taking (Schoar, Yeung, and Zuo, 2022). Earlier studies (Murphy and Zimmerman, 1993, Denis and Denis, 1995, Weisbach, 1995, Huson, Malatesta, and Parrino, 2004) document large changes in firm performance and behavior after CEO turnovers. Because turnovers typically occur at the same time as other corporate changes, attributing these changes to CEOs is difficult.

[10] See, among others, Bertrand and Schoar (2003), Malmendier and Tate (2005, 2008), Perez-Gonzalez (2006), Malmendier, Tate, and Yan (2011), Kaplan, Klebanov, and Sorensen (2012), Ben-David, Graham, and Harvey (2013), Mullins and Schoar (2016), Schoar and Zuo (2017), Bandiera, Lemos, Prat, and Sadun (2018), Bandiera et al. (2020), Kaplan and Sorensen (2021), and Kaplan, Sorensen, and Zakolyukina (2022).

preferred CEO at all times, CEO deaths simply cause firms to hire a similar replacement, with minimal effects. Our results suggest that this is not a good description of reality.

II. Theoretical Background

A useful benchmark for thinking about the effects of CEO deaths on firms are models in which labor markets are frictionless and competitive and in which the matching between executives and firms is efficient. Competitive assignment models have long been used in labor economics (Jovanovic, 1979, Sattinger, 1979, Rosen, 1982) and have become popular in the CEO compensation literature (Gabaix and Landier, 2008, Terviö, 2008).[11]

In a frictionless and competitive assignment model, firms hire the CEO that maximizes firm value net of compensation costs, and CEOs join the firm that offers the highest expected compensation. In equilibrium, the assignment of CEOs to firms maximizes the aggregate value of all firms, and each CEO receives at least their outside option. This outside option is given by what the CEO could earn at the next highest-paying firm that prefers them to its actual CEO. Importantly, each firm-CEO match generates a non-negative match surplus, which is the difference between the firm's value under its actual CEO and under the next best CEO it could hire. How this surplus is divided between CEO and shareholders is typically determined outside the model.[12]

What is the effect of a CEO death in a competitive and frictionless assignment model? Because the assignment of CEOs to firms is efficient, a CEO death cannot improve firm value. If

[11] For other applications of competitive assignment models to CEOs, see Edmans, Gabaix, and Landier (2009), Baranchuk, MacDonald, and Yang (2011), Edmans and Gabaix (2011), Eisfeldt and Kuhnen (2013), Matveyev (2017), Pan (2017), and Dupuy, Kennes, and Lyng (2022).

[12] A strictly positive match surplus only arises if there are discrete differences in firm and CEO characteristics. If instead the distributions of firms and CEOs are continuous, then competition is perfect and match surpluses are zero, as the outside option is to match with the next best CEO, who is indistinguishable from the incumbent. This is the case in the models of Gabaix and Landier (2008) and Terviö (2008). Empirically, we observe large effects of CEO deaths on firms, which leads us to favor models with discrete differences in CEO abilities and firm characteristics.

there were another CEO candidate who would increase value net of the compensation required to hire them, they would have already been hired.

By how much shareholder value falls when a CEO dies depends on the size of the match surplus and its division between CEO and shareholders. In the limit, if a CEO extracts the entire surplus, then their death has no effect on shareholder value. While the CEO is alive, shareholders receive their outside option, which is the value of the firm under the next best CEO. After the CEO dies, the outside option is exercised, and shareholder value is unchanged. In all other cases, the match surplus is divided between the CEO and shareholders. When a CEO dies, shareholders lose their portion of the surplus, and shareholder value declines.

In a world without frictions, the size of the match surplus is determined entirely by the differences in abilities and outside options between the incumbent and the next best candidate. With frictions, search and transition costs increase the match surplus. After a CEO dies, firm value falls because the successor is worse, or because finding them and transitioning the leadership is costly. Thus, if boards work well, we expect CEO deaths to decrease shareholder value (because the incumbent was the best match) but not by too much (because succession planning improves successor quality and reduces search and transition costs).

Because a CEO death cannot increase shareholder value in frictionless assignment models, finding that certain types of CEO deaths systematically do rejects such models. This might happen for at least two reasons. First, assuming CEOs are paid their outside option, firms might have the wrong CEO, with other candidates available who would have created more value (net of compensation). Thus, the incumbent should have already been replaced. Alternatively, the

deceased CEO might have been the best match but was paid more than their value added. In either case, firms' decisions did not maximize shareholder value.[13]

III. Data and Descriptive Statistics

A. Data collection

We collect a comprehensive sample of CEO deaths through a search of news reports, press releases, corporate reports, SEC filings, and various other sources. We start by searching all news items published by the Wall Street Journal, Dow Jones Newswires, PR Newswire, and Business Wire for the years 1980 to 2012. We also search all electronically available 8-Ks, 10-Ks, and proxy statements filed with the SEC between 1994 and 2012.

Since the top executive is not always referred to as CEO, especially in earlier years, we use "chief executive", "CEO", "president", "founder", and "chairman" to identify potential top executives. Combining these with keywords related to death results in many hits, the vast majority of which are false positives. We manually screen these articles, press releases, and company filings to identify all cases in which the top executive of a publicly traded company died in office.

We collect the date of death and the announcement date. We also collect detailed information on the cause of death, which allows us to distinguish between sudden and non-sudden cases. We define a death as sudden if it was not preceded by any indication of poor health. Clear examples are car accidents and plane crashes, other frequent causes are heart attacks and strokes. The latter are, however, sometimes preceded by reports of ill health, in which case we reclassify them as non-sudden. Non-sudden deaths are preceded by reports of poor health and therefore

[13] In dynamic contracting models, allowing managers to become entrenched, even though ex-post inefficient, can be ex-ante efficient because it insures managers' human capital and firm-specific investments or motivates innovation (Harris and Holmstrom, 1982, Almazan and Suarez, 2003, Manso, 2011).

potentially foreseeable. Most non-sudden deaths are caused by cancer or other long-term illnesses. Internet Appendix Table A1 details the causes of death in our sample.

We use corporate press releases, proxy statements, annual reports, executive bios, and various online sources to collect the CEO's age and tenure, defined as the number of years the CEO had been in office. We also record whether the deceased CEO was a founder of the firm. Founder CEOs are usually identified in firms' death announcements. We also classify the CEO as founder if their tenure begins the year the firm was founded. In addition, we classify CEOs as founders if a) the CEO inherited a small business and significantly expanded it (three cases); b) the CEO was the founder of a firm that acquired the sample firm and continued as CEO of the combined firm (five cases); or c) the CEO bought the sample firm (20 cases).[14]

We match the event firms with Compustat, CRSP, and (after 1994) its SEC filings on EDGAR. For a small number of firms, we collect missing information from these filings. The final sample contains 449 CEO deaths in 440 firms for which we know at least their book assets at the fiscal year-end preceding the death. 152 deaths are sudden and 297 are non-sudden.

B. Descriptive statistics

Table 1 presents summary statistics for the 449 CEOs and their firms. Unsurprisingly, the CEOs are relatively old, with average and median age of 62. The average and median CEO tenure are 17 and 14 years, respectively. There is considerable variation—25% of the CEOs are 56 or younger, and 25% have at most 6 years of tenure. 40% are founders, and almost 70% are chairmen.

Firm characteristics are measured at the fiscal year-end preceding the CEO death. Average book assets and sales are $1.7 billion and $1.0 billion, respectively. Many event firms are small—

[14] CEOs are not classified as founders if a) the CEO was head of a unit that was spun off (two cases); b) the CEO was the founder of a firm that was acquired by a larger firm and continued as CEO of the combined firm (one case); or c) the CEO bought a minority stake in the firm (14 cases).

median book assets are $92 million, and median annual sales are $85 million. The sample spans a wide range of firm sizes, with standard deviations of assets and sales of $5.3 and $3.0 billion, respectively. Some of the most prominent firms are Apple, AT&T, Coca Cola, and McDonalds.

Panel B reports summary statistics by type of death: sudden deaths, non-sudden deaths for which the illness start is reported, and non-sudden deaths for which it is not. Sudden deaths are associated with CEOs who are relatively young and short tenured. Firm size predicts whether the illness before a non-sudden death is announced, with small firms often failing to do so.

C. Endogenous CEO deaths

An important advantage of analyzing the effects of CEO deaths is that they, unlike other CEO turnovers, are not a decision made by the board of directors. It is, however, possible that some CEO deaths are caused by job-related stress and, thus, potentially by poor firm performance. For example, we observe 10 CEO suicides during our sample period. Since these might be endogenous to firm performance, we have excluded them.

To examine whether CEO deaths might be caused by firm performance, Internet Appendix Table A2 tests whether poor stock returns predict CEO deaths. Using alphas from market models (Panel A) and Fama-French three-factor models (Panel B) to measure abnormal returns, we find no evidence of bad performance during the 1-24 months before sudden deaths. Most alphas are insignificantly positive, suggesting that the event firms performed relatively well before their CEO died. Thus, there is no evidence that CEO deaths are caused by poor performance.[15]

[15] Borgschulte, Guenzel, Liu, and Malmendier (2022) provide evidence that work-related stress reduces CEOs' life expectancy. Consistent with our results, this mortality increase occurs many years later, usually long after retirement.

IV. Shareholder Value Effects

We begin by documenting the effects of CEO deaths on shareholder value. Section A analyzes sudden CEO deaths and Section B non-sudden deaths.

A. Stock price reactions to sudden CEO deaths

The stock price reaction to a CEO death reflects investors' assessment of the difference in firm value under the old and the new CEO. This section restricts the analysis to sudden and therefore likely unexpected deaths. This allows us to measure the stock price reaction in a short window around the announcement date and produces a relatively clean measure of the CEO death effect on shareholder value.

A.1. Average announcement returns

Table 2, Panel A reports daily abnormal returns from three trading days before to five trading days after the death announcement. Day 0 is the earliest date the CEO death is reported by the firm or by any other news source. We use the return on the value-weighted market portfolio as benchmark to calculate abnormal returns.[16]

Stock prices on average react negatively to a sudden CEO death, with average and median abnormal announcement day returns of −1.72% and −1.16%, respectively. Cumulating returns over several days results in slightly smaller effects. For example, the average cumulative abnormal return (CAR) over trading days [-1;+2] is −1.02% and statistically insignificant. These modest average stock price reactions are consistent with prior studies.[17]

[16] Benchmarking against the predicted return from a market model estimated over trading days [-230; -30] before the event yields similar results.

[17] Abnormal returns on the announcement day and the next day are 0.40% and 0.34%, respectively, in Johnson et al. (1985), −0.09% and 0.02% in Worrell et al. (1986), 0.13% and −0.05% in Chandy and Garrison (1991), 0.76% and 0.82% in Borokhovich et al. (2004), −0.16% and 0.84% in Salas (2010), and −0.74% and −0.32% in Nguyen and Nielsen (2014).

It would, however, be premature to conclude that the shareholder value effects of CEO deaths are small. Figure 1 shows that CEO deaths cause large increases in the cross-sectional variation of stock returns. Panel A of Table 2 reports the corresponding increase in the standard deviation of daily abnormal returns, which almost doubles on the announcement day and stays elevated for several days. The spread between the 10^{th} and the 90^{th} percentile of the return distribution also widens sharply. Focusing again on the CAR over trading days [-1;+2], 10% of firms experience a stock price drop of at least 13%, while another 10% see a rise of at least 11%.[18] Thus, there is large heterogeneity in the stock price reactions—sudden CEO deaths decrease shareholder value for some firms but increases it for others.

To avoid positive and negative reactions cancelling out, the last column of Panel A reports average *absolute* abnormal returns, which rise sharply on the announcement day and stay elevated for several days. Panel B compares these absolute stock price movements, measured as average absolute CARs over one to seven days around the announcement, to those during normal days, measured over windows of the same length ending seven days before the announcement.

The differences in absolute abnormal returns between the pre- and the announcement period are large and highly significant. On the announcement day, stock prices on average move by an additional ±3.0%. Expanding the window to trading days [-1,+2] around the announcement increases the abnormal stock price response to ±3.6%. The actual magnitude is likely to be larger, as CEO deaths displace other value relevant news, reducing the baseline variation in stock prices.

In sum, many CEO deaths have large effects on shareholder value, and much larger ones than suggested by the average stock price reaction. Average effects are misleading because firms

[18] The corresponding price movements over a comparison period of the same length ending seven days before the announcement are −6.1% and 6.4%, respectively (untabulated).

are affected in different directions—stock prices react negatively to some CEO deaths but positively to others.

A.2. Cross-sectional determinants: univariate results

Shareholders' reaction to a CEO death likely depends on the characteristics of the deceased CEO, including their importance to the firm, the quality of the CEO-firm match, and their level of entrenchment. To test whether observable characteristics can explain the stock price reactions, Table 3 reports average CARs, measured over trading days [-1;+2] around the announcement, for different types of CEOs (Panel A) and firms (Panel B).

Both CEO age and tenure are highly correlated with shareholders' reactions to sudden CEO deaths. The average CAR is −3.38% for CEOs in the bottom tercile of the age distribution (< 59 years) and 4.39% for CEOs in the top tercile (> 65 years), both highly statistically significant. Hence, investors react strongly negatively to deaths of young CEOs and strongly positively to deaths of old CEOs. This pattern is even stronger for founders: for young founders, the average CAR is −5.92%, while for old founders it is 7.04%.

There are several possible explanations for these differences. Young CEOs might extract less of the surplus generated by the CEO-firm match, leaving more for shareholders, and firms with young CEOs might have done less succession planning. More surprising is that deaths of old CEOs, on average, increase firm value. If boards maximized shareholder value, stock prices should never react positively to a CEO death. Finding that they often do suggests that firms have CEOs who are not the value-maximizing choice or, if they are, that they are paid more than the surplus they generate. In either case, there is a governance failure.

CEO tenure also predicts investors' reactions to sudden CEO deaths, broadly similar to age. The average CAR is −3.82% for CEOs in the bottom tercile of the tenure distribution (< 8

years) and 2.07% for CEOs in the top tercile (> 18 years). The difference of 5.89% is large and statistically significant, and it is similar for founders and non-founders. There are, however, very few short-tenured founders who suddenly die, so the founder-tenure splits are noisily estimated.

There is no difference in the average stock price reaction to deaths of founder (−1.03%) and non-founder CEOs (−1.01%), but the market reacts more positively to deaths of CEOs who are also chairman (0.44%) compared to those who are not (−3.54%). However, founder and chairman are highly correlated with CEO age and tenure, as well as with firm size. When we control for these in the next section, both founders and chairmen are associated with insignificantly higher death announcement returns.

Panel B examines how firm characteristics affect the stock price reaction to sudden CEO deaths. Small firms (bottom tercile by book assets) suffer average valuation declines of almost 7%, while large firms (top tercile by book assets) see an insignificantly positive average CAR of 1.6%. CEO deaths are significantly worse for newly listed firms and firms with high Tobin's q, bad operating performance, and high prior stock returns, and they are insignificantly worse for loss-making firms and firms with positive R&D expense.

These results are consistent with CEO deaths being more costly if CEOs are more important or more difficult to replace. CEO decisions are likely to matter more in small firms, fast-growing firms, and loss-making firms.[19] Small firms might also have fewer qualified internal successors and do less succession planning.[20] Newly listed firms might be run by unusually high-quality, and thus more difficult to replace, CEOs. Many of these firm characteristics are, however,

[19] Williamson (1967) argues that CEOs' span of control reaches further inside smaller firms. Bennedsen et al. (2010) show that CEO deaths reduce operating performance more in fast growing and R&D intensive industries.
[20] Cvijanović, Gantchev, and Li (2022) show that smaller firms are less likely to have CEO succession plans.

highly correlated with each other and with CEO characteristics. We therefore turn to multivariate analyses next.

A.3. Cross-sectional determinants: regression results

Table 4 uses regressions to examine how CEO and firm characteristics jointly determine the stock price reaction to sudden CEO deaths. The outcome variable in Panel A is the CAR over trading days [-1;+2] around sudden death announcements. We include all CEO and firm characteristics that were significant in the univariate analysis.

The regressions confirm that stock prices react very differently to sudden deaths of old compared to young CEOs, and, less strongly, of long- compared to short-tenured CEOs. In model (1), which includes CEO age and tenure linearly, age is significantly positively correlated with announcement returns while tenure is insignificant. Because age and tenure are highly correlated, and because their effects might be nonlinear, we sort CEOs into age and tenure terciles and include these tercile indicators in models (2) and (3). Consistent with the univariate evidence, sudden deaths of young CEOs (< age 59) trigger large negative announcement returns of −4.2%, while those of old CEOs (> age 65) trigger large positive returns of 4.0%, for a difference of 8.2% (p<0.01).[21] For short- and long-tenured CEOs, the announcement returns are −3.6% and 2.2%, respectively, for a still sizeable difference of 5.8% (p=0.02).

To disentangle the effects of age and tenure, model (4) interacts indicators for above- and below-median CEO age (62 years) with indicators for above- and below-median CEO tenure (14 years). Sudden deaths of younger CEOs cause large negative announcement returns, independently of whether tenure is high or low (−4.0% and −3.3%, respectively). Sudden deaths

[21] All continuous CEO and firm characteristics in Table 4 are demeaned. Thus, if all continuous characteristics are at their mean, the coefficients on the group indicators measure the average announcement return for the group.

of older CEOs, however, trigger large positive returns only if tenure is also above its median (3.7%) but not if its below (−0.5%). Thus, CEOs who are both old and long-tenured are, on average, detrimental to shareholder value, while merely old CEOs are not.

To test whether these patterns differ for founder CEOs, model (5) interacts the indicators for above- and below-median age and tenure with an indicator for founders. Some of the resulting groups are small (e.g., there are only four old and short-tenured founders), so statistical significance becomes elusive. The point estimates suggest that sudden deaths of old founders increase shareholder value, independently of tenure. For non-founders, deaths of old CEOs with short tenure trigger negative announcement returns, while those of old CEOs with long tenure trigger positive ones (difference of 6.3%, p=0.01).

These results suggest a model in which (a) many old CEOs lower firm value and (b) many founders and many long-tenured CEOs are entrenched, so they cannot easily be removed. This model can explain the positive stock price reactions to deaths of old founders (entrenched because they are founders) and of old and long-tenured non-founders (entrenched because of their long tenure). Most old but short-tenured non-founders are not entrenched, so they remain in office only if they are adding value, which explains why stock prices fall when they die.

Notably, the direct effects of the founder and chairman indicators in Panel A are insignificantly positive. Hence, losing a founder or chairman is, if anything, slightly better for shareholders than losing a CEO who is neither, again consistent with entrenchment. The positive coefficient for founders suggests that even founder CEOs, who most prior studies associate with superior performance, frequently outstay their welcome.[22]

[22] For evidence on founders' value added, see Morck, Shleifer, and Vishny (1988), Palia, Ravid, and Wang (2008), Villalonga and Amit (2006), Adams, Almeida, and Ferreira (2009), and Fahlenbrach (2009). Johnson et al. (1985) and Graham et al. (2020), however, observe positive stock price reactions to sudden deaths of founder CEOs, consistent with our results.

Turning to firm characteristics, the regressions confirm that sudden CEO deaths cause much larger value losses for smaller and for newly listed firms. A one standard deviation smaller firm size lowers announcement returns by 2.5-3.1%, and newly listed firms suffer 3.7-5.4% lower returns than more seasoned firms. Controlling for size, the effects of Tobin's q and ROA on announcement returns are no longer significant. Hence, it is small and newly listed firms, many of which also have high q and low profitability, that lose the most when their CEO dies, consistent with their CEOs being more influential or more difficult to replace.[23]

The results in Panel A might understate the importance of particular types of CEOs, or of CEOs in particular types of firms, if positive and negative stock price reactions cancel out. For example, founder CEOs might be especially important, but the average effect of founder deaths might nevertheless be small if their effects are heterogenous.

To test this possibility, we examine whether the *dispersion* of the stock price reactions varies with CEO and firm characteristics. We do so by taking the residuals of the Panel A regressions, computing their absolute values, and regressing them again on the same CEO and firm characteristics. Using residuals removes the directional effects of the characteristics, while taking absolute values ensures that positive and negative reactions do not cancel out.

The results in Panel B provide only weak and statistically insignificant evidence that deaths of chairmen and founders cause more dispersed stock price reactions. There are also no significant differences in the dispersion of CARs across age and tenure groups, with the exception of old and short-tenured founders, whose announcement returns are widely dispersed. However, there are only four observations in this group, which makes this result difficult to interpret. There is also

[23] In untabulated regressions, we controlled for lagged 4-year cumulative abnormal stock returns, which reduces the sample size. Lagged returns are insignificantly negatively correlated with announcement returns. The other coefficients are qualitatively unchanged, with the exception of the effect of Tobin's q becoming significantly negative.

only insignificant evidence that small firms, poorly performing firms, and newly listed firms have more dispersed announcement returns.

We conclude that the heterogeneity in the reactions to sudden CEO deaths is not concentrated in specific types of CEOs or firms. Instead, shareholders appear to see wide variation in CEOs' value added within many CEO types, including old and long-tenured CEOs.

A.4. Discussion

The results in this section show that some CEO deaths cause large negative stock price reactions and others large positive ones. This suggests that CEOs are important determinants of shareholder value, but also that the quality of the CEO-firm match varies widely. Moreover, the prior literature's focus on *average* announcement effects understates the importance of CEOs.

Our analysis has some success explaining the stock price reactions with observable CEO and firm characteristics. On average, sudden deaths of young and short-tenured CEOs cause large negative CARs and those of old and long-tenured CEOs large positive ones.[24] The positive reactions suggest that many of these CEOs were mismatched or overpaid. However, most of the variation in announcement returns remains unexplained, with the highest R^2 in our regressions below 35%. Hence, investors use other information to assess CEOs.

B. Stock price reactions to non-sudden CEO deaths

We next examine the shareholder value effects of non-sudden deaths. Most prior studies of the effects of CEO deaths on operating performance and behavior combine sudden and non-sudden deaths.[25] There are, however, good reason to expect non-sudden deaths to affect firms differently.

[24] This is consistent with Salas (2010), who combines CEOs, chairmen, and presidents and finds positive reactions to deaths of long-tenured top executives, but only if preceded by negative stock returns, and with Graham et al. (2020) and Brochet, Limbach, Schmid, and Scholz-Daneshgari (2021), who find positive effects of CEO tenure on sudden death announcement returns.

[25] See, for example, Bennedsen et al. (2010), Fee et al. (2013), and Bennedsen et al. (2020).

Non-sudden deaths are preceded by an illness (or injury) during which the CEO remains in office. During this illness period, the CEO's ability might be reduced, with negative effects on firm performance.[26] On the other hand, non-sudden deaths give boards more time to find a successor, increasing the probability of a good match.

Non-sudden CEO deaths can affect firms twice—first, during the CEO's illness period, and second, when the CEO is replaced. Cumulative abnormal returns over the entire illness and departure period should reflect investors' updating about the CEO's illness, the probability of the CEO being replaced, any damage the CEO does while still in office, and the expected quality of the successor. For example, stock prices might decline as an impaired CEO struggles to run the firm, or they might increase as the replacement of a badly-matched CEO becomes more likely.

In theory, the total effect of a non-sudden CEO death on shareholder value can be measured as the cumulative abnormal return from when investors first learn about the CEO's health problems until the CEO's departure. In practice, however, it is often impossible to identify when investors first notice a CEO's ill health. For our sample, we are able to find an initial illness announcement in 80 out of 274 cases.[27] There is, however, no guarantee that this announcement is the first time investors learn negative information about the CEO's health.[28] Moreover, other idiosyncratic news affect the firm's stock price during the illness period. Thus, the longer an illness lasts, the noisier our estimate of its shareholder value effect becomes.

[26] Keloharju, Knüpfer, and Tåg (2021) show that worse CEO health is associated with reduced operating performance in Swedish firms.

[27] The average and median lengths of the illness period are 196 and 142.5 days, respectively, with a minimum of 4 and a maximum of 916 days.

[28] For example, Apple did not disclose Steve Jobs' health issues for months despite widespread rumors (Lublin and Feintzeig, 2015). Fiat Chrysler's Sergio Marchionne had not even informed the company of his seriousness illness right up to his death (Ball and Sylvers, 2018).

B.1. Average announcement and illness period returns

Table 5, Panels A.1 to A.3 examine abnormal stock returns around the 80 non-sudden CEO deaths for which we can identify the illness period. Panels A.1 and A.2 focus on daily abnormal returns around the illness and the departure announcements, respectively.

The average stock price reaction to *illness* announcements in Panel A.1 is insignificantly negative, with an average CAR [-1;+2] of −0.97%. This moderately negative reaction is consistent with the one to sudden deaths in Table 2. Interestingly, the average stock price response to *departure* announcements in Panel A.2 is significantly positive, with an announcement-day average abnormal return of 0.95% (p=0.02) and an average CAR [-1;+2] of 2.05% (p<0.01). On average, investors appear to be relieved when a CEO with known health problems departs, which suggests that many of them stay longer than desired by shareholders.

Panel A.3 reports cumulative abnormal returns over the entire illness period, starting one day before the illness announcement and ending two days after the departure announcement. The average illness-period CAR is 0.96% and insignificant. Even though noisily estimated, this suggests no loss of shareholder value on average when CEOs suffer a non-sudden death.

For the 194 non-sudden deaths for which we cannot find an initial illness announcement, Panel A.4 reports daily abnormal returns around the *departure* announcements. Both the average stock price response on the announcement day and the average CAR [-1;+2] are small and insignificant. These estimates are, however, difficult to interpret, as they conflate events that combine illness and departure announcements (similar to sudden deaths) with events that are only departure announcements (since investors already know of the CEO's health problems). Given negative average stock price reactions to sudden deaths (Table 2) and positive average reactions to departure announcements (Panel A.2), an average close to zero is not surprising.

The evidence so far suggests only modest effects of non-sudden CEO deaths on shareholder value. However, as with sudden deaths, these average effects might hide large differences across CEOs. Consistent with heterogeneous effects, the second-to-last column of Panels A.1-A.4 shows an increase in the cross-sectional dispersion of daily abnormal returns on and after the announcement dates. To avoid positive and negative effects cancelling out, the last column reports averages of *absolute* abnormal returns, which increase at the announcements and remain elevated for two to three trading days.

Panel B of Table 5 compares the absolute stock price movements around illness and departure announcements to those during normal days. As benchmark, we use absolute CARs ending seven trading days before the illness announcement if there is one, or, if not, ending 252 trading days before the departure announcement. The differences in absolute abnormal returns between the announcement and the pre-periods are statistically significant. During trading days [-1,+2] around illness or departure announcements, stock prices move on average by an additional ±1.09 to ±1.64%. Thus, the announcements affect shareholder value and, as with sudden deaths, investors react negatively to some but positively to others.

B.2. Cross-sectional determinants

Although we observe the illness period for only 80 non-sudden deaths, we briefly examine how the illness period CARs relate to CEO and firm characteristics. Tables 6 and 7 present univariate and regression results, respectively.

Most of the univariate results in Table 6 are directionally similar to those for sudden deaths. For example, non-sudden deaths of old and long-tenured CEOs are associated with positive abnormal illness period returns, while those of young and short-tenured CEOs are associated with negative ones, with top-minus-bottom tercile differences of 8.76% for age and 8.65% for tenure

(Panel A). However, due to the small number of observations per group (reported in the right-most column), these differences lack statistical significance. Sorting on firm characteristics, non-sudden CEO deaths are insignificantly worse for small firms, growth firms, badly-performing firms, newly listed firms, loss-making firms, and firms with positive R&D expense (Panel B), again broadly similar to the sudden death results.

Table 7 uses regressions to examine how CEO and firm characteristics jointly determine the shareholder value effects of non-sudden deaths. Models (1) to (3) regress cumulative abnormal illness period returns on CEO and firm characteristics. The results are in line with the univariate ones. Sorting CEOs into age and tenure terciles in models (2) and (3), young and short-tenured CEOs are associated with negative abnormal returns, whereas old and long-tenured CEOs are associated with positive ones. The differences of 10.94% (p=0.17) for age and 15.96% (p=0.07) for tenure are large. There is also suggestive (but again insignificant) evidence that non-sudden deaths of founders and chairmen cause negative illness period returns, consistent with powerful CEOs damaging their firms while ill. The only significant firm characteristic is Tobin's q, suggesting that growth firms suffer more from a non-sudden CEO death.[29]

Models (4) to (6) examine how the dispersion of the abnormal illness period returns varies with CEO and firm characteristics. We take the residuals of regression models (1) to (3), calculate their absolute values, and regress them again on the same CEO and firm characteristics. The results show that founders are associated with more dispersed illness period returns (p<0.10 in models (5) and (6)) but no other significant differences. Thus, as with sudden deaths, the heterogeneity in investors' reactions to CEO deaths is not restricted to specific types of CEOs or firms.

[29] Because the number of observations per group is too small, we omit regressions that interact indicators for above- and below-median CEO age and tenure with each other and with an indicator for founders. For example, there are only four short-tenured founders, one with below median age and three above.

In sum, measuring and interpreting the effects of non-sudden CEO deaths on shareholder value is challenging. Non-sudden deaths affect firms twice, once during the CEO's illness and again when the CEO departs; ill CEOs might destroy value while in office; and ill CEOs' tendency to carry on might be correlated with, for example, bad governance. In theory, the shareholder value effects of non-sudden deaths can be measured from the onset of the illness to the CEO's departure. In reality, the exact illness start and when the market learns about the illness is often unknown, and stock prices during long illness periods are subject to many other shocks.

Nevertheless, our results for non-sudden CEO deaths parallel those for sudden deaths, with non-sudden deaths lowering shareholder value for some firms but increasing it for others. We have less success explaining this heterogeneity with CEO and firm characteristic than for sudden deaths, suggesting that investors use other information to predict the consequences of non-sudden deaths. Section V.C will examine whether shareholders' reactions to sudden and non-sudden CEO deaths are correct, i.e., whether they predict subsequent changes in operating performance.

V. Real Effects

We next analyze the impact of CEO deaths on firms' operating performance, operating policies, and survival. The stock price reactions show that shareholders expect many CEO deaths to have large effects on firms. Investors might, however, be mistaken.

The literature offers mixed evidence on whether CEOs have real effects on firms, and it has paid no attention to whether investors are able to predict them. One concern is that almost all prior studies of CEO death or illness focus on average effects.[30] These might hide large but heterogeneous changes that cancel out, as suggested by the announcement returns. If successors

[30] See, for example, Bertrand and Schoar (2003), Bennedsen et al. (2010, 2020), and Keloharju et al. (2021). A notable exception is Fee et al. (2013), who examine the volatility of changes in operating performance. Their results are, however, based on only 109 events that combine sudden and non-sudden deaths.

are chosen from the same ability and preference distribution as the deceased CEOs, average effects will be small. For each firm, the new CEO might nevertheless be very different from their predecessor, resulting in large changes in firm behavior.

Our analysis extends the literature in three ways. First, our sample is much larger than in prior studies of public firms. Given the noisiness of operating variables, this increases the chance of finding significant effects. Second, we use announcement returns, which reflect investors' information, as a guide to firms that are strongly affected by CEO deaths. Finally, we distinguish between sudden and non-sudden deaths. As previously discussed, and supported by our evidence below, the effects of sudden and non-sudden deaths are likely to differ.

A. The effects of CEO deaths on operating performance and policies

Table 8 examines changes in operating performance (ROA, profit margins, SG&A) and changes in operating policies (investment, R&D, book leverage, cash holdings, dividend payouts, asset and sales growth) around CEO deaths.[31] These variables have been the focus of the prior literature and provide a comprehensive picture of firm behavior.

Panel A focuses on *sudden* deaths. Panel A.1 documents average changes from the last fiscal year before to two years after the death. All changes are net of the same change in size- and industry-matched control firms. The matching is described in Internet Appendix Exhibit A1.

The average control-firm adjusted changes in ROA, profit margin, and scaled SG&A expense are small and insignificant. Thus, average operating performance is unaffected by sudden CEO deaths. Average operating policies show only slightly more variability. Out of seven policies, five change insignificantly, with significant declines in cash holdings and dividend payouts. This

[31] SG&A expense (scaled by sales) can be a performance measure, capturing operating efficiency, or a policy choice, reflecting, e.g., marketing strategies.

lack of change in average operating performance and most average operating policies is consistent with Fee et al. (2013).

However, as with announcement returns, the effects of CEO deaths may be heterogeneous. Panel A.2 therefore examines whether changes in operating performance and policies around sudden deaths are unusually dispersed. For each outcome, we measure dispersion as the absolute deviation from the average change, and we report the average dispersion for treated firms net of that for control firms.[32]

Changes in operating performance are indeed significantly more dispersed for treated than for control firms: ROA and profit margins of treated firms change by an additional ±1.3% and ±3.9%, respectively. These are large effects compared to treated firms' median pre-event ROA of 6.0% and profit margin of 7.5% (Table 1). Thus, as suggested by the announcement returns, some sudden deaths are associated with improved performance, others with declines.

The operating policy results are weaker but still indicate more dispersed changes in treated than in control firms. Five out of seven policy changes are more dispersed in treated firms, with significantly greater dispersion in dividend policy, cash holdings, and sales growth changes.

Panel B examines the effects of *non-sudden* deaths on operating performance and policies. There are no significant effects on average operating performance, but Panel B.1 shows several unusual changes in average operating policies—investment and dividend payouts increase relative to control firms, while R&D and sales growth decline.[33] Changes in other policies are economically small or noisily estimated.

[32] We first run a regression of changes in the outcome variable on a constant and an indicator for treated firms. We then take absolute values of the residuals and regress them again on a constant and the indicator for treated firms. The resulting coefficients, reported in Panel A.2, are the difference in average dispersion between treated and control firms.
[33] For non-sudden deaths, we measure changes in the outcomes from the last fiscal year prior to the CEO death (t=-1) to two years after (t=+2). For some CEOs, the illness onset occurs during or prior to t=-1. To accommodate long illnesses, we have examined changes between [-2,+2] with qualitatively similar results.

Panel B.2 examines whether changes in firms' operations around non-sudden deaths are unusually dispersed. Unlike for sudden deaths, there is no consistent evidence of increased dispersion. Changes in sales and investment are less dispersed than in control firms, while changes in leverage, dividend payouts, and cash holdings are more dispersed.

The evidence in Panel B suggests that, while non-sudden CEO deaths are disruptive, their effects are more complex than those of sudden deaths. This might be because some firms already change before the CEO departure, because some firms curtail their activities while the CEO is ill, or because some firms use the illness period to prepare the transition. For example, the departure of an entrenched CEO might improve performance, especially if there is time for a thorough search, yet having the same CEO incapacitated in office might do lasting damage. In any case, our results corroborate that sudden and non-sudden deaths should be analyzed separately.

B. Operating changes and CEO characteristics

Table 8 shows considerable heterogeneity in the effects of CEO deaths on firms. To see whether these differences can be explained by CEO characteristics, Table 9 regresses control-firm adjusted changes in operating performance, measured from the last fiscal year before the death to two years after, on CEO characteristics.

Panel A.1 focuses on *sudden* deaths and delivers only weak evidence that CEO characteristics predict changes in operating performance. Consistent with the announcement returns, the operating performance of firms run by old or long-tenured CEOs improves after sudden deaths (ROA and profit margins increase, while SG&A expense declines), while that of firms run by younger or newer CEOs is unchanged or worsens. These differences are, however, far from significant, as are the coefficients for founders and chairmen. CEO characteristics are, thus, not a good guide to which firms benefit and which ones suffer from a sudden CEO death.

We have also examined whether firm characteristics predict changes in operating performance after sudden CEO deaths, with even weaker results (untabulated). This is surprising given that small firms suffer much larger stock price declines when a sudden death is announced (Table 3). Investors' implied negative expectations for small firms are not yet reflected in declining operating performance two years after a CEO death.[34]

Deaths of certain CEO types, such as founders or chairmen, might be associated with more heterogeneous effects. We therefore test whether CEO characteristics predict the dispersion of operating performance changes around sudden deaths. Panel A.2 shows that sudden deaths of founders are followed by much more dispersed changes in all three operating performance measures (ROA, profit margin, SG&A expense). Thus, founder deaths have large but also very heterogeneous effects on firms' performance: some firms improve, others worsen, with an average effect close to zero.

Panel A.2 also provides some evidence that sudden deaths of younger and newer CEOs are followed by more dispersed performance changes than those of old and long-tenured CEOs, even though the differences are mostly insignificant. Greater dispersion might be explained by more heterogeneity in how prepared firms with younger and newer CEOs are for a sudden death.

Panel B examines whether CEO characteristics predict operating changes around *non-sudden* deaths. Panel B.1 focuses on directional changes in operating performance, Panel B.2 on the dispersion of those changes. Consistent with the illness period returns, Panel B.1 shows some evidence that the operating performance of firms run by old or long-tenured CEOs improves after a non-sudden death, while that of firms run by younger or newer CEOs worsens. There is also

[34] We have also examined whether CEO and firm characteristics predict changes in operating *policies* (investment, R&D expense, book leverage, cash holdings, dividend payouts, and asset and sales growth) and found no significant results (untabulated to conserve space).

some evidence that non-sudden deaths of founders are associated with declining operating performance, which might be caused by founders being difficult to replace, or by entrenched founders doing damage during the illness period.

C. Operating changes and announcement returns

Studying public firms allows us to use investors' reactions as a guide to firms that are strongly affected by CEO deaths. Table 10 tests whether the stock price responses to sudden CEO deaths predict subsequent changes in operating performance and behavior. If they do, it would indicate that investors are able to infer CEOs' contributions to firm performance. We use terciles of sudden death announcement returns to predict control-firm adjusted changes in firms' operations from the last fiscal year before the death to two years after.

Panel A shows that the stock price reactions to sudden CEO deaths predict changes in operating performance. Bottom-tercile announcement returns predict declines in ROA and profit margins and increases in SG&A expense. Top-tercile returns predict increases in ROA and profit margins and declines in SG&A expense. The differences are large and statistically significant. Thus, at the announcement of a sudden death, investors are able to predict which deaths are beneficial and which ones detrimental to firm performance.

There is much less evidence that announcement returns predict changes in operating policies. This is unsurprising—new CEOs might change policies in any direction, and these changes might increase or reduce shareholder value. Nevertheless, low announcement returns predict reductions in cash holdings and dividend payouts. These, however, may not be policy choices but consequences of worsening operating performance.

The evidence supports the idea that investors can predict at least some of the effects of CEO deaths on firms' operations. Comparing Tables 9 and 10, stock price reactions are much

better predictors of changes in operating performance than CEO characteristics. Thus, CEO characteristics are noisy signals of "good" and "bad" CEOs, and investors use other information.

Panel B examines whether the stock price reactions to sudden deaths predict the dispersion of operating changes. Changes in ROA, profit margins, and six out of the seven operating policies are more dispersed for firms with bottom-tercile announcement returns than for those in the top tercile. The differences are statistically significant for ROA, profit margins, and four out of seven operating policies. This suggests that for firms for which the CEO is difficult to replace, subsequent performance has both a low mean and a wide variance.

We repeat the analysis also for non-sudden deaths, measuring abnormal stock returns over the entire illness period (from the first illness announcement to the CEO's departure) and changes in operations from the last fiscal year before the CEO death to two years after.[35] Illness period CARs have no predictive ability for changes in operating performance or policies or their dispersions (untabulated). However, the need to observe an illness announcement and stock returns for the entire illness period reduces the sample to at most 60 observations. Given the noisiness of most operating variables, this makes finding significant patterns unlikely.

D. The effects of CEO deaths on firm survival

We finally examine whether CEO deaths affect firm survival. We focus on firm failures, for which we use distressed delistings as proxy, and on firms being acquired, all within three years of a CEO death. As in our previous tests, we compare the failure and acquisition rates of event firms to those of size- and industry-matched control firms (see Internet Appendix Exhibit A1).

To identify firms that fail or are being sold, we use CRSP delisting codes and Compustat footnote codes. We classify firms as "failed" if CRSP's delisting code is 400-490 or 550-591

[35] Measuring operating changes from the fiscal year before the illness onset does not change the results.

(liquidations; delisted by exchange), if Compustat's footnote code for deletions is 02 or 03 (bankruptcy; liquidation), or if Compustat's footnote code for total assets is TL or AG (in bankruptcy or liquidation; fresh-start accounting upon emerging from Chapter 11). We classify firms as acquired if CRSP's delisting code is 200-290 or 300-361 (mergers; exchanges), or if Compustat's footnote code for deletions is 04 (reverse acquisition).[36]

Table 11 Panel A.1 reports event firms' failure and acquisition rates within one and three years after a CEO death, net of the same rates for control firms. In the first three years after a death, 30 out of 414 event firms (7.2%) fail and 60 (14.5%) are acquired. These rates are not significantly different from control firms. Separating sudden and non-sudden deaths in Panels A.2 and A.3 does not change this conclusion.

It is possible that some CEO deaths increase the probability of firm survival while others reduce it. From Section V.C, we know that the stock price reactions to CEO deaths predict changes in firms' operations. We therefore examine whether announcement returns also predict firm failures and acquisitions.[37]

Table 11 Panel B focuses on firm failures. After sudden deaths, firms with announcement CARs in the bottom tercile fail insignificantly more than their control firms, while firms with top-tercile CARs fail significantly less (columns (1) and (2)). The differences are large—within three years of a sudden death, the control-firm adjusted failure rate is 14.2 percentage points higher for firms with CARs in the bottom tercile than for those in the top tercile CARs (p=0.06).

[36] These classifications follow Fama and French (2004), Duffie, Saita, and Wang (2007), Doidge, Karolyi, and Stulz (2017), and Corbae and D'Erasmo (2021). In line with these studies, CRSP is our main source for acquisitions, with only reverse acquisitions added from Compustat.

[37] In untabulated tests, we found no predictive ability of CEO or firm characteristics for firm survival after CEO deaths, consistent with these variables also being poor predictors of operating changes.

For non-sudden deaths (columns (3) and (4)), we have only 79 event firms with complete illness period returns. None of them fail within one year of a CEO death and only three fail within three years. Compared to control firms, the 3-year failure rates are insignificantly higher for firms with bottom tercile illness period returns and significantly lower for firms with top tercile returns. Thus, investors' reactions to both sudden and non-sudden deaths have at least some ability to predict subsequent firm failures.

Panel C examines whether investors' reactions to CEO deaths also predict firms being sold. The theoretical predictions are ambiguous. High announcement or illness period returns might be followed by acquisitions if high returns identify entrenched CEOs who had blocked sales. Low announcement or illness period returns might also be followed by acquisitions if both low returns and firm sales are caused by the loss of difficult-to-replace CEOs.

Panel C shows little evidence that investors' stock price reactions to sudden or non-sudden deaths predict subsequent firm sales. Unexpectedly, for sudden deaths, there is some evidence that firms in the middle CAR tercile are less likely to be acquired. Small announcement returns might be associated with non-disruptive CEO transitions, which might be followed by few acquisitions. However, this pattern does not obtain for non-sudden deaths.

In sum, CEO deaths are not followed by unusually many corporate failures or sales. This, however, again masks heterogenous effects—for sudden deaths, low death announcement returns predict high failure rates, while high announcement returns predict low failure rates. This suggests that CEOs matter for firm survival, with some CEO departures increasing failure probabilities and others reducing them.

VI. Summary and Conclusion

The effects of CEO deaths are highly heterogeneous, both in magnitude and direction, with large declines in value and performance for some firms and large improvements for others. Some of this heterogeneity is explained by CEO age, tenure, founder status, and firm size, but most of it remains unexplained. Stock price reactions to CEO deaths predict subsequent changes in operating performance and firm survival, indicating that shareholders understand CEOs' effects on firms.

Our results show that individual CEOs are an important determinant of firm value, performance, and behavior. The large stock price declines after many CEO deaths show that these firms are worth more under the incumbent than the successor, and that shareholders receive a significant part of the match surplus. The stock price gains following other deaths show that the incumbent CEOs were either not the best match or overpaid, consistent with CEO entrenchment and board failures. Since the same board is choosing the successor and their pay, the hypothetical gains from optimal matching and contracting would likely be even higher.

If there were a large supply of capable CEOs of all types, and if firms could frictionlessly match with their preferred CEO at all times, a CEO death would cause firms to quickly hire a similar replacement, with minimal effects. Our results show that this is not a good description of reality for many firms. Instead, they suggest that the supply of executive talent is limited, the matching process far from frictionless, and the resulting match quality highly heterogeneous.

References

Adams, Renée, Heitor Almeida, and Daniel Ferreira, 2009, Understanding the relationship between founder-CEOs and firm performance, Journal of Empirical Finance 16, 136-150.

Almazan, Andres, and Javier Suarez, 2003, Entrenchment and severance pay in optimal governance structures, Journal of Finance 58, 519-547.

Ball, Deborah, and Eric Sylvers, 2018, Fiat Chrysler's Sergio Marchionne was seriously ill for over a year before dying, Wall Street Journal, July 26.

Bamber Linda, John Jiang, and Isabel Wang, 2010, What's my style? The influence of top managers on voluntary corporate financial disclosure, The Accounting Review 85, 1131-1162.

Bandiera, Oriana, Renata Lemos, Andrea Prat, and Raffaella Sadun, 2018, Managing the family firm: Evidence from CEOs at work, Review of Financial Studies 31, 1605-1653.

Bandiera, Oriana, Andrea Prat, Stephen Hansen, and Raffaella Sadun, 2020, CEO behavior and firm performance, Journal of Political Economy 128, 1325-1369.

Baranchuk, Nina, Glenn MacDonald, and Jun Yang, 2011, The economics of super managers, Review of Financial Studies 24, 3321-3368.

Bebchuk, Lucian A., and Jesse M. Fried, 2004, Pay without performance: The unfulfilled promise of executive compensation (Harvard University Press, Cambridge, MA).

Becker, Sascha, and Hans Hvide, 2022, Entrepreneur death and startup performance, Review of Finance 26, 163-185.

Behn, Bruce, Richard Riley, and Ya-wen Yang, 2005, The value of an heir apparent in succession planning, Corporate Governance: An International Review 13, 168-177.

Ben-David, Itzhak, John Graham, and Campbell Harvey, 2013, Managerial miscalibration, Quarterly Journal of Economics 128, 1547-1584.

Bennedsen, Morten, Francisco Pérez-González, and Daniel Wolfenzon, 2010, Do CEOs matter?, Working Paper, INSEAD.

Bennedsen, Morten, Francisco Pérez-González, and Daniel Wolfenzon, 2020, Do CEOs matter: Evidence from hospitalization events, Journal of Finance 75, 1877-1911.

Bertrand, Marianne, and Antoinette Schoar, 2003, Managing with style: The effect of managers on firm policies, Quarterly Journal of Economics 118, 1169-1208.

Betzer, André, Hye Seung Lee, Peter Limbach, and Jesus Salas, 2020, Are generalists beneficial to corporate shareholders? Evidence from exogenous executive turnovers, Journal of Financial and Quantitative Analysis 55, 581-619.

Boguth, Oliver, David Newton, and Mikhail Simutin, 2022, The fragility of organization capital, Journal of Financial and Quantitative Analysis 57, 857-887.

Borgschulte, Mark, Marius Guenzel, Canyao Liu, and Ulrike Malmendier, 2022, CEO stress, aging, and death, Working Paper, University of Illinois.

Borokhovich, Kenneth A., Kelly R. Brunarski, and Maura S. Skill, 2004, Executive compensation, entrenchment, and the stock price reaction to CEO death, Corporate Finance Review 8, 5-22.

Borokhovich, Kenneth A., Kelly R. Brunarski, Maura S. Donahue, and Yvette S. Harman, 2006, The importance of board quality in the event of CEO death, The Financial Review 41, 307-337.

Brochet, Francois, Peter Limbach, Markus Schmid, and Meik Scholz-Daneshgari, 2021, CEO tenure and firm value, The Accounting Review 96, 47-71.

Chandy, P.R., and Sharon Garrison, 1991, Top management relevance: The effect of key executive death on stock prices, Business Horizons 3, 16-19.

Choi, Joonkyu, Nathan Goldschlag, John C. Haltiwanger, and J. Daniel Kim, 2021, Early joiners and startup performance, NBER Working Paper 28417.

Combs, James G., and Maura S. Skill, 2003, Managerialist and human capital explanations for key executive pay premiums: A contingency perspective, Academy of Management Journal 46, 63-73.

Corbae, Dean and Pablo D'Erasmo, 2021, Reorganization or liquidation: Bankruptcy choice and firm dynamics, Review of Economic Studies 88, 2239-2274.

Cvijanović, Dragana, Nikolay Gantchev, and Rachel Li, 2022, CEO succession roulette, Management Science, forthcoming.

Denis, David J., and Denis, Diane K., 1995, Performance changes following top management dismissals, Journal of Finance 50, 1029-1057.

Doidge, Craig, Andrew Karolyi, and René M. Stulz, 2017, The U.S. listing gap, Journal of Financial Economics 123, 464-487.

Duffie, Darrell, Leandro Saita, and Ke Wang, 2007, Multi-period corporate default prediction with stochastic covariates, Journal of Financial Economics 83, 635-665.

Dupuy, Arnaud, John R. Kennes, and Ran Lyng, 2022, The market for CEOs: job amenities matter, Working Paper, University of Luxembourg.

Dyreng, Scott, Michelle Hanlon, and Edward L. Maydew, 2010, The effects of executives on corporate tax avoidance, The Accounting Review 85, 1163-1189.

Edmans, Alex, and Xavier Gabaix, 2011, The effect of risk on the CEO market, Review of Financial Studies 24, 2822-2863.

Edmans, Alex, Xavier Gabaix, and Dirk Jenter, 2017, Executive compensation: A survey of theory and evidence, in: Hermalin, B.E., Weisbach, M.S. (Eds.), Handbook of the Economics of Corporate Governance. Elsevier, Amsterdam.

Edmans, Alex, Xavier Gabaix, and Augustin Landier, 2009, A Multiplicative model of optimal CEO incentives in market equilibrium, Review of Financial Studies 22, 4881-4917.

Eisfeldt, Andrea L., and Camelia M. Kuhnen, 2013, CEO turnover in a competitive assignment framework, Journal of Financial Economics 109, 351-372.

Fahlenbrach, Rüdiger, 2009, Founder-CEOs, investment decisions, and stock market performance, Journal of Financial and Quantitative Analysis 44, 439-466.

Fama, Eugene F., and Kenneth R. French, 2004, New lists: Fundamentals and survival rates, Journal of Financial Economics 73, 229-269.

Fee, Edward C., Charles J. Hadlock, and Joshua R. Pierce, 2013, Managers with and without style: Evidence using exogenous variation, Review of Financial Studies 26, 576-601.

Frydman, Carola, and Dirk Jenter, 2010, CEO compensation, Annual Review of Financial Economics 2, 75-102.

Gabaix, Xavier, and Augustin Landier, 2008, Why has CEO pay increased so much?, Quarterly Journal of Economics 123, 49-100.

Graham, John, Si Li, and Jiaping Qiu, 2012, Managerial attributes and executive compensation, Review of Financial Studies 25, 144-186.

Graham, John, Hyunseob Kim, and Mark Leary, 2020, CEO-board dynamics, Journal of Financial Economics 137, 612-636.

Harris, Milton, and Bengt Holmstrom, 1982, A theory of wage dynamics, Review of Economic Studies 49, 315-333.

Hayes, Rachel M., and Scott Schaefer, 1999, How much are differences in managerial ability worth?, Journal of Accounting and Economics 27, 125-148.

Huber, Kilian, Volker Lindenthal, and Fabian Waldinger, 2021, Discrimination, managers, and firm performance: Evidence from "Aryanizations" in Nazi Germany, Journal of Political Economy 129, 2455-2503.

Huson, Mark R., Malatesta, Paul and Parrino, Robert, 2004, Managerial succession and firm performance, Journal of Financial Economics 74, 237-75.

Johnson, Bruce W., Robert Magee, Nandu Nagarajan, and Harry Newman, 1985, An analysis of the stock price reaction to sudden executive death: Implications for the management labor market, Journal of Accounting and Economics 7, 151-174.

Jovanovic, Boyan, 1979, Job matching and the theory of turnover, The Journal of Political Economy 87, 972-990.

Kaplan, Steven N., 2008, Are U.S. CEOs overpaid? Academy of Management Perspectives 22, 5-20.

Kaplan, Steven, Mark Klebanov, and Morten Sorensen, 2012, Which CEO characteristics and abilities matter?, Journal of Finance 67, 973-1007.

Kaplan, Steven, and Morten Sorensen, 2021, Are CEOs different?, Journal of Finance 76, 1773-1811.

Kaplan, Steven, Morten Sorensen, and Anastasia Zakolyukina, 2022, What is CEO overconfidence? Evidence from executive assessments, Journal of Financial Economics 145, 409-425.

Keloharju, Matti, Samuli Knüpfer, and Joacim Tåg, 2021, CEO health, Working Paper, Aalto University.

Khurana, Rakesh, 2002, Searching for a Corporate Savior: The Irrational Quest for Charismatic CEOs (Princeton University Press, Princeton, NJ.)

Larson, James Alan, 1999, Stock price reactions of small public firms to the loss of the CEO, Journal of Small Business Management 37, 15-24.

Lie, Erik, 2001, Detecting abnormal operating performance: Revisited, Financial Management 30, 77-91.

Lublin, Joann S., and Rachel Feintzeig, 2015, What should companies say when the CEO is sick? Wall Street Journal, October 16.

Malmendier, Ulrike M., and Geoffrey Tate, 2005, CEO overconfidence and corporate investment, Journal of Finance 60, 2661-2700.

Malmendier, Ulrike M., and Geoffrey Tate, 2008, Who makes acquisitions? CEO overconfidence and the market's reaction, Journal of Financial Economics 89, 20-43.

Malmendier, Ulrike M., Geoffrey Tate, and Jon Yan, 2011, Overconfidence and early-life experiences: The effect of managerial traits on corporate financial policies, Journal of Finance 66, 1687-1733.

Manso, Gustavo, 2011, Motivating innovation, Journal of Finance 66, 1823-1860.

Matveyev, Egor, 2017, Sorting in the U.S. corporate executive labor market, Working Paper, MIT Sloan School of Management.

Morck, Randall, Andrei Shleifer, and Robert Vishny, 1988, Management ownership and market valuation: An empirical analysis, Journal of Financial Economics 20, 293-315.

Mullins, William, and Antoinette Schoar, 2016, How do CEOs see their roles? Management philosophies and styles in family and non-family firms, Journal of Financial Economics 119, 24-43.

Murphy, Kevin J., and Jerold L. Zimmerman, 1993, Financial performance surrounding CEO turnover, Journal of Accounting and Economics 16, 273-315.

Murphy, Kevin J, 2013, Executive Compensation: Where We Are, and How We Got There. In Handbook of the Economics of Finance, Volume 2, edited by George M. Constantinides, Milton Harris, and René M. Stulz, 211–356. New York and Oxford: Elsevier/North-Holland.

Nguyen, Bang Dang, and Kasper Meisner Nielsen, 2014, What death can tell: Are executives paid for their contribution to firm value?, Management Science 60, 2994-3010.

Palia, Darius, S. Abraham Ravid, and Chia-Jane Wang, 2008, Founders versus non-founders in large companies: Financial incentives and the call for regulation, Journal of Regulatory Economics 33, 55-86.

Pan, Yihui, 2017, The determinants and impact of executive-firm matches, Management Science 63, 1-278.

Pérez-González, Francisco, 2006, Inherited control and firm performance, American Economic Review 96, 1559-1588.

Quigley, Timothy, Craig Crossland, and Robert J. Campbell, 2017, Shareholder perceptions of the changing impact of CEOs: Market reactions to unexpected CEO deaths, 1950-2009, Strategic Management Journal 38, 939-949.

Rosen, Sherwin, 1982, Authority, control and the distribution of earnings, Bell Journal of Economics 13, 311-323.

Salas, Jesus M., 2010, Entrenchment, governance, and the stock price reaction to sudden executive deaths, Journal of Banking and Finance 34, 656-666.

Sattinger, Michael, 1979, Differential rents and the distribution of earnings, Oxford Economic Papers 31, 60-71.

Sauvagnat, Julien, and Fabiano Schivardi, 2023, Are executives in short supply? Evidence from death events, Review of Economic Studies, forthcoming.

Schoar, Antoinette, Kelvin Yeung, and Luo Zuo, 2022, The effect of managers on systematic risk, Management Science, forthcoming.

Schoar, Antoinette, and Luo Zuo, 2017, Shaped by booms and busts: How the economy impacts CEO careers and management style, Review of Financial Studies 30, 1425-1456.

Slovin, Myron B., and Marie E. Sushka, 1993, Ownership concentration, corporate control activity, and firm value: Evidence from the death of inside blockholders, Journal of Finance 48, 1293-1321.

Terviö, Marko, 2008, The difference that CEOs make: An assignment model approach, American Economic Review 98, 642-668.

Villalonga, Belen, and Raphael Amit, 2006, How do family ownership, control and management affect firm value, Journal of Financial Economics 80, 385-417.

Weisbach, Michael, 1995, CEO turnover and the firm's investment decisions, Journal of Financial Economics 37, 159-188.

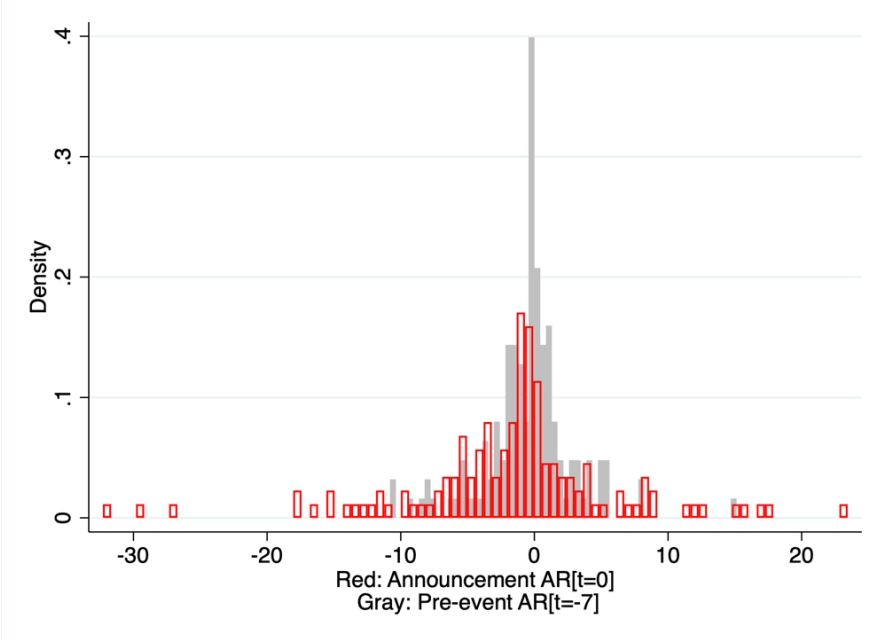
Williamson, Oliver E., 1967, Hierarchical control and optimum firm size, Journal of Political Economy 75(2), 123-138.

Worrell, Dan L., Wallace N. Davidson III, P.R. Chandy, and Sharon L. Garrison, 1986, Management turnover through deaths of key executives: Effects on investor wealth, Academy of Management Journal 29, 674-694.

Figure 1
Sudden Death Announcement Returns

Panel A shows the distribution of abnormal stock returns (AR) on the announcement day [t=0] for firms with a sudden CEO death, and Panel B shows cumulative abnormal returns (CARs) over trading days [-1;+2]. Day 0 is the earliest day the sudden death is reported. Abnormal returns are the difference between daily stock returns and the CRSP value-weighted index return, and CARs are the sum of daily abnormal returns. The panels also show (in gray) the same firms' abnormal returns over one- and four-day windows ending seven trading days before the announcement. The sample contains 145 sudden deaths with any stock return data for days [-3;+5].

Panel A: Abnormal returns on the announcement day [t=0]



Panel B: Cumulative abnormal returns over trading days [-1;+2]

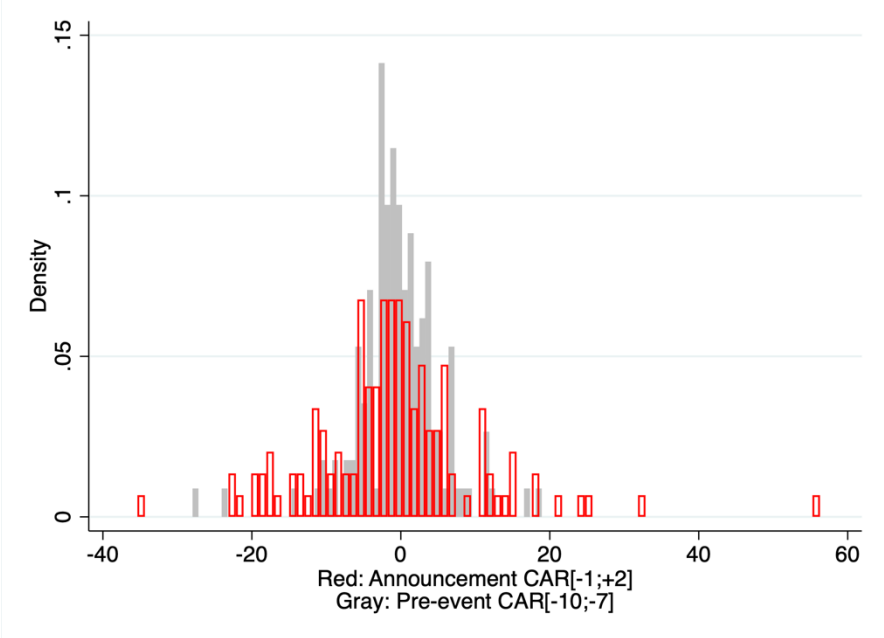


Table 1
Descriptive Statistics

This table reports descriptive statistics for 449 CEO-firm combinations that experienced a CEO death. CEO characteristics are observed at the time of death. Age is CEO age, and Tenure is the number of years the CEO has been in office. Founder is a dummy variable that equals one if the CEO is a founder of the firm, and zero otherwise. Chairman is a dummy variable that equals one if the CEO is board chairman, and zero otherwise. Illness duration (in Panel B, calculated for non-sudden deaths with known illness start only) is the number of days between the illness announcement and the announcement of the death or resignation, whichever comes first. Firm characteristics are from the last fiscal year end prior to the CEO death. Book assets are total assets and Sales are net sales (both in millions of dollars). ROA is return on assets, calculated as earnings before interest and taxes (EBIT) / book assets. Average 3y ROA is the average ROA for the three most recent fiscal years. Profit margin is EBIT / sales. Negative EBIT is a dummy variable that equals one if EBIT is negative, and zero otherwise. SG&A expense is selling, general, and administrative expense / sales. Investment is capital expenditure / book assets. R&D expense is research and development expense / book assets. Asset growth is (book assets – prior year book assets) / prior year book assets. Sales growth is (sales – prior year sales) / prior year sales. Book leverage is total short- and long-term debt / book assets. Cash is cash and short-term investments / book assets. Dividend payout is dividends paid on common and preferred shares / earnings before interest, taxes, depreciation and amortization. Tobin's q is (book assets – book common equity + market value of common equity) / book assets. Pre-event 4y CAR (in Panel B) is the cumulative abnormal return (CAR) over four years ending five trading days before the death (illness) announcement for sudden deaths (non-sudden deaths with known illness start); CEOs not in office for all four years are excluded; CARs are the sum of daily abnormal returns, calculated as daily stock returns minus CRSP value-weighted index returns. Newly listed is a dummy variable that equals one if the difference between the death announcement year and the firm's first year on CRSP is at most six years, and zero otherwise. Variables in levels (ratios) are winsorized at the 1st and 99th (5th and 95th) percentiles.

Panel A: Full sample

	Mean	Median	P25	P75	SD	N
CEO characteristics						
Age	62.3	62.0	56.0	69.0	10.3	449
Tenure	17.1	14.0	6.0	25.5	13.7	444
Founder	0.40					445
Chairman	0.69					449
Firm characteristics						
Book assets	1,673	92	16	506	5,323	449
Sales	1,048	85	14	446	2,973	449
ROA	-0.004	0.060	0.000	0.126	0.241	449
Average 3y ROA	-0.025	0.060	0.004	0.123	0.304	449
Profit margin	-0.093	0.075	0.010	0.136	0.603	436
Negative EBIT	0.254	0.000	0.000	1.000	0.446	449
SG&A expense	0.301	0.226	0.140	0.362	0.254	374
Investment	0.062	0.039	0.013	0.083	0.067	424
R&D expense	0.078	0.024	0.000	0.088	0.127	220
Asset growth	0.156	0.074	-0.025	0.216	0.376	433
Sales growth	0.128	0.082	-0.040	0.219	0.311	419
Book leverage	0.332	0.274	0.068	0.529	0.293	432
Cash	0.147	0.076	0.020	0.200	0.173	449
Dividend payout	0.073	0.000	0.000	0.130	0.105	438
Tobin's q	1.77	1.29	1.01	1.94	1.29	422
Newly listed	0.271					410

Panel B: By type of death

	Sudden death (N=152)		Non-sudden death with known illness start (N=104)		Non-sudden death with unknown illness start (N=193)	
	Mean	Median	Mean	Median	Mean	Median
CEO characteristics						
Age	57.5	58.0	62.4	62.0	65.9	65.0
Tenure	12.4	10.0	17.3	15.5	20.6	16.0
Founder	0.39	0.00	0.36	0.00	0.42	0.00
Chairman	0.63	1.00	0.73	1.00	0.72	1.00
Illness duration	n.a.	n.a.	192	137	n.a.	n.a.
Firm characteristics						
Book assets	1,217	82	4,292	610	619	47
Sales	796	66	2,831	554	286	43
ROA	-0.044	0.056	0.064	0.076	-0.009	0.054
Average 3y ROA	-0.080	0.053	0.079	0.086	-0.037	0.048
Profit margin	-0.233	0.061	0.042	0.086	-0.056	0.075
Negative EBIT	0.303	0.000	0.125	0.000	0.285	0.000
SG&A expense	0.337	0.238	0.231	0.184	0.311	0.227
Investment	0.066	0.039	0.059	0.042	0.060	0.036
R&D expense	0.099	0.025	0.053	0.025	0.074	0.021
Asset growth	0.228	0.084	0.108	0.074	0.126	0.071
Sales growth	0.158	0.099	0.079	0.039	0.132	0.098
Book leverage	0.349	0.278	0.316	0.311	0.327	0.250
Cash	0.174	0.086	0.129	0.073	0.136	0.072
Dividend payout	0.067	0.000	0.098	0.009	0.064	0.000
Tobin's q	1.94	1.46	1.54	1.32	1.76	1.17
Pre-event 4y CAR	0.379	0.224	0.134	0.060	n.a.	n.a.
Newly listed	0.386	0.000	0.163	0.000	0.241	0.000

Table 2
Sudden Death Announcement Returns

Panel A reports daily abnormal returns around announcements of sudden CEO deaths and cumulative abnormal returns (CARs) for trading days [-1;+2]. Day 0 is the earliest day the sudden death is reported. The sample is restricted to 145 deaths with any stock return data for days [-3;+5]. Daily abnormal returns are daily stock returns minus CRSP value-weighted index returns, and CARs are the sum of daily abnormal returns. Robust standard errors are used to calculate *t*-statistics for means, and Wilcoxon signed-rank tests to calculate *z*-statistics for medians. Panel B reports the dispersion of announcement returns, measured as average absolute CARs for several announcement and pre-event periods. The pre-event periods have the same length as the announcement periods and end seven trading days before the death announcement. *t*-statistics of mean comparison tests between the two periods are in parenthesis. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Panel A: Daily abnormal returns

Trading days	Mean	*t*-statistic	Median	*z*-statistic	P10	P90	% with positive returns	Standard deviation	Mean abs. abnormal returns
-3	-0.06%	-0.19	-0.03%	-0.46	-3.97%	4.09%	49.7%	3.86%	2.53%
-2	-0.15%	-0.53	-0.02%	-0.37	-3.73%	3.20%	49.0%	3.50%	2.17%
-1	-0.49%	-1.34	-0.17%	-0.26	-4.41%	4.25%	47.9%	4.41%	2.75%
0	-1.72%***	-2.61	-1.16%***	-3.34	-10.87%	7.39%	33.1%	7.85%	5.27%
1	0.53%	1.06	-0.19%	0.19	-4.25%	6.83%	46.9%	6.05%	3.73%
2	0.70%	1.49	0.53%*	1.87	-4.27%	6.26%	59.3%	5.61%	3.42%
3	0.70%*	1.92	0.06%	1.08	-3.51%	4.88%	51.0%	4.42%	2.65%
4	-0.14%	-0.27	-0.09%	-0.09	-4.37%	5.45%	45.5%	6.25%	3.39%
5	-0.24%	-0.91	-0.18%	-1.31	-4.22%	3.50%	46.9%	3.23%	2.19%
[-1;+2]	-1.02%	-1.22	-1.57%*	-1.75	-13.35%	11.47%	43.4%	10.06%	7.59%

Panel B: Dispersion (average absolute CARs)

	Trading days			
	[0;0]	[-1;+1]	[-1;+2]	[-1;+5]
Announcement period	5.27%	6.83%	7.59%	8.72%
Pre-event period [-*t*;-7]	2.29%	3.58%	4.02%	5.29%
Difference	2.98%***	3.25%***	3.57%***	3.43%***
	(5.78)	(5.07)	(4.63)	(4.79)

Table 3
Sudden Death Announcement Returns: CEO and Firm Characteristics

This table reports cumulative abnormal returns (CARs) for the [-1;+2] trading day window around announcements of sudden CEO deaths. Day 0 is the earliest day the sudden death is reported. The sample is restricted to 145 deaths with any stock return data for days [-3;+5]. CARs are the sum of daily abnormal returns, calculated as daily stock returns minus CRSP value-weighted index returns, and are winsorized at the 1st and 99th percentiles. In Panel A, observations are sorted into CEO age and tenure terciles based on the full sample of sudden and non-sudden deaths (age terciles: <59 / 59-65 / >65 years; tenure terciles: <8 / 8-18 / >18 years). In Panel B, observations are sorted into firm characteristic terciles based on the sudden death sample only. The last column reports the overall number of observations and, in parenthesis, the number for each subsample. Variables are described in Table 1. CEO (firm) characteristics are observed at the CEO death (the last fiscal year end prior to the death). *t*-statistics based on robust standard errors are in parenthesis. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Panel A: Announcement returns by CEO characteristics

	Average CARs [-1;+2]				
	Yes	No		Difference	N (Group N)
Founder	-1.03%	-1.01%		-0.02%	145
	(-0.60)	(-1.08)		(-0.01)	(47/98)
Chairman	0.44%	-3.54%***		3.97%***	145
	(0.41)	(-2.74)		(2.38)	(92/53)
	Bottom tercile	Middle tercile	Top tercile	Top minus bottom tercile	N (Tercile N)
CEO age					
All	-3.38%***	0.26%	4.39%**	7.77%***	145
	(-3.13)	(0.15)	(2.76)	(4.08)	(78/43/24)
Founders	-5.92%***	0.30%	7.04%**	12.95%***	47
	(-3.04)	(0.08)	(2.55)	(3.87)	(22/14/11)
Non-founders	-2.39%*	0.23%	2.15%	4.54%**	98
	(-1.87)	(0.13)	(1.31)	(2.22)	(56/29/13)
CEO tenure					
All	-3.82%***	0.32%	2.07%	5.89%***	142
	(-2.97)	(0.23)	(1.23)	(2.78)	(62/50/30)
Founders	-4.82%	-1.82%	1.60%	6.42%	47
	(-0.94)	(-0.76)	(0.58)	(1.13)	(7/23/17)
Non-founders	-3.69%***	2.14%	2.68%	6.38%***	95
	(-2.80)	(1.51)	(1.71)	(3.15)	(55/27/13)

Panel B: Announcement returns by firm characteristics

	Average CARs [-1;+2]				
	Bottom tercile	Middle tercile	Top tercile	Top minus bottom tercile	N (Tercile N)
Book assets	-6.68***	0.73	1.64	8.32***	136
	(-4.98)	(0.54)	(1.21)	(4.36)	(46/45/45)
Tobin's q	1.48	-1.67	-4.18***	-5.67***	134
	(1.03)	(-1.16)	(-2.88)	(-2.78)	(45/45/44)
Pre-event 4y CAR	1.31	1.26	-2.75*	-4.05*	96
	(0.79)	(0.77)	(-1.67)	(-1.74)	(32/32/32)
Average 3y ROA	-3.81***	-2.96**	1.58	5.39***	130
	(-2.64)	(-2.02)	(1.08)	(2.62)	(44/43/43)
	Yes	No		Difference	N (Group N)
Newly listed	-4.02***	0.71		-4.74***	145
	(-2.98)	(0.70)		(-2.79)	(53/92)
Negative EBIT	-3.54**	-1.34		-2.20	129
	(-1.99)	(-1.37)		(-1.08)	(30/99)
R&D expense	-3.14**	-1.11		-2.03	129
	(-2.21)	(-1.03)		(-1.14)	(47/82)

Table 4
Sudden Death Announcement Returns: Regressions

This table reports regressions of sudden death announcement returns on CEO and firm characteristics. The dependent variables in Panel A are cumulative abnormal returns (CARs) for the [-1;+2] trading day window around death announcements. The dependent variables in Panel B are the dispersion of announcement returns, measured as absolute values of the residuals from the Panel A regressions. Day 0 is the first day the CEO death is reported. The sample is restricted to 145 deaths with any stock return data for days [-3;+5]. CARs are the sum of daily abnormal returns, calculated as daily stock returns minus CRSP value-weighted index returns. Observations are sorted into CEO age (<59 / 59-65 / >65 years) and tenure (<8 / 8-18 / >18 years) terciles and (using median splits) into young (<62) vs. old (>=62) and short (<14) vs. long tenured (>=14) based on the full sample of sudden and non-sudden deaths. All CEO and firm characteristics (except dummy variables) are demeaned. Variables are described in Table 1. CEO (firm) characteristics are observed at the CEO death (the last fiscal year end prior to the death). CARs (Average 3y ROA and Tobin's q) are winsorized at the 1st and 99th (5th and 95th) percentiles. *t*-statistics based on robust standard errors are in parenthesis. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Panel A: Announcement CARs

Tercile grouping variable	CARs [-1;+2]				
		Age	Tenure		
	(1)	(2)	(3)	(4)	(5)
Founder	1.375	2.564	1.626	2.213	
	(0.69)	(1.29)	(0.83)	(1.10)	
Chairman	0.649	0.377	1.608	1.118	1.128
	(0.39)	(0.23)	(0.84)	(0.51)	(0.50)
CEO age	0.321***				
	(3.84)				
CEO tenure	0.112				
	(1.05)				
CEO age/tenure					
Bottom tercile		-4.164***	-3.578**		
		(-4.62)	(-2.61)		
Middle tercile		-0.515	-1.560		
		(-0.30)	(-1.18)		
Top tercile		4.017**	2.155		
		(2.36)	(1.17)		
Young CEO × Short tenure				-3.320**	
				(-2.42)	
Young CEO × Long tenure				-4.014**	
				(-2.60)	
Old CEO × Short tenure				-0.485	
				(-0.17)	
Old CEO × Long tenure				3.736**	
				(2.28)	
Founders					
Young CEO × Short tenure					-1.917
					(-0.88)
Young CEO × Long tenure					-4.249*
					(-1.70)
Old CEO × Short tenure					6.838
					(0.75)
Old CEO × Long tenure					5.251**
					(2.18)
Non-founders					
Young CEO × Short tenure					-4.064**
					(-2.28)
Young CEO × Long tenure					-2.968*
					(-1.81)
Old CEO × Short tenure					-3.334**
					(-2.21)
Old CEO × Long tenure					2.964
					(1.42)
Log of book assets	1.175**	1.133**	1.378***	1.193**	1.236**
	(2.37)	(2.32)	(2.72)	(2.33)	(2.38)
Average 3y ROA	-0.958	-0.392	-0.395	-1.229	-1.680
	(-0.44)	(-0.18)	(-0.21)	(-0.63)	(-0.82)
Tobin's q	-0.654	-0.774	-0.203	-0.787	-0.857
	(-0.84)	(-1.08)	(-0.27)	(-1.09)	(-1.15)
Newly listed	-3.761**	-4.946***	-4.585**	-5.249***	-5.442***
	(-2.23)	(-2.93)	(-2.41)	(-2.95)	(-3.02)
Constant	-1.657**				
	(-2.33)				
R^2	0.346	0.306	0.265	0.310	0.330
N	127	128	127	127	127

Panel B: Dispersion of announcement CARs

	Absolute residual CARs [-1;+2]				
Tercile grouping variable		Age	Tenure		
	(1)	(2)	(3)	(4)	(5)
Founder	0.351	-0.142	1.083	0.662	
	(0.26)	(-0.10)	(0.87)	(0.47)	
Chairman	1.405	1.201	2.128	2.066	2.132
	(1.22)	(1.10)	(1.55)	(1.32)	(1.33)
CEO age	0.084				
	(1.49)				
CEO tenure	-0.045				
	(-0.63)				
CEO age/tenure					
Bottom tercile		5.358***	6.402***		
		(9.95)	(6.57)		
Middle tercile		7.005***	5.673***		
		(5.69)	(6.49)		
Top tercile		6.064***	6.194***		
		(5.89)	(5.56)		
Young CEO × Short tenure				6.454***	
				(6.65)	
Young CEO × Long tenure				4.424***	
				(4.44)	
Old CEO × Short tenure				5.453**	
				(2.50)	
Old CEO × Long tenure				5.742***	
				(5.55)	
Founders					
Young CEO × Short tenure					5.094***
					(4.28)
Young CEO × Long tenure					4.605***
					(2.76)
Old CEO × Short tenure					13.198***
					(2.92)
Old CEO × Long tenure					6.355***
					(4.19)
Non-founders					
Young CEO × Short tenure					6.691***
					(5.29)
Young CEO × Long tenure					4.244***
					(4.24)
Old CEO × Short tenure					3.402***
					(3.92)
Old CEO × Long tenure					5.291***
					(4.08)
Log of book assets	-0.441	-0.314	-0.368	-0.358	-0.295
	(-1.28)	(-0.95)	(-1.13)	(-0.99)	(-0.83)
Average 3y ROA	-1.351	-1.181	-1.033	-1.129	-1.187
	(-1.10)	(-0.90)	(-0.81)	(-0.83)	(-0.90)
Tobin's q	-0.172	-0.209	-0.368	-0.485	-0.364
	(-0.33)	(-0.44)	(-0.75)	(-1.00)	(-0.84)
Newly listed	0.823	1.129	0.610	1.046	1.332
	(0.71)	(0.99)	(0.48)	(0.87)	(1.19)
Constant	5.685***				
	(12.14)				
R^2	0.074	0.057	0.065	0.063	0.153
N	127	128	127	127	127

Table 5
Non-sudden Deaths: Illness and Resignation/Death Announcement Returns

Panels A.1, A.2, and A.4 report daily abnormal returns around CEO illness and departure (resignation or death) announcements for non-sudden CEO deaths, as well as cumulative abnormal returns (CARs) for the [-1;+2] trading day window. Day 0 is the earliest day the illness or departure is reported. Panel A.3 reports illness period CARs from one day before the illness announcement to two days after the departure. Panels A.1-A.3 are for events with known illness start, Panel A.4 is for events with unknown illness start. Daily abnormal returns are daily stock returns minus CRSP value-weighted index returns, and CARs are the sum of daily abnormal returns. Robust standard errors are used to calculate *t*-statistics for means, and Wilcoxon signed-rank tests for *z*-statistics for medians. Panel B reports the dispersion of announcement CARs, calculated as average absolute CARs for the [-1;+2] trading day window and a similar pre-event period. For events with known illness start, the pre-event period is trading days [-10;-7] before the illness announcement. For events with unknown illness start, the pre-event period is trading days [-255;-252] (one calendar year) before the departure announcement. *t*-statistics of mean comparison tests between the pre- and the announcement period are in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Panel A: Daily abnormal returns and CARs

Trading days	Mean	*t*-statistic	Median	*z*-statistic	% with positive returns	Standard deviation	Mean abs. abnormal returns
A.1 Illness announcements (N=80)							
-1	0.02%	0.06	0.04%	-0.01	51.3%	3.12%	1.83%
0	-0.60%	-0.95	-0.27%	-1.32	43.8%	5.70%	3.06%
1	-0.31%	-0.98	-0.45%	-1.58	41.3%	2.86%	2.03%
2	-0.07%	-0.24	-0.11%	-0.28	47.5%	2.72%	1.75%
3	-0.19%	-0.68	-0.19%	-1.06	45.0%	2.43%	1.74%
[-1;+2]	-0.97%	-1.21	-0.42%	-0.91	46.3%	7.16%	4.70%
A.2 Departure (resignation/death) announcements for events with known illness start (N=80)							
-1	-0.05%	-0.16	-0.41%	-1.45	40.0%	3.11%	1.99%
0	0.95% **	2.30	0.18% *	1.84	56.3%	3.70%	2.61%
1	0.57%	1.04	0.17%	0.61	52.5%	4.84%	3.04%
2	0.59%	1.29	0.20%	1.16	53.8%	4.07%	2.16%
3	1.05% **	2.20	0.26%	1.43	56.3%	4.27%	2.61%
[-1;+2]	2.05% ***	2.73	0.97% **	2.40	60.0%	6.71%	4.50%
A.3 Illness period for events with known illness start (N=80)							
[*t*-1;*T*+2]	0.96%	0.40	1.74%	0.56	52.5%	21.6%	-
A.4 Departure (resignation/death) announcements for events with unknown illness start (N=194)							
-1	-0.06%	-0.21	-0.03%	-0.66	47.9%	4.09%	2.46%
0	-0.01%	-0.02	0.25%	1.22	55.2%	4.94%	3.18%
1	0.67%	1.83	0.10%	0.95	51.0%	5.08%	3.24%
2	-0.06%	-0.19	-0.21%	-0.59	45.9%	4.32%	2.68%
3	0.29%	1.02	0.02%	-0.08	50.3%	3.95%	2.47%
[-1;+2]	0.54%	1.04	0.33%	0.89	52.6%	7.21%	4.91%

Panel B: Dispersion (average absolute CARs)

	Illness announcements	Departure announcements
B.1 Non-sudden deaths with known illness start		
Announcement window [-1;+2]	4.70%	4.50%
Pre-event period [-10;-7] [#]	3.06%	3.06%
Difference	1.64%**	1.44%**
	(2.36)	(2.11)
B.2 Non-sudden deaths with unknown illness start		
Announcement window [-1;+2]	n.a.	4.91%
Pre-event period [-255;-252]	n.a.	3.82%
Difference	n.a.	1.09%**
		(2.32)

[#] For both illness and departure announcements, the pre-period starts 10 trading days before the illness announcement.

Table 6
Illness Period Returns: CEO and Firm Characteristics

This table reports cumulative abnormal returns (CARs) for CEOs' illness periods from one trading day before the illness announcement (at t=*t*) to two trading days after the announcement of the CEO departure (resignation or death, at t=*T*). The announcement day is the earliest day the illness or departure is reported. CARs are the sum of daily abnormal returns, calculated as daily stock returns minus CRSP value-weighted index returns, and are winsorized at the 5th and 95th percentiles. In Panel A, observations are sorted into CEO age and tenure terciles based on the full sample of sudden and non-sudden deaths (age terciles: <59 / 59-65 / >65 years; tenure terciles: <8 / 8-18 / >18 years). In Panel B, observations are sorted into firm characteristic terciles based on the illness sample only. The last column shows the overall number of observations and, in parenthesis, the number for each subsample. Variables are described in Table 1. CEO (firm) characteristics are observed at the CEO departure (the last fiscal year end prior to the departure). *t*-statistics based on robust standard errors are in parenthesis. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Panel A: Illness period returns by CEO characteristics

	Average CARs [*t*-1;*T*+2]				
	Yes	No		Difference	N (Group N)
Founder	-0.45%	1.68%		-2.12%	80
	(-0.09)	(0.65)		(-0.37)	(27/53)
Chairman	0.26%	2.50%		-2.24%	80
	(0.09)	(0.60)		(-0.44)	(55/25)
	Bottom tercile	Middle tercile	Top tercile	Top minus bottom tercile	N (Tercile N)
CEO Age					
All	-2.71%	1.68%	6.05%	8.76%	80
	(-0.82)	(0.39)	(1.14)	(1.41)	(31/31/18)
Founder	-10.29%	-0.60%	6.59%	16.88%	27
	(-1.52)	(-0.06)	(0.82)	(1.60)	(7/10/10)
Non-founder	-0.50%	2.77%	5.36%	5.86%	53
	(-0.13)	(0.64)	(0.77)	(0.76)	(24/21/8)
CEO Tenure					
All	-3.97%	2.48%	4.67%	8.65%	80
	(-1.13)	(0.64)	(0.90)	(1.38)	(27/29/24)
Founder	-7.62%	-4.57%	3.25%	10.87%	27
	(-0.76)	(-0.51)	(0.46)	(1.04)	(2/10/15)
Non-founder	-3.68%	6.19%*	7.04%	10.72%	53
	(-0.98)	(1.75)	(0.90)	(1.26)	(25/19/9)

Panel B: Illness period returns by firm characteristics

	Average CARs [*t*-1;*T*+2]				
	Bottom tercile	Middle tercile	Top tercile	Top minus bottom tercile	N (Tercile N)
Book assets	-0.01%	1.23%	1.16%	1.17%	80
	(0.00)	(0.30)	(0.29)	(0.20)	(26/26/28)
Tobin's q	4.73%	1.55%	-3.02%	-7.76%	79
	(1.15)	(0.38)	(-0.75)	(-1.35)	(26/26/27)
Pre-event 4y CAR	1.65%	-6.29%	7.97%	6.32%	63
	(0.35)	(-1.34)	(1.70)	(0.95)	(21/21/21)
Average 3y ROA	0.94%	-1.49%	1.54%	0.60%	78
	(0.21)	(-0.37)	(0.38)	(0.10)	(23/28/27)
	Yes	No		Difference	N (Group N)
Newly listed	-1.23%	1.39%		-2.63%	80
	(-0.11)	(0.37)		(-0.47)	(18/62)
Negative EBIT	-2.71%	0.62%		-3.33%	78
	(-0.37)	(0.25)		(-0.42)	(8/70)
R&D expense	-3.02%	2.02%		-5.04%	78
	(-0.75)	(0.69)		(-1.01)	(27/51)

Table 7
Illness Period Returns: Regressions

This table reports regressions of illness period returns on CEO and firm characteristics. In models 1-3, the dependent variables are cumulative abnormal returns (CARs) from one trading day before the illness announcement (at t=*t*) to two trading days after the announcement of the CEO departure (death or resignation, at t=*T*). The announcement day is the earliest day the illness or departure is reported. CARs are the sum of daily abnormal returns, calculated as daily stock returns minus CRSP value-weighted index returns, and are winsorized at the 5th and 95th percentiles. In models 4-6, the dependent variables are the dispersion of illness period returns, measured as absolute values of the residuals from models 1-3. Observations are sorted into CEO age (<59 / 59-65 / >65 years) and tenure (<8 / 8-18 / >18 years) terciles and (using median splits) into young (<62) vs. old (>=62) and short (<14) vs. long tenured (>=14) based on the full sample of sudden and non-sudden deaths. All CEO and firm characteristics (except dummy variables) are demeaned. Variables are described in Table 1. CEO (firm) characteristics are observed at the CEO departure (the last fiscal year end prior to the departure). CARs, Average 3y ROA, and Tobin's q are winsorized the 5th and 95th percentiles. *t*-statistics based on robust standard errors are in parenthesis. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

	CARs [*t*-1;*T*+2]			Dispersion (absolute residual CARs [*t*-1;*T*+2])		
Tercile grouping variable		Age	Tenure		Age	Tenure
	(1)	(2)	(3)	(4)	(5)	(6)
Founder	-7.675	-5.960	-10.154	3.187	6.801*	6.608*
	(-1.01)	(-0.83)	(-1.31)	(0.74)	(1.79)	(1.71)
Chairman	-7.138	-6.365	-7.908	-1.702	-1.254	-0.426
	(-1.20)	(-1.11)	(-1.38)	(-0.53)	(-0.37)	(-0.14)
CEO age	0.305			0.021		
	(0.82)			(0.10)		
CEO tenure	0.206			0.230		
	(0.57)			(1.25)		
CEO age/tenure						
Bottom tercile		-4.015	-7.357		13.845***	14.833***
		(-1.03)	(-1.64)		(5.36)	(5.42)
Middle tercile		1.625	0.946		17.581***	14.449***
		(0.37)	(0.23)		(7.51)	(6.26)
Top tercile		6.923	8.599		16.626***	18.125***
		(1.12)	(1.40)		(4.38)	(5.41)
Log of book assets	0.670	0.701	0.802	-0.578	-0.729	-0.688
	(0.62)	(0.65)	(0.74)	(-0.94)	(-1.14)	(-1.11)
Average 3y ROA	14.820	13.142	16.429	-6.770	-8.838	-3.149
	(0.40)	(0.36)	(0.46)	(-0.28)	(-0.40)	(-0.14)
Tobin's q	-8.246*	-8.535*	-7.935*	1.344	0.197	0.884
	(-1.92)	(-1.93)	(-1.97)	(0.47)	(0.08)	(0.29)
Newly listed	6.469	5.802	6.281	4.313	1.772	3.209
	(0.79)	(0.69)	(0.77)	(0.92)	(0.38)	(0.71)
Constant	0.503			15.851***		
	(0.20)			(10.78)		
R^2	0.085	0.079	0.104	0.144	0.136	0.160
N	77	77	77	77	77	77

Table 8
Operating Changes

This table reports control-firm adjusted operating changes after sudden (Panel A) and non-sudden CEO deaths (Panel B). Operating changes are measured over three fiscal years, from the last fiscal year end before the death to the third fiscal year end after ([-1y;+2y], with the death in year 0), are net of the corresponding changes in size- and industry-matched control firms, and are winsorized at the 5th and 95th percentiles. Panels A.1 and B.1 report average operating changes, net of changes in control firms. Panels A.2 and B.2 report the dispersion of operating changes, net of the dispersion in control firms. Dispersion is measured as the average absolute value of demeaned operating changes, with separate demeaning for event and control firms. Variables are described in Table 1 and the selection of control firms in Internet Appendix Exhibit A1. *t*-statistics based on standard errors clustered by death events are in parenthesis. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Panel A: Sudden deaths

	ROA	Profit margin	SG&A expense	Investment	R&D expense	Book leverage	Cash	Dividend payout	Log assets	Log sales
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
A.1 Operating changes [-1y;+2y] (net of control firms)										
Average	-0.001	-0.005	-0.003	0.018	0.001	0.023	-0.023**	-0.014*	-0.037	0.020
	(-0.09)	(-0.26)	(-0.34)	(0.87)	(0.20)	(1.01)	(-2.40)	(-1.90)	(-0.64)	(0.36)
A.2 Dispersion of operating changes [-1y;+2y] (demeaned, absolute, net of control firms)										
Average	0.013**	0.039***	0.008	0.000	0.000	0.020	0.012*	0.022***	0.013	0.063*
	(2.04)	(2.72)	(1.25)	(-0.03)	(-0.07)	(1.28)	(1.73)	(4.37)	(0.40)	(1.93)
N event firms	110	109	101	103	49	116	118	114	118	116

Panel B: Non-sudden deaths

	ROA	Profit margin	SG&A expense	Investment	R&D expense	Book leverage	Cash	Dividend payout	Log assets	Log sales
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
B.1 Operating changes [-1y;+2y] (net of control firms)										
Average	0.003	0.001	0.003	0.022**	-0.007*	0.016	-0.000	0.008*	-0.030	-0.066**
	(0.48)	(0.15)	(0.66)	(2.02)	(-1.95)	(1.11)	(-0.07)	(1.71)	(-1.03)	(-2.49)
B.2 Dispersion of operating changes [-1y;+2y] (demeaned, absolute, net of control firms)										
Average	0.003	0.000	0.001	-0.017**	-0.000	0.019**	0.008*	0.014***	-0.031	-0.042**
	(0.81)	(0.01)	(0.41)	(-2.49)	(-0.16)	(1.99)	(1.92)	(4.03)	(-1.59)	(-2.45)
N event firms	203	201	181	193	86	221	224	215	224	220

Table 9
Operating Changes and CEO Characteristics

This table reports regressions of operating changes after sudden (Panel A) and non-sudden deaths (Panel B) on CEO characteristics. Operating changes are measured over three fiscal years, from the last fiscal year end before the death to the third fiscal year end after ([-1y;+2y], with the death in year 0). All changes are net of the corresponding changes in size- and industry-matched control firms and winsorized at the 5th and 95th percentiles. In Panels A.1 and B.1, the dependent variables are operating changes, net of changes in control firms. In Panels A.2 and B.2, the dependent variables are the dispersion of operating changes, measured as absolute values of the residuals from the regressions in Panels A.1 and B.1. Observations are sorted into CEO age (<59 / 59-65 / >65 years) and tenure (<8 / 8-18 / >18 years) terciles based on the full sample of sudden and non-sudden deaths. Variables are described in Table 1 and the selection of control firms in Internet Appendix Exhibit A1. *t*-statistics based on standard errors clustered by death events are in parenthesis. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Panel A.1: Sudden deaths – operating performance changes

	Operating changes [-1y;+2y] (net of control firms)					
	ROA		Profit margin		SG&A expense	
Tercile grouping variable	Age	Tenure	Age	Tenure	Age	Tenure
	(1)	(2)	(3)	(4)	(5)	(6)
Founder	0.011	0.013	0.002	-0.004	-0.005	0.003
	(0.51)	(0.53)	(0.05)	(-0.08)	(-0.20)	(0.12)
Chairman	0.005	0.017	0.004	0.010	0.019	0.017
	(0.21)	(0.78)	(0.09)	(0.21)	(0.83)	(0.75)
CEO age/tenure						
Bottom tercile	-0.011	0.003	-0.010	-0.014	-0.001	0.005
	(-0.77)	(0.21)	(-0.33)	(-0.40)	(-0.08)	(0.32)
Middle tercile	0.008	-0.016	-0.025	-0.008	0.003	0.008
	(0.46)	(-0.97)	(-0.71)	(-0.27)	(0.15)	(0.42)
Top tercile	0.010	0.015	0.040	0.017	-0.020	-0.032
	(0.55)	(0.66)	(1.21)	(0.41)	(-1.01)	(-1.50)
Top – bottom tercile	0.021	0.011	0.049	0.030	-0.019	-0.037
	(0.91)	(0.40)	(1.14)	(0.52)	(-0.76)	(-1.29)
N treated firms	110	109	109	108	101	99

Panel A.2: Sudden deaths – dispersion of operating performance changes

	Absolute operating changes [-1y;+2y] (demeaned, net of control firms)					
	ROA		Profit margin		SG&A expense	
Tercile grouping variable	Age	Tenure	Age	Tenure	Age	Tenure
	(1)	(2)	(3)	(4)	(5)	(6)
Founder	0.032**	0.035**	0.073**	0.104***	0.038***	0.042***
	(2.45)	(2.16)	(2.30)	(2.80)	(2.68)	(2.81)
Chairman	-0.008	-0.017	-0.055	-0.043	0.009	0.010
	(-0.57)	(-1.20)	(-1.60)	(-1.23)	(0.59)	(0.70)
CEO age/tenure						
Bottom tercile	0.017*	0.011	0.025	0.064***	0.009	0.010
	(1.86)	(1.13)	(1.40)	(3.01)	(1.01)	(1.07)
Middle tercile	0.024**	0.027***	0.084***	0.034	0.017	0.013
	(2.44)	(2.72)	(3.23)	(1.47)	(1.64)	(1.21)
Top tercile	-0.017	-0.014	0.010	-0.005	-0.005	-0.007
	(-1.41)	(-0.85)	(0.44)	(-0.16)	(-0.34)	(-0.54)
Top – bottom tercile	-0.035**	-0.024	-0.015	-0.070	-0.014	-0.017
	(-2.16)	(-1.20)	(-0.49)	(-1.60)	(-0.83)	(-1.00)
N treated firms	110	109	109	108	101	99

Panel B.1: Non-sudden deaths – operating performance changes

	Operating changes [-1y;+2y] (net of control firms)					
	ROA		Profit margin		SG&A expense	
Tercile grouping variable	Age	Tenure	Age	Tenure	Age	Tenure
	(1)	(2)	(3)	(4)	(5)	(6)
Founder	-0.012	-0.023	-0.030	-0.035*	0.016	0.021*
	(-0.79)	(-1.36)	(-1.59)	(-1.69)	(1.46)	(1.71)
Chairman	-0.007	-0.009	0.005	0.001	0.003	0.003
	(-0.42)	(-0.65)	(0.25)	(0.04)	(0.30)	(0.35)
CEO age/tenure						
Bottom tercile	-0.013	-0.007	-0.000	-0.009	0.015	0.020*
	(-0.97)	(-0.50)	(-0.01)	(-0.50)	(1.11)	(1.79)
Middle tercile	-0.001	-0.021**	-0.018	-0.012	0.006	0.004
	(-0.05)	(-2.12)	(-1.51)	(-0.87)	(0.80)	(0.45)
Top tercile	0.023**	0.032***	0.019	0.018	-0.007	-0.007
	(2.10)	(2.99)	(1.43)	(1.40)	(-1.07)	(-1.09)
Top – bottom tercile	0.036*	0.039**	0.019	0.027	-0.021	-0.027*
	(1.91)	(2.02)	(0.75)	(1.11)	(-1.34)	(-1.93)
N treated firms	199	199	198	198	179	179

Panel B.2: Non-sudden deaths – dispersion of operating performance changes

	Absolute operating changes [-1y;+2y] (demeaned, net of control firms)					
	ROA		Profit margin		SG&A expense	
Tercile grouping variable	Age	Tenure	Age	Tenure	Age	Tenure
	(1)	(2)	(3)	(4)	(5)	(6)
Founder	0.005	0.006	0.005	0.002	0.007	0.004
	(0.56)	(0.65)	(0.44)	(0.14)	(1.07)	(0.67)
Chairman	-0.007	-0.004	0.002	-0.002	0.002	-0.002
	(-0.71)	(-0.52)	(0.16)	(-0.15)	(0.34)	(-0.37)
CEO age/tenure						
Bottom tercile	0.002	0.006	0.007	-0.007	0.008	0.004
	(0.24)	(0.87)	(0.56)	(-0.63)	(1.23)	(0.79)
Middle tercile	0.003	0.004	-0.002	0.008	0.001	-0.001
	(0.43)	(0.60)	(-0.30)	(0.85)	(0.31)	(-0.22)
Top tercile	0.002	-0.003	-0.005	-0.004	-0.002	0.001
	(0.30)	(-0.48)	(-0.57)	(-0.51)	(-0.44)	(0.28)
Top – bottom tercile	0.000	-0.009	-0.012	0.003	-0.010	-0.003
	(0.04)	(-0.90)	(-0.75)	(0.19)	(-1.18)	(-0.40)
N treated firms	199	199	198	198	179	179

Table 10
Announcement Returns and Operating Changes

This table reports regressions of operating changes after sudden CEO deaths on death announcement returns. Operating changes are measured over three fiscal years, from the last fiscal year end before the death to the third fiscal year end after ([-1y;+2y], with the death in year 0). All changes are net of the corresponding changes in size- and industry-matched control firms and winsorized at the 5th and 95th percentiles. The explanatory variables are tercile indicators for cumulative abnormal returns (CARs) for the [-1;+2] trading day window around sudden death announcements. Day 0 is the earliest day the sudden death is reported. CARs are the sum of daily abnormal returns, calculated as daily stock returns minus CRSP value-weighted index returns. In Panel A, the dependent variables are operating changes, net of changes in control firms. In Panel B, the dependent variables are the dispersion of operating changes, measured as absolute values of the residuals from the Panel A regressions. Variables are described in Table 1 and the selection of control firms in Internet Appendix Exhibit A1. *t*-statistics based on standard errors clustered by death events are in parenthesis. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Panel A: Sudden deaths – operating changes

	Operating changes [-1y;+2y] (net of control firms)									
	ROA	Profit margin	SG&A expense	Investment	R&D expense	Book leverage	Cash	Dividend payout	Log assets	Log sales
CAR [-1;+2]:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Bottom tercile	-0.032	-0.101**	0.041*	0.014	-0.006	0.059	-0.052***	-0.027**	-0.109	-0.115
	(-1.46)	(-2.15)	(1.86)	(0.35)	(-0.38)	(1.29)	(-2.74)	(-2.24)	(-0.83)	(-1.01)
Middle tercile	0.009	0.037	-0.020	0.047	0.006	-0.018	-0.021	-0.006	-0.020	0.078
	(0.62)	(1.41)	(-1.59)	(1.42)	(0.49)	(-0.44)	(-1.27)	(-0.40)	(-0.22)	(0.87)
Top tercile	0.020	0.044**	-0.019	-0.011	0.003	0.034	0.001	-0.010	0.011	0.079
	(1.61)	(2.58)	(-1.14)	(-0.28)	(0.49)	(1.02)	(0.11)	(-1.00)	(0.16)	(0.96)
Top – bottom tercile	0.052**	0.145***	-0.061**	-0.024	0.009	-0.025	0.053**	0.016	0.120	0.193
	(2.06)	(2.90)	(-2.17)	(-0.45)	(0.52)	(-0.44)	(2.33)	(1.03)	(0.81)	(1.38)
N treated firms	110	109	101	103	49	116	118	114	118	116

Panel B: Sudden deaths – dispersion of operating changes

	Absolute operating changes [-1y;+2y] (demeaned, net of control firms)									
	ROA	Profit margin	SG&A expense	Investment	R&D expense	Book leverage	Cash	Dividend payout	Log assets	Log sales
CAR [-1;+2]:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Bottom tercile	0.029**	0.099***	0.001	-0.025	0.014	0.052	0.019	0.035***	0.108	0.188***
	(2.31)	(3.38)	(0.07)	(-1.11)	(1.10)	(1.62)	(1.43)	(3.82)	(1.59)	(2.87)
Middle tercile	0.013	0.010	0.009	0.017	-0.004	0.009	0.020	0.017*	-0.020	0.002
	(1.29)	(0.49)	(1.05)	(0.86)	(-0.43)	(0.33)	(1.55)	(1.89)	(-0.39)	(0.04)
Top tercile	-0.006	0.013	0.010	0.006	-0.011**	-0.006	-0.004	0.016**	-0.037	0.025
	(-0.77)	(0.93)	(0.86)	(0.35)	(-2.13)	(-0.38)	(-0.43)	(2.15)	(-0.91)	(0.51)
Top – bottom tercile	-0.035**	-0.086***	0.009	0.031	-0.025*	-0.058	-0.023	-0.020*	-0.145*	-0.162*
	(-2.38)	(-2.68)	(0.57)	(1.09)	(-1.83)	(-1.61)	(-1.41)	(-1.67)	(-1.83)	(-1.97)
N treated firms	110	109	101	103	49	116	118	114	118	116

Table 11
Firm Failures and Acquisitions

This table reports firm failure and acquisition rates within one and three years after CEO deaths. Rates are net of the corresponding rates for size- and industry-matched control firms. Panel A reports failure and acquisition rates. Panels B and C report failure and acquisition rates, respectively, after sudden deaths by death announcement return tercile in columns 1-2 and after non-sudden deaths (with known illness start) by illness period return tercile in columns 3-4. Announcement returns are cumulative abnormal returns (CARs) for the [-1;+2] trading day window around sudden death announcements. Day 0 is the first day the death is reported. Illness period returns are CARs from one day before the illness announcement to two days after the CEO resignation or death. CARs are the sum of daily abnormal returns, calculated as daily stock returns minus CRSP value-weighted index returns. Events are identified using CRSP delisting codes and Compustat footnote codes. Firms are classified as failed if the CRSP delisting code is 400-490 (liquidations) or 550-591 (delisted by exchange), if the Compustat footnote code for the deletion reason is 02 (bankruptcy) or 03 (liquidation), or if the Compustat footnote code for total assets is TL (company in bankruptcy or liquidation) or AG (fresh-start accounting upon emerging from bankruptcy). Firms are classified as acquired if the CRSP delisting code is 200-290 (mergers) or 300-361 (exchanges), or if the Compustat footnote code for the deletion reason is 04 (reverse acquisition). The selection of control firms is described in Internet Appendix Exhibit A1. *t*-statistics based on standard errors clustered by death events are in parenthesis. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Panel A: Failure and acquisition rates (net of control firms)

	Firm failures		Acquisitions	
	Within 1 year after death	Within 3 years after death	Within 1 year after death	Within 3 years after death
	(1)	(2)	(3)	(4)
A.1 All deaths				
Event rate	0.005	-0.008	-0.003	0.008
	(0.50)	(-0.53)	(-0.27)	(0.40)
N treated firms	414	414	414	414
N events treated firms	13	30	21	60
A.2 Sudden deaths				
Event rate	0.022	0.007	-0.011	-0.033
	(1.06)	(0.22)	(-0.54)	(-0.90)
N treated firms	140	140	140	140
N events treated firms	6	13	7	16
A.3 Non-sudden deaths				
Event rate	-0.003	-0.016	0.001	0.030
	(-0.29)	(-0.94)	(0.05)	(1.14)
N treated firms	274	274	274	274
N events treated firms	7	17	14	44

Panel B: Failure rates as a function of announcement and illness period returns

	Failure rates (net of control firms)			
	Sudden deaths		Non-sudden deaths with known illness start	
CAR:	Within 1 year after death	Within 3 years after death	Within 1 year after death	Within 3 years after death
	(1)	(2)	(3)	(4)
Bottom tercile	0.060	0.085	-0.025*	0.032
	(1.17)	(1.20)	(-1.84)	(0.50)
Middle tercile	0.023	-0.031	-0.048*	-0.045
	(0.83)	(-0.78)	(-1.68)	(-0.94)
Top tercile	-0.022**	-0.057***	-0.025	-0.071*
	(-2.05)	(-2.74)	(-0.99)	(-1.93)
Top – bottom tercile	-0.082	-0.142*	0.000	-0.103
	(-1.56)	(-1.92)	(0.01)	(-1.40)
N treated firms	138	138	79	79
N events treated firms	6	12	0	3

Panel C: Acquisition rates as a function of announcement and illness period returns

	Acquisition rates (net of control firms)			
	Sudden deaths		Non-sudden deaths with known illness start	
CAR:	Within 1 year after death	Within 3 years after death	Within 1 year after death	Within 3 years after death
	(1)	(2)	(3)	(4)
Bottom tercile	0.017	-0.002	-0.009	0.074
	(0.38)	(-0.04)	(-0.19)	(1.05)
Middle tercile	-0.043	-0.084**	0.039	0.078
	(-1.48)	(-2.14)	(0.59)	(0.99)
Top tercile	-0.011	-0.012	-0.036	0.103
	(-0.37)	(-0.16)	(-0.78)	(0.89)
Top – bottom tercile	-0.028	-0.010	-0.027	0.029
	(-0.52)	(-0.10)	(-0.41)	(0.22)
N treated firms	138	138	79	79
N events treated firms	7	16	6	19

Internet Appendix

Exhibit A1
Selection of Control Firms

To select size- and industry-matched control firms, we use an approach similar to Lie (2001). For each treated firm, we identify control firms that are within ±20% of the book value of assets of the treated firm in the fiscal year prior to the CEO death. We select up to five control firms closest in size, gradually relaxing the industry match requirement and continuing to the next step only if no match has been found: 1) within the same 2-digit SIC industry; 2) within the same 1-digit SIC industry; and 3) within any industry.

Table A1
Causes of Death

This table reports the causes of CEO deaths. The data are from company filings with the SEC and news sources.

Cause of death	Number of deaths			
	Full sample	Sudden deaths	Non-sudden deaths	
			Illness start known	Illness start unknown
Accident	38	38	0	0
Blood disease	8	4	3	1
Cancer	122	0	76	46
Complications from surgery	9	0	3	6
Died in sleep	4	3	0	1
Died in sleep, good health	3	3	0	0
Died on business trip, vacation	2	2	0	0
Heart attack	80	76	2	2
Heart failure	10	6	0	4
Illness	52	0	10	42
Murdered, shot, stabbed	5	5	0	0
Natural causes	4	0	0	4
Other disease/disorder	15	2	3	10
Other heart disease	6	2	2	2
Overdose	2	2	0	0
Pneumonia	5	0	3	2
Stroke	6	6	0	0
Unknown	78	3	2	73
Total	449	152	104	193

Table A2
Stock Returns Before Sudden CEO Deaths

This table reports abnormal stock returns before 145 sudden CEO deaths. The pre-death windows span 1, 3, 6, 12, and 24 months and end five trading days before the death announcement. Panel A reports mean and median alphas from market models, estimated by regressing, separately for each firm, daily stock returns (net of the risk-free rate) on returns of the CRSP value-weighted market portfolio (net of the risk free-rate). Robust standard errors and Wilcoxon signed-rank tests are used to calculate *p*-values for means and medians, respectively. Panel B reports alphas from Fama-French three factor models estimated using calendar time portfolio regressions. From 1980 to 2012, the equal-weighted return (net of the risk-free rate) of a portfolio of all event firms in the respective pre-event estimation window is regressed on the returns of the CRSP value-weighted market portfolio (net of the risk free-rate) and the SML and HML portfolios. Factor portfolio returns and risk-free rates are from Ken French's website. *t*-statistics based on robust standard errors are in parenthesis. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Panel A: Alphas from market model regressions

Pre-event window (in months)	Mean	*p*-value	Median	*p*-value	SD
1	-0.00025	(0.667)	-0.00024	(0.722)	0.00697
3	0.00043	(0.236)	0.00025	(0.449)	0.00438
6	0.00032	(0.214)	0.00012	(0.327)	0.00314
12	0.00029	(0.162)	0.00029	(0.028)	0.00250
24	0.00018	(0.301)	0.00023	(0.108)	0.00210

Panel B: Alphas from Fama-French three-factor model calendar time portfolio regressions

	Pre-event window (in months)				
	1	3	6	12	24
Alpha	-0.00033	0.00050	0.00028	0.00024	0.00014
	(-0.43)	(0.99)	(0.82)	(0.93)	(0.77)
Rm – Rf	0.67551***	0.80260***	0.88534***	0.96796***	0.93993***
	(4.85)	(11.34)	(20.96)	(27.11)	(36.14)
SMB	0.33454	0.51948***	0.65047***	0.61346***	0.61768***
	(1.28)	(4.04)	(9.62)	(11.88)	(15.73)
HML	-0.04515	0.28703**	0.49800***	0.53823***	0.43377***
	(-0.19)	(2.05)	(5.71)	(8.19)	(9.79)
R^2	0.028	0.040	0.083	0.174	0.282
N	2,404	5,004	6,721	7,754	8,093

about ECGI

The European Corporate Governance Institute has been established to improve *corporate governance through fostering independent scientific research and related activities.*

The ECGI will produce and disseminate high quality research while remaining close to the concerns and interests of corporate, financial and public policy makers. It will draw on the expertise of scholars from numerous countries and bring together a critical mass of expertise and interest to bear on this important subject.

The views expressed in this working paper are those of the authors, not those of the ECGI or its members.

ECGI Working Paper Series in Finance

www.ecgi.global/content/working-papers

Electronic Access to the Working Paper Series

The full set of ECGI working papers can be accessed through the Institute's Web-site (www.ecgi.global/content/working-papers) or SSRN:

Finance Paper Series	http://www.ssrn.com/link/ECGI-Fin.html
Law Paper Series	http://www.ssrn.com/link/ECGI-Law.html