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**MANAGERIAL NETWORKS AND SHAREHOLDER VALUE:
EVIDENCE FROM SUDDEN DEATHS**

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Managerial Networks and Shareholder Value: Evidence from Sudden Deaths*

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Abstract

This paper investigates the causal effect of connections among top executives and directors of different firms on shareholder value using a quasi-natural experiment. Our identification strategy rests on the idea that sudden deaths trigger unexpected and exogenous dissolutions of connections, which enables us to isolate the value of managerial connections by studying stock price reactions at firms where managers connected to a suddenly deceased manager work. Our results show that firms connected to a suddenly deceased manager experience a statistically significant reduction in shareholder value between 1.6 and 2.6 million USD, which is consistent with the notion that managerial connections foster shareholder value. When exploring the cross-sectional variation, we find evidence that connections to inside directors, connections established via previously shared work engagements, and within-industry connections are most valuable.

JEL Classification: L14, G14, G34

Keywords: Social networks, Firm value, Sudden death

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1 Introduction

Whom we know determines with whom we interact and communicate. Thereby, social connections provide access to information. This arguably applies to almost any profession. In the academic community, for instance, a better connected (randomly assigned) discussant increases the likelihood of publishing a paper in either a top finance or top economics journal because of facilitated access to information (Georg et al., 2017).¹ Consistently, a researcher’s output declines following the sudden death of a superstar co-author because of a loss of an irreplaceable source of ideas (Azoulay et al., 2010). In the corporate world, social connections have also been found to serve as a conduit for information. For instance, Khurana (2002) documents that the CEO search process takes place via board connections, Shue (2013) finds that stronger social interaction among top executives leads to more similar managerial decision making, and Cai and Sevilir (2012) show that board connections between a target and its acquirer lead to a better understanding of the target by the acquirer, which manifests in higher acquirer announcement returns. These results suggest that a firm’s shareholders benefit if its top managers are better connected, a relationship that we empirically test in this paper. Consistent with the existence of such a relationship, Engelberg et al. (2013) show that shareholders pay their CEOs larger salaries for having a larger network.

As for most research questions related to networks, identification poses a major challenge (Manski, 1993). Identifying a causal relationship between the network of a firm’s managers and shareholder value is difficult for at least three reasons. First, shareholder value and managerial networks are jointly determined, which makes it difficult to rule out omitted variables as an explanation for any obtained results. Second, the direction

¹ The paper is part of a larger project that aims at estimating the networks among financial economists globally. For more information including centrality measures and network visualizations at the individual researcher level of more than 6,000 financial economists, see <http://www.central-places.net>.

of causality is difficult to uncover in most settings, which gives rise to reverse causality concerns. Finally, the social network of a firm, that is, the social networks of all managers affiliated with a firm, is usually too vast to be modeled in its entirety. Instead, researchers typically focus on a subgroup comprised of top managers, which has the potential to induce a measurement error. A credible identification strategy has to address these concerns.

The goal of this paper is to establish a causal relationship between the social connections of a firm’s managers² and firm value. To this end, we study a quasi-natural experimental setting that enables us to identify and quantify the value of managerial connections for a firm’s shareholders. Our identification strategy rests on the idea that sudden deaths of managers trigger unexpected and exogenous dissolutions of connections between firms, which in turn enables us to quantify the value of each connection to the suddenly deceased managers by estimating firm value changes at all firms that are affiliated with the managers that form part of the deceased managers’ network. Thereby, our identification strategy helps us to overcome the three most salient identification issues. Specifically, we study exogenous shocks to firms’ networks and the resulting market value changes, which renders omitted variables an unlikely explanation for our results. Moreover, we estimate the value of single connections to deceased managers, reducing the impact of potential measurement error from aggregating at the firm level. Finally, sudden deaths are by definition unexpected and therefore exogenous, which helps us to overcome reverse causality concerns.

To implement our identification strategy, we search for all sudden deaths of managers affiliated with an S&P500 firm at the time of death during our 2000 to 2013 sample period. Next, we identify the set of connected managers, that is, managers that share overlapping work engagements with the 42 suddenly deceased managers, graduated with the deceased

² Throughout the paper, we analyze connections of both full-time employed top executives with and without board memberships as well as outside directors, which is why we refer to this group collectively as “managers”. We later split this group and document that connections to executives, especially those who serve on the board, are most important for shareholder value.

managers from the same university, or share other social ties such as club memberships with the deceased managers. We continue by identifying around 7,000 firms where the connected managers work at the time of the death.³ In order to determine whether shareholders of these connected firms are influenced by the sudden termination of a connection to the suddenly deceased managers, we use standard event study methodology and estimate abnormal returns around the announcement of the sudden deaths. In univariate tests, we document that stock prices of the connected firms are significantly negative as they drop by around 0.1% following the sudden dissolution of a connection, which is equivalent with the average connection being worth around 1.6 to 2.6 million USD for firms' shareholders. While this estimate may appear economically small at first sight, it is important to emphasize that it represents the value of one single connection. Given that one managerial death in our sample affects around 225 managers at other firms on average implies that the aggregate spillover effects documented in this paper are substantial and economically meaningful. More detailed analyses of the abnormal returns reveal that the effect is concentrated on the announcement date of the death and turns out to be robust even when using more conservative sample selection criteria, for instance, when excluding observations that are potentially plagued by confounding events. Overall, these results provide supportive empirical evidence for the conjecture that managerial networks positively influence shareholder wealth.

Because we identify such a large number of connected firms per suddenly deceased manager, we can exploit rich variation in the characteristics of the relationships to assess the relative importance of several mechanisms that could plausibly account for our main

³ Investors can access and retrieve network and connection information for a given manager and for a given firm that is very similar to the measures that we construct and analyze in this paper. Equilar and Bloomberg, for instance, provide interactive connection and network information for a given manager, the managers connected to a given manager as well as firms affiliated with the connected managers. For an example of such data, see Appendix II, which shows the network profile of Kenneth I. Chenault, the former CEO of American Express and a current director of Facebook, Inc. and AirBnB, Inc., as provided by Equilar and Bloomberg.

finding. At the same time, studying the cross-sectional variation of the main effect helps us to answer the question which connections are more valuable for firms' shareholders. In univariate and multivariate tests, we find that connections to inside directors are more valuable than connections to outside directors or executives without a board membership. Moreover, we document that connections that arise from shared past employments have higher value for a firm's shareholders than current employment, education or other social connections. We are also able to show that shareholders assign higher values to connections that link their firm to an industry peer. These results are consistent with the notion that certain connections are more important than others, presumably because the information disseminated and accessed via these connections is more important and therefore more valuable. These results also survive a battery of robustness tests, for instance, alternative parameter selections when estimating the abnormal stock returns. Finally, we document that our results hold if we test for the existence of alternative connections between the sample of connected firms and firms affiliated with the deceased managers.

Our study's focus on deaths of managers affiliated with S&P500 firms can be justified on two grounds. First, we require detailed data on managerial careers that not only comprise information on work engagements when the individual in question already gained recognition, but also information on less known areas such as early career steps, college graduation, and membership in clubs as well as charitable organizations. Focussing on individuals affiliated with S&P500 firms therefore ensures sufficient data quality. Second, we are interested in estimating stock price reactions across a wide array of affected firms, so the event in question has to draw sufficient public attention. Our manual data collection efforts confirm that sudden deaths of individuals affiliated with S&P500 firms receive – as tragic as they may be – substantial public attention.

Our contribution to the literature is at least threefold. First, our results speak to the papers that investigate the impact of social networks in finance, particularly those that

emphasize the ability of networks to transmit information. A number of papers show that social networks facilitate information gathering for investors and thereby influence investment performance. Cohen et al. (2008), for example, show that mutual fund managers with ties to corporate board members place larger bets on connected firms and perform significantly better on these holdings than non-connected mutual fund managers. Similar findings are reported for connections of financial analysts (Cohen et al., 2010) and venture capitalists (Hochberg et al., 2007). Cai and Sevilir (2012) study the facilitated flow of communication through social connections between firms in the context of M&As and show that transactions characterized by existing connections between directors of the target and the acquirer are associated with higher acquirer announcement returns. Fracassi (2017) constructs a set of time-varying connection measures among firms and concludes that information diffuses through these networks, leading to similar investment policies of more socially connected firms. The findings of this paper that stock returns at connected firms, especially at industry peers, are significantly negative upon sudden dissolutions of connections are consistent with results documented in this stream of literature in a sense that they support an information flow-based explanation. Noteworthy in this literature is Engelberg et al. (2013), who show that CEOs receive higher compensation for a larger network. Even though the authors mitigate rent-extraction as an explanation for their results by controlling for measures of firm-level governance, they do not provide direct evidence on the question whether awarding higher pay to CEOs with larger networks indeed benefits firms' shareholders. Therefore, the key contribution of our paper is to document an arguably causal relationship between managerial networks and firm value. Our finding that stock prices at connected firms are significantly negative around the termination of a connection supports the conclusion of Engelberg et al. (2013) that higher pay awarded to CEOs with larger networks is not caused by managerial rent-extraction but is in shareholders' interests.

In terms of the empirical approach used to identify the value of connections, our paper is closely related to studies that aim at estimating the value of *political* connections. To preserve causality, a substantial number of studies quantify the value of a political connection as the change of the market value of equity of connected firms following shifts of power of individual politicians. Ferguson and Voth (2008), for instance, evaluate the stock market performance of German firms around Hitler’s assertion to power and document substantial shareholder value gains for firms linked to Hitler’s Nazi party. Jayachandran (2006) studies stock returns around the unexpected announcement of Senator Jeffords to leave the Republican Party, which tipped Senate control to the Democrats and led to negative (positive) stock returns at firms connected to the Republican (Democratic) Party. In their paper on the value implications of having politically-connected boards, Goldman et al. (2009), find, among others, firm value gains (losses) at firms connected to the winning (losing) Republican (Democratic) party following the 2000 U.S. presidential election. Acemoglu et al. (2016) analyze stock returns of financial firms around the announcement of the nomination of T. Geithner as Treasury Secretary and find gains in shareholder value at connected firms. Fisman (2001) documents stock price losses of Indonesian firms surrounding rumors of worsening health conditions of Suharto, the former president. Recent papers, which document consistent evidence, refine this approach by extending their focus beyond changes to the political influence of one politician. Akey (2015) studies close-call U.S. off-cycle congressional elections, while Amore and Bennedsen (2013) explore variation in the influence of Danish politicians caused by exogenous changes in Danish local municipality sizes. At least two papers in this stream of the literature establish causality by using sudden deaths of politicians to create exogenous variation in the political network of firms. Roberts (1990) evaluates the stock returns of firms that made contributions to Senator Henry Jackson, who passed away suddenly. Faccio and Parsley (2009) use a worldwide sample of 122 sudden deaths of politicians and find a negative abnormal return

at connected firms. By studying firm value changes at firms connected to 42 suddenly deceased S&P500 firm affiliated managers, we borrow the methodology to exploit exogenous terminations of connections, specifically terminations caused by sudden deaths, from the literature on the value of political connections. While political networks are undoubtedly important for firms, our focus on managerial connections is a reasonable and interesting application of this approach given that managerial connections are more prevalent than are political connections.

Finally, our study contributes to the nascent stream of papers that study sudden manager deaths for identification purposes in a corporate context. Nguyen and Nielsen (2010), for instance, use sudden deaths of corporate directors to overcome the identification problem that board structure is endogenously related to firm value, as emphasized by Hermalin and Weisbach (1998, 2003). Following sudden independent directors deaths, stock prices drop, which lends support to the notion that independent directors' services are valuable for shareholders. A similar identification strategy is used by von Meyerinck et al. (2016) to estimate the value of industry-experienced outside directors for firms' shareholders. Nguyen and Nielsen (2014) explore stock price reactions to sudden deaths of top executives as a measure of expected contribution to shareholder value and find that CEOs retain around 65% of the marginal rent from the firm-manager relationship. Falato et al. (2014) examine sudden deaths of directors and CEOs to evaluate exogenous variation in the workload of the remaining directors on the board and show that firms interlocked via the remaining directors suffer stock price losses, which is consistent with the notion that directors' busyness is detrimental to board monitoring. We follow this strand of the literature by using sudden deaths of managers to create exogenous dissolutions of connections between firms and show that they cause significant reductions in shareholder value at firms that form part of the suddenly deceased managers' networks. Studying sudden deaths helps us to rule out reverse causality concerns. In other words, our setting helps us to ensure that the

direction of the effect runs from managerial networks to firm value (and not vice versa).

The remainder of the paper is structured as follows. Section 2 outlines the identification problem and how our identification strategy overcomes it. Section 3 describes how we compile our sample and reports sample characteristics. Section 4 contains our results. Section 5 concludes.

2 Identification Problem and Identification Strategy

2.1 Identification problem

A straightforward (albeit naïve) way to study the relation between some corporate outcome variable and managerial networks would be to run an ordinary least squares (OLS) regression on panel data, for instance

$$O_{i,t} = \alpha + \beta X_{j,t} + \gamma Y_{j,t} + \delta Z_{i,t} + \epsilon_{i,t}, \quad (1)$$

where $O_{i,t}$ represents an outcome variable of firm i at time t , $X_{j,t}$ represents some sort of network measure of a senior manager j , $Y_{j,t}$ represents a vector of additional manager characteristics, and $Z_{i,t}$ represents a vector of firm characteristics. The coefficient of interest is β , which measures the relation between the outcome $O_{i,t}$ and the network measure $X_{j,t}$ after controlling for other determinants of the outcome captured by $Y_{j,t}$ and $Z_{i,t}$.

However, the coefficient β obtained from estimating (1) might not reflect the causal effect of managerial networks on the outcome variable for at least three reasons. First, managerial networks and the outcome variable might be jointly influenced by an unobservable omitted variable. In other words, we cannot rule out that $O_{i,t}$ and $X_{j,t}$ are both correlated with the error term $\epsilon_{i,t}$, resulting in a biased coefficient β . In our setting, where the outcome variable is the market value of the equity, a variable that comes to mind is the reputation of the firm, which is difficult to quantify empirically if not unobservable and

likely to simultaneously influence firm value and the matching of well-connected managers to firms. Second, one cannot rule out that reverse causality drives the estimated coefficient β . Under reverse causality, the outcome variable and the network measure are mutually dependent. Specifically, in our setting, the story under reverse causality is that only highly valued firms are able to attract well-connected managers, which seems plausible. Third, the network measure $X_{j,t}$ is defined at the individual manager level, as indicated by the index j , while the outcome variable $O_{i,t}$ is defined at the firm level, as indicated by the index i . Estimating (1) at the firm level therefore requires the researcher to restrict the focus to a single senior manager (the CEO, for instance) or to aggregate the network measures across a group of senior managers (the board of directors, for instance) to determine $X_{j,t}$. Such approximations are usually implemented for data availability reasons and are justified by arguing that these managers (and their networks) have the strongest influence on firm policies (and thereby on the outcome $O_{i,t}$). The resulting measurement error in the managerial network measure $X_{j,t}$ might still blur the true effect of the managerial network on the outcome variable captured by β and one could go as far as to claim that the network measure only serves a proxy for managerial connectedness at the firm level. In order to accurately identify the impact that managerial networks have on firm value, we therefore require an identification strategy that rules out unobservable and omitted variables, reverse causality, as well as measurement error in the managerial network measure caused by aggregation.

2.2 Identification strategy

In order to overcome the omitted variable problem, we employ first-differencing to (1). If the time period for calculating first-differences is chosen sufficiently short, we can assume that unobservable factors remain constant and rule them out as a driver of the

change of the outcome variable.⁴ The coefficient β then estimates the effect that a *change* of the network measure $X_{j,t}$ has on a *change* of the outcome variable $O_{i,t}$ after controlling for simultaneous *changes* to the other characteristics captured by $Y_{j,t}$ and $Z_{i,t}$. When empirically estimating the modified regression, our ability to rule out reverse causality and to make causal statements on the relation between managerial networks and firm value depends on the exogeneity of the variation in the network measure $X_{j,t}$. We arguably use the most exogenous source of variation, that is, we exploit variation in the network measure caused by sudden manager deaths. The definition of a sudden death chosen throughout the paper ensures that these events are unanticipated by the market, which follows Johnson et al. (1985), Nguyen and Nielsen (2010, 2014), as well as Fee et al. (2013), among others. Finally, our identification strategy aims at circumventing the measurement error by disaggregating the managerial network measure $X_{j,t}$ in order to isolate the value of single connections. To this end, we make use of the fact a person’s network represents the sum of all connections and that each connection links two distinct individuals. Therefore, the sudden death of a manager causes sudden dissolutions of all his connections. As a result, the value of a connection to the suddenly deceased manager should be observable at the firms where individuals work that are connected to the suddenly deceased manager. In other words, we exploit exogenous variation in the network caused by sudden manager deaths but study changes of the market value of equity at firms that employ managers that form the deceased managers’ networks. These firms are arguably unaffected by the sudden death of the manager *except* through the connection they share. The variable of interest in this paper is therefore the change in the market value of equity of all firms connected to the suddenly deceased manager around the death announcement.

In the first part of the empirical analysis, in Section 4.1, we test whether stock price

⁴ Admittedly, the caveat that comes with first-differencing is that it effectively renders studying other outcome variables than the market value of equity impossible because other potentially interesting outcome variables are not available on a daily basis.

reactions at firms connected to managers that pass away suddenly are significantly negative in order to provide causal evidence of the relation between managerial networks and firm value. In the second part of the empirical analysis, in Sections 4.2, we explore the cross-sectional variation of the results in order to test whether certain connections are more important than others. To this end, we begin by comparing the abnormal returns at the connected firms across different groups. Specifically, we form groups based on connection characteristics, deceased executive characteristics, and sample firm characteristics. Moreover, we can study this question in a multivariate regression setting such as

$$CAR_{i,t} = \alpha + \beta \Delta X_{j,t} + \gamma \Delta Y_{j,t} + \delta Z_{i,t} + \epsilon_{i,t}, \quad (2)$$

where $CAR_{i,t}$ represents the cumulative abnormal return at firm i that is the connected to the deceased manager j , $\Delta X_{j,t}$ represents measures describing the type of connection broken up by the sudden death of manager j , $\Delta Y_{j,t}$ represents a vector of deceased manager characteristics, and $Z_{i,t}$ represents a vector of connected firm characteristics. The coefficient β provides us with an estimate for the value of a connection to the suddenly deceased manager j for the shareholders of the connected firm i .

Finally, we emphasize that our setting comes with the additional advantage that we observe multiple market reactions to the sudden passing of the same manager. In settings where we explore variables that show within-death variation, for instance, the relative importance of certain connection types, we can employ a fixed effect for each manager death. Technically speaking, these event fixed effects not only absorb the (necessarily incomplete) set of *observable* deceased manager characteristics $\Delta Y_{j,t}$ but additionally rule out any *unobservable* deceased manager characteristics as well as event characteristics such as death and market circumstances surrounding the event as an explanation for the results.

3 Sample Construction and Data

In this section, we explain how we compile our data and describe the sample. We start by outlining how we create our sample of sudden manager deaths, continue by explaining the determination of the individuals connected to the deceased managers as well as the firms where the connected managers work at the time of death. Finally, we discuss characteristics of the sample of connected firms.

3.1 Sudden manager death sample

Our sample of sudden manager deaths stems from the BoardEx database. For top executives and corporate board members, BoardEx tracks personal characteristics such as nationality, gender, the date of birth and date of death, as well as information on past and current employments, education, and other activities such as club memberships. We begin our search by screening BoardEx for all persons with a non-missing death date. Following the literature, we restrict our sample period by considering only deaths that occurred after January 2000 because BoardEx has shown reliable coverage starting in 2000 (Engelberg et al., 2013; Fracassi and Tate, 2012). Our sample period ends on May 6, 2013, because it is the date our excerpt from the database ends. Next, we restrict the sample of deaths to managers who worked for an S&P500 firm at the time of death. We impose this restriction for two reasons. First, we find that the coverage of managers of non-S&P500 firms is less complete in BoardEx, which turns out to be problematic when estimating the deceased individuals' networks. Second, we require each manager death to be headline news in order to determine its impact on a broad set of firms, which we find to be true during our manual data collection process. Our initial search for manager deaths yields a gross death sample of 209 individuals that passed away while being employed at an S&P500 firm.

It is worth pointing out that we deviate from previous research by solely relying on

BoardEx to build a sample of manager deaths. Related papers such as Falato et al. (2014) and Nguyen and Nielsen (2010, 2014) rely on newspaper searches and/or screenings of filings made by firms with the Securities and Exchange Commission (SEC) to compile their death samples. We believe, however, that BoardEx as our source for a sample of manager deaths fulfills the prerequisite of being objective, that is, its coverage is not biased towards successful managers whose sudden death might be associated with larger stock price reactions. Nevertheless, we run a second battery of searches for manager deaths for our sample firms across various additional databases to validate our sample selection procedure. We start by comparing our BoardEx manager death sample with a manager death sample compiled using Audit Analytics' file covering Director and Officer Changes. This dataset contains all officer and director changes filed as Item 5.02 on an 8-K with the SEC and indicates whether a departure was due to death. Next, we benchmark our sample with a manager death sample from the CapitalIQ news database. CapitalIQ collects firm news, and we search it for news mentioning manager deaths. Specifically, we screen all situation descriptions for words often used in the context of manager deaths.⁵ Finally, we compare our death sample with a sample of deaths obtained from Compustat Execucomp. Execucomp in general tracks the five highest earning individuals across firm-years. Besides compensation data, the database contains a variable indicating the reason managers are no longer employed by their firms, which allows us to search for departures due to death. Taken together, this backstop search results in no additional death cases and leads us to conclude that BoardEx is a reliable source for compiling a sample of manager deaths.

We run extensive news and online searches for each of these 209 deaths in order to identify the cause of death. We classify death causes into categories derived from the

⁵ We use the following words to screen CapitalIQ: passed away, pass away, passed by, passing, died, dies, dying, mourn, deceased, demise, death, accident, crash, perish, assassinated, dead, fatal, lethal, mortal, kill, serious, injure, hurt, depart this life, departed this life, survived by, bereavement, heart attack, painful loss, grievous, lugubrious, desolate, gloom, sadness, depressive, saturnine, somber, dismal, casualty, casualties, sacrifice, suicide, victim, oblation, quarry, immolation, and wounded.

medical literature following Nguyen and Nielsen (2010). As shown in Panel A of Table 1, 81 deaths (38.76% of the gross death sample) are related to cancer, 6 (2.87%) result from complications of specified diseases (excluding cancer), 21 (10.05%) result from complications of surgery, and 14 (6.70%) are caused by an unspecified illness. Further, we identify three suicides (1.44%), which we do not classify as sudden deaths as they might reveal information on the state of the firm. We are unable to find any information on the cause of death for 41 cases (19.62%) and label them as undisclosed. Because the idea of the paper is to use manager deaths as exogenous shocks, we require such deaths to be unanticipated by the stock market in order to be included in our event sample, which we define as the death being unlikely 24 hours before it happened. We follow Nguyen and Nielsen (2010) and classify deaths as sudden if caused by a heart attack, a stroke, an accident, or if the cause is undisclosed but is described as unexpected, unanticipated, or sudden. We find that 43 deaths occurred suddenly (20.57% of the gross death sample). Panel B of Table 1 exhibits detailed information on the causes of death for the subsample comprising sudden deaths. The largest share of sudden deaths is caused by heart attacks (22 cases or 51.16% of all sudden deaths) followed by accidents (7 cases or 16.18%) and strokes (2 cases or 4.65%). The remaining 12 cases (27.91%) cannot be classified into any of the aforementioned categories but our search results clearly indicate that the death occurred suddenly and was unexpected. We are especially conservative when classifying deaths into the latter category and only do so if we cannot find any contradictory information, for example a source indicating any sort of illness prior to death.

The characteristics with regard to death causes of our gross death sample and the resulting sudden death sample are similar when compared to previous studies. Nguyen and Nielsen (2010, 2014), for example, find 29.7% and 28.7% of their deaths to be sudden. Moreover, the relatively high fraction of sudden deaths for which we cannot find information on the specific sudden death cause (27.91%) is not a feature special to our data as these

fractions of sudden deaths amount to 33.6% in Nguyen and Nielsen (2010) and 28.2% in Nguyen and Nielsen (2014).

For each of these 43 sudden death cases, we verify the date of death obtained from BoardEx and search for the event date, which is the earliest date for which we find a mentioning of the death.⁶ As shown in Panel C of Table 1, almost all sudden deaths become public knowledge within four trading days after the death date. We follow previous literature and drop sudden death cases where the time lag between death date and first news date exceeds five trading days, resulting in a loss of one event (Falato et al., 2014). Excluding this sudden death case with a comparably long time lag reduces the mean time lag from 1.53 trading days to 1.24, which is similar to Falato et al. (2014) and Nguyen and Nielsen (2010).

3.2 Connected manager sample

Equipped with a sample of 42 suddenly deceased managers and the respective event dates, we identify all individuals connected to the suddenly deceased manager in the spirit of Fracassi and Tate (2012) and Engelberg et al. (2012, 2013). For each suddenly deceased manager, we retrieve employment, education, and other activity data from BoardEx and estimate four types of connections. A Past Employment connection arises if another manager shares an overlapping work engagement with the suddenly deceased manager at the same employer that terminated before the death date. A Current Employment connection results from an overlapping work engagement at the same employer at the time of death. An Education connection is formed when another manager graduated from the same university within one year as the manager that passes away suddenly. Similarly, an Other Activity connection arises if another individual is active in the same charitable

⁶ For approximately half of these sudden death cases, firm-initiated news are the first source to report the manager death (23 cases or 53.49%), followed by newspaper articles (15 or 34.88%), and obituaries (5 or 11.63%).

organization as the manager that passes away suddenly.⁷

Panel D of Table 1 depicts suddenly deceased manager characteristics. The mean age across all 42 suddenly deceased managers is 64.55 years of age with a median age of 62.67 years. Only two (4.76%) of the suddenly deceased managers are females. The average number of different connections per suddenly deceased manager sums up to around 225 CRSP/Compustat-firm-employed managers, and the majority of the connections stems from past employment. Around two-thirds of our suddenly deceased managers serve as outside directors at an S&P500 firm, while around 14% are inside directors (e.g., CEOs, Presidents or Executive Chairmen, or some other C-level executives, who also hold a position on the board of directors).

3.3 Connected firm sample and sample characteristics

Next, we identify our sample firms, that is, all firms where the connected managers work at the date the death becomes public knowledge. We refer to these firms as the "connected firms". It is important to note at this stage that we impose restrictions on these connected firms. First, we are not interested in studying stock price reactions at firms where the suddenly deceased managers themselves work in any capacity when he passes away, which is why we exclude within-firm connections, that is, connections to other managers at the firms where the managers work when they pass away. Although it may sound macabre, we refer to the firms where the managers pass away suddenly as the "death firms" henceforth. Second, we only keep connected firms for which we can retrieve stock market data from CRSP to run an event study and financial data for the most recent financial year end

⁷ Similar to previous studies, we require that both individuals are "active members" in a club or a charitable organization in order to be connected. The reason for imposing this additional requirement is that coverage of start and end dates in the dataset containing Other Activities is sparse. However, it is reasonable to assume that these activities are usually long-lasting so the additional requirement of being an "active member" ensures that the individuals actually knew each other (Fracassi and Tate, 2012).

from Compustat.⁸ Third, we require a connected firm to have common shares outstanding (CRSP share code starts with 1) and drop Real Estate Investment Trusts (REITs) as well as closed-end funds (CRSP share code ends with 4, 5, or 8).⁹ The remaining firms constitute our sample.¹⁰

Table 2 shows sample characteristics for our sample of connected firms. Mean total assets of these firms amount to 34.4 billion USD. The market-to-book ratio (MTB), defined as the market value of equity scaled by the book value of equity, has a mean of 1.99. The firms in our sample exhibit a mean (book) leverage, defined as long-term debt and debt in current liabilities scaled by total assets, of 0.22, and a return on assets (ROA), estimated as operating income before depreciation scaled by total assets, of 0.08. The definitions of all variables are shown in Appendix I of this paper.

4 Empirical Results

4.1 Are stock returns at connected firms negative?

In order to provide causal evidence on the relation between firm value and managerial networks, we first study the question whether connected firms' stock returns are significantly negative following the sudden dissolution of a connection to an S&P500-affiliated manager. To this end, we apply standard event study methodology to all connected firms around the date the sudden death becomes public knowledge with the goal of purging gen-

⁸ This requires matching BoardEx' firm identifier with the stock time-series identifier from the Center for Research in Security Prices (CRSP). Appendix III of this paper describes the matching procedure that we employ in detail.

⁹ In a robustness test, we later also drop utility and financial firms. The results remain virtually unchanged.

¹⁰ Note that we retain a connected firm only once per sudden manager death case, even though a connected firm can be linked to the deceased manager via multiple connections. To test whether this materially impacts our findings, we later show a set of robustness tests. First, we retain only firms affected via one single connection and find the results to remain unchanged. Second, we add a variable that captures whether a firm is affected via multiple connections and find this variable to obtain an insignificant coefficient, indicating that this sample selection criteria does not affect our conclusions.

eral market movements from the observed stock returns (Campbell et al., 1997). Following common practice, a daily abnormal return (AR) is estimated by subtracting an expected return from the observed daily return. For each connected firm and each day in the event window, we predict the daily expected return using estimates from a market model regressions. These regression parameters are obtained by regressing daily value-weighted index returns on daily stock returns provided by the Center for Research in Security Prices (CRSP) over a 200-day estimation window ranging from 220 trading days before to 21 trading days before to the event date. We require at least 90 daily observations with non-missing stock and index return data to run the regression for a given firm. In order to mitigate the impact of outliers, we winsorize all abnormal return measures on the 1% and 99% percent level throughout our empirical analysis.

Panel A of Table 3 shows that the mean daily abnormal return is around 0.01% on the trading day before (AR [-1]) and 0.00% on the trading day after the event date (AR [1]), which is economically negligible and statistically indistinguishable from zero in a two-sided t-test. On the event day, however, the mean daily abnormal return (AR [0]) amounts to -0.13%, which is statistically significant at the 1% level with a t-value of -4.48. Similar conclusions can be drawn from the median of the daily ARs: the median abnormal return on the event day amounts to -0.15%, which is statistically different from zero at the 1% level with a z-value of -8.24. In contrast, median abnormal returns on the trading day after the event (-0.03%) and the trading day before the event (-0.06%) are economically smaller and only weakly significant on the trading day before the event.

In Panel B of Table 3, we show results of similar tests for cumulative abnormal returns (CARs) for our sample of connected firms following the sudden dissolution of a connection to a manager employed by an S&P500 firm. The CARs equal the sum of daily ARs over different event windows. For a two-day event window spanning the event day and trading day after the event (CAR [0,1]), the mean amounts to -0.11%, which is statistically

different from zero at the 1% level. Similar results are obtained for a two-day event window comprising the event day and the day before the event (CAR $[-1,0]$), where the mean amounts to -0.10% (significant at the 1% level) as well as a three-day event window running from the day before to the trading day after the event (CAR $[-1,1]$), for which we find a mean of -0.10% (significant at the 5% level). For median CARs, the effects are slightly larger, both in terms of economic and statistical magnitude. For our main analysis, we use a two-day event window that covers the day of the announcement of the sudden death and the day after the announcement. The reason is that we were unable to precisely identify the time stamp for each sudden death announcement while collecting these data. This leaves the theoretical possibility open that the announcement takes place after trading hours, which would imply that the corresponding economic effect is incorporated into the stock prices on the following trading day. Using a two-day event window that comprises the announcement date as well as the trading date after the announcement date is therefore a conservative approach to ensure that our event window indeed covers the sudden death announcement.

The obtained results enable us to quantify the average effect of the dissolution of one connection for the shareholders of the average connected firm in dollar terms, which is our estimate for the average market value of the connection to the suddenly deceased manager. Specifically, we find that sudden manager deaths result in repercussions on connected firms, with cumulative abnormal return estimates ranging from -0.10% to -0.16%. The market capitalization of our sample firms is highly skewed with a median of 1.619 billion USD. The obtained abnormal return estimate therefore translates into an abnormal equity market value loss for the median firm, that is, the average value per connection, of 1.62 to 2.59 million USD. While this estimate may appear economically small at first sight, it is important to emphasize that it represents the value of one single connection. Given that one managerial death in our sample affects around 225 managers at other firms on average

implies that the aggregate spillover effects documented in this paper are substantial and economically meaningful. Overall, these results provide supportive empirical evidence for the conjecture that managerial networks positively influence shareholder wealth.

Even more important, our setting supports a causal interpretation of this relationship. First, our results and our setting arguably set a high bar for an omitted variable being the primary driver of our results. Specifically, such an omitted variable has to have a systematically negative effect on the market value of a large sample of firms connected to a group of suddenly deceased managers on the date of the announcement of the sudden death (see Panel A of Table 3) and has to be uncorrelated with general market movements (as the abnormal returns are already purged from systematic shocks). Second, our setting enables us to rule out reverse causality concerns due to the exogeneity of the shock to the network of the connected firms: accidents and other fatalities of managers affiliated with other firms can be assumed to be orthogonal to any firm characteristic, including firm value. Finally, we believe that the quality of these data used to estimate the sample of connected firms ensures that the individuals identified as connected indeed know each other and thereby rules out measurement errors as a possible explanation for our results.

In Panel C of Table 3, we provide a number of robustness tests for this initial result. Our first robustness test deals with the choice of the market proxy used to estimate daily abnormal returns. We played around with a number of alternative market proxies and, for brevity, only show the results if we substitute CRSP's value-weighted market return with the S&P500 index return as an alternative market proxy. In these tests, we find that the cumulative abnormal return around the death announcement date and the trading day after is still negative and significant, if anything, the results become economically and statistically stronger. Another concern with our results is that they might be driven by confounding events at the connected firms that coincide with the announcement of the sudden managers' deaths. As outline above, we believe that such an omitted variable is an

unlikely explanation for our results because the omitted variable has to fulfill a number of properties in order to explain our result. Unfortunately, the large number of event firms in our sample renders manually searching for confounding events at the connected firms unfeasible. Nevertheless, we address such concern by searching for confounding events at the connected firms using the CapitalIQ news database. CapitalIQ collects a vast array of news from various origins for each firm on an intraday basis and categorizes them into groups. This comes with the advantage that we can use the news categories provided by CapitalIQ to carefully classify connected firms as being confounded without actually reading the content of the news.¹¹ For each connected firm, we match all news from CapitalIQ in a five trading day window from two days before to two days after the death announcement and drop all connected firm observations for which we find a confounding event that takes place concurrently to the death of the connected manager. Using this reduced sample, we can confirm that the cumulative abnormal returns remain negative and statistically significant, even after taking into account confounding events. In another robustness test, we follow prior literature and drop connected firms that are financial and utility firms (SIC codes 6000-6999 and 4940-4949, respectively) from our sample. Again, we find the CARs to remain unaffected. Finally, we test whether our results hold if we restrict the sample to connected firms that are only linked to the deceased manager via one individual and additionally retain only death events where the deceased manager is affiliated with only one S&P500 firm. The rationale for this test is that one could argue that we can only quantify the value of one connection in such a setting without being subject to potential measurement error. As expected, however, the results remain unaffected.

¹¹ Table A.3 of Appendix IV shows the list of CapitalIQ events that we classify as confounding.

4.2 Which connections matter for firms' shareholders?

Next, we explore the cross-sectional variation in the responses of the stock prices of the connected firms to the sudden death announcement. The results of these tests not only show which connections are more valuable for firm's shareholders but also help us to understand the channels through which our main effect operates, that is, how managerial connections influence firm values. In line with the empirical framework developed in Section 2, the variables that we are interested in can be broadly classified into connection characteristics, deceased manager characteristics, and firm characteristics. We begin this set of tests with univariate analysis in which we sort connected firms into subgroups based on these characteristics, and compare the CARs of the subgroups with the goal of identifying the subgroups with stronger stock price responses. In the latter part of this section, we estimate variants of regression equation (2), which enables us to consider these characteristics jointly.

First, we are interested in the relative importance of the connection types. Recall that we estimate four different connection types throughout the paper, namely Education connections, Past Employment connections, Current Employment connections, and Other Activity connections. In Panel A of Table 4, we find mean CARs that are negative and statistically different from zero for firms connected to a suddenly deceased manager via a Past Employment connection (mean CAR: -0.23%; t-value: -4.46), while the CARs of the connected firms are negative and statistically significant for firms *not* connected to a deceased executive via any other connection type. These results turn out to be economically and statistically similar when studying median CARs. We also employ tests for differences in means and medians between the groups in order to find out whether the stock price reactions are statistically different from each other. Most importantly, we find that firms that are linked to a suddenly deceased manager via a Past Employment connection show CARs

that are 0.24% lower (t-value: -3.21) than the group of firms not connected via a previously shared work engagement. Moreover, we find that firms experience higher abnormal returns when connected via any other connection type. Taken together, these results support the conjecture that connections arising from previously shared employments are more important for shareholders than connections originating from time spent studying together, time spent outside of the workplace in organizations such as clubs, and connections arising from current overlapping work engagements. Economically, these results indicate that the value of a Past Employment connection is around 2.5 times more valuable for shareholders than the average connection (as shown in Table 3). Even though intuitive, these results tend to contradict findings from previous studies that underscore the importance of educational ties (e.g., Cohen et al., 2008; Cohen et al., 2010; Engelberg et al., 2013). As outlined in Section 2, results obtained in such settings are potentially plagued by reverse causality and omitted variables biases and should therefore be interpreted with caution.

Second, we analyze the role that personal characteristics play for the relative importance of the connections. We first analyze whether stock price reactions at connected firms depend on the seniority of the suddenly deceased manager. We therefore sort the connected firms into three buckets: one bucket contains connected firms that suffer a termination of a connection to an inside director, one contains firms that suffer a termination of a connection to an outside director, and one contains firms that suffer a termination of a connection to a senior executive that is not a board member (a “Senior Manager” according to BoardEx). In Panel B of Table 4, we document a mean (median) CAR at the connected firms of -0.36% (-0.25%) for sudden inside director deaths, -0.01% (-0.11%) for sudden outside director deaths, and -0.10% (-0.05%) for sudden non-board executive deaths. Both parametric and non-parametric tests for differences reveal that stock price reactions following the dissolution of a connection to an inside director are 0.29% lower than firms connected otherwise (t-value of -3.03), while firms *not* connected to outside directors or other senior

managers either show higher or no differences in the CARs. These results indicate that the strongest effect – both from an economic and a statistical perspective – originates from firms connected to an inside director and suggest that connections to an inside director are around 3.5 times more valuable than the average connection. Moreover, these results are intuitively appealing and can be justified by arguing that connections to managers with superior access to material inside information (i.e., inside directors) are more valuable for shareholders, which is consistent with a large literature on insider trading that argues (and finds) that senior firm insiders have better access to material information, which manifests itself in superior returns (e.g., Ravina and Sapienza, 2010). We also form groups based on the gender of the suddenly deceased manager. Both parametric and non-parametric tests against zero indicate that CARs of both groups are significantly negative and that firms that suffer a loss in connection to a female manager experience larger drops in stock prices (mean difference of -0.51% and median difference of -0.44%). We do, however, caution the interpretation of these results due to the fact that our sample of 42 deaths only comprises two sudden deaths of female managers, resulting in substantially different subsample sizes (304 vs. 6,832 connected firms). Finally, we test whether age is a driver of the value of a connection. We split our sample of suddenly deceased managers into above and below the sample mean age at death (62.67 years) and compare the market reactions of the two subgroups of connected firms. We find that the mean stock price reaction at firms connected to a younger (older) suddenly deceased manager amounts to -0.21% (-0.03%), with the difference of 0.18% being statistically significant at the 5% level, suggesting that connections to younger managers are more valuable.

Third, we test whether the value of the connections depend on firm characteristics. We begin this set of tests by turning our attention to the distance between the firms' headquarters. To this end, we retrieve the addresses of the headquarters of all death and connected firms from Compustat, geocode these addresses, estimate geodetic distances be-

tween the death and connected firms' headquarters, and define an indicator variable that we label Remote that equals one if the distance between the firms' headquarters exceeds 750 km (around 466 miles) and zero otherwise. Interestingly, we find that connections seem to be more important when they connect firms that are situated further apart from one another (mean CAR: -0.36%) compared to firms situated in proximity to each other (mean CAR: -0.02%), with the difference in CARs of -0.34% being statistically significant at the 1% level.¹² This finding lends some credibility to the idea that connections help to transfer information, which is especially important when bridging large distances because of potential alternative channels for the local flow of information.¹³ We also test whether within-industry connections are more valuable compared to connections that link firms in different industries. In these tests, we use two indicator variables that proxy for industry relatedness. Specifically, we set a dummy variable equal to one if death and connected firm are active in the same Fama-French 48 (FF48) industry and if death and connected firm share the same Hoberg and Phillips (2016) Fixed Industry with 50 industries (FIC 50). The conclusion from these tests, disclosed in Panel C of Table 4, is that shareholders of firms suffer more severe losses if the connection broken up represents a within-industry connection as indicated by the negative and significant differences of the CARs. Economically, these results suggest that within-industry connections are around 7.5 times more valuable than the average connection. This finding is consistent with the idea that within-industry connections are more important than connections to firms in other industries (Engelberg et al., 2013) and arguably also supports an information-access channel driving the importance and value of managerial connections. Finally, we test whether stock price drops are

¹² We admit that the chosen cutoff is arbitrary. However, we obtain very similar results and conclusions in multivariate regressions when we use the log of the distance as a continuous variable rather than a dummy variable.

¹³ In their paper on CEO pay and CEO networks, Engelberg et al. (2013) test whether CEOs are paid for connections to local or remote firms. They find a higher coefficient for their local network variable as compared to their remote network variable, but the difference between the two variables is insignificant at conventional levels.

more severe if the death and the connected firm are likely to be a supplier or a customer of each other. To this end, we follow Fan and Goyal (2006)) and use the input-output tables of the Bureau of Economic Analysis and determine whether the two firms belong to SIC codes that purchase or sell goods or services from each other. In this test, we find that firms that are vertically related to a death firm experience significantly lower mean (median) abnormal returns of 0.30% (-0.23%), which is significant at the 5% (10%) level.

The disadvantage of these univariate tests is that the groups formed to analyze the relative importance of the different connections are not mutually exclusive. For instance, it seems plausible that the finding that sudden deaths of younger managers lead to larger stock price drops at connected firms also captures the result that sudden deaths of inside directors trigger larger stock price drops because the two groups tend to overlap. In order to overcome this problem, we move to a multivariate analysis and estimate regression equation (2) derived and discussed in Section 2.2. In these OLS regressions, the dependent variable is the stock price reaction of the sample firms, that is, the cumulative abnormal return of the connected firms on the announcement day of the death and the trading day after the announcement date (CAR [0,1]). The additional connected firm-level control variables that we include are the logarithm of total assets as a proxy for firm size, (book) leverage, the market-to-book ratio (MTB), (net) property plant and equipment scaled by total assets, and return on assets (ROA). Finally, we also control for firm risk, defined as the standard deviation of stock returns from 100 to 21 days prior to the event date, and stock liquidity, defined as the mean volume of shares traded scaled by shares outstanding from 100 to 21 days prior to the event. In addition, we add Fama-French 48 industry fixed

effects and cluster standard errors at the connected firm level.^{14,15}

We begin our multivariate analysis with a focus on the four connection types and add indicator variables to the regressions which equal one if the connected firm is linked via a given connection type to a suddenly deceased manager. Note that the interpretation of these results is similar to the tests for differences in means shown in Table 3 because we benchmark the abnormal stock price reaction observed in one subgroup of our sample firms with the abnormal stock price reaction of the remaining connected firms. In other words, these indicator variables pick up *differences* in the stock price reactions between the groups. In Column 1 of Table 5, we find that firms affected via Educational connections show stock price reactions that are 0.28% higher when compared to stock price reactions of firms that are affected via any other connection type (significant at the 5% level), suggesting that another type of connections is responsible for the negative overall effect. Results in Column 2 reveal that firms have 0.19% lower abnormal stock returns following the loss of a connection that originated from a Past Employment overlap (significant at the 1% level), while no significant differences can be detected for Current Employment (Column 3) and Other Activity connections (Column 4). Finally, we rerun the regression and include all four connection type measures jointly to the model (Column 5), which implies that we benchmark all four groups against each other. In order to improve the comparability of the results, we select the group containing Other Activity connections as the benchmark group, which is why we do not obtain a coefficient for it. We can confirm that terminations of Past Employment connections have stock market reactions that are -0.13% lower (significant at

¹⁴ We leave out any sort of time fixed effects. The reason is that employing time fixed, for example year dummies, is identical to using event fixed effects in years where only one person suddenly passes away, which is true for some years in our sample (see Table A.1 of Appendix IV). In addition, event fixed effects capture both observable and unobservable event characteristics, including all deceased manager characteristics such as the role, gender, and age of the deceased manager. Since we aim at estimating value implications of these characteristics, we restrain from using year fixed effects for now. In later tests, we employ event fixed effects.

¹⁵ We have experimented with alternative clustering. The results remain economically similar.

the 10% level), while firms linked via education connections have stock returns that are 0.21% higher (significant at the 10% level). Sudden terminations of Current Employment connections have stock returns that are similar to the ones found for terminations of Other Activity connections.¹⁶

Interestingly, we also find that larger connected firms have less negative returns, indicating that smaller firms are more dependent on connections to S&P500 firms. Firms with more growth opportunities, proxied with the market-to-book ratio, show lower cumulative abnormal returns around the termination of a connection, suggesting that firms with higher growth opportunities suffer more from the loss of a connection. Note that these two findings are in line with those of Faccio and Parsley (2009) for the value of political connections. The other control variables reveal that firms with more tangibles assets, lower profitability, and lower return volatility have lower abnormal returns in the event window.

Second, we analyze the role of deceased manager characteristics. In these tests, we first consider the three seniority groups (i.e., inside directors, outside directors, and executives without a board membership). In Column 1 of Table 6, we can confirm our univariate finding that sudden deaths of inside directors are associated with lower returns when compared to outside director or senior manager deaths (significant at the 5% level), even when controlling for firm-level characteristics and industry fixed effects. The economic magnitude of this effect is similar when compared to the univariate tests and amounts to approximately -0.24%. Also consistent with our univariate tests is the finding that the sudden passing of an outside director shows the opposite result (Column 2) and that differences for senior manager deaths obtain an insignificant coefficient (Column 3). In Columns 4 and 5, we also confirm our univariate result that connections to female managers

¹⁶ This result is also noteworthy in light of the findings of Falato et al. (2014), who show that deaths of fellow board members create an increase in the workload of the other directors sitting on the same board. Given that our results are stronger for Past Employment connections suggests that the effect that we document cannot stem from the increased workload as in Falato et al. (2014), because the effect they document is captured by Current Employment connection variable.

and to younger managers are worth more when compared to connections to male and older managers. Finally, in Column 6, we add all deceased manager characteristics jointly to the model. Again, we define one group as the benchmark group, which is why we drop the outside director variable from the model and therefore benchmark the group of inside directors and senior executives with the group of outside directors. Results confirm that inside directors' deaths are associated with 0.26% lower returns than are outside directors' deaths (significant at the 5% level). The difference in abnormal returns between inside directors and other senior executives is negative, but the coefficient is statistically insignificant at conventional levels. Connections to female managers also remain more valuable.

Third, we test how connected firm-specific characteristics influence the value of a managerial connection in a multivariate setting. Results shown in Column 1 of Table 7 confirm our conjecture that connected firms that are located further away from the death firm show stock price reactions that are 0.36% lower upon the dissolution of a connection. Using this multivariate setting, we can also confirm that firms active in the same industry show lower abnormal returns when the connected manager passes away, both when using the FF48 industries (0.64%, Column 2) and the Fixed Industry Classification with 50 industries (and 0.48%, see Column 3) to classify firms into industries. The coefficient on the vertical relatedness measure is negative but statistically insignificant (Column 4). Interestingly, we find significant results when we split this vertical relatedness measure into an upstream and a downstream measure: the coefficient on the measures that classifies the firm where the manager passes away as upstream firms loads negatively (Column 5), while the coefficient on the downstream measure is also negative, but insignificant (Column 6). We interpret this finding as evidence that connections to supplying firms seem to be more valuable than

connections to customer firms.¹⁷ Finally, we add our geographic distance measure together with our measure indicating whether both the firm where the manager passes away and the sample firm are active in the same industry as well as the up- and downstream measures jointly to the model. We continue to find evidence that connections that bridge larger distances and within-industry connections are particularly valuable.

Finally, we estimate the regression equation (2) and add all variables jointly to our model. Here, we continue to find that past employment connections, connections to inside directors, as well as within-industry connections are most valuable for shareholders (see Column 1 of Table 8). Next, we saturate our regression with shock fixed effects rather than industry fixed effects. The advantage of this setting is that we compare stock price reactions of the connected firms within managerial death cases, i.e., the economic effect and statistical significance is estimated solely based on variation of the stock price responses to the sudden death of the same manager. At the same time, such shock fixed effects absorb both observable deceased manager characteristics such as age, gender, and the positions held by deceased manager as well as all unobservable characteristics related to each sudden death case, for instance, special circumstances of the death. Notably, this regression specification also mitigates concerns related to the fact that each manager death impacts an unequal number of firms. Results of such a regression, shown in Column 2 of Table 8, remain similar for the dummy variable capturing whether the connection links firms in the same industry, while the indicator variable for the Past Employment connections turns insignificant, as

¹⁷ Ideally, we would like to know whether the connected firms indeed purchase/sell products from/to the death firms. To test this idea, we follow Cohen and Frazzini (2008) and download the Compustat segment database, match the names of the strategic customers (firms that make up more than 10% of the total reported sales) disclosed by the connected firms as well as the death firms, and check for every death firm-connected firm pair whether they mention each other as a strategic customer, which would imply that they purchase/sell products from each other. Unfortunately, these data come with a number of problems: First, firms have substantial leeway in disclosing strategic customers. Second, strategic customers are oftentimes aggregated and if disclosed by name, manual name-matching is required (for more details see Cohen and Frazzini, 2008). For our sample, we obtain only 16 customer-supplier matches (0.2% of all connected firm observations). Not surprisingly, both univariate and multivariate tests return insignificant results.

does the geographic proximity proxy. Our interpretation of these results is as follows: when controlling for deceased manager fixed effects, the variation in the explanatory variables, particularly those related to the origins of the managerial networks, is insufficient to obtain statistically significant coefficients. This seems plausible given the fact that each manager’s background, which can be thought of being a person fixed characteristic, influences the formation of the network. For illustrational purposes, consider a manager that spent a decent amount of time studying at ivy league schools. Most likely, his entire network years after his graduation will reflect this personal characteristic: it seems plausible that a larger share (and possible also value) of his network will originate from university connections and will be geographically concentrated in the north-eastern region of the U.S. Apparently, this does not apply to industry characteristics of his network, as within-industry connections still obtain a statistically significant and negative coefficient, as do connections to supplying firms.

We run a number of robustness tests. In Column 3 of Table 8, we re-run the regression from Column 1 of Table 8 but substitute the S&P500 index as the market proxy in our event study. We find our key conclusions to remain unaffected. The same is true of Columns 4 and 5, in which we drop confounding events (Column 4) and financial and utility firms (Column 5). Next, we tackle concerns related to the fact that some firms in our sample are linked via multiple connections to the deceased manager and that one deceased manager can be affiliated with more than one S&P500 firm, for example when holding additional outside board seats. In Column 6, we therefore re-estimate our regression and restrict our sample to firms that are only linked via one connection to the deceased manager and simultaneously exclude managerial death cases where the deceased managers are affiliated with multiple S&P500 firms. In both columns, we find our results to remain unaffected. In Column 7, we run an alternative test and show that an indicator variable that equals one if a firm is only affected via one connection does not obtain a statistically significant

coefficient, suggesting that the strength of the shock does not play a role for the stock market reaction. In our final test, we acknowledge that the value loss of a dissolution of a connection for a firm might depend on the existence of alternative connections between a connected firm and the firms that are affiliated with the deceased manager. In other words, the relation between managerial connections and firm value could be concave, that is, shareholders might value a connection to a firm only once, most likely because the information disseminated through multiple connections might contain some redundancies (Engelberg et al., 2013). In order to test this conjecture, we re-run the estimation of the value of the connections for our sample firms and add a dummy variable that we set equal to one if the connection broken up is indeed a unique connection, that is, we cannot find an individual that links any of the death firms with the connected firm, and zero otherwise. In the regression shown in Column 8, the variable obtains a statistically insignificant coefficient, suggesting that the existence of alternative connections is not a reason for concern.

4.3 Which are the most important connections?

So far, we have shown that connections to an inside director, connections that arise from past overlapping employments, and to firms in the same industry are most valuable for shareholders. In this subsection, we test whether these first-order effects tend to reinforce each other. By interacting the different manager, connection, and firm characteristics, we can make statements on whether the connections to an inside director who is, for example, at the same time younger, are even more important than are connections to an inside director and to a younger director.

Table 9 shows the results for a selected set of interactions. We begin with the relation between connections to inside directors and the age of the inside directors in Column 1. As one could expect, the coefficient on manager age and on the inside director indicator

variable remain significant on a stand-alone basis. The coefficient on the interaction term between these two variables loads significantly positive, indicating that connections to an inside director who is at the same time young, is not as valuable as a connection to an inside director who is at the same time old, possibly because inside directors tend to become more influential over the time of their career. In Column 2, we test whether Past Employment connections to inside directors are particularly valuable and find this not to be the case as the interaction variable obtains an insignificant coefficient, while the two coefficients remain almost unchanged on a stand-alone basis. In Column 3, we test whether the value of a connection to an inside director depends on the distance between the firms and find that connections to an inside director are more valuable when the distance between the firms is comparably large, suggesting that local connections to inside directors are not as important. Moreover, the coefficient on the inside director indicator variable turns insignificant on a stand-alone basis. Finally, Columns 4 to 6 test the hypothesis that connections to an inside director are particularly valuable for certain connected firms. In Column 4, the coefficient on the interaction term between an FF48 indicator variable and the indicator variable for an inside director turns out negative, but (borderline) insignificant. When we interact the inside director dummy variable with the product similarity indicator, we find the interaction term to be negative and statistically significant. In Column 6, we interact the inside director variable with the vertical relatedness dummy, which also shows a negative and statistically significant coefficient. From the last three tests, we conclude that there is some evidence that connections to inside directors for firms located in the same product space and that (potentially) buy or sell products from each other tend to be more valuable.

5 Conclusion

This paper uses a large-scale quasi-natural experiment to determine whether top executives and directors are valued by shareholders for their connections to other managers and which of these connections are most valuable. The identification strategy rests on the idea that sudden deaths of managers trigger unexpected and exogenous dissolutions of managerial connections between firms. By studying the market reactions of the firms where the connected managers work, we are able to isolate the value of connections. Using a sample of 42 managers that suddenly pass away while working for S&P500 firms, our results show that around 7,000 connected firms experience a significant reduction in shareholder value, suggesting that managerial networks influence shareholder value. We also find evidence that connections to inside directors, connections established via previous overlapping work engagements, and within-industry connections to be most valuable. On the other hand, this paper documents the flip-side of the positive relation between firm value and managerial connections: sudden dissolutions of a large number of connections between firms can cause substantial losses so shareholders are well advised to make sure that the networks of their firms are well-diversified.

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Table 1: Summary statistics of the sample of manager deaths

This table shows sample characteristics for the sample of manager deaths. A death case enters our sample if the manager passes away between January 1, 2000, and May 6, 2013, if the manager is active at an S&P500 firm at the time of death, and if the manager is covered by the BoardEx database. This results in 209 deaths. Panel A gives information on the causes of death, as defined by Nguyen and Nielsen (2010). Information on the specific death causes for the 43 suddenly deceased managers are shown in Panel B. Panel C displays the time lag in trading days between the death date and the announcement date of the death. Similar to Falato et al. (2014), we drop cases where the lag between the death date and first news date is larger than a week (5 trading days). This reduces the sample size by one sudden death cases to 42. Panel D exhibits descriptive characteristics for the sample of suddenly deceased managers. For each suddenly deceased manager, we determine the network of managers that works for a CRSP/Compustat firm that has common shares outstanding, is not a REIT or a closed-end fund, and graduated from the same university within one year of the deceased manager (Education connections), shared an overlapping working engagement prior to the death (Past Employment connections), shared an overlapping working engagement when death struck (Current Employment connections), or shared an active engagement (more than a “member”) at the same non-profit organization (Other Activity connections). All connections is the sum of Education connections, Past Employment connections, Current Employment connections; and Other Activity connections, with the adjustment that a link established to a manager via two network types is only counted once (for example, if a manager graduated together with the deceased manager and is also active in the same non-profit organization, this is counted separately for Education connections, Past Employment connections, Current Employment connections; and Other Activity connections, but only once for All connections). Age (years) is the age of the suddenly deceased manager in years and Female (Dummy) is an indicator variable equal to one if the deceased manager is female. The remaining three indicator variables describe the role the suddenly deceased manager holds at an S&P500 firm while she passes away.

Panel A: Death causes

Cause of death	N	%
Cancer	81	38.76%
Complications from specified diseases	6	2.87%
Complications from surgery	21	10.05%
Sudden	43	20.57%
Suicide	3	1.44%
Unspecified illness	14	6.70%
Undisclosed	41	19.62%
Sum	209	100.00%

Panel B: Sudden death causes

Cause of sudden death	N	%
Accident	7	16.18 %
Heart attack	22	51.16 %
Stroke	2	4.65 %
Unspecified cause	12	27.91 %
Sum	43	100.00%

Panel C: Time lag between news date and death date

News date – death date (in trading days)	N	%
0	8	18.60%
1	22	51.16 %
2	7	16.28%
3	4	9.30%
4	1	2.33%
14	1	2.33%
Sum	43	100.00%

Panel D: Network size, network composition, and other deceased manager characteristics

Deceased manager characteristic	Mean	Median	SD	N
Other Activity conn. (D)	70.71	19.00	116.89	42
Past Employment conn. (D)	121.43	58.00	170.86	42
Current Employment conn. (D)	20.29	12.50	19.16	42
Education conn. (D)	24.10	3.50	40.23	42
All connections	225.38	152.00	225.37	42
Age (years)	64.55	62.67	9.81	42
Female (D)	0.05	0.00	0.22	42
Inside Director (D)	0.14	0.00	0.35	42
Outside director (D)	0.67	1.00	0.48	42
Senior Manager (D)	0.26	0.00	0.45	42

Table 2: Characteristics of the connected firms

This table shows selected sample characteristics for the firms that are affiliated with at least one manager that is connected to the suddenly deceased manager. The sample comprises all firms connected to the 42 suddenly deceased managers who work for an S&P500 firm between January 1, 2000, and May 6, 2013, from Table 1. Firms are connected to these 42 suddenly deceased managers if one of their managers graduated within one year of the deceased manager from the same university, shares a previous or active overlapping employment at the same employer at death, or are “active” members at the same social organization. From the sample of connected firms, we drop REITs, closed-end funds, firms without common stock, and the firms where the deceased managers work. If a firm is connected to a suddenly deceased manager via more than one person, it is kept only once. Variable definitions as well as details on their computation and sources can be found in Appendix I.

Firm characteristic	Mean	Median	SD	N
Total assets	34,445.14	1,884.69	161,954.43	7,136
Market cap.	12,797.76	1,619.00	34,858.05	7,136
Leverage	0.22	0.19	0.21	7,105
MTB	1.99	1.49	1.47	7,136
PPE / Total assets	0.22	0.15	0.21	7,034
ROA	0.08	0.10	0.16	7,088
Return Vola	0.03	0.02	0.02	7,136
Liquidity	0.01	0.01	0.01	7,136
Within industry (FF48;D)	0.09	0.00	0.29	7,136
Product similarity (FIC 50;D)	0.07	0.00	0.26	6,546
Vertical relatedness (D)	0.08	0.00	0.27	7,095
Upstream relatedness (D)	0.05	0.00	0.21	7,095
Downstream relatedness (D)	0.06	0.00	0.24	7,095

Table 3: Are stock returns at the connected firms negative?

The table shows results of univariate tests to analyze whether firms experience abnormal returns around the sudden dissolution of a connection to an S&P500 firm. The sample comprises all firms connected to the 42 suddenly deceased managers who work for an S&P500 firm between January 1, 2000, and May 6, 2013, from Table 1. Firms are connected to these 42 suddenly deceased managers if one of their managers graduated within one year of the deceased manager from the same university, shares a previous or active overlapping employment at the same employer at death, or are “active” members at the same social organization. From the sample of connected firms, we drop REITs, closed-end funds, firms without common stock, and the firms where the deceased managers work. All panels show sample means of the daily abnormal returns (ARs) or cumulative abnormal returns (CARs) as well as the numbers of positive and negative ARs and CARs of the connected firms around the death announcements date. Further, all panels show results of a parametric t-test estimating whether the ARs and CARs are equal to zero and results of a non-parametric Wilcoxon signed-rank test estimating whether the true proportion of positive and negative ARs and CARs is equal to one-half. CARs are calculated as the sum of the ARs over days t_x to t_y where 0 denotes the event date, x the beginning of the event window, and y the end of the event window. Daily abnormal returns are calculated as the observed return minus the predicted return. The daily predicted return is estimated using a market model regression where daily stock returns are regressed on daily CRSP value-weighted returns over a 200-day estimation window ranging from t_{-220} to t_{-21} . At least 90 daily observations with non-missing stock and index return data are required. Panel C shows results from a set of robustness tests, in which we re-run the event study but substitute CRSP’s value-weighted index with the S&P500 index as a market proxy, drop confounded events as determined using CapitalIQ’s news database and the events disclosed in Appendix A.2 of Appendix IV, drop connected firms that are financial or utility firms (SIC codes 6000-6999 and 4940-4949, respectively), and if we retain only connected firms that are connected to the deceased manager via one connection and retain only death cases where the deceased manager is affiliated with one S&P500 firm only. Variable definitions as well as details on their computation and sources can be found in Appendix I. ***, **, and * denotes statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Daily abnormal returns

Day relative to event	N	Mean	t-value	Positive:Negative	Median	z-value
AR [-1]	7,136	0.01%	0.34	3,453:3,683	-0.06%*	-1.82
AR [0]	7,136	-0.13%***	-4.84	3,245:3,891	-0.15%***	-8.24
AR [1]	7,136	0.00%	0.11	3,487:3,649	-0.03%	-1.22

Panel B: Cumulative abnormal returns

Event window	N	Mean	t-value	Positive:Negative	Median	z-value
CAR [-1,0]	7,136	-0.10%***	-2.73	3,334:3,802	-0.16%***	-5.69
CAR [0,1]	7,136	-0.11%***	-3.12	3,348:3,788	-0.14%***	-5.03
CAR [1,1]	7,136	-0.10%**	-2.23	3,412:3,724	-0.13%***	-3.83

Panel C: Robustness tests for CAR[0,1]

Robustness test	N	Mean	t-value	Positive:Negative	Median	z-value
S&P500 as market index	7,136	-0.17%***	-4.44	3,269:3,867	-0.20%***	-6.89
Drop confounded events	5,223	-0.12%***	-2.63	2,440:2,783	-0.14%***	-4.20
Drop financial and utilities	5,998	-0.15%***	-3.63	2,769:3,229	-0.18%***	-5.50
Drop multiple connections	5,559	-0.14%***	-3.37	2,585:2,974	-0.16%***	-5.12

Table 4: Which connections matter for firms' shareholders? Univariate results

The table reports results of univariate tests for different groups of sample firms. For each group, the table shows results of a parametric t-test estimating whether the cumulative abnormal return (CAR) for the announcement date and the trading day after the announcement are equal to zero and results of a non-parametric Wilcoxon signed-rank test estimating whether the true proportion of positive and negative CARs is equal to one-half. Further, the table shows results of tests for differences in means and medians for the respective groups. The sample comprises all firms connected to the 42 suddenly deceased managers who work for an S&P500 firm between January 1, 2000, and May 6, 2013, from Table 1. Firms are connected to these 42 suddenly deceased managers if one of their managers graduated within one year of the deceased manager from the same university, shares a previous or active overlapping employment at the same employer at death, or are "active" members at the same social organization. From the sample of connected firms, we drop REITs, closed-end funds, firms without common stock, and the firms where the deceased managers work. Variable definitions as well as details on their computation and sources can be found in Appendix I. ***, **, and * denotes statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Connection types

	N	Parametric test		Non-parametric test	
		Mean CAR	t-value	Median CAR	z-value
Education conn. (D) = 1	981	0.11%	1.00	-0.02%	0.28
Education conn. (D) = 0	6,155	-0.15%***	-3.91	-0.16%***	-5.58
Difference	7,136	0.26%**	2.47	0.14%**	2.04
Past Employment conn. (D) = 1	3,665	-0.23%***	-4.46	-0.19%***	-5.56
Past Employment conn. (D) = 0	3,471	0.01%	0.13	-0.08%	-1.48
Difference	7,136	-0.24%***	-3.21	-0.11%***	-2.94
Current Employment conn. (D) = 1	776	-0.03%	-0.30	-0.06%	-0.34
Current Employment conn. (D) = 0	6,360	-0.12%***	-3.17	-0.16%***	-5.18
Difference	7,136	0.10%	0.81	0.09%	1.55
Other Activity conn. (D) = 1	2,447	-0.04%	-0.78	-0.11%**	-2.51
Other Activity conn. (D) = 0	4,689	-0.15%***	-3.20	-0.15%***	-4.40
Difference	7,136	0.11%	1.37	0.04%	0.96

Panel B: Suddenly deceased manager characteristics

	N	Parametric test		Non-parametric test	
		Mean CAR	t-value	Median CAR	z-value
Inside Director = 1	1,235	-0.36%***	-3.89	-0.25%***	-4.25
Inside Director = 0	5,901	-0.06%	-1.59	-0.12%***	-3.59
Difference	7,136	-0.29%***	-3.03	-0.13%***	-2.65
Outside Director = 1	5,344	-0.01%	-0.20	-0.11%**	-2.20
Outside Director = 0	1,792	-0.43%***	-6.04	-0.24%***	-6.23
Difference	7,136	0.42%***	4.98	0.13%***	4.23
Senior Manager = 1	1,135	-0.10%	-1.20	-0.05%	-1.35
Senior Manager = 0	6,001	-0.12%***	-2.88	-0.16%***	-4.85
Difference	7,136	0.02%	0.17	0.11%	0.91
Female (D) = 1	304	-0.60%***	-3.97	-0.54%***	-4.58
Female (D) = 0	6,832	-0.09%**	-2.46	-0.11%***	-4.22
Difference	7,136	-0.51%***	-2.80	-0.43%***	-3.26
Age < mean Age	3,244	-0.21%***	-3.99	-0.24%***	-5.99
Age ≥ mean Age	3,892	-0.03%	-0.63	-0.07%	-1.39
Difference	7,136	-0.18%**	-2.47	-0.17%***	-3.37

Panel C: Firm characteristics

	N	Parametric test		Non-parametric test	
		Mean CAR	t-value	Median CAR	z-value
Remote (Dummy) = 1	1,959	-0.36%***	-5.11	-0.28%***	-5.84
Remote (Dummy) = 0	5,172	-0.02%	-0.48	-0.09%**	-2.32
Difference	7,136	-0.34%***	-4.18	-0.19%***	-3.86
Within industry (FF48) = 1	645	-0.76%***	-5.87	-0.57%***	-6.29
Within industry (FF48) = 0	6,491	-0.05%	-1.31	-0.10%***	-3.20
Difference	7,136	-0.71%***	-5.57	-0.47%***	-5.60
Within industry (FIC 50) = 1	465	-0.78%***	-5.01	-0.44%***	-5.19
Within industry (FIC 50) = 0	6,081	-0.08%**	-1.99	-0.11%***	-3.77
Difference	6,546	-0.70%***	-4.69	-0.34%***	-4.34
Vertical relatedness (D) = 1	566	-0.40%***	-2.64	-0.36%***	-2.85
Vertical relatedness (D) = 0	6,529	-0.10%**	-2.52	-0.13%***	-4.51
Difference	7,095	-0.30%**	-2.21	-0.23%*	-1.94

Table 5: Which connections matter for firms' shareholders? Multivariate results – Connection types

The table reports results of pooled OLS regressions of the cumulative abnormal returns (CARs) on connection type variables. CARs are calculated as the sum of the ARs over days t_0 to t_1 where t_0 denotes the event date. Daily abnormal returns are calculated as the observed return minus the predicted return. The daily predicted return is estimated using a market model regression where daily stock returns are regressed on daily CRSP value-weighted returns over a 200-day estimation window ranging from t_{-220} to t_{-21} . At least 90 daily observations with non-missing stock and index return data are required. The sample comprises all firms connected to the 42 suddenly deceased managers who work for an S&P500 firm between January 1, 2000, and May 6, 2013, from Table 1. Firms are connected to these 42 suddenly deceased managers if one of their managers graduated within one year of the deceased manager from the same university, shares a previous or active overlapping employment at the same employer at death, or are “active” members at the same social organization. From the sample of connected firms, we drop REITs, closed-end funds, firms without common stock, and the firms where the deceased managers work. Across the columns, proxies for the connection types vary. Industry fixed effects are defined using the Fama-French 48 industry classification. The t-values are based on robust standard errors clustered at the firm level and are reported in parentheses. The constant is not shown for brevity. Variable definitions as well as their computation and sources can be found in Appendix I. ***, **, and * denotes statistical significance at the 1%, 5%, and 10% level, respectively.

Dependent variable:	CAR[0,1] in %				
	(1)	(2)	(3)	(4)	(5)
Education conn. (D)	0.28** (2.43)				0.21* (1.69)
Past Employment conn. (D)		-0.19*** (-2.61)			-0.13* (-1.76)
Current Employment conn. (D)			-0.02 (-0.16)		0.01 (0.09)
Other Activity conn. (D)				0.07 (0.89)	
ln(Total assets)	0.08*** (3.62)	0.08*** (3.47)	0.08*** (3.51)	0.08*** (3.46)	0.08*** (3.51)
Leverage	0.32 (1.32)	0.31 (1.26)	0.32 (1.32)	0.32 (1.30)	0.31 (1.27)
MTB	-0.12*** (-3.42)	-0.12*** (-3.42)	-0.12*** (-3.46)	-0.12*** (-3.46)	-0.12*** (-3.40)
PPE / Total assets	-0.77*** (-2.66)	-0.78*** (-2.68)	-0.76*** (-2.63)	-0.77*** (-2.65)	-0.78*** (-2.69)
ROA	0.91** (2.27)	0.94** (2.33)	0.94** (2.34)	0.95** (2.35)	0.92** (2.28)
Return Vola	7.94* (1.66)	8.66* (1.80)	8.79* (1.83)	8.98* (1.87)	8.06* (1.68)
Liquidity	-6.75 (-0.91)	-6.92 (-0.93)	-7.09 (-0.95)	-7.15 (-0.96)	-6.72 (-0.91)
FF48 industry fixed effects	Yes	Yes	Yes	Yes	Yes
R ²	0.02	0.02	0.02	0.02	0.02
N	6,980	6,980	6,980	6,980	6,980

Table 6: Which connections matter for firms' shareholders? Multivariate results – Deceased manager characteristics

The table reports results of pooled OLS regressions of the cumulative abnormal returns (CARs) on deceased manager characteristics. CARs are calculated as the sum of the ARs over days t_0 to t_1 where t_0 denotes the event date. Daily abnormal returns are calculated as the observed return minus the predicted return. The daily predicted return is estimated using a market model regression where daily stock returns are regressed on daily CRSP value-weighted returns over a 200-day estimation window ranging from t_{-220} to t_{-21} . At least 90 daily observations with non-missing stock and index return data are required. The sample comprises all firms connected to the 42 suddenly deceased managers who work for an S&P500 firm between January 1, 2000, and May 6, 2013, from Table 1. Firms are connected to these 42 suddenly deceased managers if one of their managers graduated within one year of the deceased manager from the same university, shares a previous or active overlapping employment at the same employer at death, or are “active” members at the same social organization. From the sample of connected firms, we drop REITs, closed-end funds, firms without common stock, and the firms where the deceased managers work. Across the columns, deceased manager characteristics vary. All regressions contain the following connected firm control variables: $\ln(\text{Total assets})$, Leverage, MTB, PPE / Total assets, ROA, Return Volatility, and Liquidity. Industry fixed effects are defined using the Fama-French 48 industry classification. The t-values are based on robust standard errors clustered at the firm level and are reported in parentheses. The constant is not shown for brevity. Variable definitions as well as details on their computation and sources can be found in Appendix I. ***, **, and * denotes statistical significance at the 1%, 5%, and 10% level, respectively.

Dependent variable:	CAR[0,1] in %					
	(1)	(2)	(3)	(4)	(5)	(6)
Inside Director (D)	-0.24** (-2.43)					-0.26** (-2.32)
Outside Director (D)		0.41*** (4.82)				
Senior Manager (D)			-0.03 (-0.31)			-0.06 (-0.52)
Female (D)				-0.52*** (-3.39)		-0.54*** (-3.27)
Age < mean Age (D)					-0.19*** (-2.60)	-0.08 (-0.93)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
FF48 industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R ²	0.02	0.02	0.02	0.02	0.02	0.02
N	6,980	6,980	6,980	6,980	6,980	6,980

Table 7: Which connections matter for firms' shareholders? Multivariate results – Firm characteristics

The table reports results of pooled OLS regressions of the cumulative abnormal returns (CARs) on additional firm characteristics. CARs are calculated as the sum of the ARs over days t_0 to t_1 where t_0 denotes the event date. Daily abnormal returns are calculated as the observed return minus the predicted return. The daily predicted return is estimated using a market model regression where daily stock returns are regressed on daily CRSP value-weighted returns over a 200-day estimation window ranging from t_{-220} to t_{-21} . At least 90 daily observations with non-missing stock and index return data are required. The sample comprises all firms connected to the 42 suddenly deceased managers who work for an S&P500 firm between January 1, 2000, and May 6, 2013, from Table 1. Firms are connected to these 42 suddenly deceased managers if one of their managers graduated within one year of the deceased manager from the same university, shares a previous or active overlapping employment at the same employer at death, or are “active” members at the same social organization. From the sample of connected firms, we drop REITs, closed-end funds, firms without common stock, and the firms where the deceased managers work. Across the columns, connected firm characteristics vary. All regressions contain the following connected firm control variables: $\ln(\text{Total assets})$, Leverage, MTB, PPE / Total assets, ROA, Return Vola, and Liquidity. Industry fixed effects are defined using the Fama-French 48 industry classification. The t-values are based on robust standard errors clustered at the firm level and are reported in parentheses. The constant is not shown for brevity. Variable definitions as well as details on their computation and sources can be found in Appendix I.***, **, and * denotes statistical significance at the 1%, 5%, and 10% level, respectively.

Dependent variable:	CAR[0,1] in %						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Remote (D)	-0.36*** (-4.27)						-0.35*** (-4.16)
Within industry (FF48; D)		-0.64*** (-4.47)					-0.65*** (-3.85)
Within industry (FIC50; D)			-0.48*** (-2.95)				
Vertical relatedness (D)				-0.22 (-1.39)			
Upstream relatedness (D)					-0.54** (-2.46)		-0.35 (-1.39)
Downstream relatedness (D)						-0.25 (-1.38)	0.31 (1.48)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FF48 industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R ²	0.02	0.02	0.02	0.02	0.02	0.02	0.03
N	6,975	6,980	6,408	6,939	6,939	6,939	6,934

Table 8: Additional multivariate tests

The table reports results of a set of additional multivariate OLS regressions of the cumulative abnormal returns (CARs) on different deceased manager, networks, and firm characteristics. In Column 1, we add all three types of explanatory variables used in the previous tables to the model. In Column 2, we substitute the industry fixed effects with event fixed effects and drop the deceased executive characteristics as they are absorbed by the event fixed effects. In Columns 3 to 5, we test the robustness of the results from Column 1: in Column 3, we re-run the event study but substitute CRSP's value-weighted index with the S&P500 index, in Column 4, we drop financial and utility firms (SIC codes 6000-6999 and 4940-4949, respectively), and in Column 5, we exclude confounding events identified using CapitalIQ's news database and the events disclosed in Appendix A.2 of Appendix IV. In Column 6, we address the concern that some connected firms are shocked multiple times and some deceased managers are affiliated with multiple S&P500 firms when they pass away by reducing the sample to sudden managers only affiliated with one S&P500 firm and to firms linked to the suddenly deceased manager via one connection only. In Column 7, we control for the number of connections that exist to the suddenly deceased manager using a dummy variable set to one if the sample firm was only shocked once, while in Column 8 we add a dummy that equals one if alternative connections between the connected firm and the firm of the suddenly deceased manager exist. In CARs are calculated as the sum of the ARs over days t_0 to t_1 where t_0 denotes the event date. Daily abnormal returns are calculated as the observed return minus the predicted return. The daily predicted return is estimated using a market model regression where daily stock returns are regressed on daily CRSP value-weighted returns (S&P500 index returns in Column 4) over a 200-day estimation window ranging from t_{-220} to t_{-21} . The sample comprises all firms connected at the same employer at death, or are "active" members at the same social organization. From the sample of connected firms, we drop REITs, closed-end funds, firms without common stock, and the firms where the deceased managers work. All regressions contain firm control variables as in the baseline regression from Table 5 ($\ln(\text{Total assets})$, Leverage, MTB, PPE / Total assets, ROA, Return Vola, and Liquidity) and FF48 industry fixed effects. The t-values are based on robust standard errors clustered at the firm level and are reported in parentheses. The constant is not shown for brevity. Variable definitions as well as details on their computation and sources can be found in Appendix I. ***, **, and * denotes statistical significance at the 1%, 5%, and 10% level, respectively.

Dependent variable:	CAR[0,1] in %							
Robustness test:		Shock FEs	S&P500 as market index	Drop financials & utilities	Only non- counfounded events	Only shocked once	Additional controls	Additional controls
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Education conn. (D)	0.16 (1.23)	-0.09 (-0.59)	0.23* (1.77)	0.19 (1.30)	0.21 (1.46)	0.18 (1.27)	0.16 (1.25)	0.15 (1.22)
Past Employment conn. (D)	-0.16** (-2.06)	-0.09 (-0.94)	-0.14* (-1.78)	-0.23** (-2.42)	-0.20** (-2.21)	-0.22** (-2.32)	-0.16* (-1.96)	-0.16** (-2.00)
Current Employment conn. (D)	0.03 (0.31)	-0.06 (-0.51)	0.08 (0.73)	0.03 (0.20)	-0.01 (-0.07)	-0.09 (-0.70)	0.04 (0.35)	0.04 (0.33)
Inside Director (D)	-0.30*** (-2.72)		-0.46*** (-4.05)	-0.24* (-1.76)	-0.39*** (-3.14)	-0.63*** (-4.54)	-0.30*** (-2.71)	-0.28** (-2.44)
Senior Manager (D)	-0.01 (-0.08)		-0.02 (-0.16)	0.08 (0.55)	-0.07 (-0.49)	-0.03 (-0.18)	-0.01 (-0.11)	-0.04 (-0.31)
Female (D)	-0.50*** (-2.93)		-0.50*** (-2.89)	-0.39** (-2.02)	-0.52*** (-2.67)	-0.43** (-2.19)	-0.51*** (-2.94)	-0.47*** (-2.64)
Age < mean Age (D)	-0.11 (-1.17)		-0.12 (-1.27)	-0.22** (-2.09)	-0.05 (-0.44)	-0.14 (-1.33)	-0.11 (-1.16)	-0.12 (-1.28)
Remote (D)	-0.35*** (-4.11)	-0.04 (-0.44)	-0.39*** (-4.51)	-0.30*** (-2.87)	-0.40*** (-4.27)	-0.32*** (-3.29)	-0.35*** (-4.12)	-0.34*** (-4.06)
Within industry (FF48; D)	-0.58*** (-3.37)	-0.62*** (-3.96)	-0.55*** (-3.15)	-0.49** (-2.44)	-0.54*** (-2.87)	-0.59*** (-2.72)	-0.58*** (-3.35)	-0.58*** (-3.35)
Upstream relatedness (D)	-0.36 (-1.41)	-0.64** (-2.38)	-0.37 (-1.45)	-0.42 (-1.42)	-0.40 (-1.47)	-0.14 (-0.47)	-0.36 (-1.42)	-0.37 (-1.45)
Downstream relatedness (D)	0.38* (1.82)	0.42** (2.08)	0.37* (1.72)	0.45* (1.84)	0.40* (1.78)	0.38 (1.50)	0.39* (1.83)	0.38* (1.80)
Shocked once (D)							0.05 (0.52)	
Unique connection (D)								0.07 (0.69)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FF48 industry fixed effects	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Shock fixed effects	No	Yes	No	No	No	No	No	No
R ²	0.03	0.06	0.03	0.03	0.03	0.04	0.03	0.03
N	6,934	6,934	6,934	5,083	5,915	5,414	6,934	6,934

Table 9: Which are the most important connections? Multivariate results – Interaction effects

The table reports results of pooled OLS regressions of the cumulative abnormal returns (CARs) on the different deceased manager, networks, and firm characteristics. CARs are calculated as the sum of the ARs over days t_0 to t_1 where t_0 denotes the event date. Daily abnormal returns are calculated as the observed return minus the predicted return. The daily predicted return is estimated using a market model regression where daily stock returns are regressed on daily CRSP value-weighted returns over a 200-day estimation window ranging from t_{-220} to t_{-21} . At least 90 daily observations with non-missing stock and index return data are required. The sample comprises all firms connected to the 42 suddenly deceased managers who work for an S&P500 firm between January 1, 2000, and May 6, 2013, from Table 1. Firms are connected to these 42 suddenly deceased managers if one of their managers graduated within one year of the deceased manager from the same university, shares a previous or active overlapping employment at the same employer at death, or are “active” members at the same social organization. From the sample of connected firms, we drop REITs, closed-end funds, firms without common stock, and the firms where the deceased managers work. All columns include interaction variables of the dummy indicating whether the deceased manager is an insider director, while X indicates the interacted variable. All regressions contain firm control variables as in the baseline regression from Table 5 ($\ln(\text{Total assets})$, Leverage, MTB, PPE / Total assets, ROA, Return Vola, and Liquidity) and Fama-French 48 industry fixed effects. The t-values are based on robust standard errors clustered at the firm level and are reported in parentheses. The constant is not shown for brevity. Variable definitions as well as details on their computation and sources can be found in Appendix I. ***, **, and * denotes statistical significance at the 1%, 5%, and 10% level, respectively.

Dependent variable:	CAR[0,1] in %					
	(1)	(2)	(3)	(4)	(5)	(6)
Inside Director (D)	-0.50*** (-3.03)	-0.42*** (-3.28)	-0.17 (-1.54)	-0.17 (-1.58)	-0.12 (-1.05)	-0.14 (-1.35)
Inside Director (D) $\times$ X	0.44** (2.14)	0.33 (1.56)	-0.62** (-2.43)	-0.52 (-1.53)	-0.77** (-2.30)	-0.91** (-2.44)
X = Age < mean Age (D)	-0.22*** (-3.66)					
X = Past Employment conn. (D)		-0.28*** (-3.58)				
X = Remote (D)			-0.30*** (-3.42)			
X = Within industry (FF48; D)				-0.52*** (-3.18)		
X = Within industry (FIC50; D)					-0.28 (-1.41)	
X = Vertical relatedness (D)						-0.01 (-0.07)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
FF48 industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R ²	0.023	0.023	0.025	0.025	0.025	0.022
N	6,980	6,980	6,975	6,980	6,408	6,939

Appendix I: Variable Definitions

This appendix contains variable definitions of all variables used throughout the paper. Firm financials are in million USD. All Compustat-based variables are calculated as of the most recent financial year end prior to the announcement date. Database mnemonics are in italics (if available).

Panel A: Manager characteristics

Variable	Definition	Source
Age	(Date of death (<i>DOD</i>) – Date of birth (<i>DOB</i>)) / 365.25	BoardEx; hand collected if missing
Female (D)	Dummy variable equal to 1 if person is female; 0 otherwise	BoardEx
Senior Manager (D)	Dummy variable equal to 1 if person is executive without board seat (<i>SM</i>), 0 otherwise	BoardEx
Inside Director (D)	Dummy variable equal to 1 if person is executive with board seat (<i>ED</i>), 0 otherwise	BoardEx
Outside Director (D)	Dummy variable equal to 1 if person is non-executive with board seat (<i>NED</i>), 0 otherwise	BoardEx
Other Activity conn. (D)	Dummy variable equal to 1 if connections via other activities exists, 0 otherwise. In line with prior papers, we only count social connections between two individuals if both fulfill “active roles” in the respective organization, i.e., the <i>Role</i> has to be more than “member” (e.g., Fracassi and Tate, 2012).	BoardEx
Past Employment conn. (D)	Dummy variable equal to 1 if connections via past employment exists, 0 otherwise. Formed between two individuals if both worked at the same firm in the past. We require that the connection is formed at a firm that differs from the firm where the manager passes away.	BoardEx
Current Employment conn. (D)	Dummy variable equal to 1 if connections via current employment exists, 0 otherwise. Formed between two individuals if both work at the same firm as of death date. We require that the connection is formed at a firm that differs from the firm where the manager passes away.	BoardEx
Education conn. (D)	Dummy variable equal to 1 if connections via the same university exists, 0 otherwise. In line with prior papers, we only count Education connections between two individuals if both attended the same university and graduated within a year of each other.	BoardEx
All connections	Sum of Other Activity connection, Past Employment connections, Current Employment connections, and Education connections. A connection to the same individual formed via two distinct network channels (for example, via Other Activity connections and Past Employment connections) is only counted once.	BoardEx

Panel B: Firm characteristics

Variable	Definition	Source
CAR [x,y]	Cumulative abnormal return calculated as the sum of the daily abnormal returns over days t_x to t_y where t_0 denotes the event date. Daily abnormal returns are calculated as the observed return (ret) minus a predicted return. The predicted return is estimated using a market model regression where daily returns (ret) are regressed on daily CRSP value-weighted returns including dividends ($vwredt$) over t_{-220} to t_{-21} . At least 90 daily observations with non-missing stock and index return data are required. Winsorized at the 1% and 99% level.	CRSP
Total assets	Total assets (at)	Compustat
Market cap.	Price (prc) times shares outstanding ($shrout$) / 1,000, estimated 21 trading days prior to event (t_{-21}) and winsorized at the 1% and 99% level	CRSP
Leverage	Long-term debt ($dltt$) plus debt in current liabilities (dlc) / Total assets (at), winsorized at the 1% and 99% level	Compustat
ROA	Operating income before depreciation ($oibdp$) / Total assets (at), winsorized at the 1% and 99% level	Compustat
Liquidity	Mean volume traded (vol) / shares outstanding ($shrout$) from t_{-100} to t_{-21}	CRSP
Return Vola	Standard deviation of stock returns (ret) from t_{-100} to t_{-21}	CRSP
MTB	Market value of assets (at + Market cap. - ceq - $txdb$) / Total assets (at) ($txdb$ is set to zero if missing), winsorized at the 1% and 99% level	CRSP / Compustat
PPE / Total assets	Property, plant, and equipment ($ppent$) / Total assets (at), winsorized at the 1% and 99% level	Compustat
Within industry (FF48; D)	Dummy variable equal to 1 if firm is active in the same FF48 industry as one of the death firms, 0 otherwise.	Compustat
Vertical relatedness (D)	Dummy variable equal to 1 if the firm has an absolute vertical relatedness measure of > 0.05 , 0 otherwise. The vertical relatedness scores are estimated using the input-output tables of the Bureau of Economic Analysis using the methodology of Fan and Goyal (2006). If a firm is vertically related to more than one death firm, we use the maximum value.	Bureau of Economic Analysis
Downstream (D)	Dummy variable equal to 1 if the firm has a downstream vertical relatedness measure ($v_{j,i}$) of > 0.05 , 0 otherwise. The downstream score is estimated using the input-output tables of the Bureau of Economic Analysis. If a firm is vertically related to more than one death firm, we use the maximum value.	Bureau of Economic Analysis
Upstream (D)	Dummy variable equal to 1 if the firm has an upstream vertical relatedness measure ($v_{i,j}$) of > 0.05 , 0 otherwise. The upstream score is using from the input-output tables of the Bureau of Economic Analysis. If a firm is vertically related to more than one death firm, we use the maximum value.	Bureau of Economic Analysis

Remote (D)	Dummy variable equal to 1 if the distance between the connected firm's headquarter and the death firm's headquarter is ≥ 750 km, 0 otherwise.	Headquarter addresses are from Compustat; addresses are geocoded using the US Census Bureau address batch upload service and https://www.latlong.net .
Within industry (FIC 50; D)	Dummy variable equal to 1 if firm is active in the same Hoberg and Philipps text-based Fixed-Industry Classifications 50 as one of the death firms, 0 otherwise (Hoberg and Phillips, 2016).	Hoberg and Phillips data library, available at http://hobergphillips.usc.edu .
Shocked once (D)	Dummy variable equal to 1 if the connected firm is linked to the deceased manager via one single connection, 0 otherwise.	BoardEx
Unique connection (D)	Dummy variable equal to 1 if the connected firm is unique, that is, if there is no alternative social connection between the connected firm and any of the firms affiliated with the suddenly deceased manager, 0 otherwise.	BoardEx

Appendix II: Connection and network information available to investors

This appendix shows the network and connection information that is available to investors using the example of Kenneth I. Chenault, the former CEO of American Express and a current director of Facebook, Inc. and AirBnB, Inc.. Panel A shows an excerpt of the 212 individuals connected to Kenneth I. Chenault from Equilar, including the connected individual's name (left column), information on the shared employment that gives rise to the connection to Kenneth I. Chenault (middle section), and the firm(s) affiliated with the individual connected to Kenneth I. Chenault (right section). Panel B shows an excerpt of the 113 distinct firms connected to Kenneth I. Chenault from Equilar, including the connected firm's name (left column), information on the individual that connects a firm to Kenneth I. Chenault (second column from the left), and information on the shared employment that gives rise to the connection to Kenneth I. Chenault (right section). Note that the data structure depicted in Panel B more or less mirrors the data structure used throughout our analysis. Panel C shows the individuals and firms connected to Kenneth I. Chenault as provided by Bloomberg.

Panel A: Individual persons connected to Kenneth I. Chenault as provided by Equilar (incomplete)



Person Connections of Kenneth I. Chenault

People to which Kenneth I. Chenault has a 1st-degree connection will each appear as unique rows in the table below.
Connected People: 212

Name	Connection Path to Kenneth					Biographical Information				
	Current Colleague of Kenneth	Shared Company	Start Year of Overlap	End Year of Overlap	Total Years of Overlap	Current Companies	Former Companies	Age	Gender	BoardEdge Profile Link
Alain Juan Pablo Belda	No	IBM	2008	2016	7.8	N/A	Former Board Member, IBM; F	73	M	Alain J.P. Belda, 71, is a mana https://boardedge.equilar.com/#research/person=275898
Alan D. Schwartz	Yes	New York University Langone I	2017	Present	0.1	Board Member, The Madisc	Former Board Member, AMC N	66	M	Mr. Schwartz is Executive Chai https://boardedge.equilar.com/#research/person=348505
Alan G. Lafley	No	The Procter & Gamble Compa	2008	2016	8.2	Board Member, Snap Inc.	Former Executive Chairman of	69	M	Mr. Lafley has served on our bi https://boardedge.equilar.com/#research/person=12451
Alex Gorsky	Yes	IBM	2014	Present	3.1	Board Member, IBM, Chairrr	N/A	56	M	Mr. Gorsky, 56, was appointed https://boardedge.equilar.com/#research/person=236553
Alex J. Trotman	No	IBM	1998	2002	4.2	N/A	Former Board Member, IBM; F	83	M	ALEX TROTMAN, 69, is chairm https://boardedge.equilar.com/#research/person=401317
Alfred F. Kelly Jr.	No	American Express	2008	2008	0.8	Chief Executive Officer and	Former Board Member, The H	58	M	Prior to joining Visa Inc, Mr. Ke https://boardedge.equilar.com/#research/person=2737
Alice M. Tisch	Yes	New York University Langone I	2017	Present	0.1	Board Member, New York U	N/A	N/A	F	N/A https://boardedge.equilar.com/#research/person=18091939
Allen R. Thorpe	Yes	New York University Langone I	2017	Present	0.1	Board Member, New York U	N/A	N/A	M	N/A https://boardedge.equilar.com/#research/person=18091997
Amb. Charlene Barshefsky	Yes	American Express	2001	Present	16.8	Board Member, Intel Corpo	Former Board Member, Starw	67	F	Ambassador Barshefsky is Se https://boardedge.equilar.com/#research/person=1836554
Amy L. Chang	Yes	The Procter & Gamble Compa	2017	Present	0.3	Board Member, The Proctei	Former Board Member, Splun	40	F	Ms. Chang is the founder and https://boardedge.equilar.com/#research/person=92041
Andrew Hamilton	Yes	New York University Langone I	2017	Present	0.1	Board Member, New York U	N/A	N/A	M	N/A https://boardedge.equilar.com/#research/person=18092003
Andrew N. Liveris	Yes	IBM	2010	Present	7.7	Executive Chairman and Br	Former Chief Executive Officer	62	M	Mr. Liveris will serve as the Ex https://boardedge.equilar.com/#research/person=474340
Andrew W. Brotman	Yes	New York University Langone I	2017	Present	0.1	Senior Vice President, Chie	N/A	N/A	M	Dr. Andrew W. Brotman, senio https://boardedge.equilar.com/#research/person=18091903
Angela F. Braly	Yes	The Procter & Gamble Compa	2009	Present	7.8	Board Member, Exxon Mobi	Former Employee and Chair o	56	F	Ms. Braly is the former Chair o https://boardedge.equilar.com/#research/person=58529
Anne L. Lauvergeon	Yes	American Express	2013	Present	4.6	Board Member, American E	Former Board Member, Rio Tir	57	F	Ms. Lauvergeon is Chairman i https://boardedge.equilar.com/#research/person=297178
Annette Johnson PhD	Yes	New York University Langone I	2017	Present	0.1	Senior Vice President, Gen	N/A	N/A	F	Annette Johnson, senior vice p https://boardedge.equilar.com/#research/person=18091905
Anthony Welters	Yes	New York University Langone I	2017	Present	0.1	Board Member, Carlyle Gro	Former Board Member, West F	61	M	Mr. Welters is currently Executi https://boardedge.equilar.com/#research/person=345213
Barry F. Schwartz	Yes	New York University Langone I	2017	Present	0.1	Board Member, New York U	N/A	N/A	M	N/A https://boardedge.equilar.com/#research/person=18091989
Bernard L. Schwartz	Yes	New York University Langone I	2017	Present	0.1	Board Member, New York U	Former Chairman of the Boar	91	M	Bernard L. Schwartz Chairma https://boardedge.equilar.com/#research/person=838220
Beverly Sills Greenough	Yes	American Express	1997	Present	20.8	Board Member, American E	N/A	N/A	F	N/A https://boardedge.equilar.com/#research/person=18242800
Bradley J. Wechsler	Yes	New York University Langone I	2017	Present	0.1	Board Member, Apollo Inve	Former Chairman of the Boar	65	M	Bradley J. Wechsler (65) Direc https://boardedge.equilar.com/#research/person=703307
Bridget A. van Kralingen	Yes	IBM	2016	Present	1.6	Board Member, Royal Bank	N/A	53	F	Bridget van Kralingen is Senio https://boardedge.equilar.com/#research/person=799558
Bruce L. Byrnes	No	The Procter & Gamble Compa	2008	2008	0.1	Board Member, Brown-Forr	Former Board Member, Bostor	69	M	Positions with The Procter & G https://boardedge.equilar.com/#research/person=367687
Carla Solomon	Yes	New York University Langone I	2017	Present	0.1	Board Member, New York U	N/A	N/A	F	N/A https://boardedge.equilar.com/#research/person=18091897
Carlos Ghosn	No	IBM	2004	2004	0.0	N/A	Former Board Member, Arconi	63	M	Mr. Ghosn, 56, was elected to https://boardedge.equilar.com/#research/person=275676

Panel B: Firms connected to Kenneth I. Chenault as provided by Equilar (incomplete)



Company Connections of Kenneth I. Chenault

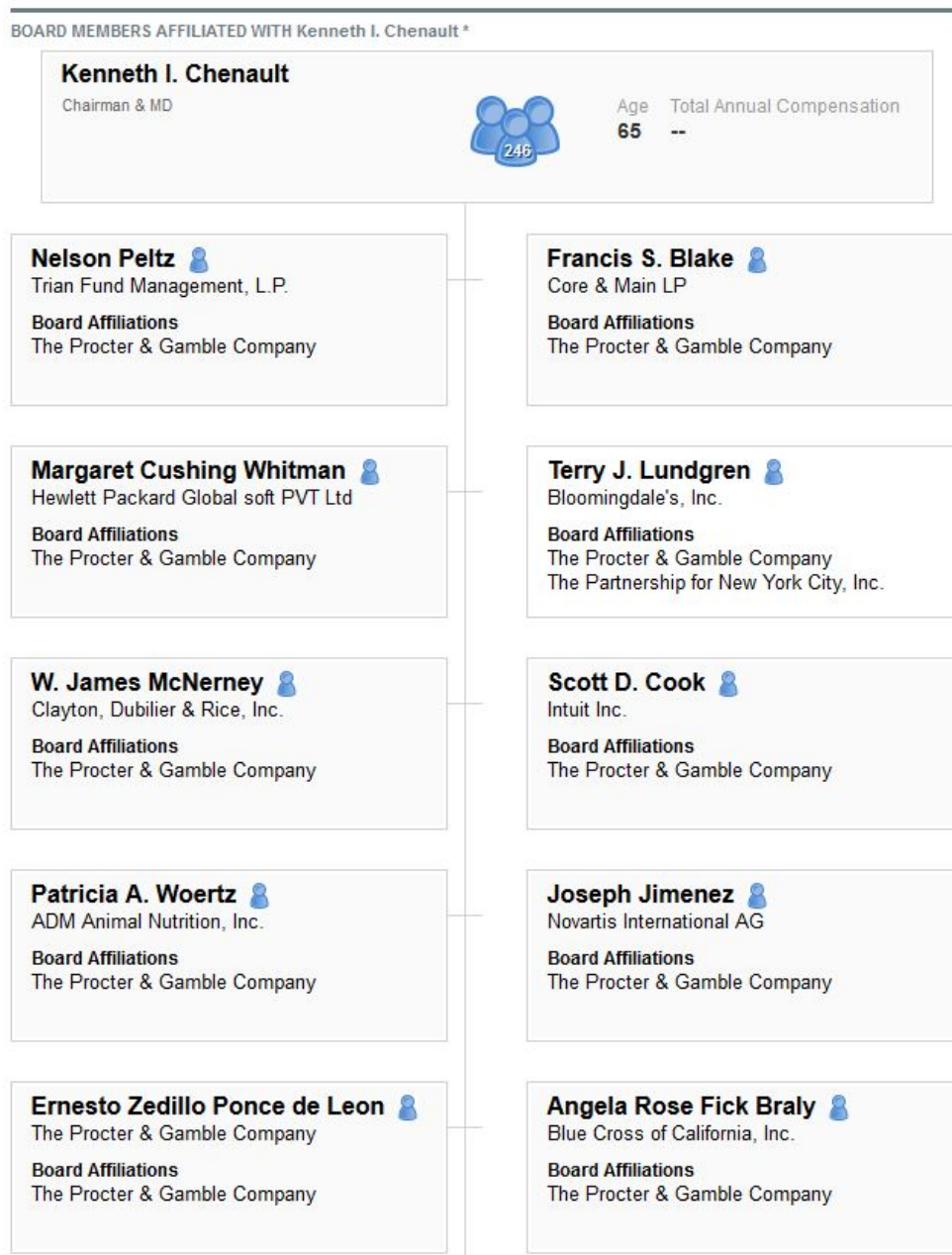
Public companies to which Kenneth I. Chenault has a 1st-degree connection will each appear as rows in the table.

Only public companies at which the connection currently works are included as rows. If multiple connections of Kenneth currently work at the same company, the company will have multiple rows.

Unique Connected Companies: 113

Company Name	Connection Path to Kenneth						Current Colleague of Kenneth
	Connection Name	Shared Company	Start Year of Overlap	End Year of Overlap	Total Years of Overlap	Role	
IBM	Self	N/A	N/A	N/A	N/A	Board Member	N/A
The Procter & Gamble Company	Self	N/A	N/A	N/A	N/A	Board Member	N/A
American Express	Self	N/A	N/A	N/A	N/A	Chairman and Chief Executive Officer	N/A
3M Company	Patricia A. Woertz	The Procter & Gamble Company	2008	Present	9.4	Board Member	Yes
3M Company	Michael L. Eskew	IBM	2014	Present	3.6	Lead Director	Yes
ABM Industries Incorporated	Filippo Passerini	The Procter & Gamble Company	2012	Present	5.2	Board Member	Yes
AMD	Nicholas M. Donofrio	IBM	2006	2006	0.8	Board Member	No
Alcoa Corporation	Dr. Ernesto Zedillo Ponce de Le	The Procter & Gamble Company	2008	Present	9.4	Board Member	Yes
Alcoa Corporation	Dr. James W. Owens	IBM	2006	Present	11.6	Board Member	Yes
Ameriprise Financial, Inc.	James M. Cracchiolo	American Express	2002	2004	2.7	Chairman and Chief Executive Officer	No
Anixter International Inc.	Valarie L. Sheppard	The Procter & Gamble Company	2017	Present	0.2	Board Member	Yes
Apollo Investment Corporation	Bradley J. Wechsler	New York University Langone Hospita	2017	Present	0.1	Board Member	Yes
Berkshire Hathaway Inc.	Thomas S. Murphy Sr.	New York University Langone Hospita	2017	Present	0.1	Board Member	Yes
BlackRock, Inc.	Laurence D. Fink	New York University Langone Hospita	2017	Present	0.1	Chairman and Chief Executive Officer	Yes
British American Tobacco p.l.c.	Dimitri Panayotopoulos	The Procter & Gamble Company	2012	Present	5.2	Board Member	Yes
Brookfield Asset Management Inc.	Angela F. Braly	The Procter & Gamble Company	2009	Present	7.8	Board Member	Yes
Brown-Forman	Bruce L. Byrnes	The Procter & Gamble Company	2008	2008	0.1	Board Member	No
C. R. Bard, Inc.	Anthony Welters	New York University Langone Hospita	2017	Present	0.1	Board Member	Yes
Cadence Design Systems, Inc.	Maggie Wilderotter	The Procter & Gamble Company	2009	2015	6.2	Board Member	No
CareDx	Dr. Ralph D. Snyderman M.D.	The Procter & Gamble Company	2008	2010	1.9	Board Member	No
Carlyle Group	Anthony Welters	New York University Langone Hospita	2017	Present	0.1	Board Member	Yes
Cincinnati Financial Corporation	Linda W. Clement-Holmes	The Procter & Gamble Company	2017	Present	0.2	Board Member	Yes
Cisco Systems, Inc.	Amy L. Chang	The Procter & Gamble Company	2017	Present	0.3	Board Member	Yes
Citigroup Inc.	Dr. Ernesto Zedillo Ponce de Le	The Procter & Gamble Company	2008	Present	9.4	Board Member	Yes

Panel C: Individual persons and firms connected to Kenneth I. Chenault as provided by Bloomberg (incomplete)



Appendix III: Matching between CRSP and BoardEx

This Appendix outlines the matching procedure employed to link the BoardEx firm identifier labeled *CompanyID* with the permanent firm identifier from the Center for Research in Security Prices (CRSP) labeled *permco*. This matching procedure merits attention for the following reasons. First, BoardEx only provides limited information on the companies besides the firm name, which requires name matching in a substantial number of cases. Further, any firm information provided by BoardEx is stored as header information, and BoardEx regularly assigns new identifiers to the same firm, for example following name changes. It follows that linking BoardEx’ *CompanyIDs* to CRSP’s *permcos* requires substantial effort in order to ensure that links remain valid through time. The matching procedure employed and outlined is geared towards ensuring such validity. Note that the matching procedure used is related to Engelberg et al. (2013), but provides refinements that improve the result of the matching.

To identify the universe of employers in BoardEx, we begin by identifying all institutions listed as employers. To this end, we use BoardEx’ employment file, which covers all employments of individuals for North America. We drop all positions without information on the start or end date of a position as we do not use such positions throughout the paper. Next, we keep only organizations where the organization type (*CompanyType*) is either “Quoted” or “Private”, thereby dropping employers such as clubs, the armed forces etc.^{18,19} This results in a sample of 182,568 distinct *CompanyIDs* for which we aim to find the corresponding *permco* in CRSP. For each *CompanyID*, we additionally keep the name as well as the minimum start date and the maximum end date of all employments. This

¹⁸ Note that overlapping employments at organizations such as clubs, the armed forces etc. can still give rise to connections between two individuals, but can never constitute a sample firm because we require stock data for our sample firms in order to run the event study.

¹⁹ It is important to retain companies listed as “Private” as information on the organization type is also stored as header information. Dropping private firms has the potential to neglect firms that were public in the past and changed its status to private, potentially introducing a survivorship bias.

supplementary information enables us to identify the date range a firm identifier is used in the BoardEx employment data.

For a subset of BoardEx firms, we can retrieve additional (header) information provided by BoardEx that facilitates the CRSP – BoardEx match. Among others, we obtain the *sedol*, which allows us to extract the 9-digit *cusip*, the stock exchange ticker, the *cik* issued by the Securities and Exchange Commission, the address, zip code, phone number, and website, as well as the revenue and the last financial year end date. In our initial matching, we use different combinations of this information. This procedure gives us confidence that we are assigning the *permcos* to the right *CompanyIDs*, which is important given that these *CompanyIDs* belong to the firms with the highest number of affiliated individuals in BoardEx. We are able to assign *permcos* to 6,270 distinct *CompanyIDs* by using firm-specific information provided by BoardEx.

For the next iterations, we make use of the fact that firm names in BoardEx often contain valuable identifying information besides the name itself. For example, firm names in BoardEx often carry delisting dates. We extract the delisting year and month and match these delisted companies with companies with similar names and delisting dates obtained from the CRSP delisting file, essentially conducting a fuzzy name matching for delisted companies in the same month and year. We also extract listing date information from the firm names and repeat the matching procedure for newly listed firms. Likewise, firm names in BoardEx often contain historical names as well as the date of the corresponding name change. After extracting such information from the firm names, we match companies with similar names and name change dates from the CRSP historical company names file. This second step of the matching procedure ensures that firms and their corresponding *CompanyIDs* in BoardEx are mapped to CRSP’s *permcos* through time, even if firms change their names, are listed, delisted, or change their legal status, for instance, because of an acquisition. This step complements the matching outlined above as it would otherwise

solely rely on header information provided by BoardEx and would therefore not only fail to match a substantial number of firms but potentially introduce a survivorship bias. This step of the matching procedure additionally maps *permcos* to 2,602 distinct *CompanyIDs*.

Finally, we employ conservative name matching and match BoardEx firm names with historical firm names in CRSP. This assigns *permcos* to 7,105 distinct additional *CompanyIDs*. In total, our matching assigns *permcos* to 15,977 *CompanyIDs*.

To illustrate the complexity of the matching procedure, consider the case of RailAmerica Inc, which is delisted in our sample period, relisted, and delisted again. In the process, RailAmerica obtains as much as four different *CompanyIDs* in BoardEx:

CompanyName	CompanyID	First BoardEx usage date	Last BoardEx usage date
RAILAMERICA INC (De-listed 02/2007)	337229572	March 1, 1994	February 15, 2007
RailAmerica Inc (Listed 10/2009)	11158013083	February 15, 2007	October 13, 2009
RAILAMERICA INC (De-listed 10/2012)	16497559723	October 13, 2009	October 1, 2012
RailAmerica Inc	196219612172	October 1, 2012	May 6, 2013

Using the matching procedure explained above, we are able to link all four *CompanyIDs* to CRSP's unique *permco* 11792, either by conducting fuzzy name matching combined with the listing/delisting information or by fuzzy name matching alone:

CompanyName	Matched via	CRSP listing date	CRSP delisting date
RAILAMERICA INC (De-listed 02/2007)	Name & delisting date	-	February 14, 2007
RailAmerica Inc (Listed 10/2009)	Name & listing date	October 13, 2009	-
RAILAMERICA INC (De-listed 10/2012)	Name & delisting date	-	October 1, 2012
RailAmerica Inc	Name only	-	-

Appendix IV: Additional Tables

Table A.1: Distribution of event dates over sample years and sample months

This table shows the distribution of the deaths of suddenly deceased managers. A manager death case enters our sample if the manager passes away between January 1, 2000, and May 6, 2013, if the manager is affiliated with an S&P500 firm at the time of death, if the manager is covered by the BoardEx database, and if the death was sudden as defined in Section 3.1 of the paper.

Year	Month												Sum	%
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.		
2000	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
2001	0	0	0	0	0	0	0	0	0	1	0	0	1	2.4%
2002	0	1	0	1	1	0	0	0	0	0	0	1	4	9.5%
2003	0	1	0	0	0	0	0	1	0	0	1	0	3	7.1%
2004	1	0	0	1	0	1	0	1	2	0	0	0	6	14.3%
2005	0	0	0	1	0	1	0	1	1	1	2	0	7	16.7%
2006	1	0	1	0	0	0	0	0	0	0	0	0	2	4.8%
2007	1	0	0	0	0	0	0	0	1	0	0	1	3	7.1%
2008	1	0	0	1	1	0	0	1	0	0	0	1	5	11.9%
2009	0	0	0	0	0	0	0	0	0	0	0	1	1	2.4%
2010	0	2	1	0	0	0	0	0	0	0	1	1	5	11.9%
2011	0	1	0	0	0	0	0	0	0	0	1	1	3	7.1%
2012	0	1	0	0	0	0	0	0	0	0	0	0	1	2.4%
2013	0	0	1	0	0	-	-	-	-	-	-	-	1	2.4%
Sum	4	6	3	4	2	2	0	4	4	2	5	6	42	100.0%
%	9.5%	14.3%	7.1%	9.5%	4.8%	4.8%	0.0%	9.5%	9.5%	4.8%	11.9%	14.3%	100.0%	100.0%

Table A.2: List of CapitalIQ events classified as confounding events

The table reports the list of events classified as confounding events. *keydeveventtypeid* is the event category ID used by CapitalIQ and *keydeveventtypename* is the event category name used by CapitalIQ.

Event ID (<i>keydeveventtypeid</i>)	Event name (<i>keydeveventtypename</i>)
23	Client Announcements
24	SEC Inquiries
25	Lawsuits & Legal Issues
26	Corporate Guidance - Lowered
27	Corporate Guidance - Raised
28	Announcements of Earnings
29	Corporate Guidance - New/Confirmed
36	Buybacks
42	Debt Financing Related
43	Restatements of Operating Results
46	Dividend Increases
47	Dividend Decreases
59	Auditor Going Concern Doubts
61	Delayed Earnings Announcements
62	Annual General Meetings
73	Impairments/Write Offs
74	Debt Defaults
76	Legal Structure Changes
77	Changes in Company Bylaws/Rules
80	M&A Transaction Announcements
81	M&A Transaction Closings
8	M&A Transaction Cancellations
83	Private Placements
85	IPOs
86	Follow-on Equity Offerings
87	Fixed Income Offerings
88	Derivative/Other Instrument Offerings
89	Bankruptcy - Filing
90	Bankruptcy - Conclusion
91	Bankruptcy - Emergence/Exit
93	Shelf Registration Filings
94	Special Dividend Announced
95	Index Constituent Adds
97	Special/Extraordinary Shareholders Meetings
99	Potential Privatization of Government Entities
101	Executive Changes - CEO
102	Executive Changes - CFO
134	Composite Units Offerings
135	Structured Products Offerings
137	Spin-Off/Split-Off
138	Announcements of Sales/Trading Statement
152	Potential Buyback
153	Bankruptcy Asset Sale/Liquidation
154	Bankruptcy financing

Table A.2: List of CapitalIQ events classified as confounding events (cont'd)

Event ID (<i>keydeveventtypeid</i>)	Event name (<i>keydeveventtypename</i>)
155	Bankruptcy Reorganization
160	Communication (Letter etc) to Employees by Target
156	Activist Request / Demands Target
157	Activist Letter to Target
163	Declaration of Voting Results - 10Q / 13D /Any SEC form
164	Confidentiality Agreement
177	Financing option from Activist to Target
187	Supporting statement to Target by Third Party
205	Regulatory Authority - Regulations
206	Regulatory Authority - Compliance
207	Regulatory Authority - Enforcement Actions
213	Dividend Cancellation
214	Dividend Initiation
215	Preferred Dividend
224	Halt/Resume of Operations - Unusual Events
225	Corporate Guidance - Unusual Events
226	Announcement of Operating Results
230	Buyback - Change in Plan Terms
231	Buyback Tranche Update
232	Buyback Transaction Announcements
233	Buyback Transaction Cancellations
234	Buyback Transaction Closings