Irreplaceable Venture Capitalists*

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March 2023

We provide causal evidence on how individual venture capitalists (VCs) add value for startups, using exogenous deaths of VC directors on startup boards. Losing a VC director increases the probability of startup failure, delays a successful exit and reduces the IPO likelihood. Affected startups that raise capital after a director loss obtain a narrower investor base. These effects persist after the replacement of deceased VCs, indicating the importance of the original deal experts for startup survival, financing, and going public. In contrast, the loss of a VC director does not affect recruitment, product development, and trademarks, suggesting that these skills are replicable. Overall, a VC's network and reputation are key irreplaceable assets.

* For helpful comments, we thank Emmanuel Yimfor and seminar participants at the University of Paris-Dauphine. Kexin Feng and Luman Zou provided excellent research assistance. The use of California death records was approved by the State of California—Health and Human Services Agency Committee for the Protection of Human Subjects, IRB 2021-205. Contact information: Ewens: Michael.ewens@columbia.edu; Sosyura: dsosyura@asu. First draft: March 15, 2023.

Nearly every new firm starts as a private enterprise, and its future trajectory critically depends on the business decisions made early in its lifecycle. During this formative period, a firm defines its business strategy, develops its product portfolio, and attracts the key inputs of production: human capital and financial capital. These foundational decisions are made by the startup's board of directors—a team of the founders and external directors, such as angel investors, venture capitalists, and business advisers. Despite the importance of such decisions as a runway to the firm's development, we know little about individual directors' role in startup outcomes. First, the inner workings of startup boards are unobservable. Second, directors endogenously select startups, making it difficult to attribute any outcomes to a director's treatment effect rather than their selection of boards.

To study the contribution of an external director to firm outcomes, an ideal experiment would require either a random assignment of a director to a startup board or a random removal of a director with particular characteristics. Such an experiment would also require observing the full composition of the startup's board, each director's characteristics, and startup outcomes.

This paper offers such an experiment. We study the real effects of individual directors on startup outcomes and the mechanisms through which directors achieve such outcomes. To do so, we exploit quasi-random separations of individual directors from startup boards resulting from director deaths—the factors exogenous to the startup. We also provide evidence on how early-stage enterprises replenish their board's human capital and adjust the board structure, control rights, and internal governance in response to unanticipated shocks. To accomplish these goals, we reconstruct board composition for over 18,000 startups, collect the characteristics of individual directors, and combine them with administrative data from Social Security and vital records (with medical conclusions), which form the basis for identifying exogenous director removals unrelated to startup characteristics. Our primary focus is on the external directors who invest in the firm—namely, venture capitalist (VC) directors.

Ex ante, the contribution of a VC director to a startup board is ambiguous. The effects of removing such a director could be insignificant, positive, or negative. They could also be nonmonotonic and may vary with director characteristics, board structure, and outcome type.

The null hypothesis predicts that removing a director should have no significant long-run effects. Survey evidence shows that the most prevalent group of external directors—namely, venture capitalists—single out selection of startups as the dominant source of value creation, but "perhaps surprisingly, VCs do not cite their own

contributions as a source of success or failure." (Gompers et. al. 2020, p. 171). Similarly, using a decomposition of returns to VCs, Sorensen (2007) attributes most of the variation in performance to the selection of startups. While there is certainly scope for value add-on by venture capitalists, angel investors, and other external stakeholders in the startup, the startup's board may not be essential to the mechanisms of value creation, such as improved access to financing or investment network, which need not rely on individual directors. Consistent with this view, Ewens, Nanda, and Rhodes-Kropf (2018) document the decline in VCs' involvement in corporate governance, which is replaced by a "spray and pray" investment approach of allocating minimal support to a greater number of startups.

An alternative hypothesis posits that an exogenous removal of an external director could positively affect the startup. Some external directors could induce friction in corporate decision-making, for example, if they prioritize the preferences of special interest groups or engage in a power struggle with entrepreneurs. In this case, losing such a director would facilitate consensus decision-making on the board and create a rare opportunity for a governance shakeup and a better director replacement in a traditionally sticky startup board. For example, external directors promulgated weak governance and condoled egregious violations in many important private firms, such as WeWork and Theranos. These companies would likely benefit from a board shakeup and a replacement of external directors.

Finally, directors may add valuable firm-specific human capital by contributing their expertise, networks, and reputation across various outcomes, ranging from recruiting human capital and product commercialization to operational discipline, capital funding, and financial exit. Expert external directors could also serve as the conduits of investors' voice because a higher likelihood of interaction between investors and the management improves monitoring (Bernstein, Giroud, and Townsend 2016). In this case, losing a director would have negative consequences, but only if external directors add unique resources in short supply that cannot be replicated by the efforts of investors, other board members, or director replacements. For example, Hochberg, Ljungqvist, and Lu (2007) find that a VC partnership's network helps explain performance differences in VC portfolios. Individual VCs may serve as key anchors in their firms' networks. The strong incentives for all parties to replace lost directors with the best candidates set a high bar for identifying the irreplaceable component of directors' human capital. These incentives also pose the question of which type of directors' firm-specific human capital is most valuable for the firm and most difficult to replicate.

Our main finding is that individual VC directors impose a large positive effect on the startup. Their contributions improve the startup's likelihood of survival and transition to public capital markets. These effects are causal, incremental to deal selection, and economically important. Startups that lose a VC director experience a sharp downward shift in their business trajectory. An exogenous loss of an VC on a startup board increases startup failure rate by 11 percentage points (p.p.) over the next three years. This effect, significant at 1%, represents a 34% increase in the failure rate relative to the unconditional mean (32%).

The startups that remain in business after an exogenous loss of a VC director face diminished chances of a successful exit and a slower path to public capital markets. These effects are permanent and persist after the replacement of deceased VCs, indicating that the original deal experts provide unique value-add, and their contributions are difficult to replicate. The death of a VC director is followed by an 8 p.p. drop in the probability of a startup's Initial Public Offering (IPO) and a 7.4 p.p. decline in the probability of a successful acquisition, defined as an acquisition with at least a median valuation multiple (2x). Finally, the startups that go public or become acquired take 18 months longer to reach this milestone, a 28% delay in their time-to-exit relative to the unconditional mean.

These economic estimates capture the incremental impact of one original VC director on startup outcomes over and above the effects of a VC partnership. To isolate the value-add of an individual director from the value-add of their VC partnership, our estimates compare the startups that lose a VC director with other startups funded by the same VC partnership but unaffected by an individual's death. This approach—comparing startups within the investment portfolio of the same VC firm—also absorbs the effects of deal sourcing and deal selection on startup outcomes. The remaining variation captures the treatment effect of losing a VC director but retaining the relationship with the VC partnership and access to its resources.

To interpret the director loss as quasi-random, the director's death must be unrelated to the startup's future economic prospects immediately preceding the death event. To fulfill this condition, we focus on lethal events that are beyond an individual's control and that are orthogonal to startup characteristics. For example, we eliminate deaths by suicide (3.45% of events), as they could be correlated with expectations about the startup's economic prospects. We also repeat our analyses with sudden deaths (such as accidents, strokes, heart attacks, and other premature deaths before age 70) and find consistent results.

Our first results suggest that the original VC directors causally improve startup outcomes via unique value-add mechanisms that cannot be replicated by other directors or VC partnerships, despite strong incentives. We investigate three such mechanisms: (1) financing, (2) professionalization, and (3) innovation. The financing mechanism posits that VC directors assist startups with raising follow-on capital by supplying expertise, certification, and investor connections. The professionalization mechanism indicates that VC directors help streamline startups' operations by recruiting talent, enhancing monitoring, and commercializing products. Finally, the innovation mechanism focuses on VCs' contributions to developing, patenting, and implementing new inventions and technologies.

We find the strongest evidence in support of the financing channel. The loss of a VC director reduces a startup's probability of raising follow-on capital, delays new financing rounds, and alters investor composition. After an exogenous director loss, a startup is 17% less likely to raise a new capital round relative to other startups in the portfolio of the same VC partnership with similar vintage and capital stock. The startups that do raise follow-on financing take four months (or 25%) longer to complete an investment round. They also attract significantly fewer new investors. These results suggest that individual VC directors are crucial for a startup's access to capital, and the directors' value-add likely relies on their non-transferable assets, such as reputation and networks. Consistent with this interpretation, the loss of a VC director leads startups to switch to alternative, non-VC sources of financing. A startup that loses a VC director is 40% more likely to seek capital from non-VC investors or obtain debt financing. These adjustments are associated with a 12% startup capital growth slowdown.

We do not detect reliable effects on the measures of professionalization. The loss of a VC director does not appear to affect the startup's launch of new products, registration of trademarks, or employee growth. We also do not find a significant change in CEO turnover. These results suggest that the board's monitoring and professionalization activities are less dependent on the unique human capital of individual VCs and can be replicated by other members of the startup's board and the VC partnership.

Finally, we find suggestive but inconclusive evidence on the innovation channel. The loss of a VC director is associated with a uniform decline in the measures of patenting intensity, but these effects fall short of being statistically significant at conventional levels. This mechanism requires further investigation with more granular measures of the innovation process.

Overall, our evidence indicates that individual VC directors create significant value for their portfolio companies over and above deal selection and the impact of the VC partnership. Such individual contributions have a large causal effect on the startup's business trajectory and ultimate success. They increase the probability of survival, improve the likelihood of a successful exit, and accelerate progression to key milestones. The unique, irreplaceable source of directors' value-add is most significant for raising follow-on capital. The original deal experts on the startup's board appear to serve as the firm's champions in funding future growth, and their reputation and networks are likely key irreplaceable assets.

The central contribution of this paper is to provide causal evidence on how individual VCs add value for startups. Our study departs from most prior work in two ways. First, this paper is one of the first to uncover the unique sources of individual VC directors' value-add and identify the irreplaceable components of their human capital. Second, while it is usually challenging to attribute startup performance to deal sourcing, selection, or post-investment value-add, we offer sharp identification to isolate VCs' treatment effects on various outcomes and provide individual-level inferences. Clean identification of the sources of value-add is important to understand why entrepreneurs are willing to give up ownership stakes, control rights, and valuation premiums to attract reputable VCs (Hsu 2004).

Our paper adds to the literature studying how venture capital investors add value to startups. Several survey papers describe venture capitalists' own views about their engagement with portfolio companies and identify self-reported channels of involvement (Gorman and Salhman 1989; Kaplan and Stromberg 2003; Gompers et. al. 2020). Empirical work with field data finds positive performance differentials between VC-backed startups and their non-VC-backed peers on such outcomes as the formalization of business activities (Hellmann and Puri 2002), fundraising and recruiting (Bottazzi et. al. 2008), scaling up business operations (Puri and Zarutskie 2012), and attracting human capital (Amornsiripanitch, Gompers, and Xuan 2019). Moreover, even within the subsample of VC-funded startups, the startups funded by well-connected VC firms perform better than their peers (Hochberg, Ljungqvist, and Lu 2007).

What is less clear is which of the successful outcomes of VC-funded startups are attributable to VC's ability to identify future outperformers and source the best deals (selection), and which reflects the VCs' causal impact on portfolio firms (treatment). Chemmanur, Krishnan, and Nandy (2011) show that both selection and treatment jointly explain a greater efficiency of VC-funded firms, and Sorensen (2007) finds that selection

explains the majority of performance differentials. Our identification strategy shuts down the effects of deal sourcing and screening and isolates the value-add contributions of individual directors.

In its pursuit of causal inferences on value-add, our paper adds to a recent study by Bernstein, Giroud, and Townsend (2016) that uses sharp identification. The authors find that introducing new airline routes, which facilitate travel between the headquarters of the VC firm and its portfolio companies, leads to improved innovation outcomes and more successful exits at the portfolio firms. This paper exploits a shock at the level of a VC partnership-startup pair and remains silent on the underlying mechanisms. Our study complements this work by looking inside the VC partnership and studying the value-add skillsets of individual directors. We provide the first evidence of the irreplaceable component of directors' human capital that affects startup outcomes over and above the impact of the VC partnership. We also identify the underlying mechanisms through which VC directors affect the startup's success.

1. Institutional details and hypotheses

This section provides background on the institutional setting and sets up our testable hypotheses.

1.1. Institutional background

We ask whether VC investors add value to the startups after their initial investment selection and match with the startup. The latter component is a critical part of value-add to venture capitalists' own investors (Sorensen, 2008), while the former tells us something about the activities of VC investors with their portfolio companies. The academic literature and industry practice show that investor value-add can stem from the VC firms investing in the startup and/or the partners associated with the investment. Our focus is on the former, so we leverage the partner-level data with information on startup boards of directors.[2] Director positions provide an unambiguous connection to the VC partner, and it is a common setting used in the literature when studying partner-level activities (e.g., Ewens and Rhodes-Kropf, 2015; Amornsiripanitch et al., 2019). The VC-backed startup board of directors is a central setting for VC control of startups. Venture capital partners can interact with their portfolio firms and add value without seats. However, connecting the two without a board seat is empirically challenging. Before presenting some basic testable hypotheses for our analysis, describing our setting and the institutional features is important.

[2] It is also possible to connect VC partners to startups if there is no board seat connection. We are in the process of implementing this using lead investor and VC employee rolls.

Board seats are negotiated as part of a financing contract between startups and the syndicate of investors in the financing rounds. The contract – often called a term sheet – details cash flow and control rights, including the board seat election rights (Kaplan and Stromberg 2004). One investor in the syndicate will represent the investors and is called the lead investor. Lead investors typically sourced the deal, formed the financing syndicate, and provided a larger amount of capital in the syndicate. Importantly, an individual partner from the investing firm will present a lead investor. These are our focus of interest. Board election rights are available to the class of preferred shareholders (e.g., the Series A or Series B investors) where that class elects a member to represent them on the board. The lead investor's partner is the most common choice for the shareholders' elected board member(s) (Amornsiripanitch et al., 2019). Thus, our study of VC directors is a study of partners intimately involved in deal sourcing, deal selection, and board activity for the VC investor.

What do startup boards and their directors do? Ramsinghani (2021) writes, "The boardroom is where the VC wields the greatest influence on a company's future growth." The board of directors is thus an ideal environment to study VC value-add. Ewens and Malenko (2022) document the board's composition over the startup lifecycle and the VC's role on the board. VCs tend to join the board in the first or second financing event. As a set of investor directors, they will not control the board (i.e., have more than 50% of the seats) until later in the startup's life. Control rights exercised on the board of directors takes several forms. In terms of investor director roles, Ramsinghani (2021) continues: "[They] are expected to provide support to the portfolio company CEO in a number of ways – providing strategic inputs where necessary, access networks of investors and customers, and identifying executives to build the management team." (page 358) The board decides on C-level hiring or firing and approves exits, new share issuances, stock option plans, and annual budgets.

1.1.1 Director replacement

We exploit variation around the loss of VC directors, so it is natural to ask what happens to the board after such an exit. Conversations with practitioners and reviews of government filings of annual board membership of startups reveal that all lost VC board members will be replaced. The incentive for a relatively quick replacement is the difficulty of operating a board without a member. Boards cannot vote on major decisions unless the class of shares has its representative available. The director's death does not change the voting composition of the financing syndicate, so it should have no impact on the lead investing firm's ability to elect a new director. Thus, we assume that another individual from the same VC firm or a firm with the same share class replaces the lost director.

1.2. Value-add predictions

The body of evidence in the literature suggests that VCs – firms and/or partners – add value, but less is known about what provides the value – firm or partner–and how. For example, the documented persistence in the asset class's performance (Kaplan and Schoar, 2005; Harris et. al 2022). and investment-level returns (Cochrane, 2005; Korteweg and Sorensen, 2010; Ewens and Rhodes-Kropf. 2015) reveal something time-invariant separates the best from the worst VCs. We thus expect the loss of a VC director –likely the lead investor that sourced the deal – to harm the startup. This should manifest as lower IPO rates, more failures, and lower-valued acquisitions. Supposing we find such evidence, the question is *why* this effect exists.

1.2.1. Capital raising

VC investors of all types provide their own fund's follow-on capital and have networks of other VCs they can tap for the startup's future capital raising (Hochberg et al., 2007). The Dotzler (2001) survey of founders shows that "advice and introductions for financings" was an area these individuals thought VCs could add value. Similarly, the Bottazzi et al. (2008) survey shows that fundraising support is a major part of VC activities. Insofar as the access to capital sources resides in the individual VC partner, we expect their loss to harm the startup's ability to raise more capital from both the focal VC and outside VCs. If, instead, the networks reside at the partner's firm or the networks are transferred to others (e.g., other board members or syndicate partners), then we would predict no change in startup capital raising.

The lower ability should manifest as a lower probability of a funding round and, conditional on successfully raising, a smaller round of financing from a few investors that should take longer to close. It is also possible that because the lead investor from the focal VC is lost, the startup loses its "advocate" from the firm. Thus, the startup may also be less likely to raise from the impacted VC.

1.2.2. Operational Improvements and Strategy

Survey evidence (see Gompers et al., 2020) and previous work show that VCs can significantly facilitate startup growth. Professionalization (Hellmann and Puri, 2002) includes implementing HR policies, introducing stock option plans, and hiring talent. Some of these impacts on the startup are at the extensive margin and occur at the time of the first VC financing, while others are inputs over the startup's life. All these activities aid the startup's ability to achieve product-market fit, expand the team, and grow revenues. Thus, we expect the startup's employment headcount, product completion, trademarking, and patenting to suffer after losing a VC director.

1.2.3. Managerial Oversight and Monitoring

A key role of the board is oversight and monitoring of the CEO and top management, which includes firing decisions (Lerner, 1995). The first causal evidence for this role is Bernstein et al. (2016) study showing that exogenous increases in the cost of in-person visits worsen patenting productivity and exit outcomes. While the loss of a major VC investor is unlikely to impact the allocation of control on the board because of replacement, the loss could result in a different stance of investors relative to management. For example, the lost director may have advocated for the current CEO. We thus expect that founder-CEO and CEO turnover to increase after the VC director's loss.

1.3. Interpreting null effects

Since lost directors are replaced, negative effects show us that the *specific and individual* VC partner matters for the key outcomes (Ewens and Rhodes-Kropf, 2015). The lost investor had irreplaceable characteristics valuable to the startup. However, the replacement norms on boards mean that finding no effects of a director loss does *not* imply that VCs do not add value. Instead, it could mean that the replacement director had skills that replaced those of the lost director. Alternatively, both the replacement and the lost director provided no value-add. Any value-add for VC would thus be associated with deal flow and/or selection effects that benefit mostly VC fund investors.

2. Data and Sample

The analysis combines data on venture capital-backed startups, boards of directors, and biographical data on those directors. This section details each of these data sources.

2.1. Directors and Startups

We start our sample construction with the universe of investors covered by VentureSource in 1990 to 2020. VentureSource (previously owned by Dow Jones, now CB Insights) covers the U.S. venture capital ecosystem with information on startups, financings, investors (firms, funds, and partners), management teams, and boards of directors. The key criteria for inclusion into our primary database is that the startup had to have raised at least some capital from a traditional VC investor. This rule means startups backed only by angel investors, banks, accelerators, or non-VC PE investors are not in the sample. VentureSource tracks managers and partners at VC firms, often providing start dates and titles. The coverage of startup boards is primarily restricted to VC investor directors, which we supplement with data from Ewens and Malenko (2022).

We impose three sample filters. First, since we focus on venture capital directors, we restrict the sample to individuals employed by venture capital firms with at least two investments in portfolio companies and at least one closed fund. Second, we require all investors in the sample to hold at least one board seat at a portfolio company during their career. We use VC investors without board seats as a control group for subsample tests. Third, since our administrative vital records cover the United States, we restrict our sample to directors serving on the boards of U.S-based startups and employed by venture capital partnerships headquarters in the United States. After imposing these filters, we arrive at our initial sample of 8,576 investor-directors who serve on the boards of 18,921 startups.

2.2. Death Events

We hand-match directors to the Lexis Nexis Public Records (LNPR) database, using each individual's full name, contact information, and employment history in VentureSource. LNPR aggregates information on over 500 million U.S. individuals (live and deceased), traced throughout the database via a unique ID linked to one's social security number and employment records. Individual records in LNPR are linked via social security numbers to the administrative Death Master File of the Social Security Administration (SSA). This SSA database aggregates incoming death records from U.S. states into a central repository, updated weekly in LNPR. Examples of other records in LNPR include deed and tax assessment records, utility and telephone connections, criminal filings, and voting records. Prior studies have used LNPR to acquire personal information on CEOs (Cronqvist, Makhija, and Yonker 2012; Yermack 2014), fund managers (Pool, Stoffman, and Yonker 2012; Chuprinin and Sosyura 2018), securitization agents (Cheng, Raina, and Xiong 2014), and financial journalists (Ahern and Sosyura 2015).

Our paper is one of the first in financial economics to rely on administrative data from Social Security and state vital records to identify death events and classify death causes. This approach departs from most prior work that has relied on media searches and public announcements to identify death events (e.g., Jenter, Matveyev, Roth 2016; Borgschulte, Guenzel, Liu, and Malmendier 2021). The use of administrative data linked via social security numbers allows us to avoid possible media biases, such greater coverage of successful individuals, better coverage of recent events, and difficulties with locating individuals with common names.

To identify death events, we manually match venture capitalist directors to LNPR and validate the accuracy of each match by ensuring that the director's employer, work email address, and title listed in the

employment records in LNPR match the career history listed in VentureSource. Throughout this process, we identify 381 death events during our sample period using the SSA Death Master database in LNPR. Using the combination of the individual's name, date of birth, and date of death from the SSA records, we further validate each death event by retrieving the corresponding obituary from two national databases: Legacy.com and newspapers.com. Legacy.com aggregates obituaries from over 3,500 funeral homes and over 1,500 media outlets, and Newspapers.com covers obituaries and articles from over 3,000 newspapers.

As another validity check, we verify that the deceased individual's career background in the obituary matches their employment history in VentureSource. This criterion nearly eliminates the possibility of a spurious match (false death event) by relying on the unique combination of an individual's name and employment history and validating them against the employment records of VC directors from two independent sources: LNPR and VentureSource.

Using obituaries, we also collect an individual's place of birth, place of death, and the cause of death. We augment these data with career progression from LinkedIn, Pitchbook, VentureSource, and director biographies to identify the director's final job title before death.

Panel A in Table 1 presents summary statistics for sample death events. The average director's death occurs at age 70. The overwhelming majority of directors (79%) held regular employment at their death, and 55% of the deceased directors worked in the venture capital industry in their last professional position.

2.3. State Vital Records

We augment the death records from Social Security with detailed vital records from select states that granted access for this study: California[3], Connecticut, Florida, Massachusetts, North Carolina, and Ohio. During our sample period, these states account for 60-70% of the national venture capital investments, as measured by the headquarters of venture capital firms and the locations of VC-funded startups.

Using the individual's full name, date of birth, and date of death, we retrieve their case from state vital records. Vital records contain dozens of variables for each case, such as the residential address, occupation and industry, years of education, and close relatives of the deceased. Most importantly, these records provide the

[3] The use of California death records was approved by the State of California—Health and Human Services Agency Committee for the Protection of Human Subjects, IRB 2021-205.

official medical conclusion regarding the death cause, a detailed classification of primary and secondary death factors, a distinction between natural and unnatural death events (such as accidents), and, for a subset of observations, the time interval elapsed between the primary death cause and the death event. We use these data for crosschecking and augmenting the death causes obtained from obituaries, inferring the approximate onset of a terminal disease, and identifying a subset of sudden and unanticipated deaths.

Panel B in Table 1 lists the primary death causes in our sample. Some of the common causes include cancer (36%), cardiovascular issues and heart attacks (14%), brain disease (12%), accidents (9%), lung disease (5%), and liver and kidney disease (4%). We eliminate observations with death events caused by suicide (3%) because they are plausibly endogenous to startup outcomes (reverse causality).

2.4. Startups

Using the information on board appointments from VentureSource and Pitchbook, we link directors to startups and obtain the full composition of startup boards from \cite{ewens2020board}. For each startup, we collect the sources of financing and the amount of raised capital (VentureSource), employee count and employment growth (Venturesource, LinkedIn), patent activity (PatentsView, USPTO), trademarks (USPTO), and startup exit outcomes (IPOs, acquisitions, and failures) and exit multiples (VentureSource, Pitchbook).

Panel A in Table 2 shows that the average startup is founded in 2003 and receives the first round of VC financing within the first two years of its life. The average startup receives $7.74 million in investment capital, and most firms (54%) lack a commercial product at the time of the first VC investment. The most common industries for the VC-funded startups in our sample include information technology (42%), healthcare (27%), business and financial services (17%), and consumer services (10%).

We also obtain information on VC partnerships, their investment funds, and portfolio companies from VentureSource. Panel C in Table 2 shows that the average VC partnership has $11.7 million in outstanding investments and $18.3 million in total funds closed. The mean VC partnership has one realized exit, 1.9 new investments, and 1.9 follow-on investments. Exits via M&A are more common (33%) than exists via IPOs (19%). About 8% of the VC partnerships experience a general partner's death during our sample period.

3. Main Results

This section details the results of our analysis of the effects of VC partner loss on the startup.

3.1. Exit outcomes

We first ask whether the loss of a director affects the ultimate outcome of the startup. If we find no impact of VC loss at the exit stage, then it is not obvious that we need to explore any impacts on the startup before exit. We consider various outcome variables used in the venture capital literature (see Yimfor and Garfinkel, 2023, for a review). We ask whether the outcome differs by whether the startup experienced at least one VC director loss before exit (measured as of 2020Q1). The preferred specification compares startups in a VC firm's portfolio with a VC fixed effects specification:

$$Y_{ij} = \beta_0 + \beta_1 \text{Experienced death}_i + \beta_2 X_i + \alpha_j + \epsilon_{ij} \quad (1)$$

where i represents the startup and j is the VC investor. Y_{ij} is an outcome such as IPO, failure, or log of exit valuation. $\text{Experienced death}_\text{i}$ is one if the startup had at least one director death before exit. The control X_i includes startup controls such as industry, year, and location fixed effect. The VC firm fixed effect α_j ensures that we compare the effects of death on startup's in the VC's portfolio.

Table 4 presents the results where the main variable of interest is "Board experienced death" which is one if the startup's board lost a VC director to death. The unit of observation is a startup-investor (see equation 1), where the investor had at least one board seat on the startup's board. This allows us to estimate VC firm fixed effects, comparing startups in the same VC's portfolio with and without a deceased director. All models include the year of the first VC financing, startup location, and startup industry.

The first column considers startup failure using a dummy variable. We follow Ewens, Nanda, and Stanton (2023) and assign failure to firms that have not raised capital in three years (as of 2020Q1). With an average of 32%, this is a conservative measure of failure as it does not include acquisitions with low valuations that are likely hidden failures (Puri and Zarutskie, 2012). In this column and the next two, firms that have yet to exit by the end of the sample have zero for their dependent variable. The coefficient estimate in column 1 implies that startups fail at significantly higher rates if one of their VC directors dies (over 40% relative to the mean). This higher failure rate is paired with a lower probability of IPO: column 2 shows an even larger impact of director loss with a 70% decline in the startup's IPO probability. The next column finds that acquisition outcomes – which can capture high and low returns (see Puri and Zarutskie, 2012) – are less likely, but we have no statistical significance. Column 4 considers the sample of startup exits and asks whether the likelihood the startup is acquired for more than two times capital differs by director death. Here we see a 29% lower probability relative to the sample mean

(at a 10% significance level). This outcome is close to realized returns for all non-failure exits, showing that VC partner loss is meaningful for VC investors.

Column 5 again conditions on exits. It shows that startups with director deaths take 28% longer to exit. This represents over 1.5 years relative to the sample average time to exit (all types). The last column (6) asks whether the non-failure valuations of exits differ. The caveat with such an analysis is sample selection: successful startups are likelier to disclose their valuation. While the negative sign is consistent with the other results in the table, we do not find a statistically significant difference.

Overall, the results in Table 4 show that director loss is detrimental to startup outcomes that likely lower investor *and* entrepreneur returns. Given that the lost director is replaced relatively quickly, this negative impact suggests that something unique about the lost director could not be replaced. Therefore, in the following analysis, we investigate what happens to the startup around the death event to isolate the specific VC partner activities that help startups.

3.2. Pre-exit startup outcomes

The next set of regressions explore the effects of VC partner loss on the startup during its lifecycle. We estimate a modified version of equation one, were we track the VC-startup pair over time starting from the year the VC joins the board to when it gives up the seat (or the startup exits). The estimation equation is:

$$Y_{ijt} = \beta_0 + \beta_1 \text{After death}_{it} + \beta_2 X_{it} + \beta_3 Z_i + \alpha_j + \gamma_t + \epsilon_{ijt} \quad (2)$$

where, *i* represents the startup, and *j* is the VC firm. We track startups from first VC financing to exit. The panel structure is annual if we are studying outcomes that can vary each year or only tracks startups in years where it raises capital. The main variable of interest is After death_{ij}, which equals one for startup years on or after the death event. This variable definition implies that all VC directors active with the startup at the time of the director loss are "treated" regardless of whether the VC firm is associated with the lost director. Given that someone at the same VC firm likely replaces the lost director, we retain the startup-VC pair of the lost director after death.[4]

The control X_{it} includes time-varying measures such as capital stock and financing round number fixed effects. The time-invariant control Z_i includes startup location, industry, and year of first VC financing fixed effects. Most models will include VC firm fixed effects α_j. All models include year (or financing year) fixed

[4] We are in the process of collecting more information about the exact replacements.

effects γ_j. The VC fixed effect specification means that we can control for time-invariant differences in VC quality or strategy and that the estimation compares the startup outcome within the VC portfolio. In some analyses we estimate a startup-year version of equation 2 where we ignore VC-startup pairing and exclude VC firm fixed effects.

3.2.1. Follow-on financing

The typical entrepreneurial firm backed by venture capital raises a new financing round every 12 to 18 months and is unprofitable. This staged financing (Gompers, 1995) provides both an opportunity to expand or abandon, but also means that the startup depends on periodic cash infusions to survive and grow. One explanation for the higher failure and lower IPO rates (Table 4) is the startup's struggle to raise capital. The director's death could cause this in several ways. At one extreme, the lost partner is associated with a major investor who stops investing after the death. Relatedly, suppose the partner was viewed internally and externally as a critical asset of the firm that is difficult to replace. In that case, existing investors may abandon the startup, and new investors may stay away. The lost director could also have been an important networking source for external investors who tend to join all new financing rounds. If financing rounds' completion requires some minimum capital investment, losing the director's network of external financiers may lead to a higher likelihood of failed financing. Table 5 addresses these questions, again estimating equation 2.

The dependent variable is equal to one if the startup raised a new round of financing in that year, where we track the startup from first VC financing to exit year. The first two columns' unit of observation is the startup-year. Here we find a 23% decline in the probability of capital raising after a death event (relative to the sample mean). The 12 to 18 month runway of capital -- combined with the fact that most startups are not profitable -- implies that most of these firms without follow-on financings likely failed.

Column 2 adds a control for the startup's capital stock, with no change in results. The final three columns use the startup-director-year data structure (equation 2) that allows us to control for VC firm fixed effects. Unless we observe a director leave the board, they maintain their position from the start date to the startup's exit. We impose the industry convention that another partner at the same VC firm replaces the lost director. While the economic magnitudes are smaller (17%), we continue to find that the startup is less likely to raise a new round of financing after the death event. How much of this lack of capital raising explains the outcome results in Table 4? Table A2 in the Appendix ignores all startups that suffered from a lost director and did not raise a follow-on round.

The results are weaker, but we still see higher failure rates and lower IPO probabilities. Thus, the exit outcomes in Table 4 could be explained by changes to the set of startups that successfully raised a new round of financing. We explore such changes below.

3.2.2 Financing round characteristics

The next two analyses investigate the financing characteristics of the startups that successfully raise a new financing round. Here we estimate equation 2 for years when the startup raises capital. The obvious first test is whether the successful follow-on financings are smaller. Smaller financings – all else equal – could limit the startup's growth and ability to take advantage of investment opportunities. A possible candidate for the outcome variable in equation 2 is the capital raised in a financing round. Given startups' complex, unobserved capital demands, a regression of the (log) capital raised on a set of independent variables is difficult. For example, the interquartile range of capital raised is $1.2 to $10m, with a similar spread within industries. Across industries, the mean capital raised is 3 to 5 times the median. Thus, an individual startup's capital raise is a complex outcome of supply and demand, making it difficult to interpret coefficient estimates. We instead construct a dependent variable that effectively removes the startup fixed effect: the log of capital growth. This outcome variable provides a less ambiguous prediction for coefficient estimates because the staging of VC typically results in startups raising larger and larger financings over their life (see Figure 1). We thus expect the firms that experience the director death to experience slower capital stock growth.

This is indeed what we find in Table 6. Capital raising growth is 12 to 25% lower after losing a VC director. The negative effects hold across specification and sample, with our preferred VC firm fixed effects models showing a 12% lower capital raising growth (at the 10% significance level).

Table 7 further investigates the capital raising challenges and hints at some of the mechanisms behind the previous two tables. In the interest of space, we present the VC firm fixed effects (equation 2) estimates throughout (results are consistent across models). Columns 1 and 2 in Panel A ask whether the time to complete a financing round changes after losing a director. Completed financings after a death event take 25% longer, or about four months, relative to the average closing time. This delay likely negatively affects the startup's ability to hire talent and complete new products.

Next, columns 3 and 4 in Panel A ask whether valuations change after death events. As with the level of capital raised, regressions of valuations are difficult to interpret. Unfortunately, sample selection leads to too many high-quality startup valuations and too few consecutive valuations to measure changes. Nonetheless, predictions about the effect of director loss are ambiguous: it may lower firm value because of expected worse outcomes realized in Table 4, or the loss of a director could shift bargaining power in favor of founders, increasing valuation. The results provide no conclusive evidence for either hypothesis.

3.2.3. Sources of capital

The most valuable network to the startup is the investor's external network of investors. Figure 1 shows that over 60% of financings across the startup lifecycle have at least one new investor. New investors are critical to helping the startup raise more capital, as existing investors are typically constrained in how much capital they can invest in the startup (10-15% of their fund). The literature provides suggestive evidence for network's role in startup outcomes. Hochberg et al. (2007) show a strong correlation between a VC firm's network position, VC fund returns, and startup-level outcomes. They find that the more networked a VC firm is, the more likely a startup can raise a follow-on financing and survive. Our analysis asks whether this relationship is causal and whether these relationships are unique to the individual VC partner.

The following regressions explore these questions using partner-level data – where networks are most likely to reside – and exploit exogenous variation in network positions. Recall that a partner at the same VC firm with a network similar to the deceased most likely replaces the deceased director. Thus, any negative effects in these regressions would show the replacement network is an imperfect substitute for that of the lost investor.

Panel B of Table asks whether the loss of the director is a loss of their capital networks. To do so, we consider outcome variables connected to syndicate formation. Columns 1 and 2 ask whether the fraction of investors in a financing event are new to the startup, while columns 3 and 4 ask if the financing is more likely to be sourced via debt or from non-traditional sources. For a fraction of new investors outcome variable, we take the ratio of new investors to total investors in the completed financing. The results in columns 1 and 2 suggest that losing the director leads to fewer new outside investors in successful financings. This decline in external investors is consistent with the director's network being no longer available to the startup.

The final two columns of Panel B ask whether the startup is more likely to raise capital outside traditional networks. Many non-traditional investors, such as corporations, angel investors, private equity firms, and hedge

funds, play a role in many startup financings but are rarely the primary startup investors. Similarly, non-equity financing is another way a startup can substitute traditional VC financings when losing VC networks. To study these predictions we consider an outcome variable that is one if the startup's new investors are non-tradition, non-VCs or the financing round is debt. Columns 3 and 4 show a strong, positive effect on this likelihood. The coefficient estimate implies a 40% increase in the probability of such financings. This increase is consistent with the startup seeking capital outside traditional networks after losing the VC director.

3.3. Operations and Management

The venture capital literature documents investors' actions with startups that can add value: professionalization, aiding with talent searches, strategic advice, and monitoring (among many others). If the lost VC investor has an irreplaceable set of skills for these actions, we should observe worse outcomes. Unfortunately, observing these actions is difficult. Equally difficult is the task of connecting the actions to observable outcomes. We consider five outcomes that signal firm growth, management changes, and innovation. In each case, we expect the investor loss to affect outcomes (if the skills are irreplaceable) negatively. Tables 8 and 9 present the results. Panel A of the former asks whether the startup's completion of a product changes after the death. The sample only includes startups that did not have a completed product at the time of their first VC financing. The results in Columns 1 and 2 show no statistically significant effect, with a relatively small coefficient (10% of sample mean). The last two columns investigate whether a startup's trademark filing propensity changes. Again, we find no major impacts on this type of product development. This panel suggests that the lost director's skills in helping the startup achieve a product are either small, or there are excellent substitutes in the VC investor's firm.

Panel B of Table 8 first studies the startup's employee headcount. Amornsiripanitch et al. (2019) show that VC investors provide connections for startup hiring. Bernstein et al. (2022) provide causal evidence that the VC investor's reputation improves the startup's ability to attract high-quality talent. We would thus predict – assuming the individual partner's skills are irreplaceable – that losing a partner will harm employment growth. Columns 1 and 2 of Panel B of Table 8 show – if anything – the opposite: employment counts increase after the death event (though statistically insignificant). One challenge with these regressions is a small sample from limited employment data in VentureSource and LinkedIn.

Ewens and Marx (2018) show that VCs are active in replacing – often struggling – founders and that those replacements help the startup. The loss of a VC partner could impact the bargaining power of the remaining investors or lower the information available to them about managerial performance. The last two columns of Table 8 Panel B ask whether CEO turnover changes after the death event. The samples in these columns consider startups founded in years with higher quality replacement data (2000 and forward). We find no statistically significant change in CEO turnover and some evidence that it increases. We conclude from these results that losing a VC partner does not impact the board or VC syndicate's ability to replace CEOs.

The final table studies patenting activity of startups. Motivated by the Bernstein et al. (2016) study of VC monitoring's impact on startup patenting, we consider dependent variables that count the number of patent applications in each year. If the lost VC's activities were instrumental in the patent application and approval process and her peers cannot replicate the process, then patenting rates should fall. Across specifications – Poisson counts in columns 1 and 2 or log number of patents plus one for startups with at least one patent – there is no observed impact on patenting. Given the expense and time it takes to complete a patent application and the already-documented startup challenges around capital raising, this result is somewhat surprising. However, the consistently negative coefficients on the main death event and its economically large size for the Poisson model suggest that further data cleaning may reveal a statistically significant effect.

3.4. Summary of effects on startups

Our results show the unique, irreplaceable skills that VC partners provide their startups. Individual VC directors are critical information sources and advocates for the startup's follow-on financing, likely via their networks. While we find no negative effects on operations from director or partner loss, this does not imply that VCs add no value to these dimensions because our experiment replaces one VC with another rather than replacing VC with no one. A null effect means that the value-add is small or that other VC partners can substitute for the lost director.

3.5. Challenges with studying heterogeneous effects

A natural question is whether the results documented above vary by startup, board, or director characteristics. These tests are challenging as they reintroduce deal flow and matching issues. For example, suppose that we believe that the effects of the director depend on the size of the board of directors, splitting the sample by small versus large boards. Larger boards could be associated with older startups – introducing survivorship bias – or

larger boards are situations where VC investors had significant bargaining power. Similarly, we could split by director age at death as a proxy for experience or networks. Again, this split would introduce new confounds. Suppose that older VCs are of higher quality than their younger counterparts. If there is any assortative matching between startups and investors at the match stage, then splitting by age is a split by startup quality. For these reasons, we only exploit variation from the average death event.

3.6 Effects on the venture capital firm

The startup that lost a VC director is not the only impacted entity after the death. The lost director's VC firm is also likely impacted. Firstly, the worse outcomes found in Table 4 will impact the VC fund's performance, which could impact future fundraising. Secondly, VC firms are small, typically with 3-4 partners selecting and managing investments. Thus, the loss of one partner could impede the firm's operations. Contracts between VC funds and their investors (limited partners) incorporate such risk through "Key Person" provisions. This contract features state that in the event of the loss of a predetermined individual(s) of the VC fund, the fund must halt investments in new startups. These provisions can require the VCs to receive the majority of LP approval to continue operating the fund. Importantly, these contracts allow the VC fund to continue investing and managing investments made before the partner loss. The existence of key person provisions suggests that LPs believe the human capital of the VC fund is critical to its success. We investigate whether the VC firm – and its funds – experience any negative effects after the loss of a partner.

Table 12 reports regression results using a VC firm-year panel that tracks fundraising and investment performance. Here "Post-death" is a dummy variable for years after a partner's death. All the regressions include fixed effects for year, the number of funds the VC has raised, and VC firm. We stop tracking VC firms five years after their last fund, assuming they shut down if no new fund is raised. Column 1 of Panel A asks whether the VC firm's fundraising success changes after the loss, which we would expect if the LPs were investing in a team of partners. VC fundraising falls in the year after death. The coefficient implies a 22% decline in the annual probability of successful fund close (relative to the sample mean). Column 2 considers years with a successful fund raise. Here we find no change in fund size after death.

The remaining columns of Panel A of Table 12 study whether VC fund performance falls after the death (columns 3 to 5) and whether investment activity changes (columns 6 and 7). Outside of a negative coefficient on exit valuations in column 3, we find no statistically significant effect on the VC firm's performance or

operations. Of course, these estimations effectively require the VC firm to continue operations after the death, so it is more likely that the lost director was not a key person.

Panel B of Table 12 repeats the analysis of Panel A for the deaths of likely key persons: partners or managing directors. The economic magnitudes are larger, and statistically significant results emerge for performance effects. We find that the count of IPOs falls, along with deal volume proxied by number and dollars (columns 6-7). These results are consistent with top venture partners at VC firms being critical assets for their firm.

4. Robustness

The results above are robust to a host of robustness tests.

Unexpected deaths. All regressions used the full set of deaths of directors sitting on the board at the time of their death. Some directors likely had diseases or were old enough that death was anticipated. Including these death events only attenuates our results. If the board anticipates the death – and believes the director's loss will harm the startup – then all parties are incentivized to adjust to minimize such effects. Our first robustness test considers only death events where the individual was younger than 70 years old and not retired at the time of the death (retired VCs can keep their board seats from before retirement). In unreported results, we rerun all the tables and find no qualitative change in the results. The smaller sample of plausibly unexpected deaths lowers statistical power. However, no coefficient signs flip.

Failure and lack of capital. VC partner loss leads to significantly higher failure rates and the firm's ability to raise a follow-on financing. The latter could cause most of the former. We exclude all startups that experienced a VC partner loss and failed to raise a new financing round after the death. Table A2 reports this subsample. The coefficients on failures and IPOs are about 20% lower than that found in Table 4, suggesting that failed follow-on financings explain only a portion of the cross-sectional effects.

VC investors with loss. Subject to the standard key person arrangements (see Section 3.5), the firm can continue investing in the startup if the lost director is such an individual at their VC firm. We, therefore, assume throughout that the VC firm associated with the lost director kept the seat after the death. In this robustness test, we stop tracking the VC-startup pair for these investors, thus studying treatment effects for directors that sat on the same board representing a different investor. Re-estimating all the regressions related to capital raising, operations, and management (unreported), we find no change in results.

5. Conclusion

This paper studies how individual venture capitalists add value for startups. Our findings show that VC directors contribute unique skills that increase a startup's chances of survival and ultimate success beyond the influence of the VC partnership and other board members. Such skills are difficult to replicate, particularly when funding the startup's growth and raising new rounds of venture capital. Our findings highlight the important role of the original investors on the board as the startup's champions in the capital raising process and suggest that their networks and reputation are irreplaceable assets.

Our study makes a step towards understanding the role of individual VCs in the governance of early-stage enterprises. While most prior work has viewed VC partnerships as the main unit of observation in their interaction with startups, our evidence shows that value-add mechanisms' efficacy depends critically on the individual VCs on the startup's board. A loss of even one original investor on a startup board severely undercuts the startup's chances of survival and long-term success, despite the VC partnership's resources and strong incentives of investors, other directors, and entrepreneurs to replenish the lost human capital. We hope that the growing interest in constructing a complete picture of individual directors' involvement on startup boards will continue to expand our understanding of the inner workings of early-stage enterprises. The subsequent versions of this paper will refine our evidence on directors' skill sets and study how startups replace their lost directors.

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Figures and Tables

Figure 1: Average dollars raised and likelihood of new investors

Notes: The figure reports the average dollars raised by financing round and the fraction of each round that have at least one new investor in the syndicate.

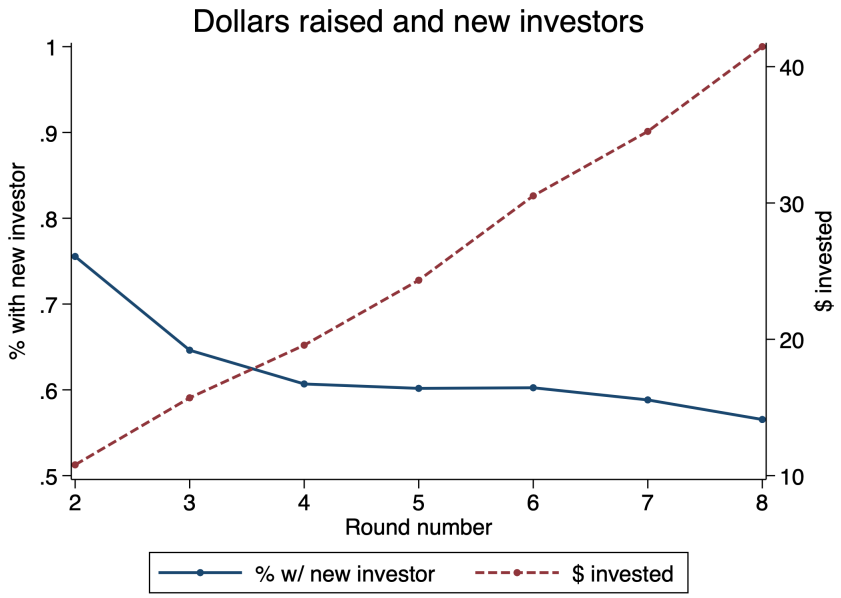

Table 1: Summary statistics

Notes: The table reports summary statistics for the startups, directors, and VC firms in our sample. Panel A considers the set of startups (one observation per firm). Variable definitions are found in Appendix Table A1. Panel B reports the same data as Panel A, but considers all pairs of director-startup. Panel C reports the summary statistics of the VC firm-year data.

	Panel A: Startup					
	Mean	SD	Min	Med.	Max	N
Year founded	2003.50	7.85	1919.00	2003.00	2019.00	18,923
Year first VC	2005.32	7.13	1980.00	2005.00	2020.00	18,923
First round Series A	0.58	0.49	0.00	1.00	1.00	18,923
First capital raised (m)	7.57	10.13	0.00	4.30	59.00	18,396
Size of first syndicate	2.33	1.66	1.00	2.00	32.00	18,889
Post-money (first round)	31.17	54.40	2.24	15.60	490.00	10,890
Information technology	0.41	0.49	0.00	0.00	1.00	18,923
Business and Financial Services	0.19	0.39	0.00	0.00	1.00	18,923
California	0.44	0.50	0.00	0.00	1.00	18,923
Massachusetts	0.11	0.31	0.00	0.00	1.00	18,923
No product at first VC	0.54	0.50	0.00	1.00	1.00	18,923
Startup exited	0.80	0.40	0.00	1.00	1.00	18,923
Failed	0.31	0.46	0.00	0.00	1.00	18,923
Had IPO	0.08	0.27	0.00	0.00	1.00	18,923
Acquired	0.41	0.49	0.00	0.00	1.00	18,923
Age at exit (yrs.)	6.58	3.71	1.00	6.00	26.00	15,133
Exit value / capital raised	6.59	78.30	0.00	0.61	6960.63	8,930
	Panel B: Director-startup					
	Mean	SD	Min	Median	Max	N
Year founded	2002.19	6.87	1919.00	2001.00	2019.00	185282
Year first VC	2003.79	6.23	1980.00	2003.00	2020.00	185282
First round Series A	0.62	0.49	0.00	1.00	1.00	185282
First capital raised (m)	7.27	9.27	0.00	4.50	59.00	181579
Size of first syndicate	2.43	1.61	1.00	2.00	32.00	184892
Post-money (first round)	26.20	43.01	2.24	14.75	490.00	112512
Information technology	0.42	0.49	0.00	0.00	1.00	185282
Business and Financial Services	0.17	0.38	0.00	0.00	1.00	185282
California	0.46	0.50	0.00	0.00	1.00	185282
Massachusetts	0.12	0.33	0.00	0.00	1.00	185282
No product at first VC	0.58	0.49	0.00	1.00	1.00	185282
Startup exited	0.83	0.38	0.00	1.00	1.00	185282
Failed	0.26	0.44	0.00	0.00	1.00	185282
Had IPO	0.10	0.30	0.00	0.00	1.00	185282
Acquired	0.46	0.50	0.00	0.00	1.00	185282
Age at exit (yrs.)	9.18	4.32	1.00	9.00	26.00	153002
Exit value / capital raised	4.45	38.07	0.00	0.88	6960.63	95,115
	Panel C: VC funds sample					
	Mean	SD	Min	Max	N	
Exit value $> 2X$ capital raised	0.49	1.30	0.00	27.00	26,537	
IPO	0.19	0.80	0.00	20.00	36,635	
# new investments	1.87	3.98	0.00	77.00	36,635	
# follow-on investments	1.88	4.52	0.00	83.00	36,635	
Dollars invested (m USD)	11.69	40.32	0.00	1527.11	36,635	
# total exits	1.16	2.52	0.00	42.00	36,635	
Total funds closed (m USD)	18.34	111.48	0.00	8180.00	36,635	
% change in fund size	1.48	6.34	-0.99	157.73	2,648	
Post-death year	0.03	0.18	0.00	1.00	36,635	
Had a partner death	0.08	0.28	0.00	1.00	36,635	

Table 2: Deceased venture capitalists summary statistics

Notes: The table reports the characteristics of the set of deceased VCs, regardless of board seat affiliation. The sample includes all identified deceased venture capitalists when passed away before 2021.

Panel A: Deceased characteristics		
Characteristic	Mean	s.d.
Death year	2013.41	5.83
Birth year	1942.67	12.93
Age at death	70.46	13.91
Born CA	0.06	0.24
Born in U.S.	0.75	0.43
Death in CA	0.23	0.42
Retired	0.21	0.41
Last job at VC	0.53	0.50
Found in Lexis Nexus	0.94	0.23
Has SSN	0.95	0.21
Total deaths	333	

Panel B: Cause of death		
Cause of Death	All Deaths	Before 70 y.o.
cancer	35.96%	50.53%
cardiovascular / heart decease	14.29%	11.58%
brain disease	12.32%	3.16%
accident / natural disaster	9.36%	13.68%
lung disease	5.42%	2.11%
liver/kidney/organ disease	4.93%	6.32%
suicide	3.45%	5.26%
stroke	1.97%	2.11%
other	12.32%	5.26%
Total	100.00%	100.00%

Table 3: Comparing deceased directors to non-decreased

Notes: The table reports differences in VC investors from Table 2 that are directors with all other non-deceased directors in the sample (by 2020). by whether they are deceased by the end of the sample. Panel A considers all deceased directors and Panel B only those who passed away before retirement and the age of 70.

All deaths (249 deceased)

	Alive	Deceased	Diff.	s.e.	obs.
Total board seats	5.11	6.45	-1.34***	(0.42)	9591
Year first board	2004.51	1994.85	9.66***	(0.54)	9591
Year last board	2009.27	2001.05	8.22***	(0.47)	9591
Avg. first capital raised	12.29	8.98	3.31***	(0.86)	7387
% IPOs	0.09	0.21	-0.12***	(0.01)	9591

Under 70 and non-retiree deaths

	Alive	Deceased	Diff.	s.e.	obs.
Total board seats	5.12	7.50	-2.38***	(0.69)	9587
Year first board	2004.32	1997.19	7.13***	(0.88)	9587
Year last board	2009.11	2003.49	5.62***	(0.77)	9587
Avg. first capital raised	14.79	11.89	2.91	(3.54)	7406
% IPOs	0.09	0.17	-0.08***	(0.02)	9587

Table 4: Startup outcomes: with and without VC director death

Notes: The table reports startup-level outcomes. The unit of observation is a startup-investor pair and the main independent variable of interest "Board experienced death" is equal to 1 if the startup experienced at least one VC director death from its first VC financing to exit. "Failed" is equal to one if the startup failed, "IPO" is a dummy variable for an initial public offering, "Acq." is a dummy variable for an acquisition event and "$> 2X$ if exit" is one if the startup had an exit with a reported exit valuation two times or greater than equity invested. "Yrs. to exit" is the log of the number of years from first VC financing to exit (missing if no exit event). "Log exit value" is the log of exit valuation for non-failed startups. "VC FE" are VC firm fixed effects, "First fin. year" are fixed effects for the startup's first VC financing year, "Industry FE" are eight industry fixed effects and 'State FE" are fixed effects for the startup's state headquarters. Standard errors are clustered at the startup level.

	Failed	IPO	Acq.	>2X if exit	Yrs. to exit	Log exit value (> 0)
	(1)	(2)	(3)	(4)	(5)	(6)
Board experienced death	0.11***	-0.080***	-0.063	-0.074*	0.24***	-0.067
	(0.041)	(0.028)	(0.040)	(0.039)	(0.032)	(0.24)
Log total capital raised	-0.091***	0.052***	-0.027***	0.040***	0.25***	0.68***
	(0.0030)	(0.0024)	(0.0034)	(0.0036)	(0.0035)	(0.025)
Observations	34235	34235	34235	28100	28100	12030
Mean dep. var.	0.28	0.11	0.44	0.25	1.85	4.38
# startups	18287	18287	18287	14609	14609	5446
# startups w/ death	191	191	191	161	161	70
R^2	0.18	0.21	0.18	0.15	0.43	0.30
VC FE	Y	Y	Y	Y	Y	Y
First fin. year FE	Y	Y	Y	Y	Y	Y
Founding year FE	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y
State FE	Y	Y	Y	Y	Y	Y

Table 5: Startup follow-on financing and director death

Notes: The table reports OLS regressions of startup-year and startup-director-year outcomes on the main independent variable "Year after death", which is one if the startup experienced a death in the past. The unit of observation is either the startup-year (columns 1 and 2) or startup-investor(director)-year (columns 3 and 4). The outcome variable is a dummy equal to one if the startup raised a round in the current year. The VC investor associated with the deceased director is assumed to keep the board seat unless we have data indicating otherwise. Treatment with "Year after death" impacts all investors (or years) with board seats after the death event. The control "Log total capital raised" is the log of cumulative capital prior to the current year. "VC FE" are fixed effect for the VC investor with the board seat. "Fin. year FE" are financing year fixed effect, "Industry FE" are dummies for the eight startup industries, "State FE" are fixed effects for the startup's state headquarters and "Round # FE" are fixed effects for the financing round number. Robust standard errors in columns 1 and 2. Standard errors clustered at the startup level in columns 3 and 4.

	Raised new financing?				
	(1)	(2)	(3)	(4)	(5)
Year after death	-0.13***	-0.12***	-0.10***	-0.097***	-0.090***
	(0.023)	(0.022)	(0.026)	(0.026)	(0.026)
Log. capital raised		-0.011***		-0.039***	-0.044***
		(0.0015)		(0.0017)	(0.0017)
Observations	105266	105259	185282	185276	185193
# startups	18923	18921	18923	18921	18879
# w/ death	194	194	194	194	194
Mean dep. var.	0.51	0.51	0.53	0.53	0.53
R^2	0.00048	0.051	0.00042	0.055	0.088
Unit	Startup-year	Startup-year	Startup-dir.-year	Startup-dir.-year	Startup-dir.-year
VC FE	N	N	N	N	Y
Round # FE	N	Y	N	Y	Y
Industry FE	N	Y	N	Y	Y
State FE	N	Y	N	Y	Y

Table 6: Capital raising amount and director death

Notes: The table reports OLS regressions of startup-year or startup-investor-year outcomes on the main independent variable "Year after death", which is one if the startup experienced a death in the past. The unit of observation is either the startup-year (columns 1 and 2) or startup-investor(director)-year (columns 3 and 4). The VC investor associated with the deceased director is assumed to keep the board seat unless we have data indicating otherwise. Treatment with "Year after death" impacts all investors (or years) with board seats after the death event. The outcome variable log of the capital raised in the financing scale by the previous capital raised amount. T The control "Log total capital raised" is the log of cumulative capital prior to the current year. "VC FE" are fixed effect for the VC investor with the board seat. "Fin. year FE" are financing year fixed effect, "Industry FE" are dummies for the eight startup industries, "State FE" are fixed effects for the startup's state headquarters and "Round # FE" are fixed effects for the financing round number. Robust standard errors in columns 1 and 2. Standard errors clustered at the startup level in columns 3 and 4.

	Log K_t/K_{t-1}				
	(1)	(2)	(3)	(4)	(5)
Year after death	-0.29***	-0.11	-0.31***	-0.14*	-0.13*
	(0.070)	(0.072)	(0.074)	(0.076)	(0.076)
Observations	39562	39558	77242	77240	76859
# startups	15438	15435	15438	15436	15214
# w/ death	113	113	113	113	113
Mean dep. var.	0.35	0.35	0.33	0.33	0.32
R^2	0.00035	0.071	0.00061	0.072	0.098
Unit of obs.	Startup-year	Startup-year	Startup-dir.-year	Startup-dir.-year	Startup-dir.-year
VC FE	N	N	N	N	Y
Round # FE	N	Y	N	Y	Y
Industry FE	N	Y	N	Y	Y
State FE	N	Y	N	Y	Y

Table 7: Financing round characteristics and director death

Notes: The table reports OLS regressions of startup-investor-year outcomes on the main independent variable "Year after death", which is one if the startup experienced a death in the past. The unit of observation is the investor-startup-year where the investor has a board seat on the startup and the startup raised a new round of financing. The outcome variable "Time to close" is the log of the number of years from the current financing to the previous financing. The outcome variable "Log value" is the log of the financing's post-money valuation. The outcome variable "% new investors" is the fraction of the completed financing's investors that are new investors in the startup. The outcome variable "Debt or non-VC" is a dummy variable that is equal to one if the financing type is debt or a non-VC round such as corporate VC, angel, or private equity. Fixed effects are as defined in Table 6. Standard errors clustered at the startup level.

	Panel A: Time and valuation			
	Time to close		Log value	
	(1)	(2)	(3)	(4)
Year after death	0.26***	0.20***	0.18*	0.0078
	(0.079)	(0.074)	(0.093)	(0.090)
Log. capital raised	0.044***	0.054***	0.22***	0.19***
	(0.0046)	(0.0048)	(0.0054)	(0.0052)
Observations	41995	81034	30315	57030
# startups	15764	15562	13854	13629
# w/ death	118	118	70	70
Mean dep. var.	1.42	1.41	3.52	3.74
R^2	0.047	0.11	0.44	0.57
	Panel B: Investor types			
	% new investors		Debt or non-VC	
	(1)	(2)	(3)	(4)
Year after death	-0.041**	-0.040**	0.046	0.066**
	(0.020)	(0.020)	(0.028)	(0.033)
Log. capital raised	0.018***	0.013***	-0.0097***	-0.0017
	(0.0012)	(0.0013)	(0.0013)	(0.0014)
Observations	51802	94173	53850	97572
# startups	18735	18513	18789	18590
# w/ death	117	117	121	121
Mean dep. var.	0.55	0.50	0.16	0.16
R^2	0.40	0.41	0.094	0.13
Unit of obs.	Startup-year	Startup-dir.-year	Startup-year	Startup-dir.-year
VC FE	N	N	Y	Y
Round # FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
State FE	Y	Y	Y	Y

Table 8: Operational outcomes and director death

Notes: The table reports OLS regressions on outcomes where the main independent variable "Year after death", which is one if the startup experienced a death in the past. The unit of observation is the the startup-year (columns 1 and 3) or investor-startup-year where the investor has a board seat on the startup in all years the startup is active (columns 2 and 4). The outcome variable "Has product" is one if the startup completed a product or earned it first dollar of revenue. In this sample, we ignore all startups that have a product at the time of first VC financing because they have no risk of transition. The outcome variable "Has trademark" is equal to one if the startup had trademark filed in the year. The outcome variable "Log # emp." is the log of the number of employees in the year reported in VentureSource or LinkedIn (the max if both are available). The outcome variable "CEO turnover" is a dummy variable equal to one if the startup's original CEO was replaced in that year (or previous). "VC FE" are fixed effect for the VC investor with the board seat. "Fin. year FE" are financing year fixed effect, "Industry FE" are dummies for the eight startup industries, "State FE" are fixed effects for the startup's state headquarters and "Round # FE" are fixed effects for the financing round number. Standard errors clustered at the startup level.

	Panel A: Product development			
	Has product		Has trademark	
	(1)	(2)	(3)	(4)
Year after death	0.00080	-0.036	-0.0032	-0.0027
	(0.046)	(0.046)	(0.0038)	(0.0023)
Observations	43545	76874	53851	185225
# startups	10070	10017	18789	18881
# w/ death	83	83	121	192
Mean dep. var.	0.34	0.37	0.0056	0.0056
R^2	0.32	0.38	0.0044	0.024

	Panel B: Employees and CEO			
	Log # emp.		CEO turnover	
	(1)	(2)	(3)	(4)
Year after death	0.36	0.12	0.015	0.015
	(0.23)	(0.28)	(0.027)	(0.031)
Observations	13254	22296	31360	54266
# startups	5137	4980	12037	11825
# w/ death	16	16	52	52
Mean dep. var.	3.27	3.46	0.046	0.051
R^2	0.37	0.54	0.023	0.060

Unit of obs.	Startup-year	Startup-dir.-year	Startup-year	Startup-dir.-year
VC FE	N	N	Y	Y
Round # FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
State FE	Y	Y	Y	Y

Table 9: Patenting and director death

Notes: Notes: The table reports OLS regressions on outcomes where the main independent variable "Year after death", which is one if the startup experienced a death in the past. The unit of observation is the the startup-year (columns 1 and 3) or investor-startup-year where the investor has a board seat on the startup in all years the startup is active (columns 2 and 4). The outcome variable "Number patents" is the count of patents applied for in that year (including zeros). These models estimate the Poisson fixed effects specification. The outcome variable "Log # patents" is the log of the number of patents (plus 1) in the sample of startups that ever had a patent from first VC financing to exit (conditioning on patenting limits the number of zeros for the log transformation). "VC FE" are fixed effect for the VC investor with the board seat. "Fin. year FE" are financing year fixed effect, "Industry FE" are dummies for the eight startup industries, "State FE" are fixed effects for the startup's state headquarters and "Round # FE" are fixed effects for the financing round number. Standard errors clustered at the startup level.

	Number of patents		Log # patents	
	(1)	(2)	(3)	(4)
Year after death	-0.22	-0.29	-0.024	-0.053
	(0.21)	(0.19)	(0.072)	(0.081)
Observations	105222	176429	47587	93220
# startups	18914	17868	6703	6687
# w/ death	192	191	122	122
Mean dep. var.	0.74	0.95	0.56	0.60
R^2			0.052	0.13
Unit of obs.	Startup-year	Startup-dir.-year	Startup-year	Startup-dir.-year
Model	Poisson		OLS	
VC FE	N	N	Y	Y
Round # FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
State FE	Y	Y	Y	Y

Table 10: Financing round characteristics and director death: dynamics

Notes: The table reports OLS regressions of startup-investor-year outcomes on the main independent variable "Year after death" split into event time, which is one if the startup experienced a death in the past. The unit of observation is the investor-startup-year where the investor has a board seat on the startup and the startup raised a new round of financing. The outcome variable "Time to close" is the log of the number of years from the current financing to the previous financing. The outcome variable "Log value" is the log of the financing's post-money valuation. The outcome variable "% new investors" is the fraction of the completed financing's investors that are new investors in the startup. The outcome variable "Debt or non-VC" is a dummy variable that is equal to one if the financing type is debt or a non-VC round such as corporate VC, angel, or private equity. Fixed effects are as defined in Table 6. Standard errors clustered at the startup level.

	Panel A: Investor types			
	% new investors		Debt or non-VC	
	(1)	(2)	(3)	(4)
Death year(-1)	-0.042	0.0013	0.063	0.062
	(0.032)	(0.039)	(0.042)	(0.048)
Death year	-0.11***	-0.071*	0.13**	0.14**
	(0.035)	(0.040)	(0.050)	(0.055)
Death year(+1)	-0.040	-0.061	-0.059	-0.020
	(0.045)	(0.051)	(0.049)	(0.059)
Death year(2+)	-0.0022	-0.019	0.059	0.084
	(0.030)	(0.027)	(0.048)	(0.052)
Log. capital raised	0.018***	0.013***	-0.010***	-0.0024*
	(0.0012)	(0.0013)	(0.0013)	(0.0014)
Observations	51802	94173	53850	97572
# startups	18735	18513	18789	18590
# w/ death	117	117	121	121
Mean dep. var.	0.55	0.50	0.16	0.16
R^2	0.40	0.41	0.094	0.13
Unit of obs.	Startup-year	Startup-dir.-year	Startup-year	Startup-dir.-year
VC FE	N	N	Y	Y
Round # FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
State FE	Y	Y	Y	Y

Table 11: Capital raising differences by VC investor type

Notes: The table reports OLS regressions of outcomes on the main independent variable "Year after death", which is one if the startup experienced a death in the past. The unit of observation is the the startup-year (columns 1 and 3) or investor-startup-year where the investor has a board seat on the startup in all years the startup is active (columns 2 and 4). Panel A considers the sample of startups that raised capital from VC's in the top 10% of deal experience (rolling by year). Panel B considers all other VC investors' deals. The outcome variables are those presented in Table 6 and 10. All models include VC firm fixed effects ("VC FE"). "Fin. year FE" are financing year fixed effect, "Industry FE" are dummies for the eight startup industries, "State FE" are fixed effects for the startup's state headquarters, "Round # FE" are fixed effects for the financing round number, and "Founding year FE" are startup founding year fixed effects. Standard errors clustered at the startup level.

	Panel A: Top VC investor			
	Log K_t/K_{t-1}	Time to raise	% new inv.	Debt/Non-VC
	(1)	(2)	(3)	(4)
Year after death	-0.12	0.19**	-0.043**	0.058*
	(0.076)	(0.072)	(0.020)	(0.032)
Observations	58925	61875	71470	73784
# startups	12742	12933	15014	15070
# w/ death	106	112	110	114
Mean dep. var.	0.32	1.39	0.48	0.16
R^2	0.094	0.081	0.40	0.11
	Panel B: Non-top VC investor			
	Log K_t/K_{t-1}	Time to raise	% new inv.	Debt/Non-VC
	(1)	(2)	(3)	(4)
Year after death	-0.13	0.29*	-0.030	0.099*
	(0.14)	(0.15)	(0.037)	(0.052)
Observations	17821	19050	22582	23668
# startups	6288	6541	7874	7961
# w/ death	49	49	51	51
Mean dep. var.	0.33	1.46	0.54	0.18
R^2	0.14	0.20	0.43	0.19
Unit of obs.	Startup-dir.-year	Startup-dir.-year	Startup-year	Startup-dir.-year
VC FE	Y	Y	Y	Y
Round # FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
State FE	Y	Y	Y	Y

Table 12: Venture capital firm outcomes: fund outcomes

Notes: The table reports OLS and poisson regressions of VC firm and fund outcomes. The main independent variable "Post-death" is equal to one if the VC firm (and its funds) experienced a death in the current or past years. "Raised fund?" is equal to one if the VC firm raised a new fund in the year. "Fund size" is the log of a new fund raised in the year (missing if no fund raised). The remaining columns consider the investment activity and outcomes of the VC firms' investments / funds in each year. "Exit value" is the average of exit valuations (when reported) for portfolio firm exits in that year. For this and the following three columns, we use the Poisson pseudo-likelihood regression with multiple levels of fixed effects ("ppmlhdfe" in Stata) to allow for zeros. "# acq." is the number of acquisition exits, "# IPO" is the number of IPOs and "# new inv." are the number of new investments in startups across the VC firm's funds. The last column reports the log of total capital invested by the firm's funds in that year ("Log $ inv."). The control "Log dollars invested t-1" is the lag of total dollars invested, "Log # investments t-1" is the log (plus 1) of the total investments made by the VC firm in the previous year. "Fund seq. FE" are fixed effects for the number of funds raised as of year t. Standard errors clustered at the VC firm.

	Panel A: All death events						
	Fundraising		Fund investing				
	Raised fund?	Fund size	Exit value	# acq.	# IPO	# new inv.	Log $ inv.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Post-death	-0.027***	0.032	-78.9*	-0.088	-0.088	0.080	-0.038
	(0.0094)	(0.12)	(41.0)	(0.060)	(0.087)	(0.053)	(0.065)
Log dollars invested t-1	0.026***	0.062**	23.3	0.27***	0.45***	0.030**	
	(0.0027)	(0.026)	(15.5)	(0.016)	(0.026)	(0.014)	
Log # investments t-1	0.056***	0.069**	-32.0**	0.043*	-0.055*	0.42***	0.53***
	(0.0048)	(0.034)	(14.5)	(0.024)	(0.032)	(0.025)	(0.017)
Observations	28296	2700	11719	24013	16975	24752	28181
R^2	0.11	0.82	0.28				0.78
	Panel B: Deaths of partners and managing directors						
	Fundraising		Fund investing				
	Raised fund?	Fund size	Exit value	# acq.	# IPO	# new inv.	Log $ inv.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Post-death	-0.034***	0.20	-63.9	0.011	0.031	0.11	-0.10
	(0.011)	(0.17)	(49.9)	(0.070)	(0.11)	(0.067)	(0.091)
Log dollars invested t-1	0.026***	0.062**	23.3	0.27***	0.45***	0.030**	
	(0.0027)	(0.026)	(15.5)	(0.016)	(0.026)	(0.014)	
Log # investments t-1	0.056***	0.068**	-31.8**	0.044*	-0.053*	0.42***	0.53***
	(0.0048)	(0.034)	(14.5)	(0.024)	(0.032)	(0.025)	(0.017)
Observations	28298	2700	11719	24013	16975	24752	28183
R^2	0.11	0.82	0.28				0.78
Model	OLS	OLS	OLS	Poisson	Poisson	Poisson	OLS
VC firm FE	Y	Y	Y	Y	Y	Y	Y
Fund seq. FE	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y

Internet Appendix

Table A1: Variable definitions

Variable	Definition
Year founded	Year the startup was founded.
Year first VC	Year first raised venture capital.
First round Series A	Dummy variable for whether the first round raised was a Series A (alternatives are Seed, Angel, Bridge, etc.)
First capital raised (m)	The total capital raised in the first financing round.
Size of first syndicate	Number of investors in the startup's first financing round.
Post-money (first round)	Valuation (m) of the first financing round.
Information technology	Dummy variable for whether the startup is in the information technology industry.
Business and Financial Services	Dummy variable for whether the startup is in the Business and Financial Services industry.
California	Dummy variable for whether the startup is headquartered in California.
Massachusetts	Dummy variable for whether the startup is headquartered in Massachusetts.
No product at first VC	Dummy variable for whether the startup reports a completed product at the time of first VC financing.
Failed	Dummy variable for whether the startup failed as of 2020Q1. If the startup had not raised capital 3 years since its last financing, then we set the firm to failure and use the beta distribution to assign a failure date between 2 and 5 years after the last financing event.
Exit value $>$ 2X capital raised	Dummy variable for whether the startup exited at a valuation at least two times capital raised.
IPO	Dummy variable for whether the startup had an initial public offering as of the end of the sample (2020Q1).

Table A2: Startup outcomes after director death: excluding deaths without follow-on

Notes: The table reports startup-level outcomes. The unit of observation is a startup-investor pair and the main independent variable of interest "Board experienced death" is equal to 1 if the startup experienced at least one VC director death from its first VC financing to exit. The sample excludes death events where the startup failed to raise a round of financing afte the death (38% of death events). "Failed" is equal to one if the startup failed, "IPO" is a dummy variable for an initial public offering, "Acq." is a dummy variable for an acquisition event and "Acq. (no priv.)" considers the set of startups that had an exit. This final variable differs from the first three columns that consider the exit type compared to all other outcomes, including remaining private. "Yrs. to exit" is the log of the number of years from first VC financing to exit (missing if no exit event). "Log exit value" is the log of exit valuation for non-failed startups. "VC FE" are VC firm fixed effects, "First fin. year" are fixed effects for the startup's first VC financing year, "Industry FE" are eight industry fixed effects and 'State FE" are fixed effects for the startup's state headquarters. Standard errors are clustered at the startup level.

	All death events					
	Failed	IPO	Acq.	Acq. (no priv.)	Yrs. to exit	Log exit value
	(1)	(2)	(3)	(4)	(5)	(6)
Board experienced death	0.089*	-0.063*	-0.059	-0.040	0.22***	-0.31
	(0.047)	(0.036)	(0.051)	(0.056)	(0.040)	(0.26)
Log total capital raised	-0.091***	0.052***	-0.027***	0.0080**	0.25***	0.68***
	(0.0030)	(0.0024)	(0.0034)	(0.0040)	(0.0035)	(0.026)
Observations	33999	33999	33999	27905	27905	11964
# startups	18222	18222	18222	14558	14558	5429
# startups w/ death	121	121	121	101	101	47
R^2	0.18	0.21	0.18	0.11	0.42	0.30
VC FE	Y	Y	Y	Y	Y	Y
First fin. year FE	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y
State FE	Y	Y	Y	Y	Y	Y

Table A3: Balance test of startup observables: with and without a director loss (all deaths)

Notes: The table reports differences in startup observables at the time of its first VC financing split by whether the startup ever experienced the loss of a director.

	No loss	Has loss	Diff.	s.e.	obs.
Year founded	2003.53	2000.62	2.90***	(0.57)	18925
Year first VC	2005.35	2002.27	3.08***	(0.52)	18925
First round Series A	0.58	0.61	-0.03	(0.04)	18925
First capital raised (m)	7.60	7.49	0.10	(0.74)	18403
Size of first syndicate	2.33	2.52	-0.18	(0.12)	18891
Post-money (first round)	31.29	22.27	9.02*	(4.83)	10889
Information technology	0.41	0.44	-0.03	(0.04)	18925
Business and Financial Services	0.19	0.10	0.08***	(0.03)	18925
California	0.44	0.41	0.03	(0.04)	18925
Massachusetts	0.11	0.11	-0.01	(0.02)	18925
No product at first VC	0.54	0.67	-0.13***	(0.04)	18925

Table A4: Startup outcomes: with and without VC director death (startup-level)

Notes: The table reports startup-level outcomes. The unit of observation is a startup and the main independent variable of interest "Board experienced death" is equal to 1 if the startup experienced at least one VC director death from its first VC financing to exit. "Failed" is equal to one if the startup failed, "IPO" is a dummy variable for an initial public offering, "Acq." is a dummy variable for an acquisition event and "$> 2X$ if exit" is one if the startup had an exit with a reported exit valuation two times or greater than equity invested. "Yrs. to exit" is the log of the number of years from first VC financing to exit (missing if no exit event). "Log exit value" is the log of exit valuation for non-failed startups. "VC FE" are VC firm fixed effects, "First fin. year" are fixed effects for the startup's first VC financing year, "Industry FE" are eight industry fixed effects and 'State FE" are fixed effects for the startup's state headquarters. Standard errors are clustered at the startup level.

	Failed	IPO	Acq.	>2X if exit	Yrs. to exit	Log exit value (> 0)
	(1)	(2)	(3)	(4)	(5)	(6)
Board experienced death	0.043	-0.024	-0.058	-0.038	0.29***	-0.33
	(0.042)	(0.022)	(0.045)	(0.039)	(0.040)	(0.25)
Log total capital raised	-0.087***	0.041***	-0.015	0.037***	0.24***	0.69***
	(0.0061)	(0.0039)	(0.012)	(0.0081)	(0.0099)	(0.035)
Observations	17793	17793	17793	14211	14211	10670
Mean dep. var.	0.31	0.080	0.42	0.23	1.74	2.11
# startups	17793	17793	17793	14211	14211	10670
# startups w/ death	189	189	189	159	159	127
R^2	0.23	0.22	0.21	0.18	0.43	0.33
VC FE	Y	Y	Y	Y	Y	Y
First fin. year FE	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y
State FE	Y	Y	Y	Y	Y	Y