Executive Replacement in Venture Capital-Backed Startups

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Abstract

We show that venture capitalists add value in struggling startups by replacing executives. Augmenting a large database of entrepreneurial firm executives with hand-collected join/departure dates, we characterize firms that failed to raise their next round of financing within an expected window as "living dead." Executives are approximately three times as likely to be replaced in struggling startups and especially by investors who hold greater board influence and high portfolio performance. Using plausibly exogenous shocks to the supply of new executives, an instrumental variables analysis implies a positive causal effect of replacement on outcomes for struggling startups.

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1. Introduction

How and when do venture capitalists add value in early-stage startups? Prior work might suggest that beyond deal selection and capital infusion, investors are primarily effective in that they accelerate the growth of portfolio companies that appear on track while disengaging from ventures that do not develop as expected. This view might seem consistent with the small fraction of widely successful outcomes that compose much of the returns to VC as well as the practice of staging investments to preserve one's exit option, as originally identified by Gompers (1995). On the other hand, given how common failure is, it seems plausible that investors would attempt to turn around their struggling startups. Contracts as well as anecdotal evidence suggest that investors do not uniformly abandon ventures at the first time of trouble. However, with the exception of the Puri and Zarutskie (2012) comparison of VC and non-VC-backed firms, the literature lacks a substantial characterization of the dynamics of struggling startups and their investors. In this paper, we investigate whether and how investor intervention in troubled portfolio companies contributes to the value added by venture capitalists.

At least since Gorman and Sahlman (1986), several scholars have suggested that venture capitalists add value beyond providing capital. Hsu (2006) shows that investors help with strategic partnerships. Hellmann and Puri (2002) provide evidence that VCs "professionalize" or "monitor" nascent firms by instituting human-resource policies and bringing in professional CEOs to replace founders. Scholars including Bottazzi and Hellmann (2008), Chemmanur and Nancy (2011), and Bernstein and Townsend (2014) moreover identify a causal link between investor involvement (a.k.a. "monitoring", "activism") and positive portfolio company outcomes.

While these papers help to establish that post-investment intervention is partially responsible for achieving liquidity events, less well understood are the circumstances in which monitoring is effective. In particular, prior work does not distinguish between portfolio

companies that are generally on-track vs. those that are struggling.[1] Thus the connection between monitoring and liquidity events might be fully explained by VCs accelerating the growth of companies that are on-track while at the same time exercising their option to exit struggling startups. Yet there are several reasons to think that investors might (try to) impact outcomes for struggling portfolio companies:

First, venture capital contracts anticipate failure. Kaplan and Strömberg (2003) show the transfer of control rights to investors not only for purposes of winding down the firm but also to enable corrective action. One mechanism by which dissatisfied investors might attempt to "right the ship" is replacing executive management. A large literature on CEO turnover among public companies connects executive replacement to poor performance by the firm (see for example Hermalin and Weisbach (1988); Jenter and Lewellen (2010)). One might expect the principals of private firms to react similarly when promised progress does not materialize. However, investors could instead exercise their exit option and abandon a struggling startup rather than potentially throw good money (and time) after bad.

Second, venture capitalists often claim that they try to "fix" failing firms. As stated by Fred Wilson, investor in both Twitter and Tumblr: "Investments that are working often don't need that much from an investor. [T]he struggling investment needs a lot of help. And I think the investor has an obligation to provide that help."[2] Certainly there could be peer pressure within or across firms not to abandon portfolio companies at the first sign of trouble. On the other hand, such representations could be self-serving to the extent that entrepreneurs are led to believe that investors will not abandon their struggling ventures.

Third, if investors did not attempt to fix struggling firms, we might expect sharp differences between successful and failed firms with regard to how long investors were involved with successful vs. failed portfolio companies. But a comparison of all entrepreneurial firm financings between 1992 and 2007 suggests striking similarities in the duration of investor

[1] Bottazzi and Hellmann (2008) take a step in this direction by tying specific VC value-add activities to outcomes via survey data. Their question considered firms both struggling and growing (e.g., "Has your firm been involved in recruiting senior management for this company? Y/N").

[2] See http://avc.com/2013/03/when-things-dont-work-out/.

involvement, questioning whether investors exercise their exit option as aggressively as they are theoretically able to. To make this comparison, we define a "failed" venture as one that either goes bankrupt or whose acquisition value was not more than 1.15x capital raised. "Successful" ventures were those completing an IPO or acquired for more than two times capital raised. By these critiera, approximately 39% of all ventures fail and some 19% succeed. Both failed and successful firms raise about $6.5 million in the first round of financing. They have approximately the same number of follow-on rounds (3.3 for failed, 3.6 for successful) and last for nearly the same amount of time after raising their first round (4.6 years for failed, 4.8 years for successful).

These surprising similarities suggest that VCs indeed stay involved with their portfolio companies even as they struggle rather than aggressively exercising their exit option. This stylized fact leads to at least three questions. First, if investors stay involved in troubled startups, what corrective measures do they take? Second, is there heterogeneity among VCs in terms of trying to "fix" struggling startups vs. walking away? Third, does investor intervention help to turn around struggling companies?

One area in which investors are known to spend time—whether in on-track or struggling companies—is by recruiting senior management, as shown in surveys by Gorman and Sahlman (1986) as well as Bottazzi and Hellmann (2008). Time spent recruiting can be applied either to expanding the management team (i.e., by bringing in a VP of Human Resources) or by replacing existing managers. Replacements might take place in companies otherwise on-track as well as struggling firms. But aside from the Hellmann and Puri (2002) classification of approximately 40% of founder/CEO replacements leading to the departure of the founder, we have little sense of whether replacing managers is more common in one or the other.

To provide greater insight into this question, we collect unique data on executive replacements in venture-backed firms, augmenting VentureSource records from 1992-2012 with extensive hand-collection of individual career histories. We seek to ascertain whether investors

are more likely to replace executives in struggling startups and whether such replacements help. In our analysis of these data we find several trends. CEOs are more likely than other executives to be replaced. Executives present before the first round of financing are more likely to be replaced, even when controlling for tenure. Executive replacements tend to cluster around the second and third rounds of financing, once investors have presumably had some time to observe the management team in action. Executives are more likely to be replaced when there are more investors on the board of directors and especially when firms are struggling. Taken together, these suggest that principals deliberately replace members of the executive team.

We then investigate whether executive replacement is more common in struggling startups. Given that our population consists of private firms, we cannot rely on stock prices as performance indicators. Instead, we create a proxy by measuring whether the firm's next round of financing arrives unusually late as compared to others in the same industry and of the same vintage: a state we refer to as the "living dead." Firms that are ever counted among the "living dead" are 55% less likely to IPO and 19% more likely to fail. "Living dead" financings account for 10% of all financing rounds in our sample but nearly 40% of all executive replacements. In both cross-sectional and firm fixed-effect models, executives are at least 60% more likely to be replaced at "living dead" startups. These results indicate that a key corrective measure for investors seeking to turn around troubled portfolio companies is replacing executive management.

Next, we examine executive replacement rates among different types of investors. If such replacement is truly a source of value-add, then we should expect it to correlate with measures of VC experience or quality. When we classify VCs based on the current performance of the portfolio, we find that "high quality" VCs are more likely to replace executives on average and especially among struggling portfolio firms. By comparison, investors with relatively lower success rates and experience are less likely to replace executives generally and are no more likely to intervene in struggling startups. These connections suggest that replacing

executives in companies that are not developing as expected might well be a key vehicle by which investors add value.

Finally, we assess the causal impact of replacing executives in imperiled portfolio companies. Doing so is not straightforward given the endogeneity of the decision to replace an executive. Indeed, naive regressions linking replacement to liquidity events could easily be explained by selection as investors choose to intervene only on behalf of the "living dead" startups that seem most promising. We instrument for executive replacement using a plausibly exogenous shock to the supply of executives who might serve as suitable replacements. The instrument is motivated by two facts: incoming executives to startups often come from established firms, and those firms are dominant players in the acquisition market. Specifically, we count the number of acquisitions in the entrepreneurial firm's industry two years prior, to allow for the expiration of "golden handcuff" lockup agreements that commonly accompany the executives of acquired firms.[3] Instrumented regressions show that executive replacements predict exit from the living-dead state, either by raising a new round of capital or by achieving an attractive acquisition. The effect is stronger for replacements of founders or CEOs than for other types of executives, consistent with the notion that investors "fix" their portfolio companies by extracting entrenched members of the management team.

This paper is the first to demonstrate that an important component of venture capitalist value-add is turning around troubled portfolio companies. The results complement those showing a role for venture capitalists "professionalizing" firms as shown by Hellmann and Puri (2002) and Kaplan, Sensoy, and Strömberg (2009). VC value-add is not limited to deal selection or accelerating the growth of companies already on-track; rather, investors improve outcomes by intervening in struggling startups. Our focus on struggling, high failure rate investments expands the understanding of how an common set of VC returns studied in papers such as Cochrane (2005) and Korteweg and Sorensen (2010). The association between future success and replacement of founders and CEOs suggests that replacing executives helps

[3]The industry practice of two-year contracts motivates this IV, however, we also find empirically that other lags have little predictive power.

to unlock value in core assets of the firm by undoing entrenchment on the part of current management. Hellman and Puri (2000) as well as Ewens and Rhodes-Kropf (Forthcoming) find a unique role for both experience and "skill" in the cross-section of VC firm performance. Our paper reveals that some of these VC performance differences likely stem from an ability to replace executives in struggling firms. Moreover, more successful VCs are more likely to replace managers on average and especially among struggling startups. These facts provide an additional interpretation of Hsu (2004), who finds that entrepreneurs pay for high-quality VC affiliation. More generally, this work provides a first deep-dive into the dynamics of struggling ventures, including a novel "living dead" measure that does not rely on sales or customer data difficult to collect for private firms.

2. Successful vs. failed venture-backed startups

We begin by comparing characteristics of successful versus failed venture-backed startups. Understanding VC investment of both capital and time for successful vs. unsuccessful outcomes can reveal the importance of various sources of value-add. As Puri and Zarutskie (2012) observe, we know little about the dynamics of failed ventures because the literature focuses on firms that eventually became successful.

We rely on VentureSource to track portfolio companies from 1992 through 2008. VentureSource is a database of venture capital transactions, entrepreneurial firms, investments and outcomes provided by Dow Jones.[4] The main sample described below includes 10,403 entrepreneurial firms, 45,549 financings and 52,097 executives. A summary of most of the variables used in this paper is found in Table 1.

We separate firms' ex-post outcomes into "successful" and "failed" as follows. Firms completing Initial Public Offerings and those going bankrupt are easily classified. More complex are those that continue to operate as private firms as well as those that have been acquired. While many papers take acquisitions as measures of success, not all acquisitions represent

[4]The data are graciously provided by Correlation Ventures, a quantitative VC fund.

attractive liquidity events. We differentiate between attractive and unattractive acquisitions based on a comparison of capital invested with acquisition price. If the acquisition price was more than double the capital raised by the firm, we label the acquisition as "attractive." If the acquisition price was less than 1.15 times capital raised, we label the acquisition as "fire sale." Acquisitions between 1.15-2 times capital raised are marked as "unknown." Also in the "unknown" category are acquisitions in which the price is unavailable. Both "unknown" acquisitions and firms still in business are excluded from either "successful" or "failed" classifications. Thus we compare the tails of the outcome distribution in which the outcome is clearly defined.

Table 2 shows that failed and successful ventures are similar in several respects. As one might expect, successful firms raise more capital over their lifespan and from more investors as shown in columns (1-3). However, as seen in column (4) there is no statistically significant difference in the number of rounds over which that capital is raised. Moreover, the lifespan of successful vs. failed firms does not differ materially, either when considering age since founding or just the time elapsed since the first round of venture funding. These similarities are even stronger in unreported analysis in which we compare failed firms with all non-failed firms, including those still in operation as of 2007 or those for whom we cannot locate acquisition values. The differences are also insensitive to using 1.15X and 3X as cutoffs.[5]

The striking similarities between successful and failed ventures suggests that investors indeed remain engaged in struggling companies rather than simply exercising their exit option. If so, what are investors doing beyond providing capital? Prior work including by Hellmann and Puri (2002) suggests that investors could replace the founder with a "professional" CEO, but replacement has not been investigated in the full population of venture-backed startups. The next section characterizes executive replacement in general, after which we examine struggling startups in particular.

[5]While the principle aim of Puri and Zarutskie (2012) is to compare venture-backed firms with non-venture backed, their Table VIII also reveals a similar lifespan between VC-backed ventures that are acquired (whether attractively or in a fire-sale) vs. those that go bankrupt.

3. Executive replacements

Recruiting executives is one of the most commonly mentioned value-add activities observed in the literature on VC monitoring (Gorman and Sahlman (1986); Hellmann and Puri (2002); Bottazzi and Hellmann (2008)). Recruiting could be necessary to complete a nascent founding team, e.g., by adding a Vice President of Marketing to a technology-focused startup. But recruiting can also be necessary to fill a vacancy following the departure of an executive who has been demoted—as is common in the case of founders relinquishing the CEO role—or who has left the company entirely. Hellmann and Puri (2002) investigate founder/CEO succession in a sample of 173 Silicon Valley startups, which we extend to the full population of venture-backed startups.

We explore executive replacement in venture-backed startups using VentureSource, which includes information on top-level managers, executives and investor board members. The data from which we sample include 52,097 executives with a known join date in 10,403 entrepreneurial firms. For each executive, VentureSource contains each title held at each venture-backed firm in which that person served as an executive. Whenever we observe two individuals at a startup with the same title, excepting inherently joint titles such as "Founder" and "Co-CEO", we conclude that a replacement has occurred. We normalize job titles both by level (e.g., "VP" and "Vice President") and by function (e.g., "Software Development" vs. "Software Engineering") while being careful not to lump together titles at the same level and in the same function that are nonetheless distinct (e.g., "VP North American Sales" and "VP International Sales"). Fortunately, since we aim to identify within-firm replacements, most of the within-firm variation in title naming is due to typography.[6]

Determining who replaced whom, requires establishing the dates at which each holder of the same title at a given firm joined the company. Moreover, as we are ultimately interested in

[6]In some cases, a new occupant of a role can signify not the departure of the executive but rather a promotion or demotion (as when founders relinquish the CEO role but stay on in another role, as discussed by Hellmann and Puri (2002)). VentureSource does not track the individual's title history, but we are able to determine 768 individual changes in title by analyzing the text of individual biographies. These demotions and promotions identify the first position at the firm, which we use when searching for replacements.

the dynamics of executive replacement when ventures are struggling, not only the order of the occupants but the join date for each new occupant of a given title is essential. Unfortunately, join dates are missing for approximately 70% of observations in the original data. When there were multiple CEOs, and only one CEO was missing a join date, and none of the other occupants of the CEO role had join dates concurrent with (or close to) the founding of the company, we assume the founding date as the missing join date. For all other missing dates, we undertake a data collection process using company websites, Capital IQ, Zoominfo and public LinkedIn resumes. These sources typically include an online biography or resume from which the join date can be extracted or inferred. From this collection, we are able to add the join date for more than 6200 additional executives (1063 are executives who are never replaced), reducing the number of missing join dates to 14% of observations.

Table 3 presents summary statistics on the firms for which we can and cannot identify the dates of replacement. Firms that lack replacement dates are different in several dimensions: they are younger, raise less initial capital and have fewer financing rounds. Similarly, they fail at a 80% higher rate. It appears that the missing dates could be a consequence of short-lived firms that either VentureSource cannot not fully survey or whose executives do not report. It might also be that firms choose to shut down rather than allow executives to be replaced. The sample's tendency towards firms with replacement that are older and have raised more capital will likely attenuate our results concerning struggling, failed firms.

For non-joint titles in which we have join dates for all occupants, we take the join date(s) of the non-initial occupant(s) as indicative of an executive replacement. For example, if a startup had two executives with the job titles "VP Product"and "Vice President of Product Management" with start dates of 1/1/1995 and 6/5/1997, we label 6/5/1997 as the date of the executive replacement. Executive replacement is used both as a dummy variable in analysis of executives and as a count variable in analysis of firms. In models using firm-financing rounds as the unit of observation, replacement occurs on or after the focal financing and prior to any subsequent financing. Firms might experience multiple replacements in a single

round of financing, but results are robust to a dichotomous indicator for any replacement within the firm in that round.

3.1. Executive replacements in all venture-backed startups

We analyze executive replacements in venture-backed startups between 1992–2008. The coverage of management teams is relatively thin for pre-1992 financings, and truncating the data at 2008 allows time for both exits and replacements to occur. Additionally, we require that a startup have at least two financings so that there is time for executives to be replaced. The sample includes all executives with the title "CEO," "Vice President" (or equivalent), or "Chief" in their title. Executives who joined the firm prior to the first financing are included if they remain at least one day after the first round of financing; otherwise, it is difficult for us to claim that investors were involved in their replacement. The resulting dataset includes 52,097 executives in 10,403 startups.[7] Of these executives, we identify 11,329 individuals with the title of founder or co-founder. Replacements that occur after the round's closing date are assigned to the most recent previous round of financing for purposes of analysis.

There are 4,312 firms that have at least one CEO/CXO or VP level executive replaced during their life course, approximately 30% of firms. Approximately 15% of all executives are ever replaced over the sample period (8,219). This replacement rate might seem low given that Hellmann and Puri (2002) find 47% of founder-CEOs in their Silicon Valley sample are replaced and Kaplan et al. (2009) find that merely 44% of CEOs and 26% of the top five non-CEO executives survive until the IPO. However, both of these papers consider different, smaller samples. Over 50% of firms fail within four years and could have little time for management changes. If we aggregate replacement rates to the annual level, we find that 4% of active CEOs are replaced each year with non-CEO C-level executives replaced at a slightly lower rate.

How do these rates compare to executive replacements in public firms?[8] Kaplan and

[7]The sample shrinks slightly in some specifications due to missing covariates.

[8]Our sample of executives and firms is much larger than previously studied in the context of public firms

Minton (2012) and Huson, Parrino, and Starks (2001) show an average of 12% of firms have at least one replacement in a given year, which compares to the 30% of firms in the VC-backed sample. Similarly, Taylor (2010) and other studies point to involuntary replacement rates of CEOs of approximately 2% a year. Thus, VC-backed executives appear to be at a significantly higher risk of replacement than public firm executives. Finally, the mean (median) tenure of a CEO who was replaced is 3 (2.27) years and 4.43 (3.8) if not replaced. These compare to four and six years among CEOs of public firms as in Taylor (2010). These relatively lower tenure lengths, coupled with our results below, suggest that the bulk of executive replacements are involuntary.

When does executive replacement occur in the entrepreneurial firm life-cycle? Figure 1 presents the distribution of replacement events by firm financing round. Many replacements occur in the first round of financing, perhaps as a condition of an initial investment. Replacement rates peak in a firm's second round of financing, perhaps because investors make more changes after an initial period of assessing the management team. We continue to see high rates of replacement even after five or six rounds of financing.

We next examine which executive and firm characteristics predict replacement. Table 4 shows these relationships longitudinally. The unit of observation is each round of financing experienced by a given executive. For the roughly 50% of the sample that are part of the management team prior to the first investment round, we measure the characteristics at the firm's first financing. We estimate the following specification:

$$\text{Replacement}_{ijt} = \beta_0 + \beta_1 X_{it} + \beta_2 Z_{ij} + \beta_3 T_{ijt} + \gamma_{ijt} + \epsilon_{ij} \tag{1}$$

where i is executive, j is entrepreneurial firm and t is firm j's financing event. The vector X_i includes individual characteristics at the time the executive joins the firm, such as title and past experience. An executive is designated a founder as described in Ewens and Fons-Rosen

(e.g. 1,627 replacements in Jenter and Kanaan (Forthcoming) or 981 CEOs and 7,325 firm-years in Taylor (2010)).

(2013) using VentureSource, company websites, Capital IQ and LinkedIn. The vector Z_{ij} includes startup, investor and board characteristics measured at the time executive i joins firm j: size of the investment syndicate, round number, total capital raised, firm industry and firm founding year. The vector T_{ijt} includes person and firm time-varying characteristics such as the individual's tenure at the current firm, firm age, and capital raised to date. The vector γ_{ijt} include year of join fixed effects. The results below are from a linear probability model for easier coefficient interpretation, however, all conclusions are robust to a probit or logit specification.

Table 4 shows that CEOs are much more likely to be replaced than other executives in venture-backed startups, followed by other C-level executives. Founders are less likely to be replaced than non-founders. Interestingly, serial founders appear no less likely to be replaced than other founders. Executives who join before the first round of financing are at greater risk of being replaced, even when controlling for tenure. This finding suggests that investors are indeed scrutinizing the pre-financing management team and making changes. Longer-tenured executives are otherwise less likely to be replaced. Executives are more likely to be replaced if a new investor joined at the time of their hire. Such a correlation again suggests that VCs play an important role in executive turnover. The final column of Table 4 restricts the analysis to executives with at least one full year of tenure, with no change in results.

These results establish that executives are routinely replaced in venture-backed startups and moreover at a higher rate than in public companies. Given our earlier finding that investors stay involved in struggling firms, coupled with prior work finding that executive turnover in public companies is related to poor performance by Hermalin and Weisbach (1988) and Jenter and Lewellen (2010), it seems possible that replacing executives is one of the key mechanisms by which investors attempt to "fix" struggling startups . The remainder of the paper explores this proposition, first by comparing rates of replacement in on-track versus struggling startups and then attempting to draw a causal link between replacement and improvement in outcomes.

4. Executive replacement in struggling ventures: the "living dead"

Although a venture ultimately goes public or has a successful acquisition does not mean that it was always on track. For example, OpsWare was acquired by Hewlett-Packard for $1.6 billion in cash but only after multiple episodes during which then-CEO Ben Horowitz nearly shut down the company. To examine the dynamics of struggling startups, we need a time-varying metric that can be calculated for private firms. Straightforward measures of performance are difficult to obtain for non-public firms, except perhaps in the restricted-access census data employed by Chemmanur and Nancy (2011). We construct a novel metric of whether the struggles of a venture-backed startup based on the timing of financing rounds.

4.1. Classifying struggling ventures

Few venture capitalists have the goal of funding a company that exists perpetually as a private, independent entity (even if a profitable one). Rather, they require liquidity events to generate attractive returns for their limited partners. The VC fund's limited life (ten to twelve years) and common features of the preferred stock contracts held by VCs reinforces this demand for liquidation. Startups that have not yet achieved a liquidity event are likely to seek additional funding to continue toward that goal. Indeed, a strong measure of success is the rate of capital raised over time and the growth in the capital level (e.g. see Korteweg and Sorensen (2010)). Those that fail to raise a successive round of funding in a timely manner, adjusting for industry and period trends, are often referred to as "zombie companies" or the "living dead." We formalize this notion as follows: a firm is said to have entered the ranks of the "living dead" if it does not raise a successive round of capital within the time it took the 90th percentile of peer firms to do so.[9] By "peer" firms we mean those in the same industry, at a similar stage of development (early vs. late) and with a similar stock of capital (e.g.,

[9] All results are insensitive to using the 75th, 80th, 85th and 95th percentiles.

above or below median). A firm emerges from the "living dead" state if and when it raises a subsequent round of financing.[10]

For example, consider a second round financing in 1998 of a biotechnology firm that has raised a below-median amount of capital. If the 90th percentile of time to next financing is two years, then if the focal firm does not raise its second round by two years and one month after the its first round of financing we label it "living dead" in that month. Note that if the focal firm obtains its second round of financing arrived three years after its first round, it would be labeled as in the "living dead" state for the 12 months it was "late" in obtaining financing.

Table 5 characterizes the "living dead" variable. Panel A asks how firms that ever enter this state differ in both ex-ante and ex-post characteristics. If "living dead" proxies for a negative shock from which firms do not fully recover, we would expect these firms to appear worse at exit or end of sample. Indeed, firms that enter this state are 60% less likely to IPO, are less likely to have attractive acquisitions, and are more likely to fail. Furthermore, "living dead" firms raise slightly less capital yet produce exit valuations that are $140m less on average.

Panel B details the financing-level relationship between firms that left the "living dead" state by raising a subsequent round of financing. Several differences across financings are clear. First, firm financings following entry into the "living dead" state are more likely to include new investors, who are less experienced and who invest in smaller syndicates. These two facts are consistent with a struggle to raise outside money, probably at a reduced valuation. The higher probability of being profitable is likely driven by "living dead" being a later-stage event. Last, employment growth from a merge of the National Establishment Time Series (NETS) data are statistically lower after a living dead financing.[11] Overall,

[10]Firms labeled as profitable do not receive a living dead classification, as no capital might have been required to keep the firm alive.

[11]The NETS data (Walls and Associates (2012)) cover employment and sales from Dun & Bradstreet. Unfortunately, many of the annual observations use imputed values, so we do not use the data even as control variables in most specifications. Missing or imputed values also make it impractical to identify struggling firms via NETS data.

Table 5 suggests that the "living dead" measure captures a meaningful distinction between startups that are on-track and those that struggle.

4.2. Executive replacement in on-track vs. struggling startups

Having characterized the "living dead" variable, we now investigate whether this state correlates with executive replacement. If it were the case that investors aggressively exercised their exit option when firms went off-track, we might expect less executive replacement in struggling firms. Instead, investors might primarily replace executives in promising companies to accelerate their progress by bringing in a "professional" CEO to replace the founder. Wasserman (2003) finds that many founder-CEO successions accompany strong revenue growth, and Hellmann and Puri (2002) find that it is more common for the founder to stay after relinquishing the CEO role than to leave the company. Thus, replacement could be common among promising firms in which the investors wish to accelerate growth. To establish the relative importance of these two explanations, we estimate the following cross-sectional regression in which the dependent variables are various dummy variables for executive turnover measured first at each financing:

$$Y_{it} = \beta_0 + \beta_1 \text{Living dead}_{it} + \beta_2 \text{High growth}_{it} + \beta_3 X_{it} + \beta_4 Z_i + \gamma_t + \epsilon_{it}. \quad (2)$$

The regressions include time-varying firm controls (X_{it}), time-invariant firm characteristics (Z_i) and financing year fixed effects (γ_t). Rather than simply compare the 10% of "Living dead" financings to all others, we also consider high quality financings. A financing is "high growth" if it was followed by or follows a relatively quick financing event, namely in the bottom 10% of speed to refinancing. Moreover, a financing is "high-growth" if it is the first time an entrepreneurial firm reports revenues or profits. Some 32% of financings in the sample satisfy either of these conditions. The differences in coefficients β_1 and β_2 tell us the relative sensitivity of performance to replacement rates, compared to all other financing

events.

Table 6 presents this analysis in firm- and financing-level panels, respectively. The second panel aggregates at the firm level, in which we consider a dummy for any living dead financing and the dependent variables are one if there was at least one executive turnover. As one would expect, the first panel shows that replacement rates increase as firms age and raise more capital. Larger executive teams at are higher risk of turnover. Regardless of specification, executives are considerably more likely to be replaced in "living dead" firms or financings than otherwise. Moreover, executives are much less likely to be replaced in "high-growth" financings. Relative to the excluded performance category, firms struggling to raise new capital are almost four times more likely to have at least one executive replacement. "Living dead" financings account for 10% of all financing rounds in our sample but nearly 40% of all executive replacements. Importantly, the regressions in Table 6 control for important alternative explanations such as firm age, time to next financing, and team size. These empirical patterns are not consistent with the view that investors aggressively exercise their exit option when their portfolio companies fail to develop as planned. Instead, investors appear to attempt to fix those firms by replacing executives.

4.3. Executive replacement, investor power, and "living dead"

The results thus far point to significant differences in executive replacements depending on firm performance. While our analysis above suggests that replacements are generally involuntary, one might be concerned that executives could leave "living dead" companies not because they are pushed out but rather because they lose confidence in the company's prospects. If investors proactively replace executives to improve firm performance as opposed to reactively backfilling those who left after losing confidence, then executive replacement in "living dead" financings should increase with investor power.

To assess the role of investors in replacing executives, we use the number of outside directors as a proxy for investor power. The board is explicitly tasked with hiring and firing

the CEO and can exert significant influence over the hiring and firing of other executives. Similar studies of public firm boards, such as Weisbach (1988), show a direct connection between board size and investor power. Furthermore, the VC-backed entrepreneurial firm has a board of directors comprised of three different agents: independent observers, investors and executives (see Kaplan and Strömberg (2003) for details). Independent directors and investors have been shown to play an important role in executive replacement. Lerner (1995) shows that CEO replacement is strongly correlated with an increase in the role of investors on the board of directors. These facts motivate our variable "Outside board size."

Constructing the board of directors dynamics requires three pieces of information. The first is the current and former investor board members provided by VentureSource. It is rare that join dates and end dates are available, so the next two pieces of information help isolate entry and exit onto the board. Each investor that has a board seat is assigned to that board at their first investment in which either they are identified as the "lead" or if they never have a lead position, their first investment in the firm. To isolate exit from the board is more challenging. Although most VCs will retain their position, it is often possible for early-stage VCs to leave the board as the entrepreneurial firm nears a public offering. We date these exits by tracking the first investment in which a known investor stops participating. Additionally, we require that same financing includes a new investor who also has a board seat. If these two conditions hold, then the board member is removed from the board and the new investor joins. This methodology captures over 150 board exits.

Table 7 explores the role of board size in executive replacement for living-dead firms. The dependent variable is equal to one if an entrepreneurial financing had at least one turnover event on or after the investment date. (Results are robust to using counts instead of dummy variables.) Columns (2)-(4) indicate that bigger boards are correlated with more investor replacement in all ventures (# VC board members). The estimates imply a 19% increase in the probability of a turnover with a one standard deviation (1.2) increase in the number of

board members.[12] Column (4) interacts the size of the board with the dummy for firms in a living-dead state for that financing round. The positive coefficient on the interaction term implies that boards with relatively more VC representation are more sensitive to firm performance than smaller boards. The sensitivity to board size increases nearly 57% (.0278/.0474) in the living dead state. Such board connections are the manifestation of the changing board around replacement in VC-backed firms as discussed by Lerner (1995) in the context of private firms and by Denis and Sarin (1999) in the context of public firms. Overall, the results mirror those of Weisbach (1988), who finds that independent boards respond more strongly to firm performance.

4.4. Executive replacement rates across VCs

Thus far we have shown that struggling entrepreneurial firms are at a much higher risk of an executive replacement, and that investors are major decision-makers in this outcome. If the replacement of executives by investors is an important vehicle by which professional investors add value, we would expect executive replacement to differ by investor characteristics. If, as we expect, executive replacement contributes to the performance of startups, then investors with better track records should be more likely to replace executives—especially in struggling startups—for at least three reasons.

First, more successful investors might possess a sharper ability to assess when an executive is not functioning well and needs to be replaced. Less skilled investors could give a struggling executive too many "second chances" or could feel more beholden to charismatic or influential founders. Second, by virtue of their track record, more successful investors will enjoy ties to a larger number of executives who could serve as qualified replacements, both those they have worked with directly and also those accessible through more distant networks. Knowing that they can draw on a deeper pool of talent can enable them to be more aggressive in replacing executives who are struggling. Third, by virtue of their visibility and reputation,

[12]The predicted probability of a turnover at the mean of the control variables in 10.6%. Fixing the means while increasing board size by 1.2 results in a predicted probability of a turnover to 12.2%.

such investors will be better able to convince individuals to join their portfolio companies, particularly when those companies are struggling. An executive might be more likely to take a risk on a struggling startup not only because they think the chances of success are higher when a more successful VC is involved but also because such investors could reward them in the future with more attractive opportunities. For all of these reasons we expect that more prominent and successful VCs will replace executives at a higher rate. Mindful of the result in Table 7 that replacements are driven by larger boards, we examine only board members and not the entire syndicate, as peripherally-involved investors would seem less likely to drive replacement.

We begin by assessing whether VCs are inherently sensitive to the "living dead" state when it comes to executive replacement, as it could be possible that some VCs walk away from investments before they are counted among the "living dead." Column (1) of Table 8 examines the financing-level regressions on executive replacement with investor fixed effects (here, conditional logit). This analysis enables us to answer whether VCs are more likely to replace executives in struggling startups, controlling for time-invariant VC firm characteristics. Suppose that some VCs walk away from investments before they are counted among the "living dead." Here, we cannot separately identify the living-dead dummy from the VC firm fixed effects. On the other hand, some VCs never or rarely replace executives, again limiting the variation to estimate the fixed effect model. This analysis shows that the average VC firm responds to struggling startups by replacing executives.

Column (2) analyzes replacement rates in startups with the frequently-used measure of "experienced" VCs. Following Sorensen (2007), we measure experience as the total (real) dollars invested by that VC in the past three years. The variable "experienced board member" is a dummy variable equal to one if any of the board members of the startup is in the top quartile of investment experience. The largest investors are quite active, so more than a quarter of the financings in our sample have a board member in the top quartile of experience. This model suggests that "experienced" board members are more likely to

replace executives in general. However, the interaction term with the "living dead" state is statistically insignificant, indicating that experienced board members replace neither more nor less often when the entrepreneurial firm is struggling. Although we do not find that "experienced" VCs are more likely to replace executives when startups struggle, we note that "experience" may be a lagging indicator of quality. As shown by Chung, Sensoy, Stern, and Weisbach (2012), dollars invested are highly correlated with fund size. A large fund might have been raised years ago based on even earlier performance. For the remainder of our analysis, we turn to success measures based on more recent performance.

Our next step is to characterize VCs by their current investment performance. For each board member VC, we calculate two measures of current performance. The first is the rate of attractive liquidity events among its portfolio companies in the past three years, again defining "attractive" as either an IPO or a non-fire-sale acquisition. The second is simply the failure rate of its portfolio companies in the past three years. (Results are robust to using a two or four-year lag.) We then define two types of VCs: "high quality" and "low quality." High-quality VCs are those in the top quartile rate of attractive liquidity events in the past three years.[13] Low-quality VCs are those who in the last three years have either not had any attractive liquidity events or, even if they have, are nonetheless above the 75th percentile in terms of failure rate. A firm is classified as having one of these types of investors—as of a given financing event—if at least one active board member satisifies these conditions.

Column (3) introduces the indicator for a "high quality" VC. The coefficient on this variable suggests that, relative to all other VC board members, those with high current performance are more likely to replace executives on average. The coefficient on the interaction of high-quality VC and "living dead" is positive and statistically significant. Thus high-quality VCs not only replace executives more often in general but especially when startups struggle. By contrast, "low quality" VCs in column (4) are less likely to replace executives on average and do not more aggressively replace executives in struggling startups. Both of these

[13]Similarly, Nahata (2008) uses a VC's past IPO market capitalization as a powerful measure of reputation.

results are consistent with our expectations. Taken together, columns (3) and (4) indeed indicate that more successful VCs are more likely to intervene by replacing executives.

If successful investors are more likely to replace executives, especially in portfolio companies that have entered the living-dead state, one might suppose that part of their success is due to their ability to turn around struggling startups. This possibility seems particularly plausible given the connection between larger boards and higher replacement rates. Given that 40% of replacements happen in "living dead" states even though these compose only 10% of financing rounds, we might think that investors turn around struggling startups by replacing executives. On the other hand, it could be that replacing executives in struggling companies has no causal effect on outcomes. Perhaps successful investors nonetheless invest time and energy in good faith but without success, or more cynically, do so primarily to burnish their reputation for "rolling up their sleeves" to help portfolio companies that are not on-track. In the next section, we explore the impact of replacing executives in struggling startups.

5. The Impact of Replacing Executives in "Living Dead" Startups

As noted above, Bottazzi and Hellmann (2008), Chemmanur and Nancy (2011), and Bernstein and Townsend (2014) establish a causal connection between investor activism and IPO/acquisition outcomes. Our analysis differs in two key respects. First, prior work does not distinguish between on-track and struggling startups as does our "living dead" measure. Second, we distinguish between attractive and non-attractive acquisitions (i.e., fire sales). And while prior work has shown that investors indeed replace CEOs of their portfolio companies in good times and in bad (Lerner (1995); Hellmann and Puri (2002); Wasserman (2003)), no connection has been drawn between the replacement of executives and subsequent performance of the struggling portfolio company.

Suppose that the researcher randomly allows a VC to replace an executive of their choice. This assumption eliminates selection issues (i.e. the VC picks the companies that have the best prospects to replace execs or those that need replacement are worse firms) and simply considers causal effects. There are three possible outcomes. In the first, the cause of the firm's struggles are the "jockey" and not the "horse" as suggested by Kaplan et al. (2009) in their analysis of firms that eventually completed an IPO. For whatever reason (e.g. entrenchment), the replacement of the executive is not done without this hypothetical intervention and the firm's performance improves. Similarly, exiting the living-dead state requires a quality match of management and assets for a future acquisition or raising of new equity. Replacement here improves the quality of the firm. Last, replacement could have a negative impact on performance if the executive(s) are an important asset to a typical firm, with random removal lowering firm prospects.

To understand the implications of executive replacement, we would ideally focus on those replacements (or potential replacements) in which the investors took charge and forcefully replaced an executive. The results in Table 7 show that both "living dead" and more VC board positions result in a high rate of turnover. Moreover, Kaplan and Strömberg (2004) show that VC contracts often stipulate strong control rights should the startup struggle. Therefore, our analysis of the effects of executive turnover focuses on the set of entrepreneurial firm financings that enter "living dead" and are presumably struggling.

Consider the dependent variable set to one for an investment that exits from the living-dead state either by raising a successive round of financing or achieving an attractive acquisition that exceeds 125% of total capital raised. Those firms that exit living dead by going public are excluded because they were unlikely ever struggling. An unattractive acquisition, failure of the firm, or remaining in the living-dead state all set the dependent variable to zero.[14] Our empirical model ties the number of replacements to this outcome:

[14]If an acquisition value is unreported, Puri and Zarutskie (2012) suggest that it is small.

$$\text{Exit living dead}_i = \rho_0 + \rho_1 R_i + \rho_2 X_i + v_i \ldots \quad (3)$$

where X_i contains entrepreneurial firm, investor and current investment characteristics measured at the firm's last financing event. R_i counts the number of executive replacements made in the financing. We include industry fixed effects but exclude year fixed effects as explained below. Table 9 presents the results of the equation (3) for the cross-section of firms that enter living dead. Columns (1) and (2) show in linear and dichotomous models, respectively, a strong association between the number of executives replaced after the company has entered the living-dead state and its eventual exit from living-dead (again, via subsequent financing or attractive acquisition). The estimates imply a 15% increase in the probability of exiting living dead when a firm goes from zero to one replacement. This correlation could either have an upward or downward bias of the true treatment effect. Suppose that the treatment effect is positive. If VCs select the firms with the best prospects (conditional on being in living dead), then the estimate of ρ_1 is too large. The VCs could instead only have to intervene when the firm is under-performing, leading to too low of an estimate of ρ_1. Complicating these stories is the heterogeneity in response by investments as shown in Table 7. We now consider an instrumental variables solution to these selection issues.

5.1. Instrumental variables

The variable R_i is likely correlated with the current and future prospects of the entrepreneurial firm, both omitted from (3). We require a variable Z_i that predicts the number of replacements but does not belong in equation (3) (i.e. exclusion restriction). Recall that our sampling procedure considers only firms that are struggling to raise money, allowing us to argue that replacements are investor-led. Under this assumption, we further argue that investors of these firms each have some demand for a new executive to replace one or some of the existing team. Our proposed instrument proxies for changes to the supply of these

outside executives, thus exploiting plausibly exogenous supply shocks combined with a fixed demand.

Table 10 tabulates the the last known employer for all the new executives that replaced existing executives in our sample. Some of the largest established firms dominate the list and provide the first motivation for our proposed instrument. The last column of the table provides the count of acquisitions done by the firm over 1992-2008 as measured from the Securities Data Company (SDC) mergers & acquisitions database. In the majority of cases, the firms have at least as many acquisitions as movement of executives to startups. This connection motivates the instrumental variable: the number of acquisitions done in the entrepreneurial firm's industry – mapped to the industry class in SDC – in the two years prior to the financing event.

The two-year lag stems from a popular contract employed by acquiring firms for the acquired firm's executive teams. These contracts often involve two to four year vesting or bonuses for the executives of acquired firms.[15] These retention contracts create "golden handcuffs" and present executives strong incentives to stay with acquiring firm two years. The expiration of these contracts acts as our source of exogenous variation in the supply of new entrepreneurial firm executives.

A simple analysis confirms a connection between past acquisition activity and executive turnover in VC-backed firms. We estimate the relationship between the number of industry acquisitions in the previous five years and the number of executive replacements in an entrepreneurial firm:

$$\mathrm{R}_{it} = \beta_0 + \beta_1 X_{it} + \sum_{j=-5}^{t} \gamma_j \mathrm{IA}_j + \epsilon_{it} \tag{4}$$

[15] A conversation with an attorney specializing in mergers & acquisitions of private companies explained to us that although the stock options of the executives in the target company fully vest on the change of control, incentives are typically added to retain key personnel beyond the acquisition. It has become common to include large cash-based incentives which are evaluated no later than two years after the acquisition. As one example, Mike McCue left Microsoft just two years after it acquired his startup Tellme Networks (http://www.cnet.com/news/tellmes-mike-mccue-leaving-microsoft). Michael Gilman left Biogen one year and four months after it acquired his prior startup, Strometrix (http://www.bizjournals.com/boston/blog/bioflash/2013/07/gilman-head-of-early-stage-programs.html).

Again, R_it is the count of replacements in entrepreneurial firm i's financing t. This count ranges between zero and five. The estimates of γ_j reveal whether there is a reduced form correlation between the industry acquisitions (IA_j) and replacement (R_{it}). Figure 2 suggests our argument that past acquisitions impact the replacement rates in entrepreneurial firms. The coefficient on same-year acquisitions is economically small and not statistically different from zero, as is the one-year lag. The coefficient on the two-year lag, however, is considerably larger in magnitude than either the zero- or one-year lag, and moreover is statistically significant at the 5% level. Coefficients on three-, four-, and five-year lags are also small and not statistically distinct from zero. These patterns present strong evidence for the proposed connection between acquisition markets and executive replacement rates in venture-backed startups.

To instrument for the number of replacements in firm i at time t we estimate the first-stage model in 2SLS (or IV probit) as:

$$\text{R}_{it} = \phi_0 + \phi_1 \text{IA}_t + \phi_2 X_i + u_{it} \tag{5}$$

where IA_t is the count of acquisitions done by established firms in entrepreneurial firm i's industry two years prior and is our instrument for replacements. The specificiation in (3) and (5) exclude year fixed effects because the IV (IA_t) is measured within industries and across years. Thus, inclusion of year dummies would imply the IV simply provides cross-sectional industry variation.

Column (3) of Table 9 presents the first stage estimates of (5) used in both the two stage least squares and IV probit models. The coefficient on "Acquisition $t-2$" (IA_i) has the predicted sign and is statistically significant. The second stage estimates in columns (4) and (5) present the instrumented coefficient for replacements R_{it}. Two results emerge. First, the positive, statistically significant coefficient remains, suggesting a positive treatment effect. Second, the differences in the estimates between the naive regressions (columns (1) and (2)) and IV results (columns (2) and (5)) imply a downward endogeneity bias. This downward

bias likely stems from a selection of relatively worse firms requiring VC intervention through executive replacement.

Table 11 presents some robustness checks of the instrumented results. One concern about the use of two-year lagged acquisition counts as an instrument is the sort of cyclicality shown by Rhodes-Kropf and Viswanathan (2004). In particular, one might worry that a surge in acquisitions in a given year might be followed by a dearth of acquisition or investment activity a few years later, which then might make it more difficult for firms to exit the living-dead state via acquisition or even follow-on investment. To account for this possibility, the first three models of of Table 11 omit observations in which the two-year acquisition count was not among the top 10% for that industry. Magnitudes and statistical significance closely resemble those of Columns (5) and (6) of Table 9, providing reassurance that the cyclical nature of acquisition "waves" is not a key driver of the results.

Columns (5) and (6) of Table 11 further investigate the mechanism underlying the impact of replacement on exiting the living-dead state by limiting replacements to CEOs or founders. If replacing executives alleviates entrenchment, we would expect the impact of replacing founders and CEOs to be stronger than executives on average. Indeed, the magnitude of the coefficients on the count of CEO and founder replacements in columns (5) and (6) is greater than in columns (3) and (4). These relatively large estimates relative to those in Table 9 reinforces the notion that executive replacements are involuntary, as CEOs and founders likely have the most to lose reputationally by resigning.

6. Discussion and Conclusion

The paper makes four contributions to the literature on how venture capitalists create value. First, it helps to resolve the question of whether investors persist by trying to improve their portfolio companies even as they begin to struggle. Given the low prior probability of success, it is not obvious that investors would not disengage as soon as the portfolio company

begins to struggle. In the realm of public firms, many studies show that top management replacements typically occur following poor performance. This paper is the first to show the same behavior among private directors, using a novel "living dead" measure of pre-exit performance.

Second, this work contributes to a nascent literature on failure in the venture capital industry, which has been largely ignored even though the vast majority of VC-backed ventures do not produce highly attractive returns (see Puri and Zarutskie (2012) for an exception). Understanding how management and investors interact in these situations highlights the role of financial intermediaries and another view of the riskiness of high-growth entrepreneurship. We also offer entrepreneurs a first look at how professional investors are likely to react to interim struggles. While our paper represents one of the first steps in understanding the dynamics of struggling firms, we see room for considerable contributions in this area. We hope that our "living dead" measure will be of use to other scholars who seek to understand the dynamics of failing startups but cannot use restricted-access Census data secured by Chemmanur and Nancy (2011).

Third, ours is the first paper to draw a causal link between involvement by investors (i.e., by replacing executives) and turnarounds of struggling startups. The results complement those of Bottazzi and Hellmann (2008), Bernstein and Townsend (2014), Chemmanur and Nancy (2011), all of whom show that VC's involvement with an entrepreneurial firm improves outcome but do not distinguish between startups that are on-track vs. failing to develop as expected. One possible benefit of additional time is the ability to replace executives in struggling firms. More generally, we contribute to a perennial debate in the venture capital literature regarding the value of the VC firm and partner (Ewens and Rhodes-Kropf (Forthcoming); Gorman and Sahlman (1986); Hellmann and Puri (2002)). To date, value added by investors has primarily been found at the point of investment selection or the monitoring of firms as they grow. Given that the majority of entrepreneurial firms fail, establishing that investors (attempt to) add value by replacing executives in imperiled ventures represents a

novel contribution. Our finding that investors having seen recent success are more likely to replace executives—especially among their struggling portfolio companies—is moreover indicative that "fixing" imperiled startups is a key tool in the VC toolbox.

Fourth, our work is also related to the "horse-vs-jockey" debate in venture capital. Among firms that completed an IPO, Kaplan et al. (2009) found substantial replacement of CEOs. Although "living dead" firms rarely attain IPOs, we likewise find a connection between executive replacement and subsequent liquidity events. Our findings suggest that investors find it productive to replace the "jockey" when they believe the underlying "horse" to be of good stock. Thus a key contribution of investors can be unlocking the value of a firm's core assets by replacing entrenched executives.

These results also suggest a potentially different view of why VCs stage investments (see Gompers (1995)). Whereas prior treatments suggest that investors invest a small amount of capital to maximize learning and preserve their exit option, our data indicate that investors do not in fact aggressively exercise that exit option (as evidenced by continued involvement even in failed companies and higher rates of corrective action in "living dead" startups). Rather, investors replace executives to try to turn around troubled firms. Perhaps the more important role of staging is to preserve the investor's leverage, such that management must agree to changes (perhaps including the sacrifice of their own jobs) to secure further rounds of capital.

Several avenues for future work emerge from this study. While we have focused on the replacement of executives as a mechanism for investors to intervene, what other steps might investors take in an attempt to turn around troubled ventures? Perhaps investors will insist on strategic changes, new business models, or other adjustments. Moreover, ours is only one of the first steps in an effort to more fully characterize the dynamics of struggling startups. Future work may help to reveal the calculus by which investors and entrepreneurs jointly decide to persist (or not).

Tables and figures

Fig. 1. Hazard function of time to transition: round number

Note: Figure reports the distribution of round numbers for all transitions. A transition is assigned to the closest previous financing event of the entrepreneurial firm. Smaller round numbers are for early stage financings.

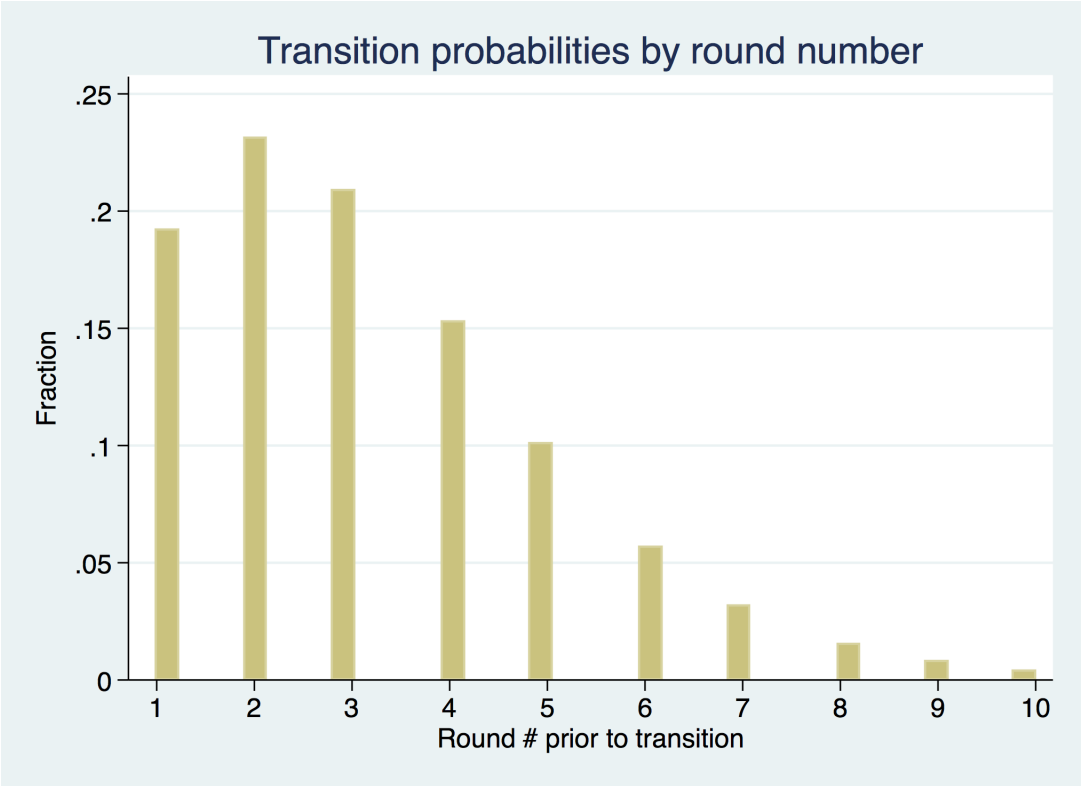

Fig. 2. Replacements and industry acquisitions over time

Note: Figure reports the coefficient estimates of an OLS regression where the dependent variable is the number of replacements in a living dead firm. The model is

$$\text{Number replacements}_{it} = \beta_0 + \beta_1 X_{it} + \sum_{j=-5}^{t} \gamma_j \text{Industry ACQ}_j + \epsilon_{it}$$

where the figure reports the estimates $\hat{\gamma}_j$. The main regressors are the industry-level acquisitions done in the current and previous five years. For example, the "-2" shows the coefficient on the two year lag of acquisitions done in the entrepreneurial firm's industry by established firms.

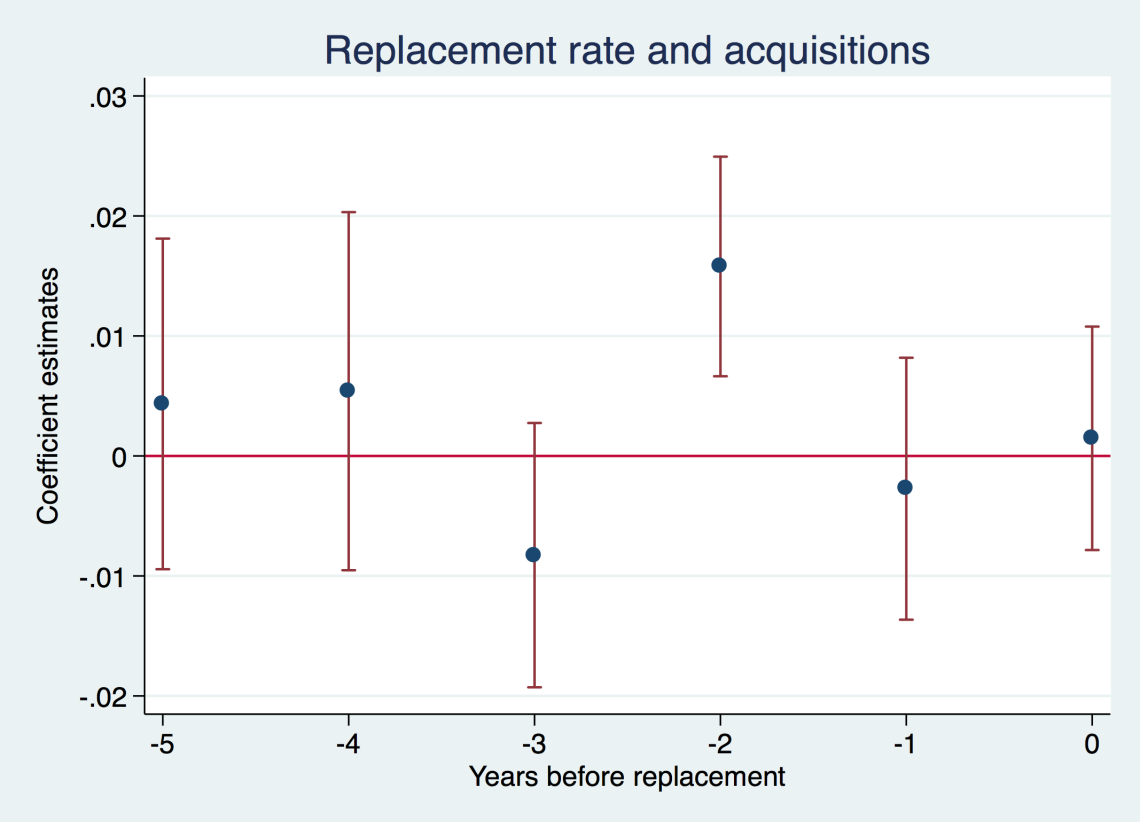

Table 1: Variable description

Note: Description of the variables used in the summary statistics and regression analysis.

IPO	A dummy variable equal to one if the entrepreneurial firm exited via an initial public offering by the end of the sample period (6/2013).
Acq.	A dummy variable equal to one if the entrepreneurial firm exited via an acquisition or merger by the end of the sample period (6/2013).
High acquistion	A dummy variable equal to one if the entrepreneurial firm exited via an acquisition with a reported valuation of at least two times capital invested.
Private	A dummy variable equal to one if the entrepreneurial firm remains private as of the end of the sample (2012).
Failed	A dummy variable equal to one if the entrepreneurial firm failed by the end of the sample (6/2013).
Founding year	The founding year of the entrepreneurial firm, set to the year of first VC financing if unknown.
Biotech	A dummy variable equal to one if the entrepreneurial firm's industry is healthcare or biotechnology.
IT	A dummy variable equal to one if the entrepreneurial firm's industry is information technology.
First capital raised	The total capital raised in the first first VC financing.
Total raised	Total capital raised by an entrepreneurial firm across all its financing events.
Total rounds	Total financing rounds with VC for the entrepreneurial firm.
Is living dead	A dummy variable equal to one if the entrepreneurial firm's financing event took longer than similar financings in the same industry, stage and capital amount over the previous five years (top 10%).
VC total investments (log)	The average number of investments made by all syndicate members as of financing event (logged). This is an experience measure.
Age of firm	Age of entrepreneurial firm at a financing event in years since firm founding .
Total VC invested previous year	Total capital raised in VC in the prior year in all entrepreneurial firms.
Founder	Dummy for whether the individual is a firm founder
CEO?/CXO etc.	Dummy for each of the major titles for executives: CEO, CXO (where "X" can be 'F' or 'I' or 'M') and VP
Time at firm (quarters)	Tenure of executive at firm in quarters by the financing event.
Capital raised as of join	Total capital raised by entrepreneurial firm at the time the executive started (can be 0).
Syndicate size	The number of investors in the current financing round.
Revenues or profits?	Dummy for whether the firm has revenues or profits in the current financing.
Previous founder	Dummy for whether the executive has previously been a founder.

Table 2: Differences in firm characteristics: failed vs. non-failed firms

Note: The table presents cross-sectional regressions comparing failed and non-failed firms. "Total raised" is the log of total capital invested in the firm prior to any exit. "Years private" is the number of years from firm founding to exit. "Years VC-backed" is the number of years from first VC financing to exit. "Board size" is the total number of non-executive board members at the time of exit. "Total investors" is the total number of unique investors by the time the entrepreneurial firm exits. "Log # rounds" is the log of the total number of financings prior to exit. Standard errors clustered at the founding year reported. Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Failed vs. successful					
	First capital	Total raised	Board size	Log # rounds	Years private (log)	Years VC-backed (log)
	(1)	(2)	(3)	(4)	(5)	(6)
Failed?	-0.128*	-0.376*	-0.880**	-0.0921	0.0732	0.122
	(0.0466)	(0.156)	(0.170)	(0.0704)	(0.0832)	(0.0916)
First K raised		0.470***	0.219***	-0.0582***	0.0138	-0.0475**
		(0.0194)	(0.0173)	(0.00651)	(0.00842)	(0.0101)
Consumer	-0.00182	-0.268***	-0.278***	-0.197***	-0.291***	-0.363***
	(0.0118)	(0.0276)	(0.0211)	(0.0148)	(0.0438)	(0.0386)
IT	0.0320*	-0.104**	-0.343***	-0.0920**	-0.164**	-0.167**
	(0.0126)	(0.0284)	(0.0199)	(0.0174)	(0.0326)	(0.0319)
Biotech	-0.0612***	0.187***	0.575***	0.0999***	-0.00978	0.0736***
	(0.00602)	(0.0130)	(0.0348)	(0.0114)	(0.00949)	(0.0120)
Constant	1.338**	1.868***	3.492***	0.946**	1.864***	1.207**
	(0.372)	(0.154)	(0.471)	(0.165)	(0.254)	(0.265)
Observations	7674	7674	7674	7674	7623	7613
R^2	0.0345	0.267	0.117	0.0851	0.110	0.0722
Year founded FE?	Y	Y	Y	Y	Y	Y
State FE?	Y	Y	Y	Y	Y	Y

Table 3: Comparison of firms with transitions: known and unknown dates

Note: Table report means, differences and two-sided t-statistic p-values for two sub-samples for entrepreneurial firms with at least two financing events. "Unknown date" are management transitions where we observe two unique individuals with the same title, but we cannot determine when each joined the firm. The column "Known date" includes the set of firms for which we can date at least one of the individuals, and thus the transition itself. Table reports entrepreneurial firm characteristics as defined in Table 1.

	Unknown date	Known date	Diff/s.e.
IPO	0.0926	0.119	-0.0262**
			0.00912
Acq.	0.349	0.398	-0.0494***
			0.0140
Private	0.249	0.285	-0.0363**
			0.0129
Failed	0.282	0.162	0.120***
			0.0111
CA	0.387	0.421	-0.0342*
			0.0142
MA	0.0939	0.123	-0.0290**
			0.00924
TX	0.0500	0.0581	-0.00816
			0.00664
NY	0.0606	0.0465	0.0141*
			0.00621
Founding year	1997.0	1998.1	-1.030***
			0.180
Biotech	0.225	0.197	0.0270*
			0.0115
IT	0.502	0.567	-0.0645***
			0.0143
First capital	5.712	6.593	-0.881
			0.476
Total Raised	31.86	54.59	-22.73***
			4.515
Total rounds	3.815	4.839	-1.024***
			0.0667
Exit valuation	$138.9m	$244.7m	-$-105.7*
			67.5
Unique firms	1,531	6,383	7,914

Table 4: Longitudinal analysis of executive replacements

Notes: Table reports the entrepreneurial executive-level analysis of firm, investor and market characteristics that correlate with turnover. The dependent variable is equal to one if the executive was ever replaced. All variables are measured at the time of the executives first financing when their tenure begins. All regressions are linear probability models. The column "> 1 tenure" includes all executives with at least one year of tenure. "CEO" is one if the executive is the CEO title, "CXO" is one for all other "Chief" level titles and the excluded category is "VP." "Firm founder?" is equal to one if the individual is the firm founder and "Serial founder?" is one if that founder has previous founding experience. "VC experience at join" is the log of the VC syndicate at the executive's join date. "# VCs on board at join" counts the number of VC investors on the board at join. "Syndicate size at join" is the size of the VC syndicate at time of join and "New investor at join?" is equal to one if a new investor joined the syndicate. "Joined before VC" is one if the executive was with the firm prior to the first investment by VCs. "Capital raised as of join" is the total capital raised by the time the executive joined. "Industry FE?" are five industry dummies, "Year join FE?" are dummies for the join year, "Stage join FE" are fixed effects for the stage of the firm when the executive joined (e.g. early vs. late) and "State FE" are entrepreneurial firm state dummies. Standard errors are clustered at the join year of the executive. Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	All	All	All	> 1 tenure
	(1)	(2)	(3)	(4)
CEO	0.0702***	0.0664***	0.0733***	0.0733***
	(0.00406)	(0.00405)	(0.00406)	(0.00416)
CXO	0.00366	0.000640	0.00618**	0.00728**
	(0.00275)	(0.00283)	(0.00285)	(0.00291)
Firm founder?	-0.0433***	-0.0559***	-0.0608***	-0.0580***
	(0.00276)	(0.00405)	(0.00412)	(0.00415)
Previous founder?	0.00191	-0.00479	-0.00156	0.00210
	(0.00931)	(0.00920)	(0.00930)	(0.00942)
Time at firm (quarters)		-0.0102***	-0.00921***	-0.00217***
		(0.000674)	(0.000674)	(0.000642)
Time at firm sq. (quarters)		-0.00689***	-0.00770***	-0.00800***
		(0.000260)	(0.000257)	(0.000258)
VC experience at join		-0.000191	0.000399	0.000293
		(0.00109)	(0.00110)	(0.00112)
# VCs on board at join		-0.00192*	-0.00133	-0.00135
		(0.00112)	(0.00113)	(0.00116)
Syndicate size at join		0.00323	-0.00165	-0.00197
		(0.00296)	(0.00297)	(0.00301)
New investor at join?		0.0154***	0.0105**	0.00784*
		(0.00440)	(0.00442)	(0.00463)
Joined before VC		0.0189***	0.0204***	0.0205***
		(0.00474)	(0.00483)	(0.00493)
Capital raised as of join		0.0000511	-0.000732	-0.000499
		(0.000810)	(0.000813)	(0.000826)
Observations	186562	186355	186355	178014
R^2	0.009	0.028	0.038	0.033
Unique executives	50317	50201	50201	45598
# firms	10391	10391	10391	10259
% transition	0.0985	0.0982	0.0982	0.0909
Industry FE?	N	N	Y	Y
Year join FE?	N	N	Y	Y
Stage join FE?	N	Y	Y	Y
State FE?	N	Y	Y	Y

Table 5: Living dead: financings and dynamics

Notes: Table reports the financing-level predictability of a "living dead" within an entrepreneurial firm's financing. The first panel aggregates at the firm-level and the second panel considers financing characteristics. "High acquisition" is an acquisition that results in a price at least two times total capital. "Failed/Unknown acq." is a failed firm or an acquisition with unknown or below one times capital invested price. All other variables defined in Table 1. Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Living dead firms		
	Never living dead	Ever living dead	Diff/s.e.
IPO	0.109	0.0403	0.0691***
			0.00595
High acquisition	0.178	0.150	0.0278***
			0.00792
Failed / unknown Acq.	0.510	0.606	-0.0959***
			0.0105
Private	0.204	0.205	-0.00176
			0.00852
CA	0.428	0.360	0.0684***
			0.0104
MA	0.116	0.110	0.00597
			0.00672
Founding year	1999.9	1999.1	0.811***
			0.0854
Biotech	0.193	0.232	-0.0383***
			0.00854
First capital	6.218	6.430	-0.212
			0.382
Total Raised	47.84	39.49	8.353***
			1.574
Total rounds	4.440	4.336	0.104*
			0.0459
Exit value ($m)	248.3	107.7	140.6***
			22.6
Observations	7149	3254	10403
	Living dead financings		
	Not living dead	Living dead	Diff/s.e.
Executive replacement?	0.145	0.372	-0.228***
			0.00733
Next new board member	0.343	0.359	-0.0162
			0.00958
Next new investor	0.630	0.704	-0.0737***
			0.00970
Syndicate size	11.31	10.38	0.935***
			0.188
Employment growth	0.242	0.196	0.0455***
			0.00859
New board member?	0.444	0.436	0.00892
			0.0100
Last financing before failure	0.00847	0.0278	-0.0194***
			0.00200
Revenues or profits?	0.653	0.802	-0.149***
			0.00949
Round number	2.988	3.173	-0.184***
			0.0429
VC total investments (log)	3.673	3.567	0.106***
			0.0251
Financing year	2003.4	2005.5	-2.112***
			0.0918
Financings	41960	3891	45851

Table 6: Relative rates of executive replacement: success vs. struggling firms

Notes: Table reports regressions of the probability that an executive was replaced at the financing and firm-level. The first panel reports the financing level characteristics that correlate with various types of replacement. "Any exec." has a dependent variable equal to one if any executive was replaced at or after the financing. "Founder" is one if at least one of the executives was a founder, "CEO" is one if at least one executive was a CEO and "CEO or Fndr." is one if an executive was a founder or CEO. "# replaced" is a count of the number of replacements in the financing or company. The second panel reports the firm-level analysis. "Living dead" in the first panel is equal to one if the financing was ever labeled living dead. "High growth fin." is equal to one if the financing was raised very quickly (top 10% of speed) or the firm reached profitability in the financing. Variables defined in Table 1. Standard errors clustered at the financing year or year founded in parentheses. Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	Financing-level				
	Any exec.	Founder	CEO	CEO or Fndr.	# replaced
Living dead?	0.467***	0.321***	0.321***	0.287***	0.194***
	(0.0466)	(0.0427)	(0.0466)	(0.0425)	(0.0207)
High growth fin.?	-0.141***	-0.112***	-0.158***	-0.154***	-0.0294***
	(0.0232)	(0.0314)	(0.0256)	(0.0205)	(0.00449)
Age of firm	0.0922***	0.0544**	0.103***	0.0883***	0.0118**
	(0.0289)	(0.0220)	(0.0261)	(0.0193)	(0.00443)
Exec. team size	0.176***	0.103***	0.101***	0.112***	0.0603***
	(0.00571)	(0.00714)	(0.00784)	(0.00771)	(0.00648)
Total capital raised (log)	0.0168**	-0.00161	0.0142**	0.000979	-0.00336***
	(0.00664)	(0.0105)	(0.00627)	(0.00474)	(0.00111)
Last round?	-0.730***	-0.467***	-0.534***	-0.450***	-0.128***
	(0.0895)	(0.108)	(0.0947)	(0.108)	(0.0345)
Years to next fin.	0.0619***	0.0531***	0.0601***	0.0485***	0.0118***
	(0.00950)	(0.00997)	(0.00984)	(0.00963)	(0.00317)
Observations	34917	32606	32962	34005	34917
Psuedo R^2	0.206	0.118	0.134	0.118	
R^2					0.190
Firms	10129	9815	9873	9995	10129
State, round FE?	Y	Y	Y	Y	Y
Year founded FE?	Y	Y	Y	Y	Y
Industry X year FE	Y	Y	Y	Y	Y
	Firm-level				
	Any exec.	Founder	CEO	CEO or Fndr.	# replaced
Ever living dead?	0.285***	0.250***	0.285***	0.239***	0.181***
	(0.0399)	(0.0485)	(0.0546)	(0.0567)	(0.0202)
Firm age at exit	0.399***	0.211***	0.332***	0.288***	0.183***
	(0.0538)	(0.0568)	(0.0574)	(0.0399)	(0.0256)
Team size	0.180***	0.0783***	0.0863***	0.0946***	0.138***
	(0.00490)	(0.00586)	(0.00642)	(0.00504)	(0.00598)
Total capital raised	-0.00548	-0.0179	-0.0204	-0.0334**	-0.0396***
	(0.0110)	(0.0110)	(0.0141)	(0.0139)	(0.00508)
Total financings	0.0611***	0.0339***	0.0361***	0.0638***	0.0604***
	(0.00786)	(0.00611)	(0.0121)	(0.00764)	(0.00891)
Observations	8770	8655	8690	8735	8790
Psuedo R^2	0.224	0.0811	0.108	0.115	
R^2					0.326
State FE?	Y	Y	Y	Y	Y
Round # FE?	N	N	N	N	N
Year founded, industry FE?	Y	Y	Y	Y	Y

Table 7: Executive replacement and board size

Notes: Table reports the financing-level propensity for replacement where the unit of observation is each financing for which an executive is part of the management team. The dependent variable is equal to one at least one executive was replaced. Regression models are probit. The variable "Living dead" is equal to one if the financing ever entered the living dead state (i.e. struggling to raise new capital). "Firm age (yrs.)" is the age of the entrepreneurial firm at the time of the financing. "Log team size" is the log of the number of active executives as of the financing. "Total capital raised" is the sum of capital raised by the entrepreneurial firm. "Syndicate size" is the count of the number of investors in the current financing. "# VC board members" is the total number of outside board members as of the financing. The FE variables as defined in Table 4. Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	At least one executive replacement?			
	(1)	(2)	(3)	(4)
Living dead?			0.670***	0.614***
			(0.0243)	(0.0391)
Firm age (log yrs)	0.0256**	0.0281**	0.000574	0.00688
	(0.0124)	(0.0124)	(0.0125)	(0.0125)
Log team size	0.459***	0.451***	0.467***	0.468***
	(0.0173)	(0.0174)	(0.0177)	(0.0177)
Total capital raised (log)	0.0616***	0.0508***	0.0559***	0.0513***
	(0.00759)	(0.00770)	(0.00761)	(0.00761)
Syndicate size	0.0479***	0.00504	0.00656	-0.00666
	(0.0132)	(0.0146)	(0.0149)	(0.0152)
# VC board members		0.0462***	0.0540***	0.0474***
		(0.00675)	(0.00682)	(0.00708)
# VC board members X Living dead				0.0278*
				(0.0149)
Observations	44959	44959	44959	44958
Pseudo R^2	0.090	0.091	0.112	0.113
Unique firms	10386	10386	10386	10386
Financing year FE?	Y	Y	Y	Y
Industry FE?	Y	Y	Y	Y
State FE?	Y	Y	Y	Y

Table 8: Executive replacement and investor characteristics

Notes: Table reports the financing-level propensity for replacement where the unit of observation is each financing for which an executive is part of the management team. The dependent variable is equal to one at least one executive was replaced. Regression models are probit. Most variables defined in Table 7. "VC experience" is the log of the total number of investments made by all syndicate members as of the financing. "High quality VC" is a dummy variable if at least one of the firm's board members as of the financing had top quartile IPO or successful acquisition rates over the previous three years. "Low quality VC" is a dummy variable if those same board members are in the top quartile of failure rates in the last three years and/or in the bottom quartile of IPO / successful acquisition rates. The dummy variable "Experienced board member" is equal to one if the entrepreneurial firm's board has at least one member whose past three year investment activity (in dollars) is in the top quartile of all VC investors. FE as defined in Table 4. Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	At least one executive replacement?			
	(1)	(2)	(3)	(4)
Living dead?	1.062***	0.671***	0.609***	0.674***
	(0.0270)	(0.0316)	(0.0559)	(0.0333)
Firm age (log yrs)	0.107***	0.0312**	0.0197	0.0211
	(0.0163)	(0.0140)	(0.0183)	(0.0138)
Log team size	1.018***	0.528***	0.528***	0.528***
	(0.0201)	(0.0191)	(0.0269)	(0.0191)
Total capital raised (log)	0.0953***	0.0517***	0.0587***	0.0569***
	(0.0125)	(0.00894)	(0.00666)	(0.00903)
VC experience	0.0999***	0.0262***	0.0464***	0.0506***
	(0.0109)	(0.00802)	(0.00704)	(0.00763)
# VC board members	0.0582***	0.0289***	0.0375***	0.0369***
	(0.00751)	(0.00776)	(0.00893)	(0.00766)
Experienced board member		0.202***		
		(0.0214)		
Experienced board X Living dead		-0.0577		
		(0.0536)		
High quality VC			0.0766***	
			(0.0202)	
High quality VC X Living dead			0.147**	
			(0.0684)	
Low quality VC				-0.117***
				(0.0199)
Low quality VC X Living dead				-0.0622
				(0.0519)
Observations	92262	35531	35531	35531
Pseudo R^2	0.115	0.110	0.108	0.109
Unique firms	9844	10235	10235	10235
VC firm FE?	Y	N	N	N
Financing year FE?	Y	Y	Y	Y
Industry FE?	N	Y	Y	Y
State FE?	N	Y	Y	Y

Table 9: Impact of replacement in struggling firms: Instrumental variables

Notes: Table reports the first stage and IV results for the specification of whether executive replacement effects the entrepreneurial firm's ability to exit the "living dead" state. Column (1) runs the naive regression of the main dependent variable – a dummy for whether the firm exited the living dead state – on the count of replacements done by the firm. Column (2) reports the same regression, but with a probit. Column (3) is the first stage result of the last two column specifications. It regresses the number of executive replacements on the main controls and the instrumental variable (IV). The IV is the two-year lagged acquisition count for the entrepreneurial firm's industry dated by the predicted year the firm entered living dead. Column (4) presents the simple two-stage least squares, while Column (5) reports the IV probit (because the main dependent variable is binary). "# replacements" is the count of replacements made in the first living dead financing. "Acquisition $t-2$" is the count of acqusitions done in the entrepreneurial firm's industry two years prior to the financing. "Has revenues/profits?" is a dummy equal to one of the firm has revenues at the time of the financing. "Log total capital" is the log of total capital raised by the firm as of the financing. "Log firm age" is the log of the firm's age as of the financing. "F-stat" is the Cragg-Donald test statistic for weak instruments. "Industry FE?" are fixed effects for the five major industry categories in VentureSource. Robust standard errors in parentheses. Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1) Exit LD?	(2) Exit LD?	(3) 1st stage	(4) 2SLS	(5) IV probit
# replacements	0.0783***	0.203***		0.349**	0.853***
	(0.0127)	(0.0349)		(0.149)	(0.296)
Acquisition $t-2$			0.0204***		
			(0.00382)		
Has revenues/profits?	0.0463**	0.121**	0.0970***	0.0188	0.0437
	(0.0186)	(0.0487)	(0.0165)	(0.0239)	(0.0607)
Log total capital	0.0243***	0.0638***	0.0507***	0.00982	0.0232
	(0.00339)	(0.00922)	(0.00386)	(0.00868)	(0.0231)
Log firm age	-0.0195***	-0.0510***	0.0241***	-0.0250***	-0.0605***
	(0.00731)	(0.0191)	(0.00676)	(0.00807)	(0.0183)
Constant	0.337**	-0.430	0.0991	0.309*	-0.464
	(0.158)	(0.412)	(0.138)	(0.169)	(0.406)
Observations	4349	4349	4349	4349	4349
R^2	0.0370		0.0858	.	
Pseudo-R^2		0.0322			
F-stat				28.537	28.537
Year FE?	N	N	N	N	N
Industry FE?	Y	Y	Y	Y	Y

Table 10: Top 40 employers of replacing executives joining entrepreneurial firms

Notes: Table tabulates the count of employers for the executives that join the entrepreneurial firms in our sample where we identify a replacement. Employers are from the short biographical string of the executive available in VentureSource. "Total acquisitions" counts the number of firms acquiring US-based targets over the 1992-2008 sample period.

	Count	Percent	Cumulative %	Total acquisitions
IBM	59	6.81	6.81	80
Oracle	57	6.57	13.38	44
HP	43	4.96	18.34	60
Cisco	42	4.84	23.18	86
Lucent	39	4.50	27.68	26
AT&T	38	4.38	32.06	31
Microsoft	36	4.15	36.22	87
GE	30	3.46	39.68	197
Intel	29	3.34	43.02	42
Nortel	28	3.23	46.25	8
Motorola	26	3.00	49.25	47
Sun Microsystems	24	2.77	52.02	39
EMC	23	2.65	54.67	32
PeopleSoft	21	2.42	57.09	15
Symantec	21	2.42	59.52	34
Ernst & Young	20	2.31	61.82	34
Price Waterhouse	19	2.19	64.01	1
SAP	19	2.19	66.21	1
Deloitte & Touche	18	2.08	68.28	33
Siebel	18	2.08	70.36	15
Lucent	17	1.96	72.32	26
Dell	17	1.96	74.28	9
3Com	16	1.85	76.12	18
Siemens	16	1.85	77.97	23
McKesson	15	1.73	79.70	25
Novell	14	1.61	81.31	17
Cadence Design Systems	13	1.50	82.81	29
EDS	13	1.50	84.31	29
Yahoo	13	1.50	85.81	26
Ariba	12	1.38	87.20	26
Medtronic	12	1.38	88.58	32
i2	12	1.38	89.97	9
AOL	11	1.27	91.23	15
Accenture	11	1.27	92.50	0
Apple	11	1.27	93.77	13
Computer Associates	11	1.27	95.04	2
FOX	11	1.27	96.31	5
Pfizer	11	1.27	97.58	19
Sony	11	1.27	98.85	4
Merck & Co	10	1.15	100.00	7
Total	867	100.00		

Table 11: Impact of replacement in struggling firms: IV robustness check

Notes: Table reports two additional specifications of the instrumental variables model in Table 9. The dependent variable in columns (2) -(3) and (5) - (6) is a dummy for whether the entrepreneurial firm exited the "living dead" state (i.e. didn't fail or remaining a struggling firm). Columns (1) - (3) only include those entrepreneurial firms who did not enter the living dead state after a very active industry acquisition market (outside the top 10% of activity within the industry). Column (1) is the first stage OLS regression of the number of replacements regressed on the lagged industry acqusition rate IV. Columns (4) - (6) considers the count of founder and/or CEO transitions as the main (endogenous) variable of interest ("# CEO/Founder replacements"). Column (4) is the first stage OLS regression of the number of founder/CEO replacements regressed on the main controls and the lagged acquisition rate IV. All controls are as defined in Table 9. Robust standard errors in parentheses. Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)	(5)	(6)
	No acq. peaks			CEO / Founder		
	1st stage	2SLS	IV probit	1st Stage	2SLS	IV Probit
# replacements		0.434**	1.038***			
		(0.180)	(0.331)			
# CEO/Founder replacements					1.277*	2.415***
					(0.686)	(0.615)
Acquisition $t-2$	0.0369***			0.00557***		
	(0.00773)			(0.00208)		
Has revenues/profits?	0.0732***	0.00308	0.00659	0.00165	0.0505**	0.0935*
	(0.0199)	(0.0279)	(0.0671)	(0.0109)	(0.0222)	(0.0513)
Log total capital	0.0447***	0.00936	0.0227	0.0127***	0.0113	0.0207
	(0.00454)	(0.00957)	(0.0251)	(0.00213)	(0.0100)	(0.0244)
Log firm age	0.0122*	-0.0216**	-0.0503**	0.00938**	-0.0286***	-0.0535***
	(0.00738)	(0.00966)	(0.0227)	(0.00365)	(0.0102)	(0.0163)
Constant	0.255	0.261	-0.564	-0.0381***	0.392**	-0.201
	(0.176)	(0.223)	(0.504)	(0.0124)	(0.158)	(0.310)
Observations	2567	2567	2567	4349	4349	4349
R^2	0.0758	.		0.0178	.	
F stat		22.75	22.75		8.37	8.37
Year FE?	N	N	N	N	N	N
Industry FE?	Y	Y	Y	Y	Y	Y

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