Destructive Creation at Work: How Financial Distress Spurs Entrepreneurship*

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ABSTRACT

Using U.S. Census firm-worker data, I document that firms' financial distress has an economically important effect on employee departures to entrepreneurship. The impact is amplified in the high-tech and service sectors, where employees are key assets. In states with enforceable noncompete contracts, the effect is mitigated. Compared to typical entrepreneurs, distress-driven entrepreneurs are high-wage workers who found better firms, as measured by jobs, pay, and survival. Startup jobs compensate for 33% of job losses at the constrained incumbents. Overall, the financial inability of incumbent firms to pursue productive opportunities increases the reallocation of economic activity into new firms.

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Many new firms have been founded by workers who leave paid employment. Bhide (2000) finds that 71% of founders replicated or modified an idea from previous jobs. Why do workers start new firms instead of pursuing that economic activity with their original employer? In addressing this question, prominent theories of the firm emphasize that frictions are fundamentally important for understanding where economic activity takes place (Hart, 1988). Two kinds of frictions are critical. First, employees may lack incentives to bring growth options to fruition, while entrepreneurs do not. This incentive-related friction tends to push projects into new firms. Second, incumbent firms usually have the financial resources needed to pursue productive opportunities, while startups do not. This financing-related friction favors incumbent firms.

Although the implications of incentive-related frictions for startups are well understood, how incumbent firms' financial inability to pursue productive opportunities affects employee reallocation to entrepreneurship is not clear. Classic corporate finance theories predict a null effect. For example, debt overhang or the firm-specific nature of projects suggest that opportunities unfunded due to financial constraints disappear.[1] Alternatively, financial distress can boost entrepreneurship in models based on incomplete contracting.[2] In these models, growth options partially reside in workers' human capital and, therefore, can literally walk out with the employees. Hence, employees can take valuable projects, clients, or ideas from a financially constrained employer to a startup. Or firms' distress might stifle entrepreneurship if the shock increases risk aversion or decreases wages.

I document that incumbent firms' financial distress has a positive and economically significant effect on employee departures to entrepreneurship. Jobs created in the new firms account for 33% of the job losses at the distressed incumbents. Entrepreneurs spawned from constrained employers are high-wage workers who found better performing firms, as measured by jobs, pay, and survival, relative to typical startups. Overall, the financial inability of incumbent firms to pursue productive opportunities increases the reallocation of economic activity into new firms.

Three big challenges likely explain the lack of prior similar evidence. First, tracking workers from incumbent to new firms is difficult, as such data are rare. Second, because of the endogeneity of worker separations, attributing entrepreneurial departures to employer-related frictions is difficult.

[1]See Myers (1977) and Titman (1984), respectively.

[2]See Grossman and Hart (1986), Hart and Moore (1994), and Rajan and Zingales (2001).

For example, a decline in a firm's fundamentals or other omitted variables can cause bankruptcy. These omitted factors can lead workers to flee or to appropriate employers' assets well before bankruptcy, raising concerns about reverse causality and selection into distressed firms. A shock is needed to establish a time line for departures. Third, identifying the financial constraints channel proves challenging because of potential indirect effects associated with firm capital structure.

To overcome the first challenge, I construct a unique data set that combines firms' financial data from Compustat with U.S. Census databases on firm-worker matched data and on newly created employer firms. Focusing on new firms that hire employees allows me to overcome criticisms of the commonly used self-employment measure, which creates few jobs.[3] The average startup in my sample is an incorporated business with an office and 11 employees in its first year. Using these databases, I construct novel panel data that measure departure rates of workers from U.S. public firms to firms founded over 1990–2008. My entrepreneurship measure captures founders and key early employees, the people likely to bring ideas, clients, and human capital to new firms. I document that, on average, 1.5% of employees depart to entrepreneurship within 3 years.

To address the second and the third challenges, I identify incumbent firm distress in a difference-in-differences setting around unexpected industry-wide shocks. I then compare the effect of shocks on firms with differential ex ante financial exposure. I use firms' financial leverage as the main measure of exposure and the fraction of maturing long-term debt, for robustness.[4] This setting is conducive to testing the key hypothesis: financing frictions should be especially binding for firms with either a large debt burden, which has to be serviced from sparse cash flows, or with high maturing debt, which needs to be rolled over or paid down during these adverse conditions. The shocks are plausibly exogenous from the perspective of any given firm or worker, mitigating the reverse causality, selection, and omitted variables issues mentioned above. In this setting, the effect of firm distress on entrepreneurship is identified through the incremental effect of shocks on more-exposed firms, while controlling for the direct effects of the shocks and the firm exposure.

The granularity of my data allows me to include a wide array of fixed effects to address specific additional concerns. The tightest specification includes establishment, state-year, and industry-year

[3] See Schoar (2010), Hurst and Pugsley (2011), and Levine and Rubinstein (2017).
[4] See Opler and Titman (1994), Almeida et al. (2012), and Carvalho (2015).

fixed effects. These fine fixed effects allow for isolation of the direct impact of financial exposure to shocks on workers who otherwise face the same industry and local conditions. Using within-firm variation in firm exposure to shocks addresses the concern that entrepreneurial workers select into high-exposure firms. Because I compare the same employees before and after the shock, I control for the average selection effect. Two additional tests further mitigate omitted variable concerns. First, there are no changes in entrepreneurial departures in more-exposed firms leading up to the industry shocks, which supports the parallel trends assumption of the difference-in-differences strategy. Second, high-leverage firms are not generally more sensitive to shocks: a placebo test shows statistically zero effect in high-exposure firms following unexpected industry booms.

The results suggest that incumbent firm distress is an important trigger for the reallocation of employees to new firms. A 1-standard-deviation increase in leverage preshock predicts a 21% increase in departures to entrepreneurship post-shock. Moreover, departures specifically increase to entrepreneurship. I find no significant exit to other incumbent firms. These findings uncover a novel channel for the creation of high-growth entrepreneurship within a population of economically important new firms.

The cross-sectional results are consistent with the theoretical models in which financial constraints impair incumbent firms' ability to exploit productive opportunities. First, the financial constraints channel predicts that distress-driven startups will pursue economically related activity that could have taken place inside the distressed firm. Indeed, I find larger economic effects of distress on departures to same-sector new firms compared to exits to all startups. Relatedly, I find that the results are driven by states with less enforceable noncompete agreements, that is, states in which firms are legally constrained from using contracts to discourage employees from competing. Second, theory predicts more distress-driven entrepreneurial departures in sectors with more intangible assets, where growth options likely reside with employees. As predicted, the effects are larger in high-tech and service industries. Third, the financial constraints channel implies that an employee starts a firm to exploit a valuable growth opportunity that the distressed employer is unable to capitalize upon. Indeed, distress predicts the spawning of new firms that have high future employment and payroll growth relative to typical new firms. Theoretically, high-wage workers are more likely to have access to projects, clients, and good ideas. Consistent with this, workers with above-median wages drive the startup growth results.

I consider several plausible alternative explanations. For example, high leverage may ensure greater discipline in downturns (Jensen, 1986), which produces both firm restructuring and employee exits (the discipline mechanism). Or, high leverage can attract risk-loving workers, who are more likely to start a business (the risk-taking mechanism). Finally, high-leverage firms also may be less productive (the economic distress mechanism). After using a wide array of tests for each of these alternative explanations, I do not find that they drive the results.

The remaining question is whether the financial constraints of incumbent firms dislocate employees into new firms more generally or a shock is needed to trigger the constraint. Practically, finding a setting in which a firm exogenously becomes constrained in good times is difficult. For that reason, the literature has used firm-level indices of financial constraints. I use the W-W index (Whited and Wu, 2006) and the Size-Age index (Hadlock and Pierce, 2010) to predict departures to startups. Consistent with my main results, both indices predict financially constrained incumbents will have higher rates of entrepreneurial departures and spawn high-growth new firms. These additional findings generalize the results to periods without industry downturns.

In sum, the results paint a consistent story. Employees depart financially constrained incumbents to create economically important new firms. Following employer distress, it is the workers with access to projects, clients, and good ideas who start high-growth new firms. The effect is amplified in industries with high intangible assets, in which growth options likely reside with employees. The effect is mitigated when a distressed incumbent can use enforceable noncompete agreements to discourage workers from leaving.

The implications are important from empirical and theoretical perspectives. Empirically, the findings imply that measuring employment losses at the firm level (standard in the literature) will overestimate total losses due to financial constraints. My findings suggest that jobs created at the distress-driven new firms partially compensate for job losses at the distressed incumbents. In theory, my findings suggest that when an incumbent is financially unable to pursue productive opportunities, they do not necessarily evaporate. If the opportunities are indeed valuable, an employee can pursue them independently. The results lend support to theories of the firm that emphasize the importance of frictions faced by *existing* firms as a cause for *new* firm creation (Hart, 1988). These theories are understudied empirically. From a policy perspective, they are quite relevant. A well-documented decline in new-firm creation led to calls to study potential inefficiencies behind the trend (Decker et al., 2014). Theoretically, if incumbents face fewer frictions (e.g., through deregulation, better risk management), having fewer new firms might not be bad.

This paper contributes to the entrepreneurship literature and, specifically, the literature that considers why employees become entrepreneurs. The closest paper to mine is Gompers et al. (2005), who examine characteristics of U.S. public firm that predict employee departures to venture capital (VC) funded startups, but does not study distress. My contribution is fourfold. First, I document that following employer distress, employees are more likely to start and join new firms, and that the results are consistent with the financial constraints channel. Second, I construct novel data on a much broader set of new firms. Third, I examine the quality of entrepreneurship: many papers do not because of data constraints. Fourth and finally, existing papers typically use cross-sectional variation to predict entrepreneurial departures. Isolating a shock to establish a time line for departures is difficult.[5] In contrast, this paper uses a difference-in-differences strategy around industry shocks.

This paper also adds to the research on costs of firms' financial distress. Theory has long argued that distress is costly, because it hurts a firm's ability to attract and retain human capital (Titman, 1984). However, few papers identify these workforce-related costs. There are two exceptions. Brown and Matsa (2016) find that job applicants reduce labor supply to distressed firms. Graham et al. (2015) find that bankruptcy predicts lower wages. Complementing these studies, this paper examines how firm distress affects worker retention and documents an increased turnover to startups post-distress, but no significant departures to other incumbents or unemployment. As with the prior papers, obtaining direct evidence on costs to the firm is difficult. But cross-sectional evidence suggests potential costs. If the departures were not costly, I would observe no variation based

[5]For example, Gompers et al. (2005) use public firms' age, size, diversification, location, sales, and VC-backed status. Nanda and Sørensen (2010) use incumbent firm size to examine the influence of coworkers. Hacamo and Kleiner (2016) examine entry into self-employment after firm liquidation compared to reorganization.

on enforceability of noncompete agreements. Moreover, significant departures among high-wage workers point to a loss of human capital. Finally, departures to same-sector startups might indicate competition or client stealing.[6]

Previous literature has shown that firms' financial decisions affect real outcomes such as employment. However, relatively little is known about the impact on workers' labor market outcomes. This paper documents the real effect of incumbent firm leverage on new-firm creation through employee reallocation. These findings are consistent with recent theories in which incumbent firm debt can affect labor markets and new firm creation (Almazan et al., 2015; He and Matvos, 2015).

More broadly, the paper is connected to empirical work on the boundaries of the firm. Baker and Hubbard (2004) examine the impact of a monitoring technology on the decision to vertically integrate, Robinson (2008) studies strategic alliances, Fresard et al. (forthcoming) and Seru (2014) examine the link between integration and innovation. This paper shows that the capital structure decisions of existing firms have implications for new firm creation, and hence affect firm boundaries.

1 Hypothesis Development

As a starting point for developing testable hypotheses, it is helpful to highlight why people generally develop projects inside incumbent firms despite incentive-related issues associated with the fact that employees are nonowners. Many corporate finance theories argue that incumbent firms provide access to necessary financial resources to pursue productive opportunities. I consider theoretical predictions on what can happen to departures to start and join new firms when an employing firm becomes financially unable to exploit valuable projects.

Several classic corporate finance theories predict no relationship between the financial situation of an incumbent employer and the development of projects by employees outside in a startup. For example, during debt overhang, the ownership of productive opportunities essentially belongs to creditors (Myers, 1977). These creditors do not implement a positive NPV project because it does not make them better off. Similarly, models of capital structure based on firm-specific assets

[6] A concurrent work by Baghai et al. (2018) uses Swiss data to examine prebankruptcy turnover among employees with the highest military intelligence scores. In contrast, this paper primarily examines the impact of financial distress shocks on new firm creation. Other differences are the use of U.S. data and earnings to proxy for human capital.

predict that opportunities unfunded due to financial constraints disappear because they have little value outside the firm (Titman, 1984). Even if projects are not "attached" to the firm, it is not clear that if the constrained incumbent cannot fund good projects, employees would. For example, under asymmetric information, outside investors can assign a negative signal to projects spawned from distressed incumbents (Myers and Majluf, 1984; Gromb and Scharfstein, 2002). Finally, if risk sharing is paramount, employees could simply leave a distressed employer to work for nondistressed incumbents.

A number of alternative models predict a positive effect of employers' financial constraints on entrepreneurial departures. In trade-off and pecking order theories, financing of investments with debt can be valuable. However, unanticipated shocks make debt costly through its amplification of financial constraints. Constrained incumbents scrap existing and new projects, narrow their customer and client bases, and lay off workers (Maksimovic and Titman, 1991; Opler and Titman, 1994; Andrade and Kaplan, 1998). An employee with access to these assets might be better off exploiting them in a new firm than having a job.

Models based on incomplete contracting also predict a boost to entrepreneurship (Grossman and Hart, 1986; Hart and Moore, 1994; Rajan and Zingales, 2001). In these models, growth options partially reside in workers' human capital and hence can literally walk out with the employees. The contractual incompleteness stems from the inalienability of human capital. Firms do not own human capital, workers do. When an employer is unable to pay workers or is at risk of going under because of distress, these assets may no longer have the highest value for workers inside the incumbent. Employees can exclude the distressed employer from these assets by taking them to startups. This effect can be magnified in sectors with high intangible assets, where growth options are more likely to reside with employees. This effect can be mitigated when incumbents legally can use contracts, such as noncompete agreements, to discourage employees from leaving.

Finally, theories of competitive predation predict that competitors can steal customers and clients from financially distressed incumbents (Bolton and Scharfstein, 1990). Extending this logic to startups, it is employees who have relationships with clients and might convince them to switch to a firm they found. These predation theories are similar to the incomplete contracting literature regarding cross-sectional predictions. Employees are more likely to steal clients from a constrained employer when the employer cannot use enforceable noncompete contracts to discourage this activity. This employee predation is also expected to occur in service sectors, where the relationship between employees and clients is essential.

Employer financial distress could also stifle entrepreneurship among employees whose decision to become an entrepreneur is unrelated to corporate finance theories. For example, workers might have ideas unrelated to their employer or want to test their entrepreneurial abilities (Manso, 2016). Wage decreases during financial distress can delay starting a business. Or firm distress can make employees more risk averse (Malmendier and Nagel, 2011), decreasing their risk-taking capacity.

I formalize the intuition discussed above in a simple model, which is presented in Internet Appendix A. In the model, a worker decides to start a firm by trading off expected earnings in paid employment and profits from entrepreneurship. Importantly, I provide intuition on how financial constraints of the employing incumbent firm might affect its worker's decision to found his own firm. Consistent with the hypotheses discussed above, the financial constraints of the employing firm can increase or decrease entry of its workers in entrepreneurship. Moreover, for certain parameter values, no entry into entrepreneurship can occur and valuable ideas are lost when the employer becomes financially constrained.

2 Data

2.1 Data sources

Because U.S. firms' financial data are only available for public firms, Compustat firms form the sample of incumbent firms for which I measure employee reallocation to new firms. I merge Compustat data into the restricted-access U.S. Census Bureau's Longitudinal Business Database (LBD) using a Census-provided crosswalk. The LBD is annual panel data that track the universe of U.S. business establishments from 1978 to 2011 with paid employees and provides information on the number of employees and annual payroll. An establishment is a physical location where business is conducted (Jarmin and Miranda, 2002). The LBD contains a unique firm-level identifier that longitudinally links establishments that are part of the same firm through time. I use the LBD for firm-level variables and to measure firm age. In the LBD, firm age is equal to the age of the oldest establishment that the firm owns in the first year the firm is observed in the LBD (Haltiwanger et al., 2012). A firm birth is defined when all of its establishments are new, which prevents an establishment that changes ownership from being misclassified as a startup.

The U.S. Census Bureau's Longitudinal Employer-Household Dynamics (LEHD) data allow me to obtain information on public firms' workers and observe their mobility across firms. The LEHD database provides quarterly firm-worker matched data from the states' unemployment insurance benefit programs and has been previously used in economic research.[7] The database provides workers' quarterly wages and individual characteristics. Although the LEHD does not contain information about equity ownership, wages include all forms of compensation that are immediately taxable (e.g., exercised stock options and bonuses). The data coverage starts in 1990 for several states and coverage of states increases over time, ending in 2008. Within covered states, the data include over 96% of all private-sector jobs, mitigating concerns about employee self-selection. The project has access to 25 states and the District of Columbia, which covers almost 40% of the U.S. population or 110 million people. Internet Appendix Figure 1 shows the map of available states: Arkansas, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Louisiana, Maine, Maryland, Montana, Nevada, New Jersey, New Mexico, North Carolina, Oklahoma, Oregon, Rhode Island, South Carolina, Tennessee, Utah, Vermont, Virginia, Washington, and Wisconsin.

Given that the project does not have access to entrepreneurial states, such as California or Massachusetts, I next examine representativeness of the LEHD states in terms of employment composition by industry and by firm age. To examine industry representativeness, I use data from the nationally representative Bureau of Labor Statistics (BLS) Current Employment Statistics Survey. In Internet Appendix Table 1, I show that the distribution of jobs by industry within the LEHD states' sample is surprisingly similar to that in the non-LEHD sample. For example, Professional and Business Services represent 11.9% of employment within the LEHD states and 12.2% within other states. In Internet Appendix Table 2, a second test considers the share of

[7] See Abowd et al. (2009) for data description.

people employed in an industry in the LEHD states versus the other states. The percentage of employment for each industry is similar to the overall share. Next, I establish representativeness of employment across young versus more-established firms. Using a public version of the LBD, I calculate that, over my sample period, in my states, 10.8% of all employees are in firms open for 3 years or less, compared to 11.4% in other states.

In the LEHD, workers are identified with firms' state-level reporting units or State Employer Identification Numbers (SEINs). Each SEIN contains workers' state and industry information. I link SEINs to firms in the LBD using federal employer identification numbers (EIN) present in both data sets. For ease of exposition, I term SEINs "establishments." I perform the linkage in the first quarter of each year given that the annual LBD measures employment and payroll in March. This yields an annual panel of public firm establishments, in which employees are observed as of the first quarter of each year. I then track whether an individual stays at the same firm or moves to other employment.

2.2 Variable construction

To measure employee mobility to new firms, I follow the public firms' employees for 1, 2, and 3 years. I am interested in employees who join founding teams of new firms—founders and early employees who likely contribute crucial ideas, skills, and client relationships. Similarly, Gompers et al. (2005) focus on the executive team of new firms. I proxy for an individual's being on the founding team using the five highest earners at new firms, which are firms founded after employment at the public firm. Focusing on the highest earners not only identifies workers with crucial human capital but also usually captures the founders. While Census data do not reveal equity ownership, Azoulay et al. (2018) show that in 60%–70% of cases, the top-three earners capture the founders.

My primary definition of employee departures to entrepreneurship uses the 3-year window, which balances the fact that it takes time to open a company and that the effects might not be immediate against the concern that too long of a window limits the ability to directly tie the departures to the distress event.[8] I examine the timing of departures in Section 4.2. To arrive at my primary

[8]Parker (2009) reports that the median time needed by an entrepreneur to open a business is more than a year.

outcome variable—an establishment's rate of employee departures to founding teams—I calculate the percentage of an establishment's employees who are defined as founding team members of new firms 3 years later. New firms are firms less than 3 years old. I call this variable $\text{Entrepreneurs}_{t+3}$. For robustness, I examine a range of entrepreneurship measures in Section 4.2.

There are four other possible future outcomes for employees. First, they may remain at the firm. Second, they may be employed at a different incumbent firm. Third, they may be employed at an institution of an unknown age (not covered by the LBD used to determine firm age). Finally, the employee may no longer be observed in the data, because, for example, he or she left the workforce. I use these outcomes to distinguish between mechanisms.

As a primary measure of a public firm's financial exposure to shocks, I use book leverage measured as the ratio of long-term debt plus debt in current liabilities normalized by total firm assets (Opler and Titman, 1994; Lemmon et al., 2008). For robustness, I use other popular measures of financial leverage: market, net, and long-term leverage, interest expense coverage, and debt coverage. As a second measure of a firm's financial exposure to shocks, I use the fraction of maturing long-term debt (Almeida et al., 2012).

For my primary measure of industry shock, I use a commonly used definition from Opler and Titman (1994), who classify a three-digit SIC industry-year as distressed if from the beginning of that year, the industry 2-year sales growth is negative and the industry 2-year stock return is less than –30%. In robustness tests, I also use two additional industry stock return thresholds: –20% and –25%. Using industry stock returns ensures that the shock is unanticipated and is plausibly exogenous from the perspective of any given firm or worker. As in Opler and Titman (1994), I exclude financial and regulated firms, and industry-years with fewer than four firms. Following Denis et al. (2002), I also exclude firms with sales less than $20 million (firms with poor quality data), and for which aggregated segment sales differ by more than 5% from the consolidated sales in Compustat (firms with sales in unreported segments). Typical drivers of industry distress are a fall in demand and an increase in input prices (Gopalan and Xie, 2011).

Internet Appendix Table 3 shows the distribution of industry shocks by year and by industries. Although shocks are more likely to occur during economic downturns, some shocks occur during nonrecessionary periods. There is also heterogeneity of shocks across industries. I merge the establishment-level entrepreneurship panel with the industry distress panel so that the workers are identified as of the first quarter of each year. This merge ensures that 2 years separate the year during which industry shock is defined (year t) and when entrepreneurship is measured (first quarter of year $t+3$). Figure 1 presents the time line. Among all establishment-years, 3.1% are in industry distress, which is similar to the 3% Opler and Titman (1994) find. The small percentage of observations in industry distress reflects the severity of the shock. Internet Appendix Table 4 shows that observations in industry distress are representative of the overall sample in terms of ex ante characteristics of public firms and their establishments. Column 1 in Table 3 shows the percentage of establishment-years in industry distress within each SIC1 sector.

2.3 Summary statistics

Table 1, panels A and B, show summary statistics on firm-years of public firms and their establishment-years, respectively. The mean for indicator variables and the standard deviation for continuous variables are reported. I measure my main dependent variable—Entrepreneurs$_{t,t+3}$—at the establishment-year level (panel B). This includes 91,000 establishments of public firms with nonmissing data between 1990 and 2003.[9] The number of observations and all estimates are rounded according to the Census disclosure rules. On average, 1.5% of an establishment's employees are identified as founding team members of new firms 3 years later. Similarly, Kerr, Kerr, and Nanda (2015) find 1.7% of workers who own a house transition to founding teams over the next 4-year period in the LEHD-LBD-2000 Decennial Census matched data. I construct additional measures of entrepreneurial mobility, which show higher transitions to startups (3.8%; *Move to new firms*$_{t+3}$ includes all startup employees) and higher entrepreneurship rates among departing workers (4%; *Entrepreneurs*$_{t,t+3}$/*turnover*$_{t,t+3}$).

As this is the first paper to calculate employee departure rates from U.S. public firms to employer startups, I compare the new estimate with other measures of entrepreneurship. To facilitate the comparisons, I calculate an annual flow of founding teams into 1-year-old startups and find that,

[9] The employee sample goes through 2008, but I stop in 2003 to allow 3 years to follow workers and additional 2 years to measure their entrepreneurship outcomes.

on average, 0.54% of employees join founding teams annually (variable $Entrepreneurs_{t,t+1}$). These transitions to new firms with employees are economically larger than those to VC-backed startups: Gompers et al. (2005) find roughly ten executive team members of new VC-backed startups per one million public firm employees. Although VC-backed startups are likely more growth-oriented than a typical new firm, focusing on them misses 99.9% of all new firms. Using the LBD, Puri and Zarutskie (2012) find that only 0.11% of new firms ever receive VC funding. Dillon and Stanton (2017) report that 2.1% of male employees transition to self-employment annually. While more ubiquitous, the self-employed usually do not create jobs and are not growth-oriented (Schoar, 2010; Hurst and Pugsley, 2011). Therefore, my measure of entrepreneurship—departures to founding teams of new firms with employees—balances the cost of including potentially nongrowth-oriented new firms against the cost of excluding firms that represent a large share of U.S. employment.

Table 2 compares public firm workers who, within 3 years, are either identified as founding team members of new firms (*Entrepreneur* column; 315,000 observations) or not (*Nonentrepreneur* column; 28.7 million observations). These entrepreneurs include all future entrepreneurs from financially constrained and unconstrained public firms. Compared to all public firm workers, typical future entrepreneurs are 4 years younger and earn slightly less at the public firm ($31,000 vs. $32,000 per year in real 2014 dollars). It is not surprising that younger workers earn less as age is an important determinant of wages. When I control for personal characteristics, future founders earn 4% more relative to coworkers (see Internet Appendix Table 5.) Overall, these average wages are somewhat lower than the yearly average U.S. personal income of $36,000 over the sample period.[10] The low wages are largely due to workers with incomplete-quarter jobs. Jobs can start after the beginning of the quarter or end before the end of the quarter, depressing quarterly wages. Among workers with complete quarter jobs, future entrepreneurs and nonentrepreneurs earn $43,000 and $45,000, respectively. Because of this large heterogeneity in wages, I also examine entrepreneurship among high-wage workers (workers with above-median wages within a public firm). Among these high earners, the mean wage of the future entrepreneurs is $57,000. These high earners are more likely to have access to projects, clients, and good ideas, which can leak due to employers' financial

[10]U.S. Bureau of the Census's "Real Mean Personal Income in the United States" expressed in 2014 real dollars.

constraints. Finally, entrepreneurs created following industry shocks look quite similar to other entrepreneurs in terms of personal characteristics and wages (Internet Appendix Table 6).

Table 3 describes 315,000 observations on new firms associated with founding team members from U.S. public firms. Given that startup employment and payroll variables are known to be highly skewed, I also report quasimedians for these variables. Census disclosure procedures prohibit reporting percentile values. I approximate the median by taking the mean of observations within the interquartile range. The new firms in the LBD tend to be economically significant in terms of employment creation, because the data cover firms with an office and employees (Haltiwanger et al., 2012). In the first year a new firm hires employees, it has 11 (5) workers an average (quasimedian). Sixty-three percent are incorporated, which is associated with the intention to grow (Levine and Rubinstein, 2017).

In Table 4, I compare distribution by industry sector of all LBD establishments to establishments of U.S. public firms and new firms in my sample. The four samples are (1) establishment-years of public firms described in panel B of Table 1 (Column 2); (2) all establishments in the LBD (Column 3); (3) new firms in the LBD (Column 4); and (4) new firms in my sample described in Table 3 (Column 5). Relative to all LBD establishments, public firms tend to be in capital-intensive industries (manufacturing and transportation) and less in service industries. Public firms also have more establishments in the trade sector (SIC1 = 5). This is well known because of the rise of big-box retailers and restaurant chains over 1980–1990.[11] In contrast, the distribution of new firms in my sample is similar to the new firm universe. New firms in service (38% in my sample vs. 40% in LBD) and trade (33% in my sample vs. 30% in LBD) sectors are the most ubiquitous.

3 Empirical Methodology

The hypothesis development section motivates the key question of this paper: does incumbent firms' financial inability to pursue productive opportunities affect employee decisions to start and join new firms? Next, I describe major empirical challenges and how I address them.

[11] Foster et al. (2006) documents the growth of large firms in the trade sector. Similar to this paper, Giroud and Mueller (2017) finds that 44% of U.S. public firms' establishments in the LBD are in nontradable sectors. Nontradables consist of restaurants and retail, which are a subset of the trade sector (SIC1=5).

Bankruptcy, a commonly used measure of financial distress, showcases these challenges. The first two concerns are reverse causality and selection into distressed firms. Workers might flee from "a sinking ship" before bankruptcy. We then have to worry about who actually stayed until the firm fell apart. One also has to worry that the departures of productive workers contributed to the firm's demise. Moreover, an omitted variable can drive both bankruptcy and workers running away from the firm. For example, bankrupt firms are usually in deep economic distress often because they do not have valuable ideas and projects. Therefore, it is not generally possible to tease out the impact of financial constraints in bankrupt firms. Finally, workers cannot be randomly allocated to firms, which might mean that entrepreneurial workers match to more-levered firms.

To address these concerns, I identify incumbent firm distress in a difference-in-differences setting around unexpected industry-wide shocks. I then compare the effect of shocks on firms with differential ex ante financial exposure. I use firms' financial leverage as the main measure of exposure and fraction of maturing long-term debt, for robustness. This strategy, proposed by Opler and Titman (1994), and its variants, has been used in many subsequent papers.[12] This setting is conducive to testing the key hypothesis. Financing frictions should be especially binding for firms with either a large debt burden, which has to be serviced from sparse cash flows, or high maturing debt, which needs to be rolled over or paid down during these adverse conditions. Specifically, I estimate Equation 1, where e denotes an establishment, f a firm, and t a year. I include firm, state-year, and industry-year fixed effects as well as time-varying controls. As described above, the primary dependent variable is the percentage of e's employees at time t who are among the top-five earners at startups as of $t+3$. Following Opler and Titman (1994), firm leverage is lagged by two periods from the base year t to avoid reverse causality from the shock to the firm balance sheet.

$$\begin{aligned} Entrepreneurs_{e,f,(t,t+3)} = {} & \beta_1 \times \text{Firms' Financial Exposure}_{f,t-2} \times \text{Industry Distress}_{i,t} \\ & + \beta_2 \times \text{Firms' Financial Exposure}_{f,t-2} \\ & + \text{Firm FE} + \text{Industry-year FE}_{e,t} + \text{State-year FE}_{e,t} \\ & + \gamma' X_{e,f,t} + \epsilon_{e,f,t} \end{aligned} \tag{1}$$

[12] Some of the variants are maturing debt during downturns (Almeida et al., 2012; Carvalho, 2015) and high firm leverage before a decline in consumer demand (Giroud and Mueller, 2017).

The main coefficient of interest, β_1, measures the incremental effect of shocks on more-financially exposed firms relative to the unconditional effect of financial exposure on entrepreneurship, measured by β_2. For ease of exposition, I refer to relatively more-levered firms with establishments in industry distress as distressed firms. All regressions in the paper control for the direct effects of shocks and firm exposure. The coefficient on industry distress cannot be estimated in specifications with industry-year fixed effects because they are collinear.

This setting addresses the above-mentioned empirical challenges in the following ways. Using a difference-in-differences setting around unexpected industry-wide shocks mitigates reverse causality, omitted variables, and selection concerns. These shocks are plausibly exogenous from the perspective of any given firm or worker. As the shock is based on industry stock return, it is unlikely that firms would have adjusted their leverage in anticipation, or workers would have fled from the firm before the shock. To minimize the impact of economic distress, I do not use bankrupt firms. Instead, my sample is all public firms. I also control for past profitability, Tobin's q, and investments. To address the matching concerns, I use within-firm variation in firm exposure to shocks. Because I compare the same employees before and after the shock, I control for the average selection effect. Firm fixed effects also help address potential downward bias, which might occur if firms vulnerable to the loss of important human capital during the industry shock under lever to avoid such consequences. I include industry-year fixed effects to isolate the direct impact of firms' financial exposure to shocks on workers who otherwise face the same industry and funding conditions. State-year fixed effects control for regional shocks. I also control for firm-level (age, diversification, asset tangibility, assets, cash) and establishment-level (average wage, employment) characteristics, which could correlate with changes in leverage and entrepreneurship.

An important residual concern is that serial correlation of the error term can lead to understated standard errors, especially in difference-in-differences estimations (Bertrand et al., 2004). In all regressions, I cluster standard errors at the SIC 3-digit industry level to account for any arbitrary correlation of the error term across establishments in the same industry.

Although this strategy has been used to show that relatively more-levered firms are more negatively affected by industry shocks, I also validate the strategy in my setting. I use Equation 1 to examine the effect on employment growth. Consistent with existing literature (Sharpe, 1994; Giroud and Mueller, 2017), I find that establishments of relatively more-levered firms hit by shocks have negative employment growth (see Table 12, Column 1). This lower employment growth might come from higher separations or lower new hiring. I examine the role of hiring and separations in Section 5.2. Unfortunately, the data do not allow me to decompose separations into layoffs and quits. But this is not essential to the financial constraint channel. A worker can steal clients or have access to the employer's intangible assets (know of good projects) even if he is laid off.

4 Main Results

4.1 Effect of employer distress on employee departures to entrepreneurship

Table 5 shows the main results from estimating Equation 1. Each column includes different controls, but all show that high firm leverage before industry shocks is a robust predictor of reallocation of employees into entrepreneurship. My preferred specification in Column 6 includes firm, industry-year, state-year fixed effects, and all time-varying controls. The coefficient of 1.505 implies that a 1-standard-deviation increase in leverage preshock predicts a 21.4% increase in the employee departure rate to entrepreneurship, relative to sample mean of 1.51%.[13] The result is robust to a wide array of alternative controls. For example, the estimates do not attenuate with the inclusion of past firm profitability, suggesting that economically weak firms do not drive the results. The results are robust to including fine establishment fixed effects, which control for unobserved time-invariant heterogeneity across establishments.

The result suggests that incumbent firm distress triggered by capital structure decisions is an important predictor of reallocation of employees into new firms. To highlight the results graphically, Figure 2 plots the average predicted entrepreneurial departures after distress versus nondistress industry-years as a function of ex ante leverage. The figure shows two things. First, changes in leverage preceding normal industry conditions have a minimal effect on entrepreneurship, while

[13] I calculate this as 21.4% = (1.505 x 0.215) / 1.51%, where 0.215 is the standard deviation of book leverage. Firm-level controls are measured at $(t-1)$, which is 1 year before year t when the industry shock is measured, whereas establishment-level variables are measured when the employee snapshot is taken (first quarter of year t).

more employees depart to entrepreneurship from firms that happen to have relatively high leverage prior to shocks. Second, industry shock itself does not affect entrepreneurship. This is consistent with literature that finds a mixed relationship between economic declines and entrepreneurship.[14]

4.2 Timing and alternative measures of entrepreneurial departures

Next, I look at the timing of entrepreneurial exits around employer distress. I expect to observe two patterns. First, there should be no changes in departures before the shock. The difference-in-differences strategy requires that relatively more-levered firms do not experience a differential trend in entrepreneurship before the shock. Second, following the shock, cumulative departures are likely to be gradually increasing given that it takes time to open a firm. For each establishment in year t, I measure the departure rates from ($t-3$ to t), ($t-2$ to t), ($t-1$ to t), (t to $t+1$), (t to $t+2$), and (t to $t+3$). The departures measured with 1-, 2-, and 3-year lags consider workers joining firms aged 1, 2, or 3 year(s) or younger (to make sure that people do not join already existing firms).[15] Similarly, the departures measured in the future 1, 2, or 3 year(s) consider workers joining firms aged 1, 2, or 3 year(s) or younger. For example, the entrepreneurship rate measured from $t-2$ to t is the percentage of an establishment's employees as of the first quarter of year $t-2$ who, 2 years later, are at a firm no more than 2 years old and among the five highest earners at that firm.

Table 6 shows the results using the tightest specification from Table 5. Prior to the shock, there are no differential trends in entrepreneurship in more-levered firms, validating the absence of pretrends and consistent with a causal interpretation of the financial leverage effect. Following the shock, departures to entrepreneurship are gradually increasing in ex ante levered firms. The last estimate in Column 6 uses a 3-year window. I chose this primary 3-year window to avoid a concern that too little or too much time has passed since the distress event. Next, I examine whether departures to founding teams continue after 3 years. For this, I measure an annual flow of founding team members into brand new startups over the next 5 years since I define an industry shock. I then examine an annual entrepreneurial outflow from distressed employers in Internet Appendix Table 8. I find that the distress-driven annual flow peaks in 3 years (with a statistically significant

[14]Regression analysis in Internet Appendix Table 7 confirms the null effect of industry shocks.

[15]Note, missing lagged observations are imputed with the sample average.

coefficient of 1.2) and declines to statistically zero in year 4 (coefficient of -0.02). Therefore, my 3-year window captures well the timing of the effect.

I also demonstrate that my results are not sensitive to a particular construction of the entrepreneurship variable. The primary 3-year future entrepreneurship measure captures cumulative departures to startups in existence for up to 3 years. Next, I examine to what extent the results are driven by (a) the cumulative number of founding team members present since the startup's founding, versus (b) departing workers joining the startup at a later stage. Focusing on group (a) in Column 1 of Table 7, one sees the parameter estimate is similar to the baseline measure. This similarity to the main results arises because the initial founding team dominates the main entrepreneurship measure. On average, 1.2% of workers are founding team members who joined at the founding (compared 1.5% that includes group (a)).

Column 3 shows similar results among long-tenure workers defined as workers with above-median tenure within an establishment-year. Therefore, low-tenure workers, who are more likely to have incomplete quarter jobs, do not drive my main results. I continue to find a robust result using only the top earner at the new firm rather than the top five. Column 4 shows that this "main founder" definition yields economically larger effects: a 1-standard-deviation increase in ex ante leverage is followed by a 34% post-shock increase from the mean rate. Next, I verify that employer distress is accompanied by an increase in the number of employee-founded startups because team exits, in which multiple employees depart together for a new firm, could explain the results. Redefining the dependent variable as the number of unique startups associated with the founding team members leaving public firms yields similar results (Column 5). I also find significant effects on the reallocation of employees to startups more generally, without conditioning on earnings at startups (Column 6).

Next, I examine the effect among departed workers. The definition of entrepreneurship normalizes the number of future entrepreneurs by the predistress employment. This normalization captures the likelihood of ex ante employees becoming entrepreneurs. To examine the impact on departed workers, I examine the effect on entrepreneurship among workers employed by a different firm 3 years later (Table 7, Column 7). This alternative measure produces similar estimates in terms of economic and statistical significance, suggesting that employer distress affects departures specifically to entrepreneurship.

4.3 Alternative measures of firms' financial exposure and industry shocks

The results are robust to alternative measures of firms' financial exposure to shocks and of industry distress, as shown in Table 8. First, motivated by previous research, I use the ex ante maturity structure of a firm's long-term debt to predict its financial exposure to industry downturns. Firms do not typically spread out their long-term debt-maturity dates across time, which leads to significant differences across firms in the fraction of their debt maturing at the time of unexpected shocks (Almeida et al., 2012; Carvalho, 2015). Column 1 shows the results are robust to using this alternative strategy. Second, Columns 2, 3, and 4 show that the results are robust to using other commonly used measures of leverage, such as long-term, market, and net financial leverage ratios, respectively. Redefining financial exposure as interest expense (total debt) normalized by EBITDA yields similar results in Column 5 (6). Third and finally, I define two additional industry distress variables to ensure that the results are not driven by an industry stock return cutoff of –30%. The results are robust to using –20% and –25% industry stock return cutoffs (Columns 7 and 8, respectively).

4.4 Robustness

This section describes additional analysis to address a concern that an omitted variable might correlate with firm capital structure measures and entrepreneurship. Section 4.2 has already addressed this concern by showing the absence of a trend in entrepreneurial departures before shocks in more-levered firms. Two tests address specific concerns. First, high-leverage firms may be "high-beta": leverage can accelerate spawning of entrepreneurs after growth phase for industry and decrease spawning during the growth phase. More generally, there is no reason financial constraints are particularly binding in levered firms in booming times. Indeed, a placebo test shows statistically zero departures from the more-levered incumbent to new firms following unexpected industry booms (Internet Appendix Table 9). Second, a related concern is that more-levered firms might have different sensitivity to shocks due to other observable factors. However, the main estimate and its significance do not change with the inclusion of all time-varying control variables interacted with the industry distress indicator (Internet Appendix Table 10).

5 Mechanisms

5.1 Financial constraints mechanism

Three sets of analyses examine whether the financial constraints channel is a likely driver of the main results. First, I use an additional identification strategy used in prior studies to pin down financial constraints. Second, I test cross-sectional predictions of the financial constraints channel motivated by theories outlined in the hypothesis development section. Rich data allow me to paint a comprehensive story by using characteristics of (1) public firms; (2) new firms; and (3) workers who move to startups. Third, I use a different setting that does not condition on a shock to examine whether, on average, financial constraints of incumbent firms predict entrepreneurial departures.

As discussed in Section 4.3, I use the ex ante maturity structure of a firm's long-term debt as a measure of financial exposure to industry downturns. As Almeida et al. (2012) argue, financing frictions should be especially binding during bad economic conditions for firms with maturing debt because they need to either roll over or pay down their debt during these adverse conditions. Consistent with the financial constraints mechanism, the results are robust to using this strategy.

The hypothesis development section motivates several testable predictions of the financial constraints channel. I start by examining which industries *within* distressed firms drive entrepreneurial departures. During times of financial distress, the leakage of economic activity is likely to be more severe in high-tech and service sectors. In high-tech, intangible assets are important, and growth options likely reside with employees. In services, employees have relationships with clients and, hence, appropriation of clients is a real possibility. Physical-asset-heavy manufacturing is less likely to be a driving industry. Neither are retailers and restaurants, which are dominated by low-wage cashiers and restaurant workers.

To test these predictions, I define four broad industry sectors: manufacturing (SIC1 = 2 or 3);

trade (SIC1 = 5, which includes retailers and restaurants); services (SIC1 = 7 or 8); and high-tech (computers, biotech, telecom, electronics).[16] To examine which sectors drive the results, I use a triple difference setting. I test whether the effect *within* distressed firms comes from, say, services versus nonservices. I perform this test for all four sectors, shown in Table 9. All regressions include interactions of a sector dummy with leverage and industry shock, not reported for brevity. As predicted by the financial constraints channel, the departures are larger in service and high-tech industries. Manufacturing and trade show null effects.

Next, I examine the validity of the assumption underlying the financial constraints channel, namely, that a growth option leaked due to distress is valuable. To test this, one would ideally examine whether the growth option displaced into a startup would have been implemented by the incumbent in the absence of financial constraints. Clearly, this is not a feasible test. The next option is to compare the performance of distress-driven startups to typical startups. What is the counterfactual? A typical entrepreneur does not start a firm because of his employer's financial constraint. Perhaps he wants to learn about his entrepreneurial abilities (Manso, 2016). Or, perhaps he has ideas unrelated to his employer, such as opening a "mom-and-pop" shop.[17] All incumbents, constrained and nonconstrained, spawn these typical entrepreneurs. But constrained firms also spawn entrepreneurs due to financial constraints. Hence, the goal is to test whether a correlation exists between the severity of an incumbent firm's financial constraints and the performance of spawned new firms. This test also helps us understand the economic impact of distress-driven startups in a broader context of the spawning of entrepreneurs.

Under the null hypothesis, there is no correlation, and distress-driven and typical startups are similar. For example, distress can increase the creation of more "mom-and-pop" shops. Under financial constraints, a positive correlation ensues because the more constrained the incumbent is, the higher the likelihood that the better projects are leaking to startups. Finally, distress-spawned startups would perform worse if their founders had less time to plan a business, or if workers with

[16]Because of the U.S. Census disclosure rules, I cannot explore the less-populous sectors. Before I use sectoral variation, I show that all four sectors have nonzero average leverage (Internet Appendix Figure 3).

[17]This counterfactual is consistent with the fact that one of the most ubiquitous sectors for new firms in the LBD is the trade sector, which includes shops and restaurants. It is also consistent with growing empirical evidence that the typical entrepreneur is not a high-growth type usually pictured in economic models (Hamilton, 2000).

the best ideas left regardless of distress.

Most studies on entrepreneurial entry do not examine startup performance, often because of data constraints. The LBD allows me to examine three future economic outcomes of startups: jobs, payroll, and exit. In my sample I select all new firms associated with employee-entrepreneurs. For each startup, I measure a 5-year future exit indicator from the time I identify the founder of the new firm. For firms that survive for 5 years, I also estimate 5-year future employment and total payroll, both logged. I use the same difference-in-differences methodology as for my main results, except I drop firm fixed effects. As a relatively rare event, entrepreneurship provides limited variation for within-firm comparisons. For brevity, I only report the main coefficient on the interaction between leverage and industry shock. As before, all regressions include fine industry-year and state-year fixed effects, which means I compare entrepreneurs leaving public firms in the same industry and year, but from more- versus less-levered employers. I also control for potential differences in personal characteristics of entrepreneurs and include all controls used in the main analysis. Additionally, I control for logged initial employment and payroll. Hence, we interpret the regression coefficients as employment and payroll growth. I find a positive correlation between the severity of employer distress and future employment and payroll growth of spawned new firms (Table 10, Columns 4 and 5). Startup exit is negatively, but insignificantly correlated with the spawning firm's distress (p-value of 11%; Table 7, Column 3). Therefore, distress-driven new firms are, on average, higher growth firms, consistent with the financial constraints story.

High-wage workers are the ones with access to projects, clients, or good ideas. Thus, financial constraints are more likely to drive these top earners into startups. My next goal is to test whether, on average, high-wage workers are likely behind the entrepreneurial departures and the startup growth results. I focus on workers with above-median public firm wages, and I perform three tests. First, I examine distress-driven entrepreneurial departures in this high-wage worker group. If low-wage workers drove the exits, that would be inconsistent with the financial constraints story. I find significant departures among high earners (Table 7, Column 2). In fact, Internet Appendix Table 11 shows that the departures among low-wage workers (workers below median public firm wages) are either insignificant or economically smaller than for the high-wage worker group, depending on specification.

In the second test, I show that conditional on being an entrepreneur, the distress-driven entrepreneurs earn more at the public firm and also after joining the new firm (Table 10, Columns 1 and 2). Finally, for the financial constraints story to make sense, the startups' high growth results must be driven by departing high-wage workers. Indeed, the top earners drive the high startup growth results (Table 10, Columns 8 and 9). In fact, among low-wage entrepreneurs, there is no correlation between distress of incumbent firms and the growth of spawned startups. The high-wage earners also predict significantly lower startup exit, consistent with the prediction that good ideas leave distressed employers (Table 10, Columns 7). In sum, high-wage workers are behind the entrepreneurial departures and the high-growth startups, consistent with the financial constraints channel.

The last set of cross-sectional tests is motivated by the prediction that new firms driven by the financial distress of an incumbent firm likely pursue economically related activity that could have taken place inside the constrained incumbent. Two hypotheses address this point. First, one would expect financial constraints of incumbent firms to have a greater economic impact on the creation of new firms in similar industries. To test this, I regenerate the entrepreneurial departure rate to new firms in the same SIC1 industry as the spawning establishment. Indeed, Column 8 of Table 7 shows large economic effects on departures to same-sector new firms: a 41% increase from the mean rate. This 41% is twice the baseline increase of 21% that captures the impact on departures to new firms in all sectors. The second hypothesis predicts that the effect of financial constraints on entrepreneurial departures would be mitigated when incumbents can use enforceable contracts to prevent employees from competing. In other words, when contracts are more complete, one would expect to see less leakage of growth options from the constrained incumbents. In practice, firms use noncompete agreements to protect their intangible assets from being used by departed workers. These contracts restrict employees from joining or establishing a competing firm for a specified time period, usually 1 to 2 years. In theory, noncompetes are supposed to be used for high-wage workers, but in practice, they are also used among low-wage workers (Starr et al., 2019). There is significant variation in the willingness of states to enforce noncompete agreements (Garmaise, 2011). One would expect departures to startups to be mitigated in states that are more likely to enforce noncompete agreements. In a triple difference setting, I find that the main results are driven by states that are less likely to enforce noncompete agreements (Table 9, Column 5). This finding supports the financial constraints theories based on incomplete contracting and competitive predation.

The remaining question is whether financial constraints of incumbent firms dislocate employees into new firms more generally or whether a shock is needed to trigger the exit. This paper uses industry shocks to aid in identification. But, presumably, some incumbents are also financially constrained in good times. Practically, finding a setting in which a firm exogenously becomes constrained in good times is difficult. For that reason, the literature has used firm-level indices of financial constraints. Following the literature, I use the W-W index (Whited and Wu, 2006) and the Size-Age index (Hadlock and Pierce, 2010) to predict departures to startups.[18] Consistent with my main results, both indices predict financially constrained incumbents will have higher rates of entrepreneurial exits and spawn high-growth new firms (Table 11). The relationship is economically significant. A 1-standard-deviation increase in these indices predicts 7%–13% more entrepreneurial exits. These findings generalize the main results to normal economic conditions.

In sum, the cross-sectional results paint a consistent story. Employees depart financially constrained incumbents to create economically important new firms. Following employer distress, it is workers who are more likely to have access to projects, clients, and good ideas that start high-growth new firms. The effect is amplified in industries with high intangible assets, where growth options are more likely to reside with employees. The effect is mitigated when a distressed incumbent can enforce noncompete agreements to discourage workers from leaving.

[18]These indices are measured as a linear combination of firm cross-sectional variables associated with financial constraints. For that reason, I do not include firm cross-sectional variables or firm fixed effects in these regressions.

5.2 Alternative mechanisms

5.2.1 Discipline mechanism

Agency-based theories of capital structure argue that firms can use leverage to discipline managers and workers (Jensen, 1986, 1988). Large debt service during downturns forces firms to divert cash to servicing debt, forcing them to restructure and terminate unproductive, entrenched, or overpaid workers. Some of these workers can end up in new firms.

This agency-driven channel provides several testable hypotheses. First, the restructuring implies broad employee turnover following firm distress, not just turnover to startups. I test this in Table 12. I measure turnover rates to three other types of destinations in 3 years. Column 2 measures turnover to other incumbents (a different firm that existed before the year of the worker's employment at the public firm). Column 3 shows turnover to an employer with an unknown firm age (some LEHD employers are nonprofits, government entities, or firms without employees present in the LBD, which is used to determine employer age). Column 4 shows an exit from the employment sample, which can occur if the worker left the workforce or moved to a non-LEHD state. I do not find statistically significant results in any of these three groups.

These null findings might seem surprising, but they are fully consistent with the literature on labor hoarding (Biddle, 2014). Labor hoarding predicts two things: (1) firms hit by shocks retain more workers than technically needed to save on firing, hiring, and training and (2) labor adjustments come in the form of reduced hiring. The second prediction is supported in my data: the number of new hires drops off following firm distress (Internet Appendix Table 12). This finding suggests that the hiring margin is important to understand the drivers of lower employment growth in financially constrained firms—the margin that is usually ignored in the literature.

The discipline channel also predicts the dismissal of entrenched or overpaid workers. To test for entrenchment, I look at the effects in manufacturing, where literature has found high labor entrenchment due to unionization (Addison and Hirsch, 1989). However, in manufacturing, I find statistically zero departures from distressed to new firms. To test whether overpaid workers are laid off, I note that, by definition, overpaid workers should have negative wage growth after departure.

For an apples-to-apples comparison, I compare the wage growth of workers who join startups from more-distressed versus less-distressed incumbents. Wages at startups and incumbents cannot be fairly compared, because young and old firms can have different wage-setting policies. I find that wage growth is actually positive for workers who join startups from more-distressed firms (Table 10, Column 2). Moreover, this positive wage growth is driven by workers with above-median wages earned at public firms (Table 10, Column 6), inconsistent with the overpaid worker hypothesis.[19]

Labor hoarding literature suggests that, if layoffs do occur, they tend to be more prevalent among low human capital workers (cashiers or production workers), who can be more easily replaced. Inconsistent with this hypothesis, the results are essentially null in the trade and manufacturing sectors. Moreover, pet projects are one of the symptoms of inefficient managers (Jensen, 1986). In downturns, higher leverage forces the firm to cut down on these pet projects. Pet projects are likely to be in industries that are noncore to the firm. If these predictions were true, then distressed firms likely reduce activity in sectors that represent an economically small fraction of the firm's business. However, the main results are unchanged when industries that are less than 10% of firm employment are excluded (Internet Appendix Table 13, Column 1).

Finally, Jensen (1986) and, later Stulz (1990), argue that the discipline function of debt is more important for firms in mature industries with few growth options. However, a declining sector like manufacturing shows a null result. Overall, the cross-sectional evidence does not support the discipline channel as the primary driver of entrepreneurial reallocation.

5.2.2 Risk-taking mechanism

Another possibility is that entrepreneurial-type workers select into firms with high financial exposure. For example, high leverage could attract risk-loving workers. In the event of industry shock, these risk-loving workers are more likely to start a firm. These matching types of channels are difficult to identify. It is just not possible to randomly allocate workers to firms—a challenge faced by all studies with firm-worker matched data. This probably explains why, empirically, researchers have not yet studied whether leverage causes worker selection.

[19] Both columns use the log of wages after workers join startups as the dependent variable and include log wages at incumbent firms as controls. Thus, the interpretation of regression coefficients is wage growth.

I address this alternative story in several ways. First, the results are robust to several measures of firms' financial exposure to shocks. It is unlikely that workers simultaneously match on all those variables. For example, workers probably do not decide to work at a firm based on its debt maturity structure. Second, the main specification includes firm fixed effects. Firm fixed effects control for any time-invariant differences across firms that might correlate cross-sectionally with leverage and entrepreneurship. Identification comes from within-firm changes in leverage. For example, I compare exit rates from Microsoft when it has higher versus lower leverage.

Of course, a concern remains that firms adjust their workforce as leverage changes. While theoretically possible, this concern is not supported by the following four empirical facts. First, if the concern were true, then leverage changes would also predict departures to entrepreneurship in good times as well. But this is not the case as is shown by the placebo test in Section 4.4. Second, the main estimate does not change when I include time-varying workforce controls associated with entrepreneurial behavior, such as risk-taking (age), or experience (years in employment) (Internet Appendix Table 14). Third, the results are not be driven by relatively more risk-loving and entrepreneurial group workers, such as younger employees. I find significant results for older workers (Internet Appendix Table 15, Column 1). Fourth and finally, if selection drove the results, then the estimates would be biased upward when estimated with cross-sectional variation in leverage. Instead, the cross-sectional estimates with just industry-year fixed effects (1.2%; Table 5, Columns 1–3) are lower than they are with firm fixed effects (1.4%; Table 5, Column 4–6). Overall, the selection of more entrepreneurial workers into more-financially exposed firms does seem to drive my main results.

5.2.3 Economic distress mechanism

High leverage firms also may be less productive and more sensitive to downturns. In this economic distress story, firms with lower growth opportunities become more levered and naturally lose employees to new firms. Ruling out economic distress has probably been the biggest challenge in empirical papers that seek to isolate the impact of financial constraints during firm distress. I address this alternative story in two ways. From the sample selection point of views, I minimize the impact of economic distress by using all public firms, the majority of which are economically healthy. In contrast, commonly used bankrupt firms are practically all economically distressed (Andrade and Kaplan, 1998). Several robustness tests also show that unprofitable firms do not drive my main results. First, Table 5 reveals that controlling for past profitability does not attenuate the estimates. Second, following Andrade and Kaplan (1998), I identify firms with past negative operating income as economically weak. In a triple difference setting, these weak firms do not drive the results (Internet Appendix Table 13, Column 4). In sum, less profitable firms do not drive entrepreneurial departures from financially exposed firms.

5.2.4 Spin-offs

The last alternative interpretation I consider is that the distress-driven new firms might be employer-initiated spin-offs. For example, distressed firm might divest under-performing segments to improve efficiency (Çolak and Whited, 2007). However, this is unlikely to explain the results. First, the definition of a new firm controls for the possibility of a transfer from one entity to another. Only newly created establishments are defined as firm births. Second, spin-offs usually "inherit" the majority of former employees. But the results do not change materially when I (a) exclude establishments from which more than 50% of employees move to new firms (Internet Appendix 13, Column 2) or (b) consider only smaller new firms with ten or fewer employees (Internet Appendix Table 15, Column 3).

6 Discussion and Conclusion

This paper documents that incumbent firms' financial distress has a positive and economically significant effect on the reallocation of employees into new firms. The impact is amplified in high-intangible industries, where growth options likely reside with employees. The effect is mitigated when a distressed incumbent can use enforceable noncompete agreements to discourage workers from leaving. Following distress, it is workers with access to projects, clients, and good ideas who start high-growth new firms. Compared to typical entrepreneurs, distress-driven ones are high-wage workers who start better firms as measured by jobs, pay, and survival. The financial constraints channel operates in good and bad times. Overall, the evidence supports a channel through which the inability of incumbent firms to exploit productive opportunities due to financial constraints increases the reallocation of economic activity into new firms. I will now connect my findings to the existing literature and discuss the economic significance of distress-driven entrepreneurship in the broader context of spawning entrepreneurs.

I start by relating my findings back to theory. Classic corporate finance theories predict that valuable growth options disappear if a firm is financially unable to pursue them. These theories describe an old-economy type of firm that consists mainly of physical assets that has full ownership of its productive opportunities. But a modern firm looks different. It relies more on intangible assets, specifically on employees, to create value. Models based on incomplete contracting speak to this modern firm. In these models, growth options partially reside in workers' inalienable human capital. These theories imply that employees can take valuable projects, clients, or ideas to startups, especially when their employer is financially constrained. To the best of my knowledge, this is the first paper to show empirical evidence consistent with this prediction. Across several empirical settings, I show a robust correlation between financial constraints of incumbent firms and employee departures to startups. My findings suggest that when an incumbent is constrained from exploiting productive opportunities, those opportunities do not necessarily evaporate. If opportunities are indeed valuable, an employee can pursue them on his own.

The results suggest that financial constraints of incumbent firms predict a positive reallocation of employees to entrepreneurship. Hence, jobs created in new firms potentially compensate for jobs lost at distressed incumbents. I quantify this compensating effect in a back-of-the-envelope calculation. On average, because of firms' financial distress, total establishment employment decreases by 11.3 employees per 100 jobs (see Internet Appendix Table 12, Column 4). On average, distress-driven new firms create 3.8 jobs per 100 employees, which is calculated in Internet Appendix B. Therefore, jobs created in new firms compensate for 33.4% of job losses at the constrained incumbents. The finding implies that measuring job losses at the constrained-firm level (standard in the literature) overestimates total losses due to financial constraints.

Interestingly, I do not find significant reallocation of employees from constrained incumbents to other incumbents or unemployment. These findings are in contrast to the high departure rates of CEOs from bankrupt firms to other incumbents or unemployment, relative to departures to entrepreneurship (Eckbo et al., 2016). The differences in findings could represent the value of CEOs' skills for managing mature firms and the discipline effect imposed on CEOs responsible for the firms' going bankrupt. Or, differences in demographics between CEOs and the overall workforce might explain the disparity in findings. Understanding which groups of workers are most affected by financial distress and the mechanisms behind the effects are fruitful areas for future research.

From an economic point of view, it is important to understand the impact of distress-driven startups in a broader context of spawning entrepreneurs. Overall, the results are important from quantity and quality perspectives. In terms of quantity, a 1-standard-deviation increase in financial constraints indices of incumbent firms predicts 7%–13% more entrepreneurial exits. In terms of quality, entrepreneurs coming from financially constrained incumbents tend to start more economically important firms in terms of jobs, pay, and survival. While it might be counterintuitive that distressed-driven startups perform better than typical startups, recent research suggests that valuable ideas are not so easy to find (Bloom et al., 2017). Hence, employers, who are not able to pursue good ideas, might engender valuable new startups.

Two findings seem surprising initially. The first is the ability of workers to fund growth options when the incumbent cannot. However, this becomes less surprising once the data reveal that distress-driven new firms are started by high-wage workers and perform better than a typical startup. These findings suggest that valuable people and ideas are leaving constrained incumbents. The worker can bootstrap, raise outside money, or cofound with someone who has the necessary financial resources. Of course, it is less likely that if General Motors (GM) scrambles for cash, an employee will start another GM. But it is certainly not surprising that a worker would start a firm in low-capital-intensive industries, like high-tech or services.

The second surprising finding is that new firms are spawned out of the ashes of industry downturns. In the macro literature, adverse economic conditions can lead to increases or decreases in entrepreneurial entry, depending on the channel. Theoretically, an increase can occur, because, as some firms close during recessions, the supply of cheap second-hand capital equipment, office space, and labor increases (Almazan et al., 2015). This macro view is related to the mechanism in this paper, namely that incumbents can "feed" startups key assets such as employees, ideas, or even clients. I name this process, in which old firms need to be either constrained or otherwise destroyed for new firms to arise, "Destructive Creation." This directionality contrasts with the classic Schumpeterian story of "Creative Destruction" in which innovating entrepreneurs destroy incumbent firms.[20]

New firm entry also can be procyclical. For example, people might be more willing to take risk in good times (Rampini, 2004). Empirically, new firm creation is procyclical, but only slightly so. For example, the public version of the LBD shows that in 2000, the height of the tech bubble, 482,000 new firms were created. In the recessionary, dot-com bust year of 2001, 471,000 new firms were founded. Clearly, plenty of new firms are created, even in bad times.

It also might be surprising that ideas that leave the distressed firms are not implemented by other incumbents. It would seem to be an easier transition for an employee to bring valuable opportunities into another already existing firm. Incomplete markets for ideas is often used to explain why this alternative transition usually does not happen (Arrow, 1962). Disclosing an idea exposes the person to expropriation risk. A famous example of such appropriation is the Ford Motor Company's appropriation of Robert Kearns's invention of an intermittent windshield wiper.

I conclude by relating my findings to broader trends and speculate on how the two can be linked. A well-documented decline in new firm creation and worker mobility across firms led to calls to study potential inefficiencies behind the trend. What else has been happening? The answer is deregulation, generally, and particularly in the financial sector (Kroszner and Strahan, 1999). Financial deregulation can have many effects. One is that it reduces frictions, enabling productive firms to grow. If incumbents become less constrained from pursuing economic activity internally, they can employ more workers. Thus, fewer new firms are needed to accommodate the same employment level. This argument is important for theories of the firm that emphasize the

[20]The quote from the Library of Economics and Liberty (1999–2019) succinctly describes Schumpeter's vision: "Innovation by the entrepreneur, argued Schumpeter, leads to gales of 'creative destruction' as innovations cause old inventories, ideas, technologies, skills, and equipment to become obsolete."

importance of frictions faced by *existing* firms as a cause for *new* firm creation. These theories are understudied empirically despite their well-recognized importance.[21] From a policy perspective, they are quite relevant. Theoretically, if incumbents face fewer frictions, having fewer new firms might not necessarily be bad. More work is needed to understand whether reductions in financing frictions can explain the decrease in new firm creation and the concurrent increase in market concentration (Grullon et al., 2019).

[21]For example, the 2016 Nobel Prize in Economic Sciences was awarded to Oliver Hart and Bengt Holmstrom for their theoretical contributions on theory of the firm and contract theory.

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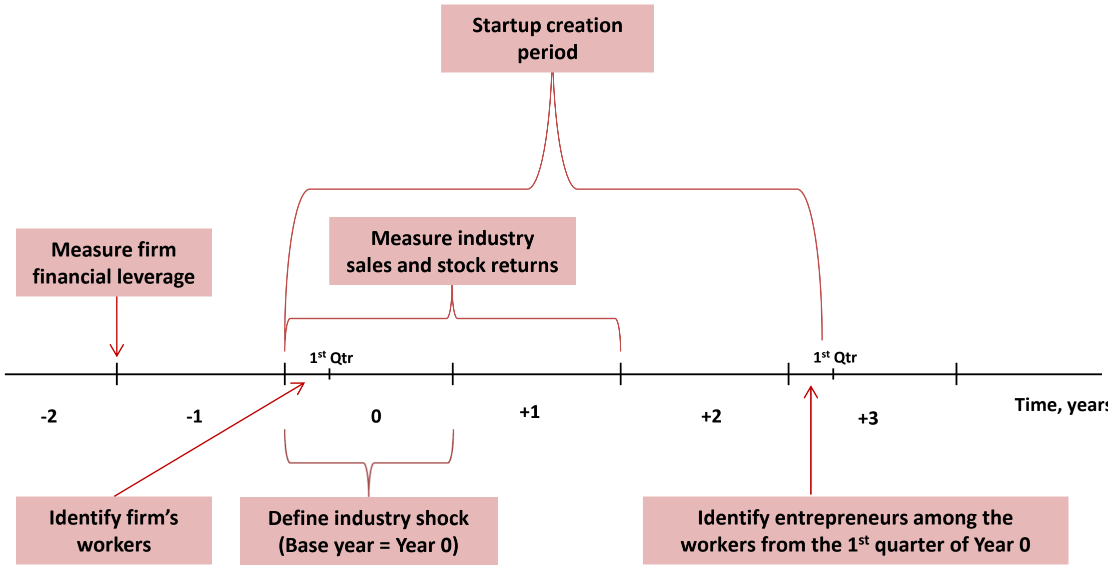

Figure 1
Time line

This graph shows when the main variables are measured. Following Opler and Titman (1994), I identify an industry to be in distress in a base year, $t = 0$, if from the beginning of that year the median 2-year sales growth of firms in that industry is negative and the median 2-year stock return is less than -30%. Following Opler and Titman (1994), I measure the firm book financial leverage ratio (long-term debt plus debt in current liabilities, normalized by total firm assets) 2 years prior to the base year, at $t = -2$. Firms' workers, who are potentially exposed to the distress shock, are identified as of the first quarter of the base year, at $t = 0$. Allowing for 2 full years to pass since the end of the base year, I determine where those workers are in the first quarter of year $t = +3$: stayed with the firm, left to work for another firm that existed prior to $t = 0$, dropped out of the employment sample, or left to work for a startup (a firm founded from $t = 0$ to $t = +3$, inclusively). In the first quarter of $t = +3$, a former worker is part of the founding team of a new firm if he works at a startup and is one of the top-five earners at that startup (main definition).

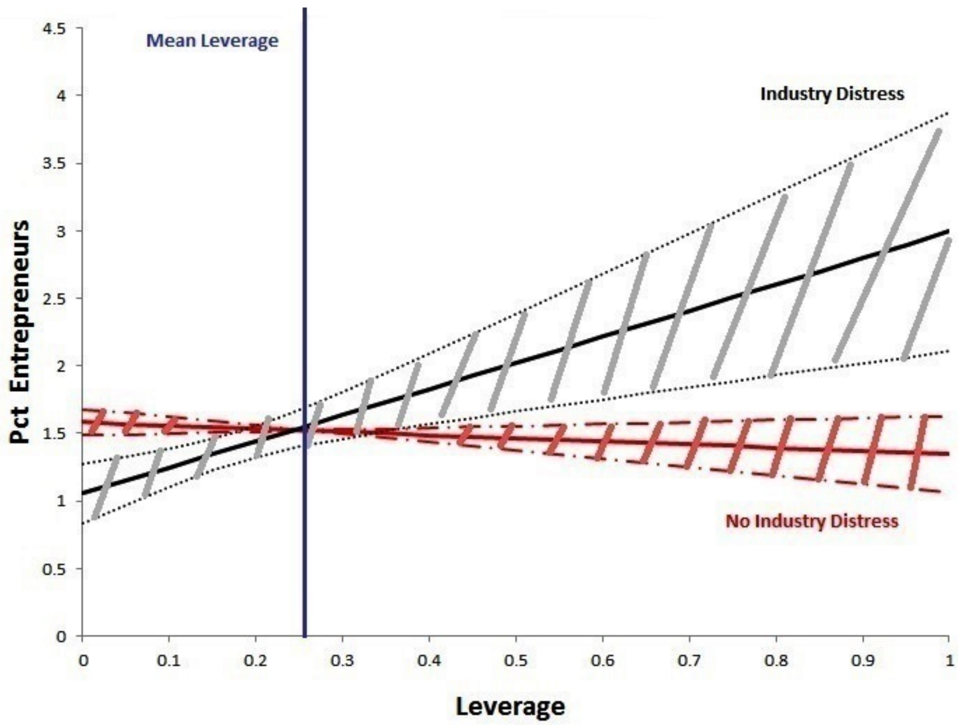

Figure 2
Predicted entrepreneurship rate after distress versus nondistress industry years as a function of employer financial leverage

This graph shows the predicted future worker entrepreneurship rate after distress and nondistress industry years as a function of employer financial leverage. The average predicted values are plotted along with the corresponding confidence intervals. The predicted values and their confidence intervals come from the following equation (the regression estimates are in Table 5, Column 7):

$$y_{e,f,t+3} = \boldsymbol{\beta_1} \times Leverage_{f,t-2} \times IndDistress_{i,t} + \beta_2 \times Leverage_{f,t-2} + \beta_3 \times IndDistress_{i,t} + \alpha_e + \epsilon_{e,f,t},$$

where e indexes establishments, f indexes firm, i indexes industry, t indexes time in years; y is the percentage of employees at the establishment e of firm f at time t who are founding team members at t+*3*, founding team includes founders and early employees, defined as people at a firm no more than 3 years old and who are among the top-five earners at that new firm (main definition); *Leverage* is the firm book financial leverage ratio (long-term debt plus debt in current liabilities, normalized by total firm assets) measured at t-*2*; *IndDistress* is an indicator variable equal to one if the industry-year i, t is in distress; α_e is establishment fixed effects; and ϵ is the error term. The vertical bar "Mean Leverage" is average firm leverage across all establishment-years. The difference between the two slopes equals the regression coefficient on the interaction between leverage and industry shock, β_1. The difference between the two intercepts equals the regression coefficient on industry shock, β_3.

Table 1
Summary statistics on public firms and their establishments

Panels A and B present summary statistics for U.S. public firms: panel A at the firm-year level (20,000 observations) and panel B at the establishment-year level (91,000). Base year, $t = 0$, is when industry distress is defined (variable IndDistress$_t$) and stock of public firms' employees is taken (as of the first quarter). Leverage$_{t-2}$ is the firm book financial leverage ratio (long-term debt plus debt in current liabilities, normalized by total firm assets). Entrepreneurs$_{t,t+3}$ is the percentage of an establishment's employees as of the first quarter of year 0 who are founding team members as of the first quarter of year 3. Founding team includes founders and early employees, defined as people who are working at a firm that has been operating for fewer than 3 years and who are one of the top-five earners at that new firm (main definition). Move to new firms$_{t,t+3}$ is the percentage of employees as of the first quarter of year 0 who, 3 years later, work for a firm no more than 3 years old. Entrepreneurs$_{t,t+3}$/turnover$_{t,t+3}$ is the percentage of founding team members normalized by the number of public firm employees as of the first quarter of year 0 who work for a different employer 3 years later. All other entrepreneurship variables normalize a particular type of departures by the base year employment and are expressed in percentages. Entrepreneurs since new firm existence$_{t,t+3}$ is measured in the same way as the main definition, except I limit the entrepreneurs to those who were at the new firm since it appeared in the LBD with positive employment. Entrepreneurs$_{t,t+1}$ (Entrepreneurs$_{t,t+2}$) is measured in the same way as the main definition, except I identify departures to entrepreneurship 1 (2) years since the base year to a firm no more than 1 (2) years old. Entrepreneurs above-median public firm wage (tenure)$_{t,t+3}$ is measured in the same way as the main definition, except I limit the workers at U.S. public firms to be in the top half of their employer's wage (tenure) distribution. # new firms$_{t,t+3}$ measures the number of unique new firms associated with the founding team members defined according to the main definition. Per Census Bureau disclosure rules, observations and estimates are rounded.

Panel A. Firm-year variables (20,000 observations)

	Mean	SD
Levearge$_{t-2}$	0.260	0.215
Tobin's q$_{t-1}$	1.81	1.27
Age$_{t-1}$	19.4	5.83
Total assets$_{t-1}$ ($millions)	2,300	7,252
Employment$_{t-1}$	8,536	17,920

Panel B. Establishment-year variables (91,000 observations)

	Mean	SD
IndDistress$_t$	0.031	
Entrepreneurs$_{t,t+3}$	1.51	3.94
Move to new firms$_{t,t+3}$	3.80	6.36
Entrepreneurs$_{t,t+3}$/turnover$_{t,t+3}$	4.07	9.00
Entrepreneurs since new firm existence$_{t,t+3}$	1.18	3.48
Entrepreneurs$_{t,t+1}$	0.54	2.24
Entrepreneurs$_{t,t+2}$	1.04	3.18
Entrepreneurs above median public firm wage$_{t,t+3}$	1.58	5.12
Entrepreneurs above median public firm tenure$_{t,t+3}$	1.45	4.96
# new firms$_{t,t+3}$	1.39	3.57

Table 2
Summary statistics on workers of public firms

The table presents summary statistics for workers of U.S. public firms. The data are at the worker-year level of workers at establishments in panel B of Table 1 by two groups of employees: those who, in 3 years (a) are not defined as entrepreneurs ("Nonentrepreneurs" column, 28.7 million observations) versus (b) are defined as entrepreneurs ("Entrepreneurs" column, 315 thousand observations). Base year $t = 0$ is when industry distress is defined (variable IndDistress$_t$) and stock of public firms' employees is taken (as of the first quarter). Entrepreneurs are employees as of the first quarter of year 0 who are founding team members as of the first quarter of year 3. Founding team includes founders and early employees, defined as people who are working at a firm that has been operating for fewer than 3 years and who are one of the top-five earners at that new firm (main definition). Born in state$_t$ equals 1 for workers who were born in the state of their employment with the U.S. public firm. Total experience$_t$ (years) measures the number of years a worker is observed in the LEHD data as of year 0. Tenure$_t$ (years) measures the number of years a worker has been employed by his current employer. Wages are annualized quarterly earnings in real 2014 dollars and expressed in thousands. Wages$_t$ ($000) (all) include all employees in year 0. This sample includes workers with incomplete-quarter jobs. These wages are depressed downward because jobs can start after the beginning of the quarter or end before the end of the quarter. To correct for this downwards bias, I also report statistics on earnings of workers with complete quarter jobs; this is a subset of workers who were at the firm during the quarter before and after the first quarter of year 0. Per Census Bureau disclosure rules, observations and estimates are rounded.

Worker-year variables (29 million observations)		
	Nonentrepreneurs	Entrepreneurs
	Mean (SD)	Mean (SD)
Female	0.475	0.462
White	0.701	0.782
Foreign born	0.063	0.063
Born in state	0.517	0.532
Age$_t$ (years)	36.4	32.2
	(12.7)	(11.2)
Education$_t$ (years)	13.6	13.2
	(2.51)	(2.43)
Total experience$_t$ (years)	3.97	3.83
	(3.37)	(3.26)
Tenure$_t$ (years)	2.08	1.51
	(2.37)	(1.85)
Wages$_t$ ($000) (all)	31.9	30.8
	(44.4)	(43.5)
Wages$_t$ ($000) (complete quarter jobs)	45.2	43.4
	(39.3)	(44.4)

Table 3
Summary statistics on new firms

This table presents summary statistics on new firms associated with founding team members after they leave employment at U.S. public firms from 1990 through 2003. These new firms were founded from 1990 through 2006. Surviving new firms are a subset of new firms that survive for at least 5 years. Base year $t = 0$ is when industry distress is defined and stock of public firms' employees is taken. Per Census Bureau disclosure rules, observations and estimates are rounded and percentile statistics are not disclosed. Quasi median approximates the median by taking the mean of observations within the interquartile range. New firm wages$_{t+3}$ ($000) are annualized quarterly earnings in real 2014 dollars and expressed in thousands. New firm initial employment and payroll are measured during the first year the new firm appears in the LBD with positive employment. $t + 3$ new firm employment and payroll is measured as of the first quarter of year 3 (when founding team members are identified with new firms); during this snapshot the average new firm is 1.6 years old (maximum of 3 years old). For firms that survive for 5 years since year 3, I also measure their total employment and payroll in year 8.

New firm characteristics and outcomes	Mean	SD	Quasi median
All new firms (315,000 observations):			
New firm is incorporated (initial)	0.632		
New firm 5-year exit$_{t+3,t+8}$	0.482		
New firm wages$_{t+3}$ ($000)	35.8	39.9	
New firm age$_{t+3}$	1.6	1.0	
New firm employment (initial)	11.2	24.2	5.4
New firm payroll (initial; $000)	262	710	95.9
New firm employment$_{t+3}$	13.4	32.8	5.9
New firm payroll$_{t+3}$ ($000)	770	12,959	112
Surviving new firms (163,000 observations):			
New firm 5-year employment$_{t+3,t+8}$	15.4	28.5	7.7
New firm 5-year payroll$_{t+3,t+8}$	574	1,776	166

Table 4
Distribution of observations by industry sectors

This table shows distribution by SIC 1-digit code sectors. Per Census Bureau disclosure rules, percentile statistics and some estimates are not disclosed (marked "ND"). Column 1 shows within-sector percentage of establishment-years of public firms in industry distress. The sample is the same as that in panel B of Table 1. Columns 2–5 show distribution across industry sectors in four samples: establishment-years of public firms in my sample described in panel B of Table 1 (Column 2); LBD establishments of all firms, excluding finance and states not covered by the LEHD to facilitate comparison with the U.S. public firm sample (Column 3); LBD establishments of new firms, firms aged 3 years or younger and excluding states not covered by the LEHD to facilitate comparison with the new firms in my sample (Column 4); new firms in my sample described in Table 3 (Column 5). In Column 2, the number of observations for finance is "NA," because financial public firms are excluded.

Distribution of observations by industry sector					
	% in industry	Distribution of establishments			
	distress	Public firms (my sample)	LBD firms (all)	LBD firms (new firms)	New firms (my sample)
	[1]	[2]	[3]	[4]	[5]
Mining and construction (SIC1 = 1)	ND	1.6	10.8	12.8	11
Manufacturing (SIC1 = 2 or 3)	3.5	15.5	6.7	5.1	4.5
Transportation (SIC1 = 4)	ND	11.2	5	4.6	4.7
Retail and wholesale trade (SIC1 = 5)	2	48.9	35.8	29.7	33.3
Finance (SIC1 = 6)	ND	NA	NA	8.3	8.6
Services (SIC1 = 7 or 8)	6.8	22.8	41.7	39.5	38.1
All industries	3.1	100	100	100	100

Table 5
Effect of employer financial distress on employee departures to entrepreneurship

The table presents the main results of the paper and shows the effect of employer financial distress shock on employee departures to entrepreneurship. The sample is an establishment-year panel of U.S. public firms from 1990 through 2003. The base year, $t = 0$, is the year relative to when all variables are measured. The dependent variable, $\text{Entrepreneurs}_{t,t+3}$ is the percentage of an establishment's employees as of the first quarter of year 0 who are founding team members as of the first quarter of year 3. Founding team includes founders and early employees, defined as people who are working at a firm that has been operating for fewer than 3 years and who are one of the top-five earners at that new firm (main definition). IndDistress_t equals 1 if an industry-year at $t = 0$ is in distress, and 0 otherwise. An industry-year is in distress if from the beginning of that year the 2-year industry sales growth is negative and the 2-year industry stock return is less than –30% (Opler and Titman, 1994). Leverage_{t-2} is the firm book financial leverage ratio (long-term debt plus debt in current liabilities, normalized by total firm assets). Establishment characteristics are measured as of the first quarter year 0, when public firms' employee snapshot is taken. Firm Age_{t-1} is equal to the age of the oldest establishment that a firm owns when it first appears in the data. Diversified Firm_{t-1} equals 1 if a firm owns establishments in more than one SIC 3-digit industry. Note, the coefficient on IndDistress cannot be estimated in columns that include industry-year fixed effects because they are collinear with the industry distress indicator. Standard errors are clustered at the SIC 3-digit code industry level and are in parentheses. *$p < .1$; **$p < .05$; ***$p < .01$.

Dependent variable:	Entrepreneurs$_{t,t+3}$								
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
$\text{Leverage}_{t-2} \times \text{IndDistress}_t$	1.167**	1.186***	1.275**	1.385***	1.417***	1.505***	1.939***	1.952***	1.857***
	(0.459)	(0.442)	(0.611)	(0.418)	(0.420)	(0.430)	(0.541)	(0.558)	(0.588)
Leverage_{t-2}	0.336**	0.336**	0.308**	-0.160	-0.120	-0.138	-0.235	-0.179	-0.153
	(0.154)	(0.153)	(0.146)	(0.156)	(0.158)	(0.166)	(0.191)	(0.192)	(0.204)
IndDistress_t				-0.271***	-0.279***		-0.456***	-0.463***	
				(0.067)	(0.072)		(0.113)	(0.123)	
log(Establishment employment)$_t$			-0.144***			-0.136***			0.068
			(0.021)			(0.022)			(0.065)
log(Establishment payroll/employment)$_t$			-0.061			-0.077			0.113
			(0.053)			(0.054)			(0.100)
Firm age$_{t-1}$ (years)			-0.019***			-0.016			-0.013
			(0.005)			(0.026)			(0.014)
Diversified firm$_{t-1}$			-0.179***			-0.073			0.015
			(0.066)			(0.088)			(0.121)
Firm sales growth$_{t-1}$			0.220***			-0.044			-0.042
			(0.067)			(0.071)			(0.074)
Firm return on assets$_{t-1}$			-0.841**			-0.229			-0.161
			(0.330)			(0.390)			(0.330)
Firm investments/total assets$_{t-1}$			0.990**			0.615**			0.269
			(0.413)			(0.251)			(0.235)
Firm R&D/total assets$_{t-1}$			-0.177			3.092*			2.753*
			(0.941)			(1.657)			(1.526)
log(Firm Tobin's q$_{t-1}$)			-0.018			0.062			0.063
			(0.062)			(0.060)			(0.072)
log(Firm total assets$_{t-1}$)			-0.062***			0.055			0.023
			(0.015)			(0.056)			(0.055)
Firm net PP&E/total assets$_{t-1}$			-0.416***			-0.179			-0.159
			(0.152)			(0.278)			(0.391)
Firm cash/total assets$_{t-1}$			0.001			-0.310			-0.103
			(0.267)			(0.300)			(0.303)
Industry–year FE	Yes	Yes	Yes			Yes			Yes
State–year FE		Yes	Yes		Yes	Yes		Yes	Yes
Firm FE				Yes	Yes	Yes			
Establishment FE							Yes	Yes	Yes
Adjusted R-squared	0.005	0.011	0.014	0.069	0.071	0.068	0.299	0.299	0.294
Number of observations	91,000	91,000	91,000	91,000	91,000	91,000	91,000	91,000	91,000

Table 6
Timing of departures to entrepreneurship around employer financial distress

The table shows dynamic effects of the employer distress on entrepreneurial departures. The sample is an establishment-year panel of U.S. public firms from 1990 through 2003. The base year, $t = 0$, is the year relative to when all variables are measured. In each column, the dependent variable measures employee departures to entrepreneurship around $t = 0$, when the industry distress is defined. IndDistress$_t$ equals 1 if an industry-year is in distress, and 0 otherwise. An industry-year is in distress if from the beginning of that year the 2-year industry sales growth is negative and the 2-year industry stock return is less than –30%. Leverage is the firm book financial leverage ratio (long-term debt plus debt in current liabilities, normalized by total firm assets). All definitions of entrepreneurship are conditioned on the founders (i.e., entrepreneurs) being one of the top-five earners at a new firm. In Column 1, the dependent variable is the percentage of an establishment's employees as of the first quarter of year $t = -3$ who are entrepreneurs as of the first quarter of year $t = 0$. An entrepreneur is defined as a person at a firm that has been operating for no more than 3 years (at $t = 0$). In Column 2, the dependent variable is the percentage of an establishment's employees as of the first quarter of year $t = -2$ who are entrepreneurs as of the first quarter of year $t = 0$. An entrepreneur is defined as a person at a firm that has been operating for no more than 2 years (at $t = 0$). In Column 3, the dependent variable is the percentage of an establishment's employees as of the first quarter of year $t = -1$ who are entrepreneurs as of the first quarter of year $t = 0$. An entrepreneur is defined as a person at a firm that has been operating for no more than 1 year (at $t = 0$). In Column 4, the dependent variable is the percentage of an establishment's employees as of the first quarter of year $t = 0$ who are entrepreneurs as of the first quarter of year $t = +1$. An entrepreneur is defined as a person at a firm that has been operating for no more than 1 year (at $t = +1$). In Column 5, the dependent variable is the percentage of an establishment's employees as of the first quarter of year $t = 0$ who are entrepreneurs as of the first quarter of year $t = +2$. An entrepreneur is defined as a person at a firm that has been operating for no more than 2 years (at $t = +2$). In Column 6, the dependent variable is the percentage of an establishment's employees as of the first quarter of year $t = 0$ who are entrepreneurs as of the first quarter of year $t = +3$. An entrepreneur is defined as a person at a firm that has been operating for no more than 3 years (at $t = +3$) (main definition). All columns include leverage, industry distress and control for establishment size and average wage as well as firm age, diversification, sales growth, return on assets, investments, R&D expenses, net PP&E, and cash holdings, Tobin's q, and firm assets. Standard errors are clustered at the SIC 3-digit code industry level and are in parentheses. *p <.1; **p <.05; ***p <.01.

Dependent variable:	Departures to entrepreneurship measured from ...					
	$(t-3$,t)	$(t-2$,t)	$(t-1$,t)	$(t, t+1)$	$(t, t+2)$	$(t, t+3)$
	[1]	[2]	[3]	[4]	[5]	[6]
Leverage$_{t-2}$ × IndDistress$_t$	0.131	-0.025	0.323	0.376	0.700**	1.857***
	(0.273)	(0.181)	(0.304)	(0.248)	(0.326)	(0.588)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry–year FE	Yes	Yes	Yes	Yes	Yes	Yes
State–year FE	Yes	Yes	Yes	Yes	Yes	Yes
Establishment FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.573	0.470	0.269	0.216	0.266	0.294
Number of observations	91,000	91,000	91,000	91,000	91,000	91,000

Table 7
Effect of employer financial distress on alternative measures of entrepreneurial departures

The table shows the effect of employer distress on alternative measures of entrepreneurial departures. The sample is an establishment-year panel of U.S. public firms from 1990 through 2003. The base year, $t = 0$, is the year relative to when all variables are measured. In Columns 1–6 and 8, entrepreneurship is expressed as a percentage of employees who are at the public firm's establishment at $t = 0$ to measure the impact on ex ante stock of workers. In Column 7, the number of entrepreneurs (defined according to the main definition) is normalized by the number of employees who work for a different employer at $t = +3$ to measure the impact among departed workers. According to the main definition, a founding team member (i.e., entrepreneurs) is a person at a firm that has been operating for no more than 3 years and who is one of the top-five earners at that new firm. Columns 1 through 4 and Column 8 additionally restrict the main definition of entrepreneurship. Column 1 restricts founding team members to be at new firms during the new firms' first year of existence to exclude those who might have joined after firm birth. Column 2 (3) restricts founding team members to be among public firms' high-wage workers (high-tenure workers) to proxy for a loss of skilled human capital. A worker is high-wage (high-tenure) if his wages (tenure) are above the 50th percentile of the establishment-year wage (tenure) distribution. Column 4 restricts founders to be the top earner at new firms to proxy for the most important founder. Column 5 counts the number of unique new firms associated with the founders from the main definition to control for team starts. Column 6 counts all workers at time $t = 0$ who are at new firms 3 years later. New firms are firms less than 3 years old. Column 8 restricts founders to be at new firms in the same SIC-1 industry sector as the public firm establishment employing them at $t = 0$ to proxy for competing startups. Leverage_{t-2} is the firm book financial leverage ratio (long-term debt plus debt in current liabilities, normalized by total firm assets). IndDistress_t equals 1 if an industry-year is in distress, and 0 otherwise. An industry-year is in distress if from the beginning of that year the 2-year industry sales growth is negative and the 2-year industry stock return is less than –30%. All columns include leverage, industry distress, and controls for establishment size and average wage as well as firm age, diversification, sales growth, return on assets, investments, R&D expenses, net PP&E, and cash holdings, Tobin's q, and firm assets. The last row shows economic significance of a 1-standard-deviation increase in leverage on the mean rate of entrepreneurial departures. Standard errors are clustered at the SIC 3-digit code industry level and are in parentheses. *$p < .1$; **$p < .05$; ***$p < .01$.

Dependent variable:	Entrepreneurship is measured at $t+3$ and defined as ...							
	Present since new firm existence	Above median public firm wages	Above median public firm tenure	Top 1 earner at new firm	# New firms	All workers who move to new firms	Normalized by turnover_{t+3}	Same industry new firm
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
$\text{Leverage}_{t-2} \times \text{IndDistress}_t$	1.352***	1.522***	1.773***	0.833***	0.944***	2.029***	4.016***	1.233***
	(0.501)	(0.540)	(0.503)	(0.247)	(0.270)	(0.775)	(1.378)	(0.405)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry–year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State–year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.069	0.073	0.059	0.042	0.041	0.129	0.052	0.085
Number of observations	91,000	91,000	91,000	91,000	91,000	91,000	91,000	91,000
Effect of 1-SD increase in leverage on the mean	24.6%	20.7%	25.9%	34.4%	14.6%	11.5%	21.2%	41.4%

Table 8
Alternative measures of employer financial exposure to shock on entrepreneurial departures

The table shows departures of employees to entrepreneurship as a function of alternative measures of their employer's exposure to shock. The sample is an establishment-year panel of U.S. public firms from 1990 through 2003. The base year, $t = 0$, is the year relative to when all variables are measured. The dependent variable, $\text{Entrepreneurs}_{t,t+3}$, is the percentage of an establishment's employees as of the first quarter of year 0 who are founding team members as of the first quarter of year 3. Founding team includes founders and early employees, defined as people who are working at a firm that has been operating for fewer than 3 years and who are one of the top-five earners at that new firm (main definition). Columns 1 through 6 use the main definition of industry distress (used in other tables) according to which an industry-year is in distress if from the beginning of that year the 2-year industry sales growth is negative and the 2-year industry stock return is less than –30%. Columns 7 and 8 use alternative definitions of industry distress by modifying the restriction on industry stock return to be less than –20% in Column 7 and –25% in Column 8. Columns 1 through 6 use alternative definitions of exposure to the shock. Column 1 uses the fraction of maturing long-term debt. Column 2 uses long-term leverage (long-term debt normalized by total firm assets). Column 3 uses market leverage (long-term debt plus debt in current liabilities, normalized by total market value of firm assets). Column 4 uses net leverage (long-term debt plus debt in current liabilities minus cash and short-term securities, normalized by total market value of firm assets). Column 5 uses interest expense coverage (interest expense normalized by EBITDA), and Column 6 uses debt coverage (long-term debt plus debt in current liabilities normalized by EBITDA). Columns 7 and 8 use book leverage, which is the main definition of leverage used throughout the paper (long-term debt plus debt in current liabilities, normalized by total firm assets). All columns include leverage and industry distress as well as control for establishment size and average wage as well as firm age, diversification, sales growth, return on assets, investments, R&D expenses, net PP&E, and cash holdings, Tobin's q, and firm assets. Standard errors are clustered at the SIC 3-digit code industry-level and are in parentheses. *$p < .1$; **$p < .05$; ***$p < .01$.

Dependent variable:	Entrepreneurs$_{t,t+3}$							
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Maturing debt$_t$ × IndDistress$_t$	0.491**							
	(0.218)							
Long-term leverage$_{t-2}$ × IndDistress$_t$		1.372***						
		(0.299)						
Market leverage$_{t-2}$ × IndDistress$_t$			0.628*					
			(0.370)					
Net leverage$_{t-2}$ × IndDistress$_t$				0.984***				
				(0.279)				
Interest expense/EBITDA$_{t-2}$ × IndDistress$_t$					0.463*			
					(0.267)			
Debt/EBITDA$_{t-2}$ × IndDistress$_t$						0.050***		
						(0.019)		
Leverage$_{t-2}$ × IndDistress$_t$ (Stock return <=-20%)							1.169***	
							(0.412)	
Leverage$_{t-2}$ × IndDistress$_t$ (Stock return <= -25%)								1.413***
								(0.415)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry–year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State–year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068
Number of observations	91,000	91,000	91,000	91,000	91,000	91,000	91,000	91,000

Table 9
Cross-sectional effect of employer financial distress on entrepreneurial departures

The table shows heterogeneous effect of employer distress on entrepreneurial departures. The sample is an establishment-year panel of U.S. public firms from 1990 through 2003. Base year, $t = 0$, is the year relative to which all variables are measured. The dependent variable, $\text{Entrepreneurs}_{t,t+3}$ is the percentage of an establishment's employees as of the first quarter of year 0 who are founding team members as of the first quarter of year 3. Founding team includes founders and early employees, defined as people who are working at a firm that has been operating for fewer than 3 years and who are one of the top-five earners at that new firm (main definition). Leverage_{t-2} is the firm book financial leverage ratio (long-term debt plus debt in current liabilities, normalized by total firm assets). IndDistress_t equals 1 if an industry-year is in distress, and 0 otherwise. An industry-year is in distress if from the beginning of that year the 2-year industry sales growth is negative and the 2-year industry stock return is less than –30%. Manufacturing (Trade)[Services] equals 1 for establishments when SIC1 industry equals 2 (SIC1 = 5)[SIC1 = 7 or 8]. HighTech equals 1 for establishments in high-tech industries, which include Biotech, Computers, Electronics, and Telecom (Ouimet and Zarutskie, 2014). Weak (Strong) Noncompete Enforcement equals 1 for establishments in states with the Garmaise (2011) Noncompetition Enforceability Index value less than (greater or equal to) the median. The p-value of F-test is for a two-sided test of the difference between reported coefficients. For example, in Column 1, the difference is between "Leverage × IndDistress × Not Manufacturing" and "Leverage × IndDistress × Manufacturing." All columns include interactions of the cross-sectional dummy (an industry sector or weak noncompete enforcement) interacted with leverage and industry shock, not reported for brevity. All columns also include leverage, industry distress, and control for establishment size and average wage as well as firm age, diversification, sales growth, return on assets, investments, R&D expenses, net PP&E, and cash holdings, Tobin's q, and firm assets. Standard errors are clustered at the SIC 3-digit code industry level and are in parentheses. *p <.1; **p <.05; ***p <.01.

Dependent Variable:	$\text{Entrepreneurs}_{t,t+3}$				
	[1]	[2]	[3]	[4]	[5]
$\text{Leverage}_{t-2} \times \text{IndDistress}_t$ × Not manufacturing	1.858***				
	(0.480)				
$\text{Leverage}_{t-2} \times \text{IndDistress}_t$ × Manufacturing	0.375				
	(0.567)				
$\text{Leverage}_{t-2} \times \text{IndDistress}_t$ × Not trade		1.842***			
		(0.386)			
$\text{Leverage}_{t-2} \times \text{IndDistress}_t$ × Trade		0.548			
		(0.622)			
$\text{Leverage}_{t-2} \times \text{IndDistress}_t$ × Not services			0.694		
			(0.472)		
$\text{Leverage}_{t-2} \times \text{IndDistress}_t$ × Services			2.353***		
			(0.395)		
$\text{Leverage}_{t-2} \times \text{IndDistress}_t$ × Not high-tech				0.842*	
				(0.478)	
$\text{Leverage}_{t-2} \times \text{IndDistress}_t$ × High-tech				2.373***	
				(0.363)	
$\text{Leverage}_{t-2} \times \text{IndDistress}_t$ × Weak noncompete enforcement					3.012***
					(0.815)
$\text{Leverage}_{t-2} \times \text{IndDistress}_t$ × Strong noncompete enforcement					0.463
					(0.335)
Controls	Yes	Yes	Yes	Yes	Yes
Industry–year FE	Yes	Yes	Yes	Yes	Yes
State–year FE	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.068	0.068	0.068	0.068	0.068
Number of observations	91,000	91,000	91,000	91,000	91,000
p-val of F-test (difference)	0.058	0.060	0.010	0.009	0.004

Table 10
Employer financial distress and the performance of employee-founded new firms

The table shows that distress in U.S. public firms predicts the exit of higher-wage workers to create faster-growing new firms. The sample consists of entrepreneurs and the new firms they found from 1991 through 2006 after departing employment at U.S. public firms from 1990 through 2003. The base year, $t = 0$, is the year relative to when all variables are measured. The entrepreneurs are all workers who are identified as such using the main definition of entrepreneurship in Table 5. According to this main definition, entrepreneurs are founding team members as of the first quarter of year 3. Founding team includes founders and early employees, defined as people who are working at a firm that has been operating for fewer than 3 years and who are one of the top-five earners at that new firm. Columns 1–5 examine the relationship between employer distress and wages/new firm performance among all founding team members leaving public firms. Columns 6–9 examine the relationship between employer distress and wages/new firm performance among high- versus low-wage founding team members leaving public firms. A worker is high-wage (low-wage) if his wages are above (below) the fiftieth percentile of wage distribution of the employing public firm's establishment-year. In Column 1, log(Wages_t) are annualized quarterly wages earned at public firm during the first quarter of year 0. All wages are in constant 2014 dollars. In Columns 2 and 6, log (Wages) are annualized wages earned over 3 years after being identified with the new firm in the first quarter of year 3. 5-year Exit equals 1 if the new firm has either zero employment or exited the data 5 years after being identified with the founder in the first quarter of year 3. For new firms that survive for 5 years, log 5-year Employment (Payroll) is total employment (payroll) 5 years after being identified with the founder in the first quarter of year 3. The p-value of F-test is for a two-sided test of the difference between reported coefficients (*Leverage* × *IndDistress* × *Above-median public firm wage* and *Leverage* × *IndDistress* × *Below-median public firm wage*). All columns include leverage, industry distress, establishment-level and firm-level controls from Table 5, and worker-level controls. Worker-level control variables include worker age, worker age squared, female indicator, white indicator, worker foreign born indicator, worker born in the state of employment indicator, worker education, worker total experience, and worker tenure. In addition, Columns 2–9 include log wages at public firms and new firm controls, which are initial firm age and log of employment at the time the new firm became identified with the entrepreneur. Columns 5 and 9 also include log of payroll, measured at the same time as the initial firm age. Standard errors are clustered at the SIC 3-digit code industry level and are in parentheses. *p <.1; **p <.05; ***p <.01.

	Public firm characteristics	New firm characteristics across all public firm workers				New firm characteristics across high and low wage public firm workers			
Dependent variable:	log wages_t	log wages $(t+3, t+6)$	5-year exit $(t+3, t+8)$	log 5-year employment $(t+3, t+8)$	log 5-year payroll $(t+3, t+8)$	log wages $(t+3, t+6)$	5-year exit $(t+3, t+8)$	log 5-year employment $(t+3, t+8)$	log 5-year payroll $(t+3, t+8)$
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
$\text{Leverage}_{t-2} \times \text{IndDistress}_t$	0.481***	0.139**	-0.039	0.166***	0.176**				
	(0.088)	(0.059)	(0.025)	(0.063)	(0.082)				
$\text{Leverage}_{t-2} \times \text{IndDistress}_t \times$ Above-median public firm wage founder_t						0.273***	-0.051*	0.194***	0.236***
						(0.063)	(0.030)	(0.059)	(0.076)
$\text{Leverage}_{t-2} \times \text{IndDistress}_t \times$ Below-median public firm wage founder_t						-0.054	-0.023	-0.056	0.007
						(0.105)	(0.031)	(0.080)	(0.114)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry–year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State–year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.455	0.230	0.016	0.087	0.041	0.260	0.016	0.091	0.052
Number of observations	315,000	315,000	315,000	163,000	163,000	315,000	315,000	163,000	163,000
p-val of F-test (difference)	NA	NA	NA	NA	NA	0.009	0.426	0.000	0.065

Table 11
Employer financial constraints indices predict entrepreneurial departures and performance of employee-founded new firms

The table shows that commonly used measures of firms' financial constraints predict departure of workers to entrepreneurship (panel A) and performance of the new firms they found (panel B). The financial constraints indices are W-W index from Whited and Wu (2006) and Size-Age index from Hadlock and Pierce (2010). Both indices are normalized to have a standard deviation of one for easy interpretation of economic significance. The base year, $t = 0$, is the year relative to when all variables are measured. In panel A, the sample is an annual panel of establishments of U.S. public firms from 1990 through 2003. In all four columns, the dependent variable, $\text{Entrepreneurs}_{t,t+3}$ is the percentage of an establishment's employees as of the first quarter of year 0 who are founding team members as of the first quarter of year 3. Founding team includes founders and early employees, defined as people who are working at a firm that has been operating for fewer than 3 years and who are one of the top-five earners at that new firm (main definition). Establishment controls are employment and average wage of public firms' establishments, both logged. Note, public firm controls are not included since the indices are linear combination some of the firm-level variables included in Table 5. In panel B, the sample is new firms founded over 1990–2006 and associated with entrepreneurs in panel A. In Columns 1–2 (3–4), log 5-year Employment (Payroll) measures a new firm's total employment (payroll) five years after being identified with the founder in the first quarter of year 3 (measured for the new firms that survive for 5 years). Worker controls include worker age, worker age squared, female indicator, white indicator, worker foreign born indicator, worker born in state indicator, worker education, worker total experience, and worker tenure. New firm controls are initial firm age in all columns; log of employment in Columns 1 and 2 (log of payroll in Columns 3 and 4) at the time the new firm became identified with the entrepreneur. Standard errors are clustered at the SIC 3-digit code industry level and are in parentheses. *$p < .1$; **$p < .05$; ***$p < .01$.

Panel A. Predict entrepreneurial departures

Dependent variable:	$\text{Entrepreneurs}_{t,t+3}$			
	[1]	[2]	[3]	[4]
WW index_{t-2}	0.112***	0.084***		
	(0.022)	(0.022)		
$\text{Size-age index}_{t-2}$			0.226***	0.189***
			(0.031)	(0.034)
Establishment controls	No	Yes	No	Yes
Industry–year FE	Yes	Yes	Yes	Yes
State–year FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.008	0.011	0.010	0.012
Number of observations	91,000	91,000	91,000	91,000

Panel B. Predict performance of employee-founded new firms

Dependent variable:	log 5-year $\text{employment}_{t+3,t+8}$		log 5-year $\text{payroll}_{t+3,t+8}$	
	[1]	[2]	[3]	[4]
WW index_{t-2}	0.009***		0.014*	
	(0.003)		(0.008)	
$\text{Size-age index}_{t-2}$		0.010***		0.023***
		(0.004)		(0.005)
Worker and startup controls	Yes	Yes	Yes	Yes
Wages at public firm control	Yes	Yes	Yes	Yes
Establishment controls	Yes	Yes	Yes	Yes
Industry–year FE	Yes	Yes	Yes	Yes
State–year FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.195	0.195	0.050	0.050
Number of observations	163,000	163,000	163,000	163,000

Table 12
Employment growth and turnover in financially distressed firms

The table examines employment growth and employee turnover following distress shocks to employing firms. The sample is an establishment-year panel of U.S. public firms from 1990 through 2003. All dependent variables are measured over the same period as the main entrepreneurship variable (outcomes in the first quarter of year $t = +3$ relative to the first quarter of base year $t = 0$) and expressed in percentage terms. The base year, $t = 0$, is the year relative to when all variables are measured. Employment growth is the log difference between 3-year future and base year employments. Move to incumbent firms is the percentage of an establishment's workers who work at a different firm that existed prior to the base year. Move to firm age unknown is the percentage of employees who leave to join firms for which I am unable to determine firm age (some LEHD employers are not included in the LBD, which is required to determine employer age). Depart LEHD coverage is the percentage of an establishment's workers who are not observed in the LEHD 3 years later. Employees may leave the data, because they leave the workforce, become unemployed, or are employed in an area outside of the LEHD coverage. IndDistress_t equals 1 if an industry-year is in distress, and 0 otherwise. An industry-year is in distress if from the beginning of that year the 2-year industry sales growth is negative and the 2-year industry stock return is less than –30%. Leverage_{t-2} is the firm book financial leverage ratio (long-term debt plus debt in current liabilities, normalized by total firm assets). All columns include leverage, industry distress, and controls for establishment size and average wage as well as firm age, diversification, sales growth, return on assets, investments, R&D expenses, net PP&E, and cash holdings, Tobin's q, and firm assets. The last row shows economic significance of 1-standard-deviation increase in leverage on the mean rate of the dependent variable. Standard errors are clustered at the SIC 3-digit code industry level and are in parentheses. *$p < .1$; **$p < .05$; ***$p < .01$.

Dependent variable:	Employment $\text{growth}_{t,t+3}$	Move to incumbent $\text{firms}_{t,t+3}$	Move to firm age $\text{unknown}_{t,t+3}$	Depart LEHD $\text{coverage}_{t,t+3}$
	[1]	[2]	[3]	[4]
$\text{Leverage}_{t-2} \times \text{IndDistress}_t$	-0.613***	3.265	1.671	-0.322
	(0.211)	(3.078)	(1.538)	(1.433)
Controls	Yes	Yes	Yes	Yes
Industry–year FE	Yes	Yes	Yes	Yes
State–year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.281	0.404	0.173	0.157
Number of observations	91,000	91,000	91,000	91,000