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The Performance Effects of Disrupting Founding Teams? Prior Shared Experience through Job Hoppers

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Abstract

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The Performance Effects of Disrupting Founding Teams' Prior Shared Experience through Job Hoppers ¹

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ABSTRACT

Start-ups founded by team members with prior shared experience in incumbent firms tend to perform better than other start-ups. While the prior shared experience might bring relevant knowledge and coherent routines, it could also corner the new firms in local search and limit innovation. I investigate how start-ups mitigate the negative aspects of shared prior experience by including in the founding team individuals with extensive experience in multiple prior jobs or industries – i.e., job hoppers. I find that indeed job hoppers positively moderate the effect of shared experience on performance. I also find that the effect is stronger for job hoppers who bring knowledge from outside the start-up industry to teams with prior shared experience in the start-up industry. Consequently, the job-hoppers may embody both the positive disruptive effect and the introduction of relevant complementary knowledge. With these results, the paper uncovers a novel mechanism that underlies the knowledge complementarities in founding teams.

INTRODUCTION

Start-ups founded by entrepreneurs who had relevant prior work experience tend to perform better: the start-ups are bigger (Roberts et al., 2011), survive longer (Agarwal et al., 2004; Delmar and Shane, 2006) and get more funding from investors (Chatterji, 2009) than other start-ups. These entrepreneurs often start their new ventures with previous colleagues with whom they share work experience and knowledge (Holbrook et al., 2000; Ganco, 2013). During this prior shared experience, the future members of the founding team were able to adopt their employer's routines that they can replicate in their start-ups (Philips, 2002; Agarwal et al., 2013) and to acquire insights on each other's strengths and weaknesses that can facilitate the organization of the start-up (Lange, 2007; Muendler and Rauch, 2012). If the shared experience occurred in an incumbent firm that belongs to the industry of the future start-up, the team members also acquired useful knowledge on the technology, market and regulations (Agarwal et al., 2004; Klepper and Sleeper, 2005; Chatterji, 2009).

While the prior studies highlighted a positive effect of prior shared experience on start-up performance, such identical experience and associated knowledge can also create redundancy or inertia issues for the new firms. To perform well, start-ups led by teams with prior shared experience need additional knowledge to disrupt inertia and to innovate (Katila, 2002; Sapienza et al., 2004). This is specifically the case in technological industries where innovation even in niche markets is a key driver of survival (Agarwal, 1998; Klepper and Simons, 2000). Prior research has also showed that shared and homogenous experiences in the founding team are associated with incremental innovation and exploitation while heterogeneous experiences lead to innovation (Beckman, 2006). However, it is unclear whether and how can teams with extensive prior shared experience mitigate the downside

associated with such experience. Building on these notions, I investigate the effect of job hoppers on the relationship between prior shared experience and start-up performance.

Job hoppers are workers who change jobs frequently. There is no established frequency to be called a job hopper but typically, job hoppers² switch to a new job as soon as an interesting opportunity occurs and do not build careers in one company (Malone, 1995). In areas where the density of firms in the same or related industries is high, job hoppers are often considered responsible for knowledge spillovers (Saxenian, 1994; Fallick et al., 2006). Established firms tend to offer job hoppers higher wages (Mithas and Krishnan, 2008), which suggests that they value their multiple experiences. However, in case of departure they are costly to the firms (Mitchell et al., 2001). In the entrepreneurial domain, job hoppers who turn entrepreneurs have more innovative start-ups that are less likely to fail although they undergo early difficulties in getting funding (Dokko and Wu, 2007). They can also be actors of technological or organizational change as they synthesize knowledge accumulated across various experiences (Taylor and Greve, 2006; Dokko and Wu, 2007).

To study the moderating effect of job hoppers, I first establish a baseline relationship: the effect of team's prior shared experience on the start-up performance. Controlling for the job hoppers' quality and based on their diverse experience, I then argue that job hoppers can disrupt redundant knowledge and bring complementary knowledge to teams with extensive prior shared experience. I thus posit that job hoppers positively moderate the relationship between prior shared experience and performance. I also examine whether the effect of job hoppers is contingent on the types of prior shared experiences and their own past experience. Specifically, when job hoppers disrupt the team's shared

² In this paper, I refer to job hoppers who change job at their will and not because of poor performance.

experience and thus knowledge, they have to come up with innovative replacement based on the recombination of their knowledge with the team knowledge. Thus, I expect that teams with start-up industry knowledge benefit more from job hoppers who primarily worked outside the start-up industry while teams with knowledge about an industry other than the start-up industry benefit more from job hoppers who primarily worked in the start-up industry.

I test this theoretical framework with the employee-employer linked dataset provided by the US Census Bureau (LEHD). The study focuses on the entire population of new ventures created by at least two people in five technological industries between 2000 and 2006 in 18 US states. As the LEHD coverage is from 1991 to 2008, I am able to build precise measures of experience prior to the start-up creation and of survival for several years after the start-up creation.

Pervasive to the literature on founding team and performance is the issue of the unobserved selection of the team members and their unobserved intrinsic quality (Eesley et al., 2013). Although I do not use instrumental variables for the team and hoppers' effects, I am able to build strong control variables that proxy for quality of the start-up opportunities and quality of the team members based on the past and current earnings of the founding team.

To foreshadow my results, I find that founding team's prior shared experience is positively related to survival and that the inclusion of job hoppers in these teams positively moderates the relationship. As for the contingent effect of job hoppers, I find that the job hoppers who worked outside the start-up industry positively moderate the effect of prior shared experience in the start-up industry on survival. These results as well as the robustness

checks I developed, suggests that there should indeed be two mechanisms underlying the effect of job hoppers: disrupting inherited and redundant knowledge and innovating by bringing new-to-the-team knowledge.

With these results, the paper uncovers specific mechanisms that underlie the foundation of knowledge complementarities in founding teams. It is important to underline that the paper treats of the complementarities of the team member based on knowledge about the start-up industry and about other industries. It does not take a stance about the complementarities based on occupation within the teams. The paper also contributes to the understanding of performance heterogeneity in start-ups based on the potential complementarities between team members. It also emphasizes the importance of the shared component of the experience as opposed to experience acquired individually by the team members.

THEORY AND HYPOTHESES

Prior shared experience

When employees worked for the same incumbent firm, they typically acquired the same organizational knowledge such as processes and routines. Later, after becoming entrepreneurs, they can use these routines in their start-up, providing them with an organizational advantage compared to other new ventures (Eisenhardt and Schoonhoven, 1990; Philips, 2002; Beckman, 2006; Agarwal et al., 2013). In addition, if the team members worked for the same incumbent firm at the same time, they also had the opportunity to learn (Muendler and Rauch, 2012) and adapt to each other's qualities (Katz, 1982; Reagans et al., 2005). These processes of insight gathering and adaptation build up over time (Lange, 2007;

Muendler and Rauch, 2012). The longer the shared experience, the more realistic the team members' expectations of each other and the higher their adaptation become. This in turn creates better work outcome (Gilson, 2005; Taylor and Greve, 2006) and higher start-up performance. To summarize, as prior shared experience provides a common organizational framework to the team, start-ups led by founding teams with shared experience are expected to perform better than start-ups led by founding teams without shared experience.

In addition to organizational knowledge, if the founding team's start-up enters the industry in which the team worked previously, the team also benefit from additional industry-specific knowledge. This industry-specific knowledge can relate to the technologies, market, or regulations of the industry (Agarwal et al., 2004; Slepper and Klepper, 2005; Chatterji, 2009) and has a positive effect on the firm performance (Delmar and Shane, 2006; Roberts et al., 2011). For instance, the transfer of technological knowledge was found to increase the survival of spinouts in the disk drive industry (Agarwal et al., 2004) whereas the transfer of regulatory knowledge gets spinouts faster funding (Chatterji, 2009).

In summary, previous research highlighted that entrepreneurs who worked together in an incumbent firm prior to founding their start-up accumulated different kinds of knowledge that increase their start-up performance. Thus, I posit as a baseline hypothesis that:

H1: A founding team's prior shared experience increases the start-up performance

Although this hypothesis is well established in the literature, some scholars have discussed some of the negative aspects of common experience and the associated common knowledge. This common knowledge is by definition redundant (Peretti and Negro, 2006)

and likely to be more difficult to disrupt, which could, in turn, limit the innovation of the start-up and damage its performance.

First, if the founding teams share extensive organizational knowledge from their prior experience, they are more likely to reproduce and use the same organizational features such as routines in the start-up (Philips, 2002). The team members might be committed to these routines regardless of their intrinsic quality (Levitt and March, 1988). The more organizational features the teams transfer and reproduce, the more at risk of inertia coming from their previous employer the teams become (Hannan and Freeman, 1984).

Second, in addition to having inherited organizational knowledge and routines, the teams with prior shared experiences are also likely to have inherited and to use technological knowledge from their parents (Agarwal et al., 2004; Sleeper and Klepper, 2005). The opportunity exploited in their start-up also often comes from their previous work at the parent firm (Bhide, 1994; Gambardella et al., 2014). This heritage provides the team with a more developed business opportunity than other teams; however, it also provides them with redundancy in their technological knowledge that can limit their innovation. In technological industries, simple replication of the previously acquired idea could have hurtful consequences. The parent firm can simply sue the start-up or the start-up can be stuck with outdated products. In any cases, this would lead to a failure of the new venture.

To overcome the negative aspects of redundant organizational and technological knowledge, start-ups team can expand their knowledge diversity. In case of start-ups founded by colleagues, a potential solution is the inclusion of job hoppers, workers with multiple past experiences.

Complementary effect of job hoppers

Job hoppers are individuals who change jobs as soon as they identify a new opportunity and so build a “unique” stream of experiences. They can provide the rest of the founding team with knowledge that is varied due to their multiple work experiences and whose combination is unique enough. This later factor makes the knowledge more likely to be integrated to the knowledge of the rest of the team (Shulz, 2006; Fern et al., 2011).

Because of their frequent change of employers, job hoppers have to adapt to various organizations and their respective routines. Having worked with a broader range of routines than a non-hopping worker, they are more critical of their new firm’s organizational processes and routines and to disrupt them. This ability to be critical, however, is not the reason that job hoppers are heard by their fellow team members; instead it is their unique experience. Research has established that the opinion of team members with a unique experience or stream of experiences is more likely to be followed than the opinion of an ordinary team member (Fern et al, 2011). The rest of the team is thus more likely to pay attention to the critics and be willing to change the routines. Thus, the presence of job hoppers on the team increases the possibility to constructively disrupt the inherited organizational and reduce inertia.

Second, given that innovation is mainly built on the recombination of existing knowledge (Katila and Ahuja, 2002; Fleming and Sorenson, 2001; Schilling and Green, 2011), job hoppers who collected a broad range of knowledge from multiple past work experiences, are in a position to be innovative. This innovative ability is better contributed by individual team members than by the team as a whole. After all, individuals have more possibilities to combine the knowledge they have acquired in previous experiences than teams that may draw on a broader scope of knowledge but the coordination costs of which

are tremendous (Taylor and Greve, 2006). The inclusion of job hoppers, then, increases the team's knowledge and innovation potential.

Thus, I expect the job hoppers to have a dual role in the founding team: disrupting and innovating, which in turn has a positive effect on the founding team's prior shared experience

H2: The inclusion of job hoppers on the founding team positively moderates the effect of prior shared experience on the start-up performance.

While job hoppers may contribute to constructive disruption and innovation in the start-up, the full or partial success of these contributions might be contingent on the team's prior shared experience and their own prior experience. Thus, to develop further the theoretical framework, I split the job hoppers in two mutually exclusive groups according to the job hoppers' prior industry experience. The first group is the group of job hoppers who primarily worked outside the start-up industry and the second one is the group of job hoppers who primarily worked inside the start-up industry. I also split the shared experience into two categories: shared experience within the start-up industry and outside the start-up industry. The literature has shown that founding teams with experience in an incumbent firm or parent firm that is part of the industry the teams plan on entering has often an advantage compared to other types of start-ups (Argawal et al., 2004; Chatterji, 2009). It thus makes sense to split the founding teams' prior experience based on the belonging of the parent firm in the start-up industry.

	Primarily outside job hoppers	Primarily inside job hoppers
Prior shared experience within the start-up industry	H3	
Prior shared experience outside the start-up industry		H4

Complementary effect of job hoppers in teams with prior shared experience within the start-up industry

In a team with prior shared experience in the start-up industry, the team members share routines that are already adapted to the start-up industry (Philips, 2002) and specific knowledge such as technological knowledge that are already applied in the industry by incumbents (Sleeper and Klepper, 2005). While this knowledge is customized for industry, the scope is limited and so is the innovation of the start-up because the possibilities of knowledge recombination are lacking (Fleming and Sorenson, 2001; Katila and Ahuja, 2002). When job hoppers are part of the founding team, they can disrupt some of the inherited routines and knowledge. However, if these routines and technological knowledge are disrupted, they have to be replaced so that the new ones become more efficient or innovative. In the case of routines and knowledge already embedded and accepted in the start-up industry, the disruption and innovation of these routines and knowledge should come from their combination with the ones coming from other industries.

Most industries incorporate technologies that have been developed in other industries. The most obvious ones include the incorporation of software and of lighter materials in a wide range of industries from vehicles manufacturing to electronic devices. At the new venture level, founding teams can incorporate knowledge coming from various industries. For instance, Icon Aircraft³, a designer and manufacturer of light sport aircraft was started by a founder who was a USAF pilot and had experience in aerospace industry, Kirk Hawkins and of a founder who had a long experience in design for consumer goods across multiple firms, Steen Strand. This example nicely illustrates how the two founders

³ This example is a brief synthesis of various online sources and press articles.

combine the needed knowledge of aerospace and design, this latter knowledge being acquired across multiple industries.

Like in the Icon Aircraft example, job hoppers such as Steen Strand are key team members that bring crucial knowledge. These job hoppers can build their knowledge by having exclusively worked in other industries than the start-up industry or by having hopped across multiple industries including the start-up industries. Either type of experience expands the scope of knowledge of the founding team and is likely to be what the teams with shared experience in the start-up industry are looking for. Thus I posit that

H3: The effect of shared experience of the team within the start-up industry is positively moderated by the inclusion of job hoppers on the founding team who primarily worked outside the start-up industry.

Theoretically, it is difficult to determine whether job hoppers who exclusively worked in other industries are better than job hoppers who worked in multiple industries including the start-up industries. The extent to which the founding team's shared experience in the start-up industry cover all or partially the key knowledge relevant to the industry, will affect the size of the effect of the job hoppers with or without industry experience. One could build a theoretical argument either way. Job hoppers without start-up industry experience are more useful to avoid any redundant knowledge and create innovation or job hoppers with start-up industry experience are more useful because they have access to knowledge coming from and outside the start-up industry and can thus, integrate them. Therefore, this comparison is more of an empirical question than a theoretical one.

Complementary effect of job hoppers in teams with prior shared experience outside the start-up industry

Founding teams with prior shared experience outside the start-up industry have at hand common organizational knowledge and routines that are different from the ones used in the industry they enter. Job hoppers with experience in the start-up industry can help disrupting these routines and combine them with ones coming from the start-up industry. In this case, the innovation would be created from the combination of shared knowledge coming from another industry to the one about the industry the team enters. The teams already have at hand some knowledge that is different from the one that is mainly used in their new industry and work on integrating it to their new industry. The purpose of the job hoppers is to deepen the knowledge of the start-up team of the industry it enters rather than to expand the scope of knowledge, which is probably already broad due to the outside industry experience.

Tesla Motors is an example of this knowledge integration and combination in a start-up among team members with shared experience outside the start-up industry and job hoppers. In 2000s, an electrical engineer, Martin Eberhard and a computer scientist, Marc Tarpenning started working on the idea of an electric sport car. They both had work experience in companies, part of the computer and software industries. They met and worked together at NuvoMedia, a company that developed an e-book. Soon after the takeover of NuvoMedia, they founded Tesla Motors and included in their team, among others, JB Straubel, an energy engineer who had experience in the car manufacturing industry. Later on, top managers from car manufacturing companies were added to the team. This case illustrates the creation of a car-manufacturing venture by individuals passionate about the concept and who were able to form their team with individuals like Straubel who

complemented their knowledge with start-up industry experience and could bring the technology to motion⁴.

Although any type of job hoppers can question the routines of a team with prior shared experiences, teams with prior shared experience outside the start-up industry need job hoppers to bring knowledge relevant to this industry to have a constructive effect on the team's organization. If they do not bring that knowledge, it might be difficult to recreate routines that would work in the industry context. Second, it would also be difficult for the start-up to enter in the industry with none or little knowledge of the industry. Extensive body of work has demonstrated that for technological reasons or market intelligence, a tie in the industry was a key driver of success (Agarwal et al., 2004; Chatterji, 2009; Delmar and Shane, 2006). Thus, in the case of teams with prior shared experience outside the start-up industry, I expect that job-hoppers who worked primarily in start-up industry to be beneficial and posit that:

H4: The effect of shared experience of the team outside the start-up industry is positively moderated by the inclusion of job hoppers on the founding team who primarily worked inside the start-up industry.

DATA AND METHODS

I use an extract of the confidential Longitudinal Employer Household Dynamics dataset (LEHD), which links employees to employers. The LEHD is constructed from unemployment insurance records and provides quarterly information on all the employees for which the employers pay into the state unemployment insurance fund. As all employers

⁴ This example is a brief synthesis of various online sources including the Encyclopedia Britannica Online and press articles.

are required by law to pay the Unemployment Insurance, the LEHD coverage is universal with the exception of self-employed workers and government workers. From this universe of firms, I selected all the new ventures created between 2000 and 2006 in five technological industries⁵ in 18 US states. I identified all the employees of the start-ups. I dropped all the employees who earned less than 10,000 dollars a year on average over their career because they are probably not committed to the labor market (Campbell et al., 2010). I then restricted my sample to start-ups with at least two employees and less than 31 employees at the end of their first year or at their last quarter if they did not survive for a full year. Start-ups with a bigger team of employees at their first year of existence are likely to either be existing firms that change tax identification number or spin-offs supported by a parent firm and thus, are not the subject of this study. These early employees compose the founding team. While these early employees might not all be owners of the start-ups⁶, their decisions and actions have important consequences for the start-up so that they are considered part of the founding team (Stinchcombe, 1965). The final sample is made up of 6000 start-ups and 31,000 start-up year observations⁷.

Variables

The characteristics of the founding team and start-up are measured one year after the start-up birth. If the start-up did not survive for one full year, these variables are computed

⁵ The five industries are at the three-digit NAICS level: Fabricated Metal Product Manufacturing; Machinery Manufacturing; Computer and Electronic Product Manufacturing; Electrical Equipment, Appliance, and Component Manufacturing; Transportation Equipment Manufacturing. The four-digit NAICS level industries that are used in the methodology and analysis are described in the Table A.1 of the appendix.

⁶ The ownership information is not available in the LEHD.

⁷ The sample size is rounded for confidentiality reasons.

based on the information available the last quarter of existence. I chose the one-year landmark because the founding employees of the start-up are more likely to have joined by that time rather than at the birth of the start-up where some of them might still have another full-time job. To compute the teams' various experiences, I retraced the career of each team member. As the LEHD time coverage starts in 1991 for most states⁸, I was able to observe at least 10 years of prior experience for the eldest employees of the sample. I took in account only the team members' main job, the job for which the individuals perceived their highest earnings in a given year, to compute the experience variables (Hyatt and McEntarfer, 2012; Campbell et al., 2013).

The dependent variable is the **start-up survival**, which is a relevant measure of performance for young firms (Geroski, 1995; Agarwal et al., 2004; Phillips, 2002). The variable is coded 1 in any year the start-up is alive and 0 the year the start-up fails. On average, I observed 5 years of survival and around 27% of all the start-ups failed during the period I examined from 2000 to 2008. Because the LEHD is constructed on a quarterly basis, I was able to use the first three quarters of the last year of the data (2008) to check for failure. I also checked whether the start-ups were acquired; in that case, the last year observed as an independent firm is coded 1 and the following years are not included.

I use five time-invariant explanatory variables and their interactions. **Prior shared experience** relates to the knowledge and routines the team has inherited from their work in the incumbent firm for which it worked before founding the start-up. Accordingly I measure this variable as the number of years of experience the team worked together in the incumbent. As encountered by other studies on teams (e.g. Kor, 2003), these teams are

⁸ For detailed time coverage by state, please refer to the Table A.2 in the appendix.

almost never made entirely of team members coming from the same previous employer; therefore, I had to identify the largest set of team members who came from the same incumbent and to use this set of team members to compute the variable. I determine the largest set by counting the number of team members who worked together the year before joining the start-up. For instance, if there are four team members in the team and if two of them come from the same employer the year before starting the new venture, they would form the main set. In case of a tie, I used the set with the highest earnings the year before the start-up creation.

Prior shared experience within the start-up industry relates to the knowledge and routines the team has inherited from their work in the same industry incumbent. Once I identified the set, I use the number of years the set has spent working together in the same firm that is part of the start-up industry at a 4-digit level prior to creating their start-up⁹. If one of the team members worked longer in that same firm by herself, this additional experience is not captured in this variable but will be in the control variable, team's average experience. If none of the team members worked in the same firm before joining the new venture, the prior shared experience is null.

Prior shared experience outside the start-up industry is the number of years the largest set of team members has spent working together in the same firm, which is not part of the start-up industry. Both prior shared experience variables are mutually exclusive.

⁹ Other researchers have averaged the time each pair of team members worked together in the past to measure shared experience (Reagans et al., 2005; Zheng, 2012). This method is not appropriate in my case as these dyads would not capture the common knowledge and routines that the team inherited from the same incumbent firm but rather capture knowledge acquired across various past experiences in pairs.

The inclusion of job hoppers in the founding team is measured by **the number of job hoppers** employed by the start-up after one year of existence. Job hoppers are individuals who in the 5 years before joining the start-ups worked in at least two firms. I only include workers who entered the data at least 5 years before being employed by the start-up. I used this fixed time period to avoid comparisons between workers who had the chance to hop and workers who are at risk of hopping. I also added performance constraints to ensure that job hoppers changed job by choice and not because they were laid off for poor performance. The constraints are the following: their earnings did not decrease when they changed jobs and their average yearly earnings over the 5 years were on average of \$20,000 or more. I used the average salary to avoid including workers who did not work for a consequent part of their time before creating the start-up. A stricter earnings constraint of \$30,000 produces the same results.

Number of job hoppers who primarily worked outside the start-up industry (outside job hoppers) is made up of the jobs hoppers as previously defined who worked for firms that do not belong to the start-up industry and the job hoppers who worked for more firms that do not belong to the start-up industry than firms that do. In case of tie, the industry of the last employer is picked.

Number of job hoppers who primarily worked inside the start-up industry (inside job hoppers). This variable is built as the previous one; the number of job hoppers corresponds to the sum of job hoppers who exclusively for firms that belong to the start-up industry and the job hoppers who worked for more firms that belong to the start-up industry than firms that do not belong to the start-up industry. In case of tie, the industry of the last employer is picked. The two job hopper categories are mutually exclusive.

Control variables. As the explanatory variables relate to a specific type of experience and to the number of a specific type of team members, it is important to control for the remaining types of experience and the total number of team members. I included three controls regarding these matters. The team's total experience is the average number of years all team members worked before founding the start-up. The left-censored experience dummy takes the value one when at least one of the team members worked the first year the LEHD coverage starts and zero, otherwise. The team size is the number of team members at the end of the first year of the new venture. I also needed to control for the intrinsic quality of the individuals on the team; for this matter, I used the average earnings of the team the year before the new start-up birth (team's average earnings_{t-1}) and the earning of the highest-paid team member the year before the start-up birth (team's maximum earnings_{t-1}). Both variables were transformed with a natural logarithm. I also control for the demographic characteristics of the founding team members by including the team members' average age and the share of males on the team. To control for the quality of the entrepreneurial opportunity the team pursues, I used the payroll of new venture at the end of the first year with a natural logarithm as well. The only time variant variables that relate to the start-up are the start-up age and age squared, they control for the liability of newness of the new venture. I also added a time variant macro-economic control: the natural logarithm of the yearly number of new establishments in the county of the new venture. The other controls are: year dummies, industry dummies and region dummies¹⁰. Table 1 presents the descriptive statistics and correlation matrix.

¹⁰ I used dummy regions instead of state dummies because some states had a too low number of start-ups. The regions are the following: the West, the South, the Midwest and the Northeast following

Model

My goal is to test survival with a discrete hazard model where the period of survival is divided in discrete unit of one year each. To do so, I set up the dataset as a panel where all the variables are reported for each year of survival and for one year of failure if any. I tested the likelihood of survival an additional year using a linear probability model (LPM). The choice of a linear model was driven by the importance of the interaction terms to test the hypotheses and by the disclosure procedure of the US Census Bureau, which makes difficult to disclose split samples to correctly analyze interactions with a discrete choice model (Hoetker, 2007). To minimize the issues of using a LPM, I included robust standard errors (clustered by firm) to account for heteroscedasticity (Cameron and Trivedi, 2009). I also checked that the number of out-of-bound predictions of the linear model was limited (i.e. less than 4%), making the use of the model acceptable. I also ran a logit model with the main effects and the control variables and found consistent results to the LPM: both shared experiences being positive and significant. Finally, as suggested by Horrace and Oaxaca, I reran the LPM regressions while excluding the predictions that were out-of-bound and found the same results.

Probability of surviving an additional year, $Y_{it} = \beta_1 X_i + \beta_2 \text{Controls}_i + \beta_3 \text{Controls}_{it} + \mu_{it}$

RESULTS

Table 2 presents the main regressions and results. In Model 1, I reported the main effects of the independent variables and found that shared experience is positive and

http://www.census.gov/geo/maps-data/maps/pdfs/reference/us_regdiv.pdf. The correspondence between states and regions is shown in Table A2.

significant at 1% level. As for the controls, their effects are highly consistent in sign and significance across models. I found that the team average experience is positive and significant, which is consistent with prior research on experience. Team size is significant and negative. The demographic characteristics, age and share of males also turn out negative and significant. As for the controls for the team members' quality, I found that the team average of earnings in t-1 has a negative effect whereas the team's maximum earnings in t-1 have a positive effect. The payroll of the new venture at the end of the first year, which proxy for the quality of the business opportunity, is positively related to the survival. I also found an inverted-U shape relationship between the new venture age and the survival, which fits the liability of newness argument. I did not find a statistically significant relationship between the left-censored experience dummy and the number of new establishment in the county and the year of the start-up creation. The insignificant effect of left-censored experience dummy probably suggests that the main effect of experience is captured by the team average experience and that the dummy is not really informative. The number of new establishments in the county of the start-up was supposed to proxy for the competition for capital and if applicable, for customers in the location of the start-up. The region and industry dummies might capture this competition effect.

In Model 2, I added the interactions between the prior shared experience and the total number of job hoppers. Consistent with H1, I found that the prior shared experience of the founding team has a positive and significant effect on survival. The effect is significant at 5% level and means that if the shared experience increases of one year, the likelihood of surviving an additional year increases of 0.17 percent point. As the likelihood to fail the following year is 5%, an additional year of shared experience would reduce the failing rate of

3.4%. The main effect of the number of job hoppers is negative and significant. When job hoppers are included in any kind of teams, their effect is detrimental for the survival of the teams. Consistent with hypothesis 2, the interaction between the total number of job hoppers and the shared experience is significant at 5% level. As pictured in figure 1, the marginal effect of the job hoppers is only positive when the team has at least three years of shared experience. In this case, the inclusion of one job hopper with a 0.5 percent point effect decreases the likelihood of failing the following year of 10%.

In Model 3, I split the shared experience into two categories: shared experience within the start-up industry and shared experience outside the start-up industry. I also added the two categories of job hoppers: outside job hoppers and inside job hoppers. The shared experience within the start-up industry is positive and significant at 1% level while the shared experience outside the start-up industry is positive but insignificant. The number of outside job hoppers is negative and significant at 5% level while the number of inside job hoppers is insignificant.

In Model 4, I tested the interactions between the prior shared experiences and different kinds of job hoppers. The interaction between the prior shared experience within the start-up industry and outside job hoppers is positive and significant, consistent with H3. Figure 2 presents the interaction of H3. First, it is important to note that the outside job hoppers in teams without shared experience have a negative effect on survival. For teams with shared experience within the start-up industry, the inclusion of one outside job hopper becomes positive for survival when the team has more than one year of shared experience. For a team with 2 years of shared experience within the start-up industry and one outside job hoppers, the failure rate decreases of 14.6%. The multiplier effect turns out pretty big; for

instance, for teams with shared experience of three years within the start-up industry, the additional effect of one job hopper with outside experience decreases the failure rate of around 30%. Examining teams with prior shared experience outside the start-up industry, I found that the interaction between their experience and the inside job hoppers is positive and significant. However, as the main effect of the shared experience is not significant, H4 is not supported. This means that job hoppers who bring start-up industry experience but this experience is not their main experience can turn out to be negative. The team might rely too much of the job hopper because they have some start-up industry experience but this experience is not be their key experience and therefore relying on it turn out detrimental.

Robustness checks

There are a few alternative explanations about the effect of job hoppers to refute. First, job hoppers might positively moderate shared experience because they bring entrepreneurial knowledge to the teams. In other words, job hoppers might be serial entrepreneurs and that their effect on shared experience would be due to this extensive entrepreneurial experience. To test if job hoppers are beneficial for teams regardless of their past entrepreneurial experience, I build job hoppers variables that exclude the job hoppers who worked in an establishment that was 1 year or younger and had less than 31 employees. In Table 3 models 1 and 2, the results remain identical to the Model 2 and 4 from Table 1. Thus, experiences in new ventures do not drive the results but experiences across multiple firms, start-ups or not, do.

An additional question pertains to the shared experience of job hoppers; indeed, job hoppers might have worked in the parent firm where the rest of the team gained their prior

shared experience. Thus, one can wonder whether the job hoppers' beneficial effect is due to a mixed of experience at the parent firm and other experiences. The theoretical argument does not depend on this parent experience and therefore, I excluded job hoppers with parent firm experience and re-ran the regressions. In Table 4 Models 1 and 2, the results are presented and the same hypotheses are still supported.

A third alternative explanation could be that job hoppers are proxy for the team's diverse experience. Job hoppers could be a proxy for the average number of past employers for which the whole team worked or a proxy for long experiences in and outside the start-up industry. In these two cases, the job hoppers' synthesis of various experiences and their dual role of routines disruption and innovation would not matter. To test the first of these two alternatives, I constructed two variables: the team average number of previous employers in the start-up industry and the team average number of previous employers outside the start-up industry. In Table 5 Model 1, the shared experience outside the start-up industry is significant and positive as before. The average number of previous employers outside the start-up is negative and significant. None of the interactions between both shared experiences and both average numbers of previous employers turn out significant. This confirms that job hoppers add value to the team that is not just represented by a team's various past employers. To test the second of the two alternatives, I constructed two other additional variables: the extra experience outside and inside the start-up industry. Extra experience means the experience that is not part of the shared experience. For instance, if the team worked three years together in an incumbent and that beforehand, one team member worked 4 years in the start-up industry, this extra experience is taken into account as an average for the team (i.e. $4/3 = 1.33$ years). Table 5 Model 2 presents the results with

the team's average total experience being dropped. Two main effects are significant: the extra experience outside the start-up industry is significant and negative and the shared experience within the start-up industry is still significant and positive. The interaction between these two variables is negative and significant. The extra experience from outside the start-up industry curbed the positive impact of the shared experience within the start-up industry. In connection to the job hoppers that presents the opposite results, this suggests that knowledge from other industries are useful when synthesized by a job hopper rather than brought by the team in general. This negative finding supports the idea that outside knowledge is more easily integrated by one or a few individuals than by a whole team.

DISCUSSION

Founders' prior relevant experience is often considered as a major driver of start-up performance. However, when multiple founders have shared the same experience, this common experience can create inertia and limit innovation in the start-up. Little is known about the mitigation of these negative aspects. In this paper, I investigated how the inclusion of job hoppers in founding teams can disrupt potential inertia and bring complementary knowledge components. By doing so, I highlight a novel mechanism that underlies the knowledge complementarities in founding teams.

Drawing on a rich employee-employer linked dataset, I first established a baseline relationship: prior shared experience has a positive effect on start-up survival (H1). I then analyzed the interaction between this prior shared experience and the number of job hoppers in the team. This interaction turns out positive and significant, meaning that job hoppers make the positive effect of shared experience bigger. The job hoppers are particular

team members that have integrated experiences and knowledge coming from multiple firms. I found that job hoppers who only had experiences outside the start-up industry complement their team's prior shared experience within the start-up industry, in the sense that their effect makes the prior shared experience effect larger (H3).

One hypothesis was not fully supported (H4); the interaction between the shared experience outside the start-up industry and the number of job hoppers with experience inside the start-up industry is significant and positive but the main effect of the shared experience outside the start-up industry is not. The prior shared experience outside the start-up industry should bring to the team a better organization. However, apparently this positive contribution is not strong enough to compensate other issues such as the lack of start-up industry knowledge so that the effect would turn out significant. Once the main effect is not significant, the understanding of the interaction is by default limited.

In addition to testing the key constructs, I had to rule out alternative explanations. First, the most credible alternative explanation is based on a serial entrepreneurship argument. All the job hoppers could be serial entrepreneurs, thus rather than bringing knowledge from other industries, they would primarily bring entrepreneurial skills and resources to the team. I ruled out this explanation when, in my robustness checks, I included only the job hoppers who did not work in more than one new venture and showed that the results still hold. Second, job hoppers' positive effect might actually come from their experience in the parent firm of the rest of the team. I thus excluded job hoppers who worked in the parent firm and found similar results. Third, the job hoppers might be a proxy for the whole team's average number of past employers. I ruled out this explanation by showing that the interaction with the average number of previous employers is not

significant. Fourth, the job hoppers might be a proxy for the effect of a long work experience. I ruled out this explanation by showing that interactions between the shared experiences and the extra experiences within and outside the start-industry, respectively, do not have a positive effect either.

Overall, the combination of main results and robustness tests suggests that the two roles of job hoppers, disruption and innovation, are decisive in their positive interaction with the shared experience of the team. The theoretical argument suggests that inherited inertia needs to be disrupted and that new-to-the-team knowledge need to be integrated by the inclusion of job hoppers. If routine disruption alone were needed, the non-hypothesized interactions should turn out positive as well (i.e. shared experience within start-up industry and inside job hoppers and shared experience outside the start-up industry and outside job hoppers). On the other hand, if knowledge from other sources alone were needed, the average experiences and average number of previous employers from the robustness checks would have turned out significant as well. By showing that only job hoppers, individuals who bring disruption and other sources of knowledge, positively moderate the prior shared experience of the team, I implicitly confirm the two underlying theoretical mechanisms.

Limitations

Despite the results and robustness checks, there are several limitations to this study. First, while I did my best to control for the quality of the team members and of the opportunity they pursue, there might still be other factors influencing the selection of the team members and affecting the estimation of their effect on the start-up performance. Because in the study of teams, multiple team characteristics are typically investigated, the use

of an instrumental variable for each of these characteristics is difficult. Future research might use newer empirical technique such as many-to-many matching model to control for the mutual selection among all the team members to form the team.

There are two limitations pertaining to the use of the LEHD to address my research question. First, to enter the LEHD, a start-up has to have employees for which it pays unemployment insurance. Some start-ups might have developed their business ideas and even product before incorporating and hiring their first employees. Given the data, there is no observation of any pre-employment activities. While it would be interesting to observe the very inception of start-ups, the LEHD still offers a very detailed coverage of the start-up existence. In terms of the empirical estimation, one has to make the assumption that on average, the effects of start-ups that hire late versus the ones that hire early cancel each other out. Second, as explained earlier, this study does not cover the complementarities in the team based on the team members' occupation such as financial director. Future research could combine the knowledge based on industry experience and the occupation of the team members. This study is limited in doing so because the LEHD does not provide the information about the role of each team member and because, for confidential reasons, it would be very difficult to link this information to the current dataset.

CONTRIBUTIONS AND CONCLUSION

Despite these limitations, the paper makes several contributions. In the context of the spinout literature that focuses on entrepreneurs coming from incumbent firms, relevant knowledge acquired during prior experience in these incumbents has always been central (Helfat and Lieberman, 2002). Building on prior research, this paper goes further by

examining the complementarities between within industry knowledge and outside industry knowledge. It also highlights the knowledge shared by the team versus the knowledge brought by job hoppers. Second, whereas the spinout literature often compares the spinout performance with other kinds of start-up, this paper highlights the drivers of spinout performance heterogeneity, i.e. the inclusion of job hoppers in team with prior shared experience acquired an incumbent firm. This opens the doors to more research on the complementarities between shared experience and team's other characteristics and their effect on spinout performance.

In the entrepreneurial team literature, the diversity of founding teams in terms of experience has often been highlighted as a positive factor for start-up performance. This paper uncovers one of mechanisms underlying the effect of diversity by showing the complementarities between no diversity, shared experience, and high within diversity, the job hoppers. This paper also highlights the complementarities between a shared characteristic of the team, the prior shared experience, and a team member's unique set of experiences due to job-hopping. By doing so, this paper uncovers one of the sources of valuable knowledge diversity in the teams. Prior research on founding teams has studied the experience of the founder or CEO versus the experience of the rest of the team (Fern et al., 2011; Furr et al., 2012). By contrast, this paper does not choose to explore the complementarities of experiences based on the team members' role but based on the series of past experiences. This choice relaxed the constraints and allows exploring more knowledge combinations.

For entrepreneurs, this research suggests that if the entire team or most of it members comes from the same incumbent firm, including one or more members with a variety of experiences can significantly increase the chances of survival of the start-up. This

is therefore an important strategic decision that entrepreneurs have to make. We know that most entrepreneurs start firms with people they know well (i.e. friends, family or colleagues) and who are similar to them in terms of demographic characteristics (Ruef et al., 2003; Wasserman, 2012). This research does not criticize this formation mechanism but rather encourages future entrepreneurs to pay attention to the past experiences of their acquaintances and study the potential complementary effects that could exist among them.

In summary, I theorized and found evidence that job hoppers can be beneficial by bringing constructive disruption and innovation to teams with prior shared experiences. This study sheds light on a specific mechanism of knowledge combination across team members of founding teams.

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TABLES

Table 1 Descriptive statistics and correlation matrix

	Mean	Std. Dev.	1	2	3	4	5	6	7	8	9	10
1 Survival	0.95	0.22	1.00									
2 Shared experience	0.89	1.76	0.02	1.00								
3 Shared experience within the start-up industry	0.35	1.19	0.02	0.60	1.00							
4 Shared experience outside the start-up industry	0.54	1.41	0.00	0.74	-0.10	1.00						
5 Job hoppers	0.33	0.87	-0.02	0.05	0.01	0.05	1.00					
6 Inside job hoppers	0.06	0.42	0.00	0.04	0.10	-0.04	0.55	1.00				
7 Outside job hoppers	0.26	0.73	-0.02	0.04	-0.04	0.08	0.88	0.07	1.00			
8 Team's average experience	6.63	2.89	0.02	0.23	0.15	0.16	0.16	0.09	0.14	1.00		
9 Average age	39.33	7.63	-0.01	0.18	0.14	0.10	0.10	0.07	0.08	0.29	1.00	
10 Share of males	0.79	0.24	-0.01	0.04	0.02	0.04	0.01	0.00	0.02	0.08	-0.03	1.00
11 Team size	6.25	5.77	0.00	0.13	0.11	0.07	0.41	0.22	0.36	0.05	0.06	-0.02
12 Team's average earnings $t-1$	9.51	2.07	-0.01	0.19	0.10	0.15	0.18	0.08	0.17	0.37	0.08	0.07
13 Team's maximum earnings $t-1$	10.22	2.20	-0.01	0.16	0.09	0.12	0.20	0.08	0.19	0.32	0.06	0.05
14 Start-up age	3.67	2.50	-0.05	-0.01	-0.01	0.00	-0.02	-0.01	-0.02	-0.12	-0.04	-0.01
15 Start-up age squared	19.68	40.91	-0.01	-0.01	-0.02	0.00	0.00	-0.01	0.00	-0.08	-0.02	-0.01
16 Start-up payroll t	10.98	1.33	0.02	0.02	0.02	0.00	0.25	0.12	0.23	0.07	0.02	-0.03
17 Left-censored experience	0.26	0.44	0.01	0.12	0.10	0.06	0.12	0.08	0.10	0.37	0.10	0.05
18 Number of new establishments	8.69	1.84	-0.01	-0.02	-0.04	0.01	0.08	0.03	0.08	0.05	0.04	-0.11

	11	12	13	14	15	16	17	18
11 Team size	1.00							
12 Team's average earnings $t-1$	0.19	1.00						
13 Team's maximum earnings $t-1$	0.28	0.98	1.00					
14 Start-up age	-0.02	0.00	0.00	1.00				
15 Start-up age squared	-0.02	0.00	0.00	0.82	1.00			
16 Start-up payroll t	0.48	0.22	0.27	-0.04	-0.03	1.00		
17 Left-censored experience	0.24	0.17	0.17	-0.02	-0.03	0.15	1.00	
18 Number of new establishments	-0.04	-0.02	-0.01	0.11	0.10	0.08	-0.11	1.00

Table 2 Main regressions (on 2 pages)

	Main effects 1	Interactions 1	Main effects 2	Interactions 2
	(1)	(2)	(3)	(4)
Shared experience	0.0021*** (0.0007)	0.0017** (0.0007)		
Shared exp. x job hoppers		0.0026** (0.0012)		
Job hoppers	-0.0047*** (0.0018)	-0.0077*** (0.0024)		
Shared experience within the start-up industry			0.0033*** (0.0008)	0.0026*** (0.0009)
Shared exp. within the start-up industry x inside job hoppers				0.0019 (0.0035)
Shared exp. within the start-up industry x outside job hoppers				0.0049*** (0.0018)
Shared experience outside the start-up industry			0.0014 (0.0009)	0.0010 (0.0009)
Shared exp. outside the start-up industry x inside job hoppers				0.0062** (0.0028)
Shared exp. outside the start-up industry x outside job hoppers				0.0019 (0.0016)
Inside job hoppers			-0.0032 (0.0036)	-0.0065 (0.0058)
Outside job hoppers			-0.0051** (0.0021)	-0.0077*** (0.0027)

Number of observations is rounded for confidentiality reasons. Year dummies, industry dummies and region dummies are included. Robust and clustered standard errors. Two-sided tests, * p<.10, ** p<.05, *** p<.01. Control variables on the next page

Table 2 continued

	Main effects 1	Interactions 1	Main effects 2	Interactions 2
	(1)	(2)	(3)	(4)
Controls				
Team's average experience	0.0024*** (0.0006)	0.0024*** (0.0006)	0.0024*** (0.0006)	0.0024*** (0.0006)
Left-censored experience	-0.0048 (0.0034)	-0.0046 (0.0034)	-0.0048 (0.0034)	-0.0046 (0.0034)
Team size	-0.0005* (0.0003)	-0.0005* (0.0003)	-0.0005* (0.0003)	-0.0006* (0.0003)
Average age	-0.0005*** (0.0002)	-0.0005*** (0.0002)	-0.0005*** (0.0002)	-0.0005*** (0.0002)
Share of males	-0.0169*** (0.0055)	-0.0168*** (0.0055)	-0.0167*** (0.0055)	-0.0166*** (0.0055)
Team's average earnings _{t-1}	-0.0116*** (0.0042)	-0.0116*** (0.0042)	-0.0116*** (0.0042)	-0.0115*** (0.0042)
Team's maximum earnings _{t-1}	0.0087** (0.0039)	0.0088** (0.0039)	0.0088** (0.0039)	0.0087** (0.0039)
Start-up payroll _t	0.0068*** (0.0012)	0.0068*** (0.0012)	0.0067*** (0.0012)	0.0067*** (0.0012)
Start-up age	-0.0107*** (0.0020)	-0.0107*** (0.0020)	-0.0107*** (0.0020)	-0.0108*** (0.0020)
Start-up age squared	0.0005*** (0.0001)	0.0005*** (0.0001)	0.0005*** (0.0002)	0.0005*** (0.0002)
Number of new establishments	-0.0010 (0.0008)	-0.0009 (0.0008)	-0.0010 (0.0008)	-0.0009 (0.0008)
Constant	0.9794*** (0.0205)	0.9786*** (0.0205)	0.9798*** (0.0205)	0.9793*** (0.0205)
Observations	31000	31000	31000	31000

Number of observations is rounded for confidentiality reasons. Year dummies, industry dummies and region dummies are included. Robust and clustered standard errors. Two-sided tests, * p<.10, ** p<.05, *** p<.01

Table 3 Robustness checks: job hoppers without entrepreneurial experience

DV= Probability to survive 1 more year	Job hoppers without entrepreneurial experience 1	Job hoppers without entrepreneurial experience 2
Models	(1)	(2)
Shared experience	0.0018** (0.0007)	
Shared exp. x job hoppers (no entrepreneurial exp.)	0.0028** (0.0014)	
Job hoppers (no entrepreneurial exp.)	-0.0063** (0.0026)	
Shared experience within the start-up industry		0.0031*** (0.0009)
Shared exp. within the start-up industry x inside job hoppers (no entrepreneurial exp.)		0.0010 (0.0015)
Shared exp. within the start-up industry x outside job hoppers (no entrepreneurial exp.)		0.0045** (0.0019)
Shared experience outside the start-up industry		0.0014 (0.0009)
Shared exp. Outside the start-up industry x inside job hoppers (no entrepreneurial exp.)		0.0039* (0.0023)
Shared exp. Outside the start-up industry x outside job hoppers (no entrepreneurial exp.)		-0.0001 (0.0014)
Inside job hoppers (no entrepreneurial exp.)		-0.0233 (0.0180)
Outside job hoppers (no entrepreneurial exp.)		-0.0162** (0.0080)

Number of observations is rounded for confidentiality reasons. Year dummies, industry dummies and region dummies are included. Robust and clustered standard errors. Two-sided tests, * p<.10, ** p<.05, *** p<.01. Control variables on the next page

Table 3 continued

DV= Probability to survive 1 more year	Job hoppers without entrepreneurial experience 1	Job hoppers without entrepreneurial experience 2
Models	(1)	(2)
Controls		
Total experience	0.0024*** (0.0006)	0.0023*** (0.0006)
Left-censored experience	-0.0046 (0.0034)	-0.0049 (0.0034)
Team size	-0.0007** (0.0003)	-0.0009*** (0.0003)
Average age	-0.0005*** (0.0002)	-0.0005*** (0.0002)
Share of males	-0.0171*** (0.0055)	-0.0171*** (0.0055)
Average earnings of the team the year before the new venture birth (logarithm)	-0.0122*** (0.0042)	-0.0123*** (0.0042)
Maximum earnings of the team the year before the new venture birth (logarithm)	0.0093** (0.0039)	0.0095** (0.0039)
Payroll of new venture at the end of the first year (logarithm)	0.0067*** (0.0012)	0.0067*** (0.0012)
Start-up age	-0.0107*** (0.0020)	-0.0107*** (0.0020)
Start-up age squared	0.0005*** (0.0001)	0.0005*** (0.0001)
Number of new establishments in the county of the new venture (logarithm)	-0.0010 (0.0008)	-0.0010 (0.0008)
Constant	0.9808*** (0.0205)	0.9831*** (0.0205)
Observations	31000	31000

Number of observations is rounded for confidentiality reasons. Year dummies, industry dummies and region dummies are included. Robust and clustered standard errors. Two-sided tests, * p<.10, ** p<.05, *** p<.01

Table 4 Robustness checks : job hoppers without parent firm experience

DV= Probability to survive 1 more year	Job hoppers without parent firm experience 1	Job hoppers without parent firm experience 2
Models	(1)	(2)
Shared experience	0.0018** (0.0007)	
Shared exp. X job hoppers (no parent exp.)	0.0024* (0.0013)	
Job hoppers (no parent exp.)	-0.0100*** (0.0032)	
Shared experience within the start-up industry		0.0030*** (0.0009)
Shared exp. within the start-up industry x inside job hoppers (no parent exp.)		-0.0013 (0.0031)
Shared exp. within the start-up industry x outside job hoppers (no parent exp.)		0.0030* (0.0017)
Shared experience outside the start-up industry		0.0014 (0.0009)
Shared exp. Outside the start-up industry x inside job hoppers (no parent exp.)		0.0039* (0.0024)
Shared exp. Outside the start-up industry x outside job hoppers (no parent exp.)		-0.0012 (0.0017)
Inside job hoppers (no parent exp.)		-0.0031 (0.0294)
Outside job hoppers (no parent exp.)		-0.0258*** (0.0089)

Number of observations is rounded for confidentiality reasons. Year dummies, industry dummies and region dummies are included. Robust and clustered standard errors. Two-sided tests, * p<.10, ** p<.05, *** p<.01. Control variables on the next page

Table 4 continued

DV= Probability to survive 1 more year	Job hoppers without parent firm experience 1	Job hoppers without parent firm experience 2
Models	(1)	(2)
Controls		
Total experience	0.0024*** (0.0006)	0.0024*** (0.0006)
Left-censored experience	-0.0046 (0.0034)	-0.0051 (0.0034)
Team size	-0.0007** (0.0003)	-0.0009*** (0.0003)
Average age	-0.0005*** (0.0002)	-0.0005*** (0.0002)
Share of males	-0.0168*** (0.0055)	-0.0171*** (0.0055)
Average earnings of the team the year before the new venture birth (logarithm)	-0.0125*** (0.0041)	-0.0123*** (0.0042)
Maximum earnings of the team the year before the new venture birth (logarithm)	0.0097** (0.0039)	0.0095** (0.0039)
Payroll of new venture at the end of the first year (logarithm)	0.0069*** (0.0012)	0.0067*** (0.0012)
Start-up age	-0.0107*** (0.0020)	-0.0107*** (0.0020)
Start-up age squared	0.0005*** (0.0001)	0.0005*** (0.0001)
Number of new establishments in the county of the new venture (logarithm)	-0.0010 (0.0008)	-0.0010 (0.0008)
Constant	0.9787*** (0.0205)	0.9822*** (0.0205)
Observations	31000	31000

Number of observations is rounded for confidentiality reasons. Year dummies, industry dummies and region dummies are included. Robust and clustered standard errors. Two-sided tests, * p<.10, ** p<.05, *** p<.01.

Table 5 Robustness checks: average number of previous employers and extra experiences

DV= Probability to survive 1 more year	Average number of previous employers	Extra experience
Models	(1)	(2)
Shared experience within the start-up industry	0.0045* (0.0024)	0.0039*** (0.0013)
Shared exp. within the start-up ind. x prev. empl. in the start-up ind.	-0.0030 (0.0023)	
Shared exp. within the start-up ind. x prev. empl. outside the start-up ind.	0.0001 (0.0008)	
Shared experience outside the start-up industry	0.0006 (0.0020)	0.0004 (0.0012)
Shared exp. outside the start-up ind. x prev. empl. in the start-up ind.	-0.0030 (0.0043)	
Shared exp. outside the start-up ind. x prev. empl. outside the start-up ind.	0.0002 (0.0009)	
Average number of previous employers in the start-up industry	-0.0027 (0.0039)	
Average number of previous employers outside the start-up industry	-0.0058*** (0.0014)	
Shared exp. within the start-up ind. x extra exp. within the start-up ind.		-0.0003 (0.0005)
Shared exp. within the start-up ind. x extra exp. outside the start-up ind.		-0.0009*** (0.0004)
Shared exp. outside the start-up ind. x extra exp. within the start-up ind.		-0.0020 (0.0014)
Shared exp. outside the start-up ind. x extra exp. outside the start-up ind.		-0.0003 (0.0003)
Extra exp. within the start-up industry		-0.0001 (0.0011)
Extra exp. outside the start-up industry		-0.0036*** (0.0005)

Robust and clustered standard errors. Two-sided tests, * p<.10, ** p<.05, *** p<.01. Control variables on the next page

Table 5 continued

DV= Probability to survive 1 more year	Average number of previous employers	Extra experience
Models	(1)	(2)
Controls		
Team's average experience	0.0039*** (0.0007)	
Left-censored experience	-0.0053 (0.0034)	0.0074** (0.0033)
Team size	-0.0009*** (0.0003)	-0.0009*** (0.0003)
Average age	-0.0007*** (0.0002)	-0.0003* (0.0002)
Share of males	-0.0171*** (0.0055)	-0.0180*** (0.0055)
Team's average earnings _{t-1}	-0.0119*** (0.0042)	-0.0001 (0.0041)
Team's maximum earnings _{t-1}	0.0091** (0.0039)	0.0001 (0.0038)
Start-up age	-0.0110*** (0.0020)	-0.0130*** (0.0020)
Start-up age squared	0.0005*** (0.0001)	0.0005*** (0.0002)
Start-up payroll _t	0.0069*** (0.0012)	0.0067*** (0.0012)
Number of new establishments	-0.0011 (0.0008)	-0.0004 (0.0008)
Constant	0.9940*** (0.0205)	0.9946*** (0.0205)
Observations	31,000	31,000

Number of observations is rounded for confidentiality reasons. Year dummies, industry dummies and region dummies are included. Robust and clustered standard errors. Two-sided tests, * p<.10, ** p<.05, *** p<.01.

Figure 1

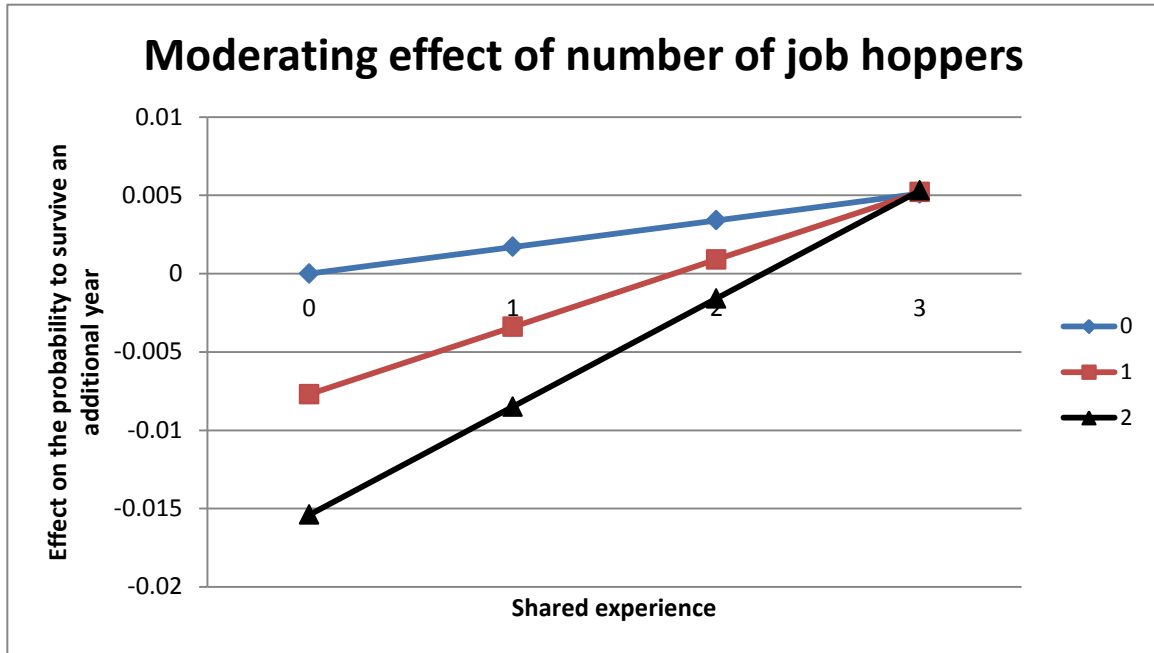
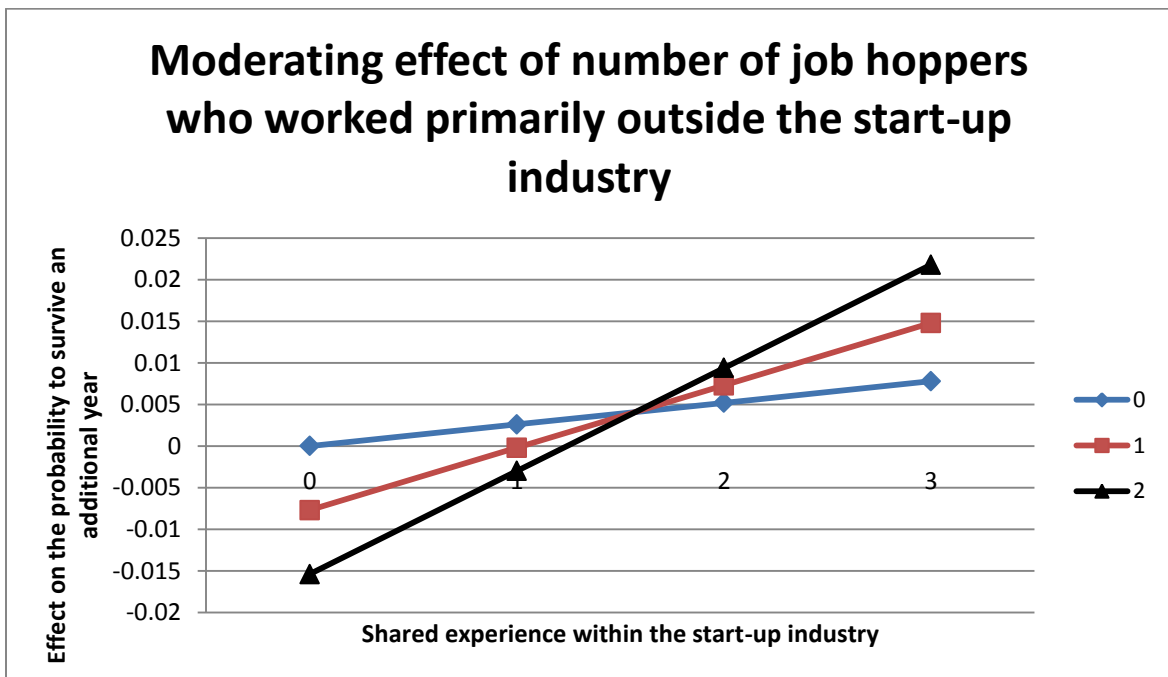


Figure 2



APPENDIX

A.1 Industries at three-digit (bold) and four-digit levels

Fabricated Metal Product Manufacturing
Forging and Stamping
Cutlery and Handtool Manufacturing
Architectural and Structural Metals Manufacturing
Boiler, Tank, and Shipping Container Manufacturing
Hardware Manufacturing
Spring and Wire Product Manufacturing
Machine Shops; Turned Products; and Screw, Nut, and Bolt Manufacturing
Coating, Engraving, Heat Treating, and Allied Activities
Other Fabricated Metal Product Manufacturing

Machinery Manufacturing
Agriculture, Construction, and Mining Machinery Manufacturing
Industrial Machinery Manufacturing
Commercial and Service Industry Machinery Manufacturing
Ventilation, Heating, Air-Conditioning, and Commercial Refrigeration Equipment Manufacturing
Metalworking Machinery Manufacturing
Engine, Turbine, and Power Transmission Equipment Manufacturing
Other General Purpose Machinery Manufacturing

Computer and Electronic Product Manufacturing
Computer and Peripheral Equipment Manufacturing
Communications Equipment Manufacturing
Audio and Video Equipment Manufacturing
Semiconductor and Other Electronic Component Manufacturing
Navigational, Measuring, Electromedical, and Control Instruments Manufacturing
Manufacturing and Reproducing Magnetic and Optical Media

Electrical Equipment, Appliance, and Component Manufacturing
Electric Lighting Equipment Manufacturing
Household Appliance Manufacturing
Electrical Equipment Manufacturing
Other Electrical Equipment and Component Manufacturing

Transportation Equipment Manufacturing
Motor Vehicle Manufacturing
Motor Vehicle Body and Trailer Manufacturing
Motor Vehicle Parts Manufacturing
Aerospace Product and Parts Manufacturing
Railroad Rolling Stock Manufacturing
Ship and Boat Building
Other Transportation Equipment Manufacturing

A.2 LEHD coverage

State	Region	Starting year	Ending year
Maryland	South	1985	2008
Colorado	West	1990	2008
Idaho	West	1990	2008
Illinois	Midwest	1990	2008
Indiana	Midwest	1990	2008
Louisiana	South	1990	2008
Washington	West	1990	2008
Wisconsin	Midwest	1990	2008
North Carolina	South	1991	2008
California	West	1991	2008
Oregon	West	1991	2008
Florida	South	1992	2008
Montana	West	1993	2008
Georgia	South	1994	2008
Hawaii	West	1995	2008
New Mexico	West	1995	2008
Rhodes Island	Northeast	1995	2008
Texas	South	1995	2008