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Pre-entry Career Experience and Start-up Survival

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1. Introduction.

Entrepreneurs are individuals who possess the skills needed to recognize, evaluate, and exploit opportunities (Shane Venkataraman, 2000). They can be viewed as generalist workers who have developed a broad set of abilities and differ from wage employees who on the contrary are specialized in one field (Lazear, 2005). Jack-of-all-trades – the individuals with a varied skill-set – are more likely to enter entrepreneurship compared to specialized workers (Lazear, 2005, Åstebro et al. 2011).

Moreover, recent evidence shows that entrepreneurs' more varied labor market experience is likely to be the result of a preference for job-related variety (Åstebro and Thompson, 2011). The link between career patterns and the transition to entrepreneurship has been well documented: Wagner (2006) uses German data to show that the number of fields of professional experience and the number of professional degrees have an impact on the probability of being a nascent entrepreneur. Silva (2007) documents how the jack-of-all-trades proxy increases (albeit modestly) the probability of being an entrepreneur but the effect disappears when individual fixed effects are accounted for, suggesting that the results could be interpreted as a result of the innate ability of individuals.

This evidence of the link between varied pre-entry experience and the transition to entrepreneurship is complemented with some studies about the variety of skills possessed by entrepreneurs and its effect on entrepreneurial outcomes (Bublitz and Noseleit, 2013 and Hartog et al., 2010 for instance examine entrepreneurial earnings). Suetzer et al. (2012, 2013) show that a balanced skill set contributes to the creation of a business and to the implementation of early stage activities. Oberschachtsiek (2012) found that experience in sales/business is one of the most important factors in self-employment duration. Moreover, Rosendal Huber et al. (2013) show that a balanced skill set can be considered an aggregate measure at the team level.

This evidence however still leaves an open question regarding the characteristics of pre-entry career-patterns associated with entrepreneurial outcomes of individuals transitioning to entrepreneurship: how does the performance of new ventures whose founders have varied labor market experience in different firms compare to that of new ventures whose founders have a less varied background? The focus of this paper is on the role of the entrepreneur's pre-entry experience on the performance of the new firm in the early life-cycle stage of the new venture, when the founder's role is particularly important for the start-up's performance. Arguably, individuals who have accumulated pre-entry work experience in different firms, positions, and industries are likely to draw on a broader set of experiences and abilities than entrepreneurs with a less varied career history, who rely on a narrower set of knowledge and skills. Entrepreneurial outcomes are therefore considered to be the product of the various combinations of firms, positions, and industries in which entrepreneurs have worked prior to their transition to entrepreneurship. Past work experience contributes to a great extent to the development of new skills (Rosen, 1972), and for entrepreneurs, pre-entry experience in various firms, as well as in different positions and industries, can promote the qualities of jacks-of-all-trades and thus be associated to more successful entrepreneurs. The contribution of this paper is to provide a better understanding of the relationship between more detailed dimensions of the pre-entry work experience and their effects on entrepreneurial outcomes. By considering first-time Danish entrepreneurs and the details of their career histories with respect to the firms, positions, and industries, this study focuses on the new firms' survival. While distinguishing between failures and other types of exit, it is shown that job hopping has different effects for early and late-career entrepreneurs. Having managerial experience is correlated with a higher chance of firm survival, and this holds true especially for entrepreneurs in the earlier stages of their career. Conversely, a large number of experiences in various firms is associated with a higher likelihood of failure. Furthermore, the higher the number of industries in which individuals

have worked prior to the establishment of a new firm, the earlier entrepreneurs are likely to close down the firm and leave self-employment.

The remainder of the paper is organized as follows: the next section, section 2, contains references to the relevant literature; in section 3, hypotheses are developed; in section 4, details about the data and methods are provided; section 5 presents the results; and section 6 contains the conclusions and the discussion of the findings.

2. Theory

This paper builds on the idea that prior to become self-employed, entrepreneurs have acquired the combination of skills necessary to be able to efficiently assemble the required factors of production, consisting of human, physical, and information resources (Lazear, 2005, p. 649). In this view, compared to more specialized employees, entrepreneurs are at a disadvantage in terms of one single skill but combine a rich number of abilities that make them *jacks-of-all-trades*. When focusing on pre-entry experience and the transition to entrepreneurship, the prediction stemming from the jack-of-all-trades has received empirical support. Similarly, Åstebro et al. (2011) argue that a history of job hopping is associated with a greater likelihood of entry into self-employment, and use a Korean dataset to show empirically that a higher number of job changes is indeed positively related to transition into self-employment. Further, Åstebro and Thompson (2011) use a dataset of Canadian inventors to investigate the motivations governing the choices of a varied labor market experience; they find that greater variety in labor market experience results from the "taste for variety" hypothesis, i.e. individuals are willing to forego income in exchange for non-pecuniary benefits deriving from variety in the labor market. Building on this evidence – that entrepreneurs have, *ceteris paribus*, a richer job history and more varied experiences compared to wage employees –

the objective of this paper is to explore in more detail the relationships between the characteristics of entrepreneurs' pre-entry job experiences and the performance of the new venture.

How do entrepreneurial outcomes of individuals with highly varied work experience differ from entrepreneurs with a less varied career? More specifically, how do the characteristics of the entrepreneurs' pre-entry job hopping affect the performance of the new venture?

Delmar and Shane (2006) show a positive association between the entrepreneurs' past experience and start-up performance: the founding team's experience enhances both the survival and sales of the new venture, but these effects are non-linear, and vary with venture age. Pre-entry industry knowledge and managerial experience is argued to enhance the likelihood of survival for new firms, as confirmed by Dencker, Gruber, and Shah (2008), who further explain how learning activities may also be constrained or facilitated by the founders' pre-entry knowledge and experience.

Pre-entry experience is therefore key to understanding how the human capital accumulated can contribute to the performance of the individual as an entrepreneur. It can be argued that individuals might consider the labor market a resource for acquiring the skills and knowledge that will be pivotal for the establishment and management of their start-up. As shown by Rosen (1972), "a large fraction of the directly marketable skills possessed by individuals are not acquired from formal schooling, but rather from work experience". Experience in the wage sector provides skills, information, and abilities also useful for entrepreneurs (Chatterj, 2009; Unger et al. 2009).

In other words, learning can be seen as an investment in human capital that takes place in the job market. And this investment can be planned rationally, according to individuals' preferences, expectations, and abilities. Systematic differences do indeed emerge when considering the nature of human capital accumulated between the self-employed and the wage workers: prospective

entrepreneurs invest more in general/portable human capital while they are wage employees compared to individuals that remain in the wage sector (Kawaguchi, 2003).

Arguably, pre-entry work experience can heavily contribute to the establishment of successful firms, given the strong relationship between the accumulation of the "right" human capital and the new firm's performance (Evans and Leighton 1989, Gimeno et al. 1997, Agarwal et al. 2004, Klepper Sleeper 2005, Denker et al. 2009). A pre-entry experience in a parent firm in the same industry as the start-up has been shown to have positive performance survival implications for the entrepreneurial venture (Agarwal et al. 2004; Dahl and Reichstein, 2007). Relevant industry experience (i.e. working in the same industry as the one in which the start-up operates) is one of the key results emerging from the literature.

In general, however, the pre-entry experience has not been studied specifically, and the literature has not devoted a great deal of attention to a detailed understanding of the specificities and facets of pre-entry experience and its effect on new ventures' performance. There are a few exceptions: Gimeno et al. (1997) differentiate between a general pre-entry human capital (i.e. knowledge and know-how that can be useful independently of the new venture) and a specific kind of human capital (i.e. knowledge and know-how that relates directly to the new venture). The authors find evidence of a positive effect of specific human capital on the survival of the new venture, but suggest that generic human capital does not seem to have an impact on survival. Also, Dencker et al. (2009) find that in the context of unemployed individuals, pre-entry knowledge and management moderate the relationship between learning activities and firm survival. Roberts et al. (2013) uncovered the relationship between pre-entry experience and the start-up's product quality by showing that previous experience is detrimental to the new organization if founders remain close to the technical core of the organization. Moreover, Dahl and Reichstein (2007) argue that the characteristics of the parent company have a remarkable effect on the survival of the new venture.

Specifically, entrepreneurs who survive longer come from the best firms, underlining how the context where they gathered pre-entry experience is of non-trivial importance. This evidence strongly suggests that the new ventures' performance is not homogeneously associated with the founders' various pre-entry experiences. For this reason, special emphasis is given here to the nature of entrepreneurs' background in order to identify the circumstances that contribute to the accumulation of human capital that will result in successful entrepreneurial outcomes. The idea of jack-of-all-trades is analyzed and considered along three different dimensions: 1) within the firm, 2) among the different firms, and 3) in the industries where individuals have accumulated their stock of human capital prior to becoming entrepreneurs. The performance of new firms is intertwined with the founders' set of knowledge, skills, and abilities. And the nature and variety of the entrepreneurs' background constitute the building blocks of the jack-of-all-trades, thus contributing significantly to the entrepreneurial outcomes. The crucial activities characterizing the entrepreneurial process as a whole are the recognition, judgment, and exploitation of opportunities (Shane and Venkataraman 2000). Interestingly, but not surprisingly, entrepreneurs tend to discover, identify, and exploit opportunities related to the information that they already possess (Shane 2000). Moreover, the process of acquiring salient knowledge can be thought of as an organizational search problem in which local search is less risky (Gruber et al. 2008). The ability to identify and consider more than one market opportunity is crucial to the success of the start-up, as shown by Dencker et al. (2008). In sum, the ability to identify opportunities can be seen as a function of the pre-entry work experience: Chatterji (2008) argues that work experience at an incumbent firm provides a number of valuable skills and resources for future entrepreneurs, including the ability to identify opportunities. Moreover, the parent company has an imprinting effect on the new organization. As argued by Sørensen and Fassiotto (2011), the organization is an "arena for learning", where employees accumulate knowledge and skills. These are then

transmitted – or inherited – from the incumbent firms where founders have accumulated experience to the new context of the start-ups (Klepper and Sleeper 2005, Agarwal et al. 2004) and produce effects on the performance of the new firm.

3. Hypotheses and mechanisms

The arguments according to which founders' pre-entry experience affects the survival of the new firms rests on one assumption, namely, that if entrepreneurs explicitly and successfully choose to accumulate a variety of experiences in a variety of different firms as a means to obtain exposure to more information flows, different social networks, and resources in general while focusing on learning, they must be better at identifying, evaluating, and exploiting opportunities - in other words, at becoming successful entrepreneurs. Pre-entry experience examined as positions within the firm, various firm and industry affiliations, and the expected effects in terms of the new firm's survival are discussed in more detail in the present section of the paper.

1. Positions within the firm. Workers accumulate human capital through learning-by-doing and on the job training (Campion et al. 1994). Employees within an organization carry out different tasks and refer to the role assigned to them within the firm's hierarchy in order to perform the activities for which they are responsible. With different roles in the organization, they contribute to the execution of the various tasks. However, the resulting stock of human capital accumulated is not necessarily fully redeployed in a new context with ease, given the component of firm or task specificity, which is not easily exploitable in a new setting or organization. It follows that individuals dealing with broader tasks and less specific activities can be able to transfer more of their expertise and skills compared to individuals who are instead responsible for a less generalist role within the firm.

Managerial roles provide knowledge about functions (such as marketing) and consist of activities involving mediations with people both inside and outside the organization (Dencker et al. 2010). Furthermore, managers possess not only the skills and knowledge needed for supervision, but are also typically knowledgeable about the nature and requirements of the lower-level activities (Gibbons and Waldman 2004). Managers also minimize the underutilization of the human capital developed (Helfat and Lieberman 2002). As already pointed out, according to Lazear (2005), it is the accumulation of a generalist skill set that favors transition into entrepreneurship. And it is a higher degree of the *right* experience (Gimeno et al. 1997, Dencker et al. 2008), which is not underutilized (Helfat Lieberman, 2002), that enhances the new ventures' performance.

For these reasons, pre-entry experience in a managerial role is expected to be associated with better entrepreneurial outcomes:

H1 founders who have accumulated pre-entry experience in managerial positions will exhibit a lower hazard of firm failure

2. Firms Organizations contribute to the development of the human capital of employees, including those who at a given point decide to become entrepreneurs (Chatterji 2008, Sørensen Fassiotto 2011). In particular, start-ups originating from parent firms active in the same industry benefit from a so-called "spinout advantage" (Agarwal et al. 2004, Klepper and Sleeper 2005, Campbell et al. 2012). One of the reasons is that departing employees transfer that knowledge and those organizational routines to which they were exposed while working in the incumbent firm. The same knowledge and skills will be at the basis of the success of the new entrepreneurial venture.

Also, existing organizations can provide the context in which opportunities are identified or help employees in developing an entrepreneurial mind-set (Sørensen Fassiotto 2011). However, as

pointed out by Roberts et al. (2013), accumulating work experiences across organizational boundaries is associated with negative outcomes.

There is no reason however to expect that working in a large number of firms guarantees that such experiences will contribute in an additive fashion to the stock of knowledge and skills of workers. Moving to a different firm implies learning about the matching between employer and employee; in other words, the worker learns about the new employer and the extent to which her skills and preferences are compatible with the existing job. Furthermore, when moving to a new firm, the firm-specific human capital has to be set aside, and the more generic components can only be redeployed partially. The more diverse the firms in terms of industry and organizational routines, the more a newly hired workers must adapt.

One of the necessary conditions for the departing employees to be able to take with them knowledge and skills accumulated in the parent firm is to have spent a sufficient period of time in that organization. For a given time interval, an individual with experience in a number of different firms will likely have less in-depth knowledge compared to an employee stable in the same firm. The tendency to frequently change firm, the so-called "hobo syndrome" is associated with increases in the likelihood of future job separation. Moreover, frequent movers systematically obtain lower wages compared to stayers: the skills and knowledge developed with frequent moves seem to be less attractive (Munasinghe and Sigman 2004). This phenomenon can be seen as a by-product of the low quality of human capital developed by frequent movers. Accordingly, a high number of job changes is likely to be associated with difficulty in finding a good match between the individual and the firm, which is the prerequisite for the acquisition of skills, abilities, or knowledge that might be fruitfully redeployed in the context of entrepreneurship. Hypothesis 2 is therefore:

H2 founders who accumulate a high number of pre-entry experiences in different firms will exhibit a higher hazard of failure.

3. Industries As noted for the firm-specific human capital, the experiences accumulated in a given industry cannot be fully applied to a different one (Neal 1995). Kaiser Møller (2011) also find support for the idea that industry-specific human capital is not applicable in all contexts, showing that an experience of self-employment does not produce a decrease in terms of salary for the self-employed who decide to return to wage employment in the same industry (while on the contrary a spell of self-employment in a different industry results in a lower wage). Abilities and human capital accumulated during work experiences in very different industries might be difficult to combine fruitfully and have a positive effect on entrepreneurial outcomes of the self-employed. Individuals who work in a large number of industries are therefore not likely to accumulate and successfully combine experiences that contribute to a balanced skill set useful to the jack-of-all-trades. The hypothesized relationship between number of industries and entrepreneurial outcomes is as follows:

H3 founders who accumulate a high number of pre-entry experiences in different industries will exhibit a higher hazard of failure.

In the previous section, the connections between the founders' pre-entry experience and the effects on the new firms' performance are analyzed, and their connections examined. However, one further important element should be introduced since individuals' experiences in entrepreneurship vary strongly according to their age. As noted by Levesque and Minniti (2006), aging reduces the relative return to entrepreneurship (a type of work ensuring a stream of future returns), so that it becomes less and less attractive for older individuals (i.e. when the individuals' time endowment is smaller). Accordingly, motivation and the persistence of entrepreneurs at earlier stages of their career can be substantially different than those at later stages of their career. For instance, Detienne

and Cardon (2010) document an inverse relationship between age and growth intentions, and Gimeno et al. (1997) find a negative relationship between age and performance threshold. In the same spirit, Aidis and van Praag (2007) show that only younger entrepreneurs benefit from accumulated pre-entry human capital, explaining how the non-conventional measure of human capital represented by a pre-entry illegal entrepreneurship experience translates into superior performance, but only for the young founders. When considering the knowledge and skills acquisition and accumulation associated with different firm affiliations it can be noted that jobs tailored for workers in earlier stages of their career entail a larger learning component than jobs designed for later career employees (Rosen, 1972): work at an early career stage is characterized by high levels of learning.

In this perspective, it can be thought that the outcomes of human capital accumulation via pre-entry experiences also vary with the age of founders: for older entrepreneurs, the impact of experiences in the labor market on the likelihood of becoming a jack-of-all trades will be smaller. This is expected because the investments in human capital vary by age, and in particular older workers are more likely to attend job-related courses and on-the-job training (Simpson et al. 2002), thereby focusing only on that component of the stock of human capital that is more firm-specific and not easily redeployable after the transition to entrepreneurship. Campion et al. (1994) show that job rotation is more common for employees in early career than for those in late career, suggesting that the former group may be more interested in the career benefits and the development of managerial talent stemming from experience in different positions within the firm. Furthermore, Maurer (2001) notices that as age increases, workers' career-relevant learning and skills development declines. As Finegold et al. (2002) show, workers at the later stage of their career do not seem to take into great consideration opportunities to develop technical skills when planning decisions about moving to a new firm. Arguably, workers at the later stage of their career who are affiliated with a large number

of different employers prior to entry into self-employment do not do so in order to broaden their abilities and qualify as jacks-of-all-trades.

These considerations point to the fact that at older ages the pre-entry experience might have a much softer effect on the component of human capital that is more general, and thus applicable to entrepreneurial roles. Older individuals tend to benefit less from pre-entry experiences, in the sense that learning is more oriented towards more firm-specific skills and knowledge that will not be decisive influences on the start-up's performance. Put differently, age will act as a moderator in the relationships between pre-entry experience in managerial positions and new firm performance:

H4 Age moderates negatively the relationship between pre-entry experience in managerial positions and the hazard of firm failure

4. Data and methods

In order to ascertain the link between self-employed pre-entry experience and start-up performance, information about new firms and individuals is required. For testing the proposed hypotheses, new firms consist of the Danish registered new businesses as resulting from the VAT register. Individuals who started a firm for the first time in 2003 have been selected, consisting of a total of 2813 first-time entrepreneurs. The year 2003 has been chosen since it makes it possible to follow entrepreneurs' history data until 2010, the most recent information available. Individuals have been tracked for the years 1995 to 2010, i.e. seven years prior to and after the transition to self-employment (which occurs, as mentioned, in 2003).

The information about individuals is obtained from Danish census data in the Integrated Database for Labor Market Research maintained by Statistics Denmark (referred to as IDA, from the Danish acronym). IDA covers the whole Danish labor force and makes it possible to track annually individuals, firms, and the individual-firm link. The sample so obtained includes the identifier of

the employer for each individual, thus allowing to record the firm to which each individual is affiliated in each year. By selecting entrepreneurs in 2003, the pre-entry and job hopping variables are computed by considering the changes of employer/position/industry in the years prior to the transition to entrepreneurship (i.e. the years from 1995 to 2002). The dependent variable of interest, exit, corresponds to the firms' failure.

The model used to estimate this probability, conditional on a set of variables, is a duration model with discrete time. This is the most suitable model, since the event of leaving self-employment can occur at any time of the year, but the data only allows observing the events of failure for each firm yearly. The hypotheses testing will therefore be performed by estimating a discrete duration model, which is best suited to predict the values of a binary dependent variable (here defined as the exit of the entrepreneur from self-employment) following a logistic distribution. The model predicts the probability of leaving self-employment as follows:

$$P(exit) = \frac{e^{(\boldsymbol{\beta_i x_i})}}{1+e^{(\boldsymbol{\beta_i x_i})}} \quad (1)$$

Where $\boldsymbol{\beta x}$ represents a vector of covariates such that

$$\boldsymbol{\beta x_i} = (\beta_{0i} + \beta_{1i}x_{i1} + \cdots + \beta_{ki}x_{ki} + \varepsilon_i) \quad (2).$$

Given potential problems of self-selection, the inverse Mills ratio has been included in the estimation; the appendix contains a detailed description of the first-stage model employed and the exclusion restrictions used. When considering the logit model estimating the likelihood of failure it can be noted that the variable of interest is only observed for individuals who actually experience a transition into self-employment. This can be thought of as a higher probability of individuals with high entrepreneurial abilities to become self-employed as compared to those with low entrepreneurial ability, who will be less likely to start a firm and thus enter the sample. In other words, the estimates are potentially biased by unobserved elements that determine whether the

subjects enter the sample. A Heckman selection model is used in order to remove potential bias resulting from this self-selection[1]. This consists of a two-stage estimation, the first stage being a probit model to account for the probability of entering the sample, defined as follows:

$$s_i = \phi(\beta_{0i} + \beta_{1i}x_{1i} + \cdots + \beta_{ki}x_{ki} + \boldsymbol{\beta_{ik}z_i} + \varepsilon_{si}) \quad (3)$$

Where ϕ is the normal cumulative distribution function, $s_i = 1$ if the individual is self-employed in 2003 (i.e. $P(exit)$ is not missing) and $s_i = 0$ if the individual is not self-employed in 2003 (i.e. $P(exit)$ is not observed). This probit is estimated for the whole population consisting of individuals who became entrepreneurs in 2003 and those who did not. $\beta_{1i}x_{1i} + \cdots + \beta_{ki}x_{ki}$ are the covariates explaining the transition to self-employment, while $\boldsymbol{\beta_{ik}z_i}$ represents a vector of variables needed to identify the model such that $Cov(z_{i,}, s_{i,}) \neq 0$ and $Cov(z_{i,}, \varepsilon_{i,}) = 0$. Specifically, the exclusion restriction must be characterized by no correlation to the hazard of firm failure, but should explain some portion of the variable s_i, i.e. the transition to self-employment. Following Sorensen and Phillips (2011) and Nanda (2008), the first exclusion restriction variable is a dummy variable equal to 1 if the individual has a self-employed parent (*Parent is entrepreneur*). Moreover, another such variable is *partner is entrepreneur*, taking value 1 if the partner of the focal individual is an entrepreneur and 0 otherwise. Considering how the parents represent a role model, it might be thought that individuals with a self-employed parent might consider self-employment a more viable career than wage employment (Carrol and Mosakowsky, 1987; Gimeno et al. 1997). The new firms' performance and subsequently the hazard of closing the firms are linked to the entrepreneurs' pre-entry experiences and are not expected to be correlated to parents' employment. In order to mitigate concerns about the exclusion restrictions used, the Sargant test for overidentification has been performed (the results are unreported), providing support for the

[1] The estimation results of the first stage model are reported in the appendix

appropriate choice of the variables included. Moreover, results are also robust when including only one exclusion restriction, namely, *Parent is entrepreneur*.

Dependent variable. In order to measure the survival of the new firms founded in 2003, a variable *exit* is generated, taking value 0 if the entrepreneur is observed as affiliated to the firm (s)he founded in 2003 and 1 otherwise. The firm is assumed to survive for the year in which *exit* is coded as 0 whereas a failure is assumed for *exit* equal to 1. Another categorical variable, exit2, is computed in order to discriminate between exits associated with failures and those that can be instead seen as successful exits. This variable takes advantage of a characteristic of the data that makes it possible to track a firm and its establishment(s). Exit2 consists of three different values and is computed by considering firms and the establishments connected to the firms. In particular it takes value 1 if the firm has been closed: the case in which the firm identifier is not present in the firm register that year, and at the same time the establishment identifiers cannot be observed in that year. Exit2 takes value 2 if the firm does not appear in the firm register but the establishment is present: this case can with sufficient certainty be assumed to be an acquisition of the establishment by another firm. Exit2 takes value 0 otherwise. Such a variable will allow the estimation of a fine-tuned duration model through a multinomial logit.

Explanatory variables. The main explanatory variables are computed for the years 1995 to 2002. *Number of firms* ranges from 1 to 8 and measures the number of different firms each individual is affiliated with. If an individual worked in firm "A" until 1999 and changed to firm "B" in 2000 and no other change is recorded up to 2002, then *number of firms* will take value 2. In order to capture the voluntary moves between firms, i.e. the moves more likely to be explicitly associated with a form of planned career development, the number of firm changes is only recorded if the individuals are not unemployed for more than one month in the year in which the firm change is observed. *Managerial positions* measures the number of managerial positions that each individual

has held prior to 2003, which is prior to the year in which the transition to entrepreneurship occurs. This information is also recorded annually. This variable builds on the classification of the positions of workers within the firm, and only includes the count of positions that involve managerial responsibilities. Finally, *Number of industries* contains information about the industries in which each individual has worked prior to entering self-employment. Industry changes are measured on the basis of the one-digit industry classification in order to capture broad industry switches.

Control variables. In order to take into account the characteristics of individuals that could potentially affect the hazard of leaving self-employment, a set of controls at the individual level is included in the model. These include *Female*, a dummy taking value 1 if the individual is female and 0 otherwise; *Education*, accounting for the highest level of education obtained by the individual and consisting of a dummy taking value 1 if the individual has obtained a bachelor or higher degree and 0 otherwise; *Wage earnings* in 2002, i.e. the year prior to transition into self-employment; *Unemployment*, a dummy variable taking value 1 if the individual is reported to have experienced a spell of self-employment of at least six months in 2002; and *Wage experience*, the sum of the total years of experience in the wage sector as of 2002. This variable is highly collinear with age, and therefore age is not included in the estimations. *Spinout* is a dummy variable that takes value 1 for individuals who have started a firm in the same two-digit industry code of the parent firm and zero otherwise. Moreover, the model also includes firms' controls: *Industry* is a categorical variable taking into account the industry in which the new-firm is active (a one-digit industry classification including nine categories). *Year* captures the year effect and dummies are included for each year in which the firm-individual affiliation is observed.

5. Results

Table 1 contains the summary statistics and the correlation matrix. It can be noted that no pairwise correlation seems to create problems of multicollinearity.

***INSERT TABLE 1 ABOUT HERE ***

Managerial positions range from 1 to 3, showing that over the life span considered, individuals have held up to three different managerial positions. This relatively lower number compared to firm switches is expected, given that promotions to managerial roles can be thought of as having to do with internal career patterns. By contrast, *number of firms* can add up to 8, i.e. one different firm affiliation per year: this number is likely to be associated with workers who cannot find a suitable match with an employer, i.e. the "hobos". *Number of industries* captures very broad movements across industries. Interestingly, the fact that its maximum is 6 reconciles with the idea that working in a completely different context implies a loss of expertise, skills, and knowledge (all of the industry-specific components), so individuals tend to move less across very different industries than they do across firms in the same industry.

Table 2 reports the estimation results of the discrete duration model on the hazard of firm failure, where marginal effects are displayed. Coefficients represent the effect of each covariate on the hazard of firm failure; therefore, a positive coefficient is associated with a positive likelihood of firm failure, while a negative coefficient implies a negative effect of the corresponding variable on the hazard of failure.

***INSERT TABLE 2 ABOUT HERE ***

Individuals who have held managerial positions show a lower risk of firm failure as displayed in

specifications 1 and 2. This result confirms hypothesis 1. Moreover, the number of firm affiliations prior to transition to self-employment increases the hazard of firm failure, showing support for hypothesis 2. Also, a higher number of industry experiences is associated with higher likelihood of failure, which confirms hypothesis 3. These findings suggest that there might be an underlying complexity in the accumulation of a pre-entry experience resulting in useful entrepreneurial ability, which is not captured by observing a somewhat crude measure represented by the number of firm affiliations and experiences in various industries. Rather, the contribution of labor market experiences to the jack-of-all-trades is more likely to be a combination of appropriate correspondence of the workers' preferences and skills within the job and the firm and industry in general. A high number of firm/industry switches does not necessarily guarantee learning and the assemblage of a broad set of skills useful in entrepreneurship. Instead, a good match between the firm and the individual is crucial, which is more likely to happen for workers at higher levels of the hierarchy, i.e. those with managerial responsibilities. In this respect, the results of this study are in line with Sørensen and Phillips (2011), showing among other things how better entrepreneurial outcomes are associated with longer tenure at the parent firm.

Figure 1 provides some evidence of the moderation effect that age exerts on the entrepreneurial outcomes. The graph shows the proportion of firms surviving organized by founders' career stage: *early career* comprises individuals who have been in the labor force for less than 16 years (the median value of wage experience); *late career* comprises the remaining entrepreneurs.

***INSERT FIGURE 1 ABOUT HERE ***

Although the Kaplan-Meier survival curve consists of a univariate analysis, it shows a tendency of entrepreneurs in the later stage of their career to display a lower hazard of failure, and this result is

robust from the years following the first year and remains consistent until the last year in which the new firms are observed. In order to test for the moderation effect while controlling for the other important variables, model 3 of table 2 includes the interaction term between the term early career and number of managerial positions. The dummy early career is positive (yet the estimate is not very precise) and incorporates the higher likelihood of firm failure for early-career entrepreneurs. As for the interaction term, the negative and significant sign provides some evidence that the managerial positions held at an earlier stage of the career are those kinds of pre-entry experiences that are more strongly associated with longer firm survival. The plot of the interaction effect against the various levels of the predicted probability shows the true interaction effect on the probability of firm failure. Figure 2 supports the results of table 2, showing that

***INSERT FIGURE 2 AND 3 ABOUT HERE ***

the interaction effect is consistently negative (as expected, the magnitude varies at the more extreme values of the predicted probability) and the plot of the z-statistic in figure 3 confirms that the effect is statistically significant at all levels of the predicted probability of firm failure.

The fact that in column 3 of table 2 the main effect of the number of managerial positions disappears also supports the idea that managerial experience will result in a more successful start-up almost exclusively for entrepreneurs in the earlier stages of their career. The effects of number of firms and industries are robust across the various specifications and also the magnitude of the effects remains unchanged; this result corroborates the idea that frequent job hopping has a detrimental effect on the survival chances of the entrepreneurial firm.

In table 3, model 2 from table 2 is estimated by splitting the sample according to the dummy early career.

***INSERT TABLE 3 ABOUT HERE ***

The results of table 3 show that the effects of the pre-entry experiences are strong and significant for the entrepreneurs in the starting phases of their career. This is consistent with the idea that at later career stages the willingness to absorb and re-combine new experiences and knowledge might be less efficient; this may explain why no significant effects are observed.

Furthermore, table 4 shows the results of a duration model with two different outcomes, namely, firm closure and other types of exit. By considering the possibility that entrepreneurs may successfully exit, the discrete duration analysis in table 4 makes it possible to isolate the effects of our main variables on the hazard of firm failure in column 1 and on other exit, i.e. successful exits, in column 2.

***INSERT TABLE 4 ABOUT HERE ***

The coefficients for the pre-entry experience measures in column 1 of table 4 are strongly significant and replicate the findings of the previous specifications, while column 2 reports much less precise estimates. Such results contribute to the idea that the pre-entry experience accumulated has a stronger effect on firm survival but is to a lesser degree linked to successful exits. However, it should be taken into account that the number of successful exits represents a small fraction of all the recorded exits. Interestingly, unemployment results seem to be negatively and strongly associated with a successful exit, while wage experience seems to impact positively on firm closure and negatively on other exits, once again corroborating the idea that the career stages at which entrepreneurs found their firm might impact also on the performance threshold and outcomes (Detienne and Cardon 2010, Gimeno et al. 1997).

Finally, it is worthwhile briefly commenting on the other control variables: the presence of children

in the entrepreneurs' family is associated with a negative hazard of failure, which can be due to a preference for a more stable career path and the flexibility provided by self-employment; *parent firm size* is instead positively associated with higher firm failure, supporting the idea that entrepreneurs spawning from larger firms tend to exit quicker.

6. Discussion and conclusion

The results presented in this study support the idea that the labor market experience of workers prior to becoming entrepreneurs has an impact on the performance of the new firms. The best performing firms are those founded by entrepreneurs who have accumulated generalist experiences by working as managers in established firms. By contrast, a high number of switches across firms and/or industries implies a higher hazard of failure. In general however, the pre-entry experience has a much sharper effect on the survival of new firms for entrepreneurs at the earlier stages of their career.

The contribution of this study can be articulated in four points. First, it complements the literature based on Lazear's (2005) jack-of-all-trades by unpacking pre-entry experience and characterizing it with some fine-grained measures, thus making it possible to test the theoretical prediction that individuals with a more varied background are better equipped to run their business and should therefore perform better. These relationships, observed for a representative sample of Danish start-ups and entrepreneurs, do not only make it possible to infer that entrepreneurs' pre-entry frequent job hopping does not seem to be beneficial for the survival of entrepreneurial ventures, although it is associated with a higher likelihood of transition to entrepreneurship.

According to the results, entrepreneurs benefit from a good combination of generalist skills acquired through a managerial experience. On the one hand, entrepreneurial skills can be seen as a

product of the parent firms' characteristics such as size; on the other hand, another important element is the individual's ability to adapt and profit from those characteristics. Managerial experiences are the kind of pre-entry experiences more significant in terms of contributions to successful entrepreneurial outcomes but also represent the completion of one of the possible itineraries towards learning.

Second, the study offers a clearer description of the new venture's performance and its associations with pre-entry career patterns. While a varied career history of affiliations with numerous firms might be the antecedent to the transition to entrepreneurship (Åstebro et al. 2011, Silva 2007, Wagner 2006), the link to the performance implications for the new venture has not previously been extensively explored, and not in such a fine-grained way. The results presented allow for clarification of one aspect of the learning-by-doing occurring in the labor market in the form of pre-entry experiences: the acquisition of abilities useful to entrepreneurs, i.e. a more generalist skill set, does not seem to be compatible with frequent job/industry switching.

Third, the study considers entrepreneurial outcomes in relation to entrepreneurs' career stages and shows that despite the fact that early career entrepreneurs have higher failure rates, it is this latter group that benefits from managerial experiences, with lower hazard of firm failure.

Fourth, a distinction is made between failures and other types of exit: the fine-tuned distinction of failures makes it possible to isolate the effects of pre-entry experience on the true survival of firms (although the market for entrepreneurial exit is not particularly developed in Denmark, i.e. failures represent the highest share of all exits).

However, the results presented should be interpreted with caution since the analyses do not allow a clear distinction of the extent to which the impact of entrepreneurs' pre-entry experience on the new firms' survival can be due to the investments in human capital or to a process of selection. It cannot be fully ruled out that the specific group of individuals with a particular tendency to prefer

a more varied pre-entry experience is also the group of individuals less likely to succeed in entrepreneurship. However, if anything, the results seem to point towards the investment effect, since the pre-entry experience characteristics impact differently on entrepreneurs at different stages of their career. Holding ability constant over time, selection could be considered the driving force of the results if pre-entry experience did not affect early and late career entrepreneurs differently. Further research should aim at developing a better understanding of the two effects and disentangling more thoroughly the driving forces behind the results.

One further consideration to be pointed out when discussing the results is that the time horizon considered is subject to left censoring insofar as it concerns individuals who entered the labor force prior to the starting point for observation in 1995. This consideration might lead to dispute about the robustness of the analysis regarding late-career entrepreneurship. On the one hand, it could be that precise estimation cannot be achieved since part of the individuals' history in the labor market is censored; on the other hand, it can be argued that the more recent experiences have the most power to influence entrepreneurs' skills while the effect of learning from activities performed long in the past is less crucial.

Additionally, earlier career entrepreneurs could systematically differ in the value they assign to the non-pecuniary benefits associated with self-employment; if this group has higher sensitivity to non-pecuniary benefits of entrepreneurship, longer survival could be also driven by a higher tolerance to a low-than-average income.

An interesting extension of this study could be to consider the pre-entry labor market characteristics of the self-employed over a longer time horizon in order to better describe the effects of mobility across various firms or positions, which are likely to be non-linear and decrease after a certain optimal point. Another element that could enrich the analysis of the pre-entry experience could be to consider growth rates; firms that experience high growth rates are likely to adopt certain hiring

policies, and the effects on learning on the job could be substantially different than those experienced by workers in low-growth firms.

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Tables

Table 1. Correlation table and summary statistics

		Mean	S.D.	Min	Max	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1)	Exit	0.236	0.424	0	1	1											
(2)	Managerial positions	0.557	0.697	0	3	-0.012	1										
(3)	Number of firms	2.583	1.32	0	8	0.112	-0.011	1									
(4)	Number of industries	1.649	0.813	1	6	0.122	-0.001	0.53	1								
(5)	Spinout	0.454	0.498	0	1	-0.213	-0.027	-0.062	-0.168	1							
(6)	Wage earnings/10000	35.477	23.345	0	273.237	0.042	0.298	0.083	0.014	-0.092	1						
(7)	Parent firm size/1000	1.485	5.327	0.001	43.537	0.102	0.005	-0.027	-0.04	-0.174	-0.033	1					
(8)	Wage experience	16.448	7.96	0	39	0.008	0.213	-0.225	-0.214	-0.096	0.258	0.089	1				
(9)	Children	0.547	0.498	0	1	-0.046	0.036	-0.05	-0.046	-0.001	0.094	-0.016	0.004	1			
(10)	Education (at least bachelor)	0.097	0.296	0	1	0.045	0.28	0.035	0.029	-0.006	0.309	0.017	-0.046	0.047	1		
(11)	Female	0.212	0.409	0	1	0.068	-0.024	-0.059	-0.036	-0.085	-0.127	0.133	0.003	-0.051	0.054	1	
(12)	Unemployment	0.002	0.046	0	1	0.011	-0.004	-0.009	0.086	-0.011	-0.052	-0.012	-0.019	-0.004	-0.015	0.033	1
(13)	Exit 2	0.248	0.461	0	2	0.971	-0.014	0.103	0.111	-0.193	0.035	0.091	-0.001	-0.043	0.038	0.06	0.009

Table 2. Discrete duration logit model on probability of firm exit

	(1)	(2)	(3)
		Firm exit	
Managerial positions	-0.039***	-0.039***	-0.014
	(0.012)	(0.012)	(0.014)
Number of firms	0.026***	0.026***	0.024***
	(0.007)	(0.007)	(0.007)
Number of industries	0.026*	0.026*	0.026*
	(0.010)	(0.010)	(0.010)
Early career		0.020	0.048+
		(0.025)	(0.027)
Early careerXManagerial positions			-0.057**
			(0.021)
Inverse Mills ratio	-0.037	-0.036	-0.037
	(0.066)	(0.066)	(0.065)
Spinout	-0.175***	-0.174***	-0.172***
	(0.017)	(0.018)	(0.019)
Wage earnings/10000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
Parent firm size/1000	0.006**	0.005**	0.005**
	(0.002)	(0.002)	(0.002)
Wage experience	0.001	0.002	0.002
	(0.001)	(0.002)	(0.002)
Children	-0.041**	-0.040*	-0.035*
	(0.016)	(0.016)	(0.016)
Education	0.019	0.019	0.027
(at least bachelor)	(0.027)	(0.027)	(0.027)
Female	0.056*	0.056*	0.055*
	(0.023)	(0.023)	(0.023)
Unemployment	-0.080	-0.080	-0.066
	(0.147)	(0.147)	(0.145)
Constant	0.165	0.040	-0.005
	(0.900)	(0.915)	(0.916)
Industry dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Observations	9,039	9,039	9,039
Pseudo R2	0.203	0.203	0.204
Chi2	1526.825	1529.111	1528.948
Prob> Chi2	0.000	0.000	0.000
Log likelihood	-3933.475	-3933.175	-3929.467

Robust standard errors in parentheses; *** p<0.001, ** p<0.01, * p<0.05

Table 3. Discrete duration model on the probability of exit, by early career and late career entrepreneurs

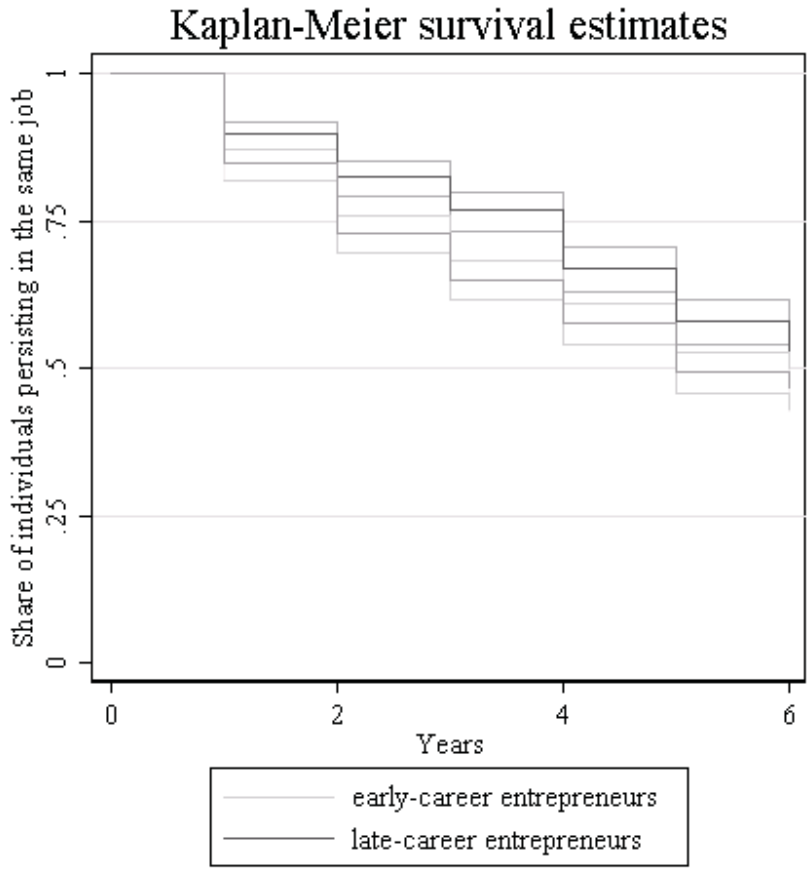
	(1) Early career	(2) Late career
	Firm exit	
Managerial positions	-0.065***	-0.008
	(0.018)	(0.016)
Number of firms	0.028***	0.014
	(0.008)	(0.012)
Number of industries	0.034**	0.014
	(0.013)	(0.017)
Inverse Mills ratio	-0.094	0.014
	(0.091)	(0.098)
Spinout	-0.177***	-0.161***
	(0.028)	(0.023)
Wage earnings	0.000	-0.001
	(0.000)	(0.001)
Parent firm size	0.008**	0.004+
	(0.003)	(0.002)
Wage experience	0.004	-0.000
	(0.003)	(0.002)
Children	-0.029	-0.043+
	(0.021)	(0.024)
Education	0.044	0.024
(at least bachelor)	(0.035)	(0.044)
Female	0.083**	0.023
	(0.032)	(0.034)
Unemployment	-0.128	0.111
	(0.139)	(0.386)
Constant	0.458	0.031
	(1.243)	(1.386)
Industry dummies	Yes	Yes
Year dummies	Yes	Yes
Observations	4,839	4,200
Pseudo R2	0.186	0.239
Chi2	730.569	815.798
Prob> Chi2	0.000	0.000
Log likelihood	-2152.516	-1745.596

Robust standard errors in parentheses; *** p<0.001, ** p<0.01, * p<0.05

Table 4. Discrete duration model with two different outcomes

	(1) Firm closure	(2) Other exit
Managerial positions	-0.171***	-0.058
	(0.049)	(0.156)
Number of firms	0.115***	0.008
	(0.029)	(0.098)
Number of industries	0.117**	-0.014
	(0.044)	(0.158)
earlycareer	0.103	-0.190
	(0.107)	(0.341)
Inverse Mills ratio	-0.114	-0.058
	(0.277)	(1.039)
Spinout	-0.762***	-0.037
	(0.065)	(0.222)
Wage earnings	-0.000	-0.001
	(0.002)	(0.006)
Parent firm size	0.023**	-0.004
	(0.007)	(0.028)
Wage experience	0.012+	-0.049*
	(0.007)	(0.022)
Children	-0.160*	-0.060
	(0.064)	(0.202)
Education (at least bachelor)	0.103	-0.273
	(0.115)	(0.459)
Female	0.252**	-0.138
	(0.097)	(0.350)
Unemployment	-0.295	-17.372***
	(0.613)	(0.527)
Constant	-0.316	-2.439
	(0.948)	(3.556)
Industry dummies	Yes	
Year dummies	Yes	
Observations	9,039	
Pseudo R2	0.207	
Chi2	19708.475	
Prob> Chi2	0.000	
Log likelihood	-4269.897	

Figure 1. Kaplan Meier survival estimates of early career vs. late career entrepreneurs



Note: thin lines represent the 95% confidence interval

Figure 2. Plot of interaction effects

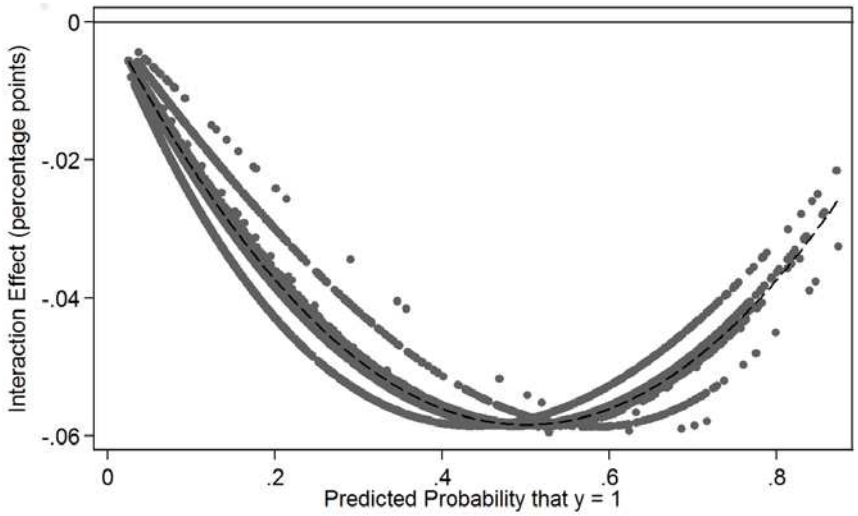
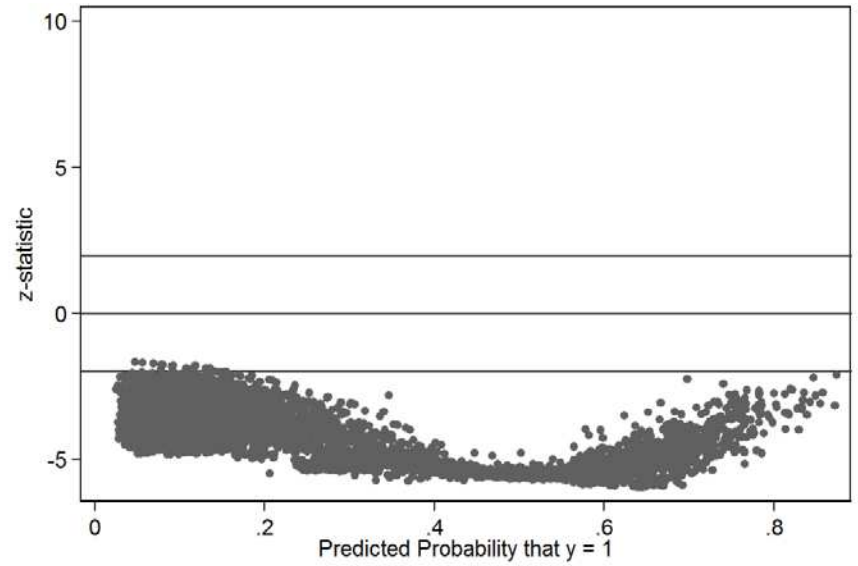


Figure 3. Plot of z-statistics



Appendix

Table 1. Selection equation. Probit on entry to entrepreneurship

	(1) transition to entrepreneurship
Number of managerial positions	0.065***
	(0.010)
Number of firms	0.039***
	(0.006)
Number of industries	0.020*
	(0.009)
Wage earnings/10000	0.003***
	(0.000)
Partner is entrepreneur	0.199***
	(0.026)
Parent is entrepreneur	0.112***
	(0.033)
Parent company size/1000	-0.013***
	(0.002)
Wage experience	-0.012***
	(0.001)
Children dummy	0.097***
	(0.013)
Education	-0.079***
	(0.023)
Female	-0.227***
	(0.016)
Unemployment	0.270+
	(0.143)
Constant	-3.061***
	(0.059)
Industry dummies	Yes
Observations	1,324,710
Pseudo R2	0.052
Chi2	1819.208
Prob> Chi2	0.000
Log likelihood	-19073.699

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Note. The explanatory variables in table A1 include the job hopping measures, namely, number of past firm affiliations, managerial positions, and firms prior to the transition to self-employment, and the excluding variables are the dummies Parent entrepreneur=1, if the mother or the father of the entrepreneur are self-employed, and Partner is entrepreneur=1, if the partner is an entrepreneur in the founding year.