Bureaucracy and Entrepreneurship*

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Abstract

A fundamental premise of sociological approaches to entrepreneurship is that social context shapes the likelihood of entrepreneurial activity, above and beyond any effects of individual characteristics. For example, a long tradition in organizational theory holds that working in bureaucratic organizations suppresses rates of entrepreneurship. Establishing such contextual effects empirically, however, is complicated by the possibility that unobserved individual traits cause people both to become entrepreneurs and to work in less bureaucratic settings. This paper presents the first systematic study of the effects of bureaucracy on entrepreneurship that accounts for such unobserved sorting processes. Using rich data on labor market attachments and transitions to entrepreneurship in Denmark, I find that people who work for large and old firms are less likely to become entrepreneurs, net of a host of observable individual characteristics. Moreover, there is strong evidence to suggest that this negative effect of bureaucracy does not spuriously reflect self-selection by nascent entrepreneurs into different types of firms. The implications of this finding for theories of organizations and entrepreneurship are discussed.
A central concern of entrepreneurship research is to understand the factors that lead some individuals both to perceive entrepreneurial opportunities and to pursue them by leaving established firms and launching a new venture (Aldrich 1999; Shane 2003; Parker 2004). Sociological interest in this question has blossomed in recent years. A fundamental premise of sociological approaches to entrepreneurship is that features of a position in social structure encourage or retard entrepreneurial activity independent of the characteristics of the position’s occupants. This contextual approach is exemplified by the growing body of work on how established organizations shape entrepreneurial activity. Because the vast majority of entrepreneurs launch new ventures following a period of employment with established firms, many scholars focus on the idea that “entrepreneurship is an organizational product” (Freeman 1986: 34). These scholars have argued that existing firms play an important role in structuring the exposure of individuals to entrepreneurial opportunities, and in shaping their desire and willingness to engage in entrepreneurship (Freeman 1986; Carroll and Mosakowski 1987; Romanelli 1989; Thornton 1999; Shane 2000; Romanelli and Schoonhoven 2001).

Several recent studies have made progress in documenting the importance of organizational context by focusing on the hypothesis that bureaucratic work conditions suppress rates of entrepreneurship. This idea has deep roots in organizational theory, reaching back to the idea in the classic studies of bureaucracy of the 1950s that the growth of the modern bureaucratic organization led to the creation of workers
characterized by a lack of entrepreneurial spirit, if not outright hostility to entrepreneurial activity (Schumpeter 1950; Whyte 1956; Merton 1968). While the classic treatises on bureaucracy did not provide direct evidence of its negative impact on entrepreneurship, more recent research does provide supporting evidence. Saxenian’s (1994) historical and qualitative comparison of Silicon Valley and Boston’s Route 128, for example, attributes the differences in entrepreneurial activity in the two regions to differences in the size distribution of local high technology firms. In Saxenian’s interpretation, the dominance of Route 128 by large, bureaucratic firms such as Digital Equipment Corporation meant that employees of these firms were overly insulated from entrepreneurial experiences and opportunities. Gompers, Lerner and Scharfstein (2005) showed that venture-capital backed firms are more likely to emerge from established firms that are less bureaucratic (i.e., younger, smaller). They also attributed this to the impact of the work environment: “… the breeding grounds for entrepreneurial firms are more likely to be other entrepreneurial firms. It is in these environments that employees learn from their co-workers about what it takes to start a new firm and are exposed to a network of suppliers and customers who are used to dealing with start-up companies” (Gompers, Lerner and Scharfstein 2005: 612). Finally, Dobrev and Barnett (2005), studying career histories of business school alumni, found that employees are less likely to enter entrepreneurship if they work for old and large firms. They attributed this empirical pattern to the increased role differentiation and routinization that accompany bureaucratisation.

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1 Low rates of entrepreneurship from bureaucratic firms may also be due to the benefits of working for large employers, such as increased job security, wage premia, and
The evidence in these studies for a negative relationship between bureaucracy and entrepreneurship seemingly bolsters the claim that contextual effects are important drivers of entrepreneurial behavior. Indeed, Dobrev and Barnett (2005: 445) argue that their “theory and results demonstrate the merit of taking a sociological approach to this question, specifically emphasizing the importance of organizational context” in influencing individual transitions to entrepreneurship. Yet counterposed to the idea that organizational context shapes the likelihood of entrepreneurial activity is the argument that some people possess distinctive attributes, such as fixed features of personality, that propel them into entrepreneurial activity (e.g., McClelland 1961; Evans and Leighton 1989; Zhao and Seibert 2006; for reviews, see Shane 2003; Parker 2004). Such dispositional approaches to entrepreneurship are rooted in a large body of work that draws linkages between individual traits and attitudes and behaviors, such as vocational preferences (e.g., Holland 1985).

From a dispositional perspective, the potential association between individual traits and employment choices calls into question contextual explanations for the observed correlation between bureaucratic work conditions and entrepreneurship. Individuals are not assigned to employers randomly; rather individuals choose where they work, and the reasons for these choices are generally not fully observable to the researcher. The choice of whether to work for a large or small organization (for example) may be driven by the same factors, such as risk attitudes and job values, that dispositional researchers claim drive entrepreneurial entry. As a consequence, the observed correlation between bureaucratic work conditions and entrepreneurship may be a spurious promotion opportunities. I address this possibility below.
consequence of unobserved sorting processes. Parker (2006), for example, develops a theoretical model that implies a negative relationship between firm size and rates of entrepreneurship due to the self-selection of less risk-averse individuals into small firms with more variable wages. Along similar lines, recent research based on twin studies suggests that there is a heritable component to both job values and interests (Lykken et al. 1993; Keller et al. 1992) and entrepreneurial activity (Nicolaou et al. 2006). While the precise mechanisms linking genetic factors to entrepreneurial activity are far from clear, these studies raise the possibility that genetic determinants shape both workplace choice and subsequent entry into entrepreneurship.

This debate between dispositional and contextual approaches constitutes a long-standing fault line in the field of entrepreneurship research (for reviews, see, e.g., Thornton 1999; Aldrich 1999; Shane 2003). Despite the fact that the two approaches are not mutually exclusive, much of this debate takes the form of mutual criticism, with each side faulting the evidence put forward by the other (Shane 2003). Advocates of contextual approaches, for example, generally dismiss dispositional explanations for entrepreneurship, saying “there has been little progress in relating types of entrepreneurs to the formation of new ventures” (Thornton 1999: 23). More forcefully, Aldrich (1999: 76) claims that “A major problem for entrepreneurship and organization theorists has been the pervasive belief that the explanation for entrepreneurial achievements must be sought in personal traits … personal traits, taken out of context, simply do not explain very much.”

Unconvincing evidence for dispositional explanations does not, however, constitute strong evidence for contextual arguments. Thanks to limitations in their
research designs, existing studies of the relationship between bureaucracy and entrepreneurship cannot rule out the possibility that the observed associations are due to unobserved sorting processes. The absence of sound studies of contextual effects that address the possibility of sorting on dispositional characteristics hinders progress in entrepreneurship research, in two ways. First, interpretive ambiguity creates barriers to theoretical advance among both dispositional and contextual researchers, particularly if it hinders productive dialogue between scholars. Second, disputes over the interpretation of basic empirical patterns create substantial uncertainty concerning the field’s understanding of the dynamics of entrepreneurship. The inability to point convincingly to drivers of entrepreneurship limits the potential impact of entrepreneurial scholarship and increases the difficulty of formulating effective entrepreneurial policies.

The aim of this paper is to strengthen the evidentiary basis for the contextual claim by determining whether the correlation between bureaucracy and entrepreneurship is a spurious consequence of (potentially unobserved) sorting processes. To do this, I examine the relationship between bureaucracy and entrepreneurship using a uniquely rich data set characterizing the Danish labor market. The primary advantage of these data is that I can address, to a much greater extent than in prior research, the concern that individuals with entrepreneurial inclinations self-select into particular types of organizations. In particular, the rich, longitudinal nature of the data allows me to control for any fixed, unobserved individual characteristics that might be associated with entrepreneurship. Furthermore, additional analyses address the possibility that the

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2 These individual differences may be due to innate differences in psychological traits, or to unobserved differences in the immediate social context, such as the structure of social networks.
observed correlation between bureaucratization and entrepreneurship reflects “strategic sorting,” in which individuals decide to enter entrepreneurship and then choose a less bureaucratic employer in order to acquire (for example) relevant skills.

I estimate the effects of firm size and firm age on the transition rate to entrepreneurship in Denmark between 1990 and 1997. Firm size and age have been studied extensively by organizational researchers, and have widely accepted associations with bureaucratization (Blau and Schoenherr 1971; Stinchcombe 1965; Sørensen and Stuart 2000; for application to entrepreneurship see Dobrev and Barnett 2005). My estimates show that net of a wide range of observable individual characteristics, people who work for large and old firms are substantially less likely to become entrepreneurs. For example, an employee working for a firm with five employees is estimated to have a 57% higher rate of entering entrepreneurship in a given year than an observationally equivalent individual working for a firm with 250 employees. Moreover, a variety of analyses suggest that these effects, and in particular the effects of firm size, are not a spurious consequence of unobserved sorting processes. In short, there is strong support for the claim that bureaucratic work conditions inhibit transitions to entrepreneurship: context matters.

**Bureaucracy and Entrepreneurship**

Traditional discussions of bureaucracy in organizational theory suggest that the bureaucratization of organizations is characterized by a number of common processes, including increased role differentiation and specialization within the firm, the emergence of specialized roles devoted to coordination and administration, the routinization of
activities through the adoption of standard operating procedures, and the emergence of
career tracks within an organizational hierarchy (Weber 1968; Bendix 1956; Blau and
Schoenherr 1971; March and Simon 1958; Doeringer and Piore 1971). Correspondingly,
while the study of entrepreneurship is characterized by a wide variety of approaches, two
elements are common to many definitions. First, entrepreneurship is typically thought to
involve perceiving and trying to exploit new business opportunities, whether these turn
out to be disruptive “Schumpeterian” innovations or more modest opportunities arising
from market disequilibria (Schumpeter 1934; Kirzner 1973; Venkatraman 1997; Shane
2003). Second, many definitions of entrepreneurship, as well as colloquial usages of the
term, emphasize that it means organizing, operating and assuming the risk of a new
business venture (Aldrich 1999; Casson 2003). In this conception, entrepreneurs stand in
contrast to workers, and thus entering entrepreneurship is a labor market transition:
leaving employment with established organizations for self-employment, whether or not
that involves employing others (Shane 2003; Parker 2004).

Under these definitions, understanding how bureaucracy shapes entrepreneurship
requires explaining how bureaucratic working conditions influence the perception of
entrepreneurial opportunities (irrespective of the accuracy of these perceptions) as well as
the willingness of individuals to leave paid employment to assume the financial and
organizational responsibilities of launching a new venture. A review of the literature
suggests at least four different and possibly complementary channels through which
bureaucracy might influence entrepreneurial transitions. First, as emphasized in the
classic discussions of bureaucratic life, bureaucracies may influence the attitudes and
mental dispositions of their employees in ways that make them less likely to enter
entrepreneurship. Second, work in bureaucracies may limit the development of the skills necessary for successful entrepreneurship, and may therefore lower the expected value of entrepreneurial opportunities. Third, an employer’s level of bureaucratization may shape the exposure of employees to entrepreneurial opportunities and activities. Finally, bureaucracies create job stability and internal routes of advancement, thereby increasing the opportunity costs of leaving paid employment to found a new venture. I discuss each of these possible paths of influence in turn.

A long tradition in organizational sociology holds that the realities of bureaucratic life are fundamentally incompatible with entrepreneurial initiative because they create workers who are timid and less likely to challenge established ways of doing things, and hence less likely to identify and act on potential opportunities through entrepreneurial exit. For example, Whyte’s (1956) account of “organization man” saw in the growth of the modern bureaucratic organization the creation of workers characterized by a lack of entrepreneurial spirit, if not outright hostility to entrepreneurial activity. Merton’s (1968: 255) discussion of the bureaucratic personality suggested that bureaucracies – with their rigidly defined roles, elaborated hierarchies, and emphasis on rules and routines – “lead to an over-concern with strict adherence to regulations which induces timidity, conservatism, and technicism.” Similarly, Schumpeter held that “rationalized and specialized office work will eventually blot out personality, the calculable result, the ‘vision’” (Schumpeter 1950: 133) and that “the bureaucratic method of transacting business and the moral atmosphere it spreads ... exert a depressing influence on the most active minds” (207). Empirical support for these ideas can be found in a long line of sociological research on work and personality characteristics (see Spenner 1988 for a
review). In particular, these studies have shown that workers exhibit less intellectual flexibility and greater social conformity when they work in jobs that are routinized, substantively simple and closely supervised and monitored (e.g., Kohn and Schooler 1982) – precisely the characteristics of many jobs in bureaucratic organizations.

Bureaucracy may also lower the likelihood of entrepreneurial entry through its effects on the development of skills relevant to entrepreneurial success. Lazear (2005) argued that if successful entrepreneurial activity requires the mastery of a wide variety of roles, then experience solving the wide variety of problems faced by organizations can lead to increases in entrepreneurial skills. Greater entrepreneurial skills in turn make more entrepreneurial opportunities viable (Dunn and Holtz-Eakin 2000). This suggests that people with diverse work experiences are more likely to become entrepreneurs, because the expected value of any given opportunity is greater than for individuals with a more narrow skill set. Employees of bureaucratic firms are more likely to undertake a narrow range of tasks; while they may on occasion rotate through different functional responsibilities, the prototypical job ladder within an internal labor market rewards depth of skills as opposed to breadth. The average diversity of work experiences should therefore be higher among workers in firms without an elaborate division of labor, leading to the expectation that rates of entrepreneurship will be lower among employees of bureaucratic firms.

Similarly, other scholars have argued that knowledge of and exposure to a firm’s external environment is an important determinant of entrepreneurial entry (Saxenian 1994; Gompers, Lerner and Scharfstein 2005; Sorenson and Audia 2000). Employees with a broad knowledge of the firm’s external environment are in a better position to
identify entrepreneurial opportunities, and are more likely to have access to a network of buyers and suppliers. As the division of labor within the firm grows more fine-grained, however, administrative functions devoted to coordination and control become more important. Workers in more bureaucratic firms are more inwardly focused on average, and therefore less likely to understand the entrepreneurial landscape, either because they have less direct experience of the environment or because they are less likely to develop social ties to actors in the environment that might serve as sources of resources and information. This again suggests that a more fine-grained division of labor should lead to lower rates of entrepreneurship. 3

Finally, bureaucracy changes the costs associated with leaving paid employment for entrepreneurship. Employment in established, bureaucratic organizations is often deemed more desirable. The formalization of roles and responsibilities, as well as the formal separation of person and position, mean that an employee’s career prospects within a bureaucratic organization are less particularistic. Employment prospects are therefore generally more stable. Furthermore, bureaucracies create greater predictability in work schedules and can thus facilitate work-life balancing (Briscoe 2006). Finally, the existence of an elaborated, formal organizational hierarchy creates the prospect for internal advancement as a potentially viable career path, whether or not the organization has a formal internal labor market (Doeringer and Piroe 1971). Since these factors increase the opportunity cost of leaving to launch a risky entrepreneurial venture,

3 Ideally, the effects of exposure to the entrepreneurial environment, as well as the breadth of job experiences, could be tested directly with detailed information on individual job responsibilities and interaction patterns. Unfortunately, such information is not available in the data set used here.
employees of bureaucratic organizations should be less likely to enter into entrepreneurship.

While these arguments all suggest that the employees of bureaucratic firms should be less likely to launch their own ventures, there are plausible theoretical accounts that suggest that the opposite (Freeman 1986; Gompers, Lerner and Scharfstein 2005). This alternative prediction arises from the belief that individuals in bureaucratic organizations are exposed to more or better entrepreneurial opportunities, because these firms generate more innovations than they are willing or able to pursue. Large, established firms are often less able or willing to take advantage of internally developed innovations, particularly if they do not fit within the scope of the firm’s established competencies (Hannan and Freeman 1984; Henderson and Clark 1990). The organizational inertia of bureaucratic firms may thus encourage entrepreneurial exit; Freeman (1986: 50) argues that the characteristics of bureaucratic organizations may “create frustration, political disruption and lost opportunity” for those individuals inside the firm attempting to pursue new ideas. Similarly, the difficulties of providing appropriate incentives in large firms may cause large firms to lose innovative ideas to entrepreneurial employees (Hvide 2005).

Bureaucracy thus has two potential types of effects: it may lower the ability of individuals to perceive a given set of opportunities and their willingness to pursue them through entrepreneurial exit (through the variety of mechanisms just discussed); or it may increase the value of the available entrepreneurial opportunities by causing firms to “leave innovations on the table.” Disentangling these effects requires measuring and holding constant the value of the entrepreneurial opportunities available to individuals in
firms with varying levels of bureaucratization. Measuring the value of entrepreneurial opportunities is inherently problematic, however, and not simply because of the difficulties associated with measuring degrees of innovation. Rather, the researcher is typically constrained by only being able to observe the opportunities that have been pursued, which are a function of two unobservable rates: the rate at which opportunities are available and the rate at which they are pursued, given their availability. This limits us to estimating the net effect of bureaucracy on rates of entrepreneurship, which will reflect the relative strength of these two processes. However, there are good reasons to suspect that the negative effects of bureaucracy on the rate at which opportunities are pursued should dominate. Innovative, “Schumpeterian” opportunities arrive at a much lower rate than the more incremental, “Kirznerian” opportunities (Shane 2003) that account for the lion’s share of observed entrepreneurial transitions. Innovative ventures therefore account for a small, though extensively studied, proportion of observed entrepreneurial transitions. Moreover, Gompers, Lerner and Scharfstein (2005) found that large, established firms were less likely to spawn new ventures, despite the fact that they focused on the emergence of venture-backed (and hence presumably more innovative) firms.

Prior Research

A number of studies have examined how organizational characteristics associated with bureaucratization influence individual rates of entrepreneurship. However, these studies are all limited by research designs that make it impossible to control for unobserved sorting processes. Wagner (2004), using a cross-sectional survey of the
German population, found that people working for young and small firms were more likely to self-identify as being in the process of launching an entrepreneurial venture. Wagner’s study is cross-sectional, however, and is therefore subject to self-selection biases: people who are predisposed to become entrepreneurs may choose to work for small, young firms before entering entrepreneurship, either because they have a preference for employment in less bureaucratic settings, or because they are trying to acquire relevant entrepreneurial experiences.

Dobrev and Barnett (2005) estimated the effects of firm size and age on the likelihood of entrepreneurial entry in a sample of graduates from the Stanford University Graduate School of Business. Their estimates suggest that the entry rate among employees was lower in large and old firms; the dynamics among founders were different. Eriksson and Kuhn (2006), using register data on the Danish population, found that employees of large firms were less likely to found entrepreneurial ventures. While these studies used longitudinal data, however, they did not address the extent to which these patterns might be due to sorting on unobserved individual characteristics. Finally, Gompers, Lerner and Scharfstein (2005) investigated how firm characteristics (including such measures of bureaucratization as firm size and age) affected the rate at which existing firms “spawn” new ventures. Their analyses also suggest that rates of entrepreneurship are higher in less bureaucratic firms. However, Gompers, Lerner and Scharfstein use entrepreneurial ventures, as opposed to individuals, as the unit of observation by performing analyses of the number of new ventures that emerge from existing firms. As they acknowledge, this raises questions about the extent to which there
is an unmeasured correlation between individual characteristics (observed or unobserved) and the firm characteristics of interest.

There are good reasons to expect that sorting processes may account for some if not all of the observed association between employer characteristics and entrepreneurship rates. This sorting process can take two potentially complementary forms. First, employers may differentially select and retain workers with entrepreneurial characteristics; a rigidly bureaucratic employer, for example, may not tolerate employees who refuse to follow prescribed procedures. Second, individuals self-select into different employment contexts based on their preferred working conditions, within the range of choices available in the local labor market. Extensive research suggests that people choose jobs consistent with their work values, such as preferences for autonomy (e.g., Halaby 2003; Spenner 1988; Mortimer and Lorence 1979).

Figure 1 presents evidence consistent with such a sorting process by considering the distribution of parental self-employment by employer size. Children of self-employed parents are substantially more likely to become self-employed themselves (Aldrich, Renzulli and Langton 1998; Dunn and Holtz-Eakin 2000; Sørensen 2006). This is at least in part due to the impact of parental self-employment on their children’s aspirations and job values (Halaby 2003; Sørensen 2006). Figure 1 shows that children of the self-employed are over-represented in small firms; similarly, individuals with prior self-employment experience are more likely to work for small firms (not shown). This suggests that the correlation between firm size and rates of entrepreneurship detected in prior research may be caused, at least in part, by sorting processes.
At its simplest, then, this alternative explanation holds that some individuals possess specific traits that shape both their place of employment and their decision to enter entrepreneurship. Methodologically, the most widespread method for addressing bias due to this type of individual unobserved heterogeneity is to include individual fixed effects in regression models (Halaby 2004). However, like other labor market transitions the analysis of entry to entrepreneurship is best done using hazard rate models (Tuma and Hannan 1984), and there is no standard fixed-effects methodology for such models. The closest approximation to a fixed-effects model in a hazard rate framework is to use conditional logistic regression as a fixed-effects discrete time model (Allison and Christakis 2000).

While attractive, this analytic strategy suffers from a number of limitations. Three of these limitations are particularly germane. First, the analysis is limited to individuals who eventually enter into entrepreneurship. Estimation of individual fixed-effects requires variation in the dependent variable within individuals; such variation is only present among those who transitioned to entrepreneurship. Second, the use of a fixed-effects estimator only addresses the issue of fixed unobserved heterogeneity among individuals. It leaves open the possibility that people’s preferences for entrepreneurship may vary in unobserved, time-varying ways that also impact the choice of employer prior to entrepreneurial entry. One might imagine, for example, that unobserved life events might increase an individual’s entrepreneurial aspirations, and that as a result of these changes, the individual seeks out employment opportunities in more entrepreneurial settings. I address this possibility below.
Finally, within-person models rely on between-firm variation in levels of bureaucracy. This between-firm variation may be correlated with other, unobserved firm characteristics that affect the rate of entrepreneurship (such as a particular corporate culture, or firm promotion policies). Unobserved organizational heterogeneity could therefore generate a spurious within-person correlation between bureaucracy and entrepreneurship. It is tempting to address this problem by including firm-level fixed effects in addition to individual fixed effects. However, firm fixed effects are not identified when individual fixed effects are included and the event is non-repeatable, as is the case here.\(^4\) This constraint forces a choice between individual and firm fixed effects. A within-firm estimation strategy addresses the potentially confounding effects of fixed unobserved firm characteristics effectively, but is vulnerable to unobserved heterogeneity among the individuals, since there is no random assignment of individuals to firms. Differences among individuals who join the organization at different points may reflect self-selection. In light of the evidence in Figure 1 that such sorting processes may be substantial, I focus on estimating models that address the possible effects of unobserved heterogeneity at the individual level.\(^5\)

\(^4\) The conditional fixed effects estimator requires variation on the dependent variable (i.e., the transition to entrepreneurship), which restricts the sample to those individuals who enter entrepreneurship. The further inclusion of firm fixed effects would restrict the sample to the period when the individual worked for the firm that he or she eventually left in order to enter entrepreneurship. In short, each individual’s history would be restricted to an attachment to a single firm. In this case, the individual and firm fixed effects cannot be separately identified, except in rare cases where multiple individuals from the same firm experience the event.

\(^5\) Two other limitations of the estimation strategy deserve brief mention: 1) Because (non-repeatable) events necessarily occur at the end of the observation period, the conditional fixed effects estimator will lead to biased estimates of any variables that are correlated with time (Allison and Christakis 2000). This fact rules out a wide range of
Data and Measures

I analyze data characterizing the Danish labor market from a database called the Integrated Database for Labor Market Research (known by its Danish acronym, IDA). IDA is a longitudinal database constructed from governmental registers and maintained by Statistics Denmark for research purposes. It contains a wealth of demographic information characterizing the entire population of Denmark, as well as information on employment status and income. Most importantly for present purposes, IDA is a matched employer-employee database, so employees can be linked to their employers and transitions from paid employment to entrepreneurship can be measured.

The data for analysis come from a special extract from IDA I commissioned for a broader project on a variety of issues in the analysis of entrepreneurship. (For confidentiality reasons, Statistics Denmark does not allow direct access to IDA and requires researchers to request and use specified subsets of the database.) This extract covers all people residing legally in Denmark in 1994 who were between the ages of 15 and 74. These individuals are tracked back in time until the first year of IDA data, 1980.

variables plausibly related to the decision to enter entrepreneurship, including such factors as income and wealth, since they tend to increase with time. 2) The fact that individuals are only included in the sample if they transition to entrepreneurship means that transitions to entrepreneurship (and hence individual career histories) are sampled proportional to employer size, even if size is uncorrelated with the transition rate. This oversampling of transitions from large firms will impart an upward bias to the estimates of the effects of organizational characteristics correlated with size. To account for this, I weight each individual’s contribution to the likelihood function by the inverse probability of the organization’s inclusion in the sample. Details of the weighting scheme are available upon request.
These individuals are also tracked forward in time until 1997. From this database, I constructed a sample for the current analyses, guided by two major principles. First, since the dynamics of serial entrepreneurship are likely different from the initial transition into entrepreneurship, I excluded individuals with a prior history of entrepreneurial activity from the risk set. Second, the transition to entrepreneurship is a form of job turnover that depends on duration in the job (e.g., Sørensen 2006). This suggests that employees should be observed from when they first become at risk of leaving a particular employer for entrepreneurship, in order to avoid the biases introduced by left-censoring (Tuma and Hannan 1984).

These principles, along with the nature of the research question, implied a set of selection criteria for the sample. Specifically, the sample is limited to those individuals who a) were employed in 1990; b) were newly hired by their employer in 1990 (i.e., zero firm tenure); c) had no prior self-employment experience between 1980 and 1990; d) were between the ages of 16 and 40 in 1990; e) were not employed in the primary sector (agriculture and extractive industries) or in industries dominated by the public sector; and f) whose employer was not a new employer in 1990. The decision to focus on people employed in 1990 reflected an attempt to balance the tradeoffs created by the left-

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6 One consequence of this sample construction is that individuals who were either not residing in Denmark in 1994, or not between the ages of 15 and 74 at that time, are not included in the sample. For labor market data, this means that some individuals who were in the labor force in earlier years (say 1980) will not be included in the sample (for example, people who were 75 in 1994 but still in the labor force at age 61 in 1980). This issue primarily affects older individuals, especially those over the age of 60 in 1980. As discussed below, I restrict the sample for the multivariate analyses to individuals who were between the ages of 16 and 40 in 1990; this age group is less likely to have suffered much non-random attrition. However, the attrition from the sample does mean that there is some downward measurement bias associated with measures like a firm’s number of employees as one moves away from 1994.
censoring of all IDA data in 1980 and the right-censoring of observations in 1997. The left-censoring of IDA data in 1980 means that any prior labor force history is unknown for people in the labor market in 1980. By focusing on individuals in the labor force in 1990, I employ the IDA data from 1980 and 1990 to identify and exclude individuals with any self-employment history between 1980 and 1990. In combination with the age restriction, this should capture the vast majority of people with prior entrepreneurial experience. Similarly, the restriction to individuals newly hired in 1990 ensures that individuals are followed from when they first become at risk of leaving their employer to enter entrepreneurship.  

I exclude individuals in the primary sector and in industries dominated by the public sector because the dynamics of entrepreneurial activity may be substantially different in these sectors. Finally, I exclude employees of newly founded firms in 1990 because these individuals may be entrepreneurs. These selection criteria result in an estimation sample of 282,911 individuals.

I rely on two types of data to measure transitions to entrepreneurship. First, Statistics Denmark supplied an occupational classification scheme that differentiates between a wide variety of labor force attachments, including employment with established firms (sub-divided into seven broad, hierarchical categories), unemployment, schooling, not in the labor force, and self-employment. Statistics Denmark employs two primary categories for self-employment. The first captures individuals who are unincorporated proprietors with employees; the second captures self-employed individuals with no employees. I treat entry into either of these two categories as transitions to entrepreneurship, consistent with the notion that a key component of the entrepreneurship.

7 People remain in the sample if they change employers.
transition to entrepreneurship is the movement from paid employment to self-employment.

A shortcoming of relying on the occupational data is that it does not capture people who found incorporated ventures. Unfortunately, due to limitations in the government registers upon which IDA is based, the founders of incorporated ventures cannot be identified and linked to the primary labor market data. This means that such transitions cannot be measured directly. Instead, I take advantage of the fact that incorporated ventures appear as new employers, with the founders of the incorporated ventures as employees.\(^8\) I therefore code individuals who are employees of newly founded firms as entrepreneurs, in addition to people who enter self-employment. Most of the new employers identified in the dataset are quite small, but there are a small number of large firms.\(^9\) It seems unreasonable to assume that all of the initial employees of a new firm with a large number of workers are entrepreneurs. I assume that all employees of new firms with three or fewer employees are the founders of the new firm. For firms with more than three employees, I only consider individuals to be entrepreneurs if their occupational titles indicate that they are directors or top managers.\(^10\) In most of

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8 Individuals who incorporate ventures but take only capital income from them will not appear as employees of the venture. This means that passive investors will not be identified as entrepreneurs.

9 This measurement strategy relies heavily on accurately identifying new employers. Of particular concern is the possibility that ongoing firms that change ownership are mis-identified as entrepreneurial ventures, which would lead to an overestimate of the rate of entrepreneurship. However, Statistics Denmark engages in an extensive screening process to eliminate such false transitions. Furthermore, the firm size and occupational restrictions in the operational definition of the transition to entrepreneurship should limit mis-measurement.

10 I also experimented with using a cut-off of five employees, which generated similar results.
the analyses presented below, I pool all three of these types of entrepreneurial entry into a single transition. However, because they may be qualitatively different, I also run robustness checks in which I consider each type of transition separately.

I censor transitions to entrepreneurship if the individuals in question experienced a period of unemployment between their observed employment in one year and their subsequent self-employment the next year. Similarly, in most analyses I censor transitions to entrepreneurship that occur simultaneously with the failure of the individual’s employer. I do this primarily to be conservative. Empirically, censoring these two types of transitions avoids any confounding effects of firm size and age on either the rate of entry into unemployment or the rate of firm failure. Conceptually, an important component of entry into entrepreneurship as defined in this paper is the decision to forsake employment with an established firm; this decision process is presumably different for the unemployed. However, separate analyses (not shown here), as well as the analyses of displaced workers below, show that this decision is not consequential for the conclusions of this paper.

Turning now to measures of organizational characteristics, it should be noted that studying the relationship between bureaucracy and entrepreneurship is complicated by the fact that an organization’s degree of bureaucratization is an unobservable construct. Moreover, constructing and collecting specialized measures of hierarchy, role specialization and routinization in the type of large scale sample needed to capture transitions to entrepreneurship is prohibitively difficult. Instead, I focus on two easily observable organizational characteristics – firm size and age– and examine how they affect individual rates of entrepreneurial activity (cf. Dobrev and Barnett 2005).
Organizational size is a classic variable in organizational research, and is of interest because it has implications for the degree of role specialization, the routinization of activities and the extent of hierarchy. A long line of research suggests that large firms generally have a more fine-grained division of labor and more elaborate organizational hierarchies (e.g., Blau and Schoenherr 1971). Furthermore, the coordination challenges faced by large firms also leads to a greater reliance on standard operating procedures and less exploratory learning. Organizational size is therefore a key measure of how bureaucratic a firm is. I measure firm size as the (log of) the number of employees in a given year.

The effects of organizational age have also been extensively studied, particularly by organizational ecologists (e.g., Freeman, Carroll and Hannan 1983; Hannan 1998; Sørensen and Stuart 2000). Holding size constant, the primary impact of organizational aging is to increase routinization (Stinchcombe 1965). For example, Sørensen and Stuart (2000) found that, holding size constant, older organizations were less likely to engage in exploratory innovation, and instead more likely to exploit established competencies. Firm age is measured as the number of years since the founding of the firm. However, the founding date of firms can only be determined for employers founded after 1981, since it is inferred from the appearance of the firm in the IDA registers. The ages of firms founded in 1980 or earlier cannot be determined. For this reasons, I use dummy variables to differentiate between different age groups. Because a firm’s routines are likely to be established relatively early in its life, I settled on three age groups: zero to two years old, three to nine years old, and ten or more years old. (Experimentation with alternative operationalizations of age yielded substantively similar results.)
The primary disadvantage of these measures of bureaucratization lies in their
generality, which makes it difficult to adjudicate between different explanations for the
observed associations. While the empirical analyses can adjudicate between conflicting
predictions regarding the effects of firm size, for example, there is no shortage of
potential competing explanations for an observed negative relationship between firm size
and entrepreneurship. Adjudicating between such competing explanations is beyond the
scope of this paper.

Results

Figure 2 presents descriptive evidence of the relationship between the rate of
entrepreneurship and firm size, while Figure 3 graphs the relationship with firm age. The
overall rate of entry into entrepreneurship is 0.60%, meaning that we observe six
transitions to entrepreneurship for every 1,000 person-years at risk. This rate is somewhat
low by international standards, although it is important to note that this estimate pools
across a very large and heterogeneous population. Furthermore, this measure somewhat
under-estimates the annual transition rate due to IDA’s measurement practices, which
capture an individual’s labor force status once a year in the 48th week. Some individuals
may have entered and exited entrepreneurship between measurement intervals. However,
the comparatively low rate of entrepreneurship likely also reflects the strong social safety
net, which lowers the extent to which people enter entrepreneurship due to “push” factors
such as poor employment prospects (Carrasco and Ejrnæs 2003).

Figures 2 and 3 distinguish between entry into self-employment (measured using
occupational codes) and transitions by individuals who are employees of a new firm,
which I term “team entry.” Figure 2 displays a clear negative relationship between firm size and the rate of entry into self-employment. The effect of firm size on team entry is also generally negative, although rates in the smallest firm size category (1-4 employees) are somewhat lower than in firms with 5-9 employees. The effect of firm size is dramatic: for either type of transition, the rate of entrepreneurial entry among people working for firms four or fewer employees is 2.8 times higher than among individuals in firms with more than 1,000 employees. Figure 3 demonstrates that rates of entrepreneurship also decline with firm age, although the pattern is not as clear as for firm size. Nonetheless, individuals working for firms less than three years old are 60% more likely to become self-employed in a given year than people working for firms more than ten years old.

As noted earlier, the bivariate effects of firm size and age apparent in Figures 2 and 3 may be spurious consequences of the fact that different kinds of people choose to work for small and large firms, or young and old firms. This sorting may be according to either observable or unobservable individual characteristics. I focus on sorting on observables first, by estimating multivariate hazard rate models that control for a host of individual characteristics. The mean values for selected individual characteristics, calculated for four different firm size categories, are presented in Table 1. Most demographic and labor market variables in Table 1 are self-explanatory. All monetary

11 Separate calculations (not shown) indicate that most individuals work for large and older firms: the average work attachment is with a firm that has 1,137 employees, while over 84% of spells cover individuals working for firms ten or more years old. This reflects the fact that large firms contribute more employees to the sample: the average firm in the sample is considerably smaller (approximately 36 employees) and somewhat younger (73% are 10 or more years old). Note that the sample is representative of the population of (new) employees and is not representative of the population of firms.
values, such as income, assets and debts, are deflated to 1980 values. For individuals already in the labor force in 1980, I measured labor force experience by imputing the expected years of labor force experience based on age and educational attainment, and then added the number of years employed between 1980 and 1990. The means of the independent variables show few strong patterns of association with firm size. The most notable pattern suggests that the employees of large firms are generally more well-established in their careers and lives than the employees of small firms. People working for large firms are slightly older and somewhat more likely to be married and have children than employees of small firms. They also have more labor force experience on average, earn larger salaries, and have greater assets and debts.

Table 2 presents estimates from discrete-time event history models of the transition to entrepreneurship, estimated using logistic regression. Not presented in Table 2 (but included in the models) are dummy variables for the broad occupational category of employment (e.g., upper white collar, lower blue collar), highest level of education completed, and educational major coded in a fourteen category scheme. In addition to the individual characteristics, the models in Table 2 include controls for the employer’s number of establishments and for whether the employer operated in more than one industry.

The models in Table 2 demonstrate that the pattern of results in Figures 2 and 3, particularly the effects of firm size, cannot be attributed to differences in the composition of firms in terms of observable worker characteristics. The four models in Table 2 vary two factors: the measure of employer size (unstandardized and standardized) and the inclusion/exclusion of industry fixed effects. The industry fixed effects absorb industry
differences in the rate of entrepreneurship that may be correlated with firm size and age. Because technological and environmental differences across industries may lead to different relationships between firm size and the degree of bureaucratization, the standardized size measure expresses firm size in a constant metric relative to the mean and standard deviation of log firm size in the firm’s industry in a given year.\textsuperscript{12}

The results for firm size in Table 2 are consistent across specifications and show that individuals working for large firms are substantially less likely to enter into entrepreneurship. Moreover, the presence of controls for firm age in the models mean that the firm size effect does not simply reflect the fact that many small firms are also young. The estimate for the effect of the unstandardized firm size variable in model 3 suggests that the rate of entrepreneurship of an employee in a firm with 5 employees is 57\% higher than the rate for an observationally equivalent employee working in a firm with 250 employees. A person working in a firm with 250 employees is 17\% more likely to become an entrepreneur than someone working in a firm with 1,000 employees.\textsuperscript{13}

The effects of firm age in Table 2 are more sensitive to the inclusion of industry fixed effects than are the effects of firm size. In particular, while both Figure 3 and the first two models in Table 2 would suggest that rates of entrepreneurship are higher among

\textsuperscript{12} While firm age distributions vary across industries, the left-truncation of the age variable means that I am not able to standardize it.

\textsuperscript{13} The changes in the rate of entrepreneurship with firm size implied by the standardized size variable are similar but are less easily summarized, because they vary with the size distribution in each industry in a given year: In an industry with a relatively compressed size distribution, moving from a firm with 5 employees to a firm with 250 employees, for example, has a greater impact than in an industry with greater spread in the size of firms. Because the results using the standardized size variable have a less intuitive interpretation, I present results using the unstandardized variable in the remainder of the paper. However, all models have also been estimated using the standardized variable, and this choice does not affect the substance of the conclusions.
employees of firms less than three years of age, this effect appears to be due to differences across industries in average firm age and rates of entrepreneurship. When unobserved industry differences are controlled for, employees of these very young firms are no more likely to become entrepreneurs than employees of firms ten years of age or older. Employees of firms between three and nine years of age, however, have a nine percent higher rate of entrepreneurship than employees of other firms. As subsequent analyses will show, however, these conclusions are sensitive to attempts to control for unobserved individual differences.

Table 3 presents robustness analyses for the operational definition of entrepreneurship. The models distinguish between the three different types of entrepreneurial transitions that can be identified in the data: team entry, self-employment with employees, and self-employment without employees. (In each case, the alternative types of transitions are censored.) These estimates reinforce the importance of firm size as a predictor of different types of entrepreneurial activity. Firm size lowers the likelihood of all three types of transitions, although it is interesting to note that the negative effect of firm size is approximately half as large for people who launch new ventures without employees. On the other hand, the effects of firm age are inconsistent across specifications of the dependent variable. Transitions to self-employment without employees appear to be substantially more likely among people working for firms zero to two years of age. For the two types of transitions that involve starting a new organization, rates are highest among people working for firms between three and nine years of age, although the effect is not significant for self-employed employers.
As noted earlier, bureaucratization may lower rates of entrepreneurship through its effects on the perception and valuation of entrepreneurial opportunities and on the willingness of employees to leave paid employment. While I cannot measure these constructs directly, I attempt to shed greater light on the mechanisms driving the observed association before addressing whether the observed effects of firm size and age are due to unobserved sorting processes.

The first of these analyses, presented in Table 4, contrasts transitions to entrepreneurship in the same industry as the former employer with transitions to a different industry. The rationale for this analysis is straightforward: if the effects of bureaucracy are solely due to its impact on the willingness to leave paid employment, then the effects of organizational age and size should not differ across the two transitions. If however bureaucracy influences the perception and valuation of entrepreneurial opportunities, and if entrepreneurial opportunities are more likely to be perceived in the current employer’s industry, then the effects of firm age and size should be stronger for transitions to entrepreneurship in the same industry. (Recall that the industry fixed effects control for differences across employer industries in the availability of opportunities, levels of competition, etc.) The estimates in Table 4 indicate that firm size has a substantially more retarding effect on entering the same industry as the parent firm than on the rate of entering a different industry. However, employer age does not influence transitions to the same industry. These results indicate that the increased division or labor and greater emphasis on coordination and control that accompany increases in organizational size hinder the perception and valuation of entrepreneurial opportunities.
Further insight can be gained by considering how organizational characteristics influence entrepreneurial entry among individuals who have experienced a turnover event. As noted earlier, bureaucracy may lower rates of entrepreneurship by increasing the opportunity cost of leaving the current employer. At the extreme, the observed effects of bureaucracy on rates of entry into entrepreneurship may simply reflect lower turnover rates of employees in bureaucratic firms, and not any effect of bureaucracy on the decision to enter entrepreneurship. To examine this, I perform analyses of the effects of firm size and age on the likelihood of entrepreneurial entry among individuals who have experienced a turnover event. These analyses ask whether individuals, given that they have left their employer, are more likely to enter into entrepreneurship if they come from a small (or young) firm. This analysis is complicated by the fact that the reasons for turnover may differ in unobserved ways that are correlated with firm size (Gibbons and Katz 1991). For example, if large firms screen workers for productivity differences more effectively, the people who leave large firms may be more likely to show little initiative or effort, and thus also be less likely to become entrepreneurs. In order to address this possible endogeneity of turnover, I distinguish between those turnover events that arise through displacement and those that do not. (Displaced workers are workers whose employers closed and laid off all of their workers, and for whom turnover is therefore exogenous.)

Figure 4 presents bivariate evidence of a decline with firm size in the percentage of both displaced and non-displaced workers who enter entrepreneurship following a turnover event. Results from a multivariate logit model of entrepreneurial entry, estimated on the full sample of individuals who experience a turnover event, strengthen
this conclusion, as the size of the previous employer has a significant, negative effect (results not shown).\textsuperscript{14} Firm age has no significant effect on the probability of entering entrepreneurship in these analyses. Similar analyses performed conditional on displacement support the same conclusions. This suggests that the effect of firm size on entrepreneurship is not simply driven by a greater resistance to leaving large employers. The analysis of displaced workers in particular provides strong evidence that the experience of working for a small firm has a positive impact on the likelihood of becoming an entrepreneur, even after that firm has failed.\textsuperscript{15} In this respect they provide, along with the analyses of industry destinations, support for the notion that the effect of bureaucracy on entrepreneurship is in part due to its impact on the perception of entrepreneurial opportunities.

\textbf{Unobserved sorting:} I turn now to consider whether the estimates of firm size and age presented to this point are biased by unobserved sorting processes that lead individuals with a disposition for entering entrepreneurship to choose particular types of employers. Table 5 presents estimates from conditional fixed effects logit models of the transition to entrepreneurship for those individuals in the original sample who entered into entrepreneurship between 1990 and 1997. Because firm age is positively correlated

\begin{quote}
\textsuperscript{14} This model includes industry fixed effects and the full set of covariates in the models in Table 2. The estimated coefficient for log firm size is \textasciitilde0.125 with a standard error of 0.009.
\end{quote}

\begin{quote}
\textsuperscript{15} The strength of this conclusion must be tempered somewhat by the fact that conditioning on turnover only address differences in internal opportunities. An alternative explanation for the differences in rates of entrepreneurship is that the employees of large firms have better re-employment prospects with other firms and are therefore less likely to consider entrepreneurship an attractive option.
\end{quote}
with duration, I include dummy variables for firm age at the time of an individual’s entry to the firm. As before, I estimate models with industry fixed effects.

In the first model in Table 5, the estimated effect of firm size is quite large and highly significant statistically. This result indicates that within a person’s career, entry into entrepreneurship is much more likely if the employer is small relative to other employers a person has worked for. This result lends substantial confidence to the results found earlier, and indicates that the observed effect of firm size does not reflect sorting process where people with (fixed) entrepreneurial tendencies are more likely to work for small firms. One concern with this estimate, however, is that firm size can change during an individual’s employment with a given firm due to firm growth and decline. In the extreme case where each person only works for one firm, the negative firm size effect may simply reflect the consequences of firm growth or decline: people in growing firms may not leave due to the opportunities within the firm, and those in declining firms may seek to get out. I therefore re-estimate the model focusing only on between-employer variation in firm size by including a measure of employer size at the time of entry into the firm. The second column of Table 5 contains the results of this model. The strong negative effect of firm size again reinforces the conclusion that people are less likely to become entrepreneurs when they work for large firms.

While the substantive effects of firm size do not change after the inclusion of individual fixed effects, the effects of firm age do change substantially. The estimates in Table 5 indicate that, within a career, people are more likely to become entrepreneurs if they joined an employer in its formative years (i.e., less than three years of age). While the models without fixed effects suggested that there was no contemporaneous effect of
working for a very young firm, this result suggests that those who entered early in the firm’s history are more likely to become entrepreneurs after the firm has matured. This is consistent with the idea that these individuals leave the firm as it becomes more established and routinized. Surprisingly, however, people are significantly less likely to leave a firm for entrepreneurship if they joined the firm when it was between three and nine years of age.

One objection to the fixed-effects results is that they cannot account for time-varying changes in entrepreneurial aspirations that might be correlated with firm characteristics. In other words, the results may be due to strategic sorting: for example, exogenous changes in aspirations may lead people to move to smaller firms in order to develop entrepreneurial skills and knowledge. I address this issue in two ways. First, I consider whether there is evidence consistent with the idea that the pattern of movement between firms of different sizes is different for individuals who enter entrepreneurship. Second, I examine whether the effects of firm age and size are attenuated among individuals who experience windfall gains in personal wealth.

If nascent entrepreneurs strategically moved to smaller firms prior to entering entrepreneurship, one would expect to see that they were more likely than others to have joined a small firm immediately prior to entrepreneurship. I assess the empirical support for this first by using log-linear models that cross-classify three variables: whether an individual’s attachment to the current firm ended with entry into entrepreneurship (0/1); the size of the current employer (using the size categories in Figure 2); and the size of the
The results of this log-linear analysis are presented in Table 6. As is apparent from comparing the first and second rows on Table 6, there is a very strong pattern of association between the sizes of prior and current employers, with the two-way interaction between these two variables accounting for almost 99% of the overall association. Further analysis shows that there is a statistically significant association between the size of the prior employer and the likelihood of entering entrepreneurship (Model 3 vs. Model 2), although the magnitude of this effect is substantially smaller than the association between the size of the current employer and entrepreneurial entry (Model 4 vs. Model 2). Most impressively, the model with all two-way interactions (Model 5) fits the data extremely well despite being fit to a table with over 646,000 individual-firm attachments, and is the best-fitting model according to the widely accepted BIC criterion (Raftery 1986).

This result suggests two important conclusions. First, there is no support in this analysis for the idea that the effect of firm size on entrepreneurship can be explained by nascent entrepreneurs strategically seeking out smaller firms before entry. Such behavior would imply that the pattern of mobility between firms would differ depending on whether or not an individual eventually entered entrepreneurship. The absence of a significant three-way interaction in Table 6, despite the large sample size, makes this claim difficult to sustain. Second, the significant two-way interaction between prior firm size and entrepreneurial entry (Model 5 vs. Model 4) indicates that the effects of firm size are not limited to the current work environment. In other words, working in a large firm

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16 I use the same data as in the full models in Table 2, but use the individual-firm attachment as the unit of observation, as opposed to the yearly spell. Analyses using yearly spells yield the same results.
has lasting effects on the rate of entrepreneurship; among employees of a small firm, those with prior employment in a large firm are less likely to enter entrepreneurship.

These conclusions are further supported in a multivariate context in Table 7. The first model in Table 7 extends the models estimated in Table 2 for the full sample by including (log) prior employer size and its interaction with current employer size. As suggested by the log-linear analyses, the main effect of prior employer size is negative and significant, reinforcing the conclusion that employer size has a lasting effect on entrepreneurial tendencies. Also in line with the log-linear models, the interaction effect is not significant. The third model in Table 7 estimates the corresponding model in a conditional fixed-effects framework. Here again, people are less likely to become entrepreneurs if, controlling for the size of their current employer, their previous employer was large, although in this model there is a significant, positive interaction effect between prior and current employer size. Consider two employees working for a firm with five employees, where one has previously worked for a large firm (with 200 employees) and the other for a small firm (with five employees). In this case, the predicted multiplier of the rate for the employee from the large firm is less than half the multiplier of the rate for the employee from a small firm (0.16 vs. 0.33).\textsuperscript{17}

These results lend further confidence to the conclusion that the estimated negative effect of firm size on rates of entrepreneurship cannot be attributed to unobserved sorting of individuals with (fixed or time-varying) entrepreneurial tendencies into small firms.

\textsuperscript{17} In the absence of the positive interaction effect, the difference between the two would have been slightly larger, but the substantive conclusion remains the same. The interaction effect does not cancel out the main effect of current employer size for any reasonable values of prior employer size.
This conclusion can be further strengthened by considering the effects of a sudden easing of any financial constraints on entering entrepreneurship. Extensive research has shown that sudden or windfall increases in personal wealth have a positive effect on the propensity to enter entrepreneurship (Lindh and Olsson 1996). I therefore use windfall gains as an indicator of exogenous lowering of the barriers to entering entrepreneurship. If the estimated effects of firm characteristics reflect unobserved changes in the desire to enter entrepreneurship, one would expect that the effects of firm age and size should be attenuated for people experiencing windfall gains.

The results of this analysis are also presented in Table 7. In the second model, estimated on the full sample, we see that windfall gains have a strong and significant effect on the likelihood of entering into entrepreneurship. This is consistent with prior research. At the same time, however, none of the interaction effects between the dummy variable for windfall gains and firm age and size are significant. This means, for example, that the effect of firm size is the same in the population of individuals experiencing windfall gains as it is in the remainder of the population. The estimates of the conditional fixed effects model in the fourth model show a slightly different pattern. The estimates indicate, as before, that individuals are substantially more likely to become entrepreneurs in a year in which they experience a windfall gain. Furthermore, there is no evidence that the employer size effect is attenuated among those experiencing windfall gains; quite to the contrary, firm size appears to have a stronger negative effect in this group. However, there is some evidence that effect of firm age may be due to unobserved

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18 A windfall gain was indicated in any year in which personal wealth increased by more than 250,000 Danish kroner, which is in the top percentile of observed changes in wealth in the data. In American terms, this is roughly a windfall of $40,000-50,000.
sorting processes, as individuals in recently founded firms are substantially less likely to enter entrepreneurship if they experience windfall gains.

**Discussion**

The results of this study point to the fundamental importance of career experiences in shaping entrepreneurial activity, a factor that has largely been neglected in research on entrepreneurship. There is strong support for the claim that working in more bureaucratic organizations makes people less likely to launch their own business ventures. Instead, small, young organizations are important engines of entrepreneurial activity.\(^1\) This conclusion is particularly robust when it comes to the effects of organizational size, which has long been seen as a driver of bureaucratic structures and processes in organizations. Moreover, these effects appear to be lasting, as evidenced by the significant effects of prior employer size observed in Tables 6 and 7. This implies that the effects of working conditions are not limited to shaping the exposure of workers to entrepreneurial opportunities. Organizational age shows less consistent effects across different model specifications (particularly with respect to the effects among young firms), although in general they suggest that individuals who work for older firms are less likely to enter entrepreneurship.

Most importantly, this paper presents compelling evidence that the observed effects of organizational size and age can be attributed to the effects of work

\(^{19}\) This is not the same as saying that small firms produce more entrepreneurs than large firms. The employment distribution (in Denmark as elsewhere) is skewed such that a relatively small number of large firms account for a large proportion of employment. In turn, at the firm level, a large firm is more likely to generate an entrepreneur in a given year than a small firm.
environment, and are not spurious consequences of unobserved sorting processes. While such conclusions can never be definitive in the absence of experimental data, the conditional fixed effects models, along with the analyses of strategic sorting, provide the strongest evidence available that the differences between small and large firms in entrepreneurship rates cannot simply be attributed to their likelihood of attracting “entrepreneurial types.” These results therefore substantially buttress the sociological approach to the study of entrepreneurship. While dispositional factors may also drive entrepreneurial activity, context matters. Entrepreneurs are made, not simply born.

Despite these advances, several issues remain to be addressed in future research. First, with strong evidence of contextual effects in hand, research should turn to deepening our understanding of the mechanisms through which bureaucracy suppresses entrepreneurship. Providing evidence on the relevance of the four (or more) different channels of bureaucratic influence – on attitudes, skills, environmental exposure and opportunity costs – requires different research designs and approaches to data collection. The evidence presented in this paper suggests that while the benefits of employment in bureaucratic organizations may help suppress entrepreneurship, these opportunity costs are not the whole story. Similarly, the lasting effects of organizational size observed in Tables 6 and 7 are consistent with the idea that bureaucratic working conditions influence attitudes toward entrepreneurship and the development of entrepreneurial skills, but do not allow for adjudication between these two types of mechanisms, or other potential examples. Much work remains to be done on how, for example, bureaucracies may influence their employees’ perception and valuation of entrepreneurial opportunities.
While the organizational size effects are robust across specifications, it is less clear why the effects of organizational age are less consistent. Two possibilities are worth considering. First, the age effects are particularly sensitive to the use of the conditional fixed effects estimator. Unobserved sorting processes may therefore play an especially important role with respect to the effects of organizational age. Within a career, people are most likely to leave an employer if they joined it when it was very young. However, they may first leave when the firm has matured somewhat, which would explain the higher rates for employees of firms aged three to nine years in the pooled analyses (Table 2). Second, if firm age, when controlling for firm size, primarily captures differences among firms of the same size in routinization and exploitation in organizational learning, the inconsistent effects may simply indicate that these factors have weak or unpredictable direct effects on entrepreneurial entry.

An additional concern with the current study is that the breadth gained through a large-scale sample of employers and employees comes at the expense of depth, particularly with respect to the measurement of organizational characteristics. For example, the effects attributed to bureaucratization may reflect the effects of other, unmeasured, firm characteristics correlated with firm size and age. One might worry, for instance, that the different rates observed in small and large firms do not derive from differences in role specialization and routinization, but rather unobserved factors, such as aspects of organizational culture or firm employment policies. Unfortunately, the limited information in IDA characterizing firms, as well as the constraints of the modeling framework, makes it impossible to address concerns about additional sources of heterogeneity among firms in this study. Similarly, while firm size and age have the
virtue of being easy to observe in large sample studies, they are imperfect measures of bureaucracy; for example, firms of the same size may vary in their degree of bureaucratization due to conscious managerial choices (e.g., Saxenian 1994).

Finally, while there is little reason to doubt that the results in this paper are empirically representative of the entrepreneurial process in Denmark, one might be concerned that distinctive features of Danish labor market policy or of the entrepreneurial environment limit the generality of the results. Yet while Denmark is well known for its extensive welfare state policies and high labor unionization rates, most accounts of the Danish labor market characterize it as very flexible and dynamic. Comparative research suggests that the Danish labor market is comparable to the U.S. labor market in terms of the level of employment protection (Bingley and Westergaard-Nielsen 2003), average levels of firm tenure (OECD 1997), and rates of job creation and job destruction (Albæk and Sørensen 1998; Davis and Haltiwanger 1992). Similarly, one manifestation of Danish labor market policies lies in the fact that few entrepreneurs are “pushed” into self-employment (Carrasco and Ejrnæs 2003): surveys suggest that 83% of those starting a business said they did so because they had identified a valuable opportunity, while only 5.4% felt that they had had no better choice available to them – the third lowest rate of “necessity entrepreneurship” among the 23 nations studied in the Global Entrepreneurship Monitor (Hancock and Bager 2001). Furthermore, there are few

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20 Hancock and Bager (2001) also found that Danish entrepreneurs rely more heavily on informal sources of funding (e.g., friends and family) than entrepreneurs in other countries, and that venture capital and angel investing are less developed. This difference in financing patterns may mean that risky, innovative ventures have greater difficulty securing start-up funding, and suggests that such ventures may be underrepresented in the Danish context.
formal barriers to entry into entrepreneurship (e.g., licensing requirements) in Denmark. Thus while questions of generalizability can only be definitively answered through further research, there are good reasons to expect that the estimated effects of firm age and size do not simply reflect idiosyncratic features of the Danish labor market or entrepreneurial environment.

Conclusion

The classic organizational theorists were right to be concerned that bureaucratic work conditions have a negative impact on rates of entrepreneurship. At the same time, few current students of entrepreneurship and industrial change would feel comfortable embracing Schumpeter’s (1950) prediction that bureaucratization spells the end of entrepreneurship; the continued entrepreneurial dynamism of industrialized nations since Schumpeter’s time have allayed many of those fears. An interesting question, then, is how the central findings of this paper can be reconciled with this continued entrepreneurial dynamism. There seem to be at least two interrelated answers.

The first is that this study has only considered the determinants of entrepreneurial entry, but not how bureaucracy affects entrepreneurial survival. For bureaucratization to lower entrepreneurship overall, bureaucratic firms must effectively crowd out entrepreneurship by making it impossible for those entrepreneurial ventures that do emerge to survive. A large body of work on the rigidities of large organizations in the face of technical change and entrepreneurial challenges (Hannan and Freeman 1984; Henderson and Clark 1990), as well as the difficulties large organizations face when trying to serve small and specialized markets (Carroll 1985) suggest that this is not the
Bureaucracies may therefore be less likely to turn their employees into entrepreneurs, but they may have greater difficulty responding to competitive threats from those entrepreneurial ventures that do emerge.

Furthermore, it is possible that while the average employee of a bureaucratic firm is less likely to become an entrepreneur, those that do enter into entrepreneurship from bureaucratic firms may be more successful because they pursue more valuable opportunities. As noted earlier, many theoretical accounts, inspired by examples such as Xerox’s inability to take advantage of its internally generated innovations (Hiltzik 1999), suggest that the employees of bureaucratic are in a stronger position to exploit valuable innovations. While bureaucratic firms have a smaller relative supply of prospective entrepreneurs, they might also have a greater supply of highly valuable entrepreneurial opportunities that can only be perceived by people within the firm. While identifying the extent to which firms differ in the extent to which they leave innovative opportunities “on the table”, this again points to the importance of understanding, through future research, how work in bureaucratic setting influences subsequent entrepreneurial performance.

At the macro-organizational level, this paper provides new insight into how the structural characteristics of existing organizational populations shape entrepreneurial activity and industry dynamics. Most existing accounts in sociology and economics privilege demand-side factors by emphasizing how the structure of an organizational population shapes the prevalence of entrepreneurial opportunities. Yet the effects of firm age and size suggest that simple differences in the distribution of these characteristics can help explain variation in rates of entrepreneurial activity across regions or industries through their impact on the supply of entrepreneurs. For example, regions with a greater
share of employment in smaller firms can be expected to generate larger number of
trepreneurs than regions with employment concentrated in large firms, even holding
constant the available entrepreneurial opportunities. This implies that there are
increasing returns to entrepreneurship in a region (Saxenian 1994; Sorenson and Audia
2000; Gompers, Lerner and Scharfstein 2005), and helps explain why some regions have
persistently higher rates of firm formation than others. Fully understanding the impact of
existing organizations on the entrepreneurial process therefore requires a consideration of
their impact on work experiences, and how these experiences shape the decision to
become an entrepreneur.

These results have important policy implications as well. Planners interested in
promoting entrepreneurial activity often focus on initiatives designed to improve the
entrepreneurial infrastructure and facilitate access to necessary resources in an industry or
region. Such policies focus on removing obstacles to entrepreneurship, on the (perhaps
implicit) assumption that there is a supply of entrepreneurs ready to take advantage of
entrepreneurial opportunities once the barriers to doing so have been removed. Yet the
impact of firm size and age on individual rates of entrepreneurship suggests that such
policies may be less likely to succeed in precisely those settings where they may be most
likely to be tried. Policy makers often attempt to encourage entrepreneurship in
economically stagnant regions or industries dominated by large but declining firms. But
in these settings, the average employee is more likely to work for a bureaucratic firm and
thus less likely to take the initiative to launch a new venture. Moreover, the importance
of small, young firms as incubators of new ventures highlights to the importance of
considering the indirect effects of policies not directly related to entrepreneurship, such
as policies that directly or indirectly support and sustain large, established firms. Not only may such policies saddle new ventures with a competitive disadvantage (and thereby discourage entry), they may also indirectly limit the supply of individuals considering entrepreneurship as a viable career option.
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Gibbons, R., and L. F. Katz

Gompers, P., J. Lerner, and D.S. Scharfstein

Gromb, D. and D.S. Scharfstein

Halaby, C.N.

Halaby, C.N.

Hancock, M., and T. Bager

Hannan, M. T.

Hannan, M. T., and J. Freeman

Hellman, T.
Henderson, R. M., and K. B. Clark

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OECD  

Parker, S. C.  


Raftery, A. E.  

Romanelli, E.  

Romanelli, E., and C.B. Schoonhoven


Stinchcombe, A.L.

Thornton, P.H.

Tuma, N. B., and M. T. Hannan

Venkatraman, S.

Wagner, J.

Weber, M.

Whyte, W.

Zhao, H. and S.E. Seibert
<table>
<thead>
<tr>
<th>Covariate</th>
<th>1-9</th>
<th>10-49</th>
<th>50-99</th>
<th>100+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>0.390</td>
<td>0.327</td>
<td>0.337</td>
<td>0.399</td>
</tr>
<tr>
<td>Age</td>
<td>27.361</td>
<td>27.997</td>
<td>28.673</td>
<td>28.915</td>
</tr>
<tr>
<td>Danish</td>
<td>0.977</td>
<td>0.978</td>
<td>0.975</td>
<td>0.974</td>
</tr>
<tr>
<td>Married</td>
<td>0.260</td>
<td>0.281</td>
<td>0.310</td>
<td>0.324</td>
</tr>
<tr>
<td>Children present</td>
<td>0.340</td>
<td>0.352</td>
<td>0.377</td>
<td>0.387</td>
</tr>
<tr>
<td>Log labor force experience</td>
<td>7.810</td>
<td>8.453</td>
<td>8.773</td>
<td>8.803</td>
</tr>
<tr>
<td>Non-Salary Income</td>
<td>10,548.800</td>
<td>9,052.920</td>
<td>8,810.221</td>
<td>8,161.397</td>
</tr>
<tr>
<td>Log Debts</td>
<td>7.651</td>
<td>8.268</td>
<td>8.653</td>
<td>8.715</td>
</tr>
<tr>
<td>Transition to entrepreneurship</td>
<td>0.009</td>
<td>0.007</td>
<td>0.005</td>
<td>0.004</td>
</tr>
<tr>
<td>N of spells</td>
<td>267,067</td>
<td>402,142</td>
<td>148,330</td>
<td>628,663</td>
</tr>
<tr>
<td>Variable</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-----------</td>
<td>-----------</td>
<td>-----------</td>
<td>-----------</td>
</tr>
<tr>
<td>Tenure: 0-1 years</td>
<td>0.440†</td>
<td>0.474†</td>
<td>0.406†</td>
<td>0.413†</td>
</tr>
<tr>
<td></td>
<td>(0.061)</td>
<td>(0.063)</td>
<td>(0.060)</td>
<td>(0.060)</td>
</tr>
<tr>
<td>Tenure: 1-2 years</td>
<td>0.371†</td>
<td>0.401†</td>
<td>0.343†</td>
<td>0.348†</td>
</tr>
<tr>
<td></td>
<td>(0.061)</td>
<td>(0.062)</td>
<td>(0.061)</td>
<td>(0.061)</td>
</tr>
<tr>
<td>Tenure: 2-4 years</td>
<td>0.297†</td>
<td>0.320†</td>
<td>0.281†</td>
<td>0.286†</td>
</tr>
<tr>
<td></td>
<td>(0.065)</td>
<td>(0.066)</td>
<td>(0.065)</td>
<td>(0.065)</td>
</tr>
<tr>
<td>Tenure: 4-6 years</td>
<td>0.194†</td>
<td>0.222†</td>
<td>0.192†</td>
<td>0.197†</td>
</tr>
<tr>
<td></td>
<td>(0.065)</td>
<td>(0.065)</td>
<td>(0.065)</td>
<td>(0.065)</td>
</tr>
<tr>
<td>Female</td>
<td>-0.706†</td>
<td>-0.716†</td>
<td>-0.788†</td>
<td>-0.788†</td>
</tr>
<tr>
<td></td>
<td>(0.030)</td>
<td>(0.031)</td>
<td>(0.031)</td>
<td>(0.031)</td>
</tr>
<tr>
<td>Danish born</td>
<td>-0.592†</td>
<td>-0.611†</td>
<td>-0.515†</td>
<td>-0.513†</td>
</tr>
<tr>
<td></td>
<td>(0.069)</td>
<td>(0.069)</td>
<td>(0.068)</td>
<td>(0.068)</td>
</tr>
<tr>
<td>Age</td>
<td>0.129†</td>
<td>0.125†</td>
<td>0.122†</td>
<td>0.120†</td>
</tr>
<tr>
<td></td>
<td>(0.020)</td>
<td>(0.020)</td>
<td>(0.020)</td>
<td>(0.020)</td>
</tr>
<tr>
<td>Age squared</td>
<td>-0.002†</td>
<td>-0.002†</td>
<td>-0.002†</td>
<td>-0.002†</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>Married</td>
<td>0.088†</td>
<td>0.086†</td>
<td>0.088†</td>
<td>0.089†</td>
</tr>
<tr>
<td></td>
<td>(0.032)</td>
<td>(0.032)</td>
<td>(0.032)</td>
<td>(0.032)</td>
</tr>
<tr>
<td>Children present</td>
<td>-0.053</td>
<td>-0.057</td>
<td>-0.030</td>
<td>-0.029</td>
</tr>
<tr>
<td></td>
<td>(0.031)</td>
<td>(0.031)</td>
<td>(0.031)</td>
<td>(0.031)</td>
</tr>
<tr>
<td>Log labor force experience</td>
<td>0.369†</td>
<td>0.393†</td>
<td>0.363†</td>
<td>0.361†</td>
</tr>
<tr>
<td></td>
<td>(0.038)</td>
<td>(0.038)</td>
<td>(0.038)</td>
<td>(0.038)</td>
</tr>
<tr>
<td>Log salary income</td>
<td>-0.074†</td>
<td>-0.108†</td>
<td>-0.075†</td>
<td>-0.076†</td>
</tr>
<tr>
<td></td>
<td>(0.020)</td>
<td>(0.020)</td>
<td>(0.021)</td>
<td>(0.021)</td>
</tr>
<tr>
<td>Non-salary income</td>
<td>0.297†</td>
<td>0.306†</td>
<td>0.298†</td>
<td>0.300†</td>
</tr>
<tr>
<td></td>
<td>(0.039)</td>
<td>(0.039)</td>
<td>(0.041)</td>
<td>(0.041)</td>
</tr>
<tr>
<td>Log debts</td>
<td>0.028†</td>
<td>0.027†</td>
<td>0.027†</td>
<td>0.027†</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.003)</td>
<td>(0.003)</td>
<td>(0.003)</td>
</tr>
<tr>
<td>Log assets</td>
<td>0.017†</td>
<td>0.016†</td>
<td>0.023†</td>
<td>0.023†</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td>(0.005)</td>
<td>(0.005)</td>
<td>(0.005)</td>
</tr>
<tr>
<td>Parents self-employed before 1990</td>
<td>0.224†</td>
<td>0.252†</td>
<td>0.230†</td>
<td>0.230†</td>
</tr>
<tr>
<td></td>
<td>(0.025)</td>
<td>(0.025)</td>
<td>(0.025)</td>
<td>(0.025)</td>
</tr>
<tr>
<td>Employer N establishments (00)</td>
<td>0.068†</td>
<td>-0.056</td>
<td>0.039†</td>
<td>0.010</td>
</tr>
<tr>
<td></td>
<td>(0.016)</td>
<td>(0.044)</td>
<td>(0.015)</td>
<td>(0.015)</td>
</tr>
<tr>
<td>Employer diversified</td>
<td>0.060</td>
<td>-0.240†</td>
<td>-0.018</td>
<td>-0.052</td>
</tr>
<tr>
<td></td>
<td>(0.063)</td>
<td>(0.072)</td>
<td>(0.058)</td>
<td>(0.058)</td>
</tr>
<tr>
<td>Employer age: 0-2 years</td>
<td>0.122*</td>
<td>0.314†</td>
<td>0.085</td>
<td>0.090</td>
</tr>
<tr>
<td></td>
<td>(0.049)</td>
<td>(0.051)</td>
<td>(0.049)</td>
<td>(0.050)</td>
</tr>
<tr>
<td>Employer age: 3-9 years</td>
<td>0.127†</td>
<td>0.295†</td>
<td>0.089*</td>
<td>0.093†</td>
</tr>
<tr>
<td></td>
<td>(0.035)</td>
<td>(0.035)</td>
<td>(0.035)</td>
<td>(0.035)</td>
</tr>
<tr>
<td>Log employer size</td>
<td>-0.171†</td>
<td>-0.116†</td>
<td>-0.180†</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.008)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log employer size (standardized)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employer industry fixed effects?</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Note: All models include dummy variables for highest educational level achieved, educational major, and broad occupational categories. See text for details. N of person-year spells = 1,232,201. Two-sided t-tests: * p<.05 † p<.01
Table 3: Discrete time event history models of the first transition to entrepreneurship, by type of entrepreneurial transition

<table>
<thead>
<tr>
<th>Variable</th>
<th>Team Entry</th>
<th>Self-Employed</th>
<th>Without Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employer N establishments (00)</td>
<td>0.058†</td>
<td>0.056†</td>
<td>0.022</td>
</tr>
<tr>
<td></td>
<td>(0.022)</td>
<td>(0.021)</td>
<td>(0.021)</td>
</tr>
<tr>
<td>Employer diversified</td>
<td>-0.033</td>
<td>0.066</td>
<td>-0.037</td>
</tr>
<tr>
<td></td>
<td>(0.103)</td>
<td>(0.108)</td>
<td>(0.084)</td>
</tr>
<tr>
<td>Employer age: 0-2 years</td>
<td>0.083</td>
<td>-0.082</td>
<td>0.146*</td>
</tr>
<tr>
<td></td>
<td>(0.084)</td>
<td>(0.111)</td>
<td>(0.071)</td>
</tr>
<tr>
<td>Employer age: 3-9 years</td>
<td>0.131*</td>
<td>0.111</td>
<td>0.047</td>
</tr>
<tr>
<td></td>
<td>(0.058)</td>
<td>(0.073)</td>
<td>(0.052)</td>
</tr>
<tr>
<td>Log employer size</td>
<td>-0.144†</td>
<td>-0.161†</td>
<td>-0.084†</td>
</tr>
<tr>
<td></td>
<td>(0.013)</td>
<td>(0.017)</td>
<td>(0.013)</td>
</tr>
<tr>
<td>Employer industry fixed effects?</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>N of transitions</td>
<td>2,685</td>
<td>1,652</td>
<td>3,664</td>
</tr>
</tbody>
</table>

Note: All models include the full set of control variables estimated in Table 2. N of person-year spells = 1,232,201. Two-sided t-tests: * p<.05 † p<.01
Table 4: Discrete time event history models of the first transition to entrepreneurship, by industry destination relative to prior employer

<table>
<thead>
<tr>
<th>Variable</th>
<th>Same Industry</th>
<th>Different Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employer N establishments (00)</td>
<td>-0.028</td>
<td>0.031*</td>
</tr>
<tr>
<td></td>
<td>(0.037)</td>
<td>(0.015)</td>
</tr>
<tr>
<td>Employer diversified</td>
<td>0.084</td>
<td>-0.047</td>
</tr>
<tr>
<td></td>
<td>(0.134)</td>
<td>(0.063)</td>
</tr>
<tr>
<td>Employer age: 0-2 years</td>
<td>0.106</td>
<td>0.084</td>
</tr>
<tr>
<td></td>
<td>(0.081)</td>
<td>(0.062)</td>
</tr>
<tr>
<td>Employer age: 3-9 years</td>
<td>0.035</td>
<td>0.118†</td>
</tr>
<tr>
<td></td>
<td>(0.061)</td>
<td>(0.042)</td>
</tr>
<tr>
<td>Log employer size</td>
<td>-0.265†</td>
<td>-0.061†</td>
</tr>
<tr>
<td></td>
<td>(0.016)</td>
<td>(0.010)</td>
</tr>
<tr>
<td>Employer industry fixed effects?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>N of transitions</td>
<td>2,317</td>
<td>5,684</td>
</tr>
</tbody>
</table>

Note: All models include the full set of control variables estimated in Table 2. N of person-year spells = 1,232,201. Two-sided t-tests: * p<.05 † p<.01
Table 5: Conditional fixed effects logistic regression estimates of the first transition to entrepreneurship

<table>
<thead>
<tr>
<th>Variable</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td>1.836†</td>
<td>1.832†</td>
<td>1.828†</td>
</tr>
<tr>
<td></td>
<td>(0.037)</td>
<td>(0.037)</td>
<td>(0.037)</td>
</tr>
<tr>
<td>Children present</td>
<td>0.638†</td>
<td>0.630†</td>
<td>0.642†</td>
</tr>
<tr>
<td></td>
<td>(0.023)</td>
<td>(0.023)</td>
<td>(0.023)</td>
</tr>
<tr>
<td>Employer N establishments (00)</td>
<td>-2.822†</td>
<td>-1.688†</td>
<td>-2.441†</td>
</tr>
<tr>
<td></td>
<td>(0.261)</td>
<td>(0.222)</td>
<td>(0.334)</td>
</tr>
<tr>
<td>Employer diversified</td>
<td>0.961†</td>
<td>1.018†</td>
<td>1.131†</td>
</tr>
<tr>
<td></td>
<td>(0.073)</td>
<td>(0.073)</td>
<td>(0.091)</td>
</tr>
<tr>
<td>Employer age at entry: 0-2 years</td>
<td>0.209†</td>
<td>0.133†</td>
<td>0.067*</td>
</tr>
<tr>
<td></td>
<td>(0.025)</td>
<td>(0.026)</td>
<td>(0.032)</td>
</tr>
<tr>
<td>Employer age at entry: 3-9 years</td>
<td>-0.059*</td>
<td>-0.114†</td>
<td>-0.134†</td>
</tr>
<tr>
<td></td>
<td>(0.023)</td>
<td>(0.024)</td>
<td>(0.030)</td>
</tr>
<tr>
<td>Log employer size</td>
<td>-0.381†</td>
<td>-0.450†</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.010)</td>
<td></td>
</tr>
<tr>
<td>Log employer size at entry</td>
<td>-0.502†</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.009)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interaction of parental self-employment with:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employer N establishments (00)</td>
<td></td>
<td>0.178†</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.014)</td>
<td></td>
</tr>
<tr>
<td>Employer diversified</td>
<td></td>
<td>-0.914</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.506)</td>
<td></td>
</tr>
<tr>
<td>Employer age: 0 years</td>
<td></td>
<td>-0.425†</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.150)</td>
<td></td>
</tr>
<tr>
<td>Employer age: 1-2 years</td>
<td></td>
<td>0.380†</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.051)</td>
<td></td>
</tr>
<tr>
<td>Log employer size</td>
<td></td>
<td>0.203†</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.047)</td>
<td></td>
</tr>
</tbody>
</table>

Employer industry fixed effects? Yes Yes Yes

Note: All models include dummy variables for broad occupational category. N of person-year spells = 61,520. Two-sided t-tests: * p<.05 † p<.01
Table 6: Log-linear models of the association between entry into entrepreneurship and size of prior and current employers

<table>
<thead>
<tr>
<th>Model</th>
<th>$G^2$</th>
<th>df</th>
<th>p</th>
<th>BIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. [P][C][E]</td>
<td>53429.12</td>
<td>112</td>
<td>0.00</td>
<td>52885.69</td>
</tr>
<tr>
<td>2. [PC][E]</td>
<td>759.97</td>
<td>63</td>
<td>0.00</td>
<td>454.27</td>
</tr>
<tr>
<td>3. [PC][PE]</td>
<td>500.84</td>
<td>56</td>
<td>0.00</td>
<td>229.13</td>
</tr>
<tr>
<td>4. [PC][CE]</td>
<td>159.50</td>
<td>56</td>
<td>0.00</td>
<td>-112.21</td>
</tr>
<tr>
<td>5. [PC][PE][CE]</td>
<td>53.85</td>
<td>49</td>
<td>0.31</td>
<td>-183.90</td>
</tr>
</tbody>
</table>

P: Size of Prior Employer  
C: Size of Current Employer  
E: Entered Entrepreneurship

Note: N=646,345
Table 7: Tests of the impact of potential exogenous time-varying changes in entrepreneurial propensity

<table>
<thead>
<tr>
<th>Variable</th>
<th>Discrete Time Event History</th>
<th>Conditional Fixed Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Employer N establishments (00)</td>
<td>0.035*</td>
<td>0.039†</td>
</tr>
<tr>
<td></td>
<td>(0.016)</td>
<td>(0.015)</td>
</tr>
<tr>
<td>Employer diversified</td>
<td>-0.004</td>
<td>-0.017</td>
</tr>
<tr>
<td></td>
<td>(0.063)</td>
<td>(0.058)</td>
</tr>
<tr>
<td>Employer age: 0-2 years</td>
<td>0.070</td>
<td>0.091</td>
</tr>
<tr>
<td></td>
<td>(0.054)</td>
<td>(0.049)</td>
</tr>
<tr>
<td>Employer age: 3-9 years</td>
<td>0.068</td>
<td>0.093†</td>
</tr>
<tr>
<td></td>
<td>(0.038)</td>
<td>(0.035)</td>
</tr>
<tr>
<td>Log employer size</td>
<td>-0.121†</td>
<td>-0.117†</td>
</tr>
<tr>
<td></td>
<td>(0.013)</td>
<td>(0.008)</td>
</tr>
<tr>
<td>Log size of prior employer</td>
<td>-0.065†</td>
<td>-0.223†</td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
<td>(0.010)</td>
</tr>
<tr>
<td>Prior * Current employer size</td>
<td>0.003</td>
<td>0.012†</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.004)</td>
</tr>
<tr>
<td>Windfall</td>
<td>0.648†</td>
<td>0.951†</td>
</tr>
<tr>
<td></td>
<td>(0.215)</td>
<td>(0.149)</td>
</tr>
<tr>
<td>Windfall * Log employer size</td>
<td>0.058</td>
<td>-0.120†</td>
</tr>
<tr>
<td></td>
<td>(0.044)</td>
<td>(0.045)</td>
</tr>
<tr>
<td>Windfall * Age 0-2 years</td>
<td>-0.651</td>
<td>-0.675†</td>
</tr>
<tr>
<td></td>
<td>(0.519)</td>
<td>(0.165)</td>
</tr>
<tr>
<td>Windfall * Age 3-9 years</td>
<td>-0.365</td>
<td>0.250</td>
</tr>
<tr>
<td></td>
<td>(0.288)</td>
<td>(0.139)</td>
</tr>
</tbody>
</table>

Employer industry fixed effects?         | Yes                        | Yes                       | Yes    | Yes    |
Figure 1
Entry into entrepreneurship by size of prior employer

Figure 2
Figure 3
Figure 4