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Author(s): Jesper B. Sørensen and Amanda J. Sharkey

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# Entrepreneurship as a Mobility Process

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# Jesper B. Sørensen<sup>a</sup> and Amanda J. Sharkey<sup>b</sup>

### Abstract

We advance a theory of how organizational characteristics, in particular the structure of opportunity within organizations, shape the decision to become an entrepreneur. Established organizations play an important yet understudied role in the entrepreneurial process, because they shape the environment within which individuals may choose to enter self-employment. Yet, despite the fact that sociologists have long recognized that inequality within organizations plays an important role in career attainment and mobility, we lack an understanding of how it shapes the pursuit of entrepreneurial opportunities. We develop a formal model in which entrepreneurial choice is driven by differences in the arrival rate of various types of advancement opportunities. Entrepreneurship then arises as a result of matching processes between workers and employers, as well as the features of opportunity structures in paid employment. Analyses using Danish census data provide support for empirical implications derived from the model.

### **Keywords**

entrepreneurship, organizations, mobility, inequality

Organizations profoundly influence attainment in developed societies. Accordingly, sociologists have devoted considerable attention to understanding when and how employers' characteristics shape job mobility and other career outcomes (e.g., Baron and Bielby 1980; Castilla 2008; Petersen and Saporta 2004). This literature largely focuses on how organizations affect attainment and mobility within and between existing firms, because most people spend the bulk of their careers as employees of established firms, and the majority of job transitions occur between positions in dependent employment. Yet moving from a job in one established firm to another is far from the only route through which individuals seek to get ahead. Voluntary transitions between paid employment and self-employment or entrepreneurship remain remarkably common, particularly when viewed over the life course. Ferber and Waldfogel (1998), for example, estimate that by their mid-30s, fully one-quarter of men and one-fifth of women in the 1979 National Longitudinal Survey of Youth cohort had experienced self-employment. Müller and Arum (2004), using data from the Panel Study of Income Dynamics, put the proportion among U.S. men in their early 50s at 40 percent. By retirement age, a substantial share of the population will have had at least one stint of self-employment in their career histories.

<sup>a</sup>Stanford University <sup>b</sup>University of Chicago

**Corresponding Author:** 

Jesper B. Sørensen, Graduate School of Business, Stanford University, 655 Knight Way, Stanford, CA 94305-5015 E-mail: sorensen@stanford.edu

When do individuals choose entrepreneurship, as opposed to changing jobs, as the way to get ahead? As Müller and Arum (2004:9) note, "involvement in self-employment implies a process whereby individuals actively decide-after considering the perceived relative costs and benefits attached to distinct paths-whether to enter self-employment." For a large share of entrepreneurs, the context within which this decision is reached is a formal organization, and many of the "distinct paths" considered are embedded within organizations. Organizational characteristics should therefore play an important role in shaping entrepreneurial entry decisions (Sørensen and Fassiotto 2011).

In this article, we focus on how the structure of opportunities within a firm, or the shape of the organizational pyramid, influences the choice of entrepreneurship. Hierarchy is one of the defining features of formal organizations, yet organizations vary markedly in both the extent of hierarchical differentiation (the height of the pyramid) and the span of control (the ratio of number of positions between different levels). The implications of such differences for attainment and mobility in paid employment have been explored extensively, but their impact on the decision to become an entrepreneur has not.

How does the shape of the pyramid in an organization affect the decision to become an entrepreneur? At first glance, it is not obvious that it should. In paid employment, the structure of inequality within a firm may induce mobility between firms as a means of attainment; for example, when people lack advancement opportunities with their current employers, they may become dissatisfied and grow increasingly likely to leave such an organization in search of greener pastures. Although inequality may induce mobility, it is not obvious that it should make people more likely to choose entrepreneurship over employment with another established firm. Using a simple theoretical model, however, we show that in the presence of matching processes generating differences in the value of a given worker to different firms, the shape of the pyramid affects the odds that people choose entrepreneurship rather than moving to another employer as a means of advancement. In other words, the structure of inequality can induce an apparent preference for entrepreneurship in individual mobility behavior.

In our model, this preference for entrepreneurship is only apparent; the entrepreneurial choice in our model is driven by differences in the relative availability of different advancement opportunities, not by relative affinities for employment and self-employment. In this way, our theory also speaks to a central puzzle in the study of entrepreneurship, namely the entrepreneurial wage penalty (Åstebro, Chen, and Thompson 2011; Hamilton 2000). We can easily imagine why people would prefer entrepreneurship when we think of entrepreneurial success stories: the software engineer who founded the wildly successful Internet start-up or the salesperson who founded a retail chain. Yet these cases are outliers; for the vast majority of the selfemployed, success is elusive and entrepreneurial activity is short-lived. Using data from the U.S. Survey of Income and Program Participation, Hamilton (2000) shows that although the earnings distribution of the selfemployed has a longer upper tail-reflecting big wins for some-it is clearly shifted to the left. Earnings of the self-employed are substantially lower than those of wage earners overall, but at the very upper end of the distribution this pattern is reversed (Hamilton 2000: Table 1). Moreover, Hamilton's careful analysis suggests that entrepreneurs would be better off, in terms of earnings, if they remained in paid employment. Selection equations for wages in paid employment generate a negative selection coefficient, "implying that the mean wages of employees are less than the expected wages of entrepreneurs had been paid employees" (Hamilton thev 2000:623). Given the entrepreneurial wage penalty, it is not evident why people leave paid employment for entrepreneurship.

Faced with this puzzle, many scholars offer explanations that center around distinguishing characteristics of the entrepreneurial role, such as autonomy, that might make it particularly appealing to some people (Benz and Frey 2008; Halaby 2003; Sørensen 2007b; Xu and Ruef 2004). Hamilton (2000), for example, interprets the wage penalty for self-employment as reflecting its nonpecuniary benefits, such as the value of "being your own boss." In short, the argument is that people who become entrepreneurs are trying to get ahead, but the utility they derive from their occupation is not fully reflected in their earnings (Benz 2009). Similarly, other scholars point to distinctive traits of the people who become entrepreneurs, in particular psychological dispositions, such as their need for achievement (McClelland 1961), overconfidence (Camerer and Lovallo 1999: Moore, Oesch, and Zietsma 2007), or tolerance for risk (Cramer et al. 2002), that might make self-employment seem more attractive to some individuals than it does to others.

Our model provides an alternative explanation for the entrepreneurial wage penalty rooted in a sociological understanding of the mobility process, rather than any nonpecuniary benefits or personality traits uniquely associated with entrepreneurship. Just as movement from one job to another in paid employment is driven by the distribution of available opportunities as well as individual differences in tastes and traits, people may decide to become entrepreneurs when selfemployment becomes the most attractive of the set of available mobility opportunities. In particular, as advancement opportunities in paid employment become less plentiful, and that route of mobility is blocked, people are more likely to turn to entrepreneurship. Considered this way, the decision to become an entrepreneur is linked to the structure of inequality in existing organizations, and variation across opportunity structures influences differences in the rate of entrepreneurship.

In addition to focusing on the impact of variation in opportunity structures, our model specifies how the extent to which an individual's skills and capabilities are firm-specific, rather than more generally valuable, affects the likely destination of workers who leave their current employer. One implication of our model is that firms are more likely to lose the employees they will find hardest to replace (i.e., employees who have high levels of firm-specific skills) to entrepreneurship rather than to their competitors. We show that this risk is heightened for firms with particular types of opportunity structures. Such insights should be of interest to organizational scholars as well as managers concerned with taking steps to mitigate the loss of particularly valued employees.

The overarching aim of this article is to develop theoretical links between organizational inequality and entrepreneurship. Our approach involves developing a formal model from which we analytically derive novel propositions about how the structure of inequality within organizations affects the decision to become an entrepreneur. In constructing our model, we make a number of simplifying assumptions that may strike some as overly stark; the simplification, however, helps to lay bare the proposed mechanisms. Furthermore, we necessarily abstract away from many of the complexities that govern empirically observed patterns of entrepreneurial entry; we do not hope to provide a comprehensive treatment of all possible causes of entrepreneurial entry, and hence do not consider other drivers of entry, such as job loss. Rather, in specifying a theoretical model of how matching processes, along with organizational inequality, matter for entrepreneurial entry, we lay the groundwork for a deeper conceptual understanding of the mechanisms that link attainment processes in paid employment to the decision to pursue entrepreneurial opportunities. We empirically test and find support for our model using individual data from the Danish labor market.

# ENTREPRENEURSHIP, MOBILITY, AND ATTAINMENT

The concept of entrepreneurship is multidimensional and definitionally contentious (Shane 2003; Sørensen and Fassiotto 2011), but our focus is on understanding entrepreneurship as a labor-force status, that is, as a form of labor market activity distinct from paid employment.<sup>1</sup> This conceptualization covers a wide range of economic activity, including founders of new organizations, independent professionals, and independent contractors; for simplicity and rhetorical variety, we use the terms self-employment and entrepreneurship interchangeably.

Theory and research on entrepreneurship generally focus on the entrepreneurial transition as a distinct social process; work in this vein tends to overlook commonalities that exist between the transition to entrepreneurship and other forms of career mobility. We depart from this work by focusing not on how people's preferences for certain types of work drive the choice between entrepreneurship and paid labor, but on how the attainment process shapes the availability of attractive opportunities in paid labor and how the presence or absence of such options then affects the odds of becoming an entrepreneur.

Sociologists have long viewed mobility as driven not only by individual preferences and skills, but also by structural forces that shape the arrival of advancement opportunities—for example, in the form of mobility vacancy chains (Sørensen 1977; White 1970). Observed mobility, in other words, depends not only on an individual's preference ranking of different opportunities, but also on how the opportunities arrive in time at different positions in the social structure. It seems natural then, that entrepreneurial entry would also depend on both the arrival of entrepreneurial opportunities and the arrival of opportunities for advancement in paid employment.

The sociological literature on entrepreneurship, however, focuses largely on sources of variation in the availability and attractiveness of entrepreneurial prospects. For example, the state of technological development (Utterback 1996) or industry evolution (Carroll and Hannan 2000) may provide more entrepreneurial opportunities in some industries than others. Similarly, cultural and institutional factors account for variation across regions in the prevalence of entrepreneurial opportunities (Saxenian 1994).

Such demand-side accounts cannot fully explain individual differences in the likelihood of entrepreneurial entry. Within a given industry and region (e.g., software in Silicon Valley), people vary substantially in their likelihood of entrepreneurial entry. In our view, organizational opportunity structures play an important role in explaining such heterogeneity. Some people work for firms with rich advancement opportunities, whereas others have more limited advancement prospects. Organizational opportunity structures affect entrepreneurial entry rates through their impact on the likelihood of getting ahead through paid employment. As such opportunities decline, self-employment is more likely to be attractive. Features of the organizational attainment process that lead to relative declines in opportunities to get ahead through paid employment should, by this logic, also be associated with increases in the rate of entrepreneurship. This is the focus of our theoretical model: specifying how the structure and process of attainment shape the arrival of opportunities to advance through paid employment, and hence indirectly affect the rate of entrepreneurship.

# MATCHING, ARRIVAL OF ADVANCEMENT OPPORTUNITIES, AND ENTREPRENEURSHIP

Labor markets are arenas for the matching of persons to jobs: workers seek jobs that complement their skills and tastes, and firms seek employees with the appropriate capabilities that fit the local work environment. Matching is important because individual and organizational heterogeneity is substantial and is a key driver of career outcomes, including mobility and wage attainment: "the value of a given worker is likely to vary dramatically across different employers and the disutility of effort associated with work will vary for a typical worker across the firms she might work for" (Lazear and Oyer 2013:492; cf. Sørensen and Sorenson 2007). Jovanovic (1979b:1248) makes this assertion even more starkly: "There are no 'good' workers and 'good' employers, but only good matches."

An important source of variation in individual productivity and, accordingly, perceived value across different firms has to do with the extent to which an individual's skills, knowledge, and characteristics are uniquely suited for a particular employer rather than being broadly transferrable across organizations. Becker (1962) characterized this as the distinction between firm-specific and general human capital. Classic examples of firmspecific human capital include experience with an idiosyncratic production technique or knowledge of the informal "way things are done" at a particular organization. In contrast, general human capital encompasses attributes such as overall intelligence and an individual's work ethic, which many employers would value. Recently, Lazear (2009) proposed a refinement of human capital theory that entails treating all human capital as general, with firms varying in their weighting of different skills. One attractive feature of this modification is that it provides a framework for deriving predictions about skills that a variety of firms might view as individually attractive (i.e., seemingly general skills), but that in combination might be of unique value to only one organization. For example, a firm providing enterprise software that does tax optimization might pay a premium for an employee who has knowledge about seemingly general areas such as programming, tax law, and economics because the combination of such skills is particularly useful at that firm alone.

Human capital theory focuses on skills acquired over time through on-the-job experience and training, but scholars have also noted the significance of workers' fixed or ex ante qualities that may make them particularly valuable at a given firm. For example, an individual might possess an innate aptitude for learning a particular production technique or might have the "right" personality to succeed in a given organizational culture. For the purpose of developing our theoretical model, whether firm-specific abilities and attributes stem from fixed individual characteristics or are learned over time is not critical. Rather, our model centers on the important distinction between individual skills, attributes, and abilities that are productivity-enhancing at one organization and are of value at other organizations as well, compared to those that lose all productive value when the employeremployee relationship ends. For ease of exposition, we use the term "firm-specific capabilities" in our model to refer to all of a worker's skills, attributes, and abilities that are specific to a particular employer-employee relationship, regardless of whether they are learned or stem from fixed worker characteristics.

What are the implications of firm-specific capabilities for the likelihood that someone will choose entrepreneurship as a means of getting ahead rather than moving to a new employer? To answer this question, we first emphasize a key difference between employment opportunities.<sup>2</sup> Arrival of an employment opportunity depends on an employer's actions and perceptions; a job offer is forthcoming only if an employer has a sufficiently positive assessment of a candidate. By contrast, the notion of striking out on one's own and creating something from scratch generally springs from individual (or collective [Ruef 2010]) imaginations.<sup>3</sup>

In this way, we can view entrepreneurial opportunities as arising through two means: the social and economic processes that generate opportunities with different economic value, and the social and psychological processes that lead people to perceive and value entrepreneurial opportunities differently. Importantly, both of these avenues can be viewed as operating independent of firm-specific capabilities for a given level of attainment. Although structural and individual factors may lead to differences in the perception of entrepreneurial opportunities among employed individuals at the same level of attainment, we assume these differences are not systematically related to the quality of the match with the current employer. This is consistent with our definition of firm-specific capabilities; the productive value of such capabilities vanishes upon turnover, whether to another firm or to entrepreneurship.<sup>4</sup>

Consider two individuals at the same attainment level, who differ only in the extent to which they possess firm-specific capabilities. Because the perception of entrepreneurial opportunities is independent of firm-specific capabilities, the likelihood of perceiving an entrepreneurial opportunity superior to the current job is the same for both individuals. However, the employee whose attainment depends more heavily on firm-specific capabilities is less likely to receive external employment offers better than the current job, because, by definition, the person's firm-specific capabilities will not be valued by other firms. Put differently, over a given time interval, the individual with more firm-specific capabilities perceives the same number of attractive entrepreneurial opportunities, but receives fewer attractive external employment offers. This implies, on the one hand, that people better matched to their employers are less likely to leave their current jobs (Jovanovic 1979a). However, it also implies that if more wellmatched individuals do leave their current jobs, they are more likely to become entrepreneurs than to leave for another firm.

*Proposition 1:* Controlling for attainment, the relative rate of entrepreneurship increases with firm-specific capabilities: individuals with greater firm-specific capabilities are more likely to become entrepreneurs than to change employers.

# A SIMPLE MODEL OF INEQUALITY AND ENTREPRENEURIAL ENTRY

We now build upon the insight in Proposition 1 to consider how differences in the way firmspecific capabilities are rewarded internally versus externally might play out across different types of organizational opportunity structures in ways that would lead to between-firm variation in rates of entrepreneurial entry. To gain traction, we develop a simple formal model of entrepreneurial entry that encodes our key intuition that individuals whose attainment is due to having skills and characteristics uniquely valued by their current employers are more likely to leave their current employers to enter entrepreneurship than they are to leave to take another job in paid employment. Our decision to adopt a more formal approach is driven largely by the desire to mathematically validate our key theoretical arguments despite the inherent difficulties in measuring many of the theoretical constructs in which we are most interested (Adner et al. 2009).

Given our interest in how inequality shapes the entrepreneurial process, a key modeling decision we face concerns how to represent inequality. The constraints of theorizing mean we cannot hope to fully capture the multifaceted nature of social inequality. In what follows, we explore the effects of two kinds of variation in inequality across organizational opportunity structures: differences in the maximum possible attainment, or wages, within an opportunity structure, and differences in the ratio of positions at adjacent levels of the hierarchy (e.g., the span of control [Simon 1957]). Both capture important differences among employers in the labor market. In settings with a low maximum wage, individuals' prospects for attainment are dampened compared to their chances in settings where the wage ceiling is higher. Opportunity structures with the same maximum attainment level can also differ in the chances for advancement they provide; for example, it is harder to get ahead in structures with a greater span of control because many people are competing for the same vacancy at the next level (Sørensen 1977).

For analytic purposes, we define an opportunity structure as a hierarchical sequence of positions in the labor market that are connected through vacancy chains. In other words, two positions are in an opportunity structure to the extent the incumbents of one (higher) position are drawn primarily from the incumbents of a second (lower) position, and movement up the hierarchy depends on the arrival of vacancies at higher levels (Sørensen 1977; White 1970). Job ladders within a firm are a prototypical example. These interdependencies may arise through formal promotion polices (as in firm internal labor markets [Doeringer and Piore 1971]), credentialing requirements (Weeden 2002), or informal practices. We conceive of opportunity

structures broadly, but we chiefly have in mind advancement opportunities within organizations, whether or not they are formally codified in internal labor market policies. Organizational policies and practices allocate and price labor, and are therefore one of the main sources of structure in the labor market (Baron and Bielby 1980).

We assume the attainment process is one in which individuals seek to maximize the rewards from work. These rewards may be multidimensional and include both pecuniary and nonpecuniary aspects such as autonomy and expected job security. (For simplicity, we use the terms "rewards" and "wages" interchangeably.) Following sociological models of the labor market, we conceive of rewards in paid employment as positional: they are attached to jobs (Sørensen 1977). As Lazear and Over (2013:499) note, wage dynamics appear "to be largely about finding the right job for the person, rather than finding the right pay for different people doing similar jobs." The attainment process, then, is one in which individuals move through positions with different levels of rewards. Movement into a position in paid employment depends on the existence of a vacancy in that position, and on the individual being selected by the employer as the best candidate for the position. Movement into entrepreneurship requires that an individual perceives an entrepreneurial opportunity and decides to pursue it.

Individuals' rewards in paid employment are driven by their ability to obtain a particular position when a vacancy arises. When a vacancy appears, job offers (whether external offers or internal promotions) in turn depend on the employer's assessment of the candidate's capabilities, which we denote as  $\beta_{ik}$  for person i and employer k. We are agnostic as to what types of individual skills, characteristics, or capabilities employers consider relevant to identifying the preferred candidate for a vacant position. For our model it is only important that all such skills and characteristics fall into one of the two broad classes identified earlier-general capabilities or firm-specific capabilities. We thus conceive of the capabilities on which candidates are evaluated as being additively separable into general and firm-specific components:

$$\beta_{ik} = \alpha_i + \theta_{ik} \tag{1}$$

where  $\alpha_i$  represents the general component of capabilities, and  $\theta_{ik}$  represents the firmspecific component of capabilities, or skills an individual can put to productive use only when matched to a specific firm that values those capabilities. As noted earlier, firm-specific capabilities could stem from either fixed characteristics of an individual (i.e., a good match) or skills acquired or revealed over time as an individual accrues on-the-job experience and the firm gains knowledge of the person's skills. Firm k, the current employer of individual i, will set the individual's wages such that they reflect the firm's assessment of both  $\alpha_i$  and  $\theta_{ik}$ . A different firm, however, would set the value of wage offers to individual *i* based only on assessment of  $\alpha_i$  because by definition  $\theta_{ik}$  does not enhance the individual's productivity at firms other than k. (For clarity of exposition, we develop only the case where individual *i* has firm-specific human capital valued only by firm k and would have no firm-specific capabilities at a different firm. We would obtain similar results, however, as long as the individual has greater firm-specific capabilities with his current employer than with other employers.) In short, this setup codifies the idea that the quality of the match between individuals and opportunity structures plays an important role in the attainment process; for a given level of  $\alpha_i$ , higher values of  $\theta_{ik}$  with an organization imply greater attainment. As firm-specific capabilities are revealed (e.g., through superior productivity) and on-the-job learning occurs, an individual with more firm-specific capabilities will advance through the opportunity structure more rapidly than an otherwise comparable individual with fewer firm-specific capabilities.

With these basics in place, we turn to consider the effects of inequality in opportunity structures for the choice of entrepreneurship. To do so, we must specify how rewards change as workers advance through an opportunity structure, and how the attainment process is shaped by characteristics of the opportunity structure. We first specify how wages evolve over time for an individual *within* an opportunity structure.

We represent wage growth through a vacancy chain model of attainment (Sørensen 1977). In this model, wages evolve over time as a function of the vacancy arrival rate and the difference between a person's current wages and the maximum possible wage the person may hope to achieve in an opportunity structure, given his particular set of skills and capabilities. This describes the commonly observed career trajectory in which wage growth is rapid early on but eventually slows as a person reaches his maximum possible attainment in a given opportunity structure. The model also allows for variation across individuals in the relevant maximum wage toward which their earnings are adjusting, as would be the case, for example, if people were on different job ladders.

For opportunity structure k, we denote the arrival of vacancies in a period as  $\gamma_k$  and the maximum possible wage in the opportunity structure as wmax<sub>k</sub>. (For simplicity, we assume characteristics of opportunity structures are fixed over time.) A person's wage at time t is then given<sup>5</sup> by

$$\mathbf{w}_{ikt} = \mathbf{w}_{ikt-1} + \gamma_k (\beta_{ik} \mathbf{w} \mathbf{m} \mathbf{a} \mathbf{x}_k - \mathbf{w}_{ikt-1}). \quad (2)$$

It follows that the change in wages or rewards in a specified period between time t - 1 and t is

$$\mathbf{w}_{ikt} - \mathbf{w}_{ikt-1} = \gamma_k (\beta_{ik} \mathbf{w} \max_k - \mathbf{w}_{ikt-1}). \quad (3)$$

This simple specification yields important insights about the relationship between inequality in an opportunity structure, matching, and the choice of entrepreneurship. Here, we focus on two aspects of inequality in an opportunity structure: the maximum attainment level and the span of control. Consider first the case of variation across opportunity structures in the maximum attainment level (i.e., the wage ceiling), and assume the maximum wage is greater in structure k than in structure *l*, or wmax<sub>k</sub> > wmax<sub>l</sub>. Hold the vacancy arrival rate y constant. Now compare two individuals i and j, employed in k and l, respectively, with the same attainment level in a particular period. Given these assumptions and the equality constraint, it follows from Equation 3 that individual *j* is viewed as more desirable by her employer than individual *i* is by his, or  $\beta_{ik} < \beta_{il}$ . This reflects the fact that the wage ceiling affects returns to capabilities: the same skill is rewarded more highly in a firm with a greater wage ceiling. Increasing one's wage is more difficult in a firm with a low wage ceiling; workers who do will generally have greater skills and capabilities.

What are the implications for rates of entrepreneurship? The implications hinge on the source of the differences in capabilities. If the source can be traced to differences in general capabilities  $(\alpha)$  as opposed to firm-specific capabilities ( $\theta$ ), then there is no reason to expect differences between the two organizations in rates of entrepreneurship. But differences in ß in our scenario should not generally be due to differences in  $\alpha$ . If external labor markets are competitive, an employee with superior general capabilities at a low-wageceiling firm will receive external offers based on those capabilities, and will therefore have an opportunity to leave the firm. This sorting process means  $\alpha_i = \alpha_i$ . As a consequence, average match quality will be higher in the opportunity structure with the lower wage ceiling:  $\theta_{ik} < \theta_{il}$ . In keeping with Proposition 1, this implies the following:

*Proposition 2:* Controlling for attainment, a lower wage ceiling in an opportunity structure increases the odds of choosing entrepreneurship rather than changing employers.

An intuitive way to understand Proposition 2 is that when the wage structure is relatively compressed, being well matched to the opportunity structure is a double-edged sword. On the one hand, firm-specific capabilities lead to more rapid advancement, as the employee is more likely to be selected for promotion opportunities that arise. On the other hand, this advancement is not very well rewarded. Compared to a colleague who has advanced to the same level without the benefit of firm-specific capabilities, the employee with firm-specific capabilities is more likely to be stuck with the current employer, whereas the colleague is more likely to receive external employment offers. Perceived entrepreneurial opportunities then become a greater share of the attractive advancement opportunities for the well-matched employee.

Now consider effects of variation in the span of control, which enters our model indirectly through the vacancy arrival rate,  $\gamma_k$ , for a given opportunity structure. In general, exogenous events like illness or retirement create vacancies at higher levels in the opportunity structure, and hence advancement opportunities. Such events do not depend on characteristics of the opportunity structure. However, the effect of a retirement at a higher level on an individual's promotion chances depends on how many people in the firm are competing for each vacancy. It depends, in other words, on the span of control, or ratio of positions between adjacent levels in the hierarchy (Sørensen 1977). Individuals in a system with a large span of control are exposed to proportionately fewer opportunities for advancement than individuals in a system with a small span.

To determine how this might affect rates of entrepreneurship, consider two opportunity structures with the same wage ceilings  $(wmax_k = wmax_l)$  but different spans of control, with structure k again more unequal than structure l. In other words, more people report to the same boss in k than in l. With a greater span of control, employees at a given level in k have fewer opportunities to get ahead, so  $\gamma_k$  $< \gamma_1$  (Sørensen 1977). Again, compare two individuals with the same attainment in a given period. It follows from these assumptions and Equation 3 that  $\beta_{ik} > \beta_{il}$ . This is intuitively sensible. In firms with a greater span of control, there is more competition for each vacancy that arises. The person in the system with a greater span of control is thus likely

more skilled than the person in the system with a smaller span. As before, these differences will be due, in general, to differences in firm-specific capabilities ( $\theta$ ) because sorting processes should eliminate any differences in general capabilities ( $\alpha$ ).<sup>6</sup>

*Proposition 3:* Controlling for attainment, a greater span of control in an opportunity structure increases the odds of choosing entrepreneurship rather than changing employers.

# EMPIRICAL SETTING AND DATA

Our theory involves predictions about the relationship between structural characteristics of opportunity structures within organizations and entrepreneurship. This makes it difficult to provide empirical tests of our propositions. On the one hand, the ideal dataset has information on individual career histories, such that we could track transitions from paid employment to entrepreneurship. Given the low transition rate to entrepreneurship, large sample sizes are required to produce reliable statistical estimates. In addition, we also wish to measure important sources of individual heterogeneity. In short, studies of entrepreneurial career transitions require breadth. At the same time, identifying opportunity structures within and between firms is quite difficult in large samples (Spilerman 1977) and is often a daunting task even in single-firm studies (Althauser and Kalleberg 1990). Sociologists generally approach this by trading breadth for depth: studies with a detailed understanding of the opportunity structure faced by workers in a firm are typically studies of a single firm (e.g., Castilla 2008). Detailed organizational data could be used to measure wage ceilings and spans of control, but doing so in the kind of large sample needed to model entrepreneurial transitions presents an insurmountable challenge. We are aware of no existing dataset that captures this detailed level of information for a large sample.

We resolve the tension between depth and breadth in favor of breadth. In other words, we

accept having to rely on indirect measures of the opportunity structures in firms in order to have a broad sample of firms and workers, along with richer data on individual characteristics. This tradeoff allows us to be more confident that any observed associations between characteristics of firms and rates of entrepreneurship are not idiosyncratic to a small set of firms, and it allows us to control for important sources of individual differences in the propensity to enter entrepreneurship.

Data analyzed in this article come from the Integrated Database for Labor Market Research (IDA), maintained by Statistics Denmark (2012). This is a large matched employer-employee dataset that allows us to examine the relationship between firm characteristics and entrepreneurial entry in a large-scale sample. IDA contains registerbased data on the labor force in Denmark, beginning in 1980, and constitutes an annual (register-based) census of the Danish population. Labor market data in IDA include information on hourly wages, annual income, employer and work establishment, and broad (seven category) occupation.

Our decision to analyze data from Denmark may raise questions about the extent to which our findings generalize to other contexts, such as the United States, or whether any observed associations are idiosyncratic to the institutional and cultural features of the Danish economy. Such concerns can ultimately only be addressed through further, comparative study. However, our examination of relevant features of entrepreneurship and labor market policies does not lead us to suspect our results are unique to the Danish context. In terms of the labor market, most casual observers correctly associate Denmark with high levels of social protection for workers, which may lead to concerns that the dynamics of labor mobility are fundamentally different. However, the specific features of Danish labor market policies (in particular the lack of employment guarantees) mean that rates of turnover and mobility between firms are comparable to the United States (Bingley and Westergård-Nielsen 2003; Organization for Economic Cooperation and Development

1997). Furthermore, with respect to entrepreneurial activity, the Danish private equity markets (e.g., venture capital) are underdeveloped in comparison to the United States (Hancock and Bager 2001). This likely shifts the distribution of entrepreneurial activity by lowering the founding rate of high-growth, riskoriented ventures. Nonetheless, there are few formal barriers to entry into entrepreneurship in the form of licensing demands or other bureaucratic requirements. Blanchflower (2000) shows that self-employment rates (as a proportion of nonagricultural employment in Denmark [7.2 percent in 1996]) are quite similar to those in the United States (6.8 percent) and Germany (8.3 percent), and somewhat lower than in the United Kingdom (11.3 percent). Danish entrepreneurs most commonly opened businesses in the following industries: wholesale/retail trade, hotels and restaurants (40.3 percent of all nonagricultural selfemployed individuals in 1996), financial intermediation and professional activities (22.3 percent), and public and personal services (13.7 percent). Differences in the industrial classification systems of Denmark and the United States make a direct comparison of the distribution of entrepreneurs across industries in the two nations difficult; however, our examination of data from both countries does not suggest dramatic differences.

One distinctive feature of the Danish context is that the level of social protection (in particular the relatively generous unemployment benefits) means that entry into entrepreneurship is generally voluntary, rather than driven by necessity (Hancock and Bager 2001). As we will demonstrate, this means that-unlike in the United States (Elfenbein, Hamilton, and Zenger 2010)-one does not see higher levels of entrepreneurship among workers in the lower tail of the wage distribution; these workers appear more likely to choose unemployment over entrepreneurship if they are poorly matched.<sup>7</sup> In our view, this is an advantage of the Danish context, as it implies that decisions to enter selfemployment are more likely to be opportunity driven; opportunity-driven entry is the focus of our theory.

Variable	Mean	Std. Dev.	Minimum	Maximum
Vocational	.499	.499	.000	1.000
Academic	.053	.224	.000	1.000
University	.134	.340	.000	1.000
Female	.348	.476	.000	1.000
Danish	.976	.155	.000	1.000
Age	28.437	6.332	17.000	45.000
Married	.307	.461	.000	1.000
Kids	.372	.483	.000	1.000
Labor force experience (log)	2.084	.546	069	2.803
Log debts	8.859	4.421	.000	17.554
Log assets	9.561	2.990	.000	17.664
Parent self-employed	.261	.439	.000	1.000
Firm mobility	.210	.407	.000	1.000
Entrepreneurial entry	.006	.705	.000	1.000
Log firm tenure	.258	.880	693	1.871
Log wage	4.732	.405	1.074	8.606
Log firm size	4.576	2.293	.000	10.971
Log maximum wage	5.858	.746	1.341	8.640
Gini	.163	.612	003	.924

**Table 1**. Descriptive Statistics for Variables Used in Analyses; N = 1,028,290

These data constitute an annual panel, with labor market variables updated as of the 48th week of each calendar year. In addition to labor market outcomes, IDA contains standard demographic information, including information on age, sex, marital status, childbearing, and education. The longitudinal nature of IDA allows one to construct career histories for individuals, although the data are left-censored in 1980. Data analyzed here are based on an extract from IDA spanning the years 1980 to 1997 and covering the entire population who were between 15 and 70 years in 1994. This extract was created for a larger research project on the dynamics of entrepreneurship.

We coded individuals as entering entrepreneurship if one of two conditions were met: (1) their occupation code, as recorded by Statistics Denmark, changed to self-employed (with or without employees), or (2) they changed jobs to join a newly founded firm with three or fewer employees (or, if larger, their occupation code indicated they were directors or top managers). We coded individuals as having changed employers if the employer code changed from one year to the next (excluding changes in ownership). All other transitions (e.g., to unemployment or schooling) are censored. Table 1 presents descriptive statistics on the data used in our analyses.

## RESULTS

### Tests of Proposition 1

Proposition 1 predicts that higher levels of firm-specific capabilities are associated with a greater likelihood of choosing entrepreneurship as opposed to switching jobs. Testing this claim directly proves challenging due to the difficulty of measuring firm-specific capabilities. These challenges are widely acknowledged in the literature. Prendergast (1993: 523), for example, notes that "firm-specific human capital . . . is difficult to quantify." More recently, Nagypal (2007:538) wrote, "data on expected match-specific quality or productivity are essentially non-existent." Rather than allowing these challenges to prevent us from testing our theoretical arguments, we provide two forms of supporting evidence that are consistent with our theory.

First, we provide a simple mathematical proof of Proposition 1 in the online supplement. In addition, we derive two implications of Proposition 1 that are unique predictions of our matching argument and are amenable to empirical testing by using tenure as a proxy for firm-specific capabilities.

There are at least three established drivers of the known positive relationship between tenure and firm-specific skills, and the practice of using tenure as a proxy for firmspecific capabilities is widely accepted in the literature (see, e.g., Altonji and Williams 2005; Farber 1994; Stevens 2003; Topel 1991). First, on-the-job learning through either experience or formal training should cause firm-specific skills to increase over time, which is rewarded via wage increases (Dustmann and Meghir 2005; Veum 1995). Second, although some workers may possess fixed characteristics (e.g., a particular personality type) that make them a good match for a firm ex ante, such traits are typically difficult to evaluate prior to the point of hire. The presence of these traits gradually becomes apparent, however, through higher productivity in a job. As such, the wages of well-matched workers tend to increase over time as the evidence accumulates that a person is a good fit. Moreover, there may be an interactive effect in that individuals who have the disposition to learn the skills required at a particular firm (i.e., workers who are good matches ex ante) have faster rates of on-the-job human capital accumulation than do others. Third, the differentially lower turnover rate of wellmatched employees relative to poor matches implies that the average level of match quality among individuals in a given cohort increases with tenure (Jovanovic 1979a). In short, there are ample reasons why tenure is often used as a suitable proxy for firm-specific capabilities.

By contrast, we expect that the rate at which people identify attractive entrepreneurial opportunities should be independent of how well matched people are for their current employers, controlling for wage. Thus, the likelihood of perceiving an attractive entrepreneurial opportunity should not vary by tenure cohort.<sup>8</sup> This implies that as tenure increases, entrepreneurial transitions should constitute an increasing proportion of all transitions to destinations outside the current firm.

We test this implication in Table 2, which presents estimates from a competing risks model of two transitions: to paid employment with a new employer and to entrepreneurship. (These data do not allow us to identify withinfirm mobility events.) All other transitions are treated as censored. For this analysis, we constructed complete histories of attachment to an employer (up to the point of censoring in 1997) by selecting all individuals who were newly hired in 1990 by an established employer and were between the ages of 16 and 40 years in 1990. We eliminated individuals with self-employment experience between 1980 and 1989, as the dynamics of serial entrepreneurship may be different. People working in the primary sector (i.e., agriculture) and industries dominated by the public sector are excluded from the sample.

The estimated effects of log tenure are presented in the first and second columns of Table 2. As we predicted, the transition rate to entrepreneurship declines less rapidly with tenure than does the rate of movement to other firms. The difference between these estimates is statistically significant well beyond conventional levels ( $\chi^2 = 86.65$ , 1 d.f.). As a consequence, as tenure increases, the conditional odds of entering entrepreneurship as opposed to moving to another firm go up. This result holds true net of a host of variables that may be correlated with tenure and with the decision to enter entrepreneurship, including measures of current wages, assets and debts, and labor force experience. This finding is novel in the literature. Research has shown that individuals become less likely to enter self-employment the longer they are with their current employer (Elfenbein et al. 2010; Evans and Leighton 1989; Sørensen 2007a), but the differential impact of tenure on entrepreneurial entry relative to moving to a new firm has not previously been established. Given the

	Transition to		Transition to		Transition to	
	New Job	Entrep.	New Job	Entrep.	New Job	Entrep.
Vocational	.008	055	.008	060	.008	054
	(.008)	(.036)	(.008)	(.036)	(.008)	(.036)
Academic	.214*	.232*	.217*	.232*	.214*	.231*
	(.016)	(.060)	(.016)	(.036)	(.016)	(.060)
University	080*	208*	073*	211*	081*	207*
2	(.013)	(.058)	(.013)	(.036)	(.014)	(.041)
Female	.071*	672*	.072*	663*	.072*	662*
	(.008)	(.036)	(.008)	(.036)	(.008)	(.036)
Danish	044**	580*	045**	580*	044**	581*
	(.021)	(.076)	(.021)	(.036)	(.021)	(.036)
Age	.059*	.085*	.057*	.094*	.057*	.094*
0	(.005)	(.025)	(.005)	(.036)	(.006)	(.037)
Age squared	001*	001*	001*	002*	001*	002*
0	(.000)	(.000)	(.000)	(.036)	(.000)	(.036)
Married	084*	.030	084*	.028	083*	.029
	(.007)	(.035)	(.007)	(.036)	(.007)	(.036)
Children present	.000	047	001	048	001	048
I	(.007)	(.035)	(.007)	(.036)	(.007)	(.036)
Labor force experience	172*	.413*	167*	.407*	168*	.409*
1	(.008)	(.049)	(.008)	(.036)	(.008)	(.037)
Log debts	.008*	.023*	.008*	.023*	.008*	.023*
	(.001)	(.004)	(.001)	(.036)	(.001)	(.036)
Log assets	053*	.014**	053*	.013**	053*	.013**
	(.001)	(.005)	(.001)	(.036)	(.001)	(.036)
Parent self-employed	049*	.250*	050*	.249*	050*	.248*
	(.006)	(.029)	(.006)	(.036)	(.006)	(.037)
Log firm tenure	347*	093*	344*	094*	567*	130
208 (0	(.007)	(.016)	(.007)	(.036)	(.054)	(.131)
Log wage	.234*	.597*	.253*	.665*	.250*	.751*
208 11280	(.014)	(.052)	(.015)	(.036)	(.015)	(.052)
Log firm size	068*	146*	034*	104*	034*	115*
208 0.20	(.004)	(.009)	(.008)	(.036)	(.008)	(.015)
Log maximum wage	(1001)	()	126 <b>*</b>	267*	131*	299*
Log maximum wage			(.023)	(.036)	(.023)	(.052)
Gini			086	2.131*	051	2.023*
			(.089)	(.036)	(.090)	(.256)
Log maximum wage x Log			()	()	.036*	013
tenure					(.010)	(.023)

Table 2. Discrete-Time Competing Risks Models of Employee Turnover

Note: All models include industry fixed effects. Standard errors clustered by employer. N = 1,028,290. \*p < .01 (two-sided *t*-tests).

well-known relationship between tenure and match quality, this result is consistent with Proposition 1: the set of attractive external offers becomes more entrepreneurial as firmspecific capabilities increase. The congruence between our empirical results and Proposition 1 lends credence to our theory about the role of matching in the transition to entrepreneurship. The effects of tenure should be interpreted with caution,



**Figure 1.** Log Wages in Danish Kroner of Workers in Paid Employment, by Whether They Entered Entrepreneurship the Subsequent Year (N = 1,189,632)

however, because omitted variables may spuriously generate negative tenure dependence. The set of plausible confounds is greatly reduced in our case by the fact that any such omitted variable would not only have to affect turnover propensities, but also do so differentially for movement between firms versus transitions to entrepreneurship. Although factors such as non-compete clauses (Marx 2011) or contingent benefits would lower the rate of movement to other firms, they should have a similar impact on the transition to entrepreneurship, and therefore cannot account for the differential pattern we observe.

Nonetheless, other unobserved variables might account for the pattern of tenure dependence in Table 2. One might imagine, for example, that an individual's taste for autonomy might make him less likely to find another job attractive yet more likely to become an entrepreneur (Xu and Ruef 2004). This prediction is somewhat inconsistent with the negative effect of tenure on entrepreneurial entry in Table 2, but we nonetheless provide additional support for the matching interpretation by focusing on an individual's earnings prior to entering entrepreneurship.

The logic of these analyses is as follows: A straightforward implication of our model is that if we hold constant the general component of capabilities, then individuals who are better matched to their employer will have higher earnings (assuming that firm-specific capabilities are rewarded, on average, through wages as opposed to nonpecuniary benefits). If individuals with greater firm-specific capabilities are also more likely to become entrepreneurs, then it follows that they should have higher wages (controlling for observable characteristics) prior to entry into entrepreneurship.

We present two kinds of evidence. First, consider Figure 1. Using data on all workers age 25 to 50 years in the Danish labor force in 1989, Figure 1 graphs the log hourly wages for two subpopulations: individuals who entered self-employment in the following year, and those who did not. The solid line represents individuals who did not become entrepreneurs in 1990; the dashed line represents those who did. Figure 1 reveals a clear pattern-workers who will soon be entrepreneurs have higher current wages in paid employment than do those who will not, with a higher median and a longer upper tail of the distribution.<sup>9</sup> The quantile regressions in Table 3 further confirm the impression from Figure 1 and demonstrate that these differences are not simply due to differences in observable individual characteristics. These models show that future entrepreneurs are disproportionately drawn from the upper part of the wage distribution, with no significant difference between groups at the 25th percentile. Controlling for a variety of demographic

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	Mean	25th Percentile	75th Percentile
Entered entrepreneurship in subsequent year	.069* (.004)	.003 (.005)	.068* (.006)

**Table 3.** Regression Estimates of the Effect of Subsequent Entrepreneurial Entry on CurrentLog Wages

Note: All models include the following variables: age, sex, marital status, presence of children, occupation, firm tenure, log debts, log assets, Danish born, and education. Regression of the mean estimated using OLS, including employer fixed effects. Quantile regressions include log firm size. N = 1,189,632.

\*p < .01 (two-sided *t*-tests).

and labor market characteristics, future entrepreneurs earn significantly higher mean wages. Because this effect holds net of the positive effect of tenure (not reported here), we interpret the positive effect of being a future entrepreneur as stemming from fixed individual characteristics that make for a good match and are rewarded via higher wages.

An objection to this interpretation is that the residual from our wage equation is composed not only of a potential effect of firmspecific capabilities ( $\theta$ ) but also of any unobserved individual abilities. Results in Figure 1 may therefore reflect a process through which individuals who are generally more able (irrespective of employer characteristics), and hence are more highly paid, become entrepreneurs, perhaps to fully capitalize on their skills. Other scholars have documented a similar pattern of higher entrepreneurial entry rates among "stars" in populations of analysts at investment banks (Groysberg, Nanda, and Prats 2009), scientists and engineers (Elfenbein et al. 2010), and individuals in Korea (Åstebro et al. 2011), and interpreted the pattern as evidence of greater ability among entrepreneurs. To address this concern, we adopt a fixed-effects framework in which we purge the wage equation of any fixed individual unobservable characteristics. For any given attachment to an employer, individual fixed effects would absorb the effect of match quality, creating an identification problem; however, we exploit the fact that we observe movement between employers in the data, and the fact that some employer attachments end with transitions to entrepreneurship (but most do not). Thus, our data allow us to examine whether wages are higher for the same individual during spells of employment that ended in entrepreneurship versus those that ended in turnover to another firm.

Table 4 shows results of this exercise, using the same panel data as in our transitionrate models, but focusing on wages over time as the outcome variable. Our hypothesis is that an individual who transitions to entrepreneurship has greater firm-specific capabilities with her employer immediately prior to entry, as compared to the same individual during a spell of employment with another organization that did not end in a transition to entrepreneurship. This should manifest in higher wage growth while working for that employer. We therefore model wage growth, and include a dummy variable for whether the employment spell ended with a transition to entrepreneurship. The first column of Table 4 demonstrates that the main effect of this dummy variable is not significant. However, we should expect benefits of firm-specific capabilities to manifest over time; an employer is less likely to reward match quality initially (March and March 1978), and an individual is likely to develop firm-specific capabilities through on-the-job learning. In the second column of Table 4, we see this is indeed the case: we find a positive interaction effect between future entrepreneurship and tenure with the employer. We interpret the effects of tenure and the interaction of tenure and being a future entrepreneur as reflecting rewards for different types of firm-specific capabilities. The positive main effect of

	(1)	(2)
Lag log wage	.572*	.572*
	(.001)	(.001)
Log firm size	.009*	.009*
	(.000)	(.000)
Labor force experience (at entry)	.064*	.064*
	(.001)	(.001)
Labor force experience squared	002*	002*
	(.000)	(.000)
Log tenure	.039*	.039*
	(.000)	(.000)
Left this employer for entrepreneurship	.012	003
	(.007)	(.008)
Log tenure x Left this employer for entrepreneurship		.022*
		(.005)

**Table 4.** Individual Fixed-Effects Regression Estimates of Departure for Entrepreneurship onLog Wages

*Note:* Models include fixed effects for individuals and occupational categories. N = 688,102. \*p < .01 (two-sided *t*-tests).

tenure indicates the existence of rewards for firm-specific capabilities acquired on the job. It may also be a function of the fact that individuals who were poor matches from the start tend to exit at higher rates, resulting in longer tenure for good matches. The interaction effect suggests that the effect of being well matched ex ante (i.e., being a future entrepreneur) gets stronger over time, most likely due to such individuals' ability to learn on the job faster than others. Given the fixed-effects framework, this is a strong result in support of the firm-specific capabilities argument, because the fixed effects rule out stable individual traits such as a taste for autonomy. As with any fixed-effects model, the possibility remains that the pattern in Table 4 is due to some time-varying omitted variable. However, existing theories of entrepreneurship do not suggest any obvious candidates for what that omitted variable should be. Overall, this result is consistent with our proposition concerning the relationship between firm-specific capabilities and entrepreneurship.

In summary, we have presented three pieces of evidence in support of Proposition 1: (1) the positive relationship between firm tenure and

the odds of choosing entrepreneurship as a form of mobility (Table 2); (2) cross-sectional evidence of higher wages of future entrepreneurs prior to entry, net of observable characteristics (Figure 1 and Table 3); and (3) higher withinperson wage growth with the employer a future entrepreneur works for immediately prior to entry, compared to wage growth with prior employers (Table 4). Each result in isolation is subject to alternative interpretations, but the consistent pattern across all three analyses suggests strong support for the proposition that matching influences the choice of entrepreneurship. These results suggest an unanticipated consequence of finding a "good job." While finding an employer who rewards you more than other firms is generally considered a good thing, it appears to have the consequence of changing the appeal of entrepreneurship relative to paid employment, because it is associated with fewer opportunities to get ahead in paid employment at firms other than one's current employer. To the extent that the appeal of an entrepreneurial opportunity is based on an overestimation of its true value, the presence of firmspecific capabilities may lead people to pursue opportunities that result in a drop in income.



Figure 2a. Log Wages by Subsequent Entrepreneurial Entry, White-Collar Workers

### Tests of Propositions 2 and 3

Propositions 2 and 3, which make predictions about how an organization's maximum level of attainment and span of control affect rates of entrepreneurship, are quite difficult to test empirically. Nonetheless, to buttress our analytically derived propositions, we present two pieces of empirical evidence that, while only suggestive, are consistent with our propositions concerning the effect of inequality on entrepreneurial choice.

Figures 2a and 2b convey in a simple way the intuition that firm-specific capabilities are a particularly important driver of entrepreneurship when workers approach the ceiling of the opportunity structure. We can gain some insight into effects of opportunity structures by distinguishing between people in white versus blue-collar occupations. In many cases, workers in blue-collar occupations can (in principle) advance to white-collar positions; as a result, well-matched blue-collar workers may still have internal promotion opportunities. Whitecollar workers, by contrast, reside toward the top of the organizational hierarchy, so those with good matches are more likely to run out of internal advancement opportunities. We therefore expect stronger evidence of a firm-specific capabilities component to wages for entrepreneurs from white-collar compared to blue-collar occupations. This pattern is clearly apparent in

Figures 2a and 2b. Future entrepreneurs have a substantially higher wage distribution among white-collar workers, but there is virtually no difference between future entrepreneurs and their nonentrepreneurial colleagues among blue-collar workers. (Regression analyses, not shown here, suggest a slightly higher wage among entrepreneurial blue-collar workers and a substantially higher wage among white-collar workers.) While this pattern is open to alternative interpretations—for example, white-collar and blue-collar workers may differ in their career orientations—we find Figure 2 striking and consistent with Proposition 2.

Table 2 provides tests of Propositions 2 and 3.<sup>10</sup> Our measure of the wage ceiling is the log of the maximum wage observed in a firm, which approximates the maximum attainment possible in that firm. It seems reasonable to assume that the maximum possible attainment on any particular job ladder is positively correlated with the maximum attainment observed within a firm overall, but this measure may overstate potential attainment because many job ladders within a firm may not provide a path to the top of the wage hierarchy. However, we are aware of no data that would allow us to reconstruct internal opportunity structures and simultaneously model transitions to entrepreneurship. Similarly, because we know of no data that directly measure the span of control for a large



Figure 2b. Log Wages by Subsequent Entrepreneurial Entry, Blue-Collar Workers

sample of individuals at risk of entering entrepreneurship, we first test Proposition 3 using the Gini coefficient of wages for each firm as a proxy for the degree of inequality, and we assess its effect on individual transitions to entrepreneurship.

Results of this analysis are presented in the second two columns of Table 2. Controlling for individual attainment and firm size, individuals in firms with higher wage ceilings have lower rates of entrepreneurship. As we would expect, a higher wage ceiling is associated with a reduced rate of movement to other employers. However, the effect on entrepreneurship is stronger ( $\chi^2 = 11.7, 1 \text{ d.f.}, p < .00$ ), implying that the wage ceiling has a negative effect on the choice of entrepreneurship relative to external mobility. This is as predicted by Proposition 2. Furthermore, the degree of inequality, as measured by the Gini coefficient, is positively associated with the transition to entrepreneurship but has no significant association with the rate of mobility to other firms. (The difference between the two coefficients is significant  $\chi^2 = 65.8$ , 1 d.f., p < .00.) As the distribution of wages within a firm becomes more unequal for a given wage ceiling (e.g., due to a greater span of control), entrepreneurship becomes the more likely form of mobility, as predicted by Proposition 3.

In the final two columns of Table 2, we present our last test of Proposition 2, which

involves an interaction effect between the wage ceiling and firm tenure. Our matching model implies that average firm-specific capabilities increase more rapidly with tenure in opportunity structures with low wage ceilings than in ones with high wage ceilings; in the former case, individuals whose attainment is due to superior general capabilities are more often drawn to better opportunities elsewhere. The rate of movement to another employer should thus decline more steeply with tenure in firms with lower wage ceilings-a positive interaction effect between the wage ceiling and tenure. Because entrepreneurial offers do not depend on whether a person is well matched to his current employer, however, our model implies that there should be no interaction between the wage ceiling and tenure for transitions to entrepreneurship. This pattern is confirmed in the final two columns of Table 2.

In summary, our empirical evidence suggests that individuals who work for organizations with higher wage ceilings are less likely to choose entrepreneurship as a form of mobility, and individuals in firms with greater internal wage inequality are more likely to do so. These are novel findings; we know of no previous evidence to suggest a connection between the structure of inequality within a firm, the quality of the match between a worker and a firm, and the choice of entrepreneurship as a form of career mobility.<sup>11</sup> In part, this reflects the fact that few studies use large-scale matched employer-employee data to analyze transitions to entrepreneurship. Yet it also reflects the fact that prior theorizing has failed to draw explicit connections between the structure of inequality within firms and the choice of entrepreneurship.

Our evidence is consistent with our theoretical predictions, but data limitations leave the central empirical associations open to alternative interpretations. This is true despite the fact that our data are unusually comprehensive in comparison to other datasets used in the study of careers and inequality. In this sense, our theorizing stretches beyond the available data and creates a number of opportunities for future research. It is perhaps futile to hope that sufficiently detailed data (e.g., comprehensive individual career histories, along with detailed information on organizational opportunity structures) will be available in the near future. Yet our theory is amenable to testing in a variety of ways, including simulation studies, studies of specialized populations, and quantitative case studies of careers and transitions to entrepreneurship within single organizations.

### DISCUSSION

We have presented a theoretical model of how organizations and their opportunity structures interact with individual career attainment processes to shape entrepreneurial entry decisions, and we provided preliminary tests of this model using rich data on the Danish labor market. Our theoretical argument emphasizes two ways in which organizational opportunity structures shape the entrepreneurial entry decision: matching between individuals and firms, and the interaction between matching and the shape of the organizational hierarchy. Each mechanism points to important channels through which established organizations shape the entrepreneurial process.

Our analysis contributes to a nascent body of work showing that matching processes in labor markets play an important role in shaping entrepreneurial propensities (Åstebro et al. 2011). The choice of entrepreneurship is situational and can arise because a "good match" with an opportunity structure leads to a decline in the arrival rate of attractive employment offers, but does not similarly affect the arrival of entrepreneurial offers. Somewhat paradoxically, people are more likely to choose entrepreneurship, as opposed to switching to another job in paid employment, when their options for external job mobility are limited by how well-suited they are for their current employer. An important feature of this type of explanation is that the quality of the match with the current opportunity structure may be invisible to the employee. Indeed, we expect employees typically have difficulty disentangling whether their attainment is due to their general skills and capabilities or to capabilities specific to their relationship with their current employer.

This information problem is consequential, because it provides an alternative explanation for the self-employment wage penalty that does not presume entrepreneurs have a taste for autonomy. Hamilton (2000) infers from the existence of the wage penalty that employees consciously choose to pay a price for autonomy when entering entrepreneurship. This inference is plausible, but it rests on an assumption that individuals have full information about the rewards attached to employment and self-employment, and it does not consider the negative nonpecuniary aspects of self-employment. Moreover, Hamilton offers no positive theory as to why individuals with a taste for autonomy should be paid more prior to entry. In our model, firmspecific capabilities affect the distribution of attractive advancement opportunities in ways that may be opaque to individuals in the attainment process, and thus may lead people to choose entrepreneurship even when they do not have a particular commitment to or interest in the entrepreneurial role. In our view, an important advantage of our model is that we can understand entry without reference to individual variation in psychological dispositions, risk preferences, or job values, and without reference to selected aspects of the role such as its level of autonomy. Instead, entrepreneurial choice, like other forms of career mobility, is a consequence of dynamics of the overall career attainment process.

The importance of firm-specific capabilities also highlights the role of established organizations in the entrepreneurial choice process. Firm-specific capabilities introduce stickiness into the labor market; when workers are well matched with idiosyncratic features of their employers, they are less likely to be mobile and more likely to choose entrepreneurship when they are mobile. In addition, match quality means that employer characteristics have a greater effect on individual careers, and specifically the choice to become an entrepreneur. Our model demonstrates the importance of different facets of organizational inequality in shaping the propensity for entrepreneurship, echoing the central role long attributed to organizations in the stratification process. In particular, our theory and evidence suggest that employees of firms with lower wage ceilings or a greater span of control are more likely to leave for entrepreneurship than to join other firms. Although data limitations make this aspect of our theory difficult to test, our evidence from a wide range of employers is consistent with our hypothesized link between organizational inequality and entrepreneurship. In our view, an important goal for future research should be to develop a deeper understanding of how the structure of inequality within the workplace shapes the decision to pursue entrepreneurial opportunities. Where we have empirically traded depth for breadth, further progress can perhaps be made through in-depth study of a more limited number of organizations. We think a particularly interesting avenue for future work would involve examining employee perceptions of flatter organizational hierarchies. Our finding that a greater span of control leads to higher rates of entrepreneurship is in a sense surprising, given the conventional wisdom that such "flat" structures help with retention of entrepreneurially inclined employees. Data on whether employees perceive flat organizations as appealing due to their lack of hierarchy, or stifling due to the difficulty of advancement, would speak to this issue.

By focusing on the role of organizational opportunity structures, our model addresses important gaps in the literatures on inequality and entrepreneurship. Established employers define the context within which the vast majority of entrepreneurs decide to launch a new venture. Despite this fact, our understanding of how organizational characteristics shape organizational decision-making has only recently begun to take shape (Sørensen and Fassiotto 2011). By focusing on how organizational variation in opportunity structures shapes entrepreneurship, we have laid a foun-

dation for a deeper understanding of the consequences of how employment policies and practices of established organizations influence the creation of new ventures.

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#### Notes

- Other definitions of entrepreneurship emphasize value creation and economic growth (Shane 2003). Because this may not involve a change in labor market status, it is not the focus of our theorizing.
- 2. We simplify by assuming an opportunity's value can be summarized in a single parameter that captures an individual's expectations concerning future wages as well as any other nonpecuniary factors. In the online supplement (http://asr.sagepub.com/ supplemental) we consider the effect of perceptual error in assessments of the two types of offers.
- 3. Venture capitalists, bankers, and other third-party resource providers assess prospective entrepreneurs before supporting them, but many entrepreneurs do not rely on them at founding (Aldrich 1999).
- Employees may leverage capabilities they have learned from their current employer in launching a new venture (Klepper and Sleeper 2005). We consider such capabilities non-firm-specific by definition.
- 5. For simplicity, we describe the wage attainment process in a discrete-time framework; our approach extends naturally to a continuous time formulation, as in Sørensen (1977: eqn. 19).
- The odds of choosing entrepreneurship should also decline with increases in the exogenous vacancy arrival

rate. Future research might consider interesting potential proxies for vacancy arrival rates. For example, because exogenous vacancies are in part due to exits from the labor force, the age structure of a firm or industry may serve as a useful measure for testing Proposition 3.

- Some labor market policies seek to reintegrate the long-term unemployed by assisting them in launching entrepreneurial ventures. We limit our analysis to currently employed individuals, however.
- 8. The estimated relationship between tenure and entrepreneurial entry will only be flat in the absence of unobserved heterogeneity. It is unlikely we have controlled for all relevant factors, so we make a weaker prediction, namely that the entrepreneurship rate should decline less steeply with tenure than will the transition rate to new firms.
- 9. There is some indication in Figure 1 of a higher density of residuals for future entrepreneurs at the bottom of the distribution as well; however, this pattern is not statistically robust. By contrast, Elfenbein and colleagues (2010) found that among science and engineering graduates in the United States, under-performers were also more likely to enter entrepreneurship. This may reflect the fact that unemployment benefits are more generous in Denmark.
- 10. We test Propositions 2 and 3 jointly because the derivation of Proposition 2 assumed the vacancy arrival rate was the same across opportunity structures. Controlling for the degree of inequality holds the vacancy arrival rate constant.
- 11. Carnahan and colleagues (2010) found, in the legal services sector, that employer wage dispersion increases the likelihood of choosing entrepreneurship among high-performing workers, but lowers it for low-performing workers. This work is consistent with our findings, although their focus is on overall performance rather than performance due to firm-specific capabilities.

### References

- Adner, Ron, Laszlo Polos, Michael Ryall, and Olav Sorenson. 2009. "The Case for Formal Theory." Academy of Management Review 34:201–208.
- Aldrich, Howard. 1999. Organizations Evolving. Newbury Park, CA: Sage.
- Althauser, Robert P. and Arne L. Kalleberg. 1990. "Identifying Career Lines and Internal Labor Markets within Firms." Pp. 308–356 in Social Mobility and Social Structure, edited by R. L. Breiger. Cambridge, UK: Cambridge University Press.
- Altonji, Joseph and Nicolas Williams. 2005. "Do Wages Rise with Job Seniority? A Reassessment." Industrial and Labor Relations Review 58:370–97.
- Åstebro, Thomas, Jing Chen, and Peter Thompson. 2011. "Stars and Misfits: Self-Employment and Labor Market Frictions." *Management Science* 57:1999-2017.

- Baron, James N. and William T. Bielby. 1980. "Bringing the Firms Back In." American Sociological Review 45:737-65.
- Becker, Gary S. 1962. "Investment in Human Capital." Journal of Political Economy 70:9-49.
- Benz, Matthias. 2009. "Entrepreneurship as a Non-Profit-Seeking Activity." International Entrepreneurship and Management Journal 5:23–44.
- Benz, Matthias and Bruno S. Frey. 2008. "The Value of Doing What You Like." Journal of Economic Behavior and Organization 68:445–55.
- Bingley, Paul and Niels Westergård-Nielsen. 2003. "Returns to Tenure, Firm-Specific Human Capital and Worker Heterogeneity." *International Journal of Manpower* 24:774–88.
- Blanchflower, David G. 2000. "Self-Employment in OECD Countries." Labour Economics 7:471-505.
- Camerer, Colin and Dan Lovallo. 1999. "Overconfidence and Excess Entry: An Experimental Approach." *American Economic Review* 89:306–318.
- Carnahan, Seth, Rajshree Agarwal, Benjamin Campbell, and April Franco. 2010. "The Effect of Firm Compensation Structures on Employee Mobility and Employee Entrepreneurship of Extreme Performers." U.S. Census Bureau Center for Economic Studies, Paper No. CES-WP-10-06.
- Carroll, Glenn R. and Michael T. Hannan. 2000. The Demography of Organizations and Industries. Princeton, NJ: Princeton University Press.
- Castilla, Emilio. 2008. "Gender, Race and Meritocracy in Organizational Careers." *American Journal of Sociology* 113:1479–1526.
- Cramer, Jan S., Joop Hartog, Nicole Jonker, and Miriam van Praag. 2002. "Low Risk Aversion Encourages the Choice for Entrepreneurship." *Journal of Economic Behavior and Organization* 48:29–36.
- Doeringer, Peter and Michael Piore. 1971. Internal Labor Markets and Manpower Analysis. Lexington, MA: Heath Lexington.
- Dustmann, Christian and Costas Meghir. 2005. "Wages, Experience and Seniority." *Review of Economic Stud*ies 72:77–108.
- Elfenbein, Daniel W., Barton H. Hamilton, and Todd R. Zenger. 2010. "The Small Firm Effect and the Entrepreneurial Spawning of Scientists and Engineers." *Management Science* 56:659–81.
- Evans, David S. and Linda Leighton. 1989. "Some Empirical Aspects of Entrepreneurship." American Economic Review 79:519–35.
- Farber, Henry S. 1994. "The Analysis of Interfirm Mobility." Journal of Labor Economics 12:554–93.
- Ferber, Marianne A. and Jane Waldfogel. 1998. "The Long-Term Consequences of Nontraditional Employment." *Monthly Labor Review* 121(5):3–12.
- Groysberg, Boris, Ashish Nanda, and M. Julia Prats. 2009. "Does Individual Performance Affect Entrepreneurial Ability?" Journal of Financial Transformation 25:95–106.

- Halaby, Charles N. 2003. "Where Job Values Come From." American Sociological Review 68:251–78.
- Hamilton, Barton. 2000. "Does Entrepreneurship Pay? An Empirical Analysis of the Returns to Self-Employment." Journal of Political Economy 108:604–631.
- Hancock, Mick and Torben Bager. 2001. Global Entrepreneurship Monitor: Danish National Report 2001. Odense, Denmark: Odense University Press.
- Jovanovic, Boyan. 1979a. "Job Matching and the Theory of Turnover." Journal of Political Economy 87:972–90.
- Jovanovic, Boyan. 1979b. "Firm-Specific Capital and Turnover." Journal of Political Economy 87:1246–60.
- Klepper, Steven and Sally Sleeper. 2005. "Entry by Spinoffs." Management Science 53:616–31.
- Lazear, Edward P. 2009. "Firm-Specific Human Capital: A Skill-Weights Approach." Journal of Political Economy 117:914–40.
- Lazear, Edward P. and Paul Oyer. 2013. "Personnel Economics." Pp 479–519 in *Handbook of Organizational Economics*, edited by R. Gibbons and J. D. Roberts. Princeton, NJ: Princeton University Press.
- March, James C. and James G. March. 1978. "Performance Sampling in Social Matches." Administrative Science Quarterly 23:434–53.
- Marx, Matt. 2011. "The Firm Strikes Back." American Sociological Review 76:695-712.
- McClelland, David C. 1961. *The Achieving Society*. Princeton, NJ: Nostrand.
- Moore, Don A., John M. Oesch, and Charlene Zietsma. 2007. "What Competition? Myopic Self-Focus in Market-Entry Decisions." Organization Science 18:440–54.
- Müller, Walter and Richard Arum. 2004. "Self-Employment Dynamics in Advanced Economies." Pp. 1–35 in *The Re-Emergence of Self-Employment*, edited by R. Arum and W. Müller. Princeton, NJ: Princeton University Press.
- Nagypal, Eva. 2007. "Learning By Doing vs. Learning about Match Quality: Can We Tell Them Apart?" *Review of Economic Studies* 74:537–66.
- Organization for Economic Cooperation and Development (OECD). 1997. OECD Employment Outlook 1997. Paris: OECD.
- Petersen, Trond and Ishak Saporta. 2004. "The Opportunity Structure for Discrimination." *American Journal* of Sociology 109:852–901.
- Prendergast, Canice. 1993. "The Role of Promotion in Inducing Specific Human Capital Acquisition." *Ouarterly Journal of Economics* 108:523–34.
- Ruef, Martin. 2010. The Entrepreneurial Group: Social Identities, Relations and Collective Action. Princeton, NJ: Princeton University Press.
- Saxenian, AnnaLee 1994. Regional Advantage: Culture and Competition in Silicon Valley and Route 128. Cambridge, MA: Harvard University Press.
- Shane, Scott. 2003. A General Theory of Entrepreneurship: The Individual-Opportunity Nexus. Northampton, MA: Edward Elgar Publishing.
- Simon, Herbert. 1957. "The Compensation of Executives." Sociometry 20:32–35.

- Sørensen, Aage B. 1977. "The Structure of Inequality and the Process of Attainment." *American Sociological Review* 42:965–78.
- Sørensen, Jesper B. 2007a. "Bureaucracy and Entrepreneurship: Workplace Effects on Entrepreneurial Entry." Administrative Science Quarterly 52:387– 412.
- Sørensen, Jesper B. 2007b. "Closure and Exposure: Mechanisms in the Intergenerational Transmission of Self-Employment." *Research in the Sociology of Organizations* 25:83–124.
- Sørensen, Jesper B. and Magali A. Fassiotto. 2011. "Organizations as Fonts of Entrepreneurship." Organization Science 22:1322–31.
- Sørensen, Jesper B. and Olav Sorenson. 2007. "Corporate Demography and Income Inequality." American Sociological Review 72:766–83.
- Spilerman, Seymour. 1977. "Careers, Labor Market Structure and Socioeconomic Achievement." American Journal of Sociology 83:551–93.
- Statistics Denmark. 2012. Integrated Database for Labor Market Research (IDA). Retrieved January 30, 2013 (http://www.dst.dk/declarations/1013).
- Stevens, Margaret. 2003. "Earnings Functions, Specific Human Capital, and Job Matching: Tenure Bias Is Negative." Journal of Labor Economics 21:783–805.
- Topel, Robert. 1991. "Specific Capital, Mobility, and Wages: Wages Rise with Job Seniority." Journal of Political Economy 99:145-76.
- Utterback, James. 1996. Mastering the Dynamics of Innovation. Boston: Harvard Business School Press.
- Veum, Jonathan. 1995. "Sources of Training and Their Impact on Wages." *Industrial and Labor Relations Review* 48:812–26.
- Weeden, Kim A. 2002. "Why Do Some Occupations Pay More Than Others?" *American Journal of Sociology* 108:55–101.
- White, Harrison. 1970. Chains of Opportunity: System Models of Mobility in Organizations. Cambridge, MA: Harvard University Press.
- Xu, Hongwei and Martin Ruef. 2004. "The Myth of the Risk Tolerant Entrepreneur." Strategic Organization 2:331–55.

Jesper B. Sørensen is the Robert A. and Elizabeth R. Jeffe Professor of Organizational Behavior in the Graduate School of Business and (by courtesy) Professor of Sociology at Stanford University. His research focuses on the intersection of organizations, markets, and careers. Sørensen strives for a world with fewer revision memos, and is a co-founder of the journal *Sociological Science*. He received his PhD in Sociology from Stanford University.

Amanda J. Sharkey is an Assistant Professor of Organizations and Strategy at the University of Chicago Booth School of Business and a Visiting Assistant Professor of Organizational Behavior at the Yale School of Management. Her research examines social factors that impact the process of valuation in market settings.