Entrepreneurship as a Mobility Process

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Abstract

Theories of entrepreneurship typically focus on identifying distinctive features of entrepreneurs or the entrepreneurial role, rather than focusing on commonalities between entrepreneurial entry and other forms of career mobility. As a result, the study of entrepreneurship is divorced from mainstream sociological understandings of labor markets and inequality: students of entrepreneurship have a poor understanding of how the structure of the attainment process shapes entrepreneurship, and students of labor market processes have a limited understanding of the drivers of entrepreneurial choice. In this paper, we develop a theoretical framework linking voluntary entrepreneurial entry to structural features of the attainment process, embedding entrepreneurship in the structure of inequality in labor markets. In our model, people become more likely to choose entrepreneurship when the attainment process affects the mix of advancement opportunities available through either paid employment or entrepreneurship. Entrepreneurship is then driven by matching processes between workers and employers, as well as structural features of opportunity structures in paid employment. Analyses using Danish census data provide support for empirical implications derived from the model.
Organizations profoundly influence the process of attainment in modern societies (Baron and Bielby 1980). Accordingly, sociologists have devoted considerable attention to understanding when and how the characteristics of an employer might shape job mobility and other career outcomes within established firms (e.g., Stewman 1988; Barnett, Baron and Stuart 2000; Petersen and Saporta 2004; Castilla 2008). The focus on how organizations impact individual mobility within and between existing firms is natural: 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 one job in an established firm to another is far from the only route through which individuals seek to get ahead. When viewed over the life course, voluntary transitions between paid employment and self-employment or entrepreneurship remain remarkably common. Ferber and Waldfogel (1998), for example, estimate that by their mid-thirties, fully a quarter of men and a fifth of women in the 1979 National Longitudinal Survey of Youth cohort had ever experienced self-employment; Müller and Arum (2004: 5), using data from the Panel Study of Income Dynamics, put the proportion among U.S. men in their early fifties at 40 percent. Thus by retirement age, a substantial share of the population will have had at least one stint of self-employment in their career history.

When do individuals choose entrepreneurship, as opposed to changing jobs, as the way to get ahead? What features of the attainment process shape this choice? As Müller

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1 In addition to actual transitions into entrepreneurship, many contemplate the move: surveys suggest that in the contemporary United States, approximately six percent of the population is engaged in forming a new business venture in a given year (Reynolds and Curtin 2008).
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. Because organizations shape the relative costs and benefits of different career alternatives, it is natural to suspect that opportunity structures within and between existing organizations should influence the transition to entrepreneurship.

In this paper, we develop a theory of how the structure of opportunities in paid employment influences the decision to enter into entrepreneurship. Our approach involves embedding the decision to become an entrepreneur into processes of attainment more generally. Rather than focus on the effects of specific organizational features, our goal is to provide an abstract theoretical framework for understanding the ways in which different policies and characteristics of organizations shape entrepreneurial transitions. We draw especially on theories of career mobility that view individual differences in mobility and attainment as functions of matching processes (Jovanovic 1979) and structural differences in exposure to advancement opportunities (Sørensen 1977). In doing so, we demonstrate that the structure of inequality within and across organizations influences how likely an individual is to become self-employed.

Our theoretical framework speaks to a central puzzle in the study of entrepreneurship. We can easily imagine the attainment potential of entrepreneurship when we think of entrepreneurial success stories: the software engineer who founded the wildly successful Internet start-up, the salesman who founded a retail chain. Yet these
cases are outliers; for the vast majority, success is elusive, and work as an entrepreneur means incurring a wage penalty. Hamilton (2000) shows, using data from the U.S. Survey of Income and Program Participation, that while the earnings distribution of the self-employed has a longer upper tail – reflecting “big wins” for some – it is clearly shifted to the left. The earnings of the self-employed are substantially lower than those of wage earners at all but the very highest percentiles of the distribution (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 they been paid employees” (Hamilton 2000: 623). If this is the case, why do people leave paid employment for entrepreneurship?

Faced with this puzzle, many scholars point to distinctive features of the entrepreneurial role, such as autonomy, that might make it particularly appealing to some people (Halaby 2003; Xu and Ruef 2004; Sørensen 2007b; Benz and Frey 2008). Hamilton (2000), for example, interprets the wage penalty for self-employment as reflecting its non-pecuniary benefits, such as the value of “being your own boss.” In short, people who become entrepreneurs are trying to get ahead, but the utility they derive from their occupation is not fully captured in their earnings (Benz 2009). Similarly, other scholars point to distinctive features of the people who become entrepreneurs, in particular psychological dispositions such as their need for achievement (McClelland 1961), overconfidence (Camerer and Lovallo 1999; Moore, Oetsch, and Zietsma 2007) or
tolerance for risk (Cramer, Hartog, Jonker and van Praag 2002), that might make self-employment seem more attractive than it does to others.

These approaches resolve the puzzle of the entrepreneurial wage penalty by suggesting that the puzzle is only apparent; once we recognize what is distinctive about entrepreneurship or about entrepreneurs, it is not hard to understand why they do what they do. Such approaches are unsatisfying, however, if sociological theorizing aims to provide general as opposed to idiosyncratic, occupation-specific, accounts of the attainment process. By emphasizing how organizational differences in the structure of opportunities affect the appeal of entrepreneurial opportunities relative to other means of advancement, our model provides an explanation for the entrepreneurial wage penalty within the context of a general model of the mobility process. The appeal of entrepreneurship may lie less in the intrinsic features of the role than in the fact that it becomes the most attractive of the set of available mobility opportunities. In particular, as advancement opportunities in paid employment become less attractive or 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.

In this paper, we develop a formal model from which we analytically derive novel propositions about how matching processes and variation across opportunity structures impact entrepreneurial choice. 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 inequality in the structure of paid employment (e.g., in organizations), matter for entrepreneurial entry, we seek to 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.

While our aims are primarily theoretical, however, we provide two forms of supporting evidence. First, we develop a simple mathematical proof that demonstrates the role of matching in entrepreneurial choice. Second, we test the empirical implications of our model using individual data from the Danish labor market. These tests, although limited by the available data, support our arguments.

Entrepreneurship, Mobility and Attainment

Although the concept of entrepreneurship is multi-dimensional and definitionally contentious (Shane 2003; Sørensen and Fassiotto 2011), our focus is on understanding entrepreneurship as a labor-force status, i.e., as a form of labor market activity distinct from paid employment.² This conceptualization covers a wide range of economic activity, including founders of new organizations, independent professionals and

² Another common conceptualization of entrepreneurship emphasizes value creation and economic growth, for example in a Schumpeterian sense. When viewed in this way, entrepreneurship does not necessarily involve a change in labor market status (Sørensen and Fassiotto 2011). While career dynamics likely play a role in entrepreneurship understood in this way, this is not the focus of our theorizing.
independent contractors; for simplicity and rhetorical variety, we use the terms self-employment and entrepreneurship interchangeably.

Theory and research on entrepreneurship generally focuses on the entrepreneurial transition as a distinct social process and 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 relative appeal 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 (White 1970; Sørensen 1977). Observed mobility, in other words, depends not only on an individual’s preference ranking, but also on the how the opportunities arrive in time at different positions in the social structure. Entrepreneurial entry therefore depends both on the arrival of entrepreneurial opportunities and on the arrival of opportunities for advancement in paid employment.

The sociological literature on entrepreneurship, however, focuses largely on the sources of variation in the availability and attractiveness of entrepreneurial prospects (i.e., what Thornton [1999] calls demand-side approaches). For example, the state of technological development or industry evolution (Carroll and Hannan 2000) may mean that there are more entrepreneurial opportunities in some industries than others (e.g.,
software vs. machine tools). Similarly, cultural and institutional factors account for variation across regions in the prevalence of entrepreneurial opportunities (Saxenian 1994). Demand-side accounts cannot fully account for individual differences in the likelihood of entrepreneurial entry. With 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, while others have more limited advancement prospects. Organizational opportunity structures affect entrepreneurial entry rates through their impact on the availability of opportunities to get ahead through paid employment. As such opportunities decline, entrepreneurial opportunities are 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, the 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, while firms seek employees with the appropriate capabilities and fit with the local work environment. Due to labor market frictions, the search for good matches unfolds over time and is a central driver of movement between jobs and employers during the career (Jovanovic 1979; March and March 1978). The
importance of matching means that organizational heterogeneity is a key driver of career mobility: “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 2012: xx). In the absence of organizational heterogeneity (in task demands, as well as in such factors as workplace culture, management practices etc.), mobility between jobs would be irrelevant for attainment processes (Sørensen and Sorenson 2007).

The role of organizational heterogeneity in driving career mobility suggests that matching processes in paid employment will have implications for entrepreneurial entry as a form of mobility. Indeed, Åstebro, Chen and Thompson (2011: 2000) argue that “individuals who find wage employment with a mismatched firm or in the wrong task will earn a poor wage, and may find self-employment or unemployment an attractive alternative.” The implications of matching processes for career mobility therefore play a central role in our account of the role of organizations in entrepreneurial entry decisions.

Matching theories rest on the idea that the value of a job to a worker varies according to where she works, and that workers and firms engage in search to find good matches. The same individual may find working for firm A more rewarding (in pecuniary and/or non-pecuniary terms) than working for firm B. A key challenge to efficient matching, however, lies in learning about the quality of the match since some skills and abilities have the characteristics of experience goods (Nelson 1970). These a priori unobservable skills may be due to talents and capabilities (e.g., work ethic) that are transferable across firms, but more commonly they reflect skills whose value is firm-specific. An employer can, after hire, evaluate and reward experience-good skills, but a
potential new employer cannot know them. Therefore, their potential value will not be reflected in offers from external employers. Other skills and capabilities, by contrast, have the characteristics of search goods and can be reliably evaluated through a process of search and inspection prior to hiring. Because such skills are readily estimable at the point of hire, their value will be incorporated into offers from external employers.

This disparity in the way that various types of skills are evaluated by external employers implies that for a given level of attainment, any individual whose current attainment can in part be attributed to a good match (i.e., positive returns to experience-good skills) will receive fewer attractive external offers than a person with an inferior match, whose attainment is due more to search-good skills. As a result, workers with good matches are less likely to depart for another employer than mismatched workers. As this differential turnover process unfolds time, the cohort rate of departure for other employers declines with tenure, as average match quality increases across tenure cohorts (Jovanovic 1979; Lazear and Oyer 2012).

What are the implications of such a process 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 and entrepreneurial opportunities.\(^3\) The arrival of an employment opportunity depends on the actions and perceptions of an employer; a job...

\(^3\) In discussing the value of both employment opportunities and entrepreneurial opportunities, we simplify by assuming that these values can be summarized in a single parameter that captures the individual’s expectations concerning future wages as well as any other non-pecuniary factors that an individual may deem important (e.g., autonomy). In Appendix A we consider the impact of perceptual error in these assessments of the two types of offers.
offer is only forthcoming 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. In fact, some nascent entrepreneurs (approximately 13% in the United States, according to Davidsson and Reynolds 2009) decide to become entrepreneurs before they identify a specific opportunity.

In this way, we can view entrepreneurial opportunities as arising through two processes: the social and economic processes that generate opportunities with different economic value, and the social and psychological process that lead people to perceive and value entrepreneurial opportunities differently. Importantly, both of these processes can be viewed as operating independently of match quality (i.e., the experience-good sources of attainment), for a given level of attainment. Thus while 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 that these differences are not systematically related to the quality of the match with the current employer.

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4 Venture capitalists, bankers and other third party resource providers do, of course, assess prospective entrepreneurs before supporting them. A large share of entrepreneurs, however, does not rely on third-party financing at founding (Aldrich 1999). Furthermore, we view this role as relevant to the resource mobilization process, as distinct from the recognition of an opportunity and the attempt to pursue it.

5 An alternative would be to assume that the perception of entrepreneurial opportunities depends on match quality. In particular, one might imagine that if individuals were aware that they were well matched in their current employment, they might systematically discount entrepreneurial opportunities. We suspect, however, that people are unlikely to be aware of the extent to which their current attainment depends on match quality. Moreover, people who know that they are well-matched should also be less likely to perceive external opportunities as attractive.
Consider then two individuals at the same attainment level, who differ only in the quality of their match with the current employer. Since the perception of entrepreneurial opportunities is independent of match quality, 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 match quality is less likely to receive employment offers that dominate the current job. Put differently, over a given time interval, the individual with higher match quality perceives the same number of attractive entrepreneurial opportunities, but receives fewer attractive external employment offers. This implies, on the one hand, that the person with higher match quality is less likely to leave the current job (Jovanovic 1979). However, it also implies that if the more well-matched individual does leave the current job, she is more likely to do so to become an entrepreneur than to leave for another firm.

Proposition 1: Controlling for attainment, the relative rate of entrepreneurship increases with match quality: individuals with higher match quality are more likely to become entrepreneurs than they are to change employers.

Testing this claim directly proves challenging due to the difficulties in measuring match quality. As Nagypal (2007) notes, “data on match-specific quality or productivity are essentially non-existent.” Thus we provide two forms of supporting evidence. First, we provide a simple mathematical proof of Proposition 1 in Appendix A. In addition, we derive two implications of Proposition 1 that are unique predictions of our matching argument, and are amenable to empirical testing.

Before turning to empirics, however, we use Proposition 1 to develop as set of predictions about the relationship between structural features of organizational
opportunity structures and entrepreneurial entry. The role of match quality raises an important question: matching with what? In particular, how do the characteristics of an employer (or, more generally, an opportunity structure such as a job ladder) interact with matching processes to influence entrepreneurial entry? As we discuss in the next section, if an organization provides few opportunities for advancement, then being well matched to that employer should make one more likely to try to get ahead through entrepreneurship. This in turn suggests an important connection between organizational inequality and entrepreneurship.

A Simple Model of Inequality and Entrepreneurial Entry

We now turn to analyzing how differences in the structure of opportunity in organizations may lead to variation in the rate of entrepreneurship. To gain traction on this question, we develop a simple formal model of entrepreneurial entry that encodes our key intuition that an individual whose attainment is due to a good match with her current employer is more likely to leave her current employer to enter entrepreneurship than she is to leave to take another job in paid employment. Our decision to adopt a more formal approach is driven largely by the desire to provide support for our key theoretical arguments despite the inherent difficulties in measuring many of the theoretical constructs in which we are most interested. Formal modeling allows us to mathematically validate the propositions we develop, rather than relying on empirical data that may be open to multiple interpretations (Adner, Polos, Ryall and Sorenson 2009).
Given our interest in how inequality shapes the entrepreneurial process, a key modeling decision we face concerns how to represent inequality in our model. The constraints of theorizing mean that we cannot hope to fully capture the multi-faceted nature of social inequality. Instead, we draw on core sociological arguments about the attainment process that view employees as embedded in opportunity structures such as firm and occupational internal labor markets (Althauser and Kalleberg 1981; Osterman 1984; Spilerman 1977). Such opportunity structures may differ in how unequally distributed rewards and opportunities for advancement are.

In what follows, we explore the effects of two kinds of variation in inequality across opportunity structures: differences in the maximum possible attainment, or wages, within an opportunity structure, and differences in the shape of the pyramid, or 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, and focusing on them allows us to gain insight into the relationship between entrepreneurship and the structure of inequality. In settings with a low maximum wage, individuals have lower prospects for attainment than in where the wage ceiling is higher. Opportunity structures with the same maximum attainment level can also differ in the opportunities for advancement that they provide; it is harder to get ahead in structures where 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 that 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 (White 1970; Spilerman 1977; Sørensen 1977). Job-ladders within a firm are a prototypical example (e.g., Baron, Barnett and Stuart 2000; Stovel, Savage and Bearman 1996). These interdependencies may arise through formal promotion polices (as in firm internal labor markets [Doeringer and Piore 1971]), credentialing requirements (Abbott 1988; Weeden 2002) or informal practices. While we conceive of opportunity structures broadly, what we chiefly have in mind are 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 (Sørensen and Kalleberg 1979; Baron and Bielby 1980).

We assume that the attainment process is one in which individuals seek to maximize the rewards from work. The rewards from work may be multidimensional and include both pecuniary and non-pecuniary aspects such as wages, 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 Oyer (2012) 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 the individual perceives an entrepreneurial opportunity and decides to pursue it.

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

$$\beta_{ik} = \alpha_i + \theta_{ik}$$  \hspace{1cm} (1)

where $\alpha_i$ represents the search-good component of skills, and $\theta_{ik}$ represents the experience-good component of skills, or those capabilities that an individual can put to productive use only when matched to a specific firm that values those capabilities.\(^6\)

Employers set the value of wage offers to external candidates based on their assessments of $\alpha_i$, since by definition they have no basis for the experience-good component of skills.\(^6\)

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\(^6\) A natural interpretation of match quality is that it reflects complementarities between an individual’s skills and the employer’s production technology, culture, etc. Indeed, we think this is often the case. However, $\theta_{ik}$ may also be due to qualities of the individual that are only recognized after the point of hire, but that would be equally valuable across employers. As long as external employers cannot be certain that this is the case, however, they will value $\theta_{ik}$ at its expected value in the population.
However, employers may set the value of wage offers to internal candidates based on their assessment of match quality $\theta_{ik}$.

In short, this setup codifies the idea matching 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. Match quality is determined by chance; since it is an experience good, individuals can only search for a good match by moving between employers. Hiring into an opportunity structure occurs as a function of the search-good component of skills, and therefore starting wages for an individual at a given employer reflect only the employer’s assessment of that component of skills. However, as match quality is revealed (for example, through superior productivity) and therefore incorporated into promotion decisions, a person with a positive match will advance through the opportunity structure more rapidly than an otherwise comparable individual with a poor match.

With these basics in place, we turn to consider the effects of inequality in opportunity structures for the choice of entrepreneurship. In order to do so, we must specify how rewards change as workers advance through an opportunity structure, and how the attainment process is shaped by the 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 the 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 early on is rapid but eventually slows as the 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 are 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 $w_{\text{max}_k}$. (For simplicity, we assume that the characteristics of opportunity structures are fixed over time.) A person’s wage at time $t$ is then given by

$$w_{ikt} = w_{ikt-1} + \gamma_k (\beta_{ik} w_{\text{max}_k} - w_{ikt-1})$$

(2)

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

$$w_{ikt} - w_{ikt-1} = \gamma_k (\beta_{ik} w_{\text{max}_k} - w_{ikt-1})$$

(3)

Viewed in this way, the structure of inequality enters into the determination of attainment in two ways. Most directly, employees in different opportunity structures may differ in their attainment because the opportunity structures differ in the maximum possible wage for them. Opportunity structures with low wage ceilings offer less room for advancement, so individuals working in such settings have limited attainment

\[7\text{ For simplicity we describe the wage attainment process in a discrete time framework; our approach extends naturally to a continuous time formulation, as in Sørensen (1977: eqn. 19).}\]
prospects unless they leave for another opportunity structure. Moreover, the shape of the pyramid or span of control enters into the attainment process indirectly through its effect on the vacancy arrival rate $\gamma_k$.\(^8\) A central theoretical result of vacancy chain models of labor markets is that the vacancy rate varies inversely with the span of control, or ratio of positions between adjacent levels in the hierarchy. Individuals in a system with a large span of control are exposed to proportionately fewer opportunities for advancement that individuals in a system with a small span.

This simple specification yields important insights about the relationship between inequality in an opportunity structure, matching, and the choice of entrepreneurship. Consider first the case of variation across opportunity structures in the wage ceiling, and assume that the maximum wage is greater in structure $k$ than structure $l$, or $w_{\text{max}}_k > w_{\text{max}}_l$. Hold the vacancy arrival rate $\gamma$ constant. Now compare two individuals $i$ and $j$, employed in $k$ and $l$, with the same attainment in a particular period. Given these assumptions and the equality constraint, it follows from (3) that individual $j$ is viewed as more desirable by her employer than individual $i$ is by his, or $\beta_{ik} < \beta_{jl}$. This reflects the fact that the wage ceiling affects the returns to skill; 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; those who do will generally have greater skills.

What are the implications for rates of entrepreneurship? The implications hinge on the source of the differences in skills. If these can be traced to differences in the search-good component of skills ($\alpha$) as opposed to match quality ($\theta$), then there are no

\(^8\) The span of control may also enter into the attainment process through the wage ratio between adjacent levels; managers who supervise more employees are often paid more (Simon 1957).
reasons to expect differences between the two organizations in rates of entrepreneurship. But differences in $\beta$ in our scenario should not generally be due to differences in $\alpha$. An employee of a low wage ceiling firm with superior search-good skills will receive external offers based on those skills, and will therefore have an opportunity to leave the firm. This sorting process means $\alpha_i = \alpha_j$. As a consequence, average match quality will be higher in the opportunity structure with the lower wage ceiling: $\theta_{ik} < \theta_{jl}$. In keeping with Proposition 1, this implies:

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, match quality leads to more rapid advancement, as the employee is more likely to be selected for the 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 match quality, the employee is more likely to be stuck with the current employer, since 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 the effects of variation in the span of control. Here, assume for simplicity that the wage ceilings in the two opportunity structures are the same ($w_{\text{max}_k} = w_{\text{max}_l}$), and that the opportunity structures only differ in the span of control, with structure $k$ again more unequal than structure $l$. In other words, in $k$ more people report
to the same boss than in \( l \). With a greater span of control, the employees at a given level in \( k \) have fewer opportunities to get ahead, so \( \gamma_k < \gamma_l \) (Sørensen 1977). Again, compare two individuals with the same attainment in a given period. It follows from these assumptions and (3) that \( \beta_{ik} > \beta_{jl} \).

This result suggests two things. First, for a given level of attainment, skills are higher when the vacancy arrival rate is lower. This is intuitively sensible; with fewer chances to advance than the person in the other firm, the employee of the firm with a low vacancy arrival rate must be more skilled to travel the same distance in the same amount of time. Second, given the inverse relationship between the span of control and the vacancy arrival rate, it is also the case that the person in the system with greater span of control is more skilled than the person in the system with a smaller span. As before, these differences will in general be due to differences in match quality (\( \theta \)) because sorting processes should eliminate any differences in search-good skills (\( \alpha \)). Therefore:

Proposition 3: Controlling for attainment, higher vacancy arrival rates in an opportunity structure lowers the odds of choosing entrepreneurship rather than changing employers.

Proposition 4: Controlling for attainment, greater span of control in an opportunity structure increases the odds of choosing entrepreneurship rather than changing employers.

We turn now to considering empirical evidence for Propositions 1-4.

**Empirical Setting and Data**
Our theory involves predictions about the relationship between the 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 data set has information on individual career histories, such that we can track transitions from paid employment to entrepreneurship. Given the low transition rate to entrepreneurship, large sample sizes are required in order to produce reliable statistical estimates. In addition, we also wish to measure important source 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 have generally approached 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. While detailed organizational data could be used to measure wage ceilings and spans of control, 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 the characteristics of firms and rates of entrepreneurship are not
idiosyncratic to a small set of firms, and allows us to control for important sources of individual differences in the propensity to enter entrepreneurship.

The data analyzed in this paper come from “IDA,” the Integrated Database for Labor Market Research, maintained by Statistics Denmark. A distinct advantage of this data source is that it is a large matched employer-employee dataset, and therefore allows us to examine the relationship between firm characteristics and entrepreneurial entry in a large-scale sample. IDA contains register-based data on the labor force in Denmark, beginning in 1980 and constitutes an annual (registry-based) census of the Danish population. Labor market data included in IDA includes 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 might generalize to other contexts, for example 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 study. However, our examination of relevant features of entrepreneurship and labor market policies does not lead us to suspect that our results are unique to the Danish context. In terms of labor market, most casual observers correctly associate Denmark with high levels of social protection of 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; OECD, 1997). Furthermore, with respect to
entrepreneurial activity, the Danish private equity markets (e.g., venture capital) are under-developed 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, risk-oriented 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 non-agricultural employment in Denmark (7.2% in 1996) are quite similar to those in the United States (6.8%) and Germany (8.3%), and somewhat lower than in the United Kingdom (11.3%).

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 demonstrate below, 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. In our view this is an advantage of the Danish context, as it implies that decisions to enter self-employment are more likely to be opportunity driven; opportunity-driven entry is the focus of our theory.

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9 Another feature of labor market policy relevant to entrepreneurial entry is the existence of a variety of government programs seeking to re-integrate the long-term unemployed by assisting them in launching entrepreneurial ventures. We limit our analysis to individuals who are currently employed, however.
The 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. The data analyzed here are based on an extract from IDA spanning the years 1980-1997 and covering the entire population between the ages of 15 and 70 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 be 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 that they were directors or top managers). Individuals were coded 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, schooling) are censored.

Results

Our first empirical test relies on the well-known relationship between tenure and the expected match quality of employees. As noted earlier, the Jovanovic (1979) matching model implies a negative relationship between firm tenure and turnover rates. In older tenure cohorts, average match quality is higher (because poorly matched individuals have left), so members of older cohorts receive fewer attractive external
employment offers (holding attainment constant). By contrast, we expect that the rate at which a person identifies attractive entrepreneurial opportunities should be independent of match quality, controlling for wage. Thus the likelihood of perceiving an attractive entrepreneurial opportunity should not vary by tenure cohort.  

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 1, which presents estimates from a competing risks model of two transitions: to paid employment with a new employer, and to entrepreneurship. (The data do not allow us to identify within-firm 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 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 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 1. As we predict, 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 ($\chi^2=86.65, 1 df$). As a

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10 The estimated relationship between tenure and entrepreneurial entry will only be flat in the absence of unobserved heterogeneity (Tuma and Hannan 1984). It is unlikely that 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 the transition rate to new firms.
consequence, as tenure increases, the conditional odds of entering entrepreneurship as opposed to moving to another firm go up. This finding is novel in the literature.

Although it has been shown that individuals become less likely to enter self-employment the longer they have been with their current employer (Evans and Leighton 1989; Sorensen 2007a; Elfenbein, Hamilton, and Zenger 2010), the differential impact of tenure on the entrepreneurial entry relative to moving to a new firm has not previously been established. Given the well-known relationship between tenure and match quality, this result is consistent with Proposition 1: the composition of the set of attractive external offers changes to become more entrepreneurial as average match quality increases.

The congruence between our empirical results and Proposition 1 lends credence to our theory about the role of matching processes in the transition to entrepreneurship. However, in the absence of a direct measure of match quality, we acknowledge that the effect of tenure is open to alternative interpretations. Any number of other factors might reduce an employee’s attractiveness to outside employers or increase the cost of leaving his employer, making entrepreneurial entry more likely.

However, in order for any alternative explanation to pass muster, two conditions must hold. First, the proposed variable must be positively associated with tenure. Second, the variable must impact entrepreneurial entry to a lesser degree than it influences movement to established firms. Fortunately, these stipulations greatly reduce the set of plausible confounds. For example, non-compete clauses may make it difficult for firms in the same industry to make offers to an employee (Marx 2011). However, non-compete clauses would similarly reduce an employee’s ability to enter entrepreneurship. Thus, non-competes could not explain our results. An analogous logic holds for other candidate
explanations, for example, contingent benefits that increase over time (e.g., vesting requirements) may make employees hesitant to leave.

While we cannot definitively rule out all possible alternatives given the limitations of our data, we can make some progress by focusing on an individual’s earnings prior to entering entrepreneurship. A straightforward implication of our model is that if we hold constant the search-good component of skills, then individuals with better match quality will have higher earnings (assuming that match quality is rewarded, on average, through wages as opposed to non-pecuniary benefits). If individuals with higher match quality 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. Such a pattern is less consistent with arguments that emphasize constraints on mobility or contingent benefits.

We present two kinds of evidence. First, consider Figure 2. Using data on all workers aged 25-50 in the Danish labor force in 1989, Figure 2 graphs the log hourly wages for two sub-populations: those who entered self-employment in the following year, and those who didn’t. The solid line represents individuals who did not become entrepreneurs in 1990; the dashed line represents those who did. Figure 2 reveals a clear pattern – workers who will soon be entrepreneurs have higher current wages in paid employment than those who will not, with a higher median and a longer upper tail of the distribution.11 Regression models, presented in Table 2, show that these differences are

11 There is some indication in Figure 2 of a higher density of residuals for future entrepreneurs at the bottom of the distribution as well; tests, however, reveal that this pattern is not statistically robust. This contrasts with the pattern identified by Elfenbein, Hamilton and Zenger (2010) in their study of science and engineering graduates in the
not simply due to differences in observable individual characteristics. Controlling for a variety of demographic and labor market characteristics, future entrepreneurs earn significantly higher mean wages. The quantile regressions in Table 2 further confirm the impression from Figure 2: future entrepreneurs are disproportionately drawn from the upper part of the wage distribution, with no significant difference between the groups at the 25\(^{th}\) percentile. Thus future entrepreneurs earn more than we would expect based on the observable characteristics included in the equation, consistent with the idea that they have higher quality matches.

An objection to this interpretation is that the residual from our wage equation is composed not only of a potential match quality effect (\(\theta\)) but also of any unobserved individual abilities. The results in Figure 2 may therefore reflect a process through which more able, and hence more highly paid, individuals become entrepreneurs, perhaps to fully capitalize on their skills. This pattern has been shown to characterize entrepreneurial entry among analysts at investment banks (Groysberg, Nanda and Prats 2009), scientists and engineers (Elfenbein et al. 2010), and individuals in Korea (Astebro et al. 2011). 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; 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).

United States, where they found that “slugs” were also more likely to enter entrepreneurship. This likely reflects the fact that unemployment benefits are more generous in Denmark.
Table 3 shows the results of this exercise, using the same panel data as in our transition-rate models, but focusing on wages over time as the outcome variable. Our hypothesis is that those who transition to entrepreneurship have higher match quality with their employer immediately prior to entrepreneurship, as compared to the same individual during a spell of employment with another organization that did not end in a transition to entrepreneurship. This higher match quality should manifest itself 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 3 demonstrates that the main effect of this dummy variable is not significant. However, we should expect the benefits of match quality to manifest over time; for example, the employer is less likely to reward match quality initially (March and March 1978). In the second column of Table 3, we see that this is indeed the case: there is a positive interaction effect between future entrepreneurship and tenure with the employer. Given the fixed-effects framework, this is a strong result. Although it is possible that our fixed-effects models do not exhaustively capture all search-good skills or credentials that might result in higher wages over time, we have no reason to think that any such omitted variables would systematically tend to be present in spells prior to entrepreneurship but absent otherwise. Overall, then, this result is consistent with our proposition concerning the relationship between match quality and entrepreneurship.

We also note that these results are consistent with Hamilton’s (2000) analyses of U.S. data, which similarly suggest that the self-employed had higher expected wages in employment. Both results suggest the presence of unobserved variables that influence
wages in paid employment as well as entry into entrepreneurship. However, our model offers a different interpretation of this unobserved variable. Hamilton (2000) interprets this as evidence of entrepreneurs being motivated by the non-pecuniary benefits of entrepreneurship (such as being your own boss). Our model, however, suggests that this evidence can be interpreted without reference to a taste for autonomy or other putative virtues of the entrepreneurial role. Instead, the higher wages of the self-employed prior to entry (and hence the “price” of entrepreneurship) may be due to the relationship between the worker and the particular firm she works for, and the relative appeal of entrepreneurship as a means of attainment.

In summary, the analyses provide consistent support for Proposition 1, although we interpret these results cautiously due to the limitations of the data. The 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. To the extent that the appeal of an entrepreneurial opportunity is based on an over-estimation of its true value, positive match quality may lead people to pursue opportunities that result in a drop in income.

Propositions 2-4 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 3a and 3b convey in a simple way the intuition that match quality is particularly important driver of entrepreneurship when workers approach the ceiling of the opportunity structure. We can gain some insight into the effects of opportunity structures by distinguishing between people in white-collar and blue-collar occupations. In many cases workers in blue-collar occupations can (in principle) advance to white-collar positions, and so well-matched workers may still have internal promotion opportunities. White-collar workers are closer to the ceiling, by contrast, so those with good matches are more likely to run out of internal advancement opportunities. We therefore expect stronger evidence of a match quality component to wages for entrepreneurs from white-collar occupations than from blue-collar occupations. This pattern is clearly apparent in Figures 3a and 3b. While future entrepreneurs have a substantially higher wage distribution among white-collar workers, there is virtually no difference between future entrepreneurs and their non-entrepreneurial 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 3 striking and consistent with Proposition 2.

A test of Proposition 3 is beyond the scope of this paper, since a direct test of the proposition would require a measure of vacancy arrival rates. We do, however, test

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12 We do note, however, that future research might consider interesting potential proxies for vacancy arrival rates. For example, since exogenous vacancies are in part due to exit from the labor force, the age structure of a firm or industry may serve as a useful measure for testing Proposition 3. Changes in retirement policies may play a similar role. Finally,
Propositions 2 and 4 in our transition rate models in Table 1. Our measure of the wage ceiling is the log of the maximum wage observed in the firm, which approximates the maximum attainment possible in the firm. This measure has substantial limitations. Many job ladders within a firm may not provide a path to the top of the wage hierarchy for all employees, but we are aware of no data that would allow us to reconstruct internal opportunity structures and simultaneously model transitions to entrepreneurship. Furthermore 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. Similarly, because we know of no data that directly measures the span of control for a large sample of individuals at risk of entering entrepreneurship, we first test Proposition 4 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 in the second two columns of Table 1. Controlling for individual attainment and the size of the firm, 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 d.f., $p<0.00$), 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 growth or decline among firms in the local labor market may change the vacancy arrival rate for a focal firm.

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13 We test Propositions 2 and 4 jointly because the derivation of Proposition 2 assumed that the vacancy arrival rate was the same across opportunity structures. Controlling for the degree of inequality holds the vacancy arrival rate constant.
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., $p<0.00$.) Thus as the distribution of wages within the firm becomes more unequal for a given wage ceiling (e.g., due to greater span of control), entrepreneurship becomes the more likely form of mobility, as predicted by Proposition 4.

In the final two columns of Table 1, 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 match quality increases 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 search good skills are more drawn to better opportunities elsewhere. As a consequence, the rate of movement to another employer should decline more steeply with tenure in firms with lower wage ceilings – a positive interaction effect between the wage ceiling and tenure. Since entrepreneurial offers do not depend on match quality, however, our model implies that there should be no interaction between firm size and tenure for transitions to entrepreneurship. This pattern is confirmed in the final two columns of Table 1.

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 firm, and the choice of entrepreneurship as a form of career.
mobility. 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.

While our evidence is consistent with our theoretical predictions, the limitations of the data 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 (such as academic scientists (Stuart and Ding 2006)), and quantitative case studies of careers and transitions to entrepreneurship within single organizations.

Discussion and Conclusion

In a related vein, Carnahan et al. (2010) find that high-performing workers in the legal services sector are more likely to enter entrepreneurship conditional on mobility when their employer has a greater degree of wage dispersion. Conversely, low-performing workers at firms with more wage dispersion are less likely to enter entrepreneurship if they leave their current employer. This work is consistent with our findings, although the theoretical mechanisms proposed are quite different. Carnahan et al. focus on an individual’s performance overall and whether high-performers are able to keep the fruits of their labor, whereas we focus on the role of match quality in reducing the number of attractive external offers for well-matched employees.
A central question in the study of entrepreneurship is why people choose to become entrepreneurs instead of continuing in paid employment. In answering this question, researchers must specify how entry into entrepreneurship, as a form of mobility, is different from conventional mobility between jobs in paid employment. Prevailing approaches in the entrepreneurship literature emphasize the intrinsic appeal of the entrepreneurial role, such as the freedom and autonomy that come from being one’s own boss. In our view, however, the appeal of entrepreneurship is a complicated matter. The independence and freedom of the entrepreneur is easily romanticized; as Galbraith (1973: 91) noted, his “independence is often circumscribed in principle and in practice by a strenuous struggle for survival ... His is often the freedom of a man who is pecked to death by ducks.” In most cases, self-employment is a bad job, with long hours, poor and unpredictable income streams, and little job security.

When we consider the fact that people nonetheless freely choose the path of entrepreneurship, it is a natural to make sense of the choice by identifying some features of the role, or of the individual, that shift the cost-benefit calculus in favor of entrepreneurship. Such solutions can be unsatisfying, however, insofar as they presume that entrepreneurship has a special status and thereby obscure the commonalities between entrepreneurial entry and other forms of career mobility. There are plenty of other career transitions that turn out poorly, but for which we do not develop distinctive accounts; theories of entrepreneurship are strangely divorced from the way we think about other types of career mobility. The insights generated by our theoretical framework suggest that we may be well served by paying greater attention to the relentless normality of entrepreneurship in modern attainment processes.
Our theory locates the distinctive feature of entrepreneurship in the ways in which entrepreneurial opportunities, as chances for career advancement, differ from opportunities in paid employment. The key difference that we emphasize lies in how the opportunities arise. Advancement opportunities in paid employment arise because employers decide to make job offers to individuals. They make these offers based on assessments of an individual’s qualifications for the job at hand. The perception of entrepreneurial opportunities, as we conceive them, is fundamentally different, because there is no decision-maker selecting whom should be given the chance to pursue the opportunity; instead, it is a question of feeling that one is in the right place at the right time and making the choice to strike out on one’s own.

Our theoretical model implies that this difference between entrepreneurial opportunities and job offers has fundamental consequences for our understanding of the linkages between the attainment process and entrepreneurial choice. In particular, our model suggests a way in which entrepreneurial choice may be driven by the structure of attainment, without reference to any individual variation in psychological dispositions, risk preferences or job values. Thus while stylized, our model generates a number of important insights. Although data limitations preclude us from claiming definitive support for our theory, the analyses presented earlier bolster our confidence in the key insights generated by the model.

Much as matching processes have proven critical in other contexts (see, e.g., March and March 1978), our analysis contributes to a nascent body of work showing that matching processes in labor markets play an important role in shaping entrepreneurial propensities (Astebro 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. People are more likely to enter entrepreneurship, as opposed to switching to another job in paid employment, when their options for external job mobility are limited, paradoxically, by how well-suited they are for their current employer. An important feature of this explanation is that the quality of the match with the current opportunity structure may be invisible to the employee. Indeed, we expect that employees typically have difficulty disentangling whether their attainment is due to their search-good component of skills, or the fortune of getting a good match. This information problem is consequential, because it provides an alternative explanation for the self-employment wage penalty that does not presume that entrepreneurs have a taste for autonomy. Thus where Hamilton (2000) interprets the wage penalty as being a price that employees consciously choose to pay when entering entrepreneurship, in our model, the lack of awareness about match quality means that employees do not know what it is they are giving up. Match quality affects the distribution of attractive advancement opportunities in ways that are opaque to individuals in the attainment process, and thus leads people to choose entrepreneurship even when they do not have a particular commitment to or interest in the entrepreneurial role and even when, as Hamilton (2000) shows, they tend to be worse off for doing so.

The role of matching processes in generating a proclivity for entrepreneurship suggests an intriguing relationship between organizational diversity and entrepreneurship. Organizational ecologists have argued that one implication of greater organizational diversity is that it allows for a greater likelihood that workers will find good matches for their skills and abilities (Hannan 1988; Sørensen and Sorenson 2007). A talented cook
may not reach her full potential in the labor market if there are no restaurants. Similarly, someone who is well-suited for work in a small entrepreneurial venture may be ill-served by an organizational environment dominated by large bureaucratic firms. Since better-matched individuals will be more likely to choose entrepreneurship, this suggests a relationship between organizational diversity and patterns of mobility into entrepreneurship.

Secondly, by conceiving of entrepreneurship as a mobility process driven by the arrival of opportunities, we have laid bare the connections between the structure of inequality in labor markets and the choice of entrepreneurship. As we noted earlier, the literature on mobility and inequality has lacked an understanding of how movement into entrepreneurship is shaped by the structure of the attainment process, even though sociologists have made substantial progress in understanding the structural sources of conventional job mobility. Our model clarifies the relationship between different dimensions of inequality in opportunity structures and entry into entrepreneurship. The linkage between the structure of inequality and entrepreneurial activity is not entirely new, as it is a centerpiece of the literature on immigrant entrepreneurship as a response to blocked mobility (see, e.g., Light 1979). Our model, however, is more general; inequality may drive entrepreneurial choice even in the absence of discrimination on ascriptive characteristics. Most importantly, our model demonstrates the importance of organizational policies and practices in shaping the propensity for entrepreneurship, echoing the central role long attributed to organizations in the stratification process (Baron and Bielby 1980).
References


Table 1. Discrete-time competing risks models of employee turnover

<table>
<thead>
<tr>
<th></th>
<th>Transition to New Job</th>
<th>Transition to Entrep.</th>
<th>Transition to New Job</th>
<th>Transition to Entrep.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vocational</td>
<td>0.008 (0.036)</td>
<td>-0.055 (0.036)</td>
<td>0.008 (0.036)</td>
<td>-0.060 (0.036)</td>
</tr>
<tr>
<td>Academic</td>
<td>0.214† (0.016)</td>
<td>0.232† (0.060)</td>
<td>0.217† (0.016)</td>
<td>0.232† (0.060)</td>
</tr>
<tr>
<td>University</td>
<td>-0.080† (0.013)</td>
<td>-0.208† (0.058)</td>
<td>-0.073† (0.013)</td>
<td>-0.211† (0.036)</td>
</tr>
<tr>
<td>Female</td>
<td>0.071† (0.008)</td>
<td>-0.672† (0.036)</td>
<td>0.072† (0.008)</td>
<td>-0.663† (0.036)</td>
</tr>
<tr>
<td>Danish</td>
<td>-0.044* (0.021)</td>
<td>-0.580† (0.076)</td>
<td>-0.045* (0.021)</td>
<td>-0.580† (0.036)</td>
</tr>
<tr>
<td>Age</td>
<td>0.059† (0.005)</td>
<td>0.085† (0.025)</td>
<td>0.057† (0.005)</td>
<td>0.094† (0.036)</td>
</tr>
<tr>
<td>Age squared</td>
<td>-0.001† (0.000)</td>
<td>-0.001† (0.000)</td>
<td>-0.001† (0.000)</td>
<td>-0.002† (0.000)</td>
</tr>
<tr>
<td>Married</td>
<td>-0.084† (0.007)</td>
<td>0.030 (0.035)</td>
<td>-0.084† (0.007)</td>
<td>0.028 (0.036)</td>
</tr>
<tr>
<td>Children present</td>
<td>0.000 (0.007)</td>
<td>-0.047 (0.035)</td>
<td>-0.001 (0.007)</td>
<td>-0.048 (0.036)</td>
</tr>
<tr>
<td>Labor force experience</td>
<td>-0.172† (0.008)</td>
<td>0.413† (0.049)</td>
<td>-0.167† (0.008)</td>
<td>0.407† (0.036)</td>
</tr>
<tr>
<td>Log debts</td>
<td>0.008† (0.001)</td>
<td>0.023† (0.004)</td>
<td>0.008† (0.001)</td>
<td>0.023† (0.003)</td>
</tr>
<tr>
<td>Log assets</td>
<td>-0.053† (0.001)</td>
<td>0.014* (0.005)</td>
<td>-0.053† (0.001)</td>
<td>0.013* (0.003)</td>
</tr>
<tr>
<td>Parent self-employed</td>
<td>-0.049† (0.006)</td>
<td>0.250† (0.029)</td>
<td>-0.050† (0.006)</td>
<td>0.249† (0.036)</td>
</tr>
<tr>
<td>Log firm tenure</td>
<td>-0.347† (0.007)</td>
<td>-0.093† (0.016)</td>
<td>-0.344† (0.007)</td>
<td>-0.094† (0.036)</td>
</tr>
<tr>
<td>Log wage</td>
<td>0.234† (0.014)</td>
<td>0.597† (0.052)</td>
<td>0.253† (0.015)</td>
<td>0.665† (0.036)</td>
</tr>
<tr>
<td>Log firm size</td>
<td>-0.068† (0.004)</td>
<td>-0.146† (0.009)</td>
<td>-0.034† (0.008)</td>
<td>-0.104† (0.036)</td>
</tr>
<tr>
<td>Log maximum wage</td>
<td>-0.126† (0.023)</td>
<td>-0.267† (0.036)</td>
<td>-0.131† (0.023)</td>
<td>-0.299† (0.052)</td>
</tr>
<tr>
<td>Gini</td>
<td>-0.086 (0.089)</td>
<td>2.131† (0.036)</td>
<td>-0.051 (0.090)</td>
<td>2.023† (0.256)</td>
</tr>
<tr>
<td>Log maximum wage *</td>
<td>0.036† (0.010)</td>
<td>-0.013 (0.023)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log tenure</td>
<td></td>
<td></td>
<td>0.036† (0.010)</td>
<td>-0.013 (0.023)</td>
</tr>
</tbody>
</table>

Note: All models include industry fixed effects. Standard errors clustered by employer. N= 1,028,290. Two-sided t-tests: † p<.01
Table 2. Regression estimates of the effect of subsequent entrepreneurial entry on current log wages

<table>
<thead>
<tr>
<th>Entered entrepreneurship in subsequent year</th>
<th>Mean</th>
<th>25th Percentile</th>
<th>75th Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.069†</td>
<td>0.003</td>
<td>0.068†</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.005)</td>
<td>(0.006)</td>
</tr>
</tbody>
</table>

All models include the following variables: age; sex; marital status, presence of children; occupation; firm tenure; log debts; log assets; Danish born; education. Regression of the mean estimated using OLS, including employer fixed effects. Quantile regressions include log firm size. N= 1,189,632
Table 3. Individual fixed effects regression estimates of departure for entrepreneurship on log wages

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lag log wage</td>
<td>0.572†</td>
<td>0.572†</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Log firm size</td>
<td>0.009†</td>
<td>0.009†</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>Labor force experience (at entry)</td>
<td>0.064†</td>
<td>0.064†</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Labor force experience squared</td>
<td>-0.002†</td>
<td>-0.002†</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>Log tenure</td>
<td>0.039†</td>
<td>0.039†</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>Left this employer for entrepreneurship</td>
<td>0.012</td>
<td>-0.003</td>
</tr>
<tr>
<td></td>
<td>(0.007)</td>
<td>(0.008)</td>
</tr>
<tr>
<td>Log tenure * Left this employer for entrepreneurship</td>
<td>0.022†</td>
<td>(0.005)</td>
</tr>
</tbody>
</table>

Note: Models include fixed effects for individuals and occupational categories. N=688,102. Two-sided t-tests: † p<.01
Figure 1. Hourly earnings for wage workers and self-employed workers from the Survey of Income and Program Participation, 1984 from Hamilton (2000)

Note: Reproduced from Hamilton (2000). “Net profit” is the reported difference between revenues and expenses for the business. “Draw” represents the amount withdrawn as salary by the business owner. “EAD” is the draw plus the year-to-year change in business equity.
Figure 2. Log wages in Danish kroner of workers in paid employment, by whether they entered entrepreneurship the subsequent year (N= 1,189,632)
Figure 3a. Log wages by subsequent entrepreneurial entry, white-collar workers

Figure 3b. Log wages by subsequent entrepreneurial entry, blue-collar workers
Appendix A. Match Quality and Probability of Entry Into Entrepreneurship

In this appendix we present a simple model of how match quality in employment relationships is related the probability of entering into entrepreneurship. We do so by specifying a simple choice model faced by individuals currently in paid employment. From this choice model, we derive the conditions under which relative rates of entrepreneurship are increasing in match quality.

We model individuals choosing between three alternatives: 1) remaining in their current job; 2) accepting an employment offer from a new employer; and 3) entering entrepreneurship in response to a (perceived) entrepreneurial opportunity. The wage in the current job is given by $y_c$; the value of the alternative employment offer is given by $y_a$; and the value of the entrepreneurial offer is given by $y_e$. Each of these is specified as follows.

The wage in the current job derives from two components: the value of the individual’s search-good skills (i.e., those skills perceived equally by the current and alternative employer) and the value of the match-specific component. We assume these components are normally distributed.

$$y_c = a + m, \text{ where } a \sim N(\mu_a, \sigma_a) \text{ and } m \sim N(0, \sigma_m)$$  \hspace{1cm} A1)

Note that match quality may be positive or negative in this specification, but the distribution of current wages in the population is centered on the mean market value of search-good skills $\mu_a$.

The value of alternative employment offers is similarly driven by two components:
\[ y_a = a + e \quad \text{where} \ e \sim N(0, \sigma_e) \]  

(A2)

As with the current wage, the distribution of external offers is centered on \( \mu_a \), but deviations are driven by \( e \), not match quality \( m \), because match quality is an experience good. \( e \) can be thought of as due to two different factors: 1) differences in firm wages relative to the current employer (i.e., firm fixed effects) due to differences in firm characteristics; or 2) perceptual errors by the individual as to the value of the job.\(^{15}\) The firm fixed effects can be thought of as differences across firms in how they value a particular set of skills.

We specify a single parameter \( s \) that captures the true value of the entrepreneurial opportunity. For simplicity we initially assume that the value of an entrepreneurial opportunity does not depend on individual skills \( a \), i.e., that the entrepreneurial draws and wage draws are independent. (We relax this assumption below.) In comparison to external employment offers, the value of an entrepreneurial offer may depend more heavily on individual perceptions. Some individuals may be unlikely to identify opportunities when they arise, while others may be overly optimistic about the value of the opportunity. Thus the perceived value of the entrepreneurial opportunity depends on the true value of the opportunity \( (s) \) and the degree of perceptual error \( (d) \):

\[ y_e = s + d \quad \text{where} \ s \sim N(\mu_s, \sigma_s) \text{ and } d \sim N(0, \sigma_d) \]  

(A3)

\(^{15}\) Since a characteristic of employment offers is typically that they are rather specific about the initial wage attached to the position, there may be little room for misperception. However, people may over- or under-estimate the value of future earnings from the employer.
We assume that individuals make choices based on the value of the opportunities as they perceive them.

Our interest is in how individual choice behavior depends on match quality $m$.

The individual’s decision rules are as follows:

1) Change employers if $y_a > y_c$ and $y_a > y_e$
2) Enter entrepreneurship if $y_e > y_c$ and $y_e > y_a$
3) Otherwise stay put

Note that the conditions $y_a > y_e$ and $y_e > y_a$ imply that the relative distributions of employment offers and entrepreneurial opportunities affect choice behavior. However, these conditions do not depend on match quality, and they only become relevant if individuals draw both employment offers and entrepreneurship offers in each period. For convenience, and to retain the focus on the effects of match quality, we assume only one offer type arrives in each period. This means that we can focus on the conditions involving the current wage, $y_c$.

When an employment opportunity arises, the probability of changing employers conditional on match quality is given by

$$Pr(\text{Change employers } | \ m) = Pr(y_a > y_c | m)$$

substituting from (A1) and (A2) and simplifying yields

$$Pr(\text{Change employers } | \ m) = Pr(e > m | m) \quad \text{(A4)}$$

Similarly, when an entrepreneurial opportunity is perceived, the probability of entering entrepreneurship is given by

$$Pr(\text{Enter entrepreneurship } | \ m) = Pr(y_e > y_c | m)$$
Substituting from (A1) and (A3) and rearranging:

$$\Pr(\text{Enter entrepreneurship} \mid m) = \Pr(s + d - a > m \mid m )$$

(A5)

To compare these probabilities for a critical value of match quality, we compare the cumulative distribution functions for $e$ and $(s + d - a)$, respectively. By assumption,

$$e \sim N(0, \sigma_e),$$

so

$$\Pr(\text{Change employers} \mid m) = 1 - \Phi(m / \sigma_e)$$

(A6)

where $\Phi$ is the cumulative distribution function for the standard normal. The quantity $(s + d - a)$ is the sum of three normal variates. By assumption, these are drawn independently, so

$$(s + d - a) \sim N(\mu_s - \mu_a, \sqrt{\sigma_a^2 + \sigma_s^2 + \sigma_d^2})$$

where $\mu_s - \mu_a$ is the difference in mean returns to entrepreneurship and to search good skills. Define $\sigma_k = \sqrt{\sigma_a^2 + \sigma_s^2 + \sigma_d^2}$. Then:

$$\Pr(\text{Enter Entrepreneurship} \mid m) = 1 - \Phi \left( \frac{(m - (\mu_s - \mu_a))}{\sigma_k} \right)$$

(A7)

For simplicity, consider first the case in which the expected returns to entrepreneurship and search good skills are the same ($\mu_s = \mu_a$). In this case, the effect of match quality depends on the relative magnitudes of $\sigma_e$ and $\sigma_k$. When $\sigma_e = \sigma_k$, the odds of entrepreneurial entry (relative to changing employers) do not depend on match quality, as $m / \sigma_e = m / \sigma_k$. When $\sigma_e < \sigma_k$, entry into entrepreneurship dominates employer changes.
when \( m > 0 \), while employer changes dominate when \( m < 0 \). This is illustrated in Figure A1, where \( \sigma_e = 1 \) and \( \sigma_k = 2 \). Individuals who are poorly matched with their current employer (\( m < 0 \)) are more likely to find a better employment offer elsewhere than to find an entrepreneurial opportunity that dominates their current job. The relative likelihood of changing employers increases as match quality declines. Conversely, the relative likelihood of entering entrepreneurship increases as match quality increases, and well-matched individuals are more likely to become entrepreneurs than to change jobs. The situation when \( \sigma_e > \sigma_k \) is, of course, reversed.

Now consider the case where returns to search-good skills in paid employment dominate the returns to entrepreneurship (\( \mu_s < \mu_a \)). In terms of Figure A1, this implies an upward shift in the threshold value above which entrepreneurship dominates changing employers, as the two lines will cross at a higher level of \( m \). This is because for any given level of match quality, the likelihood of entering entrepreneurship drops as the relative rewards drop.

This analysis confirms the intuition that the likelihood of entering entrepreneurship, conditional on turnover, increases in match quality \( m \), provided that the following assumption holds:

\[
\sigma_e < \sigma_k \tag{A8}
\]

Put more starkly, our Proposition 1 only holds if (A8) holds. How reasonable is this assumption?

Recall that \( \sigma_e \) reflects variability across employers in their willingness to pay for workers with the same observable characteristics, as well as variability in individual
assessments of the value of those external offers. $\sigma_k$, by contrast, depends on the variability in the true value of entrepreneurial offers, variability in the value of search good skills, and variability in the perception of the value of entrepreneurial offers. It seems unlikely that the variability in employer willingness to pay for identical workers should exceed the variability in search-good skills and entrepreneurial opportunities. For example, in Hamilton (2000), the standard deviation of income from self-employment was two to four times the standard deviation of wages from employment, depending on the measure of self-employment income used. Similarly, Borjas and Bronars (1989) estimated that the standard deviation of weekly income for the self-employed was twice that for wage-earners. Even if we make the (very strong) assumption that all of the variation among wage-earners in these studies is due to $e$, the assumption that $\sigma_e < \sigma_k$ is very plausible. Adding in errors in the perception of the value of entrepreneurial opportunities only strengthens this conclusion.

We have assumed that the value of entrepreneurial opportunities does not depend on an individual’s search-good skills, i.e., that $a$ and $s$ are uncorrelated. However, a positive correlation seems likely. This diminishes the magnitude of $\sigma_k$ correspondingly:

$$\sigma_k = \sqrt{(\sigma_a^2 + \sigma_s^2 + \sigma_d^2 - 2\rho \sigma_a \sigma_s)}$$

(A9)

The impact of a positive correlation depends on the magnitude of the correlation $\rho$ and the relative magnitudes of $\sigma_a$ and $\sigma_s$. Consider the case where $\sigma_a = c \sigma_s$ and $\rho = 1$. Then (A8) can be written as

$$\sigma_k = \sqrt{(\sigma_a^2 + c^2 \sigma_a^2 + \sigma_d^2 - 2 c \sigma_a^2)}$$

Simplifying yields
σ_k = \sqrt{(\sigma_a^2(c^2 - 2c + 1) + \sigma_d^2)}

or

σ_k = \sqrt{(\sigma_a^2(c-1)^2 + \sigma_d^2)}

\text{A10)}

Under the conservative assumption that \( c=1 \) and \( \rho = 1 \), (10) shows that the condition in (A8) holds if the variability in the perception of the value of entrepreneurial opportunities \( \sigma_d^2 \) exceeds the variability in the perception of the value of employment offers \( \sigma_e^2 \). Alternative employment offers routinely include precise details on compensation, while the value of an entrepreneurial opportunity is estimated much less precisely, so this assumption has substantial plausibility. Moreover, crude estimates from Hamilton (2000) and Borjas and Bronar (1989) would put \( c \) between 2 and 4, meaning that \( \sigma_k \) depends on some positive multiple of the variability in the value of search good skills \( \sigma_s \), which likely exceeds the variability in the perception of the value of alternative employment offers \( \sigma_e \). Thus even in the case of maximal correlation between \( a \) and \( s \), the assumption in (A8) appears to be a reasonable description of employment and entrepreneurship in developed economies.
Figure A.1. Match Quality and Probability of Entering Entrepreneurship vs. Changing Employers