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Experience and Entrepreneurship

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Experience and Entrepreneurship

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We document in two very different datasets an inverted U-shaped relationship between work experience and entrepreneurship among movers. The first dataset consists of 1,248, U.S. lawyers who were forced to seek alternative employment after the sudden dissolutions of their employers. The second consists of over 7.5 million observations on Swedish workers, where job separation is predominantly unrelated to job destruction. Our empirical results are consistent with a model of stochastic accumulation of employer-specific and transferable skills, where the mix between the two is not fully observable to outside parties.

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1. Introduction

Prior to engaging in entrepreneurship, individuals often acquire relevant experience at employing organizations. Such experience may alter their preferences for entrepreneurship versus organizational employment. But, evidence on the empirical relationship between the accumulation of experience and the rate of entrepreneurship is decidedly mixed. One study of academic scientists found that the rate of transition to commercial science increased monotonically but non-linearly with experience, as indicated by publication counts and number of jobs held [Stuart and Ding (2006)]. A study of MBA graduates produced a non-monotonic relationship between organizational experience (i.e., employment tenure) and entrepreneurship that changed direction twice over the experience distribution [Dobrev and Barnett (2005)]. Another study, of Danish citizens, found that the rate of transition to entrepreneurship decreased with one's experience at their current employer [Sørensen (2007)]. Similar results were obtained from a study of mutual fund managers [Kacperczyk, (2013)]. Last, a study of lawyers found an inverted U-shaped relationship between experience and the rate at which lawyers departed their employer to found a new firm [Campbell, et al. (2012)].

Prior work demonstrates the difficulty of estimating the effects of experience on entrepreneurship (and of measuring experience appropriately). The mixed results likely reflect differences across contextual settings (e.g., countries, industries, organizations) in the costs associated with the fundamental choice among labor market alternatives. For example, experience may facilitate the acquisition of entrepreneurial knowledge [e.g., Sorensen and Sharkey (2012)] and increase entrepreneurial performance [Agarwal *et al.* (2004), Franco and Filson (2006)] but it also raises the opportunity cost of abandoning wage work. Extended experience in wage work or in a particular job may also indicate an individual's innate preference for continued organizational employment, as opposed to self-employment or to founding or joining a new venture. Variations across individuals in their general preferences for employment at established organizations [Sørensen (2007), Elfenbein, Hamilton, and Zenger (2010)] or, more specifically, for their current employer [Ghiselli (1974), Viscusi (1976), Jovanovic (1979a, 1979b), Judge, Heller, and Mount (2002)], is a form of unobserved heterogeneity that is difficult to account for in analyses of archival data.

Perhaps the cleanest way to estimate the effect of experience on the choice between wage work and entrepreneurship is to identify a setting in which the

choice to separate from an employer is absent. For example, when mobility is induced by an aggregate exogenous shock, such as an unexpected employer failure, unobserved individual preferences for current employment are unlikely to drive occupational choices. Motivated by this insight, we first situate our analysis in the context of six large U.S. law firm dissolutions that displaced over 1,400 lawyers in 2008-09. As we document below, these dissolutions were sudden, unanticipated, and largely attributable to industry conditions so that displacement should not reflect negatively upon individual ability (Gibbons and Katz, 1991). We track the lawyers' post-dissolution labor market outcomes in order to evaluate the effect of accumulated legal experience on their rates of entrepreneurial activity (i.e., self-employment, founding or joining a new firm) as opposed to regaining employment at an established organization. The results of this analysis inform our subsequent development of a model of occupational choice that is consistent with the specific empirical evidence from law firm dissolutions but also general enough to be tested more broadly in settings where mobility is not exogenously induced.

Our model of occupational choice is built on the assumption that employees develop both employer-specific and general skills as they accumulate experience but that employers can only observe total skill (i.e., the sum of these two skill components). We assume that the general component can be utilized by all employers and that employer-specific skill can be utilized only by employers that pay an absorption cost. As an alternative to organizational employment, we also assume that an individual can incur a business formation cost to found an organization that effectively utilizes all her skills.

The key insight of our model is that the individual choice between organizational employment and entrepreneurship varies with (a) the difference between individual and employer information on the general and employer-specific skills that the individual accumulates with experience and (b) the difference between the individual's business formation cost and the potential employer's absorption cost. Our model predicts that when mobility is induced, moderately-experienced individuals are most likely to choose entrepreneurship because their willingness to incur the business formation costs exceeds the willingness of employers to incur the absorption cost. Conversely, at both high and low levels of experience individuals tend to choose wage work because business formation costs are relatively high at low skill levels and because absorption costs are relatively low at high skill levels. Consequently, an inverted U-shaped relationship between experience and the rate of entrepreneurship is to be expected in the dissolution context. This expectation is consistent with

our empirical analyses of the displaced lawyers' occupational choices.

To test our claim that our model generalizes readily to other settings, we test its predictions in a context characterized by predominantly voluntary job separation. We use longitudinal employment data that covers most of Sweden's economy from 2001 to 2007. In contrast to law firm dissolutions, the employed individuals in this analysis are at simultaneous risk of making three distinct occupational choices: (1) remaining with their current employer, (2) transitioning to another employer, or (3) engaging in entrepreneurship. We, therefore, analyze separation from one's employer as the primary outcome and then, conditional on job separation, analyze entrepreneurial transitions for individuals who depart their employers as a secondary outcome. The results of this analysis also support our model's prediction. Although job separation is decreasing with one's experience, we observe an inverted U-shaped relationship between experience and the rate of entrepreneurship conditional on job separation.

2. Evidence from law firm dissolutions

We first analyze a large sample of lawyers who were forced to make occupational choices due to the unexpected dissolution of their employers. The sample used in this section was constructed for Rider (2013), which studied the impact of network contacts on hiring and individual career attainment. The sample consists of 1,426 lawyers previously employed in six large U.S. firms; all were forced to seek alternative employment after their employers dissolved. As documented below, an analytically appealing aspect of these data is that each firm's dissolution was fairly rapid, thereby ameliorating selection issues arising from the greater propensity of employees with rich labor market opportunities to anticipate firm failure and depart prior to dissolution. In the appendix, we briefly describe each firm and detail the dissolutions.

2.1 Sample Construction

Of the 1,459 biographies extracted, 1,426 had sufficient data for inclusion in our sample. These biographies were supplemented with information taken from various law directories and the Internet Archive. Data for each individual at the time of employer dissolution include some demographic information, the lawyer's level (e.g., associate, partner), area(s) of practice, office location, law school attended, and the year they passed the bar. Subsequent employment outcomes were identified using searches of other firms' websites, the online version of Martindale-Hubbell, individuals' LinkedIn profiles, ZoomInfo,

and other internet resources. A total of 1,248 employment outcomes were identified, accounting for 88 percent of the original sample. Table 1 summarizes the distribution of observations across firms and rank.¹

Table 1. *Lawyers in sample, by dissolved firm*

Firm	Partners	Associates	Other	Total	Employed	% Employed
Dreier	49	52	19	120	92	77%
Heller Ehrman	113	200	39	352	320	91%
Morgan Finnegan	32	32	8	72	62	86%
Thacher Proffitt & Wood	55	106	14	175	135	77%
Thelen	188	152	52	392	367	94%
Wolf Block	155	111	49	315	272	86%
Totals	592	653	181	1,426	1,248	88%

2.2 Data and Measurement

We identified post-dissolution labor market outcomes by conducting extensive searches of law firms’ website directories, the Martindale-Hubbell online directory, LinkedIn profiles, ZoomInfo, and other internet resources. Of the 1,426 lawyers in the full sample, only 1,248 (88 percent) were identified as re-employed within approximately 9 to 12 months following dissolution, when we ceased searching. Importantly, employment was verified only if we located a lawyer using our search methods; it is possible that some employed lawyers may not have been located. Therefore, we analyze only the sample of 1,248 lawyers for whom post-dissolution labor market outcomes were identified. But, as a robustness check on sample selection bias, we report results from analyses in which we do and do not account for sample selection by including the inverse Mills ratio (i.e., the reciprocal of the predicted probability that a

¹ Almost 90% of the “other category are “Of Counsel” or “Counsel” or “Senior Counsel” (the other 10% are special situations like staff lawyer or firm advisor). These lawyers are not partners but also not junior lawyers. They typically have very specialized skills that are valuable to the firm and have indefinite tenure, but their compensation is based on salary plus bonus (like an associate) and not profit-sharing (like a partner). Occasionally, however, this is a transitional title given to a new hire who cannot become partner until elections are held.

lawyer was employed and located by the sampling methods) in our specification.

Dependent Variable. We measure a lawyer’s transition to entrepreneurship by coding an indicator variable as 1 if immediately after dissolution the lawyer founds a company, joins a newly-founded company, or enters self-employment (i.e., a solo practitioner) and as 0 otherwise. In our sample, 28 lawyers found or co-founded a new company and an additional 12 lawyers join one of these companies so the sample’s rate of entrepreneurial transition is approximately 3 percent.

Regressors. Legal experience for each lawyer was calculated by subtracting the year in which the lawyer was first admitted to a state bar from 2008. To account for heterogeneity by dissolved firm, geographic location, and practice area, we rely on fixed effects specifications. We include unreported fixed effects for the six dissolved firms (i.e., Heller, Thelen, Thacher, WolfBlock, Dreier, and Morgan & Finnegan); office location fixed effects for Los Angeles, Northern New Jersey, New York, Philadelphia (including suburban areas in Southern New Jersey), San Francisco, Silicon Valley, Washington, and “All Other” (Anchorage, Boston, Harrisburg, Hartford, Madison, San Diego, Seattle, Stamford, and Wilmington); and practice area fixed for Litigation, Bankruptcy and Restructuring, Corporate Law, Corporate Finance, Intellectual Property, Securities, Real Estate, International Law, Labor and Employment, Technology, and “All Other.”

Gender was coded by five trained analysts who reviewed lawyer names, photos, and/or biographies. The “Female” variable takes a value of 1 if most of the five analysts identified the lawyer as female and 0 otherwise. Using the same data, the analysts also classified each lawyer’s race and/or ethnicity according to the U.S. Census Bureau’s racial and ethnic classifications. Over 86 percent of the lawyers in the full sample were identified as “White”, and “Black” was the next most common category (3.5 percent). Therefore, we coded two variables that equal 1 if the majority of the five coders coded an individual as “White” or “Black,” respectively, and 0 otherwise. The omitted category includes lawyers classified primarily as Arab, Asian, Indian, Hispanic, Latino, or Middle Eastern; there are insufficient observations in these other categories to include more race variables.

To account for geographic variance in access to law school alumni networks, we included a variable for each lawyer that is the percentage of all National Law Journal 250 lawyers within the lawyer’s metropolitan area that graduat-

ed from the focal lawyer’s law school. We also included the numerical rank of each lawyer’s law school in the 2008 *U.S. News & World Report* “Best Law School” rankings to proxy for legal ability. Unranked schools were assigned a rank of 120, the lowest ranked school in the rankings. A partner indicator variable was coded 1 if a lawyer was a partner at their prior (dissolved) firm and 0 if the lawyer was an associate, counsel, or another title.

2.3 Summary Statistics

Table 2 provides some simple summary statistics. The sample is divided almost evenly between partners (41.5 percent) and associates (43.6 percent), with lawyers in other types of positions (e.g., of counsel or contract attorneys) accounting for the remaining 12.7 percent. Mean legal experience is about 12 years. There are relatively few strong correlations across the variables, with the obvious exception that legal experience is strongly associated with being a partner. But, it does seem, in our sample at least, that Whites are more likely to be partners than are Blacks, while men are more likely to be partners than women. The disparity between men and women is at least in part explainable by the differences in legal experience, but this does not appear to be true for the corresponding disparity by race. Overall, approximately three percent of the sample entered entrepreneurship in preference to joining an established firm. The correlations between the entrepreneurship indicator and other variables fail to reveal any notable monotonic relationships in the raw data.

2.4 The Probability of Entrepreneurship

Figure 1 plots raw rates of entrepreneurship by quintile of legal experience for all 1,248 lawyers in the sample. The figure documents an inverted U-shaped association between experience and entry into entrepreneurship. Fewer than 2 percent of the least-experienced displaced lawyers chose entrepreneurship over joining an incumbent firm; the rate was three times greater for the third quintile, before falling to about 2.5 percent among the most experienced. Figure 2, which plots separate rates for partners and associates (the remaining lawyers in the sample are omitted), indicates that the peak rate of entrepreneurship is found among the most experienced associates and the least experienced partners.

Table 2. *Summary statistics and correlations (N=1,248).*

	St.		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Mean	Dev.								
(1) Lawyer enters entrepreneurship (0/1)	0.03	0.18	1.00							
(2) Female (0/1)	0.30	0.46	0.02	1.00						
(3) Partner (0/1)	0.45	0.50	-0.04	-0.20	1.00					
(4) ln (years of legal experience)	2.49	0.93	0.02	-0.25	0.66	1.00				
(5) Rank of law school attended	40.6	37.8	0.02	-0.01	-0.07	-0.06	1.00			
(6) % local attorneys from same law school	0.08	0.06	-0.02	0.01	0.01	-0.01	-0.06	1.00		
(7) Black (0/1)	0.03	0.16	0.03	0.05	0.02	-0.03	-0.06	0.04	1.00	
(8) White (0/1)	0.89	0.32	-0.01	-0.14	0.18	0.20	0.04	0.02	-0.38	1.00

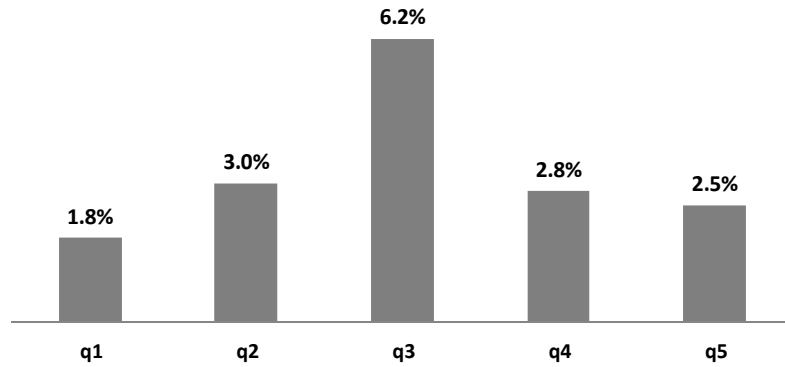


Figure 1. *Rates of Entrepreneurship by quintiles of legal experience. 1,248 lawyers.*

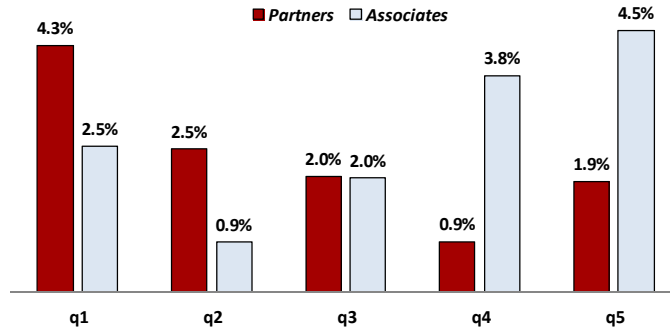


Figure 2. Rates of Entrepreneurship by quintiles of legal experience. 556 partners, 564 associates.

2.5 Analysis

Tables 3 and 4 report the results of probit regressions that assess whether the raw patterns observed in the figures are robust to conditioning on a broad range of control variables. The specifications from one column to the next are largely the same, including controls for firm, city and practice area, demographics (gender, race), rank of law school, and a proxy for the size of a lawyer’s local professional network. The main differences across specifications are in the sample coverage and the use of controls for ‘rank’.

Model 1 includes the basic regression specification with only firm fixed effects. Models 2 and 3 include office and practice area fixed effects, respectively, and Model 4 includes firm, office, and practice fixed effects. In these models, the main effect of experience on the likelihood of entrepreneurship is uniformly positive and marginally significant ($p < 0.10$). In Models 5 and 6 we check for the presence of an inverted U-shaped relationship between experience and entrepreneurship. Although the signs are consistent with such a relationship, the effects are not statistically significant regardless of how we sequence the natural log and square transformations of the experience variable. Model 7 confirms that the lack of statistical significance is not simply attributable to the natural log transformation.

From these models, we infer that the empirical relationship depicted in Figure 1 is not robust to the *ceteris paribus* condition. But, we have not yet accounted for the relationship depicted in Figure 2 – the effect of experience differs

Table 3. *Probit models of the likelihood that a lawyer transitions to entrepreneurship.* ($Y_i = 1$ if “Yes”; 0 if “No”)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Female (0/1)	0.128 (0.174)	0.131 (0.172)	0.130 (0.178)	0.126 (0.175)	0.104 (0.178)	0.126 (0.176)	0.105 (0.177)	0.061 (0.178)	0.176 (0.177)
Rank of law school attended	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	-0.002 (0.002)
In (years of legal experience)	0.150 † (0.091)	0.154 † (0.090)	0.156 † (0.091)	0.158 † (0.090)	0.632 (0.467)	0.459 (1.35)	0.632 (0.467)	0.328 ** (0.114)	0.858 ** (0.213)
[ln (years of legal experience)]²					-0.105 (0.100)				
ln[(years of legal experience)²]						-0.138 (0.632)			
Years of legal experience							0.020 (0.021)		
(Years of legal experience)²							-0.0003 (0.001)		
% of MSA alumni attorneys	-0.071 (1.11)	0.204 (1.22)	-0.162 (1.13)	0.201 (1.24)	0.175 (1.22)	0.214 (1.24)	0.179 (1.23)	0.294 (1.24)	-5.48 * (2.40)
Black (0/1)	0.325 (0.425)	0.310 (0.433)	0.462 (0.425)	0.449 (0.437)	0.451 (0.439)	0.451 (0.438)	0.445 (0.432)	0.570 (0.474)	1.68 ** (0.558)
White (0/1)	0.083 (0.256)	0.070 (0.253)	0.145 (0.239)	0.133 (0.237)	0.168 (0.234)	0.134 (0.237)	0.141 (0.235)	0.186 (0.243)	-0.876 * (0.406)
Partner (0/1)								-0.603 ** (0.215)	-2.38 ** (0.645)
Inverse Mills ratio									-4.70 ** (1.48)
Constant	-6.19 ** (0.396)	-6.30 ** (0.478)	-6.29 ** (0.425)	-6.54 ** (0.483)	-7.03 ** (0.630)	-6.63 ** (0.639)	-6.30 ** (0.435)	-6.93 ** (0.560)	-5.46 ** (0.784)
N (observations)	1,248	1,248	1,248	1,248	1,248	1,248	1,248	1,248	1,248
Lawyer sample	All	All	All	All	All	All	All	All	All
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Office city fixed effects	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Practice area fixed effects	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log pseudolikelihood	-147.08	-146.02	-144.07	-142.74	-142.22	-142.73	-143.29	-138.42	-133.85
Wald Chi-square (d.f.)	1,905.1 (11)	2,061.9 (18)	1,647.5 (21)	1,579.4 (28)	2,053.2 (29)	1,577.1 (29)	1,841.5 (29)	1,045.8 (29)	616.7 (30)

Robust standard errors in parentheses.

** p < 0.01; * p < 0.05; † p < 0.10

Table 4. *Probit models of the likelihood that a lawyer transitions to entrepreneurship. ($Y_i = 1$ if “Yes”; 0 if “No”)*

	(10)	(11)	(12)
Female (0/1)	-0.031 (0.299)	0.167 (0.277)	0.499 (0.373)
Rank of law school attended	0.001 (0.004)	0.001 (0.003)	-0.011 (0.007)
ln (years of legal experience)	-0.486 (0.387)	0.666 ** (0.201)	0.004 (0.468)
% of MSA alumni attorneys	-3.84 (2.77)	-2.07 (2.64)	-1.68 (2.77)
Black (0/1)	0.940 † (0.551)		
White (0/1)	-0.378 (0.467)		-0.699 (0.596)
Inverse Mills ratio	-0.111 (0.996)	-2.66 ** (0.811)	-1.68 (1.06)
Constant	-4.68 ** (1.07)	-7.26 ** (0.841)	-4.24 ** (1.53)
N (observations)	556	564	128
Lawyer sample	Partners	Associates	Others
Firm fixed effects	Yes	Yes	Yes
Office city fixed effects	Yes	Yes	Yes
Practice area fixed effects	Yes	Yes	Yes
Log pseudolikelihood	-41.03	-45.22	-29.33
Wald Chi-square (d.f.)	439.9 (24)	593.6 (21)	238.8 (19)

Robust standard errors in parentheses.

for associates and partners. In Model 8, we include the partner indicator variable (the omitted category includes associates and all other lawyers). For associates and other non-partners, the main effect of accumulated experience on entrepreneurship is positive and statistically significant ($p < 0.01$). Partners are substantially less likely than other lawyers to become entrepreneurs ($p < 0.01$). These main effects hold when we include the Inverse Mills ratio in Model 9 to control for sample selection bias. Using the coefficients from Model 9, we estimate that the mean marginal effect of changing the Partner variable from zero to one is to decrease the predicted probability of a lawyer making an entrepreneurial transition by approximately 59 percent (a 0.018 reduction from a baseline probability of 0.032).

In Table 4, we evaluate the main effect of experience within the associate and partner sub-samples. Consistent with the raw data in Figure 2, we find that

the main effect of experience is positive and statistically significant for associates ($p < 0.01$) and negative but not statistically significant for partners. Using the coefficients in Model 11, we estimate that the mean marginal effect of increasing the legal experience variable by 1 unit (approximately 2.7 years) above the mean is to increase the predicted probability of an associate making an entrepreneurial transition by approximately 23 percent (a 0.006 increase from a baseline probability of 0.026).

2.6 Interpretation

While the raw data indicate an inverted U-shaped relationship between experience and the rate of entrepreneurship, this relationship does not remain statistically significant in the regressions after including full sets of controls. Instead, what we observe is that the most experienced associates and the least experienced partners are the lawyers most likely to enter entrepreneurship; that experience is positively associated with entrepreneurship among associates but negatively among partners; and that overall, partners are much less likely than associates to become entrepreneurs.² What can we infer from this evidence? Our post-hoc interpretation is that the decreased probability of entrepreneurship after promotion to partner, and the contrasting effects of experience on entrepreneurship among associates and partners reflect the public information that promotion conveys about an individual's ability.

Consider first the level effect of rank. Associates are employed for a fixed probationary term, at the end of which they are evaluated by firm partners based on their abilities to not only perform legal work but, also, to recruit, retain, and relate to clients (Galanter and Palay, 1991: 28-30). Associates who are deemed by their employer's partnership to be capable of developing and maintaining sufficiently profitable client relationships are promoted to partner and those who are not are dismissed or, occasionally, retained as permanent associates. When the skills valued by a newly-promoted partner's current firm are transferable, promotion to another firm conveys information to other potential employers, who are then more likely to make attractive employment offers.

In the canonical economic model of promotion [Waldman (1994)], the current employer prevents the newly-promoted workers from being bid away by other employers by granting large wage increases to those it promotes.³ The higher

² Recalling the sample's high correlation between experience and the partner rank (0.66), the different effects of experience among partners and associates are consistent with the inverted U-shaped relationship depicted in Figure 1.

³ The key evidence that this is a signaling issue is that wage increases upon promotion

wage discourages both movement to other incumbent firms and to entrepreneurship. In our setting, where the current employers have been dissolved, pre-emptive wage increases are of course moot. It then seems plausible that potential employers of displaced lawyers are more likely to make attractive offers to partners than they are to otherwise observationally equivalent associates. In turn, partners are more likely to accept the offers they receive and, consequently, are less likely to become entrepreneurs.

How might informational frictions about ability explain the disparate relationships pre- and post- promotion between experience and entrepreneurship? In the canonical economic model, employee ability is entirely unobservable to outside firms, yet it is assumed to grow deterministically; the only uncertainty is the rate at which an individual's ability grows [e.g., DeVaro and Waldman (2012)]. This does not seem sufficient to explain our results: the only source of information is the promotion event, and the amount of experience an individual has provides no additional information. We think it more plausible to suppose the following. The lawyer's ability consists of two parts, a firm-specific component and a freely transferrable component, each of which accumulates stochastically. Total ability is, at least up to a degree, observable (for example, their clients can be observed and letters of reference can be obtained), but outside firms can never be certain about the fraction of this ability that is firm-specific. That is, they do not know how many clients a lawyer will be able to retain through an employment transition, and they are equally unsure how much of a lawyer's previous success with these clients was specific to the firm for which he worked. In this setting, extensive experience induces a presumption on the part of incumbent employers that the lawyer has sufficient transferable ability to merit an attractive offer, so few of those with the most extensive experience find entrepreneurship attractive. But there are also less experienced lawyers who, having accumulated experience more rapidly than average, are capable of performing successfully at a new employer but cannot convince them. These lawyers opt for entrepreneurship, where they can make use of their extensive skills. We will show in the next section that this framework generates the pattern observed in Figure 1 and is consistent with the results in Tables 3 and 4.

are smaller when skills are firm-specific and when there are pre-promotion publicly observable indicators of individual ability such as education [DeVaro and Waldman (2012)]. In academia, promotion is often accompanied by only modest salary increases, in large part because there is little information in a promotion that is not observable to outsiders by inspection of publication records.

3. A model of occupational choice conditional on job separation

In this section, we attempt to formalize, in a manner that might be applicable in varied contexts, the notion that the choice between employment at an incumbent firm and entrepreneurship is a result of information frictions. We will not be explicit about the context-specific distinction between associates and partners, and nor will we be explicit about the ability to retain or recruit clients. Instead, we will characterize the channel through which experience influences occupational choices in terms of experience's effect on the accumulation of skill, some of which may be only imperfectly transferable between employers. Moreover, few large-sample databases contain meaningful information about promotions, so our formal model will focus on the predictions that can be made with respect to the amount of work experience an individual has.

An agent currently employed in a firm, with work experience t , is endowed with two skills, X and Y , whose current values are $x(t)$ and $y(t)$. Skill Y is general, and can be freely exploited by any firm for which the agent works. Skill X is specific to the current employer, but it can be exploited by other firms upon payment of an absorption cost, c .⁴ The total value of the agent's output at the firm is the sum, $v(t) = x(t) + y(t)$. The firm produces under constant returns to scale and imposition of a zero profit condition implies that each employee is paid the value of his output, $v(t)$.

Both skills are accumulated over time, consistent with earnings rising with tenure and experience. We suppose that

$$dx(t) = \mu_x dt + \sigma_x z(t), \tag{1}$$

where $z(t)$ is a standard Wiener process with independent increments. Similarly,

⁴ The absorption cost may be interpreted in a number of ways. First, a firm may have to adapt its practices in order to make use of a new employee's firm-specific skills. For examples: a law firm may have to engage with clients different from those it is used to; a pharmaceutical firm hiring a researcher may need to invest in new lab equipment; and a football team hiring a new manager may need to recruit new assistant coaches and players. Second, c may represent the present value of the part of a new employee's firm-specific skills that are not transferable under any circumstances. For example, a salesperson transferring to a new location may be unable to make use of the location-specific part of her firm-specific skills. Third, c may represent the additional search cost borne by an agent committed to finding a firm that can make use of her firm-specific skills.

$$dy(t) = \mu_y dt + \sigma_y \zeta(t), \quad (2)$$

where $\zeta(t)$ is a standard Wiener process. Because X is skill accumulated only on the job, we set $x(0) = 0$. In contrast, Y may consist of readily transferable skills developed on the job, innate ability, and the product of education; we therefore allow $y(0)$ to take on an arbitrary positive value, y_0 . It then follows that the unconditional distributions of $x(t)$ and $y(t)$ are $N(t\mu_x, t\sigma_x^2)$ and $N(y_0 + t\mu_y, t\sigma_y^2)$.

We consider an agent faced with the sudden demise of his current employer. The agent knows the current values of X and Y . However, potential outside employers can only observe the agent's prior job performance, $v(t)$, and they must make inferences about $x(t)$ from observation of the pair $\{v(t), t\}$. Let $\bar{x}(t) = E(x(t) | v(t), t)$ denote outside employers' subjective expectation of $x(t)$ conditional on observables. Suppose that there is a constant exogenous job separation rate of λdt , and an instantaneous interest rate of r . Then, because any increments to X after employment at a new firm are independent of $x(t)$, potential employers will prefer to absorb X if $\int_0^\infty e^{-(r+\lambda)s} \bar{x}(t) ds > c$. That is, X is made use of in the new firm if $\bar{x}(t) > (r + \lambda)c$; otherwise, the new firm will only make use of Y .

After the agent begins work at the new firm, $x(t)$ and $y(t)$ are immediately observable. However, the value of $x(t)$ is irrevocably lost to the new employer if it did not pay the absorption cost at the time of hiring. It then follows that the wage earned in the new firm is given by

$$w(t+s) = \begin{cases} x(t+s) - x(t) + y(t+s), & \text{if } \bar{x}(t) < (r + \lambda)c \\ x(t+s) + y(t+s) - (r + \lambda)c, & \text{if } \bar{x}(t) \geq (r + \lambda)c \end{cases}, \quad \forall s \geq 0. \quad (3)$$

Let $Q(x(t), y(t), t+s)$ denote the expected value of separating from the new employer at some future time $t+s$. Then, the expected value to the agent of joining a new employer at time t is

$$\begin{aligned} W(x(t), y(t), t) &= \int_0^\infty e^{-(r+\lambda)s} w(t+s) ds + \int_0^\infty \lambda e^{-\lambda v} \int_0^v e^{-rs} Q(x(t), y(t), t+s) ds dv \\ &= \int_0^\infty e^{-(r+\lambda)s} w(t+s) ds + \tilde{Q}(x(t), y(t); r, \lambda) \end{aligned} \quad (4)$$

where $\tilde{Q}(\bullet)$ denotes the double integral term. Our assumption that $\tilde{Q}(\bullet)$ can be written as a function of only the current values of X and Y is possible because of the independent increments of the Wiener processes.

The agent may also choose to found his own startup. If he does, he is able to

exploit his firm-specific knowledge by establishing a firm designed to make use of all his skills. Firm creation costs $k > c$, and we shall continue to suppose an exogenous separation (in this case, failure) rate of λ . Hence, entrepreneurship undertaken by an agent with experience t pays $v(t) - (r + \lambda)k$, and the value of founding a startup is given by

$$V(x(t), y(t), t) = \int_0^{\infty} e^{-(r+\lambda)s} (x(t+s) + y(t+s) - k(r+\lambda)) ds + \tilde{Q}(x(t), y(t); r, \lambda) \quad (5)$$

We have written the expected present value of business closure, $\tilde{Q}(\bullet)$, to be the same as the value of job separation. This requires a symmetric treatment of specific skills at the time of separation. To accomplish this, we suppose that, even though an employer that chose not to pay c at time t does not have access to the employee's previously accumulated specific skill, $x(t)$, these skills are not lost forever: future employees that pay c can access $x(t)$ in addition to the specific skills accumulated after time t .

The agent will choose to found his own startup if $V(x(t), y(t), t) > W(x(t), y(t), t)$, and to work for a new employer if this inequality does not hold. Comparing (4) and (5), and noting that $k > c$ by assumption (so agents never establish startups if employers are willing to pay the absorption cost), the agent founds a startup if $\bar{x}(t) \leq (r + \lambda)c$ at the same time that $x_t \geq (r + \lambda)k$.

PROPOSITION 1. *For all $\mu_x > 0$, the probability, $p(t)$, that self-employment is chosen over wage employment is a non-monotonic function of t , with $p(0) = \lim_{t \rightarrow \infty} p(t) = 0$.*

PROOF. It is useful to view the problem as a signal extraction task for the potential employer. The outside employer's belief before observing $v(t)$ is that $x(t) \sim N(t\mu_x, t\sigma_x^2)$, while $v(t)$ provides a signal about $x(t)$. The noise of the signal, $y(t)$, has distribution $N(y_0 + t\mu_y, t\sigma_y^2)$. Standard Bayesian analysis for the Normal conjugate family therefore yields the posterior expectation

$$\bar{x}(t) = \frac{t\mu_x \sigma_y^2}{\sigma_x^2 + \sigma_y^2} + \frac{(v(t) - y_0 - t\mu_y)\sigma_x^2}{\sigma_x^2 + \sigma_y^2}. \quad (6)$$

Entry into entrepreneurship occurs if $\bar{x}(t) \leq (r + \lambda)c$ and $x(t) \geq (r + \lambda)k$. Given $x(t)$, the conditional probability that the outside employer will not want to pay the absorption cost, c , is

$$\Pr\{\bar{x}(t) \leq (r + \lambda)c \mid x(t)\}$$

$$\begin{aligned}
&= \Pr \left\{ y(t) \leq \frac{(r + \lambda)c(\sigma_x^2 + \sigma_y^2) - t\mu_x \sigma_y^2}{\sigma_x^2} + y_0 + t\mu_y - x(t) \right\} \\
&= \Pr \left\{ \phi(t) \leq \frac{(\sigma_x^2 + \sigma_y^2)((r + \lambda)c - t\mu_x)}{\sigma_y \sigma_x^2 \sqrt{t}} - \frac{\sigma_x \varphi(t)}{\sigma_y} \right\}, \tag{7}
\end{aligned}$$

where $\phi(t) = (y(t) - y_0 - t\mu_y)t^{-1/2}\sigma_y^{-1}$ and $\varphi(t) = (x(t) - t\mu_x)t^{-1/2}\sigma_x^{-1}$ are independent standard normal random variables. In equation (7), the conditional probability takes $\varphi(t)$ as given.

If the agent does not obtain an offer of wage employment that makes use of X , he will prefer entrepreneurship to wage employment as long as $x(t) \geq (r + \lambda)k$. This in turn requires that $\varphi(t) \geq ((r + \lambda)k - t\mu_x)t^{-1/2}\sigma_x^{-1}$, so the unconditional probability of entrepreneurship among agents with experience t is

$$p(t) = \Pr\{\bar{x}(t) \leq (r + \lambda)c \wedge x(t) > (r + \lambda)k\} = \int_{\frac{(r + \lambda)k - t\mu_x}{\sigma_x \sqrt{t}}}^{\infty} \int_{-\infty}^{h(\varphi, t)} d\Psi(\phi) d\Psi(\varphi), \tag{8}$$

where Ψ is the standard normal CDF, and

$$h(\varphi, t) = \frac{(\sigma_x^2 + \sigma_y^2)((r + \lambda)c - t\mu_x)}{\sigma_y \sigma_x^2 \sqrt{t}} - \frac{\sigma_x \varphi}{\sigma_y}. \tag{9}$$

Note that the initial value, y_0 , and the trend growth, μ_y , of general skill have no bearing on the likelihood of entrepreneurship. Finally, it is easy to verify the following limits

$$p(0) = \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} d\Psi(v) d\Psi(w) = 0, \tag{10}$$

and

$$\lim_{t \rightarrow \infty} p(t) = \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} d\Psi(v) d\Psi(w) = 0, \tag{11}$$

as claimed in Proposition 1.⁵ ●

⁵ Proposition 1 also holds for $\mu_x < 0$. When $\mu_x = 0$, $p(t)$ is monotonically increasing, and asymptotically approaches an upper bound of $\frac{1}{4} - (2\sqrt{2\pi})^{-1} \int_0^{\infty} e^{-w^2/2} \operatorname{erf}\left(\frac{\sigma_x w}{\sigma_y \sqrt{2}}\right) dw$.

Figure 3 illustrates the stochastic process underlying Proposition 1. Independent sample paths for $x(t)$ and $y(t)$ are sketched; they are drawn excessively smoothly for visual clarity. The subjective mean, $\bar{x}(t)$, is derived from observing only the sum, $v(t) = x(t) + y(t)$. If $x(t)$ grows faster than its trend, or $y(t)$ grows slower than its trend, $\bar{x}(t)$ will grow more slowly than $x(t)$, and may fall far behind it. Figure 1 illustrates the consequences for the agent of his employer’s dissolution at three distinct levels of experience. If the agent loses his job when he has experience t_1 , he will take wage work at a new employer but not be able to make use of his firm-specific skills. If dissolution occurs at t_2 , however, the agent chooses entrepreneurship – he knows that his firm-specific skills are sufficient to justify payment of k , but outside employers do not yet believe that they are large enough to justify payment of c . Finally, dissolution at t_3 enables the agent to take a position at a firm willing to pay the absorption cost, c .

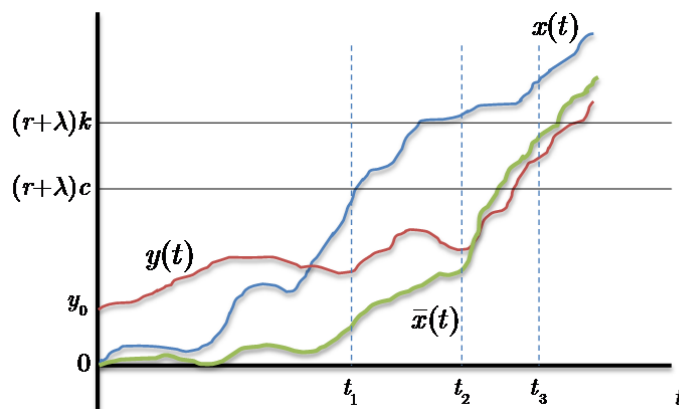


FIGURE 3. *Skill accumulation and outsider beliefs about firm-specific skill.*

Figure 4 provides some numerical plots of (8) for different trend growth rates of $x(t)$. As μ_x declines, agents with little experience are less likely to found a startup, while the more experienced become more likely to do so. The intuition for this result is straightforward upon reference to Figure 3. Startups are founded whenever $x(t)$ is greater than $(r+\lambda)k$ and $\bar{x}(t)$ is less than $(r+\lambda)c$, and the window during which these two conditions are simultaneously satisfied occurs later on average when μ_x is smaller. Figure 5 shows that increases in the variances of x and y have quite disparate effects, with an increase in the variance of x (y) increasing (decreasing) the rate of entrepreneurship among agents with high and low levels of experience, and having the opposite

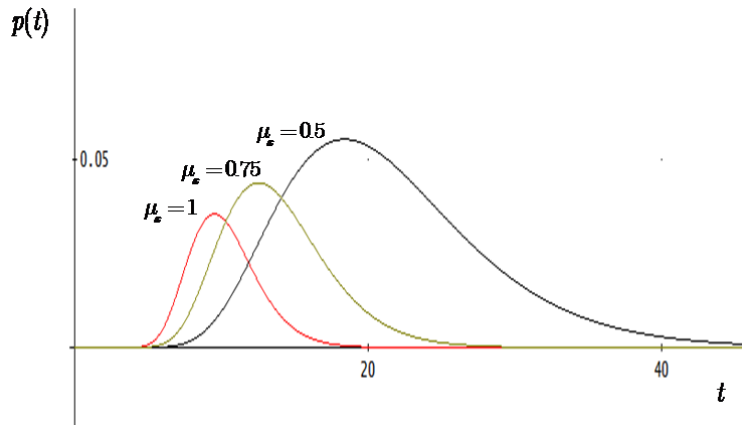


FIGURE 4. Probability of entrepreneurship as a function of work experience. Numerical plots $\sigma_x=1$, $\sigma_y=1$, $(r+\lambda)c=10$, $(r+\lambda)k=12$.

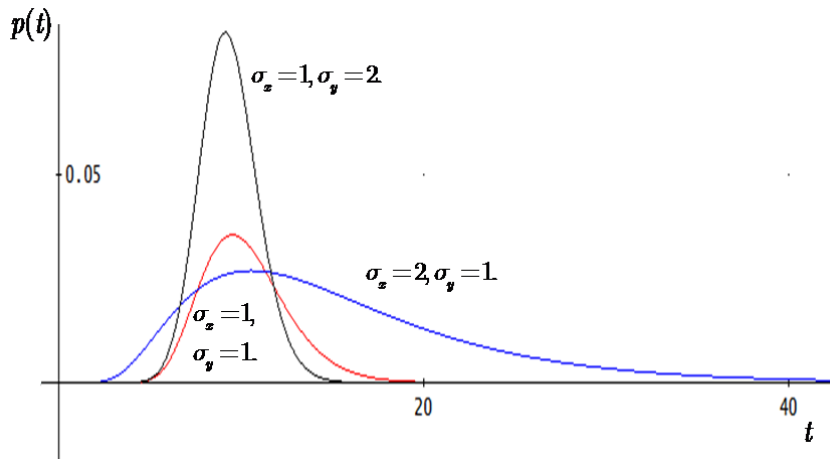


FIGURE 5. Probability of entrepreneurship as a function of work experience. Numerical plots: $\mu_x=1$, $(r+\lambda)c=10$, $(r+\lambda)k=12$.

effect on agents with intermediate levels of experience. In plots not shown, reductions in the absorption cost, c , and increases in the cost of business formation, k , reduce the likelihood of entrepreneurship.

4. Evidence from the Swedish labor market

So far, in both theory and empirics, we have only considered occupational choices made by agents who are forced to move by virtue of the demise of their employer. In Section 2 we documented an inverted U-shaped relationship between experience and entrepreneurship among lawyers that were forced to seek new employment. Section 3 developed a simple model that generates this pattern. Does this inverted U hold when job separation is voluntary? It is not obvious that it will, because the existing empirical evidence has long documented a negative correlation between separation rates and job tenure [e.g., Akerlof and Main (1981), Hall (1982)], except perhaps in a short period after hiring when the hazard of job separation first rises [e.g., Black, Moffitt and Warner (1990), Farber (1994)].⁶

4.1 Data and Measurement

We document evidence on entrepreneurship and job-switching among employees of continuing firms using a large sample constructed from a Swedish matched employer-employee panel dataset. The Swedish sample merges data from the IFN Corporate Database (IFNCDB), containing the annual accounts of all limited liability firms in Sweden acquired from the Swedish Companies Registrations Office, and the LISA database, which draws on several different individual-level Statistics Sweden registry databases of the entire Swedish population.⁷ The IFNCDB provides information on firm characteristics, while the LISA database yields information on an individual's employers, occupational choices, rank, income, and many other individual characteristics. We use observations for the period 2001-2007, and restrict the sample to workers between the ages of 20 and 60, workers in firms with more than 5 employees, workers in the private sector (we drop firms active in the health, education, agriculture and fishing industries, and in the public sector), and to workers in

⁶ Black, Moffitt and Warner (1990) find that that among some, but not all, groups of Federal employees quit rates rise between the first and second year of service before declining monotonically over the next nine years. Farber (1994), using a large sample from the National Longitudinal Survey of Youth, reports that the hazard rises before it falls, reaching a peak at about three months of tenure.

⁷ For more on the Longitudinal Integration Database for Health Insurance and Labour Market Studies (LISA) database, see http://www.scb.se/Pages/List_____257743.aspx

firms with sufficient occupation data on their employees.⁸ We average about one million observations per year of our sample, yielding a total of 7.55 million observations.

Dependent variables. Our dependent variables are dummies indicating whether an individual changed his or her primary employer in any given year, or created a new business. Job switching between incumbent firms are straightforward to identify in the data. Transitions into entrepreneurship are identified when three criteria are simultaneously satisfied: (1) the individual is working in her own company in the current year but had not been in the previous year, (2) the location of her work is different from the previous year, and (3) no other individuals in the sample had worked for the current firm in the previous year. Our identification of transitions into entrepreneurship is expressly designed to avoid including individuals that purchase a (possibly minority) stake in an existing business.⁹

Regressors. The main explanatory variable is an individual’s tenure at his current employer, which we measure in years. The regressions we report below also include a number of controls. We include basic demographic data for employees: age, gender, and education. We measure an employee’s wage in recognition of the well-documented negative association between current wages and job separations of all kinds [e.g., Evans and Jovanovic (1989)]. We also include a set of dummy variables to indicate an employee’s rank, which comes from occupational classifications used in the LISA database, and year dummies.¹⁰

Our controls for firm characteristics are a set of dummies to indicate size, which is measured using the number of employees, 43 industry classification

⁸ Our dataset is the same as in Tåg, Åstebro and Thompson (2013). They provide a more detailed description of the sample selection process and sample characteristics.

⁹ Statistics Sweden defines an individual as being employed in her own company in a given year if her total income from her own company (labor and capital income) is greater than 62.5 percent of all other labor income from possible other sources generated in the same year. “Own company” refers to a company in which the individual works and owns a substantial equity or controlling stake.

¹⁰ The LISA database goes back to 1990, so the maximum years of tenure we observe are 17. Education is on a scale from 1-6 corresponding to: 6. Postgraduate education; 5. Post-secondary education, two years or longer; 4. Post-secondary education, less than two years; 3. Upper secondary education; 2. Primary and lower secondary education; 9 or 10 years; and 1. Primary and lower secondary education, less than 9 years. Our measure of wage is an individual’s total gross labor income in a year. Tåg (2013) and Tåg, Åstebro and Thompson (2013) have documented how the occupational classifications we use provide meaningful measures of rank and how they influence job mobility, especially into entrepreneurship.

dummies, and 21 county dummies based on the location of the current employer. There is substantial evidence that workers in small firms are more likely to separate from their employers [Anderson and Meyer (1994), Lazear and Shaw (2008)], and that movers are more likely to become entrepreneurs [Wagner (2004), Dobrev and Barnet (2005), Gompers, Lerner and Scharfstein (2005), Elfenbein, Hamilton and Zenger (2010), Chen (2012), Kacperczyk, (2013), Tåg, Åstebro and Thompson (2013)]. Elfenbein et al. have shown evidence that these small firm effects reflect not only differences across firms that influence mobility of employees of a given type, but also selection of agents by type into firms of different sizes. Thus, firm size in part controls for unobserved employee characteristics that affect subsequent occupational choices.

4.2 Summary Statistics

Table 5, which provides some summary statistics, reveals that our Swedish sample possesses properties familiar from previous studies of occupational mobility. First, staying with the current employer is far more common than separation: stayers account for 86 percent of the observations. Second, entrepreneurship, which accounts for 3 percent of the occupational choices of movers, is far less common than switching between established employers. Stayers have longer tenure with their employer (5.17 years) than do those switching employers (2.76 years) or entering entrepreneurship (3.30 years); and they earned more despite having more education. These observations are well known from Evans and Jovanoic (1989), and suggest that job-matching is likely to play a significant role in mobility. Also consistent with prior evidence [see, *inter alia*, Elfenbein, Hamilton and Zenger (2010), and Tåg, Åstebro and Thompson (2013)], entrants into entrepreneurship are also more likely to be male, they are less likely to be blue-collar workers, and they are more likely to be employed in small firms.

4.3 Analysis

Table 6 reports a multinomial logit regression of job transitions for the full sample, and a logit regression for entrepreneurship among movers. The multinomial logit model records three possible outcomes for each observation: remain with the current employer (the omitted category), transition into entrepreneurship, or switch to another incumbent employer. The logit model admits only the latter two outcomes, with the dependent variable equal to one if the outcome is entrepreneurship.

Table 5. *Sweden. Summary Statistics by Destination*

	All employees			Stayers			Entrepreneurship			Job Switchers		
	Obs	Mean	Std.	Obs	Mean	Std.	Obs	Mean	Std.	Obs	Mean	Std.
Employee Characteristics												
Age	7,553,081	40.48	10.98	6,491,040	41.16	10.78	33,980	40.19	10.30	1,028,061	36.23	11.29
Female	7,553,081	0.33	0.47	6,491,040	0.33	0.47	33,980	0.24	0.42	1,028,061	0.37	0.48
Education	7,528,705	3.32	1.07	6,472,184	3.30	1.07	33,886	3.50	1.08	1,022,635	3.44	1.07
Tenure	7,553,081	4.83	4.63	6,491,040	5.17	4.70	33,980	3.30	3.87	1,028,061	2.76	3.56
Wage	7,553,081	293.6	205.1	6,491,040	300.7	199.4	33,980	288.3	258.3	1,028,061	249.2	231.5
Employee Rank												
CEOs and Directors	6,885,890	0.02	0.12	6,053,086	0.02	0.13	25,104	0.03	0.16	807,700	0.01	0.11
Senior staff	6,885,890	0.05	0.22	6,053,086	0.05	0.22	25,104	0.06	0.24	807,700	0.04	0.20
Supervisors	6,885,890	0.36	0.48	6,053,086	0.36	0.48	25,104	0.41	0.49	807,700	0.35	0.48
Bluecollars/clerks	6,885,890	0.58	0.49	6,053,086	0.58	0.49	25,104	0.50	0.50	807,700	0.59	0.49
Firm characteristics												
Firm size	7,553,081	3,243	5,861	6,491,040	3,331	5,887	33,980	1,984	4,457	1,028,061	2,728	5,703
Size <50	7,553,081	0.16	0.37	6,491,040	0.15	0.36	33,980	0.29	0.46	1,028,061	0.20	0.40
Size 50-100	7,553,081	0.08	0.27	6,491,040	0.08	0.27	33,980	0.10	0.30	1,028,061	0.09	0.29
Size 100-500	7,553,081	0.22	0.42	6,491,040	0.22	0.41	33,980	0.21	0.41	1,028,061	0.23	0.42
Size 500-1500	7,553,081	0.18	0.38	6,491,040	0.18	0.38	33,980	0.14	0.35	1,028,061	0.16	0.37
Size >1500	7,553,081	0.36	0.48	6,491,040	0.37	0.48	33,980	0.25	0.43	1,028,061	0.31	0.46

Table 6. *Sweden. Employee Mobility by Destination*

	Multinomial Logit (Full Sample)		Logit (Movers only)
	Entrepreneurship	Incumbent	Entrepreneurship.
Employee Tenure			
Tenure (years)	−0.120*** (0.005)	−0.156*** (0.001)	0.039*** (0.005)
Tenure squared	0.003*** (0.000)	0.005*** (0.000)	−0.002*** (0.000)
Employee Characteristics			
Age (years)	0.123*** (0.005)	−0.080*** (0.001)	0.186*** (0.005)
Age squared	−0.001*** (0.000)	0.001*** (0.000)	−0.002*** (0.000)
Male = 1	0.715*** (0.017)	0.093*** (0.003)	0.612*** (0.017)
Education (years)	0.098*** (0.007)	0.105*** (0.001)	0.007 (0.007)
Log(wage)	−0.621*** (0.011)	−0.530*** (0.002)	−0.131*** (0.011)
Employee Rank			
CEOs and directors	0.507*** (0.042)	−0.034*** (0.012)	0.696*** (0.045)
Senior staff	0.657*** (0.029)	0.277*** (0.007)	0.407*** (0.030)
Supervisors	0.373*** (0.018)	0.031*** (0.003)	0.330*** (0.018)
Firm Characteristics			
Size 50-100 employees	−0.399*** (0.023)	−0.063*** (0.005)	−0.358*** (0.023)
Size 100-500	−0.680*** (0.019)	−0.136*** (0.004)	−0.573*** (0.019)
Size 500-1500	−0.842*** (0.022)	−0.255*** (0.004)	−0.599*** (0.022)
Size 1500>	−1.198*** (0.020)	−0.579*** (0.004)	−0.601*** (0.020)
Observations	6,865,026		826,683

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The constant, 43 industry dummies, 21 county dummies, and the year dummies are not reported.

Consider first the control variables. First, men are somewhat more likely than women to switch employers, and they are much more likely to become entrepreneurs. Second, more educated individuals are also more mobile but, conditional on job separation, greater educational attainment does not induce greater rates of entrepreneurship. Third, age has disparate effects on job switching and entrepreneurship: older workers are less likely to move between incumbent employers, but they are more likely to become entrepreneurs. Fourth, movers earned less than stayers, and this is especially true of employees that moved into entrepreneurship. Fifth, there is a substantial small firm effect. Employees of smaller firms are more likely to switch to another incumbent employer and to become entrepreneurs; variations in firm size have a larger impact on entrepreneurship than on job switching, so there is also a small firm effect for entrepreneurship among movers. Finally, CEOs, senior staff and supervisors are each more likely than the omitted category, production workers, to found a business to become entrepreneurs. These results for the control variables are consistent with previous findings across a wide variety of settings; they indicate, as did the summary statistics, that there is nothing obviously unusual about our sample.

Our main interest, of course, is on the effect of tenure. The results from the multinomial logit regression are consistent with ample prior evidence that increases in tenure are associated with lower rates of job separation. This pattern holds not only for the effect of tenure on job switching to incumbent firms, but also for entry to entrepreneurship. Tenure is included in the regression as a quadratic, so the estimated relationship between tenure and mobility cannot be monotonic. However, as the upper panel of Figure 6 illustrates, the point estimates indicate that the rate of entrepreneurship declines as tenure rises until tenure is 20 years or so (recall that the maximum tenure we observe is 17 years), and thereafter the increase is modest and imprecisely estimated. In contrast, as the final column of Table 6 and the lower panel of Figure 6 show, when attention is restricted to movers the relationship between entrepreneurship and tenure exhibits the same inverted U that we saw in the lawyer sample, with a maximum at ten years

As in most large samples, much of the measured entrepreneurship is in fact entry into self-employment, and it is quite possible that determinants of entry into self-employment might be substantially different from determinants of the creation of growth-oriented businesses typically associated with the term

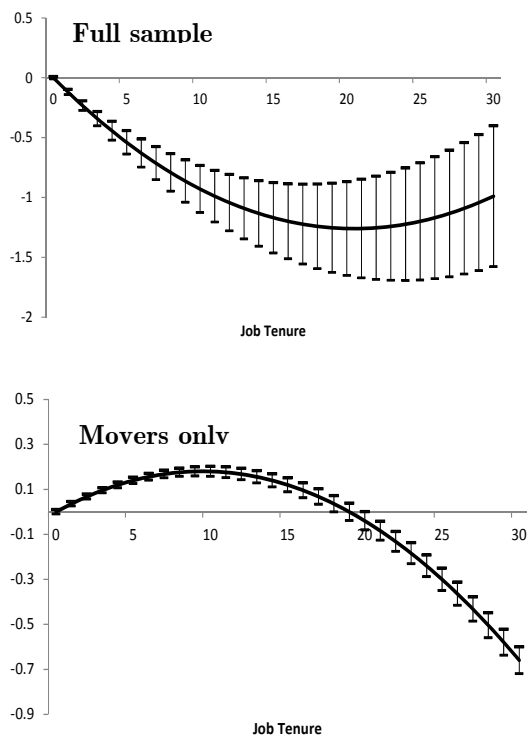


FIGURE 6. *Relationship between tenure and the relative likelihood of entrepreneurship.* Figures plot the estimated slope of the term $aT+bT^2$, where T is tenure in years and a and b are the estimated coefficients on tenure and tenured squared in the first and third columns of Table 5. 95 percent confidence intervals are shown.

entrepreneurship.¹¹ Statistic Sweden divides entrepreneurs into those with sole proprietorships and those with limited liability companies, and therefore allows us to examine whether this is the case. In Tables 7 and 8 we repeat the analyses of Table 6, but this time dividing business creation into its two constituent parts. Our findings on the effect of tenure on business creation hold for both its constituent parts.

¹¹ See Henrekson and Sanandaji (2013) for a good survey on the literature on entrepreneurship and self-employment and for arguments in support of separating the two.

Table 7. Sweden: Employee Mobility by Destination

	Multinomial Logit (Full Sample)		
	Limited Liability Company	Sole Proprietorship	Incumbent Employer
Employee Tenure and Experience			
Tenure (years)	-0.086*** (0.010)	-0.134*** (0.006)	-0.156*** (0.001)
Tenure squared	0.001* (0.001)	0.004*** (0.000)	0.005*** (0.000)
Employee Characteristics			
Age (years)	0.152*** (0.012)	0.107*** (0.006)	-0.080*** (0.001)
Age squared	-0.002*** (0.000)	-0.001*** (0.000)	0.001*** (0.000)
Male = 1	0.855*** (0.039)	0.653*** (0.019)	0.094*** (0.003)
Education	0.046*** (0.015)	0.095*** (0.008)	0.105*** (0.001)
Log(wage)	0.496*** (0.035)	-0.768*** (0.011)	-0.531*** (0.002)
Employee Rank			
CEOs and directors	1.054*** (0.067)	0.010 (0.060)	-0.034*** (0.012)
Senior staff	0.994*** (0.054)	0.400*** (0.036)	0.278*** (0.007)
Supervisors	0.748*** (0.039)	0.259*** (0.020)	0.031*** (0.003)
Firm Characteristics			
Size 50-100 employees	-0.470*** (0.047)	-0.388*** (0.026)	-0.063*** (0.005)
Size 100-500	-0.770*** (0.038)	-0.661*** (0.021)	-0.136*** (0.004)
Size 500-1500	-0.831*** (0.044)	-0.851*** (0.025)	-0.255*** (0.004)
Size 1500>	-1.281*** (0.043)	-1.172*** (0.023)	-0.579*** (0.004)
Observations	6,865,026		

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The constant, 43 industry dummies, 21 county dummies, and the year dummies are not reported.

Table 8. Sweden: Employee Mobility by Destination

	Multinomial Logit	
	(Movers Only Sample)	
	Limited Liability Company	Sole Proprietorship
Employee Tenure and Experience		
Tenure (years)	0.057*** (0.010)	0.031*** (0.006)
Tenure squared	-0.002*** (0.001)	-0.002*** (0.000)
Employee Characteristics		
Age (years)	0.204*** (0.012)	0.176*** (0.006)
Age squared	-0.002*** (0.000)	-0.002*** (0.000)
Male = 1	0.826*** (0.039)	0.545*** (0.019)
Education	-0.027* (0.015)	0.006 (0.008)
Log(wage)	0.676*** (0.031)	-0.262*** (0.011)
Employee Rank		
CEOs and directors	1.220*** (0.071)	0.244*** (0.062)
Senior staff	0.846*** (0.055)	0.154*** (0.037)
Supervisors	0.734*** (0.039)	0.220*** (0.020)
Firm Characteristics		
Size 50-100 employees	-0.487*** (0.048)	-0.329*** (0.027)
Size 100-500	-0.741*** (0.038)	-0.531*** (0.021)
Size 500-1500	-0.664*** (0.044)	-0.589*** (0.026)
Size 1500>	-0.746*** (0.043)	-0.567*** (0.023)
Observations	826,683	

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The constant, 43 industry dummies, 21 county dummies, and the year dummies are not reported.

5. A model with voluntary job separation

The key results from the previous section are: (i) the rate of job separation in general and the rates of job separation by destination all decline with tenure; (ii) among movers, there is an inverted U-shape relationship between tenure and entrepreneurship, and this pattern also holds when entrepreneurship is decomposed into its constituent parts of self-employment and the creation of a limited liability company. In this section we extend our previous model to allow for voluntary separations from continuing firms, in a manner consistent with this empirical evidence on separation rates. We do so by introducing a firm-specific, non-pecuniary and non-transferable component to the agent's payoff, which we shall term the match quality. This match quality evolves stochastically, but is known to the agent at each point in time.¹²

In this section, we suppose that an agent's payoff at his initial employer is given by

$$\tilde{w}(t) = x(t) + y(t) + m(t), \quad (12)$$

where the wage component is, as before, $w(t) = x(t) + y(t)$; $m(t)$ is the match quality, which evolves according to the diffusion process

$$dm(t) = \mu_m dt + \sigma_m \xi(t), \quad (13)$$

with $m(0) = m_0$. As in the previous section, potential outside employers observe only $w(t)$ and t , while the agent knows $x(t)$, $y(t)$ and, in the present case, $m(t)$. Transferring to another employer in cases where $x(t)$ is not absorbed by the firm costs χ , where $\chi < c < k$. In addition, we suppose that if an agent separates from his current job the match quality resets to m_0 .

Let $S(x, y, t)$ denote the expected value to the agent of separating from his current employer (and, of course, choosing the best option between entrepreneurship and incumbent employment), let $V(m, x, y, t)$ denote the value of current employment, and let $m^*(x, y, t)$ denote the value of the match quality such that $V(m^*, x, y, t) = S(x, y, t)$. The agent's instantaneous payoff is strictly increasing in $m(t)$, and match quality exhibits persistence over time. It follows

¹² An alternative is to assume that match quality is fixed but must be learned over time from stochastic signals [Jovanovic (1979a)]. The canonical formulation of this model (where earnings depend only on match quality, and match quality only affects an agent's payoff through its impact on earnings), induces a hazard of separation that initially rises but quickly enters a long phase in which it declines asymptotically to zero.

that $V(m, x, y, t)$ is strictly increasing in m , so m^* is unique, and defines the poorest match quality for which continuing with the current employer is optimal.

We proceed by considering the choice of a myopic agent who considers only the instantaneous flows of net benefits. That is, we suppose the agent makes the choice that yields the highest available payoff out of the list

$$\left\{ x(t) + y(t) + m(t), x(t) + y(t) + m_0 - (r + \lambda)k, y(t) + m_0, \right. \\ \left. x(t) + y(t) + m_0 - (r + \lambda)c \right\}, \quad (14)$$

where the last option is available only if $\bar{x}(t) > (r + \lambda)c$. The agent chooses to separate from his current job whenever $m(t) < m_0 - \chi - x(t)$, regardless of the value of $\bar{x}(t)$. In this case, switching to another employer is preferable to continuation even if the new employer chooses not to pay the absorption cost. Separation is also preferred if $m(t) < m_0 - (r + \lambda)c$, as long as $\bar{x}(t) > (r + \lambda)c$. In this case, outside employers are prepared to pay the absorption cost, and the flow net benefit is greater with a new employer than with the current one. Finally, the agent prefers entrepreneurship to continued employment if $m(t) < m_0 - (r + \lambda)k$, which option is only pursued if $\bar{x}(t) < (r + \lambda)c$.

Which, if any, of these switches are made depends on the sample paths of the triplet $\{x(t), y(t), m(t)\}$, where the path of $y(t)$ matters only through its effect on $\bar{x}(t)$. Figure 7 illustrates one such path for the pair $\{x(t), m(t)\}$. The path begins at point **a** where, because the agent has yet to accumulate any firm-specific experience and there is no switching cost, the agent is indifferent between continuation and switching employer. The sample path has been drawn to illustrate the case where $x(t)$ tends to grow over time and $m(t)$ tends to decline over time. Until point **b**, the agent continues with his current employer. Along the interval **bc**, when the sample path lies below the horizontal boundary **B**, the agent will switch to a new employer the first time that $\bar{x}(t) > (r + \lambda)c$. If $\bar{x}(t) < (r + \lambda)c$, everywhere along the interval **bc**, the agent will continue with his current employer but then switch to entrepreneurship as soon as point **c** is reached. Other sample paths could take the agent into the area lying below **A**, and as soon as this happens the agent switches to a new employer. Yet other paths could lead the agent in a northwesterly direction, in which case the agent will remain with his current employer forever.

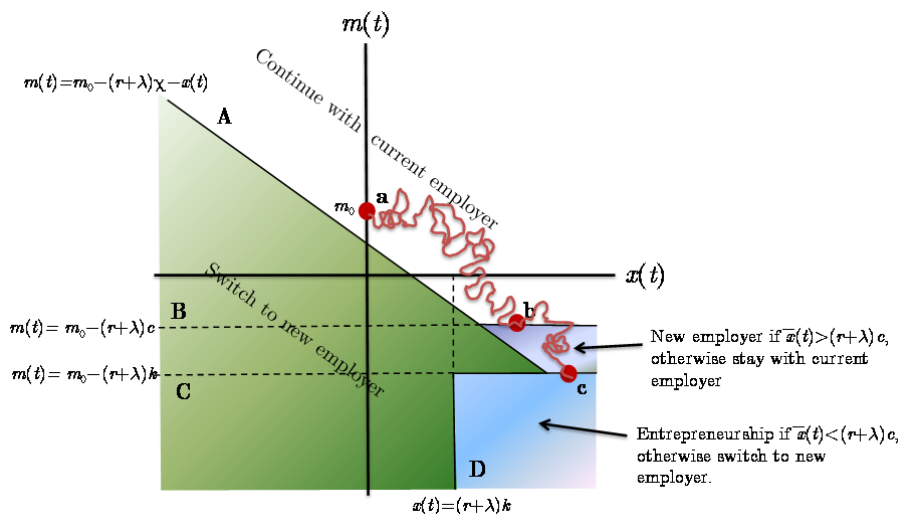


FIGURE 7. *Myopic choices with voluntary separation, with a sample path sketched.* Sample path begins from **a** at $t=0$. If $\bar{x}(t) > (r + \lambda)c$ at any point along the sample path **b**→**c**, the agent switches to a new employer; if $\bar{x}(t) < (r + \lambda)c$ everywhere along **b**→**c**, the agent becomes an entrepreneur at point **c**.

Among the most important influences on outcomes are the values of the trend growth rates of firm-specific skill, μ_x , and match quality, μ_m . We shall suppose throughout that $\mu_x > 0$, so that firm-specific skills are on average accumulated as tenure increases. However, we ought not impose any *a priori* restriction on the value of μ_m .¹³ For any given μ_m , a larger trend growth rate for $x(t)$ will move the sample path in Figure 7 more rapidly to the right, without influencing the likelihood that it falls below the horizontal boundary **B**. This makes it less likely that, by any time t , the sample path will have fallen below the boundary **A**, so job separation becomes less likely. However, the effect of in-

¹³ While match quality is commonly assumed to be trendless, we can envisage circumstances in which both positive and negative trends arise. On the one hand, personal circumstances such as spousal employment, having children in school, and home ownership, may cause a rise over time in match quality relative to alternatives that may be located elsewhere. On the other hand, agents may join a firm precisely because the match is good, but then turnover of colleagues and changes in firm direction or ownership may cause the match quality to deteriorate over time.

creasing μ_x on the likelihood of *switching employers* is ambiguous. Although the likelihood of hitting **B** is unaffected by an increase in μ_x , hits will on average take place further to the right in Figure 7 (i.e. on average at greater values of $x(t)$). Potential employers know this, and so $\bar{x}(t)$ is more likely to exceed $(r + \lambda)c$ at some point along the segment **bc**. This makes switching employers more likely and entering entrepreneurship less likely. Of course, hitting the horizontal boundaries **B** and **C** is more likely for larger t , while hitting **A** is only likely to occur at small values of t . Thus, the negative effect on switching employers of a larger trend growth rate of firm-specific ability dominates for employees with limited tenure while the positive effect dominates when tenure is longer.

While the addition of the match quality to our model is conceptually straightforward, it converts the analytically straightforward one-dimensional first-passage problem (albeit a multivariate problem) of Section 3 into a two-dimensional problem that does not have explicit solutions for the first-passage times. However, although we cannot derive the hazards of job switching analytically, our qualitative discussion of the model so far allows us to characterize them quite well. Figure 8 sketches the evolution of hazard rates over time for the case $\mu_m \leq 0$. The upper envelope of the curves depicts the hazard of hitting the boundaries **A** or **B** for the first time. The hazard must initially rise, because the sample path is continuous and it starts at a point strictly above the boundary **A**. However, it quickly reaches a unique mode before declining asymptotically to a fixed positive constant as tenure rises.¹⁴ When t is small, almost all the hits to **A** or **B** consist of hits to **A**; when this happens, the agent switches employer, although the new employer does not pay the absorption cost. As t increases, an increasing fraction of the hits to **A** or **B** consist of hits to **B**. Not all hits to **B** induce job switching. When an agent arrives at **B**, he will change employers only if outside firms believe $x(t)$ is large enough to justify payment of the absorption cost; when this is not the case, the agent will remain with his current employer. It follows that the hazard of job separation falls below the upper envelope as we begin to observe hits to **B**. However, the job separation hazard will asymptotically approach the upper envelope as t continues to increase; this is because for sufficiently large t it is vanishingly rare that outside employers will not believe $x(t)$ is large enough to

¹⁴ If $\mu_m > 0$, (i.e., if match quality tends to improve with tenure) the sample pair $\{x(t), m(t)\}$ will tend to drift in a northwesterly direction, so some agents will never leave their current employer. In this case, the hazard of hitting boundary **B** declines asymptotically zero, rather than to a positive constant, as t increases without limit.

pay the absorption cost [this would require an unusually unfavorable realization of $y(t)$].

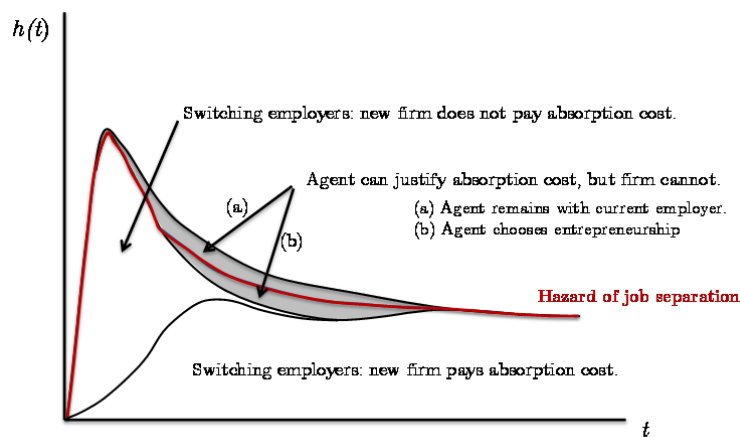


FIGURE 8. *Sketched hazard rates from myopic choices with voluntary separation.*

The shaded area in Figure 8 corresponds to all instances in which an agent would want to switch to a new employer that pays c , but would not switch to an employer that does not pay c . This area is divided into two parts. In one part, the agent remains with his current employer. In the other, his match quality has become sufficiently poor that he is willing to pay the greater cost, k , of entrepreneurship. Finally, Figure 8 illustrates the balance of job switching between firms that exploit only skill Y and firms that exploit both X and Y . As time passes, the latter rises as a fraction of all job switches, until eventually they dominate the picture.

6. Conclusions

Many entrepreneurs acquire experience at established organizations prior to engaging in entrepreneurial activity, but the empirical relationship between accumulated experience and the rate of entrepreneurship is inconclusive. We noted the difficulty of inferring individual preferences for entrepreneurship as a function of one's experience due to the coupling of the entrepreneurial choice with the more general choice to separate from one's employer.

To simplify the analytical task, we began with observations from law firm dis-

solutions so that we could examine the experience-entrepreneurship in a setting where separation was induced but not a negative signal of individual ability (Gibbons and Katz, 1991). Observing what appeared to be a curvilinear relationship between experience and entrepreneurship in the dissolution setting, we formalized an argument concerning occupational choice and human capital that could be tested in the more typical context of employment with voluntary separation. Testing our model’s predictions with data on the Swedish economy, we also found an inverted U-shaped relationship between experience and the entrepreneurship once we conditioned on separation from one’s employer. Our theoretical model and empirical analyses, therefore, support the contention that individuals of moderate experience are most likely to transition to entrepreneurship.

Experience is an admittedly crude, but reasonable, proxy for the extent to which potential employers can observe an individual’s human capital. It is, therefore, instructive to consider alternative explanations of the key result. One intuitively appealing explanation is that the accumulation of experience coincides with the accumulation of wealth. If so, then the inverted U-shaped relationship between experience and entrepreneurship might be interpreted as indicative of evolving liquidity constraints or risk tolerance. Our empirical analyses of Swedish employees control specifically for wages and employee rank. We find that high [*low*] wage employees are, conditional on separation, more [*less*] likely to form a limited liability company than a sole proprietorship. However, the inverted U-shaped relationship between experience and entrepreneurship is observed independent of these divergent wage effects. We therefore believe that our interpretation of the experience effect is robust to explanations related to liquidity or risk, both of which are likely functions of one’s wage. Similar explanations related to age or gender also seem less plausible than our interpretation, given our ability to control for gender in both empirical analyses and age in the analysis of Swedish employees.

There are, of course, contexts in which we would not expect to see the inverted U-shaped relationship between experience and entrepreneurship that we have documented, and in which our explanation cannot be correct if we do see it. For example, we do not expect to observe it in settings where all accumulated skill is firm-specific, or in settings where all skill is *not* firm-specific: in both cases, there are no important informational asymmetries between individuals and potential employers that might drive people into entrepreneurship. Similarly, we do not expect to see the relationship in settings where firm-specific skill is completely employer-specific, because in this case entre-

preneurship cannot provide an outlet for agents to utilize the firm-specific skills acquired at their previous job. Finally, it seems likely that the functional form of the empirical relationship is likely to be stronger in knowledge-intensive industries like professional services than in capital-intensive industries like manufacturing.

Appendix – Law firm dissolutions

- **Dreier LLP**, based in New York, had an unusual corporate structure in which firm governance was the responsibility of its founder and sole equity partner, Marc Dreier. Dreier was arrested on December 2, 2008 and charged with securities fraud following his impersonation of a Canadian pension fund official. The ensuing investigation revealed that Dreier operated a Ponzi scheme that defrauded clients and investors of more than \$400 million. Dreier’s arrest shocked lawyers employed by his firm and resulted in quick public disavowals by firm partners (all non-equity). Wachovia, a firm creditor, also sued Dreier for defaulting on more than \$9 million in loans and Dreier entered the firm into Chapter 11 bankruptcy on December 16, 2008, at which time 120 lawyer biographies were extracted from Dreier’s website

- **Heller Ehrman LLP** was one of the San Francisco Bay Area’s most prominent law firms and the 65th largest law firm by headcount in the U.S. in 2007, employing approximately 600 lawyers.¹⁵ In 2008, their client list included Lehman Brothers and Washington Mutual, two large corporations that failed in 2008 and left Heller with large uncollectable receivables. Heller announced its dissolution on September 26, 2008, officially dissolved in late November of 2008, and filed for bankruptcy in December of 2008. The sample of Heller lawyers is based on website biographies for 352 lawyers employed in Heller’s U.S. offices at the time of dissolution.

- **Morgan & Finnegan LLP** was an intellectual property boutique firm based in New York, but with several lawyers located in Washington and California. Morgan & Finnegan’s clients included Canon, DuPont, Nokia, and Research in Motion. The firm’s revenues fell sharply in 2008 and many partners departed. A former partner also sued Morgan & Finnegan for altering the firm’s partnership agreement to create financial disincentives for leaving the firm. A large group of partners left the firm for Locke Lord Bissell & Liddell in February of 2009 and Morgan & Finnegan filed for Chapter 7 bankruptcy in March of 2009. In 2009, 72 biographies were extracted from the Internet Archive record of the Morgan & Finnegan’s website as of January 2008.

- **Thacher Proffitt Wood LLP**, headquartered in New York City, was in 2008 the

¹⁵ Size rankings are by the National Law Journal. Current rankings can be found at http://www.law.com/jsp/nlj/PubArticleNLJ.jsp?id=1202548639714&The_NLJ_350

156th largest law firm in the U.S., employing almost 300 lawyers. Thacher's biggest client was Bear Stearns, which collapsed in March 2008. On 21 December, 2008, following the cessation of merger talks with King & Spalding, around 100 lawyers announced that they would leave Thacher for a competitor. Two days later, Thacher partners voted to dissolve the firm. In December of 2008, 175 biographies were obtained for the lawyers employed in Thacher's offices.

- **Thelen LLP** was the 78th largest in the U.S. in 2008, employing approximately 550 lawyers. Thelen's construction practice was widely-regarded as one of the best in the country and the firm's clients included Cisco, Ford, Merrill Lynch, News Corporation, and several major public utilities. Thelen's problems began after a 2006 merger with Brown Raysman induced almost 200 partner departures in a two-year period. After merger talks with Nixon Peabody failed, Thelen announced its dissolution on 28 October, 2008, and closed its doors just three days later. The biographies of 392 lawyers employed in Thelen's offices at that time were extracted at the end of October 2008.

- **WolfBlock LLP**, a Philadelphia firm, was the 149th largest firm in the U.S., employing approximately 300 lawyers in 2008. The firm's core practice was its real estate group, so WolfBlock was hit especially hard by the financial crisis. WolfBlock attempted to merge with Philadelphia's Cozen O'Connor in 2007 and with Florida's Akerman Senterfitt in 2008, but both attempts failed. As partners departed WolfBlock throughout 2008 the firm's largest creditor, Wachovia, restricted the firm's access to credit. The partners voted to dissolve in March of 2009, at which time 318 biographies were extracted from WolfBlock's website.

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