

# Home sweet home: Social capital and location choice

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## Abstract

*We argue that social capital places strong constraints on an entrepreneur's ability to found a firm in a region in which he or she does not have connections. We examine this thesis using comprehensive data on the Danish population and find evidence broadly consistent with this claim. Entrepreneurs tend to open businesses in regions in which they have deep roots ('home' regions). We further find that their ventures perform better (survive longer) when they locate in these home regions. The value of social capital moreover appears substantial, similar in magnitude to the value of having prior experience in the industry entered (i.e. human capital).*

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# 1 Introduction

Traditionally, research on location choice has focused on the match between the attributes of an industry and those of a region, arguing that some places offer more fertile ground for certain manufacturing and service businesses. Classic studies of economic geography, for example, attributed the location of an industry to the local availability of natural resources as inputs or of customers for outputs. Using this logic one might explain the location of iron and steel producers around the world as a function of their proximity to coal and iron ore, and hence their ability to minimize transportation costs (e.g., Isard, 1948). Or, one could similarly account for the concentration of niche service providers in central cities as an efficient means of reaching clients in a large catchment area (e.g., Christaller, 1966). Though the more recent research on economic and industrial geography tends to highlight other factors – most notably, the importance of locating near to other firms that can share important inputs – it too usually views location choice as an issue of industry-region match. Saxenian (1994), for instance, suggests that computer manufacturers should locate in Silicon Valley to benefit from the free flow of information across firms in the region. Similarly, Storper & Christopherson (1987) see the concentration of motion picture production in Los Angeles and New York as a rational response to the ability of moviemakers to gain economies of scale by sharing critical suppliers in these cities. And Zucker et al. (1998) point to proximity to universities, and the research and potential employees that they produce, as a key factor in the geography of the biotechnology industry (see also, Powell et al., 2002).

Though these perspectives have had much success in describing the spatial patterns observed in many industries, here we propose that those interested in the location choices of firms should also attend to the match between founders and regions. Of course, social

scientists have long understood that entrepreneurs and managers have preferences for particular places and that those preferences affect their choices of where to locate firms and plants (Katona & Morgan, 1952; Mueller & Morgan, 1962; Krumme, 1969). But we contend that the importance of the entrepreneur-region match extends beyond mere personal preferences, it also has implications for the nature and success of fledgling firms.

Our argument rests on the notion that social capital has a geographic dimension. An extensive literature has argued and documented that the ability of entrepreneurs to start firms and the success of their ventures depends in large part on social capital, or the availability of prior personal and professional relationships to those controlling critical resources (for recent reviews, see Hoang & Antoncic, 2003, and Stuart & Sorenson, 2007). These connections, for example, appear to help entrepreneurs to secure financial capital and to recruit employees. It is also well documented, however, that people primarily have connections to others that live and work in the same regions as they do. Both the odds of meeting someone and the ease of maintaining a relationship decline with distance (Stouffer, 1940; Zipf, 1949). We therefore propose that entrepreneurs cannot simply carry social capital with them, as they might with financial and human capital; rather, these connections have the greatest value in the regions in which they arise. As a result, social capital constrains entrepreneurs' location choices because they have the greatest odds of success in their 'home' regions—those in which they have long histories and deep social connections.

In an empirical exploration of this thesis, we exploit complete information on the Danish population, analyzing both the location choices of entrepreneurs and how those choices subsequently affect the performance of their ventures. In our first set of analyses, we estimate conditional logit models to assess how various attributes of regions affect entrepreneurs' decisions on where to locate their businesses. Our results suggest a strong

tendency for entrepreneurs to open businesses in (or near to) the regions in which they have lived and worked. We then turn to an analysis of how these choices affect the performance of new ventures, in terms of their rates of failure. Consistent with our thesis, firms whose founders have prior experience in the region enjoy lower failure rates.

## **2 Social capital and location choice**

Definitions of social capital abound. Though many of these definitions usefully highlight different aspects of this broad-ranging concept, for the purposes of this paper, we focus on a narrow conceptualization of social capital that depends only on the breadth and depth of an individual's social network. In particular, social capital here refers to the number and strength of an actor's social relationships. The multifaceted concept of relationship strength, itself, also deserves further elaboration: Following much of the literature, we consider a connection stronger when two parties have more frequent and longer duration interactions, and a longer history of interaction (Marsden & Campbell, 1984). We therefore consider someone rich in social capital to the extent that he or she has frequent contact with a large number of long-standing acquaintances.

In essence, we claim that social capital – or a wealth of strong connections in a region – both constrains entrepreneurs, in the sense of rooting them to the regions in which these connections reside, and enables them, in terms of contributing positively to the performance of their ventures. Our argument requires two assumptions, each of which we justify at length below. First, we assert that endowments of social capital benefit the entrepreneurs that have it. Those with the right connections can more easily spot opportunities and assemble the resources required to begin a successful business. Second, we argue that entrepreneurs' social capital remains largely circumscribed within the regions

in which they have resided. In other words, the value of social capital declines with distance. If these two assumptions hold, then we would expect that (i) entrepreneurs would rationally prefer to start their ventures in (or close to) the regions in which they have the deepest connections, and (ii) businesses located in (or nearby) the regions in which their founders have long resided should outperform those located in regions to which their founders have only recently relocated.

### **Why social capital matters**

The literature often splits the process of entrepreneurship into two stages. In the first stage, nascent entrepreneurs scan the environment for opportunities. They might, for example, perceive a need for the provision of a service not currently offered by any existing firm. In the second stage, entrepreneurs then assemble the resources necessary to exploit the opportunity. Though the precise mix of inputs differs from case to case, they must generally acquire financial capital, recruit skilled labor, and access information and know-how. Social capital facilitates both of these processes – the identification of opportunities and the mobilization of resources – though in somewhat different ways.

In the opportunity identification phase, the prospective entrepreneur must notice the need for a new product or service. That good may be new-to-the-world, in the sense that no one has offered it anywhere before. For example, when DVDs first became available, few video rental stores could justify carrying a wide range of titles. Reed Hastings, recognizing the need for a DVD rental service with more selection, therefore started Netflix, an online DVD rental service. But more commonly, the entrepreneur either sees an opportunity for incrementally improving some existing product or service, or recognizes a need for providing the good in a new location. The most common forms of entrepreneurship involve the establishment of new restaurants, bars, convenience stores and dry cleaners. In

both cases, but particularly in the latter, recognizing these opportunities requires access to detailed information about the market, and knowledge of existing production and distribution processes. Much of this relevant information, however, remains private—known to some but not freely available online or in some published source.

Social relationships enable opportunity identification because they provide the conduits through which private information flows. This general idea of the importance of relationships to the transmission of information has been a central theme in sociological studies, but the longest-standing and deepest literature highlighting it has been that on the diffusion of innovations. From Ryan & Gross' (1943) classic investigation of farmers' usage of hybrid corn to Davis & Greve's (1997) examination of the corporate adoption of poison pills, dozens if not hundreds of analyses have confirmed that social connections channel the movement of private information among actors (for reviews, see Strang & Soule, 1998, and Rogers, 2003). To the extent that individuals vary in the quantity (and quality) of their relationships, they differ also in their ability to access the relevant information; those with more extensive connections tend to spot opportunities earlier.

Following the identification of an opportunity, entrepreneurs must assemble a variety of resources to begin operations. In general, establishing an organization requires financial capital, employees with the applicable abilities and experience, and access to various sorts of information (e.g., available suppliers and their relative reliability and quality, production processes, distribution channels, etc.). Acquiring any of these resources is difficult.

Consider first the case of financial capital. New firms lack track records. Investors therefore have little on which to base their assessments of the potential return. Exacerbating this uncertainty is the fact that investors cannot place great confidence in the information that they receive from the entrepreneurs themselves. On one hand is an issue of information asymmetry. Entrepreneurs know more about their ventures and their abil-

ities than would-be investors and have incentives to exaggerate their prospects to secure funding (Amit et al., 1990). On the other hand, even impeccably honest entrepreneurs tend to hold overly optimistic expectations of their odds of success (Camerer & Lovo, 1999). Given these uncertainties and the unreliability of the information available to them, investors generally eschew unproven new ventures. Moreover, when new organizations offer novel products or operate in emerging industries, these uncertainties and asymmetries become even more pronounced, and hence the difficulty of raising funds even greater.

Social capital improves an entrepreneur's odds of securing financing for at least two reasons. First, since they cannot rely on the information provided by the entrepreneurs themselves, investors use their social connections to access private information from third parties about the quality of entrepreneurs and potential investments. If the two share a mutual acquaintance, for example, that individual might endorse the entrepreneur, thereby alleviating some of the investor's concerns (Sorenson & Stuart, 2001). Better-connected founders consequently reach the attention of more investors. Consistent with this notion, Shane & Cable (2002) found that MIT inventors with indirect connections to venture capitalists more frequently received funding for their ventures. But social capital can also alleviate investors' concerns even in the absence of such endorsements. Familiarity tends to produce a bias among individuals in their evaluations of products and people (Zajonc, 1968). As a result, potential investors probably consider entrepreneurs with whom they have prior experience of higher ability and greater honesty, thereby increasing their willingness to invest in them (Sorenson & Waguespack, 2006). Whether rational or not, as a result of these processes, financial capital for fledging firms tends to come from either friends and family, or angel investors and venture capital firms with some social connection to the entrepreneur (Fried & Hisrich, 1994; Shane & Cable, 2002; Shane & Stuart, 2002). Those with more extensive networks therefore have many more potential

investors on which to draw, and consequently have better odds of securing funding (for additional evidence, see Beckman et al., 2007).

As difficult as raising financing is, recruiting personnel can prove even more vexing. Potential employees face almost all of the same uncertainties as would-be investors, regarding the strength of the idea, the managerial acumen of the entrepreneur and the commitments of other parties to the success of the venture. Unlike financial investors, however, they have essentially no ability to diversify away any of this risk. If the venture goes sour, they can find themselves without a paycheck and searching for a job. Given these doubts, it is very difficult to entice employees away from established employers and the certainty of their salaries. However, for the same reasons that social capital can facilitate the funding of new ventures, it can also help to overcome the reluctance of employees to join them. Social connections can assuage would-be employees fears both through the conveyance of private information about the abilities of the entrepreneur and the quality of the idea, and through the (potentially unjustified) feelings of confidence in employees' assessments of the entrepreneurs recruiting them. Though little empirical research has investigated these processes, we would expect the early employees of startups to come primarily from the ranks of those with close connections to the entrepreneur. Indeed, Ruef et al. (2003) report that more than half of the early employees in a random sampling of startups in the U.S. are spouses, relatives or former business associates.

Social relations may also help entrepreneurs to access valuable private and tacit information about doing business in a particular industry or region. Through the course of their operations, organizations accumulate valuable knowledge through learning-by-doing. As the literature on spinoffs suggests, firms with access to this information perform much better than those without it (Agarwal et al., 2004; Klepper & Sleeper, 2005; Dahl & Reichstein, 2007). Though some of this knowledge appears in operational manuals and

becomes built into machinery, much of it remains tacitly incorporated in the unwritten routines that workers and managers follow. Absorbing these routines therefore requires intensive observation and involvement in the processes. As a result, accessing this information requires either prior experience in one of the existing firms in the industry or the recruitment (or close cooperation) of someone with the relevant experience, with all the difficulties noted above.

If entrepreneurs could draw on these relationships anywhere, then social capital, though valuable, would have little bearing on their location decisions. We, however, see strong reasons to suspect that social capital – unlike financial and human capital – is, to a substantial degree, specific to regions.

### **The geography of social capital**

One of the most robust findings in the long literature on social relationships in sociology has been that the odds of two actors having a connection declines with geographic distance. This finding appears to hold across a wide variety of relationships and from fine- to course-grained geographic scales. For example, in an early study, Bossard (1932) established the importance of propinquity in marriage in Pittsburgh, demonstrating that the likelihood of forming a conjugal connection declined rapidly with number of city blocks separating the husband and wife before the wedding. On an even finer spatial scale, Festinger et al. (1950) found that the odds that two college students would form a friendship fell with the number of feet separating their (randomly assigned) dorm rooms (for evidence from the workplace, see Allen, 1977). Spatial proximity similarly influences inter-firm interactions. Kono et al. (1998), for instance, discovered that corporate board interlocks – where two companies share a common director – most frequently occur among firms with headquarters in the same cities. And, in the domain of venture capital, propinquity strongly influences both

the probability that a venture capital firm invests in a target company (Sorenson & Stuart, 2001) and the other firms with which it chooses to invest (Piskorski & Anand, 2003). These cases moreover represent but examples from scores of studies providing evidence of the spatial basis of social interaction.

Two factors primarily contribute to the correlation between the likelihood of having a connection and geographic distance. Consider first the process of forming a relationship. Individuals generally meet initially in the context of some activity: school, work, church, etc. (Feld, 1981). Since people lead largely local lives, they attend schools near where they live, work at jobs not too much further away, belong to congregations in their neighborhoods and shop, socialize and recreate in their local communities. As a result, one's opportunities to form new relationships are highly concentrated among those that live in the same communities. But simply meeting does not constitute a strong connection; relationships require time and interaction to develop. Proximity, and particularly common membership in some activity, facilitates this process by reducing the costs of interaction—both in terms of opportunities forgone and in terms of actual travel and communication costs (Stouffer, 1940; Zipf, 1949). Moreover, even amongst these initial contacts, those from the same communities might find themselves drawn to one another vis-à-vis their familiarity with the same people, places and pasts. As a result of this process, not only do people tend to meet those that live and work in the same regions as they do, but even among those they meet, they more commonly form enduring connections with those belonging to the same communities.

A second factor, moreover, ensures that relationships spanning short distances typically last longer. Most long distance relationships probably arise as a result of a move on the part of one or both of the individuals involved. Two people, once classmates, neighbors or colleagues, might continue to stay in touch even after they no longer live or work in

the same places. The cost of maintaining such relationships nevertheless increases with distance (Zipf, 1949). Meeting face to face might involve a long drive or flight. Talking by telephone can incur long distance charges and require careful coordination (particularly if separated by many time zones). Moreover, the common acquaintances and activities that once bolstered these relationships may now represent competition for limited time. Hence, these relationships have a tendency to decay, rarely abruptly, but over time less and less frequent interaction leads to weaker and weaker relationships until none remains.

In our context, these processes imply that entrepreneurs cannot easily transplant their social capital. The relationships that can help them to spot opportunities and to assemble the resources necessary for an organization to exploit those opportunities are concentrated in the regions in which they have lived and worked. Though the would-be entrepreneur might consider moving, these relationships, even if maintained, have less value in other regions. In part, the information that their contacts convey is specific to the regions in which those contacts live. Moreover, because their contacts' contacts also tend to be local, the potential financiers and employees that they might know also tend to reside in these same regions (and presumably have less interest in distant investment and employment opportunities). Though these connections may still prove useful to some degree – for example, a friend, trusting his friend, might still invest in his venture even if he lives far from it – our contention is that on average these relationships prove less valuable to would-be entrepreneurs trying to draw on them from a distance. As a result, entrepreneurs should benefit from locating their businesses in the (home) regions in which they have deep social roots, and therefore should tend to open operations in these locations.

### 3 Empirical evidence

We examined entrepreneurs' location choices and the performance of their ventures using a dataset covering all Danish residents. Our data come from government registers collected in the Integrated Database for Labor Market Research (referred to by its Danish acronym, IDA) and the Entrepreneurship Database (ED), both maintained by Statistics Denmark. IDA holds comprehensive, annually updated, longitudinal data on all individuals residing in Denmark from 1980 to 2003, including their family relations, education, income, work experience, occupation, and the geographic location of their homes. The dataset also links individuals to annual information on their employers, including the location, employment, sales and industry classification of those firms. The Entrepreneurship Database meanwhile includes annual information, including most importantly the identities of the primary founders, on new limited liability and individually owned firms in Denmark from 1995 until 2001.

Our sample consists of all new firms with at least one employee in the first year, where we have information about the founder in the founding year and the preceding year. We excluded start-ups in the wholesale, primary and public sectors because we expect a host of other factors to affect location choice in those industries. In total, we have information on 8,400 startups.

#### 3.1 Location choice

Our approach to estimating the location choices of entrepreneurs stems from a random utility model. An entrepreneur  $i$  has  $J$  possible choices for where to locate his or her new

venture. The utility  $u_{ij}$  associated with choosing region  $j$  is:

$$u_{ij} = \beta' x_{ij} + \epsilon_{ij}, \tag{1}$$

where  $x_{ij}$  represents a vector of region-specific characteristics. Some have suggested that one should interpret these choices as dependent only on the expected profitability of locating in different regions (Figueiredo et al., 2002), but entrepreneurs' choices of locations may also reflect their utility for regional characteristics unrelated to the performance of their firms (e.g., staying close to family and friends, or being close to cultural amenities). Individuals' preferences for particular regional attributes therefore represent some unknown weighting of the implications that those choices would have for the expected success of their ventures and the non-business-related satisfaction they would gain from living in those regions.

If we assume the errors in (1) to be independently and identically drawn from a Weibull distribution, then the probability that individual  $i$  chooses region  $j$  is:

$$P(y_i = j) = \frac{e^{\beta' x_{ij}}}{\sum_J e^{\beta' x_{ij}}} \tag{2}$$

As a result, the model nets out the attributes of the entrepreneur and the intrinsic randomness in the choice of locations. Our estimation approach is therefore equivalent to the conditional logit model, also referred to as the McFadden choice model (McFadden, 1974).

Practically, we constructed the sample for this first analysis by creating 276 (grouped) observations – one for each possible region – for each entrepreneur. These observations contain information about the characteristics of each region and each entrepreneur-region match. The dependent variable is either a one, for the region in which the entrepreneur

locates his or her business, or a zero, for the 275 regions not chosen.

Central to our analysis is a choice of spatial unit. We measured all regional attributes at the level of the 276 municipalities ('kommuner' in Danish) in Denmark.<sup>1</sup> These administrative units are similar in size and significance to counties or parishes in the United States. In essence, by measuring regional attributes and choices at this level, we assume that entrepreneurs care about the characteristics of these municipalities (though conceivably uniform estimates of zero for the regional attributes could reveal that they do not), and that they are sensitive to distances at this relatively fine-grained scale (the average size of a municipality is 156 km<sup>2</sup>, or 61 square miles). As a robustness check, we therefore estimated a set of models defining the choice set at the level of the 33 regions identified as labor markets through observed commuting patterns (Andersen, 2000). Defining the units at that level produced nearly equivalent results; when entrepreneurs do move, they typically move not just away from their former kommune of residence but also outside of their former commuting region.

**Location experience:** Our primary interest is whether entrepreneurs choose to locate their new ventures in regions in which they have deep social connections. Social connections themselves are not observable to us. But even if we did have information on the social networks of the entrepreneurs in our sample, we might not want to use it directly in our estimation. At issue is the fact that people select into relationships. The availability of higher quality or a larger number of connections to some individuals might therefore reflect individual-level heterogeneity rather than simply random variation in the characteristics of individual networks (Manski, 1993). In other words, it raises an endogeneity

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<sup>1</sup>Effective January 1, 2007, Denmark reorganized and consolidated its administrative units into 98 kommuner. This change, however, lies outside of the range of our data and therefore does not affect our analyses.

problem.

As an alternative, we therefore used an indirect approach to capture this idea. As our discussion above suggests, the formation of social relationships requires proximity and time. We therefore use information on the prior geographic locations of individuals to proxy for the potential availability to them of social capital in a region. First, we created an indicator variable, *home*, with a value of one if the entrepreneur lived in the municipality in the year prior to beginning his or her venture. If the individual worked in a different municipality from where he or she lived, a second indicator variable, *work*, captures whether the entrepreneur worked in the municipality in the previous year. A third variable, *distance to home*, measures the distance in miles from the entrepreneur's home address in the prior year to the centroid of each kommune. Although we experimented with a variety of functional forms, a comparison of the logged distance to a ten-piece linear spline showed almost no difference between the two. We therefore used the simpler logged distance in our estimations. Note that these variables act in different directions and hence they should have opposite signs. A preference for remaining in the same region, a positive coefficient on *home*, is consistent with not moving to more distant locales, a negative coefficient on *distance*.

Many factors other than a desire to draw on social capital could nonetheless account for geographic inertia from one year to the next. Entrepreneurs, like almost all individuals, probably prefer not to uproot their families or to allocate time and money to moving while simultaneously trying to get their new ventures up and running. Some entrepreneurs even begin their businesses on a part-time basis and maintain their full time employment as a means of reducing the risks associated with entrepreneurship (Gudgin, 1978). As a result, neither of these variables cleanly identifies the effects of social capital.

We therefore created a fourth variable that should capture more closely the core of the

idea of the depth of an entrepreneur’s social connections in a region: the *region tenure*. We counted the number of years that an entrepreneur lived in each municipality from 1980 to the year that they began their ventures, and included it as a covariate. Because we expect the marginal increase in social capital with time to decline, we logged this count. If entrepreneurs rely on their social capital, they should be more rooted to their current location when they have lived there longer, and more interested in alternative locations in which they have deeper experience.

**Region attributes:** We included two region-specific covariates in our estimates as control variables:  $Ln$  (*rivals*) is a logged count of the number of firms in the region in the same four-digit industry code as the entrant. We were agnostic as to its expected effects on both location choice and performance. On the one hand, rivals increase the level of competition for critical resources, but on the other hand, agglomeration externalities may more than compensate for this increase in competition.  $Ln$  (*city size*) is a logged count of the number of employed individuals in a region. Since most municipalities have no more than one city or town of any size, one can reasonably consider it a measure of city size. Once again, we do not anticipate any particular effects. Large cities may prove attractive thanks to their amenities and potential for spillovers *across* industries, but less urban locations typically have lower costs. We use the *kommune* size in the choice models and labor market (commuting region) size in the firm performance models. Table 1 reports descriptive statistics for all of the variables used as predictors of location choice.

Our estimates of the determinants of location choice appear in Table 2. Consistent with our expectations, entrepreneurs exhibit a strong preference for locating their businesses in the regions in which they have been living and working. When they do move, the models reveal that entrepreneurs choose nearby locations and those in which they have lived for

Table 1: Descriptive statistics for the location choice models

	Work	Home	Distance	Tenure	Rivals	City size
Mean	.002	.004	4.13	.007	1.40	7.53
Std Dev	.043	.060	.765	.123	1.14	1.17
Minimum	0	0	0	0	0	1.61
Maximum	1	1	5.53	3.18	6.74	11.8

many years in the past.

In terms of regional characteristics, entrepreneurs more frequently choose smaller municipalities and those with many other firms operating in the same industry. To determine whether this “preference” for locating near rivals simply reflects the fact that a large number of entrepreneurs begin businesses in the same industries as their former employers (34% of the entrants in our data start firms in the same 4-digit industry as their former employers), we re-estimated the determinants of location choice using only information from entrepreneurs that opened businesses in different industries (model 5). Even within this subset, we still observe a tendency for locating near similar firms, so it would appear that entrepreneurs believe that they benefit by doing so.

In model 4, we introduced a set of interaction terms, between the entrepreneur’s home location in the prior year and the attributes of the region, to explore whether certain attributes act more as “anchors”, in the sense that they prevent entrepreneurs from moving, or “sirens”, in the sense that they attract entrepreneurs that do move. We see two notable effects: First, the ability of regions to retain entrepreneurs declines with the size of the labor force. This result may reflect the fact that entrepreneurs move to escape the high costs of urban locations, but it is also consistent with a long-held notion in sociology that cities have less cohesion, and therefore bind their residents less strongly, than small towns and rural areas (Durkheim, 1951). Second, additional years of tenure in a region

Table 2: Conditional logit estimates on location choice

Variable	Model 1	Model 2	Model 3	Model 4
Home	0.914** (0.074)		0.388** (0.076)	5.734** (0.245)
Work	3.425** (0.050)		2.462** (0.056)	2.248** (0.058)
Distance to home	-1.451** (0.022)		-1.467** (0.022)	-1.338** (0.023)
Region tenure	0.252** (0.021)		0.247** (0.022)	0.911** (0.048)
Ln (rivals)		1.188** (0.020)	1.015** (0.028)	0.944** (0.030)
Ln (city size)		0.015 (0.016)	-0.231** (0.022)	-0.015 (0.026)
Home X ln (rivals)				0.043 (0.028)
Home X ln (city size)				-0.561** (0.030)
Home X region tenure				-0.788** (0.051)
Pseudo-R <sup>2</sup>	0.65	0.18	0.68	0.69
Log-likelihood	-15210	-35015	-13760	-13365
N	2103396	2103396	2103396	2103396

Standard errors in parentheses.  
Significance levels: † : 10% \* : 5% \*\* : 1%

contribute more strongly to drawing individuals elsewhere than to keeping them rooted; given the strong main effect of *home*, however, this interaction seems relatively minor.

Table 3 reports some additional robustness checks. Models 5 and 6 first split the sample according to whether the entrepreneur chooses to enter the same (4-digit) industry in which he or she previously worked. Given the importance of human capital in entrepreneurship, it is interesting to consider whether those with it choose their locations differently. For example, perhaps human capital can substitute for social capital since entrepreneurs with experience in the industry may not need to rely on social relationships for access to much of the relevant information. Our results, however, reveal no real meaningful differences

Table 3: Conditional logit estimates on location choice, continued

	Model 5 Different Industry	Model 6 Same Industry	Model 7 Region FE
Home	0.372** (0.092)	0.400** (0.137)	0.359** (0.076)
Work	2.133** (0.072)	3.030** (0.091)	2.451** (0.056)
Distance to home	-1.441** (0.027)	-1.526** (0.041)	-1.476** (0.022)
Region tenure	0.247** (0.027)	0.242** (0.038)	0.248** (0.022)
Ln (rivals)	1.030** (0.034)	0.946** (0.053)	1.023** (0.029)
Ln (city size)	-0.227** (0.027)	-0.202** (0.042)	-0.228** (0.023)
Pseudo-R <sup>2</sup>	0.66	0.72	0.68
Log-likelihood	-9475	-4230	-13731
N	1370064	733332	2103396

Standard errors in parentheses.

Significance levels: † : 10% \* : 5% \*\* : 1%

between these two groups in their location choices. Finally, in model 7, we include dummy variables at the level of the 33 labor markets to control for common characteristics of these regions. Not only are the results robust to this formulation, but also the similar size of the coefficients suggests that highly local (within county) decisions drive our results.

### 3.2 Firm performance

We assessed firm performance by analyzing the firm's time to failure. In particular, we estimated discrete time failure rate models (in essence a pooled logit regression with a value of zero on the dependent variable as long as the firm survived and a value of one in the year that it failed).<sup>2</sup> Our focus is again on how the location choice influences

<sup>2</sup>We clustered the standard errors to allow for interdependence in the errors across observations of the same firm. Assuming a normal distribution to the error term (i.e. a probit) produces equivalent results.

performance, and therefore we included all of the region attributes and entrepreneur-region match characteristics found in the location choice models. Again, if entrepreneurs benefit from their social capital, we would expect that those that choose to locate in regions in which they have deep social connections should outperform others. To control for firm-level heterogeneity, however, we also included several characteristics of the firm.

**Firm attributes:** A variable, *limited liability* company, essentially indicates whether the firm had been incorporated upon founding. Incorporation could either increase or decrease exit rates; though these firms may have more resources available at founding, they also have lower exit costs since founders are not personally liable for their debts. We also included controls for firm size and firm age. *Age* enters the models as a series of dummy variables (for 1 year, 2 years, 3-4 years, 5-6 years and 7-8 years) to allow for flexibility in the relationship between age and mortality rates. Prior research has shown a wide variety of patterns including increasing mortality rates with age, decreasing mortality rates with age, and initially decreasing but then increasing mortality rates with age (i.e. U-shaped; for a review, see Baum & Shipilov, 2006).  $\ln(\textit{size})$  is the logged count of full-time equivalent employees. Prior research has typically found a negative relationship between firm size and failure rates.

In assessing performance, we also distinguished between two types of entrants: experienced entrepreneurs and inexperienced entrepreneurs. By experienced here, we refer to whether or not the entrepreneurs have prior experience as employees in the *same industry* (4-digit), not that they have previously attempted to found a firm. We treated inexperienced entrepreneurs as the baseline category. Though we remain agnostic to these effects, a vibrant literature on spinoffs has called attention to the value of prior experience in a variety of industries. The robust finding there has been that businesses founded by those

with prior experience in the industry tend to survive longer and perform better than average (Agarwal et al., 2004; Klepper & Sleeper, 2005; Dahl & Reichstein, 2007). Table 4 provides descriptive statistics for the variables used in the performance models.

Table 4: Descriptive statistics for the performance models

	Work	Home	Distance	Tenure	Same Ind	Limited	Age	Size	Rivals	City size
Mean	.098	.632	.989	.957	.386	.556	1.96	1.33	2.78	11.6
Std Dev	.298	.482	1.42	1.18	.487	.497	1.90	.627	1.61	1.46
Min	0	0	0	0	0	0	0	0	0	5.41
Max	1	1	5.46	3.18	1	1	8	4.43	6.74	13.1

Table 5 reports estimates of the predictors of firm performance. Of the various measures of regional experience, only *region tenure*, the one that captures the length of time a person has lived in the municipality has a significant effect. As expected, those with deep connections in a region experience lower failure rates. A doubling in the number of years someone has lived in the region decreases the annual relative risk of failure by 4%; on average the typical stayer enjoys a 13% lower yearly rate of failure relative to the typical mover (using the estimates from model 10). However, simply living or working in the region in the previous year, by itself, has no significant effect on failure rates; time in the region is crucial.

Though we interpret these results as consistent with and supportive of the idea that social capital matters, an alternative interpretation could be that entrepreneurs hold region-specific knowledge. In many countries, tax codes, building regulations and a variety of other factors vary at a local level, and entrepreneurs with a better understanding of these institutional features may have an advantage in business (Håkanson, 2005). We nevertheless see this possibility as an unlikely explanation here since nearly all of the relevant codes and policies in Denmark vary at the national level.

Turning to the control variables, we note several interesting effects. Locating near to

Table 5: Discrete time estimates of firm failure

Variable	Model 8	Model 9	Model 10	Model 11
Home	0.176 (0.110)		0.130 (0.105)	0.189 <sup>†</sup> (0.109)
Work	-0.114 (0.077)		-0.069 (0.073)	-0.085 (0.073)
Distance to home	0.043 (0.034)		0.048 (0.033)	0.051 (0.033)
Region tenure	-0.083** (0.018)		-0.064** (0.018)	-0.064** (0.018)
Ln (rivals)		0.064** (0.012)	0.066** (0.012)	0.066** (0.012)
Ln (city size)		0.038** (0.013)	0.037** (0.014)	0.038** (0.014)
Age 1		-0.048 (0.045)	-0.046 (0.045)	-0.046 (0.045)
Age 2		-0.536** (0.054)	-0.534** (0.054)	-0.534** (0.054)
Age 3-4		-0.799** (0.055)	-0.798** (0.055)	-0.796** (0.055)
Age 5-6		-1.017** (0.090)	-1.015** (0.090)	-1.012** (0.090)
Age 7-8		-1.017** (0.235)	-1.007** (0.235)	-1.001** (0.235)
Limited liability		-0.527** (0.038)	-0.526** (0.038)	-0.524** (0.038)
Ln (size)		-0.182** (0.033)	-0.187** (0.033)	-0.186** (0.033)
Same industry		-0.517** (0.040)	-0.507** (0.040)	-0.389** (0.068)
Home X same industry				-0.184* (0.084)
Constant	-1.888** (0.105)	-1.419** (0.158)	-1.476** (0.205)	-1.522** (0.206)
Pseudo-R <sup>2</sup>	0.01	0.05	0.05	0.05
Log-likelihood	-11,293	-10,766	-10,755	-10,753
N	7,559	7,559	7,559	7,559

Standard errors in parentheses.

Significance levels: † : 10% \* : 5% \*\* : 1%

a large number of rivals increases the likelihood of failure. Though perhaps not surprising from the point of view that these regions engender more intense competition, it runs counter to the idea that firms might benefit from economies of agglomeration (and appears inconsistent with the attraction of entrepreneurs to these regions seen in our location choice estimates).

Human capital also clearly matters as firms founded in the same industries as their prior employers have much lower failure rates (experience in the same 4-digit industry reduces the annual relative risk of failure by 35%), consistent with the prior results in the literature on spinoffs. To explore whether the value of social capital might also have an industry-specific component, we included an interaction between *home* and *same industry*. Indeed, a large share, roughly 36%, of the value of prior experience in the industry appears to reflect industry-specific social capital rather than human capital. Entrepreneurs therefore have much to gain by entering not only regions but also industries in which they have prior experience.

Table 6 explores some alternative specifications. Since manufacturing and service businesses might vary in the importance of social capital to their operation, we split the estimates according to these broad sectors in models 7 and 8. Although overall these two broad sectors show relatively similar estimates, they do interestingly differ in terms of the value of industry-specific social capital (the interaction between *home* and *same industry*). Specifically, in services industry-specific social capital contributes more strongly to firm survival. Given that these businesses tend to have more localized customer bases and to sell goods with difficult-to-observe *ex ante* quality, having existing connections to potential customers may prove particularly important to building sales in this sector. Models 9 and 10 then replicate the models first with industry (2-digit) fixed effects and then with labor market (33 commuting region) fixed effects. The results remain robust across these

Table 6: Discrete time estimates of firm failure, continued

	Model 12 Services	Model 13 Manufacturing	Model 14 Industry FE	Model 15 Region FE
Home	0.235 <sup>†</sup> (0.129)	0.101 (0.203)	0.222* (0.109)	0.224* (0.109)
Work	-0.124 (0.087)	0.035 (0.135)	-0.083 (0.074)	-0.078 (0.073)
Distance to home	0.034 (0.038)	0.087 (0.063)	0.053 (0.033)	0.062 <sup>†</sup> (0.033)
Region tenure	-0.062** (0.022)	-0.060* (0.030)	-0.059** (0.018)	-0.063** (0.018)
Ln (rivals)	0.055** (0.014)	0.067** (0.023)	0.041** (0.013)	0.067** (0.012)
Ln (city size)	0.021 (0.016)	0.077** (0.025)	0.030* (0.014)	-0.651 (0.618)
Age 1	-0.079 (0.055)	0.033 (0.081)	-0.035 (0.045)	-0.043 (0.045)
Age 2	-0.558** (0.065)	-0.471** (0.097)	-0.516** (0.054)	-0.530** (0.054)
Age 3-4	-0.783** (0.066)	-0.812** (0.103)	-0.768** (0.055)	-0.798** (0.055)
Age 5-6	-0.997** (0.113)	-1.004** (0.146)	-0.958** (0.090)	-1.023** (0.090)
Age 7-8	-0.890** (0.273)	-1.328** (0.471)	-0.996** (0.235)	-1.026** (0.235)
Limited liability	-0.511** (0.046)	-0.487** (0.072)	-0.466** (0.043)	-0.520** (0.038)
Ln (size)	-0.180** (0.039)	-0.223** (0.061)	-0.247** (0.035)	-0.187** (0.033)
Same industry	-0.352** (0.079)	-0.440** (0.136)	-0.351** (0.069)	-0.388** (0.069)
Home X same industry	-0.216* (0.100)	-0.081 (0.158)	-0.153 <sup>†</sup> (0.085)	-0.180* (0.084)
Constant	-1.264** (0.244)	-2.074** (0.386)	-1.175** (0.259)	7.453 (8.067)
Pseudo-R <sup>2</sup>	0.05	0.05	0.06	0.05
Log-likelihood	-7,269	-3,464	-10,673	-10,735
N	4,941	2,621	7,558	7,559

Standard errors in parentheses.

Significance levels: † : 10% \* : 5% \*\* : 1%

alternate specifications. Moreover, the fact that region tenure continues to have an effect indicates that our results reflect differences across entrepreneurs in their success in regions rather than simply regional differences in firm performance.

In exploring these results, we found it instructive to compare the founding characteristics of the firms started by those entrepreneurs that stayed in their home regions (stayers) to those that moved to new regions (movers). Table 7 reports the summary statistics for both of these groups.<sup>3</sup> With respect to resources, we see two interesting differences between the movers and the stayers. First, those that stay in their home regions are better capitalized, having roughly twice as much equity value in their ventures as movers in their initial year. Second, those that stay recruit a higher percentage of employees from the local region, as one would expect if these local entrepreneurs can call more heavily on social connections for recruiting.

The first year statistics also provide a more nuanced view of the relative performance of those with recent versus deep social connections. Although movers have slightly larger firms on average – with more employees, higher sales, and even somewhat higher sales per employee – the stayers have higher profitability on average. Given that scale generally has strong positive effects on performance, it is interesting that these advantages still cannot overcome the handicap of lower social capital. Stayers both survive longer and have higher profitability. It would therefore appear that the stayers either offer higher value products and services or operate more efficiently. Either could potentially account for these patterns, and future research might interestingly explore these differences further.

Before moving to a more extended discussion of the implications of our results, we consider it important to point out one weakness of our estimates. We only observe those entrepreneurs that succeeded in beginning operations. In other words, there is an unob-

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<sup>3</sup>All differences are significant at  $p > .01$ , except the proportion of hires from the same industry.

Table 7: Initial year characteristics of movers and stayers

	Movers	Stayers
Sales (1000s)	1,946 DKK \$366.7	1,485 DKK \$279.9
Net profit (1000s)	13 DKK \$2.5	75 DKK \$14.1
Equity (1000s)	249 DKK \$46.9	490 DKK \$92.4
Number of employees	4.18	3.36
Proportion local hires	.36	.53
Proportion hires from same industry	.31	.33
N	2,844	4,908

served selection process operating that determines which firms enter our estimation. If that process is systematically related to our variables of interest, it could bias our estimates. Given the way in which social capital works, it seems plausible that nascent entrepreneurs who attempt entry in their “home” regions might experience higher success rates in entry (conditional on attempting to assemble resources to found a firm). If true, both our location choice and performance models likely yield biased estimates. In terms of location choice, we would see too many entrepreneurs choosing their home locations and therefore may well *overestimate* the effect of *region tenure* in location choice. With respect to performance, however, we believe that our effects probably *underestimate* the degree to which experience in the region reduces exit rates. Since only those entrepreneurs with the best ideas and greatest acumen likely succeed in overcoming the disadvantages of not being able to rely on social capital. As a result, ventures founded outside of entrepreneurs’ home regions probably build on ideas of higher underlying quality—one possible explanation for the higher sales of movers seen in Table 7.

## 4 Discussion

Entrepreneurs exhibit a great deal of geographic inertia in terms of choosing a location for their new ventures. Though to some extent that inertia almost certainly reflects both an absence of systematic consideration of possible locations and personal preferences for avoiding the time and financial costs of moving, our results here suggest that one might also see this behavior as a rational response to the geographically-contingent value of social capital. Social capital benefits entrepreneurs in numerous ways, both helping them to identify promising opportunities and to assemble the resources necessary to exploit those opportunities. Yet, social capital also remains geographically circumscribed. Relationships form and are maintained through contact, and the resources to which they can provide access are often themselves bound to the regions in which those contacts live. As a result, we argue that the value of social capital to entrepreneurs should decline as they locate their ventures distant from it. Consistent with this idea, we find that entrepreneurs' ventures survive longest when they locate in the regions in which they have lived for a long time.

From the point of view of the entrepreneurship literature, our results offer a strong compliment to the research on human capital. Numerous studies have consistently demonstrated that entrepreneurs with prior experience in an industry enjoy better performance (Agarwal et al., 2004; Klepper & Sleeper, 2005; Dahl & Reichstein, 2007). Prior experience in the region has a similar effect, improving the performance of those organizations whose founders have it. Here, the issue is not human capital, which entrepreneurs can carry with them to other locations, but social capital, which they cannot. Interestingly, these effects appear additive (perhaps even somewhat complementary) and similar in magnitude. Those most likely to succeed have prior experience both in the industry *and* in the region.

That fact raises interesting implications for the understanding of agglomeration. In

general, the literature on agglomeration has treated the decisions of firms as unconstrained and homogenous.<sup>4</sup> Any entrepreneur entering an industry should choose some location because of its inherent advantages. Our results, however, suggest that rational entrepreneurs should tend to enter the industries in which they have employment experience and to locate their business in the regions in which they have lived. Since acquiring experience at some existing firm in the industry generally implies living in close proximity to it, the implication of these constraints is that entrants in an industry will disproportionately emerge in regions that already have dense populations of firms in the same industry *even if co-location itself offers no advantages*.

Our research therefore provides micro-level evidence consistent with the patterns of industry evolution found by Sorenson & Audia (2000) in the footwear industry, by Staber (2001) in the apparel industry, by Stuart & Sorenson (2003) in biotechnology, and by Klepper (2007) in the automobile industry (for a review of additional related research, see Håkanson, 2005). Sorenson & Audia (2000), for example, found that geographic concentration persists in the footwear industry despite the fact that plants located in close proximity to large numbers of rivals perform worse than those in more remote regions. Staber (2001) discovered essentially identical patterns in the knitwear industry in Germany. Despite high failure rates, excessive entry in these regions maintains agglomerations. Along similar lines, Stuart & Sorenson (2003) demonstrated that regions with a large number of biotech firms experience higher biotech founding rates. These crowded regions, however, offer firms the lowest odds of going public, an important indicator of success in the biotech industry. Our results here fill in the micro-level processes underlying these dynamics. Existing employees in an industry might perceive some opportunity. Even if they recognize

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<sup>4</sup>Some notable exceptions exist. For example, Flyer & Shaver (2003) and Baldwin & Okubo (2006) develop analytic models with heterogenous firms, though interestingly with nearly opposite predictions on which firms should locate in dense regions.

the high costs of competing for local talent and resources, however, they have little choice but to enter in the same region as their current employer. It is only there that they have the contacts necessary to secure financing and recruit labor. For the individual, the value of being able to start the business outweighs the costs of congestion to the industry as a whole in the region. The geographic concentration of industries therefore may have little to do with – and in fact occur despite the absence of – benefits to co-location.

Our findings therefore bolster Martin & Sunley’s (2003) call for the need for further research, both theoretical and empirical, on the processes of cluster formation – and their effects once formed – before social scientists recommend that policymakers should attempt to stimulate agglomeration. With respect to their effects, our results indicate that firms do not benefit from clustering (though other constituents might). With respect to policy, even if bureaucrats and politicians wish to influence the geography of industrial activity, they may find it difficult to do so since the processes that we highlight produce highly stable geographic distributions over time.

How then do industries disperse? On the one hand, existing firms opening new plants do not face the same constraints as entrepreneurs, and therefore may contribute critically to the seeding of new locations. On the other hand, despite the constraints that entrepreneurs face, some individuals might have the ability to escape them. Those that have moved for employment might find themselves in positions where they understand the industry and have the relevant human capital to start a firm in it, and have not been away from their prior homes long enough to lose their social capital there. These “geographic brokers” seem interesting both in themselves and in their implications for the evolution of industries. As individuals, this set of people with one foot in an industry and another in a region not currently represented in the industry, may represent the highest potential entrepreneurs. They can potentially access both human and social capital without falling

prey to the hazards of intense local competition. With respect to industry evolution, they may play particularly important roles in determining why industries diffuse to some locations and not to others.

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