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Home sweet home: Entrepreneurs' location choices and the performance of their ventures*

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Abstract: Entrepreneurs, even more than employees, tend to locate in regions in which they have deep roots ('home' regions). Here, we examine the performance implications of these choices. Whereas one might expect entrepreneurs to perform better in these regions because of their richer endowments of regionally-embedded social capital, they might also perform worse if their location choices rather reflect a preference for spending time with family and friends. We examine this question using comprehensive data on Danish startups. Ventures perform better – survive longer and generate greater annual profits and cash flows – when located in regions in which their founders have lived longer. This effect appears substantial, similar in size to the value of prior experience in the industry (i.e. to being a spinoff).

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Consider the following facts. Entrepreneurs tend to start their businesses in the regions in which they have deep roots, the places where they have family and friends, their "home" regions (e.g. Katona and Morgan 1952; Mueller and Morgan 1962). They are even more biased toward remaining in these places than employees (Michelacci and Silva 2007; Dahl and Sorenson 2009). Yet, home regions often offer less favorable economic environments for their startups than other possible places (Sorenson and Audia 2000; Figueiredo et al. 2002). Together, these facts pose a puzzle: Entrepreneurs, who have much to gain or lose from their location choices, remain rooted in their home regions, even when more favorable conditions exist elsewhere.

One possible resolution to this puzzle is that entrepreneurs choose the places that they do, not so much to maximize the performance of their ventures, but rather to allow them to spend more time with family and friends (Gimeno et al. 1997; Dahl and Sorenson 2009). Entrepreneurs would then exhibit a preference for home regions because those places have the highest concentrations of loved ones.

Another is that the attractiveness of locations differs across entrepreneurs, even within the same industry. Those with deep roots in a region possess local information and connections of potential value to their ventures. Entrepreneurs therefore may thrive in their home regions, even if those places appear unattractive to others—for example, because of intense competition. For the founder, the question is not, where would some hypothetical entrant do best, but rather where, given my resources, do I have the greatest odds of success.

Though either of these explanations could account for entrepreneurs' preferences for home regions, they differ in their predictions for performance: If entrepreneurs choose locations to remain close to family and friends, then one might expect living near loved ones to act as a compensating differential—entrepreneurs might gladly accept lesser financial rewards in

exchange for these social benefits. If, however, locating in home regions allows entrepreneurs to exploit their knowledge and connections, then deep roots in the region should have a positive effect on performance.

To gain greater traction on the relative importance of these factors and to assess the rather practical question of how entrepreneurs' choices of locations influence the performance of their ventures, we explore data from Denmark. The Danish data provide extensive information on both the attachment of individuals to regions and on multiple dimensions of the performance of startups, including their survival and profitability.

We operationalize regional attachment in terms of the number of years that an entrepreneur has lived in a region, prior to founding his or her firm. Those with longer tenure in a region have businesses that survive longer and that generate greater annual profits. Relative to a newcomer, an entrepreneur with average tenure in a region (6.4 years) has a 9% lower rate of exit and earns roughly $8,172 more in annual profits.[1] By comparison, relative to a *de novo* entrant, an entrepreneur with average experience in the industry (or in a related industry) has an 11% (5%) lower rate of exit and earns $3,508 ($2,374) more in annual profits. These results, moreover, are relatively robust to the use of an instrumental variable – the number of years that the entrepreneur's parents lived in a region – to correct for possible endogeneity in the choice of location.

Our results have implications for a number of literatures. Most directly, with respect to the research on entrepreneurship, they imply that – even if entrepreneurs choose to remain in their home regions for other reasons – their better understanding of and social connections within these regions mean that their ventures typically do best in these places. But they also speak to two other somewhat-related streams of research. In international business, a

[1]We calculated all dollar values by converting from Danish kroner using the January 1, 2009, exchange rate of 5.5 kroner to the US dollar.

number of studies have found that firms suffer a liability of foreignness when they expand into new countries (Cuervo-Cazurra et al. 2007). Foreign companies face import restrictions, transportation costs, and unfamiliarity with the laws, language, customs and preferences of the local population. Our results demonstrate that this disadvantage of not being from a region extends to the individual level, that it can occur even in the absence of legal, linguistic or cultural barriers, and that it exists at much finer geographic scales than the crossing of national boundaries. Meanwhile, a literature at the intersection of franchising and organizational learning has noted that chains perform better when they open units in regions in which they have prior operating experience (Ingram and Baum 1997; Kalnins and Mayer 2004). This fact has generally been attributed to the ability of these chains to develop effective operational routines through learning-by-doing and then to transfer those routines across their units. Our results suggest that chains may also benefit from the *non*-operating experience of their owners and managers in the region, as this local embeddedness may allow them to spot opportunities and to build connections that facilitate hiring.

1 Regional embeddedness

Regional embeddedness captures multiple dimensions of the relationship between an individual and a place. In part it suggests understanding. The person knows more about the history of a region, the culture of a region and a large share of other factors that would be difficult for an outsider to assess. In part it reflects relationships. The embedded individual has friends and family in a region that attach him or her to it.

1.1 Compensating differentials

One possible consequence of this regional embeddedness is that entrepreneurs forgo opportunities for higher profit elsewhere. Because they derive satisfaction from spending time with family and friends, they may garner greater overall utility from living and working in a place that facilitates these interactions than in one that optimizes expected income.

Several lines of research appear to support this idea. Studies of the returns to entrepreneurship, for example, typically find that entrepreneurs could earn more as employees (Evans and Leighton 1989; Hamilton 2000). Entrepreneurs, therefore, appear to found firms not as a means of maximizing income but rather in the pursuit of non-pecuniary compensations, such as satisfaction from the feelings of accomplishment and control that self-employment offers, or from the ability to tailor their schedules to their avocations and social activities. Indeed, despite their lower incomes, entrepreneurs consistently report greater job satisfaction than wage earners (Blanchflower and Oswald 1998; Benz and Frey 2008).

Given that non-financial considerations influence entrepreneurs' decisions to open their own businesses, one might also expect them to influence the kinds of businesses pursued and the places where entrepreneurs pursue them. Researchers, for example, have found that entrepreneurs more commonly live in their regions of birth (Michelacci and Silva 2007). But does this tendency reflect a preference for non-financial factors? More direct evidence comes from Dahl and Sorenson (2009), who examined the correlates of location choice among Danish entrepreneurs and employees. They found that entrepreneurs placed greater weight than employees on living near family and friends. To the extent that entrepreneurs may then place less weight on the expected success of their ventures, those weightings could induce a negative relationship between regional embeddedness and performance (Gimeno et al. 1997).

1.2 Opportunity identification

But regional embeddedness could also contribute positively to the performance of startups. Prospective entrepreneurs must first notice an unmet need. Regional embeddedness can foster this opportunity identification both through direct experience and through interactions with others. A nascent entrepreneur living in the region, for example, might want a particular product and, being unable to find it, decide to produce it himself. Or, he could become aware of an opportunity from a friend. Regardless of the source, locals almost certainly have a better sense of the economic opportunities around them. Moreover, once the initial idea hits them, they can "test" the local market cheaply by talking about it with friends.

At least two lines of research support this idea. First, research on franchises has found that chains perform better when they open units in places in which they have prior operating experience (Ingram and Baum 1997; Kalnins and Mayer 2004). Some of this advantage may stem from the greater ability to share organizational learning across proximate units, but some of it probably also reflects a better ability to spot local opportunities and to choose restaurant locations (Kalnins and Mayer 2004). To the extent that these benefits depend on information on the local environment rather than on learning-by-doing, they should extend even to locals that lack prior experience in the industry.

Second, the literature on international business has identified a liability of foreignness—companies that expand abroad appear disadvantaged relative to domestic competitors (Cuervo-Cazurra et al. 2007). Several factors have been forwarded to explain this disadvantage, including trade barriers, transportation costs and the need to optimize operations across multiple markets. But researchers have also attributed this liability, in part, to the fact that foreign companies do not know the local environment as well and therefore cannot match their products and services to local demand as effectively as domestic competitors (e.g.,

Zaheer 1995). To the degree that demand also varies within countries, entrepreneurs with experience in a region may better match their offerings to local demand than outsiders.

1.3 Resource mobilization

Regionally-embedded entrepreneurs may also enjoy advantages in resource mobilization. Following the identification of an opportunity, entrepreneurs must assemble a variety of resources to begin operations—financial capital and employees with the applicable abilities and relevant experience.

Acquiring these resources is difficult. New firms lack track records. Investors and would-be employees therefore have little on which to base their assessments of the expected success of the venture. Moreover, they usually cannot place great confidence in the information that they receive from the entrepreneurs themselves: To secure funding and employees, entrepreneurs have incentives to exaggerate their odds of success (Amit et al. 1990; Kosová and Lafontaine 2010). And even impeccably honest entrepreneurs over-estimate their prospects (Camerer and Lovallo 1999). Investors and in-demand employees therefore generally eschew unproven ventures.

Social connections can nonetheless improve an entrepreneur's odds of securing financing and recruiting employees for at least three reasons. First, trusted third-parties that know the entrepreneur can provide investors and prospective employees with more objective assessments of the entrepreneurs' abilities and chances of success (Sorenson and Stuart 2001). Second, these shared relationships also provide a means of recourse should the entrepreneur behave dishonestly (Raub and Weesie 1990; Greif 1993). They therefore increase the level of rational trust that an investor or employee can place in the entrepreneur. But even in the absence of such "impartial" information and rational trust, prior connections to the

entrepreneur can encourage investment. Familiarity tends to bias individuals in their evaluations of products and people (Zajonc 1968). As a result, potential investors and employees probably consider entrepreneurs with whom they have had prior dealings of higher ability and of greater reliability, thereby increasing their willingness to work with them (Sorenson and Waguespack 2006).

Consistent with these ideas, research has repeatedly found that prior connections facilitate financing and recruiting. Family and friends are the most common sources of financial capital for startups (Bygrave et al. 2003). Entrepreneurs with direct and indirect connections to venture capitalists have the highest probability of securing financing from them (Shane and Stuart 2002). And more than half of the early employees in startups are spouses, relatives or former business associates of the founders (Ruef et al. 2003).

The relationships that help to facilitate this process of resource mobilization nevertheless remain largely rooted in the regions in which entrepreneurs have lived and worked. Individuals tend to form connections with those they meet in their day-to-day activities (Feld 1981; Sorenson and Stuart 2001), and their likelihood of maintaining relationships, once formed, declines with distance (Zipf 1949). Unlike human capital, which entrepreneurs carry with them wherever they go, social capital depreciates as one transports it from the regions in which it had been developed.

2 Empirical evidence

We examined the performance of Danish startups, conditional on the attributes of their founders.[2] Our data come from government registers collected in the Integrated Database for

[2]Though it should not influence the theoretical implications of our analysis, one might worry that Denmark differs in its level of entrepreneurship from other countries. Eurostat figures from 2004 (available at: `http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics`), however, indicate that, per

Labor Market Research (referred to by its Danish acronym, IDA) and the Entrepreneurship Database, both maintained by Statistics Denmark. IDA holds comprehensive, annually updated, longitudinal data on all individuals residing in Denmark from 1980 to 2006. The dataset also links individuals to annual information on their employers, such as the industry classification of those firms. The Entrepreneurship Database meanwhile contains annual information, including most importantly the identities of the primary founders, on new firms in Denmark from 1995 to 2004.

Our sample consists of all new ventures with at least one employee in the first year (15,884 cases), where we have information about the founder in both the founding year and the preceding year (15,708). Statistics Denmark records founding at the firm level. Multiple facilities owned by the same individual or shareholders – such as a factory with more than one plant or a firm with several sales outlets – would therefore only count as a single founding event. From this population, we excluded 2,010 start-ups in farming, fishing and mining, and in the wholesale sector because we suspected that performance in those cases depends primarily on the physical attributes of the region (and less on the founders' attributes). We also eliminated 532 cases with founders 55 years of age or older at the time of founding to ensure that our exit variable did not include retirements. In total, we analyzed information on 13,166 startups.

capita, Denmark has a similar number of new firms with at least one employee to other northern European countries: .82 per 1000 for Denmark, .81 for Germany, .89 for the Netherlands. The United Kingdom and United States, by contrast, report much higher rates of 3.76 and 2.05 per 1000, respectively (U.S. statistics come from the Small Business Administration). Note, however, that the U.K. and the U.S. rates also include firms with less than one full-time employee.

2.1 Independent variables

Region tenure: Our primary interest concerns how entrepreneurs socially embedded in a region perform relative to those less connected. To measure this attachment, we examined entrepreneurs' geographic histories. Denmark had 271 comprehensive and mutually exclusive municipalities ("kommune" in Danish) over the course of our observation window.[3] Our measure counts the number of years, over the 15 years prior to entry, that each entrepreneur lived in the municipality in which he or she opened her business.[4,5] Table 1 lists the industries most commonly entered and reports the average region tenure of the founders in each.

Alternatively, one might imagine trying to observe directly whether entrepreneurs had close personal contacts in a region. Even if we had such information, however, we still see reasons for focusing on region tenure instead. First, the opportunity identification advantage of being embedded in a region involves knowledge that could come through observation rather than interaction. Second, one must worry about the meaning of relationships. At issue is the fact that people select into them. Differences in the quality or number of connections available to individuals might therefore reflect individual-level heterogeneity rather than random variation in their relationships (Manski 1993). Measuring these connections directly raises a reflection problem that could bias the estimates.

Because our research design essentially compares businesses across entrepreneurs, we

[3]The municipality represents the most fine-grained geographic unit available to us. Each one encompasses an average of 54 square miles of land (SD = 38). Models using more aggregated spatial units, such as the 79 labor market areas (see Andersen 2000), yielded similar, though somewhat smaller, estimates. The smaller magnitude of effects using more aggregated units suggests that at least some of the benefits to regional embeddedness accrue at a highly local level.

[4]One might expect the value of this experience to decay. In unreported models, we explored whether the effects of region tenure fade with time and found some evidence that it does, but slowly. In the interest of easy interpretation, we nonetheless report models in which tenure's value does not decay.

[5]Although we have more than 15 years of information for many individuals, we restricted the window to 15 years so that any variation in years of residence would stem from differences in the time that entrepreneurs had spent in the region rather than from variation in our ability to observe them (left-censoring). Models using all of the available information nevertheless produced qualitatively identical results.

included three classes of entrepreneur-level characteristics – experience, demographics and financial resources – to ensure that compositional differences, across the entrepreneurs that locate their businesses in home regions versus those that locate them elsewhere, do not drive our results.

Industry experience: A number of studies suggest that entrepreneurs with prior experience in an industry perform better than those without it (e.g., Agarwal et al. 2004; Klepper and Sleeper 2005; Dahl and Reichstein 2007). These spinoff entrepreneurs presumably have more of the industry-specific knowledge necessary to run a business. Though some of this knowledge appears in operational manuals and becomes built into machinery, much of it remains tacit, incorporated in the unwritten routines that employees follow. Absorbing these routines therefore requires intensive observation and involvement in the processes, and usually stems from prior experience in an existing firm in the industry.

We measured this prior experience in two ways. (1) We counted the number of years, over the 15 years prior to entry, that each entrepreneur worked in the same four-digit industry as their current venture (*industry exp*). (2) We also summed the number of years, over that same period, that an entrepreneur worked in a different four-digit, but the same two-digit, industry as their current venture (*related ind exp*).

Demographics: Though we do not have strong priors on how they might influence entrepreneurial success, we included controls for gender, marital status, age and education. *Male* takes a value of one for male entrepreneurs. Studies have frequently found a gender gap in entrepreneurship, with businesses started by men performing better (for a review, see Brush 1992). *Married* is an indicator variable where one represents married individuals. *Founder age* records the age of the entrepreneur at the time of founding; we also included a

quadratic term for age, as prior studies suggest that age has a non-monotonic relationship with entrepreneurship (Hamilton 2000).

Many studies have also found positive associations between founder education and performance, both in terms of the survival and earnings of their start-ups (for a review, see Van der Sluis et al. 2008). Although most of these studies operationalize education in terms of years of schooling, our exploration of the data suggested that the returns to education occur in discrete steps in Denmark. We therefore coded education into three categories: *College*-educated, *Gymnasium*- or vocational-school-educated, and those with less education.

Financial resources: Finally, we introduced controls for the financial resources available to the entrepreneur. These resources could have either positive or negative effects. On the one hand, they might allow entrepreneurs to pursue good ideas that they could not have followed in the absence of these personal resources. On the other hand, they might simply permit the pursual of bad ideas longer than an outside investor would. Prior research nevertheless has generally found positive relationships between financial resources and performance (Brüderl et al. 1992; Gimeno et al. 1997).

We measured these resources with three variables: *Wage* records the amount that the entrepreneur earned in (hundreds of thousands of) Danish kroner in the year prior to founding. *Household wealth* sums the aggregate assets available to the entrepreneur in (hundreds of thousands of) Danish kroner in the year prior to founding. This measure includes both liquid and illiquid assets, such as the value of a house, net of debt. *Parent wealth* sums the assets owned by the entrepreneur's parents and his or her spouse's parents in the year prior to founding (also in units of 100,000 Danish kroner). We inflated all of these values forward, using a Danish consumer price index, to 2010 kroner. Table 2 reports descriptive statistics for the variables used in the models.

2.2 Failure rates

We began our assessment of firm performance with an analysis of exit rates. Exit here indicates that the employer code ceased to exist, which could either represent a liquidation or a sale of the business. To allow for the most flexible specification of the hazard rate, we estimated a piece-wise exponential model with age pieces for every year of firm tenure (i.e. 1 year, 2 years...). Other than this firm age parameter, none of the other variables update over time (i.e. they remain fixed for each case at their levels in the year of entry).

All of the models also included fixed effects for (i) entry year and (ii) region of entry.[6] Our data spans at least one full business cycle and the probability of failure undoubtedly varies across this cycle. The regions, moreover, differ substantially on a variety of characteristics, such as population density and proximity to ports, that may also influence performance.

Table 3 reports estimates of the predictors of firm exit as hazard ratios. Coefficients less than one therefore represent factors associated with longer survival, better performance, while those greater than one indicate factors associated with faster failure. Beginning with model 1, each year of founder tenure in the region entered reduces the rate of exit by nearly 2%; since these start-ups have an expected survival of roughly four years, each year the entrepreneur lived in the region increases the expected lifespan of the venture by about one month ($4 \times 365 \times .02 = 29.2$ days). Model 2 introduces controls for industry experience. Though industry experience appears important to entrepreneurial success – each year of experience in the industry, for example, reduces the exit rate by roughly 6% – region tenure continues to reduce exit rates significantly.[7] A cursory examination of these coefficients would suggest that industry experience matters much more than region experience, but note

[6] Our region fixed effects use the 79 mutually exclusive labor markets developed by Andersen (2000).

[7] In unreported models, the interaction of region tenure and industry experience did not significantly affect failure rates or profits or cash flows, suggesting that they do not act as complements or substitutes.

that region tenure varies more than industry experience. Hence, the changes in survival rates associated with a one standard deviation change in these factors (5.8 years in the region and 3.5 years in industry), are more similar: an 8.5% lower exit rate for longer region tenure and a 19% lower rate for greater industry experience (Model 3). These results remain robust to controls for both demographics and financial resources.

In terms of the control variables, the results appear highly consistent with past research. Male and married founders' firms enjoy lower exit rates. Success appears to vary non-monotonically with founder age, first rising and then declining; consistent with prior studies, the probability of startup survival peaks for entrepreneurs of age 42. And the companies started by those with higher levels of education survive longer.

Financial resources also increase survival rates. Here, note that though a unit of household wealth has nearly eight times the effect of that of parents' wealth, parents' wealth varies by nearly seven times as much as household wealth. Our results therefore interestingly imply that parents' wealth, which has generally not been considered in prior research, appears as important as the entrepreneur's own wealth in determining their entrepreneurial success.

Despite the consistency of our estimates, one might worry that the effects of region tenure flow not from the connections themselves but from region-specific economic shocks that influence both performance and entrepreneurs' decisions of whether to remain in a region. Model 4 addresses this issue by introducing region-year fixed effects. In essence, we compare the performance of startups within the same region in the same year on the basis of the characteristics of their founders. Though these fixed effects are jointly significant, they have no meaningful effect on any of the other coefficients. It therefore appears that region-specific shocks cannot account for our results.

Finally, Model 5 introduces region-industry fixed effects. This specification assesses, to

some extent, how much of the region tenure effect stems from the better ability of these entrepreneurs to choose good businesses for their region (opportunity identification). Although the inclusion of these fixed effects dampens the effect sizes somewhat, even within the same industry and region, those entrepreneurs with deeper historical connections to the region appear to perform better. We would also note that these industry-region fixed effects themselves are not jointly significant ($p = .48$); cross-regional performance differences within industry appear limited, at least in terms of survival.

Estimates by sector and population density: Another interesting issue is whether the value of regional experience might vary by the industry or region being entered. For example, relationships could play a role both in factor markets and in facilitating sales. One might therefore expect higher returns to regional experience in sectors, such as services, where relationships play an important role in both.

Table 4 reports the results of estimating Model 3 within three different sectors of the economy – traditional manufacturing, modern manufacturing and services – and across regions with above- and below-average population.[8] Interestingly, regional tenure appears to matter more in traditional manufacturing than in services ($t = 2.23$; $p \leq .05$) or in modern manufacturing ($t = 1.63$; $p \leq .10$). Entry into traditional manufacturing may require more financial capital and/or harder-to-recruit employees. Regional tenure also has larger benefits in less-populated regions than in more-populated ones ($t = 2.77$; $p \leq .01$), consistent with the idea that these places have more tightly-weaved social fabrics.

[8]Modern manufacturing groups a variety of businesses that one might broadly classify as high tech, such as biotechnology, computer hardware and software, and telecommunications ($N = 1,177$). Traditional manufacturing, meanwhile, comprises all other manufacturing firms and construction ($N = 2,782$). Service firms, meanwhile, include cleaners, clubs and stores, as well as accounting and consulting firms ($N = 9,209$).

2.3 Annual profits

Though our results appear consistent with the idea that entrepreneurs benefit from experience in a region, exit can mean many things. It might reflect the failure of the business idea. But it might also stem from the availability of a more attractive outside option, for example, as an employee in another firm (Gimeno et al. 1997). Since these outside opportunities might also differ across individuals, we explored the effects of entrepreneur characteristics on an alternative measure of performance: annual profits. As in the exit rate models, we included fixed effects to control for differences in profitability as a function of firm age, of the business cycle (entry year), and of the region.[9]

Table 5 reports the results of these models. Here, positive values indicate factors associated with success. Beginning with the first column (Model 11), the estimates imply that each additional year of region tenure corresponds to roughly $1,362 more in profits in each year of operation. By comparison, each year of experience in the industry – or surprisingly even in a related one – predicts an increase of roughly $1,603 of additional annual profits (Model 12). Hence, a one standard deviation increase in region tenure would predict $7,913 greater profits each year while a similar increase in industry experience would only imply a $5,546 increase in annual profits. These results remain robust to the inclusion of our various demographic controls. Interestingly, with the exception of prior wages, none of the controls have consistent, significant effects on profitability, and they unexpectedly have a negative effect: Those that earned more as employees appear to earn *lower* profits.

The table also reports a series of robustness checks, beginning in the fourth column (Model 14). First, we replaced profits with total cash flow to the founder – profits plus

[9]To accommodate potential correlation in the error structure across repeated observations of the same firm, we report robust standard errors, clustered at the firm level (Arellano 1987).

dividends and wages – as the dependent variable.[10] Entrepreneur-owned companies differ from others in that the entrepreneur can choose whether to accrue economic profits as accounting profits or to extract them as salary (Hamilton 2000). Here, we see something of a resolution to the wage effect above. Overall, the results, however, remain robust to this alternate dependent variable. In fact, only two variables appear to differ significantly across these outcomes: Male founders and those with college educations extract more from their startups in the form of salary.[11]

Model 15, then, introduces region-year fixed effects to account for region-specific economic shocks. As in the exit rate models, these fixed effects have no meaningful influence on the estimates of the effects of the other covariates. Model 16, meanwhile, reports the results of estimates with region-industry fixed effects. Whereas these fixed effects explained little in terms of variation in survival, they are more important in predicting annual profits: the choice of region-industry appears to account for more than one-third of the advantages associated with region tenure and with industry experience.

2.4 Instrumental variable estimates

Despite their consistency, our results may nonetheless overestimate the benefits of embeddedness. Notably, the decision to locate in a region could depend on the quality of one's contacts there. To address this issue, we attempted to look for variation in region tenure that stemmed from a factor unrelated to the expected effect of this tenure on firm performance,

[10] One might also consider including capital gains for those businesses sold. But, in theory, these capital gains should largely reflect the cumulative retained earnings; including capital gains in the cash flows would therefore effectively double-count these profits (for businesses exited through a sale). In unreported analyses, we nevertheless analyzed these capital gains separately for those businesses that exited and again found a positive and significant relationship between region tenure and capital gains.

[11] We have run a complete set of models using this alternate dependent variable. Because the results only differ significantly from the profits models on these two variables, we nevertheless have chosen not to report them all in the paper.

something akin to a quasi-experimental design. Specifically, we used the amount of time that entrepreneurs' parents lived in the regions in which they started their ventures as an instrument for entrepreneurs' region tenures.

Parents' time in a region should influence the entrepreneur's region tenure for at least two reasons. Most directly, during their childhoods, individuals generally had little choice but to live where their parents did. But even after becoming adults, individuals exhibit strong preferences for living near their parents and therefore their parents' location(s) should influence their own decisions regarding where to live (Dahl and Sorenson 2010). Indeed, (entrepreneur) region tenure and parent region tenure have a bivariate correlation of 0.51. We nevertheless see little reason to expect parents' time in region to affect the performance of their children's ventures, other than through their children's regional embeddedness.[12]

Two complications arose in estimating the failure rate models with an instrumental variable (IV). First, though development has begun on the use of instrumental variables in a hazard rate context (Bijwaard 2008), understanding of these methods remains limited. Second, pooling multiple years of data on each firm in a probit could lead to biased estimates. We therefore estimated IV probit models of whether or not each firm survived beyond a four-year threshold.[13]

In general, one worries about two issues in IV regression (see, for example, Murray 2006). First, is the instrument exogenous? Although one cannot statistically test the exogeneity of a single instrument (because the model is exactly identified), Model 17 first reports a reduced form probit model of exit including both the instrument, parent region tenure, and

[12]Though one might worry that entrepreneurs leverage their parents contacts, less than five percent of entrepreneurs opened businesses in a four-digit industry in which a parent had experience.

[13]We selected four years as the threshold because it represents the half-life in this sample and therefore provides the maximum statistical power. Robustness checks with thresholds from two years to six years nevertheless produced qualitatively equivalent results.

the instrumented variable, (founder) region tenure, as covariates. Though not a formal test of exogeneity, the results suggest that parent tenure has no direct effect on performance (survival), controlling for region tenure, thereby lending some confidence to the assumption that we can exclude it in the structural model.[14]

Second, is the instrument weak? The left columns for models 18 and 19 report the first-stage estimates for the IV models. Parent region tenure strongly predicts (founder) region tenure; the F-tests for the excluded instrument are 7,128 for the exit rate model and 18,665 for the annual profit and cash flow models (which have identical first stages).[15] These values far, far exceed the critical threshold of 16.4 reported by Stock and Yogo (2005) to ensure that the 2SLS estimates have no more than 10% of the bias of the OLS estimates.

In the second stages, the effect of region tenure estimated off of this exogenous source of variation in location choice remains significant and negative in the exit model. Founders who have lived in the region longer have a higher probability of seeing their ventures survive for at least four years (model 18). The story for profits and cash flows (models 19 and 20), however, seems a little less clear: though still positive, the second-stage estimates for profits and cash flows, become insignificant. But consider the 95% confidence intervals for the OLS (Models 13 and 14) versus the IV estimates (Models 19 and 20): One year of region tenure corresponds to a \$414 to \$2,139 (\$147 to \$1,965) increase in annual profits (cash flows) in the OLS models but the estimated effect ranges from -\$578 to \$1,823 (-\$364 to \$2,022) in the IV models. Though the confidence intervals for the IV estimates include zero, no effect, they also overlap almost the entire range of the confidence intervals for the OLS estimates,

[14]Parallel models for annual profits and cash flows also show no direct effect of the instrument on firm performance. For profits, parent region tenure had a direct effect of -1.881 ($t = -1.39$) while for cash flows it had a direct effect of -0.655 ($t = -0.46$).

[15]These values might seem surprisingly large. But one can easily verify them since the F-test for a single instrument is equal to the square of the t-test for the coefficient for the excluded instrument in the first stage (Wooldridge 2006, p.157). For example, $(.368/.004)^2 \approx 7128$ (Model 18).

meaning that we can reject neither the possibility that the IV points to no effect nor the possibility that the OLS and IV produce equivalent results. We can, however, conclude with confidence that those who have lived longer in the region earn no less each year than their more-recently-arrived peers and, since their businesses survive longer, that their ventures earn more over time.

Though our results are robust to a wide variety of specifications, including region-year and region-industry fixed effects and estimation with an instrumental variable to account for the possible endogeneity of location choice, one might nonetheless worry that the decision to become an entrepreneur itself may depend on region and therefore may influence our results. Though the region-industry fixed effects largely address this concern, we also explored this possibility by estimating whether rates of entrepreneurship differ across regions. Interestingly, once one accounts for compositional differences in human capital across regions, regions do not differ significantly in the likelihood that a person residing in one of them becomes an entrepreneur. It therefore appears unlikely that endogeneity in the decision to become an entrepreneur biases our estimates of the value of region tenure.

3 Discussion

Entrepreneurs exhibit a great deal of geographic inertia in terms of choosing locations for their new ventures—that is, they tend to open their businesses in the regions in which they were born or where they have lived for a long time (Michelacci and Silva 2007; Dahl and Sorenson 2009). If these location choices stem from entrepreneurs' better understanding of these regions or from their deeper social capital within them, then entrepreneurs' ventures may benefit from this geographic inertia. But if they instead reflect the entrepreneurs' desire to remain close to family and friends, these decisions may come at the expense of the

financial performance of their ventures. Yet, little research has considered the consequences of these choices for entrepreneurs.[16] Here, we examined the performance of startups across the entire range of the Danish economy and found that entrepreneurs benefit from regional embeddedness: their ventures survive longer and earn more in annual profits and cash flows when they found firms in the regions in which they have lived for a long time.

Regional embeddedness might contribute to entrepreneurial success through a number of paths—helping entrepreneurs to identify promising opportunities, to assemble the resources necessary to exploit those opportunities, or to sell goods and services. Our results nevertheless appear most consistent with the second of these possible paths. If entrepreneurs' time in their regions improved their ability to select the right industries to fit the region, then much of the effect should disappear when we compare entrepreneurs within the same industries and regions, but the effect not only persists but also remains more or less similar in magnitude even within these groups. And if entrepreneurs' tenure in their regions improved their ability to sell goods, then we would expect to see stronger effects in industries where relationships matter more to selling (e.g., business services). But we actually observe stronger effects in manufacturing. We therefore suspect that having deep roots in the region matters most for raising the capital and recruiting the personnel necessary to start these ventures.

From the point of view of the literature on entrepreneurship, our results offer a strong complement to the research on spinoffs. Numerous studies have demonstrated that entrepreneurs with prior experience in an industry survive longer and grow faster (Agarwal et al. 2004; Klepper and Sleeper 2005). Prior exposure to the region has a similar effect, improving the performance of those organizations whose founders have it. Here, the issue is

[16] In a rare exception, Berchicci et al. (2011) examined the performance of spinoffs in the hard disk drive industry and found that those that located near their parents did not differ significantly in sales growth from those that moved. But their sample of 45 companies may not have had sufficient power to identify an effect.

not human capital, which entrepreneurs can carry with them to other locations, but social capital, which they cannot (for a possible exception, see Kalnins and Chung 2006). Interestingly, these effects appear additive and similar in magnitude. Those most likely to succeed therefore have prior exposure to both the industry *and* the region.

That fact raises interesting implications for the understanding of agglomeration. In general, the literature on agglomeration has assumed that firms must cluster to benefit from co-location. Our results, however, suggest that rational entrepreneurs would enter the industries in which they have employment experience and locate their businesses 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* (Sorenson and Audia 2000).

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 who 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 yet have not been away from their prior homes long enough to lose their social capital there. These "geographic boundary spanners" seem interesting both in themselves and in their implications for the evolution of industries. As individuals, these people, with one foot in an industry and another in a region not currently home to any industry incumbents, may represent the most promising entrepreneurs. They can potentially access both human and social capital without falling

prey to the hazards of intense local competition. At the industry level, they may play particularly important roles in determining whether, when and how fast industries diffuse from their places of origin.

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Table 1: Most common entrepreneurial ventures, 1995-2004

Rank	Industry	Number	Mean region tenure
1.	Hotels and restaurants (55)	2,831	5.4
2.	Retail trade (except of motor vehicles and motorcycles) (52)	2,522	6.0
3.	Business consultancy (accounting, legal, management, marketing, architectural etc.) (74)	2,404	6.7
4.	Construction (45)	2,220	8.1
5.	IT services, software and consultancy (72)	1,060	5.4
6.	Land transportation (60)	487	8.3
7.	Sale and maintenance of motor vehicles (50)	393	6.2
8.	Manufacture of metals (28)	207	7.6
9.	Manufacture of food products and beverages (15)	178	4.2
10.	Real estate activities (70)	114	5.7
11.	Publishing and printing (22)	104	5.2
12.	Renting of automobiles (71)	88	6.7
13.	Manufacture of machinery (29)	85	7.3
14.	Manufacture of furniture (36)	61	5.4
15.	Travel agency, cargo handling and storage (63)	59	5.9
16.	Manufacture of electrical machinery and apparatus (31)	46	5.8
17.	Research and development (73)	44	3.4
18.	Post, courier and telecommunications (64)	30	6.0
19.	Manufacture of wood (20)	29	4.5
20.	Manufacture of medical, precision and optical instruments (33)	27	5.3

2-digit NACE SIC in parenthesis.

Table 2: Descriptive statistics

Variable	Mean	SD	Min.	Max.
Exit	0.21	0.41	0	1
Exit (Year 4)	0.52	0.50	0	1
Profits (1,000 DKr)	127	1,009	-100,944	7,970
Cash flow (1,000 DKr)	472	1,076	-99,931	16,147
Region tenure$_{t-1}$ (years)	6.39	5.81	0	14
Parent region tenure$_{t-1}$ (years)	5.32	8.89	0	25
Industry exp (years)	2.02	3.46	0	15
Related industry exp (years)	1.43	2.82	0	15
Men	0.75	0.44	0	1
Married	0.49	0.5	0	1
Founder age	35.6	8.65	17	55
Gymnasium	0.52	0.50	0	1
College	0.23	0.42	0	1
Wage$_{t-1}$ (100,000 DKr)	2.62	2.73	0	69.5
Household wealth$_{t-1}$ (100,000 DKr)	3.35	11.8	0	444
Parent wealth$_{t-1}$ (100,000 DKr)	12.4	69.0	0	5,718
N		13,166		

Table 3: Piece-wise exponential estimates of exit rates

	(1)	(2)	(3)	(4)	(5)
Region tenure$_{t-1}$	0.983**	0.985**	0.986**	0.986**	0.988**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Industry exp		0.942**	0.946**	0.946**	0.946**
		(0.004)	(0.004)	(0.004)	(0.004)
Related ind exp		0.955**	0.961**	0.960**	0.960**
		(0.005)	(0.005)	(0.005)	(0.005)
Men			0.880**	0.882**	0.914**
			(0.026)	(0.027)	(0.028)
Married			0.931**	0.934**	0.924**
			(0.025)	(0.025)	(0.026)
Founder age			0.954**	0.951**	0.958**
			(0.010)	(0.010)	(0.011)
Founder age^2 (/100)			1.061**	1.064**	1.054**
			(0.014)	(0.014)	(0.014)
Gymnasium			0.815**	0.814**	0.824**
			(0.027)	(0.027)	(0.029)
College			0.706**	0.708**	0.732**
			(0.036)	(0.036)	(0.038)
Wage$_{t-1}$			0.990*	0.990*	0.994
			(0.005)	(0.005)	(0.005)
Household wealth$_{t-1}$			0.991**	0.991**	0.992**
			(0.002)	(0.002)	(0.002)
Parent wealth$_{t-1}$			0.999**	0.999*	0.999*
			(0.000)	(0.000)	(0.000)
Constant	0.309**	0.352**	1.178	1.075	1.215
	(0.048)	(0.049)	(0.185)	(0.221)	(0.241)
Firm age	12 pieces	12 pieces	12 pieces	12 pieces	12 pieces
Entry year	10 cohorts	10 cohorts	10 cohorts	10 cohorts	10 cohorts
Region	79 groups	79 groups	79 groups		
Region-Year				948 groups	
Region-Industry					943 groups
χ^2 (d.f.)		408 (2)	340 (9)	1,838 (869)	862 (864)
N (firms)	13,166	13,166	13,166	13,166	13,166
N (firm-years)	50,041	50,041	50,041	50,041	50,041

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

Table 4: Piece-wise exponential estimates of exit rates by industry and density

	(6) Traditional Manufacturing	(7) Modern Manufacturing	(8) Services	(9) Large Cities	(10) Small Cities
Region tenure$_{t-1}$	0.978**	0.982*	0.988**	0.991**	0.981**
	(0.005)	(0.009)	(0.002)	(0.003)	(0.003)
Industry exp	0.964**	0.969	0.934**	0.943**	0.948**
	(0.007)	(0.029)	(0.005)	(0.006)	(0.005)
Related ind exp	0.966**	0.973	0.959**	0.956**	0.965**
	(0.010)	(0.023)	(0.006)	(0.007)	(0.006)
Men	0.898	0.709*	0.910**	0.894**	0.862**
	(0.082)	(0.151)	(0.029)	(0.040)	(0.036)
Married	0.868*	0.962	0.929*	0.951	0.929*
	(0.061)	(0.099)	(0.029)	(0.037)	(0.034)
Founder age	0.948*	0.952	0.959**	0.944**	0.962**
	(0.026)	(0.045)	(0.012)	(0.015)	(0.014)
Founder age^2 (/100)	1.070†	1.068	1.052**	1.074**	1.050*
	(0.035)	(0.060)	(0.016)	(0.020)	(0.019)
Gymnasium	0.784**	0.735*	0.831**	0.821**	0.814**
	(0.068)	(0.135)	(0.031)	(0.041)	(0.036)
College	0.741**	0.647**	0.720**	0.731**	0.668**
	(0.090)	(0.139)	(0.042)	(0.050)	(0.052)
Wage$_{t-1}$	0.995	1.024*	0.980**	0.988†	0.994
	(0.015)	(0.012)	(0.006)	(0.006)	(0.008)
Household wealth$_{t-1}$	0.968**	0.988*	0.944**	0.992**	0.990**
	(0.006)	(0.005)	(0.002)	(0.002)	(0.003)
Parent wealth$_{t-1}$	0.995**	1.001	0.999*	0.999*	0.999
	(0.002)	(0.001)	(0.000)	(0.001)	(0.001)
Constant	1.346	1.240	1.083	1.368	1.041
	(0.450)	(0.836)	(0.213)	(0.267)	(0.258)
Firm age	12 pieces	12 pieces	12 pieces	12 pieces	12 pieces
Entry year	10 cohorts	10 cohorts	10 cohorts	10 cohorts	10 cohorts
Region	79 groups	79 groups	79 groups	13 groups	66 groups
N (firms)	2,782	1,177	9,207	6,008	7,158
N (firm-years)	11,291	4,698	34,052	22,824	27,217

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

Table 5: OLS estimates of annual profits and cash flows (1,000 DKr)

	(11)	(12)	(13)	(14)	(15)	(16)
Dependent variable	Profits	Profits	Profits	Cash flows	Profits	Profits
Region tenure$_{t-1}$	7.490**	7.065**	7.023**	5.809*	7.002**	4.612*
	(2.493)	(2.517)	(2.372)	(2.500)	(1.808)	(1.831)
Industry exp		8.821*	9.646**	11.948**	9.650**	5.718*
		(3.715)	(3.606)	(3.739)	(2.798)	(2.911)
Related ind exp		6.178*	9.327*	9.099*	9.202**	4.713
		(3.059)	(3.725)	(3.985)	(3.418)	(3.458)
Men			26.168	125.650**	26.220	32.880
			(41.501)	(42.260)	(25.005)	(25.759)
Married			8.463	34.806	6.524	2.368
			(34.801)	(35.550)	(22.305)	(22.092)
Founder age			10.492	31.050*	11.411	7.870
			(12.430)	(12.962)	(9.940)	(9.872)
Founder age^2 (/100)			-19.709	-43.757*	-21.038	-14.711
			(17.178)	(17.759)	(13.127)	(13.045)
Gymnasium			5.346	27.903	4.066	6.183
			(19.433)	(21.919)	(26.414)	(26.596)
College			-63.766	52.294	-64.896*	4.181
			(40.140)	(40.297)	(31.471)	(32.671)
Wage$_{t-1}$			-48.249*	-12.433	-48.522**	-33.835**
			(20.827)	(20.513)	(3.793)	(3.754)
Household wealth$_{t-1}$			-0.024	2.513	-0.056	-1.006
			(1.799)	(2.093)	(0.736)	(0.755)
Parent wealth$_{t-1}$			-0.187	0.084	-0.196	-0.276†
			(0.378)	(0.414)	(0.168)	(0.163)
Constant	15.366	-11.436	-7.056	-262.637	312.559	-9.205
	(47.575)	(49.393)	(196.978)	(205.180)	(228.862)	(184.102)
Firm age	12 groups	12 groups	12 groups	12 groups	12 groups	12 groups
Entry year	10 cohorts	10 cohorts	10 cohorts	10 cohorts	10 cohorts	10 cohorts
Region	79 groups	79 groups	79 groups	79 groups		
Region-Year					871 groups	
Region-Industry						877 groups
N (firms)	12,301	12,301	12,301	12,296	12,301	12,301
N (firm-years)	45,355	45,355	45,355	45,103	45,355	45,355

Standard errors, clustered at the firm level, reported in parentheses.
Significance levels: † : 10% * : 5% ** : 1%

Table 6: Instrumental variable estimates

	(17)	(18)		(19)		(20)
	Probit	IV Probit		IV Reg		IV Reg
Dependent variable	Exit (Year 4)	Region Tenure	Exit (Year 4)	Region Tenure	Profits	Cash flow
Region tenure$_{t-1}$	-0.012**		-0.018**		3.424	4.557
	(0.002)		(0.004)		(3.302)	(3.281)
Parent reg tenure$_{t-1}$	-0.002	0.368**		0.370**		
	(0.002)	(0.004)		(0.003)		
Industry exp	-0.050**	0.055**	-0.050**	0.049**	10.055**	12.090**
	(0.003)	(0.013)	(0.003)	(0.006)	(2.782)	(2.763)
Related ind exp	-0.039**	0.002	-0.039**	-0.023**	9.370**	9.113**
	(0.004)	(0.016)	(0.004)	(0.007)	(3.376)	(3.352)
Men	-0.132**	-0.166†	-0.133**	-0.224**	25.743	125.521**
	(0.027)	(0.100)	(0.027)	(0.055)	(24.679)	(24.520)
Married	-0.067**	0.494**	-0.064**	0.562**	9.661	35.221
	(0.024)	(0.089)	(0.024)	(0.049)	(22.047)	(21.915)
Founder age	-0.043**	0.014	-0.043**	0.033	10.560	31.070**
	(0.011)	(0.038)	(0.011)	(0.022)	(9.809)	(9.764)
Founder age^2 (/100)	0.051**	0.221**	0.052**	0.208**	-19.368	-43.633**
	(0.014)	(0.053)	(0.014)	(0.028)	(12.957)	(12.897)
Gymnasium	-0.215**	-0.089	-0.216**	-0.140*	4.861	27.734
	(0.028)	(0.102)	(0.028)	(0.058)	(26.074)	(25.913)
College	-0.370**	-0.300*	-0.372**	-0.363**	-66.481*	51.336†
	(0.035)	(0.129)	(0.035)	(0.069)	(31.165)	(30.988)
Wage$_{t-1}$	-0.009*	-0.053**	-0.010*	-0.076**	-48.524**	-12.528**
	(0.004)	(0.019)	(0.004)	(0.008)	(3.763)	(3.741)
Household wealth$_{t-1}$	-0.007**	-0.000	-0.007**	-0.009**	-0.040	2.508**
	(0.002)	(0.005)	(0.002)	(0.002)	(0.728)	(0.725)
Parent wealth$_{t-1}$	-0.001	-0.001*	-0.001	-0.002**	-0.187	0.084
	(0.001)	(0.001)	(0.001)	(0.000)	(0.167)	(0.166)
Constant	1.797**	1.158†	1.803**	0.947*	5.974	-258.079
	(0.194)	(0.666)	(0.194)	(0.405)	(182.716)	(181.897)
Instrument F-test		7,128.4		18,665		
Critical value ($r < 0.1$)		16.4		16.4		
Firm age				12 groups		12 groups
Entry year	10 cohorts	10 cohorts		10 cohorts		10 cohorts
Region	79 groups	79 groups		79 groups		79 groups
N (firms)	13,166	13,166		12,301		12,296
N (firm-years)				43,355		45,103

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