

Are You Experienced?

Prior Experience and the Survival of New Organizations

Dahl, Michael Slavensky; Reichstein, Toke

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Michael S. Dahl ^a; Toke Reichstein ^b

^a DRUID-IKE, Department of Business Studies, Aalborg University, Aalborg, Denmark

^b Research Centre on Biotech Business, DRUID, Department of Innovation and Organizational Economics, Copenhagen Business School, Denmark

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Research Paper

Are You Experienced? Prior Experience and the Survival of New Organizations

MICHAEL S. DAHL* & TOKE REICHSTEIN**

**DRUID-IKE, Department of Business Studies, Aalborg University, Aalborg, Denmark, **Research Centre on Biotech Business, DRUID, Department of Innovation and Organizational Economics, Copenhagen Business School, Denmark*

ABSTRACT This paper investigates the relationship between the level of pre-entry experience of managers and founders, and the survival of their new firms. Using a comprehensive dataset covering the entire Danish labor market from 1980 to 2000, we are able to trace prior activities of all employees working in all Danish start-ups with at least one employee. We examine whether spin-offs from surviving parents, spin-offs from exiting parents or other start-ups are more likely to survive. Moreover, we investigate whether firms managed and founded by teams with higher levels of industry-specific experience have a higher chance of surviving. We find that spin-offs from a surviving parent and to a lesser degree industry-specific experience positively affects the likelihood of survival. We also find that spin-offs from a parent that exits are less likely to survive than either spin-offs from surviving parents or other start-ups.

KEY WORDS: Organizational routines, pre-entry experience, survival of new firms, spin-offs

1. Introduction

The establishment of new firms is a key driver of economic development and industry evolution (Schumpeter, 1934). New firms are also central job creators and facilitate competition. It has nevertheless been shown that a large proportion of newly founded firms fail after a short time (Freeman *et al.*, 1983; Brüderl and Schüssler, 1990; Aldrich and Auster, 1993). In fact, around 40 percent of new firms fail to survive even 1 year (Taylor, 1999), and more than 60 percent fail to survive for 5 years (Kirchhoff, 1994). Shane (2003) argued that the few newly established organizations that survive play a major role in

Correspondence Address: Michael S. Dahl, DRUID-IKE, Department of Business Studies, Aalborg University, Fibigerstræde 4, DK-9220 Aalborg Ø, Denmark. Fax: +45 98156013; Tel.: +45 96358268; Email: md@business.aau.dk

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shaping economic development and growth. It is therefore essential to investigate the characteristics that determine the survival of start-ups.

Stinchcombe (1965), Carroll *et al.* (1996), Klepper (2001, 2002), and Helfat and Lieberman (2002) argue that the survival and success of new organizations is fundamentally shaped by the pre-entry experiences of their founders. This relationship has been studied in the management literature, but from the perspective of the relationship between the experiences of top managers and performance (Hambrick and Mason, 1984; Bantel, 1989; Murray, 1989; Michel and Hambrick, 1992; Hambrick *et al.*, 1996). These two fields of research draw on the organizational ecology literature (see, e.g. Hannan and Freeman, 1977; Carroll, 1984; Carroll and Hannan, 2000) showing how routines and experience are transferred from previous employers to start-ups through founders (Phillips, 2002). The argument that blueprints of a parent firm are passed on to new organizations through their founders, is the cornerstone of the research in this area by scholars such as Carroll (1984), Romanelli (1985, 1989), Brittain and Freeman (1986), and Hannan and Freeman (1986). Their work represents a brief, but very active line of research on the background of founders in the 1980s (Phillips, 2002).

Along these lines, Shane (2000) argues that the knowledge and skills embedded in entrepreneurs are shaped by past work activities and education. This experience is of value in searching for new business areas and opportunities as well as coping with the day-to-day challenges facing new firms. Founders carry skills and routines which are very likely to influence the future development and success. The knowledge stock and accumulated experience of entrepreneurs varies according to their different pasts (Agarwal *et al.*, 2004).

Likewise, labor economists have studied how previous work experience affects the survival of newly established business organizations. Using non-parametric and parametric duration analysis, Brüderl *et al.* (1992) showed that education, work experience and industry-specific experience play a significant role in explaining organizational survival. Their results suggest that “*founders with a high stock of human capital set up business with high a priori chances to survive*” (Brüderl *et al.*, 1992: 239). The finding that human capital is central in shaping the performance of start-ups is supported by Lentz and Laband (1990), who claim that pre-ownership experience and years of schooling have a significant effect. Cressy (1996) also highlighted that human capital is the true determinant of new firm survival.

Start-ups that enter the same industry in which their founders were previously employed are often referred to as spin-offs (Garvin, 1983). Founders of spin-offs have industry-specific experience and are likely to bring to their new firms specific knowledge about a wide range of issues, for example, customer demand, products, technologies, suppliers and competitors (Helfat and Lieberman, 2002). Klepper (2001) uses the metaphor of spin-offs as children, and past employers as parents. He proposes an evolutionary model that combines the ideas of reproduction and inheritance with the notion of organizational routines.¹ Nelson and Winter (1982) use this notion and assume that firms are to a large extent governed by organizational routines. A firm has separate routines for the different functions (R&D, marketing, management, etc.) and products involved in its operations. The founders and/or the initial management team install these routines. Decision making at all

¹ For an interesting discussion of the concept of organizational routines, see Becker (2004, 2005).

levels will subsequently depend on these routines, which will govern the evolution of the firm. When a new firm is born, organizations are reproduced, because founders will rely on routines with which they are familiar from their previous employment experience. Similar arguments are found in labor economics, where, for example, Laband and Lentz (1983a, b; Lentz and Laband, 1990) argue that at least for some occupations there is a high probability that sons will inherit the occupation of their fathers. In addition, researchers have shown that the strategies and organizational forms of new firms are similar to those in the organizations where the founders previously worked (Aldrich and Wiedenmayer, 1993).

Since it is unlikely that organizational routines embedded in a parent firm's organizational setting can be directly transferred to a new firm by its founders, we argue that organizational routines are reconstructed in the new firm based on the knowledge and experiences of its founders. Founders will accumulate knowledge on the mere construct of the parent firm, which will enable them to replicate the construct in their own new organization. In this respect, founders are likely to replicate the organizational setup of parent firms, as found by Baron *et al.* (1999) and Baron and Hannan (2002). Schein also argues that founders will base the organizational culture of a new firm on "*experiences from the organizational culture in which they grew up*" (Schein, 1983: 14). The quality of the organizational experience will determine the future success and performance of the start-up.

In this paper, we test whether spin-offs outperform other types of start-ups by arguing that spin-offs have a competitive advantage in the form of the past experience of the founders. We define spin-offs as firms founded by individuals, which were employed by an incumbent firm in the industry immediately prior to founding the new firm. So far, empirical investigations of the importance of experience have been based on single case studies of the evolution of selected industries, notably in the USA. Using a comprehensive Danish longitudinal panel dataset, which covers all employees, all firms and thus all start-ups in Denmark, we set out to investigate these claims and past findings. Past studies of this relationship have focused on product-based industries, but by looking at the entire Danish manufacturing sector over a 15-year period, we extend the framework to analyze a broad range of industries within manufacturing. We compare the survival of spin-offs from surviving parents, spin-offs from exiting parents and other start-ups. We apply a narrow definition of spin-offs to accommodate the fact that we cannot perfectly identify founders of firms. In the present analysis, we define spin-offs as firms, where two or more employees leave the same firm to start a new firm in the same industry. Moreover, we investigate whether firms managed by teams with a relatively high level of industry-specific experience are more likely to survive or to be acquired. Furthermore, we look at whether experience from another start-up will increase the likelihood to survive or be acquired.

We find that the three types of firms perform significantly different in terms of their ability to survive. Spin-offs from surviving parents show the highest ability to survive, while spin-offs from exiting parents exhibit the lowest ability of start-ups to survive. In the middle, we find the group of other start-ups (non-spin-offs). We argue that these findings lend support to the theoretical argument that experience-based capabilities and skills are important when evaluating the survival chances of start-ups. In evaluating the survival chances of spin-offs, it is necessary to identify where the spin-off comes from and not just whether it is a spin-off. These results suggest that it is the type and source of experience that determines the likelihood of survival of firms and not just the level of experience.

The paper is organized as follows. Section 2 describes the database and its contents, the methods used and the descriptive statistics of the variables. The results of the empirical model are presented in Section 3. This is followed by a discussion of the results and concluding remarks in Section 4.

2. Data and Descriptive Statistics

In order to investigate the importance of pre-entry experiences for the survival of new organizations, we rely on a comprehensive dataset containing information on the entire Danish economy. This dataset combines detailed information on all individuals and all establishments, gathered from the official registers of the Danish government, which, due to its extensive welfare policies, records unusually detailed information about the economic activities in the country. As a result, it covers all Danish firms and plants as well as the entire Danish labor market. The dataset is maintained by Statistics Denmark under the name “Integreret Database for Arbejdsmarkedsforskning” (IDA—“Integrated Database for Labor Market Research”). The dataset is internationally recognized as being extremely useful for economic and other social science research. Recent research that has exploited this source includes Bingley and Westergård-Nielsen (2004) and Sørensen (2004).

IDA has several elements and characteristics that make it particularly interesting for economic and social science research. Firstly, it contains extensive information on the characteristics of individuals, for example, sex, age, duration and level of education, work experience, occupation, family status and relations, household characteristics, wages and other income, wealth and unemployment. Secondly, individuals are matched directly with establishments and employers. It is possible to distinguish between plants and firms, which are characterized by location, industry affiliation and other basic information. Thirdly, the database is longitudinal. It has been updated annually since 1980, and thus it is possible to follow individuals, plants and firms from one year to another.

Additionally, the identity of plants and firms is preserved over time. If a plant is bought by another firm, the plant retains its original identity, unless the majority of the employees leave the firm. This means that unless the structure and the group of employees changes during the takeover, a plant that is taken over will not be labeled as an exit.

Our study differs from other studies with similar aims in two respects regarding the data analyzed. Firstly, most other studies are narrow, single industry studies, while our data allow us to generalize across the entire manufacturing sector. Secondly, most other studies consider diversifiers from other industries to be start-ups. However, in the present study, all entrants are start-ups. A start-up is identified in the dataset as a new plant opened by a new firm in the dataset. More specifically, we search for new plant identification numbers comparing between successive years. When these are identified, we examine whether these plants are owned by firms that are also new to the dataset. If so, the plant/firm is a start-up. We capture all start-ups in the Danish economy with at least one employee. We are not able to follow very specifically defined products, but rely on the aggregations of the standard industry classifications. The data sources used in this study carry anonymous entities.

Using this database, we identify all new entrants in the manufacturing industries from 1984 to 1991. We selected this particular interval because the definition of the industry

variable and its construction changed significantly in 1992,² and as a result some plants changed industries. We chose not to consider new firms from more recent years, because of the inconsistency between past and present industry classifications. Including new firms from more recent years would introduce a possible problem when we construct the industry-experience variable. According to the industry classification used by Statistics Denmark prior to 1992, we are able to identify a maximum of 35 different manufacturing industries.

After identifying entrants, we use a method similar to that applied by Åstebro and Bernhardt (2003) defining them as survivors if they are still in existence after 5 years, or if another firm has acquired the start-up plant in this period, it is assigned as a takeover. Those start-ups that have ceased to exist are categorized as exits. In total, from 1984 to 1991, we identify 2,497 start-ups in the Danish manufacturing. The multinomial survival variable is the dependent variable in the regressions below. The outcomes are exit (1), takeover (2) or survival (3).

All entrants are linked to the data on individuals in the database. Using the occupation variable, the top-ranked members of each entrant are identified. These individuals are the founders and/or the initial management team of the entrant. It is important to note that, given the construction of the dataset, we are not able to clearly identify founders. We can however accurately identify initial managers. We would argue that the vast majority of new Danish firms are likely to be managed by their founders, and therefore assume this to be the case.³

Based on information on the management team, we construct a dummy variable indicating whether the entrant is a spin-off. A spin-off in this study is defined as a start-up if at least two members of the management team were employed in the same firm active in the same six-digit industry classification the year before its founding. We chose this criterion for spin-offs in order to cope with the problem of not being able to identify founders in the dataset. Existing studies have shown that if spin-offs are managed by two or more people, and they come from the same parent, they are very likely also to be the founders (as found by Klepper and Sleeper, 2005). Consequently, we are likely to have identified the founders for our spin-offs variable. This restriction implies that spin-offs can only be firms with at least two employees. Consequently, we delete all start-ups with only one employee in order to avoid bias in the spin-off parameter, which may otherwise have been caused by size discrepancies between spin-offs and other start-ups.

We recognize that our definition of spin-offs also involves start-ups that are formed as a result of necessity. If a firm fails, it will often be the case that some employees join forces and start-up a new firm in the same industry. The above definition of spin-offs will categorize these as such. To account for this, we distinguish between spin-offs with a parent that survives after the founding year of its progeny, and spin-offs with a parent that exits the founding year of the progeny.⁴ Thus, we have three types of start-ups: spin-off from surviving parent (3), spin-off from exiting parent (2) and other start-ups (1).

² The Danish statistical office (Statistics Denmark) created a new system, which was more detailed and included a considerably larger number of industries in the new classification.

³ Statistics Denmark have confirmed that this is indeed often the case (Erhvervs- og Byggestyrelsen, 2005).

⁴ As an alternative approximation of the quality of parents, the industry market share (in terms of share of employment) was also calculated. This ratio was tested in the estimations as the share itself or as a dummy for the quartile of market share ratio (top 25 percent, mid-high 25 percent, mid-low 25 percent and low 25 percent). However, neither of these variables was significant in any of the models estimated. Thus it proved to be a poor predictor and was dropped from the analysis.

Additionally, we test whether industry-specific experience of the initial managing team is important to understand why firms do or do not survive. The experience of this team is estimated by looking at their previous 4 years of employment activity. Based on these activities, the experience is calculated as the total number of years that the members have been employed (or active) in the same industry as the entrant. We distinguish between the 35 different manufacturing industry categories available prior to 1992. The years are weighted exponentially, so experience in the most recent year is valued as relatively more important. If the start-up was founded in 1991, the past experience of the management team is tracked from 1990 back to 1987. For each member of the team, a value of 1 is assigned for each year that the person is active in the same industry as the start-up. These numbers are then weighted by 1.000, 0.500, 0.250 and 0.125 for the years 1990, 1989, 1988 and 1987, respectively.⁵ This variable is the proxy for previous industry experience and represents the average experience of the management team.

The final experience variable refers to previous employment in a start-up. It is computed in a similar fashion to the industry experience variable. We go back 4 years from the founding of the event and trace the history of the top members. Given that they have been employed in a start-up before, we devise a weighted additive variable. These values are averaged for the entire management team as in the calculation of the industry experience variable. This variable is a proxy for the experience of individuals in respect of being a part of the start-up process, which may influence the survival chances of the present start-up.

Four control variables are added. First, we add a variable controlling for the level of education of all initial employees in the firm. We apply the same method as Åstebro and Bernhardt (2003) in constructing variables that denote the relative share of employees at various educational levels. We consider three levels of education. High level is lengthy education, equivalent to a 5-year university education or higher. This includes all university masters and doctoral programs. Medium level is education equivalent to all university bachelor level programs, or similar length and level of education from another type of educational institution. Low level is a short education, equivalent to a high school degree, tradesman/craftsman education or similar education up to 3 years' duration after primary school level.

The second control variable adjusts for the general economic business cycles in the founding year. The growth rate of the Danish economy in this year is included in the analysis in order to account for cyclical effects on the survival rate of start-ups. Thirdly, we control for the size of the start-up by including an explanatory variable equal to the logarithm of the number of employees. Finally, we control for industry differences by including seven industry dummy variables in the regression model, based on an aggregation of the 35 different manufacturing industries identifiable in the dataset for the years prior to 1992 (see Table 1 for the list of these seven aggregated industries).

Descriptive Statistics

Table 1 presents the distribution of observations across the categorical variables. The dataset contains 1,246 start-ups of which about 46 percent survived. Just less than 10 percent of the firms are acquired by another firm in the course of the 5 years considered.

⁵ Several weighting procedures were examined. The results obtained are not influenced by the degree of depreciation of experience and are robust to changes in this variable.

Table 1. Distribution of observations across the categorical variables

Variable	Number of observations	Share of observations
Survival		
Survivor	569	0.457
Takeover	119	0.096
Exit	558	0.448
Start-up		
Other start-ups (1)	923	0.741
Spin-offs from exiting parents (2)	68	0.055
Spin-offs from surviving parents (3)	255	0.205
Industry		
Food, beverages and tobacco (1)	120	0.096
Textile and footwear (2)	116	0.093
Wood, paper and graphics (3)	261	0.209
Chemical (4)	64	0.051
Non-metallic mineral (5)	58	0.047
Machinery and electronics (6)	518	0.416
Furniture (7)	109	0.087

About 25 percent of the start-ups are spin-offs, according to our definition. About 20 of the 25 percent are spin-offs from surviving firms, while the remaining almost 5 percent are spin-offs from parents that have closed down. There is a significantly higher percentage of spin-offs from better performing firms than from poor performing firms, which supports Klepper (2001). The distribution of the observations across the seven-level industry classification shows that machinery and electronics, and wood, paper and graphics account for the majority of the start-ups just over 42 percent and almost 21 percent, respectively. The non-metallic minerals industry has the lowest number of start-ups, that is, only 4.7 percent of the observations.

Table 2 summarizes the most basic descriptive statistics of the variables and the correlation matrix. Some of the statistics confirm the details presented in Table 1. We use three binary start-up variables. One for each type of start-up (spin-off from surviving parent, spin-off from exiting parent and other start-up).

The medians of the education variables indicate that a considerable number of new founded firms have managers with neither high nor a medium level education. On the mean, these start-ups may be categorized as having 6 percent of the workers in the managing team with a high level of education. Finally, the GDP growth variable shows that the economy on average is growing at approximately 6 percent per year in the period studied.

Table 2 also reveals that some of the variables are significantly correlated. Some of these were expected to be. In particular, the significant correlation between industry experience and the start-up variables highlights the fact that the initial managers of spin-offs come from being employed at a firm in the same industry and hence have substantial industry experience. The significant correlation estimates also suggest that a gradual introduction of the experience variables may produce diversified results.

Table 2. Basic descriptive statistics and the correlation matrix

Variables	Mean	Median	Std. Dev.	1a	1b	1c	2	3	4a	4b	4c	5	6
1. Start-up dummies													
a. Spin-offs from surviving parents	0.205	0.000	0.404										
b. Spin-off from exiting parent	0.055	0.000	0.227	-0.122									
c. Other start-up	0.741	1.000	0.438	-0.858	-0.406								
2. Industry experience	0.568	0.345	0.635	0.686	0.308	-0.791							
3. Start-up experience	0.129	0.000	0.645	0.055	-0.065	-0.017	-0.018						
4. Education													
a. High education	0.099	0.000	0.314	-0.085	0.082	0.036	-0.086	-0.035					
b. Medium education	0.270	0.133	0.378	-0.067	0.041	0.041	-0.095	-0.046	0.110				
c. Low education	0.402	0.385	0.236	0.032	0.002	-0.030	0.035	0.036	-0.240	-0.334			
5. GDP growth in founding year	0.056	0.032	0.049	-0.029	-0.079	0.057	-0.059	0.099	-0.035	-0.073	0.011		
6. Log(size)	2.411	2.398	0.945	0.254	0.067	-0.268	0.240	0.047	-0.246	-0.351	-0.033	0.027	
7. Log(team size)	1.109	1.099	0.468	0.260	0.202	-0.344	0.191	0.069	0.003	0.041	-0.006	-0.062	0.540

Note: Bold values are significant a 95% level.

3. Results

The aim of the paper was to investigate whether survival rates differ across types of start-ups, depending on the pre-entry experiences of the founder(s). The dependent variable is a multinomial response variable with three response levels expressing the state of the start-up 5 years past its birth year (exits, acquired survivors, independent survivors). We therefore applied a polytomous logistic regression with no assumption about the order of the three possible outcomes. The distinction between survivors and takeovers makes it especially problematic to assume that the variable is ordered. The multinomial logistic regression provides predictions of the probability that a given start-up will survive. The method applied involves a maximum likelihood estimation of parameters. Since the dependent variable has three levels, two functions will be estimated. As we have chosen exit as our base category, the first function refers to the logistic function between exits (0) and independent survivors (1). This function is referred to as the “survived function”. The second function refers to exits (0) compared to takeovers (1). We refer to this function as the “acquired function”.

Table 3 summarizes the results of the regressions.⁶ We run three models (A–C) with a gradual introduction of the experience variables. The first (Model A) only includes the spin-off variable. The second (Model B) also includes the industry experience variable, while the start-up experience variable is included in the third (Model C) model. The Pearson χ^2 statistics suggest that all three models fit the data well.

The results confirm that spin-offs from surviving parents have a higher probability of survival as an independent firm, than any other type of start-up. All parameter estimates of the “survived function” with respect to spin-offs from surviving parents are significantly positive. When benchmarking against other start-ups, spin-offs from surviving parents have approximately 1.8 ($\exp(0.6)$) times greater chance of surviving. The table also reveals that spin-offs from exiting parents have an even smaller chance of surviving than other start-ups. The negative estimate suggests other start-ups are 1.7 times more likely to survive than spin-offs from exiting parents.

The “acquired function” reveals that spin-offs from surviving parents are much more likely to be acquired than other start-ups. The parameter estimates of Models B and C suggest the odds ratio to be approximately 2.5 in favor of spin-offs from surviving parents. This is parallel to the findings of Holmes and Schmitz (1990, 1996).

The industry experience variable produces no significant results. This may indicate that the spin-off variable absorbs most of the explanatory effect of having industry experiences. Previously studies highlighting industry experience may have misinterpreted the results as a story of industry experience, while it really was a story about transfer of knowledge of a parent firm to a spin-off. Both start-up experience parameter estimates are insignificant. The start-up experience variable has a very limited effect on the results expressed by comparing Models B and C. None of the parameters change significantly when the start-up experience variable is introduced.

Finally, all GDP growth parameter estimates are significantly positive. This suggests that start-ups have a higher chance of surviving if they are founded in a year in which the economy in general is growing. Similarly, the significant parameter estimates of $\log(\text{size})$ suggest that larger start-ups have a higher probability of surviving.

⁶ The marginal effects of the regressions are included in Table A1.

Table 3. Results of the multinomial regression analysis with exit being the benchmark for the two remaining functions

Variables	Model A		Model B		Model C	
	Parameter Estimate	Standard Deviation	Parameter Estimate	Standard Deviation	Parameter Estimate	Standard Deviation
Survived function						
Spin-off from surviving parent	0.600***	0.166	0.555*	0.251	0.564**	0.252
Spin-off from exiting parent	-0.557*	0.288	-0.602**	0.346	-0.615*	0.347
Other Start-up	Benchmark		Benchmark		Benchmark	
Industry experience			0.039	0.164	0.033	0.164
Start-up experience					-0.084	0.097
Education						
High	0.046	0.213	0.048	0.213	0.044	0.213
Medium	-0.066	0.210	-0.066	0.210	-0.074	0.210
Low	-0.129	0.309	-0.132	0.309	-0.129	0.309
GDP growth in founding year	3.305***	1.255	3.323***	1.256	3.435***	1.262
Log(size)	0.322***	0.098	0.320***	0.098	0.319***	0.098
Log(team size)	-0.153	0.175	-0.145	0.177	-0.136	0.177
Constant	-0.935***	0.346	-0.950	0.351	3.435***	1.262
Acquired function						
Spin-off from surviving parent	0.417	0.270	0.931**	0.439	0.900**	0.439
Spin-off from exiting parent	-0.233	0.472	0.262	0.578	0.276	0.579
Other Start-up	Benchmark		Benchmark		Benchmark	
Industry experience			-0.433	0.291	-0.417	0.292
Start-up experience					0.189	0.164
Education						
High	-0.298	0.418	-0.316	0.418	-0.310	0.415
Medium	-0.919**	0.399	-0.916**	0.399	-0.901**	0.399
Low	-0.414	0.506	-0.389	0.505	-0.394	0.507
GDP growth in founding year	0.266	2.102	0.117	2.103	-0.194	2.117
Log(size)	0.195***	0.156	0.215	0.157	0.223	0.157
Log(team size)	-0.177	0.290	-0.250	0.295	-0.306	0.299
Constant	-1.823***	0.569	-1.682***	0.577	-1.647***	0.576
Industry Dummies	Yes		Yes		Yes	
Observations	1246		1246		1246	
Pearson Chi ²	81.64***		84.43***		87.39	
Log Likelihood	-1132.91		-1131.51		-1130.04	

Note: *: P<0.1, **: P<0.05, ***: P<0.01.

Are Spin-offs Snapshots of Parents?

The theoretical arguments presented above indicate that spin-offs are snapshots of their parents; that entrepreneurs replicate the construct of the parent firms. Even though the

Table 4. Correlation estimates between the routines of spin-offs and those of their parents

Variable	Mean of Spin-offs	Mean of Parent	Pearssons Correlation Coef.
Share of women employees	0.296	0.303	0.786***
Average wage of employees (DKK)	119053	153355	0.500***
Average educational level	2.065	2.061	0.603***
Average number of years active on the labor market	6.034	5.278	0.852***
Share of top managers in the firm	0.315	0.229	0.446***

Note: *: $P < 0.1$, **: $P < 0.05$, ***: $P < 0.01$.

spin-off evolves along its own path, there should nevertheless be some similarity between the characteristics of the spin-off and its parent.

Table 4 depicts the correlation between five characteristics of spin-offs and their parents. We look at the share of women working in the firms, average wages of employees, average education level, average number of years the employees have been active on the labor market and the share of employees that may be categorized as top managers. All five correlation coefficients are significant at a 1 percent level. The estimates are reasonably high indicating some correspondence between the behavior of the spin-off and that of its parent. The data also suggest that almost 70 percent of the spin-offs choose to be located in the same local area as the parent firm. We interpret these findings to suggest that spin-offs are to some extent snapshots of their parent firm, and that the internal structure of a spin-off is very similar to that of its parents.

4. Discussion and Concluding Remarks

This study investigates how likely various types of start-ups are to survive. It is based on an unusually comprehensive dataset, which contains very accurate information, and this has important advantages for an investigation of firms' survival. We find that the effects of prior experience on survival are shown to be rather strong. Spin-offs with surviving parents perform remarkably better than other spin-offs and other start-ups. Comparing the survival chances of spin-offs with surviving parents, with those of spin-offs with exiting parents, shows that source of experience has a remarkable effect. The effects are not so remarkable when we compare spin-offs with surviving parents to other start-ups. Here, the likelihood of survival for spin-offs of surviving parents is twice as high as that of other start-ups. These are very powerful results and illustrate the importance of the right type of experience rather than just experience from the industry generally.

Even though survival of the parent is a rather crude measure of the quality of parent, it nevertheless suggests that prior experience in such an organization facilitates access to knowledge and routines, which ultimately will be of significant benefit to the employee(s) involved in a start-up. Distinguishing between progeny of surviving parents and progeny from exiting parents proved valuable and calls for further theoretical work on distinguishing between different types of spin-offs and the differences in the implications for the performance of the individual spin-off.

The type of experience that entrepreneurs and initial managers carry from other firms in the industry thus seems to be very important for the likelihood of survival of their own new organization. From an evolutionary perspective, entrepreneurs and initial managers with a history in the industry, but from firms that are not able to continue operations, will carry routines of low fitness, which, according to the theory, will be a disadvantage. Spin-offs from exiting parents may have been pushed out because the parents were facing closure. In our analysis, spin-offs with exiting parents perform significantly worse than any other type of start-up and especially when compared to spin-offs with surviving parents. However, spin-offs with exiting parents also perform worse than other start-ups. In fact, they have only a 54 percent chance of survival compared to other start-ups. Furthermore, it is important to take the history into account when studying spin-offs and to understand that these organizations are rather heterogeneous in this respect. It is also important to recognize that the quality of a parent firm will have a vital influence on the performance prospects of any spin-off. Not only are the spin-offs influenced by the performance of the parent, they will also have a very similar internal structure. This gives us further indication that spin-offs are influenced greatly by the history of the founders.

The results give no support to the theoretical proposition that the likelihood of survival is positively influenced by a high degree of industry-specific experience. Even so we do not reject the general argument that the life chances of new organizations will be positively influenced by industry-specific experienced founders and managers. Much of the industry experience is hidden in the spin-off variable, which leaves little of that variance to be explained by our industry experience variable. At the same time, we find no evidence suggesting that experience of working in a start-up has any effect on the likelihood of survival of a new start-up. Supporting the findings of Holmes and Schmitz (1990, 1996), spin-offs from surviving parents are more likely to be acquired compared to other start-ups.

Overall, the results of the present study imply that the best start-ups come from the best existing firms. As a result of their higher chances of survival, these start-ups bring higher benefits to the economy. They have the appropriate prior experience and industry-specific knowledge, which enables them to perform better than other start-ups. Our study shows that experience gained in an exiting firm is a direct disadvantage for a new organization. This clearly demonstrates that it is the type of experience and the type of start-up, which is at the centre of survival and subsequent long-term economic growth. Many countries and governments focus heavily on entrepreneurship and increased firm founding to promote economic growth. This occurs often with no account being taken of our finding that the background of the start-ups has clear and significant effects on life chances. It would perhaps be more rational for policy makers to focus on specific types of start-up, rather than simply encouraging increased numbers of start-ups.

Our findings, and those in numerous other empirical studies, are that organizations, founded by individuals from within the industry, have relatively higher chances of survival. This result clearly directs attention towards the possible negative effect of non-compete covenants in the contracts of employees. If spin-offs are more likely to survive, they will also be socially beneficial and provide the economy with valuable input by promoting growth. In this respect, it would probably be of benefit to the economy if firms could be dissuaded from imposing conditions that prevent former employees from starting up businesses within the same industry. In fact, legislators may want to reduce the stigma often associated with employees that leave a company to start their own firms.

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References

- Agarwal, R., Echambadi, R., Franco, A. M. and Sarkar, M. B. (2004) Knowledge transfer through inheritance: spin-out generation, development and survival, *Academy of Management Journal*, 47(4), pp. 501–522.
- Aldrich, H. E. and Auster, E. R. (1993) Even dwarfs started small: liabilities of age and their strategic implications, in: L. Cummings & B. Staw (Eds) *Research in Organizational Behavior*, pp. 165–198 (Greenwich, CT: JAI Press).
- Aldrich, H. E. and Wiedenmayer, G. (1993) From traits to rates: an ecological perspective on organizational founding, *Advances in Entrepreneurship, Firm Emergence and Growth*, 1, pp. 145–195.
- Åstebro, T. and Bernhardt, I. (2003) Start-up financing, owner characteristics, and survival, *Journal of Economics and Business*, 55, pp. 303–319.
- Bantel, K. A. (1989) Top management and innovations in banking: does the composition of the top team make a difference? (Special issue: Strategic leaders and leadership), *Strategic Management Journal*, 10(Summer), pp. 107–124.
- Baron, J. N. and Hannan, M. T. (2002) Organizational blueprints for success in high-tech start-ups: lessons from the Stanford project on emerging companies, *California Management Review*, 11(3), pp. 8–36.
- Baron, J. N., Hannan, M. T. and Burton, M. D. (1999) Building the iron cage: determinants of managerial intensity in the early years of organizations, *American Sociological Review*, 64(4), pp. 527–547.
- Becker, M. C. (2004) Organizational routines: a review of the literature, *Industrial and Corporate Change*, 13(4), pp. 643–677.
- Becker, M. C. (2005) The concept of routines: some clarifications, *Cambridge Journal of Economics*, 29(2), pp. 249–262.
- Bingley, P. and Westergård-Nielsen, N. (2004) Personnel policy and profit, *Journal of Business Research*, 57, pp. 557–563.
- Brittain, J. W. and Freeman, J. (1986) Entrepreneurship in the semiconductor industry, *Mimeo*.
- Brüderl, J. and Schüssler, R. (1990) Organizational mortality: the liability of newness and adolescence, *Administrative Science Quarterly*, 35(3), pp. 530–537.
- Brüderl, J., Preisendörfer, P. and Ziegler, R. (1992) Survival chances of newly founded business organizations, *American Sociological Review*, 57(2), pp. 227–242.
- Carroll, G. R. (1984) Organizational ecology, *Annual Review of Sociology*, 10, pp. 71–93.
- Carroll, G. R. and Hannan, M. T. (2000) *The Demography of Corporations and Industries* (Princeton, NJ: Princeton University Press).
- Carroll, G. R., Bigelow, L. S., Seidel, M.-D. L. and Tsai, L. B. (1996) The fates of *de novo* and *de alio* producers in the American automobile industry 1885–1981 (Special issue), *Strategic Management Journal*, 17(Summer), pp. 117–137.
- Cressy, R. (1996) Are business startups dept-rationed?, *Economic Journal*, 106(438), pp. 1253–1270.
- Erhvervs- og Byggestyrelsen, (2005) *Vækst og dynamik i nye virksomheder—5. statistiske portræt* (København: Erhvervs- og Byggestyrelsen).
- Freeman, J., Carroll, G. R. and Hannan, M. T. (1983) The liability of newness: age dependence in organizational death rates, *American Sociological Review*, 48, pp. 692–710.
- Garvin, D. A. (1983) Spin-offs and the new firm formation process, *California Management Review*, January, pp. 3–20.
- Hambrick, D. C. and Mason, P. A. (1984) Upper echelons: the organization as a reflection of its top managers, *The Academy of Management Review*, 9(2), pp. 193–206.

- Hambrick, D. C., Seung Cho, T. and Chen, M.-J. (1996) The influence of top management team heterogeneity on firms' competitive moves, *Administrative Science Quarterly*, 41(4), pp. 659–684.
- Hannan, M. T. and Freeman, J. (1977) The population ecology of organizations, *American Journal of Sociology*, 82, pp. 929–964.
- Hannan, M. T. and Freeman, J. (1986) Where do organizational forms come from?, *Sociological Forum*, 1, pp. 50–57.
- Helfat, C. E. and Lieberman, M. B. (2002) The birth of capabilities: market entry and the importance of pre-history, *Industrial and Corporate Change*, 11(4), pp. 725–760.
- Holmes, T. J. and Schmitz, J. A. (1990) A theory of entrepreneurship and its application to the study of business transfers, *Journal of Political Economy*, 98(2), pp. 265–294.
- Holmes, T. J. and Schmitz, J. A. (1996) Managerial tenure, business age, and small business turnover, *Journal of Labor Economics*, 14(1), pp. 79–99.
- Kirchhoff, B. A. (1994) *Entrepreneurship and Dynamic Capitalism* (Westport, CT: Praeger).
- Klepper, S. (2001) Employee startups in high tech industries, *Industrial and Corporate Change*, 10, pp. 639–674.
- Klepper, S. (2002) The capabilities of new firms and the evolution of the US automobile industry, *Industrial and Corporate Change*, 11(4), pp. 645–666.
- Klepper, S. and Sleeper, S. D. (2005) Entry by spinoffs, *Management Science*, 51(8), pp. 1291–1306.
- Laband, D. N. and Lentz, B. F. (1983a) Like father, like son—toward an economic theory of occupational following, *Southern Economic Journal*, 50(2), pp. 474–493.
- Laband, D. N. and Lentz, B. F. (1983b) Occupational inheritance in agriculture, *American Journal of Agriculture Economics*, 65(2), pp. 311–314.
- Lentz, B. F. and Laband, D. (1990) Entrepreneurial success and occupational inheritance, *Canadian Journal of Economics*, 23(3), pp. 563–579.
- Michel, J. G. and Hambrick, D. C. (1992) Diversification posture and top management team characteristics, *The Academy of Management Journal*, 35(1), pp. 9–37.
- Murray, A. I. (1989) Top management group heterogeneity and firm performance (Special issue: Strategic leaders and leadership), *Strategic Management Journal*, 10(Summer), pp. 125–141.
- Nelson, R. R. and Winter, S. G. (1982) *An Evolutionary Theory of Economic Change* (Cambridge, MA: Harvard University Press).
- Phillips, D. J. (2002) A genealogical approach to organizational life changes: the parent–progeny transfer among Silicon Valley law firms, 1946–1996, *Administrative Science Quarterly*, 47, pp. 474–506.
- Romanelli, E. (1985) Performance and persistence of new firm strategies in organizational evolution: the case of minicomputers, PhD Dissertation, Columbia University.
- Romanelli, E. (1989) Organizational birth and population variety: a community perspective on origins, in: L. L. Cummings & B. M. Staw (Eds) *Research in Organizational Behavior*, pp. 211–246 (Greenwich, CT: JAI Press).
- Schein, E. H. (1983) The role of the founder in creating organizational culture, *Organizational Dynamics*, 12(1), pp. 13–28.
- Schumpeter, J. A. (1934) *The Theory of Economic Development* (Cambridge, MA: Harvard University Press).
- Shane, S. (2000) Prior knowledge and the discovery of entrepreneurial opportunities, *Organization Science*, 11, pp. 448–469.
- Shane, S. (2003) *A General Theory of Entrepreneurship: The Individual-Opportunity Nexus* (Northampton, MA: Edward Elgar).
- Sørensen, J. B. (2004) Recruitment-based competition between industries: a community ecology, *Industrial and Corporate Change*, 13(1), pp. 149–170.
- Stinchcombe, A. L. (1965) Social structure and organizations, in: J. G. March (Ed.) *Handbook of Organizations*, pp. 153–193 (Chicago: Rand McNally).
- Taylor, M. P. (1999) The survival of the fittest: an analysis of self-employment duration in Britain, *The Economic Journal*, 109, pp. C140–C155.

Table A1. Marginal effects of Models A–C

Models/Variables	Model A			Model B			Model C		
	Exits	Takeovers	Survivors	Exits	Takeovers	Survivors	Exits	Takeovers	Survivors
Spin-off from surviving parent	−0.137 ^{***}	0.007	0.129 ^{***}	−0.149 ^{***}	0.061	0.088	−0.149 ^{***}	0.057	0.093
Spin-off from exiting parent	0.123 [*]	0.001	−0.125 ^{**}	0.100	0.053	−0.154 ^{**}	0.102	0.055	−0.157 ^{**}
Industry experience				0.010	−0.038	0.028	0.010	−0.036	0.026
Start-up experience							0.010	0.019	−0.029
Education									
High	0.003	−0.027	0.024	0.003	−0.029	0.025	0.004	−0.028	0.240
Medium	0.052	−0.075 ^{**}	0.023	0.051	−0.074 ^{**}	0.022	0.052	−0.072 ^{**}	0.020
Low	0.044	−0.029	−0.015	0.433	−0.027	−0.016	0.043	−0.027	−0.015
GDP growth in founding year	−0.691 ^{**}	−0.119	0.810 ^{***}	−0.689 ^{**}	−0.131	0.821 ^{***}	−0.701 ^{**}	−0.161	0.862 ^{***}
Log(size)	−0.074 ^{***}	0.003	0.072 ^{***}	−0.075 ^{***}	0.004	0.070 ^{***}	−0.075 ^{***}	0.005	0.070 ^{***}
Log(team size)	0.039	−0.008	−0.030	0.040	−0.015	−0.026	0.041	−0.019	−0.021

Note: ^{*}: P<0.1, ^{**}: P<0.05, ^{***}: P<0.01.