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Inherited Advantage and Spinoff Success

Anders Broström* Hans Lööf* Pardis Nabavi†

Abstract

This paper investigates how incumbent firm characteristics affect the viability of its spinoffs. The survival patterns of spinoffs with roots in exporting firms and in technologically innovative firms are compared to the survival of other spinoffs. Using comprehensive Swedish employer-employee panel data sets, three possible outcomes are identified: survival, acquisition and complete exit from the market. Experience from an exporting parent is positively associated with spinoff survival. These inheritance benefits do, however, decrease with the tenure of ex-employees. This suggests that inherited advantages in this case is not primarily driven by enhanced opportunities for on-the-job learning. Above-average attractiveness to employees, and associated ability sorting and opportunity costs mechanisms, provides explanations for the superior survival of spin-offs from exporting firms that seem more congruent with data. The study also suggest that technological innovativeness, captured by parent's patenting activity, is negatively associated with spinoff survival when controlling for exports. This result support the view that knowledge inside innovative firms is "sticky" and not easily transferable to new ventures by ex-employees.

Keywords: entrepreneurship, exports, organizational heritage, innovation, spinoff, entrepreneurial spawning.

JEL-Codes: C25, F14, L26, M13, O33.

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1 Introduction

There is a broad consensus that entrepreneurial ventures founded by ex-employees of incumbent firms play a vital role in the dynamics of the economy. Following in the footsteps of e.g. Klepper and Sleeper (2005) and Bhide (1994), there is by now a quite substantial literature on the emergence and performance of spinoff firms. In this literature, growing attention has been paid to the incumbent firm from which spinoffs are spawned and on competitive advantages seemingly inherited between incumbent and spinoff firms. Among key findings are that firms spun out from firms with characteristics of superiority perform better. But it remains largely unclear both what dimensions of incumbent firm performance that translate into enhanced spin-off viability, and through what mechanisms such organisational inheritance takes place.

Theoretical models of inheritance between incumbent and spinoff firms have tended to place workplace learning concerning both technological know-how and knowledge of the market in focus (Klepper and Thompson, 2006; Cassiman and Ueda, 2006). What empirical evidence that exists is, however, scattered and partly contradictory. Direct empirical tests of on-the-job learning as a key mechanisms of organisational inheritance is largely lacking.

In this study, we address these existing gaps in the literature on organisational inheritance. Opportunities for on-the-job learning while in the employ of technologically innovative firms and exporting firms, respectively, are discussed. In parallel, we review alternative arguments for organisational inheritance from exporting and innovative firms. In a few recent studies, the traditional referral to learning as the main mechanism behind organisational inheritance between incumbent and spinoff firm has been challenged by arguments about individual sorting (Klepper, 2007). Observed patterns of better survival of spinoffs from firms with superior characteristics could, according to this line of argument, be (fully or partly) attributed to labour market sorting effects, referred to by Chatterji (2009) as the "good people work for good firms" explanation.

We empirically investigate the survival of spinoffs in relation to patenting and export activities of the incumbent from which these firms were spawned. This analysis is based on comprehensive employer-employee data of a type deployed in a series of recent studies on spinoff performance and inherited advantage (Eriksson and Moritz Kuhn, 2006; Elfenbein et al., 2010; Sorensen and Phillips, 2011; Andersson et al., 2012; Dick et al., 2013; Andersson and Klepper, 2013).

While almost all existing studies due to data limitations only distinguish between survival and exit, we also consider acquirement as a particular form of exit with potentially different connotation than that of a fold-up (c.f. Headd 2003; Dahl and Reichstein 2007; Wennberg et al. 2010; Cefis and Marsili 2012; Weterings and Marsili 2015).

The following main results emerge from this study: (i) spinoffs from exporting firms survive longer than other spinoffs, (ii) innovative parents produce less viable offspring than other firms when controlling for exports, (iii) longer tenure in parent has a generally significant positive effect on the survival of spinoffs, but this effect is weaker than average for employment in exporting firms, and stronger than average for employment in technologically innovative firms. We interpret these findings as suggesting that exporting activities constitute a previously unrecognised source of organisational inheritance, primarily driven by superior entrepreneurial ability of exporters' employees.

The paper proceeds as follows. Section 2 reviews literature on inherited advantage from firms with superior market-oriented and technology-oriented characteristics, respectively. In section 3, mechanisms of inheritance between incumbents and their spin-offs are discussed. Section 4 presents the data, formulates the methodological approach and specifies the empirical model. Section 5 reports new empirical evidence on the relationship between incumbent firms and their spinoff. Section 6 provides concluding remarks and suggestions for further research.

2 Inheritance from innovative and exporting firms

Despite long-standing interest in the phenomenon of organisational inheritance, many central questions surrounding these processes remain open. In particular, while there exists emerging coherence around the view that 'prominent' incumbent firms are more likely to spawn successful spinoffs (in terms of survival, venture growth, etc), it remains unclear what characteristics of prominence that are truly important. Opportunities for robust theoretical generalisation are limited by previous empirical results being scattered across different industries and different conceptualisations.

Across studies, tokens of incumbent prominence is recurrently sought among market-oriented and technology-oriented factors. To our knowledge, however, Agarwal et al. (2004) is the only study offering direct systematic comparison of technological and market-oriented advantages as a basis for organisational

inheritance. This study, which is set in the emergent disk-drive industry, reported evidence that incumbent technical know-how was positively associated with spinoff survival, whereas market-pioneering know-how was not. In another notable contribution, Andersson et al. (2012) report that spinoffs spawned from Swedish incumbents which have recently introduced innovations to the market are less likely to exit. This relationship is however only valid for firms spawned from persistent innovators from knowledge-intensive service sectors – for manufacturing firms and for occasional innovators no such evidence can be found. It remains open to interpretation to what extent the innovativeness of these firms is related to technological expertise, to superior market-related insights and networks, respectively.[1]

In the present cross-industry study, we choose to proxy technology-oriented superiority with patenting and market-oriented superiority with exporting activities. In what follows, we outline theoretical foundations for organisational inheritance from incumbents with superior performance in general. This discussion is subsequently applied to technological innovativeness and exporting as bases for organisational inheritance.

3 Mechanisms of organisational inheritance

The early development of newly founded firms is closely linked to the entrepreneurial and managerial competences and abilities of founders and key staff (e.g. Colombo and Grilli 2005; Man et al. 2002). Such competencies have been understood as a conundrum of inherent traits and acquired skills and knowledge (Lau et al., 1999). This implies that incumbent firms may be spawning more successful spinoffs because their employment process attracts individuals with higher entrepreneurial competence, because they offer superior opportunities for acquiring entrepreneurial competence, or for both of these reasons. Previous literature has emphasised the role of on-the-job experiences as a basis for organisational inheritance. For example, Chatterji et al. (2013) suggest that on-the-job

[1] Insights into the balance between technical and market-oriented knowledge is also offered by two studies on the US (Sleeper, 1998) and German (Buenstorf, 2007) laser industries as well as a recent study on the Irish bio tech industry (Curran et al., 2015). These studies all find that spinoffs started by individuals with a sales or marketing background were less likely to exit than firms started by entrepreneurs with a technical (academic) background.

experience at incumbent firms allows employees considering entrepreneurship to learn about their abilities and preferences through job experimentation. Bhide (1994) found that 71 percent of the founders he questioned exploited ideas they had while working for their previous employer.

While subject to increasing scholarly interest, arguments centered on differences in recruitment patterns are mostly supported by anecdotal evidence. Theoretically, it seems straightforward to expect that while the set of abilities and skills that is useful in entrepreneurship is not identical with that required for a regular career as employed, there is a significant degree of overlap. Firms which attract employees with above-average innate ability would consequently be expected to spawn higher quality spin-offs. Interestingly, it is possible to relax the assumption of an ability-based advantage and maintain the argument that incumbent firms which are more attractive as employers are likely to spawn spin-offs with higher quality, drawing on the treatment of the opportunity costs of job mobility in the labour economics literature. If the barrier to leaving employment is higher in some set of firms, those who do leave to engage in entrepreneurship should have higher-than-average expected (by the entrepreneurs) performance even if the quality of entrepreneurial opportunities available to employees or the endowment of competences and abilities are not systematically higher in that set of incumbent firms. Under the assumption that firms which are performing superiorly in some dimension are on average more attractive as employers than more mediocre performing firms, job satisfaction arguments constitute an alternative link between the performance of incumbents and the performance of spinoffs.

In the remainder of this section, we discuss technological innovativeness and exports as key characteristics which may be associated with inherited advantage, drawing on the theoretical mechanisms outlined above.

3.1 Spawning from the innovative firm

On-the-job learning of a kind valuable for entrepreneurial venturing is potentially intensified while working for a technologically innovative firm. In particular, employees of innovating firms may be exposed to ideas and gain insights relevant for future business opportunities at a higher rate than other employees. However, the relevance of this mechanism is largely unexplored. It remains un-

clear both how widely knowledge within innovative firms disseminates between employees, and to what extent such knowledge may be appropriated beyond the boundaries of the incumbent firm. IPR protection constitutes a barrier to imitation. Furthermore, evolutionary theorists have highlighted further constraints on technology transfer. Dosi and Nelson (2010) argue that replication of technological knowledge concerning processes, organisational arrangements, and products is difficult and often quite expensive. Mostly, firms are not aware of the best practice, and even if they were, they would probably not have the capability to develop or use it. Dosi and Nelson (2010) discuss the main reasons why technological knowledge is difficult to transfer between firms: (1) it is partly tacit, (2) it is embodied in complex organisational practices, (3) technological leads and lags can be linked to high initial costs, and (4) indivisibility ("Half of a statement about the property of a technology is not worth half of the full one: most likely it is worth zero").

While not explicitly discussed further in the context of the present study, we note that a different kind of indirect relationships between technological innovativeness and opportunities for on-the-job learning opportunities are possible. First, it has been suggested that innovative firms not only employ more highly educated individuals (Leiponen, 2005), they also on average invest more intensively in employee training (Freel, 2005). To the extent that on-the-job training allows employees to build skills relevant for entrepreneurial venturing, this relationship would provide a mechanism through which spin-out from innovative firms could be expected to perform better. Second, the innovativeness of firms is associated with organisational designs emphasizing decentralized decision making over centralized control (Woodward, 1965). Decentralised organizational forms may both allow employees to learn entrepreneurially useful skills at increased pace, and increase the attractiveness of employment to individuals with an entrepreneurially oriented skill set.

Beyond arguments based on on-the-job learning, individuals spinning out from technologically innovative firms can - as outlined above - be expected to outperform other spin-out entrepreneurs if they are endowed with superior innate abilities or if they faced higher-than-average opportunity costs of leaving the current job due to enhanced job satisfaction. We find little guidance in previous research to support such arguments. It may, however, be hypothesised that entrepreneurially oriented (in terms of preferences and abilities) individuals are likely to have a preference to work for innovative firms than the average in-

dividual. Similarly, more entrepreneurially oriented individuals could be more attractive for innovative firms. Such a relationship would activate both the ability-based and opportunity-cost oriented mechanisms discussed above.

In conclusion, we find that there are reasons originating in opportunity cost logic and in different kinds of learning arguments to expect spinoffs from innovative firms to perform better than other firms. We do also, however, note that technology transfer between incumbent and spinoff may not be feasible and that more indirect relationships between the technological innovativeness of the incumbent and learning opportunities for entrepreneurially oriented employees performance are largely un-tested in previous literature.

Possibly reflecting such ambiguity, the limited empirical literature that has engaged with spawning from innovative firms have found contradictory results. In a research note based on data on the early German automobile industry, von Rhein (2008) report results suggesting that once controlling for parent size, the patenting activity of the parent does not predict spinoff survival. Franco and Filson (2006) report that they were not able to identify a relationship between incumbent technical know-how and spinoff survival in the US disk-drive industry, but they do find evidence on lower exit risks for spinoffs spawned from early mover incumbents (i.e. firms which were first to market with a new category of disk drives). As noted above Agarwal et al. (2004), on the other hand, report evidence supporting the existence of such a relationship from their study of the very same industry.

3.2 Spawning from the exporting firm

A small strand of the entrepreneurship literature studies the presence of spinoffs on international markets. The evidence suggests that new ventures gain additional knowledge as they diversify further into international markets similar to those of the incumbent firms (Oviatt and McDoughal, 1994; Barkema and Vermeulen, 1998; Zahra et al., 2000; Westhead et al., 2001). However, we know very little about the exporting firm as a source of spinoffs.

It is widely acknowledged that exporting firms display superior performance, e.g. as measured in terms of labour productivity. The causality behind this relationship has been subject to extensive debate. Studies on the exporting behavior of firms in advanced economies have repeatedly found support for the notion that

more productive firms are more likely to start engaging in exports, but weak evidence for that exporting firms increase their productivity further through learning (see e.g. Bernard and Jensen 1999; Aw et al. 2000; Delgado et al. 2002). Nonetheless, evidence on learning effects have been reported for firms with a particularly high and consistent exposure to foreign markets (Castellani, 2002; Andersson and Lööf, 2009). Either way, spinoffs from exporting firms can be expected to have enhanced survivability outlooks. Since exporting firms are known to offer products of higher quality than non-exporters and to be more efficient in terms of value creation, and since employees are connected to a wider set of markets and customers, opportunities for learning and network generation should be enhanced while in the employ of an exporting firms. As these very same virtues may be related to the attractiveness of the firm as employer, it can also be hypothesised that the average opportunity costs of entrepreneurship is higher in exporting firms than in other firms. This would suggest that the expected returns to entrepreneurship is higher in ventures spawned from exporting firms. It is also quite conceivable that exporting firms attracts employees with above-average business-oriented abilities. Potential entrepreneurs may, for example, prefer to work for an exporting firm, anticipating that on-the-job experience will be useful for subsequent spells of entrepreneurial venturing.

In conclusion, we expect that spinoffs from exporting firms should show better survivability than the average spinoff. While this expectation is partly based on expectations of more efficient on-the-job learning, opportunity cost and labour market sorting arguments provide alternative theoretical mechanisms which would all seem to suggest that exporters should spawn spinoffs of higher quality.

3.3 Exploring organisational inheritance

In view of the inconclusive nature of extant empirical evidence regarding what characteristics of incumbent firm superiority that constitute a basis for organisational inheritance and a lack of coherent theoretical frameworks on which to base explicit a-priori prediction, further exploratory work on organisational inheritance is motivated. This paper sets out to empirically compare the survival prospects of firms started by employees of incumbents with superior abilities for technological innovation and superior market access to firms started by employees from incumbents lacking either - or both - of these characteristics. We

specifically link patenting and export activities of incumbents to spinoff survival. Seeking to shed some light on the mechanisms of inter-organisational inheritance, we furthermore study how the effect of tenure in the parent firm interacts with innovation and exporting, respectively. Drawing on explanations for organisational inheritance based on various kinds of on-the-job learning and network development, longer tenure in the incumbent firm would seemingly imply stronger inheritance. The other two sets of mechanisms which may increase survival rates of spinoffs spawned from innovative and exporting firms (see discussion above) are not enhanced by tenure. That is, the workforce of innovative and exporting firms may have generally higher levels of job satisfaction (i.e. increased opportunity costs of spinning out) or higher level of competence and ability, and while both these mechanisms may generate a pattern whereby spinoff survival increases, neither of them should be mediated by tenure effects. Investigation of how incumbent status as exporter or innovator, respectively, interacts with the duration of founders' tenure at the incumbent provide an opportunity to explore the relative importance of the different mechanisms of organisational inheritance outlined above. In particular, it provides a test of widely held views of on-the-job learning and network creation as a key mechanism of organisational inheritance.

4 Methodology and data

4.1 Empirical strategy

The objective of the study is to analyse how innovation and export activities of parent firms influence the performance of their spinoffs. Seeking to shed some further light on the mechanisms of inter-organisational inheritance, we furthermore study how the effect of tenure in the parent firm interacts with innovation and exporting, respectively. In the empirical analysis, we use a competing risk model for time-to-event data. Three outcome events are possible: failure, exit by M&A, or survival. The outcomes are observed at the end of each year. We apply a log-likelihood function of the competing risks. The preferred model is a complementary log-log approach. We also report regression results from a multinomial logit model. A basic assumption in both models is that the hazard rate distribution follows a generalised form of the logistic function. This

assumption is common for non-proportional hazard models and when the data set includes firms-year observations (Allison, 1982; Jenkins, 1995, 2005). The hazard rate for firm i with j exit mode is defined as:

$$\lambda_{ji}(t) = \frac{exp\{\beta_j X_{it}\}}{1+\sum_{j=1}^{k} exp\{\beta_j X_{it}\}} \tag{1}$$

where X_{it} is a vector of explanatory variables. The model is well suited to the analysis of longitudinal data sets because it can accommodate both time-constant and time-varying independent variables (Jenkins, 2005) and has been applied by Weterings and Marsili (2015), Cefis and Marsili (2012) and Fontana and Nesta (2009) to study firm exit modes.

Moreover, in order to take into account possible unobserved heterogeneity (or frailty) , we also use complementary Log-Log model with the following hazard function:

$$\lambda_{ji}(t) = 1 - exp\{-exp[\beta_j X_{it} + \theta_t]\} \tag{2}$$

where θ_t is the baseline hazard function.

The first investigation of this paper concerns the question whether spinoffs spawned from innovative and exporting parent firms survive longer. Our empirical strategy regarding this questions focuses on the inclusion of dichotomous variables reflecting each of these two factors in the vector X_{it} and evaluation of the respective coefficient estimates. The second investigation of the paper concerns the different mechanisms of inheritance suggested in previous literature. In particular, we surmise that workplace learning though exposure to parent firm knowledge and networks is contingent on individual's workplace tenure, whereas the two other mechanisms suggested to drive inheritance (differences in characteristics of employees at employment and differences in opportunity costs) are not. Our empirical strategy towards this issue is to interact both dichotomous variables mentioned above with a measure of spin-out employees' tenure in the parent firm. A positive estimate on this coefficient would confirm the validity of the hypothesis of inheritance through workplace learning.

4.2 Data and sample

Availability of employer-employee data has provided an opportunity to deepen the understanding of organisational inheritance - in particular allowing researchers to utilise rich information on both the new and the old firm, to pursue cross-sectoral analysis and to effectively reduce survival bias to a minimum. This study follows the example of a handful of recent such studies by assembling data from several register-based sources. The first is register information on firms and establishments provided by Statistics Sweden and constructed from audited information based on annual reports. The second data source is official information on people employed in the Swedish labour market. The third data source we use is patent applications from the EPO worldwide database PATSTAT. Patents, whether granted or not are assumed to be a proxy for innovation and knowledge-generating activities within the incumbent firm. Moreover, we can match all the firms with trade statistics in order to obtain information on their exporting activities.

The original data set includes observations on virtually all private Swedish manufacturing and service firms between 1997 and 2011 and information on all employees in these firms goes back to 1986. From this data we identify new ventures directly tied to other firms through employment migration. Interchangeably, these firms are labelled as entrepreneurial spawns, employee start-ups and spinoffs.

Following Andersson and Klepper (2013) and similar to Eriksson and Moritz Kuhn (2006), and Dahl and Reichstein (2007), the employee start-ups in this study are recognized by observing ex-employees in both the parent company and the new firm. If they were a minority in the parent firm the year before the transition to new firm, but a majority in the new firm the year after the transition, we consider these firms as entrepreneurial spawns or spinoffs. The method starts by identifying whether a majority of employees in a new firm in a particular year were also a minority in another firm the year before. Then the firm which was the employer of the majority of employees last year is called the parent firm and if the new firm is not a result of a merger-process, then the start-up firm is considered as a spinoff.

We have imposed several constraints on the incumbent offspring to be considered as a spinoff. First, the new entrants are restricted to firms with 2-10 employees initially. The upper limit is imposed to separate firm formation due to firm breakups from employee start-ups. The lower limit is motivated by a require-

ment that start-up needs to have at least two employees in order to be defined as an employee start-ups. By the same logic, no spinoff owned by a domestic or a foreign group are included. Third, in order to have sufficient information on both the parent firms and their descendants, we restrict the analysis to seven cohorts to track the incumbents for the last four years before the spawning and the new firms over a five-year period. The first cohort consists of spinoffs in 2001 and the last cohort of spinoffs entered the market in 2007. Furthermore, we exclude spinoffs entering into primary sectors (Agriculture, Fishing and Extraction; NACE 1-14) and the hotel and restaurant sector (NACE 55) as the entrance and survival patterns in these sectors are not similar to the rest of the economy. It should be noted that, in contrast to some prior studies, we do not narrow down the definition of spinoffs to firms that are spawned into the same industry as the parent firm. However, in the regression analysis, we exploit information on whether the new firm operates in the same five-digit industry as the parent.

The using data consists of 5,688 unique spinoffs which enter the market during 2001-2007 period and have about 70% survivors after five years, as illustrated in Table 1. The spinoffs are spawned from 5,421 unique parents where 87% of them spawned only one and 8% spawned two spinoffs. It is worthwhile to note that only 2% of the incumbent firms have more than four entrepreneurial spawns during this seven-year period (Table 2).

Table 1: Cohorts of spinoffs between 2001 and 2007, survival and year of observation of spinoffs in the study

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Surv
2001	812	736	661	633	584							0.72
2002		757	699	630	569	543						0.72
2003			776	723	648	603	565					0.73
2004				780	742	668	620	579				0.74
2005					795	723	656	605	551			0.69
2006						817	742	685	611	563		0.69
2007							951	869	799	739	695	0.73

Table 2: Percentage of parents with one or more spawned new ventures

Number of spawned ventures	Percentage
1	86.6
2	8.3
3	2.0
4	1.1
>4	2.0

4.3 Variables

Since inherited advantage and success of spinoffs have been found to be closely interlinked, prior literature emphasises the importance of observing a wider range of firm and employee characteristics to understand the genealogical process of spillovers (Sorensen and Phillips, 2011). In our effort to embrace this insight, we consider a broad set of explanatory variables including both the old and the new company and the employees in these companies. Each spinoff firm is matched to one incumbent spawning firm; the firm most frequently occurring as previous place of employment among all individuals employed in the spinoff. All variables related to incumbent firm characteristics are calculated using only data on employees from this spawning firm. The variables are presented here and defined in Table A.1.

4.3.1 *Dependent variable*

The dependent variable captures the three possible outcomes of spinoffs on the market during the initial critical five-year period. The possible outcomes are survival as an independent firm, exit through M&A and complete exit from the market. While many existing studies only consider survival as a successful outcome, exiting by M&A is also considered as a separate event. M&A in our study includes processes of buying, selling, dividing and combining companies.

4.3.2 *Key explanatory variables*

The key explanatory variables are exporting, innovation and tenure. The incumbent firm is defined as *exporter* if it has been persistently present in international markets during the four years before the spawn.[2] We identify *innovative* parents as firms which had one patent application or more during the four years before spawning. The variable *tenure* is defined as the average years of the tenure in parent firms. This measure will help us answer the question "How does the length of job tenure in the parent firm impact the success of spawns?" (Chatterji, 2009), thereby shedding light on the more general question about to what extent learning through on-the-job experiences constitute a link for inter-organisational inheritance. As with the measure of total *experience*, the variable is calculated using information on only those employees leaving the incumbent firm identified as the parent.

4.3.3 *Control variables*

The control variables are related to the characteristics of both the incumbent firms and their spinoffs. Prior literature has shown that spinoffs entering the *same industry* as their parent perform better than other spinoffs. To account for this effect, we include a dummy if both firms are classified with the same five-digit NACE-code. There is a broad agreement in the entrepreneurship literature that human capital is a key asset of new ventures. We measure *education level* as fraction of employees with at least three years of university education, and this variable is observed for both the incumbent and the new venture. Similarly, we also control for average level of ex-employees' *experience* before spawning. This variable captures general labour market experience of the spinoffs employees, while the variable tenure in parent only reflects the relative knowledge specific to the incumbent firm identified as the parent. Furthermore, we include a control for the share of spinoff employees with recent experience from *managerial* positions. Education and experience, as captured by these three variables, are associated with entrepreneurial and managerial competence in the entrepreneurship literature (e.g. Lazear, 2005; Phillips 2002; Dencker et al. 2009). They are also, however, associated with higher attractiveness on the labour market for

[2] Roughly one out of two firms who export in a given year are not reported to export in all of the the subsequent years. These temporary exporters, however, only account for 2 percent of the total value of Swedish export.

the individual, resulting in higher opportunity cost of entrepreneurship. This should be associated with higher quality of spinoffs at entry, but also with a strengthened tendency to abandon entrepreneurship should not the new venture work out as planned. In summary, all three variables are expected to enhance survival, but we note that there is theoretical room for ambiguity.

Previous literature has identified incumbent size, productivity and success as related to spinoff performance (Andersson and Klepper, 2013; Phillips, 2002; Dick et al., 2013; Fackler et al., 2015). We therefore include control for physical capital of the parent firm, and for productivity in both categories of firm (labour productivity in the incumbent firm and value added in the new venture). We also control for the size of the parent firm in terms of total number of employees, prior to spawning, and initial number of employees in the new entrant.

Eriksson and Moritz Kuhn (2006), Dahl and Reichstein (2007), and Andersson and Klepper (2013) have shown that, consistent with the view of performance heterogeneity as related to pre-founding opportunity cost differences, spinoff survival is higher for so called pulled spinoffs than for pushed spinoffs. Therefore, three distinctions have been made based on the activity of the parent firms: first, incumbents which continue being active in the labour market, *Active*; second, incumbents which exited the same year or within a one-year period of spawning, *Failure*. Finally, the variable *M&A* dichotomously identifies those incumbents which experienced a merger or acquisition process at the same time as launch of spinoff.

Other controls include ownership structure of both spinoffs and their parents, sector dummies and time effect (year dummies).

4.4 Summary statistics

Table 3 presents descriptive statistics. The upper part of the table reports statistics for the 5,421 parent firms, the middle for the founders of the new firms, and the bottom section reports summary statistics for 1,323 unique spinoffs that exited the market within the first five years (23%), 279 spinoffs that experienced merger and acquisition process (5%) and the 4,086 remaining spinoffs that continued working after the first five critical years (72%).

About 3% of spinoffs has innovative parents in both survived and exited groups, while about 20% of the offspring that survived or were acquired have exporting

Table 3: Summary statistics

	(1) Survived Spinoffs		(2) M&A Spinoffs		(3) Exited Spinoffs	
Variables	mean	sd	mean	sd	mean	sd
Parent characteristics						
Innovative	0.03	0.17	0.01	0.12	0.03	0.17
Exporter	0.19	0.39	0.20	0.40	0.15	0.35
Education Level	0.13	0.20	0.12	0.18	0.12	0.19
Size	370	1581	672	2413	274	1420
LP	12.73	1.60	12.75	1.47	12.60	1.73
Exit	0.17	0.38	0.12	0.33	0.22	0.41
M&A	0.11	0.31	0.16	0.36	0.14	0.35
Active	0.72	0.45	0.72	0.45	0.64	0.48
Uni-National	0.22	0.41	0.16	0.37	0.21	0.40
Domestic MNE	0.13	0.34	0.19	0.39	0.10	0.30
Foreign MNE	0.13	0.34	0.14	0.35	0.12	0.32
Independent	0.52	0.50	0.51	0.50	0.58	0.49
Characteristics of ex-employees in spinoff transition						
Tenure	5.10	3.86	4.16	3.05	4.03	3.47
Experience	15.41	4.18	14.20	4.33	14.07	4.57
Spinoff characteristics						
Managerial	0.06	0.15	0.06	0.14	0.06	0.15
Same Industry	0.45	0.50	0.37	0.48	0.38	0.49
Initial Size	3.46	1.87	4.13	2.06	3.12	1.69
Size	4.43	5.41	4.66	4.79	2.61	2.73
Education Level	0.13	0.25	0.10	0.21	0.12	0.27
Valued Added	13.91	1.99	13.28	3.40	12.77	3.08
Group Structure	0.08	0.28	0.09	0.28	0.05	0.22
Independent	0.92	0.28	0.91	0.28	0.95	0.22
High Tech Manuf	0.07	0.25	0.05	0.22	0.06	0.23
Low Tech Manuf	0.23	0.42	0.19	0.39	0.21	0.40
KI Services	0.35	0.48	0.39	0.49	0.36	0.48
Other Services	0.36	0.48	0.37	0.48	0.38	0.49
Observations(Unique)	20,430	(4,086)	678	(279)	3,244	(1,323)

parents. Consistent with findings from other countries, a substantial fraction of the new firms enter the same market as their parents. It is notable that new entrants that are exiting through the M&A process are typically spawned by larger firms than other new entrants. Less than 20% of the ex-employee start-ups can be considered as push-driven, since the incumbent firm disappeared from the market after the spawning. Not surprisingly, this figure is largest for exited spin offs (column 3).

Table 3 shows that the founders of survived spinoffs have slightly more tenure and labour market experience, while managerial experience are about the same for the three groups of spinoffs. Concerning the new ventures, all are independent initially by definition and more than 90% remains independent. The table reports that 7 out of 10 spinoffs were established in service sectors.

5 Results

5.1 Main results

Table 4 presents the results of the complementary log-log estimation of spinoff survival over the first five critical years on the market. The estimated coefficients are reported in exponential form, and the base outcome is failure of the spinoff. Reading the tables, it should be noted that estimates of odd ratios below 1 indicate increased likelihood to exit, while an estimate above 1 indicates increased chances of success. Results from two alternative models are presented. While the variables of interest are included in both models, model I only accounts for characteristics related to the incumbent firm. Model II also controls for the spinoff characteristics and this is the preferred specification. With reference to the base alternative exit, the upper part of Table 4 shows the relative chance of survival, and table A.5 refers to odds of M&A.

The upper section of Table 4 reports results directly related to the paper's key question about the nature of inherited advantage from the parent company. The first row shows that spin-offs spawned from innovative parents have lower propensity to survive than other spin-offs, albeit this effect is only significant at the 10%level. The result is almost identical in column 1 with no control

Table 4: Complementary Log-Log analysis, Survival outcome

	(I)		(II)	
Variables	Coeff.[a]	Std. Err.	Coeff.[a]	Std. Err.
Characteristics of parent firms and ex-employees				
Innovative	0.712*	(0.14)	0.705**	(0.11)
Exporter	1.390***	(0.15)	1.351***	(0.12)
Tenure[b]	1.175***	(0.02)	1.131***	(0.02)
Tenure^{2}[b]	0.995***	(0.00)	0.996***	(0.00)
Innovative×Tenure	1.053*	(0.03)	1.051**	(0.02)
Exporter ×Tenure	0.946***	(0.01)	0.952***	(0.01)
Experience[b]	1.036*	(0.02)	1.014	(0.02)
Experience^{2}[b]	1.000	(0.00)	1.001	(0.00)
Education Level	1.007	(0.11)	1.030	(0.13)
Size	1.000	(0.00)	1.000	(0.00)
LP	1.011	(0.01)	1.003	(0.01)
M&A[c]	0.932	(0.07)	0.904*	(0.05)
Active[fc]	1.166***	(0.06)	1.146***	(0.05)
Uni-National[d]	1.010	(0.05)	0.986	(0.04)
Domestic MNE[d]	1.120	(0.08)	1.041	(0.06)
Foreign MNE[d]	1.097	(0.08)	1.040	(0.06)
Spinoff characteristics				
Managerial	0.805	(0.11)	0.887	(0.10)
Same Industry	1.231***	(0.05)	1.149***	(0.04)
Initial Size			0.989	(0.01)
Size			1.057***	(0.01)
Education Level			1.019	(0.10)
Physical Capital			1.035***	(0.01)
Valued Added			1.041***	(0.01)
Group Structure[e]			0.919	(0.06)
High Tech Manuf[f]			0.948	(0.07)
Low Tech Manuf[f]			1.002	(0.04)
KI Services[f]			1.021	(0.04)
Year Dummies	*Yes*		*Yes*	
Observations	24,352		24,352	

Note: Robust standard errors in parenthesis; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

[a] Coefficients are reported in exponential form, the base outcome is failure

[b] Characteristics of ex-employees in Spinoff Transition, [c] Reference is Parents Exited

[d] Reference is Parents Independent

[e] Reference is Independent Spinoffs

[f] Reference is Other Services

for spinoff characteristics, and in column 2 where we introduce the full set of controls for spin-off characteristics.

Looking next at inheritance from an exporting parent, the estimates are above unity (1.390 and 1.351) and highly significant. Irrespective of whether this reflects inherited knowledge about processes, routines and other internal activities in the parent firm (Helfat and Lieberman, 2002), access to similar international networks and market alternatives as the incumbent firm, or differences in the entrepreneurial competence in the workforce of exporters, the new venture benefits from exporting experience.

Next, we consider the importance of tenure. While the estimates for tenure are showing positive impact (1.175 and 1.131) and highly significant, the tenure square coefficients show diminishing return on experience, as expected. The results for tenure are consistent with Agarwal et al. (2004) and Klepper and Sleeper (2005). As founders total labour market experience is not significantly affecting spinoff survival (rows 7 and 8), these results can be interpreted as indicating that the capabilities of the entrepreneurial spawns were significantly shaped by experience attained at the previous employer. However, this effect is somewhat weaker for tenure at exporting firms, than for tenure at non-exporters (row 6). This result is seemingly at odds with expectations on enhanced learning through on-the-job experiences in exporting firms. The impact of tenure at technologically innovative firms is significantly different from tenure at non-innovative firms (row 5), but only at 5 and 10 percent significance level.

Estimated coefficients for control variables show results consistent with the prior literature (see for example Andersson and Klepper, 2013). Employee start-ups in the same five-digit industry as the incumbent have almost 15% higher probability to survive than firms founded outside the industry. Being spawned from an active parent (or pulled spinoffs) increases the propensity of spinoff survival. Similar results are reported by Eriksson and Moritz Kuhn (2006), Dahl and Reichstein (2007) and Andersson and Klepper (2013).

Controlling for observed heterogeneity among both incumbent firms and their spawned firms and unobserved heterogeneity as well, Table 4 also reports results that are in conflict with the existing literature. While previous register-based studies suggest that the size of the parent negatively predicts the performance of the descendants Sorensen and Phillips (2011) and several studies report that more prominent firms spawn better-performing firms, Table 4 reports that the effect of parent's size, education level and labour productivity is negligible.

The estimated results on the spinoff covariates are presented in the lower part of table 4. The odds ratios show that spinoff survival chances increase with the value added, the physical capital and the size of the new firm. The estimates for initial size and education level are not significant. We note that this result seem to be linked to the inclusion of M&As as a distinct exit alternative (see results reported in the Appendix).

Table A.3 in the Appendix reports the results of the multinomial logit model as a robustness check. The estimated effects of key variables are almost the same as the results on survival presented above.

In Table A.5 in the Appendix, odds of exiting by M&A as compared to failure are displayed. Results on spinoff characteristics are largely similar to the results for the survival outcome. Results on inheritance in the upper section of the Table, do however display some interesting differences. No significant effect can be found related to prior innovative experience from the parents. The tenure variable is positive (above unity) and significant.

An interesting result reported in Table A.5 is the positive association between a parent with an M&A background and the likelihood of M&A by the spawned firm. This finding is in line with organisational heritage theory. Moreover, entrepreneurial spawn from Swedish multinational firms has larger likelihood of being acquired. No similar finding can be found for descendants of foreign MNEs. This is similar to the findings of Dahl and Reichstein (2007).

5.2 Robustness and extensions

Survival patterns of new firms is a widely acknowledged dimension of entrepreneurial performance, but it is not without limitations. In particular, exits driven by other factors than those determining the ability of the new firm to generate value may confound the analysis. As noted above, our analysis of survival has taken such concerns into account by analysing different forms of exits separately. Nonetheless, one particular problem remains, which potentially eschews the interpretation also of regular exits. Let us assume that all entrepreneurs continuously evaluate whether to stay engaged in the venture based on expectations on pay-offs as entrepreneur in the present venture versus the most attractive alternative opportunity as employed or self-employed. This implies that entrepreneurs with better alternatives will tend to abandon their present

entrepreneurial venture at higher expected entrepreneurial pay-offs than other entrepreneurs. What if working for innovative and exporting firms affects the range of alternative labour market opportunities available to entrepreneurs? In analysing survival patterns, a positive effect of enhanced entrepreneurial performance on survival would then be partly counteracted by a tendency towards "premature" exit.

In order to shed some light of to what extent the results of Table 4 are affected by confounding effects, we undertake two set of further analysis. First, we repeat the analysis of survival using data on bankruptcy. The information on date of bankruptcy shows that about 40 percent of exits are due to bankruptcy. We used this information in our analysis. The regression results show similar results but with higher magnitude. The only difference is that higher education level of both parents and the spinoff firm result in lower probability of bankruptcy. Education level has no significant effect on survival if we do not distinguish between bankruptcy and other exits.[3]

In a second extension, we explore a commonly used performance measure: the growth of firms' sales (Hoy et al., 1992; Bloodgood et al., 1996; Brush, 1995; Chandler and Hanks, 1993). Sales growth is considered to be a relevant measure of firm performance across industries (Delmar, 1997; Short et al., 2009; Shepherd and Wiklund, 2009), directly linked to the viability of a venture's business model (Delmar et al., 2013). This extension indirectly allows us to further explore through what mechanisms spin-offs spawned from exporting firms tend to survive longer than other spin-offs.

Table A.4 presents the results. We use the same control variables as in the survival regression and, following the previous literature (Delmar et al., 2013), also control for the previous sales. We find that some control variables related to the performance of the parent firm (group status, productivity) and to the scale of the spin-off (initial size, group status) which are not found to be related to survival do predict firm growth. The first set of results can be interpreted as driven by increased opportunity costs of entrepreneurship (i.e. ex-employees of larger, more productive firms face better labour market opportunities than other individuals, and are therefore more likely to voluntarily abandon an entrepreneurial venture). The second set of results that differ likely reflect a higher degree of entrepreneurial ambition regarding growth.

As regards to the key variables, results are largely consistent with those for

[3]The results are not presented here but available upon request.

survival. The interaction between Exporter and Tenure, which was found negatively associated with survival, does not explain growth. The relative impact of the variables Tenure and Exporter shifts towards the latter when regressing firm growth rather than survival only. We interpret these results as signifying that entrepreneurial ex-employees of exporting firms face greater opportunity costs than other spin-off founders. Thereby, the enhanced entrepreneurial performance of spin-offs spawned from exporting firms which is visible as increased growth is to a certain extent counteracted by an increased tendency to abandon entrepreneurship. So, we ask, which of the mechanisms of organisational inheritance outlined in section three would also produce enhanced opportunity costs of entrepreneurship in spin-off ventures? Both labour market sorting arguments and on-the-job learning seem to provide reasonable fit with this result. Entrepreneurs with high competence and abilities - whether acquired on the job or innate - would likely be sought after on the general job market, and hence face above-average opportunity costs of entrepreneurship. Job satisfaction at the incumbent, which we have argued affects the opportunity costs of entrepreneurship and thereby could be associated with superior performance of ventures, should not affect the opportunity costs of entrepreneurs (post entrepreneurship).

6 Conclusions

Inherited advantage and the success of spinoffs have attracted growing attention over the past decades. An emergent pattern from a wide array of studies is that spinoffs spawned from incumbent firms with characteristics of superiority have been found to perform better. Literature remains, however, scattered and inconclusive as regards what dimensions of performance that matter, and how such advantages are inherited.

In addressing these questions, this paper delineates theoretical arguments for organisational inheritance relating to differences in the opportunities for learning; in the opportunity costs of entrepreneurship; and in ability sorting between (different categories of) firms. More specifically, the paper focuses on the role of parent firm technological know-how and market-oriented knowledge for spinoff survival. These relationships are empirically analysed utilising data on the entire Swedish private sector in the period 1997-2011. In particular, the paper examines inherited advantages from innovative and exporting companies, while

controlling for other firm characteristics, such as productivity, human capital, size, ownership and industry. Information on the ex-employees' job position and tenure in the parent firm and their overall experience on the labour market is also exploited. Methodologically, we improve upon previous register-based studies of spinoff survival by distinguishing between failure and exit through M&A.

The regression results show a negative difference between the survival rate of the spinoffs from technologically innovative parents and other firms. This result is in line with a view of knowledge inside innovative firms as "sticky" and not easily transferable to new ventures by ex-employees. In contrast, spinoffs from exporting firms are found to have enhanced survival outlooks than other spinoffs. This latter result is seemingly in line with the prevailing notion in the literature of increased opportunities for learning and resource accumulation while working for more prominent firms. However, our further results do not provide very compelling support for this line of argument. While tenure in the parent firm is positively associated with spinoff survival, this effect is actually found to be less - not more - pronounced for tenure at exporting firms. If on-the-job learning about routines (Dahl and Reichstein, 2007) constitute an important mechanism for organisational inheritance, it would seem that a certain tenure would be required to maximise the value of such learning. The finding of an opposite relationship is seemingly at odds with the dominating (but largely empirically untested) view of inheritance as strongly linked to knowledge transfer. This finding would seem to indicate that labour market sorting and job satisfaction arguments are more important than on-the-job learning in explaining the patterns of organisational inheritance between exporting firms and their spinoffs. That is, exporting firms may attract employees with above-average entrepreneurial competence. Furthermore, the average reservation wage of entrepreneurship - the lowest expected earning which an individual would accept in order to quit his or her current job to become self-employed - may be higher at exporting firms as a consequence of offering its employees more stimulating working conditions. Neither of these views of organisational inheritance would imply that longer tenure in the exporting firm is associated with neither better nor worse performance of the spinoff.[4]

[4]Further exploration on our behalf provides complementary evidence on the mechanisms of organisational inheritance from better-performing firms. In results not reported here, an interaction term between Tenure and Active was inserted into models I and II. The estimated odds ratio is significantly below one. That is, while firms spun out from parent which remain active survive longer than firms spun out from exiting firms, the value of having acquired

Our findings thus raise more general questions about whether organisational inheritance in general is better understood as inheritance of individuals with higher innate ability than as inheritance of insights, knowledge and networks. Further work should seek to develop empirical strategies which allow to separate between 1) learning and knowledge transfer, 2) labour market sorting and 3) opportunity cost arguments as explanations for organisational inheritance between prominent firms and their spinoffs.

While the remaining results of this study confirm many previous findings, certain elements of the extant literature are also challenged. Taking exporting activity into account, parent firm size and labour productivity do not - as suggested in previous register-based studies - predict spinoff survival. Bearing in mind that both firm size and productivity are positively related to exporting activity (Andersson and Lööf, 2009), this finding calls for further study of what dimension of 'organisational prominence' that most importantly enhances spinoff viability. More detailed study of how an employee's position within the firm mediates the relationship between incumbent firm performance and spinoff survival would also seem to be a promising venue for further research.

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tenure in an active parent is lower than tenure acquired in an exiting firm. Again, this results would seem to go against the view of enhanced on-the-job learning as the key mechanism for performance inheritage, but be quite consistent with opportunity-cost based arguments and with labour market sorting arguments.

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7 Appendix

Table A.1: Definition of the key-variables in the study

Variables Name	Description
Parent characteristics	
Innovative	Parents with patent applications the last four years before spawning
Exporter	Parents present in international market persistently during the four years before the spawn
Emp	Parents number of employees before spawning
LP	Logarithm of value added per employee of parent the year before spawning
Education Level	Share of employees with at least three years of university education before the spawn
Failure	Parent exited the same year or within a one year period of spawning
M&A	Parent gone through merger and acquisition process the same time as they spawned
Active	Spinoff with active parents
Uni-National	Parent members of a domestic group
Domestic MNE	Parent members of a domestic multinational group
Foreign MNE	Parent members of a foreign multinational group
Independent	Non-affiliated parent
Characteristics of ex-employees in spinoff transition	
Tenure	Average years of the tenure in parent firms
Experience	Average years of work experience of the employees gain before spawning
Spinoff characteristics	
Managerial	Share of employees of the spinoff who hold a managerial position in the incumbent parent
Same Industry	Spinoff working in the same five-digit industry as parents
Initial Size	Initial number of employees of the spinoff
Size	Number of employees of the spinoff
Education Level	Share of employees with at least three years of university education
Valued Added	Logarithm of value added
Group Structure	Members of a group
Independent	Non-affiliated firm
High Tech Manuf	High and medium high tech manufactring based on NACE
Low Tech Manuf	Low and medium low tech manufactring based on NACE
KI Services	Knowledge intensive services based on NACE
Other Services	Other services based on NACE

Table A.2: Cross-correlation table between spinoff outcome and parents Characteristics

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Parent														
(1) Failure	1.000													
(2) Survival	**-0.903**	1.000												
(3) M&A	**-0.026**	**-0.405**	1.000											
(4) Innovative	-0.003	0.005	-0.007	1.000										
(5) Exporter	**-0.025**	**0.023**	-0.001	**0.244**	1.000									
(6) Same Industry	**-0.032**	**0.037**	**-0.018**	**-0.064**	**-0.148**	1.000								
(7) Parent M&A	**0.028**	**-0.035**	**0.022**	**-0.043**	**-0.088**	**-0.028**	1.000							
(8) Parent Active	**-0.040**	**0.038**	-0.003	**0.072**	**0.178**	**0.023**	**-0.560**	1.000						
(9) Parent Emp	**-0.015**	0.007	**0.015**	**0.294**	**0.253**	0.002	**-0.066**	**0.130**	1.000					
(10) Parent LP	**-0.021**	**0.017**	0.006	0.003	**0.111**	0.002	**-0.019**	**0.098**	0.006	1.000				
(11) Parent Education Level	-0.007	0.007	-0.003	**0.105**	**0.099**	**0.050**	**-0.031**	**0.074**	**0.053**	**0.082**	1.000			
(12) Experience	**-0.017**	**0.017**	-0.004	0.001	**0.047**	**-0.051**	-0.008	**0.020**	**0.014**	0.001	**0.083**	1.000		
(13) Tenure	**-0.063**	**0.067**	**-0.023**	**0.045**	**0.108**	0.038	**-0.053**	**0.045**	**0.050**	**0.070**	**-0.061**	**-0.467**	1.000	
(14) Managerial	0.000	-0.004	0.008	**0.035**	**0.107**	**-0.099**	-0.005	-0.003	0.000	**0.044**	**0.036**	**0.047**	**0.081**	1.000

Note: Bold values are significant at 95% level

Table A.3: Multinomial Logit analysis, survival outcome

	(I)		(II)	
Variables	Coeff.[a]	Std. Err.	Coeff.[a]	Std. Err.
Characteristics of parent firm and ex-employees				
Innovative	0.590*	(0.16)	0.523**	(0.14)
Exporter	1.568***	(0.24)	1.664***	(0.26)
Tenure[b]	1.257***	(0.03)	1.237***	(0.03)
Tenure[2b]	0.992***	(0.00)	0.994***	(0.00)
Innovative×Tenure	1.076*	(0.04)	1.084**	(0.04)
Exporter ×Tenure	0.926***	(0.02)	0.918***	(0.02)
Experience[b]	1.051*	(0.03)	1.019	(0.03)
Experience[2b]	1.000	(0.00)	1.001	(0.00)
Education Level	1.040	(0.16)	0.950	(0.23)
Emp	1.000	(0.00)	1.000	(0.00)
LP	1.014	(0.02)	1.002	(0.02)
M&A	0.933	(0.09)	0.836*	(0.09)
Active	1.265***	(0.09)	1.273***	(0.10)
Uni-National	1.015	(0.08)	0.947	(0.07)
Domestic MNE	1.202*	(0.13)	1.086	(0.12)
Foreign MNE	1.116	(0.12)	1.028	(0.11)
Spinoff characteristics				
Managerial	0.732	(0.15)	0.798	(0.16)
Same Industry	1.319***	(0.08)	1.267***	(0.08)
Initial Size			0.963	(0.02)
Size			1.173***	(0.03)
Education Level			1.042	(0.19)
Physical Capital, Log			1.061***	(0.01)
Valued Added, Log			1.062***	(0.01)
Group Structure			0.812*	(0.10)
High Tech Manuf			0.876	(0.11)
Low Tech Manuf			1.005	(0.08)
KI Services			1.058	(0.08)
Year Dummies	*Yes*		*Yes*	
Observations	24,352		24,352	

Note: Robust standard errors in parenthesis; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

[a] Coefficients are reported in exponential form, the base outcome is failure

[b] Characteristics of ex-employees in Spinoff Transition, [c] Reference is Parents Exited

[d] Reference is Parents Independent

[e] Reference is Independent Spinoffs

[f] Reference is Other Services

Table A.4: Random Effect Tobit analysis, Sales Growth regression

	(I)		(II)	
Variables	Coeff.[a]	Std. Err.	Coeff.[a]	Std. Err.
Characteristics of parent firms and ex-employees				
Innovative	-0.020	(0.09)	-0.199**	(0.09)
Exporter	0.189***	(0.05)	0.218***	(0.04)
Tenure[b]	0.032***	(0.01)	0.037***	(0.01)
Tenure^{2}[b]	-0.002***	(0.00)	-0.002***	(0.00)
Innovative×Tenure	0.001	(0.01)	0.014	(0.01)
Exporter ×Tenure	0.002	(0.01)	-0.004	(0.01)
Experience[b]	0.021**	(0.01)	0.002	(0.01)
Experience^{2}[b]	-0.001**	(0.00)	0.000	(0.00)
Education Level	-0.123***	(0.05)	0.102*	(0.06)
Size	-0.000***	(0.00)	-0.000***	(0.00)
LP	0.032***	(0.01)	0.028***	(0.01)
M&A	0.111***	(0.03)	0.004	(0.03)
Active	0.072***	(0.02)	0.055**	(0.02)
Uni-National	0.121***	(0.02)	0.077***	(0.02)
Domestic MNE	0.247***	(0.03)	0.150***	(0.03)
Foreign MNE	0.289***	(0.03)	0.214***	(0.03)
Spinoff characteristics				
Managerial	0.122**	(0.06)	0.099*	(0.06)
Same Industry	0.047**	(0.02)	-0.000	(0.02)
Sales_{t-1}	-0.561***	(0.01)	-0.703***	(0.01)
Initial Size			0.088***	(0.01)
Size			0.053***	(0.00)
Education Level			0.042	(0.03)
Physical Capital			0.037***	(0.00)
Group Structure			0.061***	(0.02)
High Tech Manuf			-0.218***	(0.03)
Low Tech Manuf			-0.169***	(0.02)
KI Services			-0.303***	(0.02)
Year Dummies	*Yes*		*Yes*	
Observations	17,776		17,776	

Note: Robust standard errors in parenthesis; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

[a] Coefficients are reported in exponential form, the base outcome is failure

[b] Characteristics of ex-employees in Spinoff Transition, [c] Reference is Parents Exited

[d] Reference is Parents Independent

[e] Reference is Independent Spinoffs

[f] Reference is Other Services

Table A.5: Complementary Log-Log analysis, M&A outcome

	(I)		(II)	
Variables	Coeff.[a]	Std. Err.	Coeff.[b]	Std. Err.
Characteristics of parent firms and ex-employees				
Innovative	0.838	(0.60)	0.787	(0.62)
Exporter	0.849	(0.27)	1.012	(0.33)
Tenure[b]	1.141**	(0.07)	1.141**	(0.08)
Tenure^{2b}	0.989**	(0.00)	0.991*	(0.00)
Innovative×Tenure	0.909	(0.13)	0.933	(0.15)
Exporter ×Tenure	1.007	(0.05)	0.977	(0.05)
Experience	1.040	(0.06)	0.989	(0.06)
Experience^2	0.998	(0.00)	1.000	(0.00)
Education Level	0.749	(0.26)	0.772	(0.39)
Emp	1.000	(0.00)	1.000	(0.00)
LP	1.097	(0.07)	1.094	(0.07)
M&A	2.002***	(0.44)	1.749**	(0.40)
Active	1.546**	(0.29)	1.550**	(0.30)
Uni-National	1.030	(0.18)	0.995	(0.17)
Domestic MNE	2.018***	(0.38)	1.658**	(0.34)
Foreign MNE	1.201	(0.24)	0.872	(0.19)
Spinoff characteristics				
Managerial	1.517	(0.59)	1.843	(0.76)
Same Industry	0.944	(0.12)	0.942	(0.13)
Initial Size			1.114***	(0.04)
Size			1.081***	(0.02)
Education Level			0.697	(0.24)
Physical Capital			0.988	(0.01)
Valued Added			1.005	(0.02)
Group Structure			1.700***	(0.33)
High Tech Manuf			1.157	(0.33)
Low Tech Manuf			1.209	(0.21)
KI Services			1.366*	(0.22)
Year Dummies	*Yes*		*Yes*	
Observations	24,352		24,352	

Note: Robust standard errors in parenthesis; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

[a] Coefficients are reported in exponential form, the base outcome is failure

[b] Characteristics of ex-employees in Spinoff Transition, [c] Reference is Parents Exited

[d] Reference is Parents Independent

[e] Reference is Independent Spinoffs

[f] Reference is Other Services

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