



Paper to be presented at

DRUID15, Rome, June 15-17, 2015

(Coorganized with LUISS)

## **Effect of M&A on Spinoffs Formation**

**Juan Martin Carriquiry**

AAU

Business and Management

[jmc@business.aau.dk](mailto:jmc@business.aau.dk)

### **Abstract**

This paper argues that M&A trigger increased employee mobility and spinoffs. It studies to what extent firms undergoing M&A ?push? employees into spinning out and starting their own ventures. The competitive implications for incumbents are further explored by analysing the characteristics of those employees most affected by the M&A. This article contributes to our knowledge about the consequences of M&A, and how spinoffs originating from certain organizational contexts differ in characteristics from other spinoffs. I predict that managers and technical employees will be particularly affected in their behaviour by M&A. An extract from the employer-employee linked Danish Labour Market database is used to test these predictions. Preliminary results of a Difference-in-Differences (DD) analysis reveals that there indeed is an increase in the probability of employees spinning off.

# Effect of M&A on Spinoffs Formation

February 28, 2015

## ABSTRACT

This paper argues that M&A trigger increased employee mobility and spinoffs. It studies to what extent firms undergoing M&A "push" employees into spinning out and starting their own ventures. The competitive implications for incumbents are further explored by analysing the characteristics of those employees most affected by the M&A. This article contributes to our knowledge about the consequences of M&A, and how spinoffs originating from certain organizational contexts differ in characteristics from other spinoffs. I predict that managers and technical employees will be particularly affected in their behaviour by M&A. An extract from the employer-employee linked Danish Labour Market database is used to test these predictions. Preliminary results of a Difference-in-Differences (DD) analysis reveals that there indeed is an increase in the probability of employees spinning off.

**Keywords:** Mergers & Acquisitions, Employee Mobility, Spinoffs

## Introduction

A major point of contention on employee mobility literature has been whether different types of mobility have differential impact on the focal firm performance. Recent research indicates that where employees go to indeed affects the performance of the source firm [Campbell et al. 2012; Gjerløv-Juel and Dahl 2012; McKendrick et al. 2009; Phillips 2002; Wezel et al. 2006]. Whether an employee leaves to enter entrepreneurship or to work for a competing firm can have different effects on the parent firm. Moreover, the characteristics of those leaving also affect the negative impact on parents' performance [Campbell et al. 2012]. This emerging line of research focusing on the competitive implications of spinoffs for the source firms highlights the strategic relevance of spinoffs for management. Employee mobility deriving from M&A might therefore have substantive performance implications for incumbents depending on the characteristics and destination of those leaving the firm.

Moreover, the motivation and characteristics of those employees who spin out as a result of M&A might differ from other spinoffs. There is currently a research gap in our understanding of how organizational context affect employees' propensity to spin off. Yet it is highly relevant to understand who those that enter entrepreneurship as a result of organizational shocks are. The limits to accessing employee-level data has meant that questions regarding how employee mobility is affected by M&A.

Research on spinoffs has shown that they tend to outperform other start-ups [Agarwal et al. 2004; Buenstorf and Klepper 2009; Dahl and Reichstein 2007; Dahl and Sorenson 2013; Eriksson and Moritz Kuhn 2006; Klepper 2001; Moore and Davis 2004]. The resemblance between spinoffs and source firms, much as the resemblance between children and parents, has been at the heart of spinoffs formation theories [Burton et al. 2002; Klepper 2001]. Empirical evidence has also shown that knowledge-rich firms beget better spinoffs [Franco and Filson 2006], and that parent and progeny performance are correlated [Buenstorf 2007a; Dahl and Reichstein 2007]. It is apparent that resource endowment at early stages of the venture are critical determinants of survival [Agarwal et al. 2011]. Since entrepreneurs reproduce organizational blueprints and routines from previous workplaces, coming from a superior firm is expected to reflect positively on performance. Agarwal et al. [2004] expose, more specifically, that firms that are good at both exploring and exploiting innovation (i.e. are technical and market pioneers) will produce fewer spinoffs, but that these spinoffs will perform better than others. They also provide evidence that parents with weak technical or market capabilities will yield more, albeit lower quality, progeny [Agarwal et al. 2004]. The ability to reproduce knowledge and blueprints of parent firms form the basis of spinoffs competitive advantage, and thus the organizational origin of entrepreneur will reflect on performance. Alternatively, Dahl and Sorenson [2013] argue that inheritance explanations only partly explain the performance gap between spinoffs and other entrepreneurs. In fact, at least some of the higher performance can be attributed to the greater effort exerted and the recruitment of more experienced employees with respect to other entrepreneurs.

We know much less, however, about how originating from different organizational contexts will affect both the likelihood that an employee will spin out. There are some studies that have

argued that M&A trigger increased employee mobility [Walsh 1988] and spinoff formation [Brittain and Freeman 1986; Buenstorf 2007b; Klepper 2009], but evidence is at best sparse, probably caused by a limited access to employee level data. Motivation to spin out might be different not only across individuals, but also across organizational realities. Employees' ability to reproduce organizational capabilities and leverage industry knowledge might vary according to the gestation context. This paper contributes to filling this gap, by providing large scale evidence in the case of M&A. It brings together literature on spinoffs, entrepreneurship, turnover and organizational change to address the question of how spinoffs resulting from M&A are different from other spinoffs.

Moreover, advancing who the employees leaving the firm are contributes to the overall discussion on the effect of mobility on the source company [Campbell et al. 2012]. In this paper, I seek to answer the following questions: Is there an effect of takeovers on the likelihood to spinoff? Who are those leaving to start-up a new firm in terms of performance, education, rank, age, tenure?

I argue that acquisitions affect the likelihood of spinoffs by increasing employees' motivation to enter entrepreneurship. Takeovers have been shown to trigger employee mobility [Carriquiry 2014], some of whom may become entrepreneurial spinoffs. Organizational shocks, such as takeovers, are pivotal points in employment relationships when employees evaluate their fit with the new organizational reality [Holtom et al. 2005; Lee et al. 1996]. Strategic disagreements over the future development of the firm [Klepper 2009] and the discontinuation of projects [Garvin 1983] often motivates employees to spin out. Moreover, it has been argued that employees spinout to profit from an idea when their employers cannot enforce their claims it [Anton and Yao 1995]. With management's attention likely to divert towards issues related to the takeover, employees who see underexploited opportunities might take the chance to size them.

The ability to depart the organization will depend on barriers to exit the organization, such as non-compete clauses and forfeit benefits. In organizational contexts such as M&A, exit probabilities might be enhanced by emphasis of minimizing duplication of activities in the new organization to achieve synergies. Therefore firms are less reluctant to facilitate employee exits in this context. Moreover, with management's attention focused on the takeover, employee behaviour might be less monitored, reducing managers chances of spotting early signs of intention to leave. The use of vested stock and other reward-based retention mechanisms are of limited in Denmark.

## Spinoffs

Spinoffs have received a variety of names, from (entrepreneurial) spinouts to intra-industry spinoffs. All these labels refer to firms with a particular characteristic: they are founded or directed by former employees of a firm in the same industry. Typically, this definition implies that the employees spinning out found the new venture immediately after leaving the parent (source) organization, although some definitions might include firms funded up to 5 years after employment at the parent. Spinoffs have raised a significant amount of attention due to the systematic finding that they outperform other types of ventures [Agarwal et al. 2004; Buenstorf 2007b; Buenstorf and Klepper 2009; Dahl and Reichstein 2007; Delmar and Shane 2006; Eriksson and Moritz Kuhn 2006; Klepper 2001; Moore and Davis 2004].

Dahl and Reichstein [2007], for example, found that the positive performance of spinoffs depend on the performance of the source company. This is in line with the inheritance story, whereby the attributes, knowledge and routines of parent firms are transferred to their progeny [Klepper 2001]. Better knowledge and routines will be associated with higher performance, and worse routines and knowledge translates into lower probability of survival. Therefore, if parent firm perform strongly, so will spinoffs, and if parent firms fail, progeny will be more likely to fail too.

Less consistency has been found, however, on the performance implications of spinoffs for the source firm. On the one hand, Campbell et al. [2012] find that, for a sample of professional law firms, spinoffs are more detrimental to the source firm than other types of employee mobility. On the other hand, Agarwal et al. [2004]; Gjerløv-Juel and Dahl [2012]; McKendrick et al. [2009]; Phillips [2002]; Wezel et al. [2006] find that all types of mobility affect source firm performance negatively (expand). The discussion on how different types of mobility affect parent firms, thus, remains a point of contention.

Considering the substantial amount of research about both M&A and spinoffs, our knowledge about their relationship is relatively underexplored. One of the main challenges behind this gap, has been the lack of employee-level data. Data at that level that tracks employees both before and after M&A is hard to come by, both because firms are reluctant to provide the data, and because M&A must be explored retrospectively -i.e. we only know about the events after they are already unleashing.

That said, there have been some studies that offer evidence of the link. M&A have been previously linked by a large study with increased employee mobility across the board for most types of employees [Carriquiry 2014]. A small-sample -55 companies- study by Walsh also shows that M&A triggers increased turnover for top managers [Walsh 1988]. Regardless of the type of M&A, he finds that top managers will leave the target company at a rate significantly higher than "normal".

Klepper [2009] cites the case of Electronic Arrays spinning off from General Microelectronics after the takeover by Philco in the semiconductors industry as an example of how M&A may lead to spinoff formation. Klepper and Thompson [2010], moreover, argue that spinoffs result from strategic disagreements, which are often due to major organizational events such as M&A. They argue that there is a pattern of higher spinoffs formation around the time of an acquisition. This

they call an empirical regularity, and yet they fail to provide references to studies that show such finding.

There are two studies of entrepreneurship, namely [Brittain and Freeman \[1986\]](#) and [Buenstorf \[2007b\]](#), that consider M&A as an explanatory variable in their models. Although it is not the focus of either study, they do show that there is a certain correlation between M&A and entrepreneurship. [Buenstorf \[2007b\]](#)'s thorough study of the German laser industry shows mixed results regarding the significance and size of the relationship, but nevertheless indicates that there is a relationship. [Brittain and Freeman \[1986\]](#)'s study of entrepreneurs as organizational products finds a correlation between time-to-entrepreneurship and unrelated acquisitions which seems to hold across different specifications. The latter study, nonetheless, focuses exclusively on the semiconductors industry in Silicon Valley, a setting particularly supportive of entrepreneurship. Silicon Valley, where non-compete clauses are not enforceable, is particularly well-known for its capacity to attract both talent and finance for the creation and development of high-tech companies.

### Why do employees spin off?

There are number of reasons, both pecuniary and otherwise, that may lead someone to enter entrepreneurship. Why do some individuals become entrepreneurs while others do not is still a major point of contention in entrepreneurship literature [[Shane 2000](#)]. Research on spinoff motivation, in particular, points out at least to there possible (work-related) explanations: strategic disagreements, resource appropriability, and necessity.

[Klepper and Thompson \[2005\]](#) have described strategic disagreements as a main source of spinoffs. [Klepper and Thompson \[2010\]](#) argue that it is an "empirical regularity" that spinoffs are founded by top managers and engineers/scientists, after disagreements on the strategies and technologies to pursue by a firm. Fall outs on regarding reward schemes, the technological direction of the firm, and managerial changes have been key factors in the prominent case studies they analyse. They provide evidence not only of the semiconductors industry, but also the automotive, laser, and hard-disk drive industries. The disagreement idea has, nevertheless, been traced back to [Garvin \[1983\]](#), who cites it as a common explanation to the spinoff phenomenon. Garvin's scepticism of this explanations has not discouraged more formal attempts to capture the disagreement argument. Researchers have developed models depicting these disagreements due to differences in perception of the value of an idea [[Klepper and Thompson 2010](#)] or different incentives to pursue them [[Cassiman and Ueda 2006](#)]. Employees then are forced to leave in order to pursue their project elsewhere.

The ability to profit from the resources developed at the parent firm is often cited a major motivation for employees to spin off. [Anton and Yao \[1995\]](#) developed a model in which employees leave to pursue a potentially profitable idea when they discover it and are able to appropriate it. If the employer cannot enforce proprietary rights on the idea, employees would profit from pursuing the idea on their own. Again, [Garvin \[1983\]](#) was sceptical about the generalizability of this claim, arguing that it is particularly relevant only in certain high-tech industries.

The last explanation for spinoff formation is that some employees will be simply "pushed" to

start their own business [Amit et al. \[1995\]](#); [Buenstorf \[2009\]](#). "Push" [[Amit et al. 1995](#)] or "necessity" [[Buenstorf 2009](#)] entrepreneurs are those who enter entrepreneurship because of particular situational factors, such as being laid-off or seeing ones career options hampered by recent developments. "Pull" or "opportunity-driven" entrepreneurs, by contrast, would be those that are motivated by the sheer desire to pursue an opportunity, relatively unaffected by their contextual situation.

### M&A and Spinoffs

Employee spinoff has so far been attributed to three causes: opportunity to profit from an unprotected idea, strategic disagreements, and necessity. M&A might have a significant effect through all three mechanisms. First, employees might be more likely to appropriate an idea when management is focused on the integration processes of the new firm. With management engaged in negotiations over continuation of different projects in their portfolio, there might be little room for the development of new ideas. The projects that are discontinued may also become available opportunities for employees to pursue on their own. This setting might be propitious for employees to walk out of the firm with a potentially profitable idea without raising alarm.

Second, disagreements regarding the firm's strategy are all the more likely in major organizational events such as M&A. The new firm might dismiss potentially profitable ideas and strategies because of the "non-invented-here" bias [[Garvin 1983](#)]. Thus, the frustration and discontent caused by discontinuation of current projects and the reluctance to develop new ideas in organizations undergoing integration processes are likely to increase the likelihood of employees spinning out.

Third, it is well established that takeovers are often followed by layoffs and downsizing, as the resulting firm strives to leverage the synergies from the merger [[Chatterjee 1992](#)]. Employees who are displaced by the takeover, for example, might be pushed into starting their own venture. Given the destabilizing effect of major organizational changes [[Dahl 2011](#)], however, the consequences might be more widespread. Being bypassed to promotion -or even being relegated- in the new firm are likely to increase frustration and disappointment, forcing employees to look for alternative employment. Those who are unsettled by the change itself or by the new unfavourable working conditions might spin out of the firm.

Certain models of employee mobility [[Holtom et al. 2005](#); [Lee et al. 1996](#)] argue that the cause of turnover is often some precipitating episode. While research on employee turnover has generally been concerned by employee satisfaction as the main explanatory variable, [Holtom et al. \[2005\]](#) argue that mobility is often triggered by particularly shocking events. These events are characterised by being relevant enough to make employees re-consider their attachment to the firm, and to seriously question the match between the firm and their self-image. These triggering events are not always related to work, but they often are. The case of M&A, in fact, is considered by [Holtom et al. \[2005\]](#) to be a prime example, due to the major organizational changes involved. Entrepreneurship literature is not alien to this proposition either, and has sometimes argued that individuals are driven to start up their venture by certain triggering events [[Cromie 2000](#)].

## Employee Characteristics

Psychological perspectives of entrepreneurship have long argue that selection into entrepreneurship depends on individual traits, and has consequently focused on individual differences that explain entrepreneurial tendencies. Individuals who possess certain traits will tend to become entrepreneurs, while those who do not possess them will not. In an organizational context, the question then becomes, which groups of employees are most likely to possess those characteristics? This question is a complex one, since what these characteristics are -and how they should be measured- remains a major contention point [Cromie 2000]. No individual trait claimed to determine entrepreneurship has proven robust across samples and showed significant exploratory power.

Perhaps more importantly, the view that certain enduring individual characteristics determine the decision to become an entrepreneur rules out contextual causes. Individuals who possess certain traits, according to this view, will tend to become entrepreneurs, while others who do not have them will not do so. This leaves little room for organizational context to affect an individual's likelihood of entering entrepreneurship. In this view, sudden shocks to organizational career prospects or working reality will have limited influence on individuals' decision to become entrepreneurs.

Another stream of research, based on Austrian economics, argues that the *discovery* of opportunities is a critical element of entrepreneurship. Although traits are important, the opportunity discovery itself is generally related to individuals' knowledge stock [Eckhardt and Shane 2003; Shane 2000]. In this view, opportunities are fundamentally surprising and they stuck people when they were not looking for them. There are no particular traits that will make individuals more likely to spot *all* entrepreneurial opportunities [Shane 2000]. Even when faced with the same event or invention, individuals perceive markedly different opportunities as a function of what they already know. This implies that individuals who differ in their knowledge stock and access to either technical or market related information will not be equally likely to spot an entrepreneurial opportunity[Shane 2000]. Each person's idiosyncratic knowledge, whether obtained through education, work experience, or elsewhere, determines their ability to identify potential entrepreneurial opportunities.

Following this line of argument, we would expect that individuals with higher educational and on-the-job experience will be in a better position to discover potentially profitable entrepreneurial opportunities -of the type described by [Anton and Yao 1995]. Employees who have been close to these developments might see the potential of technologies or markets and spot venture opportunities. Thus, individuals with higher levels of technical and strategic knowledge are more likely to spot entrepreneurial opportunities, and they will be the most likely groups to spin off as a result of M&A. Thus, top managers and technical employees -such as engineers- are the most likely groups to possess the knowledge to discover opportunities. Their exposure to the strategic and technical information respectively, and their stock of relevant knowledge, grants them a privileged position to spot market trends, gaps, and potential innovations. Therefore, I would expect these groups to be most affected in their likelihood to spin off.



Nevertheless, it is also possible that firms undergoing M&A will focus on retaining strategic human capital. This suggests that they will not allow highly knowledgeable individuals to leave the firm, but may place a weaker incentive for other employees to stay in the organization. This would encourage, in relative terms, entrepreneurship by individuals with lower human capital. If this was the case, we should expect that younger, less educated and less tenured employees will be most affected by the M&A.

### **Firm response: anticipating employee departure**

The stance that firms do not anticipate a certain degree of employee turnover following M&A would be naive. In fact, it is an established finding by both practitioners and researchers that a number of individuals will leave the company ex post [Carriquiry 2014]. Younge et al. [2014], moreover, find that the anticipation of employee departure often puts bidders off, decreasing the likelihood of M&A when institutions are not in place to prevent employee mobility post acquisition. This effect is particularly acute for knowledge-intensive firms, since for these firms human capital represents a particularly strategic asset.

In the case of Denmark, non-compete clauses play a relatively limited role in limiting individual mobility, even in knowledge-intensive sectors (see, for example, Dahl and Pedersen [2005]). This limits the control of potential acquirers over the destination of employees post acquisition, increasing the uncertainty over both the value of the deal and its competitive outcomes. This, in line with Younge et al. [2014] argument, should reduce the likelihood of M&A occurring in the first place. We should, thus, expect that the deals that do happen are those where the impact on employee mobility will be relatively less pronounced, since anticipation of high employee mobility to competitors would prevent a number of deals.

## Data

Data for this study is obtained from the IDA (Danish Labour Market Database). The IDA contains employer-employee linked data for the whole population of employees and firms with at least one employee since 1980. This includes work related and demographic variables, such as education, income, number and ages of kids, location and job tenure.

## Variables

**Treatment** The treatment is defined by a binary variable that takes the unitary value if the plant went through a M&A during the treatment window, and zero otherwise. This serves the basis for the simple logit models and the Difference-in-Difference analysis. An individual is treated when working for a plant that undergoes a M&A during the window period, which in this case was during the calendar years of 2002/2003. Individuals were monitored from 1999 through 2006.

M&A were identified as an establishment(plant) that keeps its identity but changes ownership, much like [Smeets et al. \[2006\]](#). That means that the establishment must retain the majority of its workforce and location to keep its identity, according to the criteria used by Statistics Denmark [[Timmermans 2010](#)].

**Dependent variables** The dependent variable for the analysis of M&A on spin-off formation is a binary variable with outcome equal to 1 if the individual left a firm for a startup in the same industry as the focal firm, and 0 otherwise. The definition of industry was taken as 4-digit NACE codes.

**Independent variables** At the individual level, the usual demographic variables were controlled for. This includes years of age, gender (1 female, 0 male), number of kids (age 0-6, 7-12 and 13-18, and length of education (log, months of formal education). Job-related individual-level variables include lagged income (log, Danish Kroner), lagged years of job tenure, and position (based on ISCO classification) within the organization.

At plant level, I control for industry (4 digit NACE), size (number of employees), years of age, average length of education (log, months of formal education), location (43 labour market regions), employment growth over the last year. At firm-level, size (number of employees), years of age, and employment growth over the last year are also controlled for in the models.

**Descriptives** Plants were matched according to industry and size. The descriptive statistics can be seen in Table 1.

\*\*\*\*INSERT TABLE 1 HERE\*\*\*\*

## Results

In Table 2, we see the effect of M&A on entrepreneurship in general. The simple logit model (1), shows a negative effect of being in the treated group, meaning that employees who work for an establishment that undergoes a M&A (treated) are generally associated with a lower propensity to enter entrepreneurship. Model 2, however, reflects the *change* in the propensity to enter entrepreneurship to the the M&A. The DID estimator (Post\*Treated) shows the positive and highly significant increase in the propensity of employees to move to a new venture.

\*\*\* INSERT TABLE 2 HERE \*\*\*

In Table 3 we have the main results on the relationship between M&A and spinoffs. Again, we can see that being part of the treated group has a negative overall relation with spinning of, meaning that in general these employees are less likely to do so than the untreated employees. The DID estimator, however, shows that employees exposed to a M&A are more likely to spin out following the M&A than they were before. So, even though these employees are overall less likely to spin out, they are significantly more likely to do so than after the M&A.

\*\*\* INSERT TABLE 3 HERE \*\*\*

## Employee characteristics

In this section, we delve deeper into the nuances of who are those employees that are most affected by the M&A. To do this, I split the main regression on the effect of M&A on the probability of employees spinning off according to tenure, education and age. I compute halves and quarters of the distribution of each one of these variables according to the industry and employee position within the company. In that way, the upper quarter of the "education" variable (Table ?? are the most educated individuals in that year, in that particular industry, occupying that same position -and the same goes for "tenure" (Table 4) and "age" (Table 6).

\*\*\* INSERT TABLE 5 HERE \*\*\*

Table 5 shows the result of splitting the regression by education. We can see that the M&A has a positive and highly significant effect across the board. We cannot assert that the effect is higher in magnitude for either group, however, since the regression is split, and so they are run over two different samples. It is possible to assert, though, that the effect is significant for all groups.

\*\*\* INSERT TABLE 4 HERE \*\*\*

We can see from Table 4 that the main effect of M&A on spinoffs is driven particularly by the lower quartiles of the tenure distribution. Individuals in the upper quartile (Model (8)) are not affected at all by the M&A, while the ones at the bottom quartile (Model (7)) are significantly affected.

\*\*\* INSERT TABLE 6 HERE \*\*\*

The analysis of the age distribution shows also that the effect is prevalent for all employees, regardless of their age. M&A are significantly associated with an increase in the probability of spinning out after the event with respect to before the event.

## Discussion

The preliminary results support that M&A indeed trigger spinoff formation, in line with the predictions of this paper. One implication of this finding is that M&A have a broader effect on industrial dynamics that is often explicitly considered. By increasing the number of new ventures, M&A may trigger increased competition in the industry. This will of course matter for management of incumbent firms. But it should also matter for policy-makers, since they are more often concerned with M&A potential harm on competition. Why often this might be the case, this paper shows that M&A, on average, increase the likelihood of employees spinning out, and therefore increase competition in the industry.

The results also show that most employees are affected the takeover. Splitting the regression according to age and education quartiles revealed that the effect is significant across the board, with coefficients slightly higher for the younger and more educated individuals in the industry. Analysis of the tenure distribution also shows that those most affected belong to the lower quartile. This suggests that individuals who have been for a shorter time working for an establishment in a given industry are more likely to spin out with respect to their colleagues. This can be the result of "last-in first-out" layoff policies following M&A, or it could signal lower commitment to the firm by those employees that have been around for a shorter period. The jury is still out, therefore, on whether it is the more valuable or least valuable employee who are most affected by the M&A. The results are still preliminary, so further assessment of individual characteristics is warranted. In particular, how it affects individuals according to their position and wage should be further analysed.

Given that the characteristics of those spinning out following M&A differ from other spinoffs, I expect that this will affect the survival of their ventures. Both [Buenstorf \[2009\]](#) and [Amit et al. \[1995\]](#) argue that new ventures' performance is affected by the motivation to become entrepreneurs. [Amit et al. \[1995\]](#) argue that being a "pull" entrepreneur is associated with stronger performance than being a "push" entrepreneur. [[Dahl and Sorenson 2013](#)] also found that commitment and effort are associated with stronger entrepreneurial performance, and thus we can expect opportunity driven entrepreneurship to outperform necessity-driven entrepreneurship. The next step of this investigation, therefore, will deal with the consequences of M&A on the survival of spinoffs following M&A. If the proportion of employees spinning out as a result of M&A for necessity is indeed higher, then I expect that their ventures will have lower survival chances.

There are some relevant methodological limitations to the current study. First, I cannot measure directly the employees' motivation to spin out. In this paper, I present a series of plausible reasons to expect a positive and significant effect of M&A on the likelihood of employees spinning out. Although it is evidently relevant to know the actual mechanism behind such an effect, it is beyond the scope of this paper, which seeks to determine that such an effect indeed exists, and the characteristics of those who are most affected. This investigation would certainly be enriched by a survey of these motivations to spin off. Second, spinoffs are identified as employees leaving for a startup in the same industry. This is a limitation since I do not restrict the departing employee to be the founder or director of the new venture. I am taking steps towards the refinement of this

measure.

## Appendix

### Tables

Table 1: Descriptive Statistics

	Untreated		Treated		Total	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Startup	.0207524	.1425545	.0123488	.1104373	.018568	.1349936
Tenure	4.835.938	5.990.008	5.517.519	5.800.045	5.013.105	5.948.727
Wage	287998.3	181958	298420.8	161302.1	290707.5	176880
TMT	.0061871	.0784147	.0055741	.0744518	.0060201	.0773554
Department Manager	.0298563	.170191	.0265917	.1608873	.0289667	.167713
Middle Manager	.0027631	.0524925	.0020019	.0446983	.0025557	.050489
Profesional	.0985091	.2980021	.1134464	.3171385	.1025796	.3034093
Kids Age 0-6	.2890147	.6123864	.2791183	.6038339	.2863208	.6100856
Education	4.982.677	.2151524	4.991.808	.218662	4.985.171	.2161549
Firm Size	1.911.301	3.543.465	1.137.829	2.041.176	1.710.248	3.238.892
Plant Size	5.034.248	1.281.885	2.193.977	2.726.454	4.295.959	1.118.452
Observations	643250		225932		869182	

Table 2: Estimated Probability of Startup

	Simple Logit (1)	DID Logit (2)
Treated	-0.306*** [0.030]	-0.798*** [0.049]
Post		-0.827*** [0.042]
Post*Treated		0.930*** [0.063]
Wage (lag)	0.000 [0.000]	0.000 [0.000]
Tenure (lag)	0.046*** [0.002]	0.045*** [0.002]
Age	-0.011*** [0.001]	-0.011*** [0.001]
Education	0.092* [0.054]	0.088 [0.054]
TMT	-1.161*** [0.237]	-1.166*** [0.237]
Department Manager	-0.579*** [0.077]	-0.599*** [0.077]
Middle Manager	-0.114 [0.241]	-0.145 [0.241]
Professional	-1.081*** [0.046]	-1.081*** [0.046]
Technician	-0.637*** [0.033]	-0.639*** [0.033]
Clerk	-0.547*** [0.039]	-0.537*** [0.039]
Service/Sales	0.749*** [0.035]	0.751*** [0.035]
Blue Collar	-0.339*** [0.032]	-0.337*** [0.032]
Marital Status	-0.044* [0.022]	-0.042* [0.022]
Sex	-0.127*** [0.023]	-0.135*** [0.023]
Plant Size	0.033 [0.021]	0.029 [0.021]
Firm Size	0.282*** [0.009]	0.280*** [0.009]
Firm Growth	-0.001 [0.001]	-0.000 [0.001]
Constant	-4.796*** [0.313]	-4.692*** [0.313]
Log-likelihood	-45887	-45774
Observations	610213	610213

Industry, geographic and year dummies included but not reported.

Significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 3: Estimated Probability of Spinoff

	Simple Logit (3)	DID Logit (4)
Treated	-0.402*** [0.040]	-0.529*** [0.054]
Post		-1.924*** [0.072]
Post*Treated		0.291*** [0.080]
Wage (lag)	0.000* [0.000]	0.000* [0.000]
Tenure (lag)	0.044*** [0.002]	0.044*** [0.002]
Age	-0.010*** [0.001]	-0.010*** [0.001]
Education	-0.191*** [0.064]	-0.192*** [0.064]
TMT	-1.422*** [0.311]	-1.423*** [0.311]
Department Manager	-0.709*** [0.096]	-0.717*** [0.096]
Middle Manager	0.207 [0.256]	0.199 [0.256]
Professional	-1.443*** [0.061]	-1.442*** [0.061]
Technician	-0.905*** [0.042]	-0.906*** [0.042]
Clerk	-0.784*** [0.049]	-0.780*** [0.049]
Service/Sales	0.954*** [0.039]	0.955*** [0.039]
Blue Collar	-0.690*** [0.040]	-0.690*** [0.040]
Marital Status	-0.028 [0.027]	-0.028 [0.027]
Sex	-0.094*** [0.028]	-0.096*** [0.028]
Plant Size	0.041 [0.026]	0.040 [0.026]
Firm Size	0.311*** [0.011]	0.310*** [0.011]
Firm Growth	-0.004*** [0.001]	-0.004*** [0.001]
Constant	-3.745*** [0.379]	-3.714*** [0.379]
Log-likelihood	-31139	-31133
Observations	606511	606511

Industry, geographic and year dummies included but not reported.

Significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$



Table 4: Estimated Probability of Spinoff by Tenure

	Lower Half (5)	Upper Half (6)	Lower Quartile(7)	Upper Quartile(8)
Post	-1.304*** [0.134]	-0.072 [0.108]	-1.801*** [0.200]	1.011*** [0.165]
Treated	-1.655*** [0.249]	-1.266*** [0.340]	-1.367*** [0.299]	-1.319* [0.715]
Post*Treated	1.927*** [0.259]	0.806** [0.346]	2.064*** [0.313]	0.679 [0.721]
Wage (lag)	-0.000*** [0.000]	0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]
Tenure (lag)	0.051*** [0.008]	0.068*** [0.003]	0.041*** [0.009]	0.071*** [0.005]
Age	0.001 [0.003]	-0.030*** [0.002]	0.003 [0.004]	-0.043*** [0.003]
Education	-0.205 [0.138]	-0.232** [0.093]	-0.245 [0.186]	-0.151 [0.120]
Marital Status	-0.012 [0.058]	-0.047 [0.038]	0.067 [0.080]	0.005 [0.050]
TMT	-0.592 [0.464]	-1.779*** [0.517]	-1.407* [0.726]	-1.997*** [0.734]
Department Manager	-0.062 [0.155]	-1.105*** [0.167]	-0.446** [0.204]	-1.217*** [0.222]
Middle Manager	0.666* [0.348]	0.483 [0.420]	0.538 [0.399]	-0.413 [1.013]
Professional	-0.665*** [0.110]	-2.378*** [0.114]	-0.950*** [0.145]	-3.126*** [0.175]
Technician	-0.513*** [0.087]	-1.368*** [0.063]	-0.876*** [0.115]	-1.611*** [0.081]
Clerk	-0.193** [0.093]	-1.136*** [0.073]	-0.347*** [0.128]	-1.497*** [0.102]
Service/Sales	0.184* [0.105]	1.188*** [0.050]	0.033 [0.148]	1.063*** [0.066]
Blue Collar	-0.173** [0.082]	-1.108*** [0.065]	-0.606*** [0.109]	-1.809*** [0.095]
Sex	-0.139** [0.058]	-0.112*** [0.041]	-0.303*** [0.082]	-0.153*** [0.055]
Plant Size	-0.076** [0.036]	0.091** [0.043]	-0.040 [0.050]	0.124** [0.059]
Firm Size	0.132*** [0.020]	0.372*** [0.018]	0.130*** [0.028]	0.536*** [0.029]
Firm Growth	-0.004* [0.002]	-0.004** [0.002]	-0.003 [0.002]	-0.004 [0.003]
Constant	-3.060*** [0.749]	-4.953*** [0.569]	-2.881*** [1.012]	-6.516*** [0.764]
Log-likelihood	-8771	-13327	-4554	-6953
Observations	233416	297524	112450	153880

Industry, geographic and year dummies included but not reported.

Significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 5: Estimated Probability of Spinoff by Education

	Lower Half (9)	Upper Half (10)	Lower Quartile (11)	Upper Quartile (12)
Post	-0.821*** [0.105]	-0.428*** [0.131]	-1.382*** [0.163]	-0.071 [0.181]
Treated	-1.364*** [0.242]	-1.474*** [0.361]	-1.662*** [0.386]	-2.182*** [0.717]
Post*Treated	1.117*** [0.249]	1.281*** [0.369]	1.419*** [0.395]	2.292*** [0.725]
Wage (lag)	0.000*** [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
Tenure (lag)	0.070*** [0.003]	0.067*** [0.004]	0.065*** [0.004]	0.088*** [0.006]
Age	-0.019*** [0.002]	-0.019*** [0.003]	-0.016*** [0.003]	-0.016*** [0.004]
Education	0.054 [0.117]	-2.169*** [0.380]	0.245 [0.200]	-4.135*** [0.615]
Marital Status	-0.015 [0.041]	-0.048 [0.049]	0.005 [0.057]	-0.059 [0.077]
TMT	-1.577*** [0.468]	-1.315** [0.522]	-1.157* [0.601]	
Department Manager	-0.501*** [0.127]	-1.308*** [0.243]	-0.301* [0.160]	-1.132*** [0.349]
Middle Manager	0.498* [0.302]	0.661 [0.591]	0.670** [0.320]	0.434 [0.740]
Professional	-2.011*** [0.105]	-1.234*** [0.135]	-1.998*** [0.153]	-0.843* [0.458]
Technician	-1.173*** [0.066]	-1.092*** [0.085]	-0.974*** [0.101]	-0.722*** [0.129]
Clerk	-0.881*** [0.069]	-1.017*** [0.137]	-1.178*** [0.116]	-1.116*** [0.144]
Service/Sales	0.993*** [0.059]	1.180*** [0.062]	0.850*** [0.094]	0.834*** [0.097]
Blue Collar	-0.661*** [0.064]	-0.921*** [0.077]	-0.596*** [0.084]	-1.423*** [0.182]
Sex	-0.099** [0.041]	-0.066 [0.053]	-0.167*** [0.059]	-0.006 [0.087]
Plant Size	-0.047 [0.032]	0.095* [0.052]	-0.082* [0.044]	0.102 [0.085]
Firm Size	0.298*** [0.017]	0.258*** [0.019]	0.338*** [0.025]	0.373*** [0.033]
Firm Growth	-0.003** [0.001]	-0.004 [0.003]	-0.002 [0.001]	0.002 [0.003]
Constant	-4.965*** [0.630]	5.261*** [1.966]	-5.583*** [1.013]	14.706*** [3.195]
Log-likelihood	-14158	-9039	-7188	-3499
Observations	313128	217812	169398	74318

Industry, geographic and year dummies included but not reported.

Significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 6: Estimated Probability of Spinoff by Age

	Lower Half (13)	Upper Half (14)	Lower Quartile(16)	Upper Quartile(16)
Post	-1.434*** [0.137]	-0.093 [0.108]	-2.189*** [0.266]	0.089 [0.155]
Treated	-1.798*** [0.294]	-0.950*** [0.276]	-2.467*** [0.506]	-0.794** [0.392]
Post*Treated	1.403*** [0.303]	0.945*** [0.283]	2.420*** [0.516]	0.969** [0.402]
Wage (lag)	0.000*** [0.000]	-0.000** [0.000]	0.000 [0.000]	-0.000 [0.000]
Tenure (lag)	0.063*** [0.005]	0.071*** [0.003]	0.033** [0.016]	0.071*** [0.004]
Age	0.015*** [0.005]	-0.037*** [0.003]	0.029** [0.013]	-0.048*** [0.007]
Education	-0.552*** [0.134]	-0.090 [0.094]	-0.845*** [0.252]	0.054 [0.124]
Marital Status	-0.124** [0.050]	-0.050 [0.041]	-0.087 [0.099]	-0.060 [0.061]
TMT	-3.515*** [0.763]	-0.416 [0.399]	-2.368** [1.035]	-0.828 [0.733]
Department Manager	-1.021*** [0.146]	-0.751*** [0.174]	-0.193 [0.214]	-0.945*** [0.296]
Middle Manager	0.578** [0.292]	-0.211 [0.715]	0.865** [0.363]	
Professional	-1.617*** [0.102]	-1.912*** [0.110]	-0.849*** [0.167]	-1.926*** [0.168]
Technician	-1.333*** [0.073]	-0.977*** [0.067]	-0.665*** [0.127]	-0.723*** [0.099]
Clerk	-0.877*** [0.080]	-0.864*** [0.078]	-0.148 [0.125]	-0.610*** [0.115]
Service/Sales	0.763*** [0.072]	1.305*** [0.058]	-0.076 [0.146]	1.495*** [0.092]
Blue Collar	-0.997*** [0.073]	-0.615*** [0.065]	-0.436*** [0.122]	-0.355*** [0.099]
Sex	-0.051 [0.048]	-0.117*** [0.044]	-0.116 [0.080]	-0.103 [0.066]
Plant Size	0.015 [0.045]	-0.015 [0.035]	-0.045 [0.060]	-0.040 [0.044]
Firm Size	0.227*** [0.017]	0.312*** [0.019]	0.124*** [0.026]	0.282*** [0.028]
Firm Growth	-0.004** [0.001]	-0.003 [0.003]	-0.003* [0.001]	-0.004 [0.005]
Constant	-2.775*** [0.746]	-4.095*** [0.564]	-0.656 [1.289]	-4.108*** [0.813]
Log-likelihood	-10849	-12163	-4251	-5654
Observations	245859	285081	111610	141827

Industry, geographic and year dummies included but not reported.

Significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## References

- Agarwal, R., Campbell, B. A., Franco, A., and Ganco, M. (2011). What do i take with me: the impact of transfer and replication of resources on parent and spin-out firm performance. *US Census Bureau Center for Economic Studies Paper No. CES-WP-11-06*. [2](#)
- Agarwal, R., Echambadi, R., Franco, A. M., and Sarkar, M. (2004). Knowledge transfer through inheritance: Spin-out generation, development, and survival. *Academy of Management Journal*, 47(4):501–522. [2, 4](#)
- Amit, R., Muller, E., and Cockburn, I. (1995). Opportunity costs and entrepreneurial activity. *Journal of Business Venturing*, 10(2):95–106. [6, 11](#)
- Anton, J. J. and Yao, D. A. (1995). Start-ups, spin-offs, and internal projects. *Journal of Law, Economics, & Organization*, 52(2):362–378. [3, 5, 7](#)
- Brittain, J. W. and Freeman, J. (1986). Entrepreneurship in the semiconductor industry. In *46th Annual Meeting of the Academy of Management, New Orleans*. [3, 5](#)
- Buenstorf, G. (2007a). Creation and pursuit of entrepreneurial opportunities: An evolutionary economics perspective. *Small Business Economics*, 28(4):323–337. [2](#)
- Buenstorf, G. (2007b). Evolution on the shoulders of giants: entrepreneurship and firm survival in the german laser industry. *Review of Industrial Organization*, 30(3):179–202. [3, 4, 5](#)
- Buenstorf, G. (2009). Opportunity spin-offs and necessity spin-offs. *International Journal of Entrepreneurial Venturing*, 1(1):22–40. [6, 11](#)
- Buenstorf, G. and Klepper, S. (2009). Heritage and agglomeration: The akron tyre cluster revisited\*. *The Economic Journal*, 119(537):705–733. [2, 4](#)
- Burton, M. D., Sørensen, J. B., and Beckman, C. M. (2002). *7. Coming from good stock: Career histories and new venture formation*, volume 19 of *Social Structure and Organizations Revisited (Research in the Sociology of Organizations)*. Emerald Group Publishing Limited. [2](#)
- Campbell, B. A., Ganco, M., Franco, A. M., and Agarwal, R. (2012). Who leaves, where to, and why worry? employee mobility, entrepreneurship and effects on source firm performance. *Strategic Management Journal*, 33(1):65–87. [2, 3, 4](#)
- Carriquiry, J. M. (2014). Impact of plant takeover on employee turnover: Cutting fat or losing talent? *Available at SSRN 2519927*. [3, 4, 8](#)
- Cassiman, B. and Ueda, M. (2006). Optimal project rejection and new firm start-ups. *Management Science*, 52(2):262–275. [5](#)
- Chatterjee, S. (1992). Sources of value in takeovers: Synergy or restructuring—implications for target and bidder firms. *Strategic management journal*, 13(4):267–286. [6](#)

- Cromie, S. (2000). Assessing entrepreneurial inclinations: Some approaches and empirical evidence. *European Journal of Work and Organizational Psychology*, 9(1):7–30. [6](#), [7](#)
- Dahl, M. S. (2011). Organizational change and employee stress. *Management Science*, 53(2):240–256. [6](#)
- Dahl, M. S. and Pedersen, C. Ø. (2005). Social networks in the r&d process: the case of the wireless communication industry around aalborg, denmark. *Journal of Engineering and Technology Management*, 22(1):75–92. [8](#)
- Dahl, M. S. and Reichstein, T. (2007). Are you experienced? prior experience and the survival of new organizations. *Industry and Innovation*, 14(5):497–511. [2](#), [4](#)
- Dahl, M. S. and Sorenson, O. (2013). The who, why, and how of spinoffs. *Industrial and Corporate Change*, page dtt032. [2](#), [11](#)
- Delmar, F. and Shane, S. (2006). Does experience matter? the effect of founding team experience on the survival and sales of newly founded ventures. *Strategic Organization*, 4(3):215–247. [4](#)
- Eckhardt, J. T. and Shane, S. A. (2003). Opportunities and entrepreneurship. *Journal of management*, 29(3):333–349. [7](#)
- Eriksson, T. and Moritz Kuhn, J. (2006). Firm spin-offs in denmark 1981–2000 patterns of entry and exit. *International Journal of Industrial Organization*, 24(5):1021–1040. [2](#), [4](#)
- Franco, A. M. and Filson, D. (2006). Spin-outs: knowledge diffusion through employee mobility. *The RAND Journal of Economics*, 37(4):841–860. [2](#)
- Garvin, D. A. (1983). Spin-offs and the new firm formation process. *California Management Review*, 25(2). [3](#), [5](#), [6](#)
- Gjerløv-Juel, P. and Dahl, M. (2012). The effect of top-employee migration and spin-offs on incumbent firms. *Available at SSRN 2031395*. [2](#), [4](#)
- Holtom, B. C., Mitchell, T. R., Lee, T. W., and Inderrieden, E. J. (2005). Shocks as causes of turnover: What they are and how organizations can manage them. *Human Resource Management*, 44(3):337–352. [3](#), [6](#)
- Klepper, S. (2001). Employee startups in high-tech industries. *Industrial and Corporate Change*, 10(3):639–674. [2](#), [4](#)
- Klepper, S. (2009). Spinoffs: A review and synthesis. *European Management Review*, 6(3):159–171. [3](#), [4](#)
- Klepper, S. and Thompson, P. (2005). Spinoff entry in high-tech industries: motives and consequences. *Economic Perspectives on Innovation*, Cambridge University Press, 6:187–218. [5](#)
- Klepper, S. and Thompson, P. (2010). Disagreements and intra-industry spinoffs. *International Journal of Industrial Organization*, 28(5):526–538. [4](#), [5](#)

- Lee, T., Mitchell, T., Wise, L., and Fireman, S. (1996). An unfolding model of voluntary employee turnover. *Academy of Management Journal*, 39(1):5–36. [3](#), [6](#)
- McKendrick, D. G., Wade, J. B., and Jaffee, J. (2009). A good riddance? spin-offs and the technological performance of parent firms. *Organization Science*, 20(6):979–992. [2](#), [4](#)
- Moore, G. and Davis, K. (2004). Learning the silicon valley way. *Building high-tech clusters: Silicon Valley and beyond*, pages 7–39. [2](#), [4](#)
- Phillips, D. J. (2002). A genealogical approach to organizational life chances: The parent-progeny transfer among silicon valley law firms, 1946–1996. *Administrative Science Quarterly*, 47(3):474–506. [2](#), [4](#)
- Shane, S. (2000). Prior knowledge and the discovery of entrepreneurial opportunities. *Organization science*, 11(4):448–469. [5](#), [7](#)
- Smeets, V., Ierulli, K., and Gibbs, M. (2006). Mergers of equals and unequals. Technical report, IZA Discussion Papers. [9](#)
- Timmermans, B. (2010). The danish integrated database for labor market research: Towards demystification for the english speaking audience. *DRUID Working Papers*. [9](#)
- Walsh, J. P. (1988). Top management turnover following mergers and acquisitions. *Strategic Management Journal*, 9(2):173–183. [3](#), [4](#)
- Wezel, F. C., Cattani, G., and Pennings, J. M. (2006). Competitive implications of interfirm mobility. *Organization Science*, 17(6):691–709. [2](#), [4](#)
- Younge, K. A., Tong, T. W., and Fleming, L. (2014). How anticipated employee mobility affects acquisition likelihood: Evidence from a natural experiment. *Strategic Management Journal*. [8](#)