

Furlan, Benjamin

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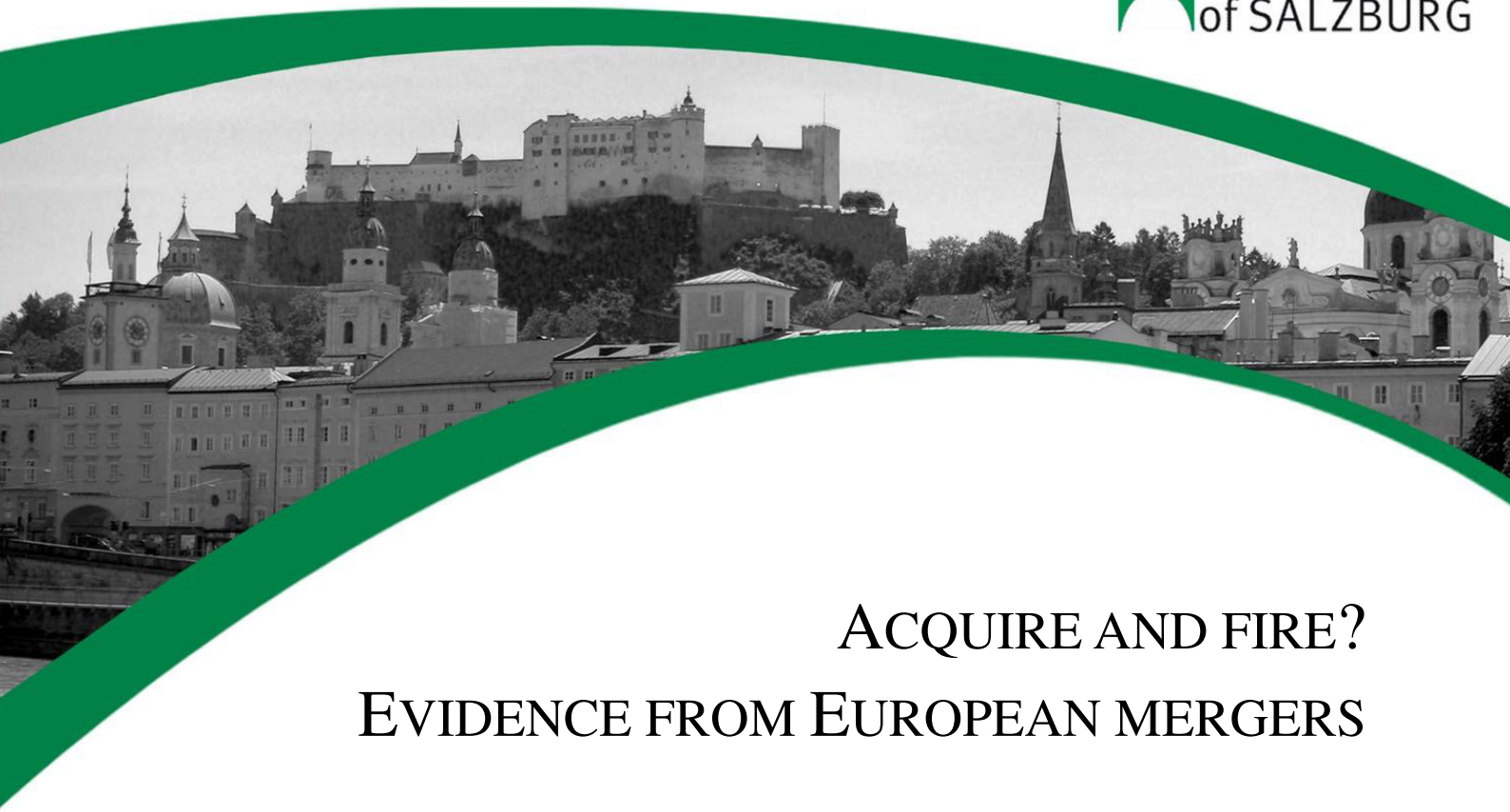
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ACQUIRE AND FIRE?
EVIDENCE FROM EUROPEAN MERGERS

BENJAMIN FURLAN

WORKING PAPER No. 2015-03

Acquire and fire? Evidence from European mergers

Benjamin Furlan*

December 6, 2015

Abstract

This paper provides a systematic analysis on the employment effects after merger and acquisition activities for a sample of European production firms. Rather than taking the perspective of the acquired firm, which has been extensively addressed in previous research, this paper focuses on the acquiring firm. At hand with a data set covering roughly 160.000 firms between 2003-2010 we apply propensity score matching methods to evaluate post-merger effects. Our results suggest that acquiring companies show a higher employment growth rate than their counterparts. This result holds by splitting our data in several sub samples (small and medium-sized firms, national takeovers).

JEL Codes: C, G, L

Keywords: Merger and acquisition evaluation, propensity score matching, employment effects.

*Department of Economics and Social Sciences, University of Salzburg, Residenzplatz 9, 5010 Salzburg; Tel.: +43 (0) 662 8044 3723. benjamin.furlan@sbg.ac.at

1 Introduction

This paper provides a systematic analysis on the employment effects after merger and acquisition (M&A) activities for a sample of European production firms between 2003 and 2010. Rather than taking the perspective of the acquired firm, which has been extensively addressed in previous research (see, e.g., Oberhofer, 2013) this paper focuses on the acquiring firm. This is not only of interest for the regarding firms but also for policy makers, as, regarding to foreign trade theory, such activities also affect domestic jobs. Merger effects on acquiring firms are not obvious *ex ante* for the following reasons: on the one hand, acquiring firms might exploit short run economies of scale by reducing overall employment (see, e.g., Gugler and Siebert, 2007); on the other hand, they want to strengthen their position in the acquired market, and increase overall employment. We construct a data set consisting of both the Bureau van Dijk's ZEPHYR (comprehensive M&A data) and Amadeus (balance sheet data) company information. Our sample covers roughly 160,000 firms and around 1,200 successful mergers. In order to evaluate post-merger effects we use propensity score matching (PSM) techniques. This allows us to construct a quasi-experimental setting comparing treated (acquiring firms) versus non-treated firms (non-acquiring firms). In a first step, we run a probability model in order to estimate the determinants for receiving the treatment (acquiring another company). Given these propensity scores, we compare in a second step the outcomes for the firms that have been acquiring or not, respectively. The resulting average treatment effect measures the effect of the treated firm compared to a (hypothetical) situation in which this firm would not have received the treatment. In addition, this approach also allows us to overcome the missing data problem and a potential self-selection into treatment. Our results suggest that companies that have been acquiring other firms show a higher employment growth rate (around 2%) than their counterparts with the same probability of receiving the treatment. For robustness checks, we divide our sample into different sub-groups according to firm size. Also in this setting, the results do not vary much but

suggest that small and medium sized firms (up to 250 employees) benefit more than large firms (>250 employees).

2 Related literature

To gain insights on the effects of M&A, several strands of literature are relevant for this topic. Lubatkin (1983) started the discussion as he stated that there is “[...] no consensus for explaining the apparent popularity of mergers” (Lubatkin, Michael (1983), Mergers and the performance of the acquiring firm, *Academy of Management Review* 8(2), p. 218). First, the main motives for engaging in M&A activities are, among others, strengthening of market power and efficiency gains (see, e.g., Kamien and Zang, 1990). Jovanovic and Rousseau (2008) show that mergers reallocate assets towards the more efficient firm. These efficiency gains may also stem from technology transfers within the new firm structure, as shown by Röller, Stennek and Verboven (2001). Morck, Shleifer and Vishny (1988) show, that engaging in M&A activities may also arise out of non-value maximizing objectives, such as empire building or employee welfare.

A second strand of literature on mergers and acquisitions focuses on firm growth and firm size. These key figures are typically measured in numbers of employees. The vast majority of contributions in this field focuses on the effects on the acquired firm. The empirical findings, however, are inconclusive with regard to the effect on the employment stock. Conyon et al. (2001, 2002) provide an empirical analysis for takeovers of firms located in the United Kingdom between 1967 and 1996. Their results suggest, that merger activities are associated with a negative impact on labor demand. Furthermore, their results suggest that hostile takeovers lead to a substantially drop in the number of employees. Girma and Görg (2004) find similar results after hostile takeovers regarding the UK electronics and food sector for the years 1980-1993. The analysis of Lehto and Böckerman (2008) focuses on firms located in Finland, indicating negative employment effects for the manufacturing sector. Similar results for Swedish manufacturing firms

are found by Siegel and Simons (2010). A more systematic analysis is provided by Gugler and Yurtoglu (2004) as their data base covers Europe and the USA for the years 1987-1998. They do not find any statistical significant effects of acquisition activities on employment for the US case but they find negative effects for labour demand in Europe (-10% compared to the pre-merger case). In contrast to the studies mentioned above, McGuckin and Nguyen (2001) state (for US firms between 1977 to 1987) that takeovers do not necessary lead to cuts in employment. Overall, they find that ownership changes lead to an increase in employment (and wages). In a similar vein, Bandick and Görg find positive employment effects for Swedish production firms (covering the years 1993-2002). More evidence for European firms is provided by Oberhofer (2013), who finds (on average) positive employment effects for M&A targets, controlling for different types of acquisitions. In contrast to the studies mentioned above, there is little empirical evidence on the effects of merger activities on the employment stock of the acquiring company. Bertrand and Betschinger (2012) investigate the performance of Russian firms, suggesting that acquirors tend to reduce productivity compared to non-acquiring firms. Stiebale (2013) shows that firms engaging in cross-border acquisitions have considerably higher R&D expenditures than non-acquiring firms. Further empirical evidence is provided by Stiebale and Trax (2011) that analyze the acquiring firms' domestic performance after cross-border M&As. On hand with data from 2000-2007 for UK and French firms they observe a improvement in domestic productivity, sales and investment. These positive effects are not accompanied with a downsizing of the employment stock. To the best of our knowledge, there is no systematic evidence on employment effects for the acquiring firms. This paper will therefore try to close this gap by running an empirical analysis for European firms.

3 Empirical strategy

The central interest of this paper is to identify the effects of M&As on employment in overtaking firms, taking into account their observable firm specific characteristics. The empirical challenge here is to tackle this type of endogeneity in acquisition probabilities. In order to overcome this endogeneity issue and to identify the causal effect of M&A activities on employment growth, we rely our estimations on propensity score matching techniques. The idea behind PSM is to compare a situation, in which a firm acquires another company with a (hypothetical) situation where exactly this firm did not acquire another firm. As this situation is not observable, we rely on PSM that allows us to construct a quasi-experimental setting where the hypothetical counter-factual outcome can be observed. Therefore, we use propensity score matching techniques for the following two reasons: (i) our data sets provides us with enough observations to construct a reliable control group, and (ii) we can calculate a selection equation as we have sufficient observable firm specific information to control for a potential self selection into treatment. In our case the treatment is a situation in which a firm (i) increases its existing shares of another firm to at least 50% or (ii) buys at least 50% of a firm. In a next step, we can analyze the effects of the acquiror's employment growth rate. In detail, we calculate the mean growth rate of the following two years after a successful merger.

We run the PSM as follows: first, we calculate a Probit model given the observable firm specific characteristics. To run this estimation, we rely on the most common variables used in M&A evaluation. In detail, we take the same specification as suggested by Oberhofer (2013). The resulting propensity score gives us predictions for the likelihood of a firm acquiring another firm. Second, the change in employment of the acquiring firm is compared to those firms that have the same (most similar) propensity score (based on the Probit model) for investing in a firm but have not done so (i.e. control group). The effect we are interested in is the average treatment effect on the treated (ATT), in our case the mean employment growth rate following the two years after a successful M&A.

Firstly we specify a binary choice model in order to predict a firm's probability to become an acquirer, based on observable firm characteristics (see, e.g., Heckman, Ichimura and Todd 1997)

$$A_{it}^* = \Phi(\mathbf{x}'_{i,t-1}\beta) \quad (1)$$

$$A_{it} = \begin{cases} 1 & \text{if } A_{it}^* > 0 \\ 0 & \text{otherwise} \end{cases} \quad (2)$$

where i indicates the i^{th} firm, t is a time index. A_{it}^* is the variable that captures a firm's probability to become an acquirer. Furthermore, the observed outcome is represented by A and takes the value of 1 if A_{it}^* exceeds the zero threshold, and zero otherwise. \mathbf{x} is a vector of variables that includes our explanatory variables measured in the period prior to the merger, with β being the corresponding parameter vector. Φ denotes the cdf of a normal distribution, as we estimate a Probit model. The explanatory variables we use are discussed below. As stated above, the interest of this paper is to measure the impact of M&A activities on the mergers' employment growth rate. We therefore denote $\tilde{w}_{i,\frac{1}{2}(t+1+t+2)}^T$ as the mean employment growth rate of the two years following a merger or acquisition. The corresponding situation in which a firm has not acquired another company is therefore given by $\tilde{w}_{i,\frac{1}{2}(t+1+t+2)}^C$. Comparing these two situations results in the average treatment effect τ_{ATT} (see, e.g., Wooldridge 2010)

$$\tau_{ATT} = E(\tilde{w}_{i,\frac{1}{2}(t+1+t+2)}^T - \tilde{w}_{i,\frac{1}{2}(t+1+t+2)}^C | A_{it} = 1). \quad (3)$$

As we are only able to observe one status (either a firm becomes an acquirer or not), we need an appropriate control group of non-acquiring firms for this counter-factual. In order to do so, we estimate Eq. (1) to attain the probability of becoming an acquirer for each firm in t (i.e., the propensity score). To proxy $\tilde{w}_{i,\frac{1}{2}(t+1+t+2)}^C$ we use the employment growth rate of the non-acquiring firms with the same (or most similar) propensity score

to a firm in the treatment group. In our baseline treatment, we use the average of the three nearest neighbors as the appropriate comparison firm. In our robustness analysis, we also conduct nearest neighbor and kernel matching techniques, respectively. In order to correctly estimate the average treatment effect we need the following assumption to hold: we need the common support assumption to hold, stating that all acquiring firms have a counterpart among the non-treated firms. Rosenbaum and Rubin (1983) propose a test to verify this assumption. In the results's section, we report some balancing property tests which commonly point to a considerable bias reduction indicating that the difference between both firm types is reduced substantially after matching.

4 Data and descriptives

For the empirical analysis we use a data set consisting of two separate sources. We take the Bureau van Dijk's Zephyr database, providing accurate information on M&A activities. In detail, we take advantage of the following variables: a unique identification number (BvDID) for both the target and the acquiring firm, deal status, deal date, amount of shares, the major sector and the home country of each firm. AMADEUS, the second database we use, is also provided by the Bureau van Dijk. The AMADEUS data set provides detailed firm specific information (balance sheet data). Both data sets cover the years from 2003 - 2010 (data for the first six months of 2010 are reported). The empirical strategy requires the following variables: firm size (measured as the number of employees), productivity (value added per worker), firm age, return on assets and capital intensity (total assets per employee). Each firm that appears in both sources has the same BvDID, which allows us to merge the information of both sources into one data set. Before using the data for the empirical analysis, the data has to be prepared as follows. As we are interested in the employment effect of the buying firm and not on the company network as a whole, we only allow consolidated accounts (both acquired and non-acquired). In a next step, we only consider completed deals (no rumours and announced deals, respectively).

To gain useful results, we have to make further restrictions on the data at hand: (i) we exclude multiple takeovers over years (multiple takeovers within a year are cumulated and treated like a single takeover) (ii) we only include firms that have all relevant information over the whole time period (iii) we exclude firms with extreme outliers and companies that have implausible values.¹ For our baseline treatment, this leaves us with a total sum of 1,012 treated units and a more than sufficient number of control firms (161,894)

Figure 1 and Table 1 show the distribution of acquiring firms over Europe between 2003 - 2010. The majority of these firms are located in France (242), Great Britain (205) and Spain (106), followed by Belgium, Germany and Italy.

Table 2 covers some first descriptive statistics for the variables used in our analysis. For our baseline treatment, we define a successful merger as a final share after M&A activities of at least 50%. This leaves us with 1,012 acquisitions. These companies have between 3 and almost 27,000 employees with a mean employment stock of 361. The relevant firms are about 24 years old and are therefore on average bigger and slightly older than the control units. Moreover, the acquiring firms are more productive (value added per employee) and have a slightly better return on assets and a almost identical capital intensity. Small and medium-sized firms² are even more productive, capital intense and have a better return on assets whilst being slightly younger. Furlan, Oberhofer and Winner (2015) amongst others show, that one loses information by focusing on a single threshold (in our baseline treatment: acquisition of at least 50% of all shares). We therefore add two more sub-samples, where we define a successful merger by acquiring at least 25% and 75%, respectively. Both these sub-groups are bigger than the control firms, more productive, older and are more capital intense. What can be seen for all samples of acquiring firms is, that, on average, they have a significant higher employment growth rate (between 0.016 and 0.026) compared to the ones of the control firms (0.07).

¹we exclude firms with negative employment stock, firms with only one employee or more than 100,000 employees or with implausible growth rate (over 5000% per year)

²We use the definition for small and medium-sized enterprises as defined in EU Law (Official Journal of the European Union, C118/5)

Table 1: List of treatment countries

Country	Frequency	Percent
Austria	11	1.09
Bosnia and Herzegovina	2	0.20
Belgium	54	5.34
Switzerland	1	0.10
Czech Republic	37	3.66
Germany	75	7.41
Spain	106	10.47
Finland	68	6.72
France	242	23.91
Great Britain	205	20.26
Hungary	2	0.20
Ireland	4	0.40
Italy	79	7.81
Netherlands	7	0.69
Norway	25	2.47
Poland	14	1.38
Portugal	13	1.28
Romania	15	1.48
Serbia	10	0.99
Sweden	29	2.87
Slovenia	7	0.69
Slovakia	6	0.59
Total	1,012	100.00

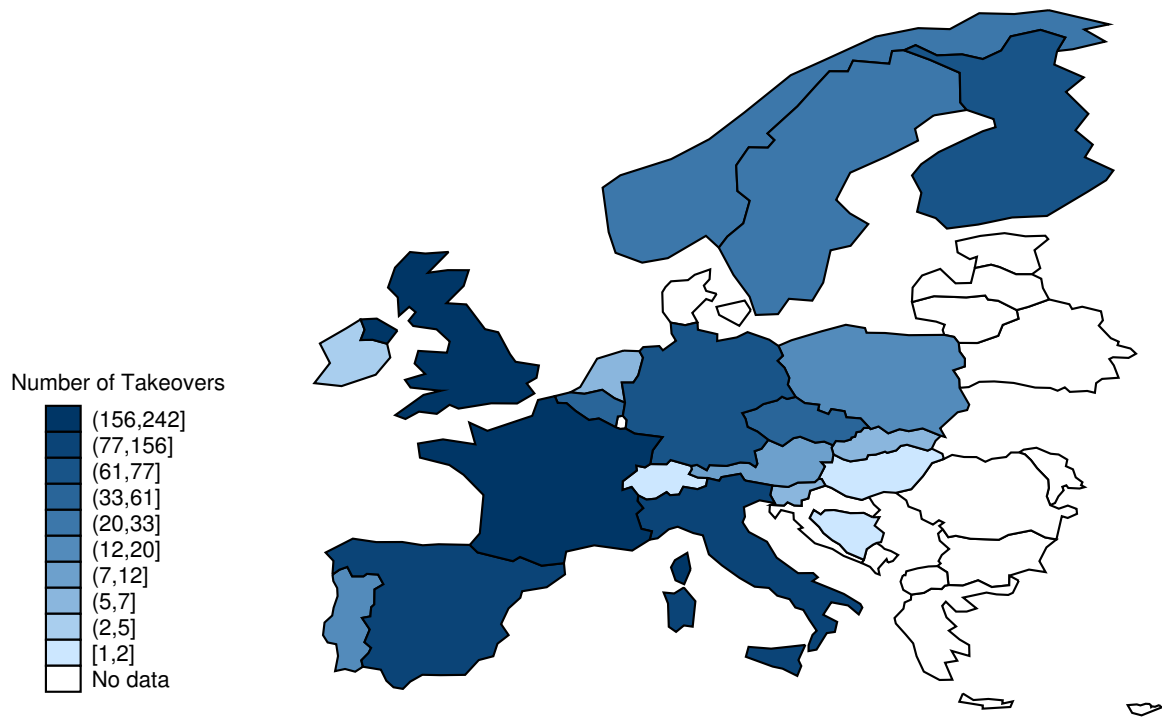


Figure 1: Data coverage

Table 2: Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
M&A acquirors (Baseline treatment)					
Employment growth	1,012	0.016	0.156	-1.354	2.037
Employees (log)	1,012	4.833	1.288	1.099	10.203
Employees	1,012	361.702	1,244.714	3	26,981
Productivity	1,012	4.156	0.715	1.652	9.199
Firm age	1,012	23.900	19.547	2	104
Return on assets	1,012	-2.454	1.004	-6.259	-0.287
Capital intensity	1,012	5.032	0.939	1.767	11.280
Final stake	1,012	94.725	12.847	50	100
M&A acquirors (Small- and medium-sized firms)					
Employment growth	750	0.026	0.162	-1.354	2.037
Employees (log)	750	4.253	0.834	1.099	5.521
Employees	750	93.484	62.858	3	250
Productivity	750	4.206	0.687	1.652	9.199
Firm age	750	22.731	17.449	2	104
Return on assets	750	-2.380	1.016	-6.259	-0.287
Capital intensity	750	5.059	0.925	2.953	11.280
Final stake	750	94.435	12.020	50	100
M&A acquirors (25% takeovers)					
Employment growth	1,085	0.016	0.159	-1.354	2.037
Employees (log)	1,085	4.885	1.364	1.099	11.106
Employees	1,085	486.794	2486.640	3	66,567
Productivity	1,085	4.168	0.729	1.652	9.199
Firm age	1,085	23.904	19.721	2	104
Return on assets	1,085	-2.478	1.008	-6.259	-0.287
Capital intensity	1,085	5.070	0.969	1.767	11.280
Final stake	1,085	90.801	19.274	25	100
M&A acquirors (75% takeovers)					
Employment growth	905	0.019	0.150	-1.333	2.037
Employees (log)	905	4.812	1.225	1.099	10.203
Employees	905	323.814	1,181.121	3	26,981
Productivity	905	4.164	0.666	1.652	7.224
Firm age	905	23.967	19.587	2	104
Return on assets	905	-2.426	1.006	-6.259	-0.287
Capital intensity	905	5.017	0.902	1.767	9.472
Final stake	905	98.769	4.623	75	100
Control firms					
Employment growth	161,894	0.007	0.161	-3.462	3.543
Employees (log)	161,894	4.205	1.420	0.693	11.511
Employees	161,894	284.274	2,038.840	2	99,837
Productivity	161,894	4.068	0.787	-2.853	11.481
Firm age	161,894	23.139	18.130	1	105
Return on assets	161,894	-2.696	0.986	-6.307	1.312
Capital intensity	161,894	5.056	1.078	-2.159	13.447

5 Estimation results

The following table shows the estimation results for our selection equation, explaining the probability for a firm to become an acquiror. Note again, that in our baseline treatment a successful merger is defined as an increase of the final stake to at least 50%. The first column refers to our baseline specification while the other three offer first robustness analyses. In particular, in column 2, we only allow small- and medium-sized firms (up to 250 employees) to become acquirors. In column 3 and 4 we use a different definition for our treatment, namely that 25% and 75% of all outstanding shares have to be acquired, respectively. What can be seen is, that bigger firms tend to be more likely to become an acquiror. We can also show, that firms with a higher level of productivity and bigger return on assets are more likely to become active regarding M&A activities. Furthermore, we find that younger firms and less capital intense companies show a higher probability to become an acquiror. All the effects mentioned above are quite robust in comparison to our different treatment definitions. The magnitude of the parameter changes only slightly, whereas significance and signs stay the same. Moreover, we control for time and industry effects (on a 2-digit NACE code level). With a total number of 162,906 observations for the baseline treatment we are confident to have a sufficient number of control firms to conduct the next step of the propensity score matching.

Table 3: Estimation results for the selection equation (takeover probability)

Variable	Baseline treatment	Small- and medium- sized firms	25% takeovers	75% takeovers
Employees	0.110*** (0.008)	0.208*** (0.015)	0.119*** (0.007)	0.107*** (0.008)
Productivity	0.117*** (0.031)	0.156*** (0.037)	0.108*** (0.030)	0.146*** (0.033)
Firm age	-0.025* (0.014)	-0.028* (0.017)	-0.032** (0.014)	-0.025* (0.015)
Return on assets	0.071*** (0.015)	0.086*** (0.017)	0.067*** (0.014)	0.073*** (0.015)
Capital intensity	-0.055** (0.023)	-0.046* (0.026)	-0.036 (0.022)	-0.078*** (0.024)
McKelvey & Zavoina's R2	0.068	0.068	0.068	0.068
Time effects	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Industry effects	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	162,906	136,143	162,906	162,906

Notes: Parameter estimates are reported. Parameter estimates of the constant are not reported. Robust standard in parentheses. *, **, *** denote 10%, 5% and 1% significance levels, respectively. ^a

Naturally, for our first alternative, the number of observations drops, as we only allow companies to be part of the Probit that have up to 250 employees. The fact, that the last two different definitions for a treatment have the same number than in our baseline version is owed to the fact that the number of treated observations decreases 1:1 with the increasing number of control firms. Consequently, the estimation outcomes of the just described selection equations allow us to predict propensity scores for both acquiring and non-acquiring companies. Subsequently, these predictions are used for the construction of the control group of non-acquiring firms. Herewith, it is necessary that the common support restriction is imposed and that the balancing property is satisfied. The common support hypothesis assumes that all acquiring companies have a relevant counterpart among the non-treated companies. With regard to the latter, Table 4 reports balancing

property tests for the baseline model with nearest neighbor matching. Evidently, after matching, both groups of companies (the acquiring ones and their matched counterparts) do not significantly differ with regard to their covariates. Consequently, especially for the baseline definition the matching procedure induces a considerable bias reduction. This implies that observations with the same propensity score have the same distribution of their observable characteristics. Thus, exposure to the treatment is now exogenous (given the included observable characteristics) and the treated and control firms are on average identical.

Table 5 not only reports various ATTs applying our baseline definition of a successful merger, but also for the already discussed sub-samples. Furthermore, we apply for each sample nearest neighbor, three nearest neighbors and kernel matching. It is worth noting, that the standard errors are obtained via bootstrapping (100 replications each). The result for our baseline treatment shows, that companies, who decide to buy another firm (in the baseline version: acquisition of at least 50%) show a statistically significant higher employment growth rate compared to a situation in which they would have not done so. The effect is around 1% for the mean employment growth of the following two years after the acquisition. If we take a look at only small- to medium-sized firms, one can see that the effect becomes even bigger (around 2%) and also holds for different definitions of the treatment, where the average treatment effect is around 1.5%. The effects are always highly statistically significant.

Table 4: Balancing property tests for the baseline model and three nearest neighbor matching

Variable	Sample	Baseline treatment						Small- and medium-sized firms					
		Mean		% bias	% reduct bias	t-test		Mean		% bias	% reduct bias	t-test	
		Treated	Control			t	p> t	Treated	Control			t	p> t
Employees	Unmatched	4.6123	4.0966	35.4		20.06	0.000	4.0154	3.6552	34.0		16.53	0.000
	Matched	4.8331	4.8081	1.7	95.1	0.41	0.685	4.2534	4.2854	-3.0	91.1	-0.74	0.461
Productivity	Unmatched	3.9811	3.9433	4.0		1.94	0.053	4.0475	3.9558	9.9		4.14	0.000
	Matched	4.1558	4.1724	-1.7	56.0	-0.49	0.621	4.2059	4.1630	4.6	53.3	1.12	0.261
Firm age	Unmatched	2.7943	2.7554	4.2		2.39	0.017	2.7525	2.7271	2.8		1.38	0.168
	Matched	2.8656	2.8739	-0.9	78.7	-0.23	0.818	2.8452	2.852	-0.7	73.5	-0.16	0.871
Return on assets	Unmatched	-2.4287	-2.6989	25.9		11.53	0.000	-2.3711	-2.6904	30.3		11.72	0.000
	Matched	-2.4537	-2.4344	-1.8	92.9	-0.46	0.649	-2.3801	-2.4134	3.2	89.6	0.67	0.500
Capital intensity	Unmatched	5.0592	4.9759	6.7		3.70	0.000	5.1289	4.9887	11.2		5.39	0.000
	Matched	5.0325	5.0487	-1.3	80.6	-0.36	0.718	5.0590	5.0276	2.5	77.5	0.61	0.541
Variable	Sample	25% takeovers						75% takeovers					
		Mean		% bias	% reduct bias	t-test		Mean		% bias	% reduct bias	t-test	
		Treated	Control			t	p> t	Treated	Control			t	p> t
Employees	Unmatched	4.6579	4.0961	38.0		22.57	0.000	4.7018	4.0957	40.5		24.84	0.000
	Matched	4.8836	4.8680	1.1	97.2	0.26	0.797	4.9455	4.8075	9.2	77.2	2.16	0.031
Productivity	Unmatched	3.9920	3.9433	5.1		2.59	0.010	3.9990	3.9432	5.9		3.02	0.002
	Matched	4.1680	4.1657	0.2	95.4	0.07	0.946	4.1744	4.1506	2.5	57.5	0.71	0.479
Firm age	Unmatched	2.7832	2.7555	3.0		1.76	0.078	2.7828	2.7555	2.9		1.77	0.077
	Matched	2.8581	2.8458	1.3	55.8	0.35	0.729	2.8600	2.8696	-1.0	65.1	-0.26	0.798
Return on assets	Unmatched	-2.4577	-2.6988	23.2		10.67	0.000	-2.4780	-2.6987	21.2		9.97	0.000
	Matched	-2.4801	-2.4633	-1.6	93.0	-0.41	0.685	-2.4975	-2.4171	-7.5	64.4	-1.84	0.066
Capital intensity	Unmatched	5.0822	4.9758	8.6		4.90	0.000	5.1019	4.9756	10.2		5.93	0.000
	Matched	5.0713	5.0587	1.0	88.2	0.29	0.775	5.0873	4.9955	7.4	27.4	2.05	0.041

Table 5: Results for employment growth rates

	ATT	Std. Err.
Baseline treatment		
Nearest Neighbour	0.010***	(0.004)
Neighbour 3	0.015***	(0.001)
Kernel	0.010**	(0.003)
Small- and medium-sized firms		
Nearest Neighbour	0.021***	(0.004)
Neighbour 3	0.022***	(0.006)
Kernel	0.014***	(0.004)
25% takeovers		
Nearest Neighbour	0.016***	(0.001)
Neighbour 3	0.013**	(0.005)
Kernel	0.012**	(0.004)
75% takeovers		
Nearest Neighbour	0.017***	(0.004)
Neighbour 3	0.018**	(0.006)
Kernel	0.012***	(0.004)

Notes: The dependent variable *employment growth rate* equals one if a company acquires another firm and zero otherwise. Bootstrapped standard errors with 100 replications reported. *, **, *** denote 10%, 5% and 1% significance levels, respectively.

5.1 Robustness checks

In order to strengthen our results, we run a couple of robustness checks. In a first step we only allow domestic takeovers. The inherent selection equation is presented in table 6. In contrast to the full sample, the number of observations drops to 100,752. Nevertheless, there are only minor changes in the magnitude of the coefficients. The signs do not change either.

Table 6: Estimation results for the selection equation (takeover probability)

Variable	Domestic takeovers
Employees	0.098*** (0.005)
Productivity	0.140*** (0.027)
Firm age	-0.013 (0.010)
Return on assets	0.061*** (0.012)
Capital intensity	-0.065*** (0.019)
McKelvey & Zavoina's R2	0.055
Time effects	<i>Yes</i>
Industry effects	<i>Yes</i>
Observations	100,752

Notes: Parameter estimates are reported. Parameter estimates of the constant are not reported. Robust standard in parentheses. *, **, *** denote 10%, 5% and 1% significance levels, respectively. ^a

We still have a sufficient number of control firms, that allows us to estimate the average treatment effect for domestic takeovers. We use the same definitions for a successful merger (acquisition of at least 25%, 50% and 75%, respectively). The positive employment effect is consistently higher than in the specification using the full sample. For domestic takeovers, we observe a positive impact on the employment growth rate

of about 2% (compared to $\sim 1.5\%$ in the full sample). It is worth noting, that for first two definitions of a successful merger, one treated unit is off support. This means that there is no matchable firm out of the control units and therefore is not considered in our estimation. For all other units, the common support hypothesis holds.

In a different setting, we change the output variable (employment growth rate) to changes in productivity. Compared to Stiebale and Trax (2011) we also find (slightly) positive effects on productivity, but these effects are not statistically significant. In a last robustness analysis, we do not find any effects on wages. Recent works that focus on employment effects on the acquired entity with similar data (Oberhofer 2013) or the same data (Furlan, Oberhofer and Winner 2015) find positive effects as well. This leads us to the conclusion, that M&A activities lead to an overall increase in labor demand.

Table 7: Results for employment growth rates

	ATT	Std. Err.
Domestic takeovers (25%) n = 764, 1 off support		
Nearest Neighbour	0.021***	(0.005)
Neighbour 3	0.021**	(0.010)
Kernel	0.014***	(0.004)
Domestic takeovers (50%) n = 728, 1 off support		
Nearest Neighbour	0.021***	(0.005)
Neighbour 3	0.022**	(0.008)
Kernel	0.041*	(0.005)
Domestic takeovers (75%) N = 664		
Nearest Neighbour	0.022**	(0.010)
Neighbour 3	0.020**	(0.009)
Kernel	0.015**	(0.007)

Notes: The dependent variable *employment growth rate* equals one if a company acquires another firm and zero otherwise. Bootstrapped standard errors with 100 replications reported. *, **, *** denote 10%, 5% and 1% significance levels, respectively.

6 Conclusion

In this paper, we provide a systematic analysis on the employment effect after M&A activities for a sample of European firms between 2003 and 2010. Rather than taking the perspective of the acquired firm, this paper focuses on the acquiring firm. This is not only of interest for the regarding firms themselves but also for policy-makers. We apply PSM techniques in order to evaluate these post-merger effects, comparing treated (acquiring) to non-treated (non-acquiring) firms. We find that acquiring companies have a statistically significant higher employment growth rate compared to the (hypothetical) situation in which they have not acquired another firm. In detail, acquiring firms show a higher growth rate of about 1.5%. In further specifications we can show, that our results are stronger for small- and medium-sized firms (up to 250 employees). For robustness checks, we apply different definitions for a successful merger. Again, our results stay robust. In a last step, we only focus on domestic takeovers only, showing that these firms have the highest growth rate ($\sim 2\%$). This paper therefore contributes to the existing literature such, that we provide a systematic analysis of post-merger effects on the acquiring firm. At hand with a recent data set for European firms we apply propensity score matching techniques, that allow us to measure the causal effect of M&A activities on the economic performance of the regarding firm.

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