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Spinoffs, parents, and institutions: Evidence from the Italian motorcycle industry

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SPINOFFS, PARENTS, AND INSTITUTIONS: EVIDENCE FROM THE ITALIAN MOTORCYCLE INDUSTRY

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ABSTRACT

In this paper we study the impact of spinoff generation events on the performance of parent organizations. Using data from the Italian motorcycle industry (1893-1993), we find that parents have higher survival chances after a spinoff generation event, confirming results from previous studies about other manufacturing industries. We also show that these enhanced survival patterns differ across time and space, and we link these effects to institutional differences: spinoff generation did not determine any survival advantage for parent firms in the Fascist era and in the Turin cluster, while it had an additional positive effect in the Motorvalley cluster. The paper contributes to the literature on spinoff generation and employee mobility and adds to the debate on the role of institutions in evolutionary economic geography, by showing the importance of contextual factors for the performance of parent firms.

Keywords: Spinoffs; Employee entrepreneurship; Parents; Institutions; Evolutionary economic geography

JEL Codes: B52, L26, O18, R11.

1. Introduction

Spinoffs are new firms originating from existing companies within the same industry (Agarwal et al., 2004; Klepper, 2007), which are common to many industries and typically show a superior performance compared to other, less experienced entrants (Klepper, 2009). Recent evidence also suggests that they played an important role in the emergence of successful industry clusters, such as the semiconductor cluster in Silicon Valley (Cheyre et al., 2015) or the automobile cluster in Detroit (Klepper, 2007).

Established companies, however, do not share the enthusiasm of policy-makers for spinoffs and can be quite hostile to spinoff formation (Garvin, 1983; Walter et al., 2014). In fact, spinoff generation is a form of employee mobility (Agarwal et al., 2016): parent firms typically endure the costs of this process, without accruing any benefit. The early literature on the topic has confirmed this view: parents suffer from the loss of human capital (Philips, 2002), the disruption of organizational routines (McKendrick et al., 2009), and the competitive threat originated from the replication of these routines in the new firm (Wezel et al., 2006). More recent works, however, have suggested that spinoff generation can also be a positive event for the parent, when considering a longer time period (McKendrick et al., 2009), to the extent that it generates a realignment with the environmental conditions (McKendrick et al., 2009), it increases the level of coherence of internal activities by reducing the amount of conflict within a firm (Ioannou, 2014), or opens a communication channel that makes the new firm a knowledge source for the parent (Corredoira and Rosenkopf, 2010; Kim and Steensma, 2017).

In this paper, we claim that the possibility to find adequate substitutes for routines and capabilities disrupted by spinoff generation is very important in determining the performance of parent firms after the parenting event, and we show that the institutional and economic context plays a moderating role in this process. More specifically, we show that differences in political economy rules changing over time and differences in the patterns of labor mobility changing across space contributed to determine whether spinoff generation had a positive effect on the parent performance or not. To this purpose, we exploit a novel dataset of the Italian motorcycle industry (1893-1993) that allows us to identify spinoffs and parents over a long period of time and both within and outside three industrial clusters, and to investigate the environmental elements favouring or hindering parent survival.

Our results show that spinoff generation improved survival chances of parent firms, but also that these patterns of survival were different across time and space. Spinoff generation in the Fascist era did not determine any survival advantage for parent firms, especially after the autarchy policy was implemented in the 1930s. Moreover, two industrial clusters presented quite different patterns: the Motorvalley cluster showed an additional positive effect on parents, whereas in the Turin area the generation of spinoff was associated to a lower performance.

The contribution of the paper is twofold. First, we contribute to the literature on spinoff generation (Klepper, 2009) and more generally on employee mobility (Agarwal et al., 2016). We show that the impact of spinoff generation (i.e. employee mobility towards entrepreneurial activities) on the source firm depends also on contextual factors. Second, we contribute to the debate on the role of institutions in evolutionary economic geography (Boschma and Frenken, 2009; MacKinnon et al., 2009; Boschma and Capone, 2015; Pike et al., 2016), by showing how the institutional context plays an important role in driving the evolutionary mechanism of capabilities reproduction through spinoffs.

The paper is organized as follows. First, we review the current literature about the impact of spinoff generation on parent firms, and we develop some testable hypotheses from it. Then we illustrate the empirical context, the data and the methodology that we use for our analysis. In the following section we present the results of our work. Finally, we conclude by discussing their implications for the existing literature.

2. Background Theory

In the last 15 years the phenomenon of spinoffs has gained increasing attention by academic scholars and policy makers. A large set of empirical studies supports the claim that spinoffs perform better than other firms in many sectors (see Klepper, 2009 and Capone et al., 2018, for a review). This superior performance is attributed to the transfer (or "inheritance") of successful routines (Philips, 2002; Wezel et al., 2006; Dahl and Reichstein, 2007) and capabilities (Agarwal et al., 2004) from the parent firm, as well as to the experience in the industry that allows to identify potential opportunities (Costa and Baptista, 2015).

2.1 Spinoff Generation: Negative and Positive Impact on Parent Firms

A possible implication of the "inheritance" view is that the spinoff formation process is detrimental to the parent firm: the creation of the new entity is necessarily associated to the loss of employees in the existing firm, and this can have negative consequences for its performance up to become a threat to its survival. There are two fundamental mechanisms that could determine a negative impact of spinoff generation on parent performance. First, people leaving the parent firm represent a loss of human capital (Philips, 2002; Wezel et al., 2006): when employees leave a firm they take with themselves skills and resources that are currently used within the parent and sustain its activities. These activities are typically performed through routines, which are repeated patterns of behaviour within an organization (Cohen et al., 1996), that in some cases also involve actors external to the organization, i.e. social capital (Correidora and Rosenkopf, 2010). Therefore, the departure of employees disrupts the routines of the existing organization. The disruption of routines can be easily fixed if it involves a limited number of operational routines, which regulate the daily functioning of firm activities (Nelson and Winter, 1982). However, higher order routines or capabilities (Dosi et al., 2000; Winter, 2003), that deal with the use or change of operational routines, can be modified or replaced with greater costs and difficulties. So, individuals involved in these higher-order routines should have a more negative impact on the parent firm when they leave it. The empirical evidence corroborates this idea. High-rank (Philips, 2002) or high-earnings employees (Campbell et al., 2012) in U.S law firms have a stronger negative effect on the parent when they leave it to form a spinoff. Collective migration to spinoffs in the Dutch accounting industry is also associated to lower survival rates (Wezel et al., 2006), given that routines typically involve more than one individual.

The second mechanism through which spinoff generation can harm the parent firm is competition. Although spinoffs quite often are motivated by strategic disagreements (Klepper and Thompson, 2010) and therefore tend to differentiate to some extent from the parent (Fontana and Zirulia, 2015), managers of existing organizations see spinoffs as a particularly dangerous competitive threat (Garvin, 1983). Leaving employees, in fact, might appropriate innovations and ideas developed within the parent and exploit them within the new firm (Anton and Yao, 1995; Hellmann, 2007). When key people move to a direct competitor, they represent a loss not only of human capital, but also of external social capital, i.e. relational assets that involve important external stakeholders such as customers or suppliers (Somaya et al., 2008). The competitive threat is stronger when leaving employees create a new firm, because in the new organizational entity it is possible to replicate more effectively the higher-order routines of the parent firm, increasing the similarity between the two firms (Wezel et al., 2006). Such replication process is reinforced if the new firm is located in close proximity to the parent, because routines are embedded in the external environment and capabilities are meaningful in relation to a particular competitive context (Winter, 2000). Geographical proximity allows the spinoff to exploit local relationships when pursuing more aggressive technological and market strategies (Berchicci et al., 2011) and determines an increase in local rivalry for customers, suppliers, workers, and other scarce resources (Carroll and Wade, 1991; Sorensen, 1999; Cattani et al., 2003; Wezel, 2005). Empirical results confirm the role of the competition mechanism (Philips, 2002; Wezel et al., 2006), although sometimes it is difficult to disentangle its effects from those generated by the loss of human capital and the disruption of routines.

Still, the importance of these mechanisms should not be overstated. Leaving employees can be substituted minimizing routines disruption (McKendrick et al., 2009), and the spinoffs they form often do not target the same market of the parent (Klepper and Sleeper, 2005; Capone et al., 2018). Moreover, there are also a few mechanisms that could determine a positive impact of spinoff generation on parent performance. First, parent firms can benefit from a realignment to their environment induced by spinoff formation (McKendrick et al., 2009). When new firms are born, they create routines and internal structures that are influenced by the external environment and persist beyond the founding phase (Stinchcombe, 1965). Established routines and bureaucratic processes determine structural inertia, reducing the opportunities for change and adaptation of existing firms in a dynamic environment (Hannan and Freeman, 1984). The exit of key individuals forces an existing firm to find adequate substitutes, bringing in new people that can have an impact on internal processes and routines, and help the firm to realign with the external environment (McKendrick et al., 2009). The substitution process, however, takes some time: empirical evidence in the HDD industry shows that there is a long term positive effect of spinoff generation on innovation performance, but in the short run a negative effect prevails (McKendrick et al., 2009). A second mechanism through which spinoff generation can benefit the parent is based on the concept of corporate coherence (Ioannou, 2014), that is the capacity of a firm to generate and explore synergies among its competences (Teece et al., 1994; Piscitello, 2004). Spinoff generation allows the parent firm to focus its limited resources on its core competences (Prahalad and Hamel, 1990). Therefore, the removal of projects that are outside the strong learning region of the firm increases its overall coherence, and this effect is the stronger the more distant from the core is the project leading to the spinoff activity (Ioannou, 2014). Support for this mechanism is provided by the large empirical evidence on the role of strategic disagreements as drivers of spinoff activities in many industries (Klepper, 2007; Klepper and Thompson, 2010), although sometimes this also results in spinoff pursuing old activities and the parent focusing on the new project (Thompson and Chen, 2011). Third, parent firms can also benefit from knowledge spill-ins, that are flows of knowledge from firms employing their former employees (Correidora and Rosenkopf, 2010; Kaiser et al., 2015). These flows cannot be associated to a direct transfer of capabilities, and can be rather explained by the persistence of social relationships after the mobility events occur (Agrawal et al., 2006). Moreover, they are stronger in the case of mobility towards entrepreneurship: founders have more incentives and opportunities to share their knowledge with former colleagues and parent firms are more prone to pay attention to spinoff activities (Kim and Steensma, 2017). Finally, McKendrick et al. (2009) provide anecdotal evidence about the signalling effect of spinoffs success to attract talented people in the parent organization: in the long run firms spawning successful spinoffs can more easily find adequate substitutes for leaving employees.

The overall effect of a spinoff event on its parent performance, therefore, will depend on the presence and salience of all these mechanisms and on their interaction in each specific case. The sectoral context appears as an important element to consider. The loss of human capital can be very harmful in knowledge intensive settings, especially when it is difficult to find adequate substitutes. Closer competition between the spinoff and its parent is more probable in industries where the opportunities for differentiation are limited. In fact, most of the empirical evidence showing a negative effect on the parent performance following a spinoff event emerges from knowledge intensive business services (KIBS) sectors, such as legal services (Philips, 2002; Campbell et al., 2012) and accounting consultants (Wezel et al., 2006). On the contrary, in manufacturing industries characterized by the presence of multiple niches and continuous technological changes, positive mechanisms prevail due to the strengthening of internal and external coherence and the presence of opportunities for mutually beneficial knowledge exchanges: it is the case of automobiles (Ioannou, 2014), disk drives (McKendrick et al., 2009), and the IT sector (Kim and Steensma, 2017). The motorcycle industry shares many characteristics with these industries, and in particular with the automobile industry. Therefore we expect that the positive mechanisms listed above will prevail over the negative ones and we posit the following:

Hypothesis 1 (H1): Spinoff generation will have a positive impact on firm performance.

2.2 The Role of Contextual Factors

Although since long institutions have been recognized as an important determinant of economic performance (North, 1990), only quite recently scholars have shifted their attention towards their impact on entrepreneurship (Hwang and Powell, 2005; Sine and David, 2010) and have identified some of the institutional arrangements favouring or hindering the entry of new firms, such as legal barriers to entry (Marx et al., 2009), business regulations (Van Stel et al., 2007) or their practical implementation by judges (Conti and Valentini, 2017). A particular emphasis has been placed on informal institutions, and on how they interact with formal regulations in driving entrepreneurial behaviour (Eesley et al., 2018).

A peculiar feature of the spinoff phenomenon, compared to alternative types of entry, is that some of its main drivers can be identified in factors internal to existing organizations, such as asymmetric information (Anton and Yao, 1995) or disagreement (Klepper and Thompson, 2010) about the value of an innovation, learning opportunities (Franco and Filson, 2006), or strategic decisions about human capital management (Gambardella et al., 2015b) and new product commercialization (Klepper and Sleeper, 2005; Cassiman and Ueda, 2006; Gambardella et al., 2015a). Recent studies, however, have pointed out that contextual factors might also be relevant, at the spatial (Frenken et al., 2014; Baltzopoulos et al., 2016), sectoral (Capone et al., 2018), or institutional level (Cheyre et al., 2015; Starr et al., 2016).

The role of institutions in the process of spinoff formation has also emerged from the literature on clusters, and in particular on the paradigmatic case of Silicon Valley. This region has been characterized by a high level of workers mobility, facilitated by the lack of regulatory barriers, and by a widespread entrepreneurial culture (Saxenian, 1994). Moreover, new firm founders could also benefit from the presence of supportive institutions, such as venture capitalists and specialized law firms (Kenney, 2000). All these factors have enormously contributed to the entry dynamics in Silicon Valley, and specifically to the emergence of numerous spinoffs (Cheyre et al., 2015). There is more debate, instead, on the role of clusters and their institutions to explain spinoff performance. Developing his heritage theory, Klepper (2010) has challenged the traditional view about the role of agglomeration economies and institutions as main determinants of cluster performance: rather, it is the inheritance of superior routines from parents that explains both spinoffs and cluster performance. Still, Klepper (2007) recognized that spinoffs routines could include the ability to benefit from agglomeration economies. Clusters may attract the best workers (Buenstorf and Klepper, 2010), and spinoffs located in clusters could benefit from the possibility of hiring high quality early employees (Buenstorf and Costa, 2018). The best firms in the cluster, including spinoffs, could exploit their position in the knowledge network (Giuliani, 2007; Bagley, 2018). Industries specificities might also be important (Boschma, 2015). In the

Sassuolo ceramic tile industry – a traditional sector Italian industrial district – spinoffs located in the cluster did not perform better than other cluster firms, suggesting a dominant role of contextual factors (Cusmano et al., 2015). In the Italian motorcycle industry, Morrison and Boschma (2018) find that a positive cluster effect applies only to the Motorvally cluster, which is characterized by specific local institutions.

We identify two main reasons why institutions may affect the performance not only of spinoffs, but also of parent firms. First, when a new firm is born, environmental factors prevailing at that time shape its characteristics and tend to persist over time (Stinchcombe, 1965). This "imprinting" process is quite important in the early existence of an organization, and is relevant for the transfer of routines and capabilities from the parent to the spinoff (Ferriani et al., 2012). However, imprinting can also characterize other temporally restricted sensitive periods, in which the organization is more susceptible to external influences (Marquis and Tilcsik, 2013). A spinoff generation event determines a demographic shock for the parent firm (Pennings and Wezel, 2010), that experiences such a sensitive period due to the loss of human capital and the disruption of internal routines (Philips, 2002; Wezel et al., 2006) as well as the need of substituting leaving people with new members (Guenther et al., 2016). So, the environmental conditions prevailing at the spinoff founding moment may affect not only spinoffs, but also parent firms.

Second, institutions may impact parent performance following a spinoff generation event, by strengthening or weakening some of the mechanisms discussed in the previous section. The loss of human capital has less severe consequences if the environmental conditions increase the probability of substituting leaving people, through either new workers or new machinery. Competition may be weakened by the presence of business regulations, such as the enforceability of non-compete clauses. Local institutions and culture may enhance knowledge diffusion: this can help the parent firm to positively realign to the environment and might also favour spill-ins from the generated spinoffs.

The specific case that we study in this paper – the Italian Motorcycle industry – is characterized by a relevant heterogeneity in the institutional conditions along both the spatial and the temporal dimension. On the spatial dimension, it is possible to identify three industrial clusters (see Section 3.2 for details). Two of these present some notable features with respect to our argument. The Motorvalley cluster in the Emilia Romagna region is the area with the highest industry concentration after WWII, and represents a paradigmatic case of Italian industrial districts (Becattini, 2004), with thick governance institutions, embeddedness and interfirm cooperation positively affecting survival chances of small firms. The area was also characterized by further peculiar features identifying an "Emilian" model (Brusco, 1982), where local development was the outcome of the combination of economic (e.g. flexible specialization), social (e.g. strong cohesion), and institutional (high quality of government) factors (Amin, 1999). Due to the coordinated action of organized workers and progressive entrepreneurs, technical and vocational schools were created since the 19th century and contributed to the formation and diffusion of technical, scientific, and entrepreneurial culture, both in urban and rural areas. On this background, the political leaders emerging after WWII from the local communist party were able to provide government support and coordination for the economic activities, in particular for small enterprises (Capecchi, 1990). These features, and in particular the dense network of relations between entrepreneurs, workers, and politicians, enhanced the circulation of knowledge across firms, and the process of spill-overs and spill-ins that benefit parents after spinoff generation. Moreover, due to the presence of specialized suppliers and workers, as well as strong interfirm networks, in the motorcycle industry (Lipparini et al., 2014) knowledge diffusion was easier and faster, and this might have helped cluster parents in realigning with the environment and in coping with losses of human capital. Therefore, we posit the following:

Hypothesis 2a (H2a): Spinoff generation has a stronger positive effect on firm performance if the parent is located in the Motorvalley cluster.

The second cluster of particular relevance is the urban area of Turin, that was part of the industrialized area of the country, and where in the last decade of the 19^{th} century emerged also the automobile industry (Annibaldi and Berta, 1999). The area was characterized by an intense entry dynamics of small automobiles (Kim et al., 2003) and motorcycles (Morrison and Boschma, 2018) producers, among which soon FIAT took the lead, becoming the largest car manufacturer in Italy, and affecting the development of the whole automotive sector in the Turin area (Morrison and Boschma, 2018). Although FIAT was not a direct competitor in the product market for small motorcycles producers, it definitely absorbed most of the local resources in terms of human capital and workforce. So, its presence determined a sort of crowding-out effect, that could be particularly worrisome for firms subject to an unexpected shock, such as parents following an involuntary spinoff event. Therefore, we posit the following:

Hypothesis 2b (H2b): Spinoff generation has a weaker positive or even negative effect on firm performance if the parent is located in the Turin cluster.

On the temporal dimension, the Italian motorcycle industry presented three distinct eras, delimited by the two World Wars. Each era is characterized by an industry life cycle of intense entry followed by a quick shakeout (Klepper, 1997), analogous to what can be observed in other European countries (Wezel and Lomi, 2009). In Italy, the three eras were also associated to quite distinct political regimes. In particular, during the second era Italy was governed by the Fascist regime, that implemented protectionist and then autarchic policies, that did not favour imports, in particular after the 1929 crisis hit Europe (Sylos Labini, 2014). Small motorcycle producers often imported components from abroad – actually some of them started their activities as importers. Imports could also be used as a substitute for the loss of human capital following a spinoff event. However, this strategy was not available during the Fascist period. Therefore, we posit the following:

Hypothesis 2c (H2c): Spinoff generation has a weaker positive or even negative effect on firm performance if the parenting event occurs in the Fascist era.

3. Methodology

3.1 Data sources

This work is based on a dataset of motorcycle companies in Italy in the period 1893–1993, developed by Morrison and Boschma (2018) and based on two main sources: "Moto Italiane, i primi 50 anni 1895–1945" (Milani, 1998) and "Enciclopedia della motocicletta" (Wilson, 1995). From these two encyclopedias of motorbike companies it has been possible to extract the following information: year of foundation of a company; ending year of production; major re-organization or ownership changes; location of the company; name and background of founders. These information were integrated using specialized magazines, company websites, and other internet sources[1]. For economic and social data, we employ databases from the Italian statistical office (ISTAT, 2011) and the Bank of Italy (Nuzzo, 2006). Further sources are Cainelli and Stampini (2002), that report historical census data on regional employment in the Italian manufacturing sector, and Felice (2013), that reports historical data on regional school enrolment and gross domestic product (GDP).

[1] The most relevant sources were: Moto Club Storico Conti, Wheels of Italy, Moto di Lombardia, Motorvalley.

Overall, we gathered data about 869 motorcycle companies in Italy in the period 1893-1993. However, our analysis is limited to 641 companies that commercialized at least one motorcycle product on the market before 1993 and for which we have reliable location information. Companies are excluded from the analysis if: 1) they entered the industry after 1993 (7 firms), or 2) they limited their activity to the production of prototypes or race motorcycles (194 firms), 3) we were not able to univocally identify their location (27 companies).

3.2 Empirical setting: The Italian motorcycle industry

Italy is today the largest motorcycles producer in Europe, and among the world leaders (ACEM, 2015). However, the industry emerged a bit later compared to other European countries, such as Germany, where Gottlieb Daimler invented the motorcycle in 1885, or UK and France, where some companies started mass production of motorcycles as early as 1895 (Wilson, 1995). In the last decade of the 19th century, Italian prospective producers were still developing prototypes: the first commercialized motorcycle was produced in Milan by Lazzati and Figini in 1899 (Grizzi and Clarke, 2014). In the early years of the 20th century, however, the industry quickly took off, profiting from knowledge developed in neighbouring countries, especially in France. As in the case of the automobile industry, motorcycles producers concentrated mostly around the industrialized areas of Milan and Turin, and actually some of these companies entered both industries (Annibaldi and Berta, 1999). A particularly interesting case is that of the Ceirano brothers in Turin, that successfully developed a car model in 1899, and contributed to founding the car company FIAT, that became the largest producer in Italy and had a profound impact on local motorbike producers that were active also in the automobile industry. In the Emilia Romagna region the industry emerged after World War I, with a few companies focusing on race motorbikes and some of them gaining national relevance (G.D., Moto Morini) by winning important national and international races in the 1920s. These producers concentrated mostly in the provinces of Bologna and Modena, where in the same years emerged also car producers specialized in sport and luxury cars (Ferrari, Maserati, and later on Lamborghini and Pagani), earning the area the “Motorvalley” nickname after World War II. (Wezel and Lomi, 2009). Figure 1 presents the spatial distribution of firms in the motorcycle industry over all the period of analysis, considering for each province the maximum number of firms that have been active in a year: our data confirm the presence of three main clusters centred around the cities of Turin and Milan, and in the provinces of Bologna and Modena. Data about industrial demography (entry, exit, and number of active firms), show also the presence of three industry cycles, with a peak in the number of firms due to sustained entry in the early phase of the cycle, followed by a shakeout (Klepper, 1997). The three periods are roughly delimited by the two World Wars. The exit dynamics is partly related to external shocks, such as financial crises (1907. 1911) government policies (1925, 1935), or shifts in consumers preferences (1953).

3.3 Econometric model

Our data allow us to measure firm performance in terms of survival. Therefore, to test our hypotheses, we use the Cox proportional hazard regression model, a semi-parametric model that does not impose any restriction on the shape of the baseline hazard function (Cox, 1972). As other hazard models, the Cox model allows to study the relation between a set of explanatory variables describing firm characteristics and the survival rate of a population, taking into account the specific structure of duration data. Formally, the Cox model is expressed in terms of hazard rate $h(t)$, which represents the risk of failure at a specific instant t, conditional on survival up to t:

$$h(t) = h_0(t) \cdot e^{\beta' X_i} \quad (1)$$

where X_i is a vector of explanatory variables. The expression $h_0(t)$ represents the baseline hazard function, i.e. the extent to which failure depends on time irrespective of heterogeneity across observations. The Cox model belongs to the family of proportional hazard models: therefore, regression coefficients included in the vector β indicate the proportional effect in the hazard rate due to a unit change in the covariates (Jenkins, 2005). In this class of models, it is possible to present results in terms of hazard ratios. This feature is particularly useful in the case of dummy variables, as the hazard ratio represent the ratio between the hazard of observations with the specific characteristic identified by the dummy (e.g. spinoff, spinoff generation event) and the hazard of observations without that characteristic. Hazard ratios close to 1 mean that there is no effect of the specific covariate; values higher (lower) than 1 indicate a higher (lower) hazard for the group identified by the dummy variable.

3.4 Dependent variable

The construction of the dependent variable and the control explanatory variables closely follows the methodology used in similar studies about spinoffs (Philips, 2002; Klepper 2007; Ioannou, 2014). Firm survival is computed as the difference between the year of exit (i.e. last year of production) and the year of entry (i.e. first year of production). Based on this variable, the hazard rate is computed for each period of analysis. Acquisitions are treated as exits. Mergers are treated as exits if the company name disappears or the location of the firm changes. If a firm changes name for reasons different from M&A (e.g. when one of the founders leaves the firm), the firm is treated as continuing.

3.5 Control variables

Control explanatory variables include characteristics referring to founders background, entry timing and geographical location. Specifically, we distinguish four types of founders background: *spinoffs*, which are firms founded by employees of companies already active in the same industry; *experienced firms*, that are the firms which enter an industry by diversifying their portfolio of activities from related industries; *experienced entrepreneurs*, that are individuals that have worked in firms from related industries; *inexperienced firms*, that include all companies with no prior experience in the same industry or in related industries, as well as the cases for which the founder background is unknown. From previous evidence, we expect that firms in the last category are outperformed by firms belonging to the other three categories. To check for these effects, we coded four dummy variables: each of these variables takes value 1 if the entrant firms falls in the specific founder background category described by the variable, and 0 otherwise. Since the four variables completely partition the data, we include in the model only the first three categories (*Spinoff, Experienced firm, Experienced entrant*), and we treat *Inexperienced firms* as the reference category. In the case of spinoffs, we also include a variable (*Parent Duration*) describing the performance of the parent firm, which is measured by its number of years of production.

A second group of variables controls for the effect of entry timing. In the specific case of the Italian motorcycle industry, it is possible to identify three distinct phases, characterized by different shakeouts. To control for these effects, we coded three time cohort dummy variables. The first dummy (*Before WW1*) takes value 1 for firms entering before the end of World War 1, (i.e. between 1893 and 1918), and 0 otherwise. The second dummy (*Between wars*) takes value 1 for firms entering between the two wars (i.e. from 1919 to 1945), and 0 otherwise. The last dummy (*After WW2*) takes value 1 for the cohort of all remaining firms (i.e. those entering between 1946 and 1993), and 0 otherwise. Also in this case, the three variables completely partition the data. Therefore, we include in our regression models only the first two dummies, and we leave the last cohort as reference category. Moreover, since the effect of time of entry on the hazard is not constant over time, we also included time varying covariates given by the interaction of time of entry variables with time.

A third group of variables controls for the effect of geographic location. As mentioned in section 3.2, from our data and historical accounts, it has been possible to identify three clusters in the industry, that overall account for 60% of the firms that entered the industry. Therefore, we created three dummy variables: the first one (*Motorvalley*) takes value 1 if the firm was located in the provinces of Bologna or Modena, and 0 otherwise, and it includes 11% of the firms; the second dummy (*Milan area*) takes value 1 if the firm was located in the provinces of Milan, Varese, and Pavia, and 0 otherwise, and it includes 29% of the entrants; the third dummy (*Turin area*) takes value 1 if the firm was located in province of Turin, and 0 otherwise, and it includes about 20% of the firms. Firms located in other areas of Italy are used as reference category. To take into account more general location effects, we also include some more controls: the number of active motorcycle firms at the regional level (*Industry density*), and the regional employment in the mechanic sector (*Related variety*), to account for localization economies from the same or related industries; the relative number of inhabitants in the region (*Population*), to account for urbanization economies; the school enrolment rate in the region (*Education*), to account for the effect of human capital; regional gross domestic product per capita (*Regional GDP*), to account for the level of economic development. All these variables are time invariant and are measured at the entry period.

3.6 Explanatory variables

Our main explanatory variables refer to the generation of spinoffs by parent firms. First, we use a dummy variable to code for a spinoff generation event (*Spinoff generation*): it takes value 1 for firms that generate a spinoff, starting from the period in which the spinoff occurs, and until the parent firm exits; it takes the value 0 for parent firms before they generate the first spinoff, and for all firms that never generate a spinoff. Second, we use a clock variable (*Spinoff clock*) that starts from the period in which a spinoff occurs, and increases by one unit in each of the following periods; if a new spinoff occurs in the same parent, the variable is reset to 1 and then it starts increasing again.

To check for the role of institutional factors in the relation between spinoff generation and survival, we use multiple interaction terms. First, we interact both *Spinoff generation* and *Spinoff clock* variables with cluster dummies (*Spingen Motorvalley*, *Spingen Milan*, *Spingen Turin*; *Spinclcok Motorvalley*, *Spinclock Milan*, *Spinclock Turin*). Second, we also interact the two main variables with temporal dummies. However, in this case the relevant period is when the spinoff occurs, that is: *Spingen Before WW1* refers to generation of spinoffs between 1893 and 1918, and *Spingen Btw Wars* refers to generation of spinoffs between 1919 and 1945. Finally, we also consider a specific temporal variable (interacted with *Spinoff generation* and *Spinoff clock* variables) referring to the autarchic political economy by the Fascist regime. In the early 1930s several protectionist policies were implemented following the 1929 economic crisis, whereas from 1935 full autarchy was pursued by the government. Therefore *Spingen Autarchy* in its wider definition refers to spinoff generation events occurring from 1930 to 1945, and in its stricter definition includes spinoff generation events from 1935 to 1945. Spinoff events occurring after World War I and before the autarchy period are coded as *Spingen BefAut*.

4. **Results**

The results of our analysis are reported in Tables 1 to 4. All models report estimation of hazard ratios: values below 1 (above 1) indicate higher (lower) survival chances associated to that factor. When including interaction effects, we first include one variable at a time. Due to the limited number of spinoff generation events, to maintain the precision of the estimates when we run more comprehensive models we include only interactions that were significant in those stand-alone models.

Model 1 in Table 1 reports the results of a regression including only control variables[2]. As expected, experienced firms, entrepreneurs and spinoffs have better survival chances compared to inexperienced entrants. Spinoffs from better parents enjoy further survival advantages. Entry cohort dummies indicate that firms founded before WW1 and between the two World Wars have a higher hazard rate than firms entering after WW2. Moreover, the coefficient of the cohorts interacting with time suggest that the hazard related to time of entry changes with age, and specifically that firms in the earlier cohorts have a lower hazard at older ages as compared to those in the latest cohort. Finally, we also notice that among the three cluster dummies, only Motorvalley is significant, indicating that firms located in this area enjoyed survival advantages when compared to firms in the rest of Italy, including the other two clusters (Turin and Milan).

In Models 2 to 4 we introduce the main variables to study the effect of spinoff generation on parent survival. Coherently with previous evidence in manufacturing industries, we find that a spinoff generation event reduces the hazard of exit for parent firms. The effect is still present, but less precise, if we introduce a clock variable in the analysis, which is not significant, neither in absolute value (Model 3) nor in the logarithmic transformation (Model 4). These results confirm Hypothesis 1.

Table 2 reports the results of regressions where interactions between location in industrial clusters and spinoff generation events are included. The dummies for the Motorvalley (Model 1) and Milan area (Model 2) are not significant; however, the dummy

[2] The magnitude and statistical significance of the effects is analogous to what reported by Morrison and Boschma (2018)

for spinoffs occurring in the Turin area (Model 3) indicates a negative effect on survival for firms located in this cluster. Models 4 to 6 introduce also spinoff clock interactions: spinoff events occurring in the Motorvalley determine a positive survival effect on the parents, which declines over time; those occurring in the Turin area present a higher hazard rate, increasing over time; finally, the coefficients for the Milan area are not statistically significant. Model 7 confirms the previous results when both Motorvalley and Turin area variables are included in the analysis (Milan area is excluded due to insignificance in all previous models). These results confirm Hypotheses 2a and 2b: the positive effect of spinoff generation event is stronger in the Motorvalley and weaker in Turin.

Table 3 reports the results of regressions where interactions between the spinoff generation event dummy and the time cohort dummies (modified to take into account spinoff generation rather than entry) are included. Results show that the positive effect of spinoff generation is in general true for events occurring either until WW1 (Model 1) or after WW2 (Model 3), but not between wars (Model 2). This interpretation is confirmed by the results of Model 4, in which we include only the three interacting variables and we omit the general spinoff generation dummy. Still, in the following analysis, we use the specification of Model 2, which is more parsimonious, but still captures the highlighted effect. In Model 5, we add the clock variable and its interaction with the Between Wars dummy: both variables are not significant, whereas the main effects are confirmed. So, the results confirm Hypothesis 2c. Model 6 and 7 test whether our ideas about the role of the Fascist regime corporatist political economy. We take the same specification of Model 2, but we split the Spingen Btw Wars variable in two dummies, coding spinoff generation before and after autarchy measures. Using both a stricter (from 1935, Model 6) and a wider (from 1930, Model 7) definition of the autarchy period, we find a negative and significant interaction effect for spinoff generation events occurring after autarchy, and no effect for spinoff occurring between the two wars, but before autarchy, confirming our ideas about one potential mechanism driving Hypothesis 2c.

Finally, in Table 4 we report some robustness checks. First, Model 1 includes both temporal and spatial interaction effects, and it confirms results from previous models, excluding the short term effect for the Turin area. Second, in Model 2 we employ a Gompertz specification for the baseline hazard function: although the magnitude of some effects are slightly different, all results from Model 1 are confirmed. Finally, in Model 3, we repeat our analysis about the role of autarchy including spatial interactions: the main tendency is confirmed, although with lower precision and a statistical significance at 0.1.

5. Conclusions

In this paper, we showed that in the Italian motorcycle industry spinoff generation has positive effects on the survival chances of parents. We also showed that this positive effect depends on the institutional context. Parents generating a spinoff between the two World Wars or located in the Turin area did not get any advantage, and actually had lower survival chances. On the contrary, parent firms in the Motorvalley area enjoyed further advantages from spinoff generation.

Our work confirms results from previous studies about the positive impact of spinoff generation on the parent firm in manufacturing industries (McKendrick et al., 2009, Ioannou, 2014) and extends our understanding about the drivers of this effect. Our results contribute to the literature about spinoffs (Klepper, 2007) and employee entrepreneurship (Agarwal et al., 2016), by showing that institutional factors affect not only spinoff generation (Cheyre et al., 2015, Starr et al. 2016) and spinoff performance patterns (Cusmano et al.,2015, Morrison and Boschma, 2018), but also parent performance. We also contribute to the evolutionary geography literature, that has emphasized the role of spinoffs to explain the uneven distribution of economic and innovation activities in space (Boschma and Frenken, 2006; Martin and Sunley, 2006), and in particular to its recent institutional turn (Boschma and Frenken, 2009; MacKinnon et al., 2009; Boschma and Capone, 2015; Pike et al., 2016; Cortinovis et al., 2017; Antonietti and Boschma, 2018), by showing how the institutional context interacts with the evolutionary mechanism of capabilities reproduction that characterizes the link between parents and spinoffs.

An important limitation we acknowledge in our work is related to the measurement of institutions. Our hypotheses about the role of the institutional context in determining parent performance are based on considerations derived from historical accounts and empirical evidence about cluster characteristics. In particular, we refer to specific policies implemented by the Fascist government, to the presence of an industrial giant (FIAT) of a related industry (automobiles) in the Turin cluster, and to the specific institutional arrangement prevailing in the Emilian model. However, our data do not allow us to directly measure indicators of the underlying mechanisms driving our results. We hope that this shortcoming might be addressed in future work, by employing databases with complete information about the mobility of all employees.

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TABLES

Table 1. Cox proportional hazard model, hazard ratios. Italian motorcycle producers, 1893-1993. Baseline models.

VARIABLES	(1)	(2)	(3)	(4)
Spinoff Generation		0.701**	0.661*	0.672
		(0.121)	(0.142)	(0.251)
Spinoff Clock			1.007	1.023
			(0.0136)	(0.157)
Spinoff	0.488***	0.507***	0.504***	0.506***
	(0.0921)	(0.0873)	(0.0893)	(0.0893)
Experienced Entrant	0.588***	0.590***	0.591***	0.591***
	(0.0400)	(0.0415)	(0.0416)	(0.0417)
Experienced Firm	0.444***	0.443***	0.444***	0.443***
	(0.0412)	(0.0408)	(0.0409)	(0.0409)
Parent Duration	0.990**	0.990***	0.990**	0.990**
	(0.00424)	(0.00395)	(0.00411)	(0.00408)
Motorvalley	0.714***	0.725***	0.726***	0.726***
	(0.0854)	(0.0887)	(0.0893)	(0.0889)
Turin area	0.923	0.925	0.928	0.925
	(0.0683)	(0.0651)	(0.0633)	(0.0639)
Milan area	0.847	0.866	0.867	0.866
	(0.0958)	(0.0913)	(0.0895)	(0.0908)
Regional GDP	1.009***	1.01***	1.01***	1.01***
	(0.00199)	(0.00202)	(0.00203)	(0.00202)
Industry density	1.013***	1.012***	1.012***	1.012***
	(0.00412)	(0.00387)	(0.00390)	(0.00388)
Population	2.916	3.098	2.635	3.020
	(9.965)	(10.15)	(8.294)	(9.723)
Related variety	1.000***	1.000***	1.000***	1.000***
	(2.74e-07)	(2.84e-07)	(2.84e-07)	(2.83e-07)
Education	0.187***	0.195***	0.195***	0.195***
	(0.0581)	(0.0580)	(0.0577)	(0.0579)
Entry before WW1	3.692***	3.622***	3.639***	3.624***
	(0.467)	(0.438)	(0.450)	(0.443)
Entry btw Wars	1.994***	1.987***	1.983***	1.987***
	(0.252)	(0.248)	(0.248)	(0.248)
Entry before WW1 * T	0.965***	0.966***	0.965***	0.966***
	(0.00946)	(0.00869)	(0.00935)	(0.00891)
Entry btw Wars * T	0.977**	0.978**	0.979**	0.978**
	(0.0110)	(0.0108)	(0.0106)	(0.0108)
Observations	641	641	641	641

Note: Standard errors clustered at the province level in parentheses. *** p < 0.01; ** p < 0.05; * p<0.1

Table 2. Cox proportional hazard model, hazard ratios. Italian motorcycle producers, 1893-1993. Spatial interactions.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Spinoff Generation	0.718	0.553***	0.746	0.730	0.501***	0.936	0.527***
	(0.157)	(0.0985)	(0.225)	(0.188)	(0.0912)	(0.403)	(0.108)
Spinoff Clock				0.999	1.011	0.975	1.002
				(0.0169)	(0.0119)	(0.0367)	(0.0145)
Spingen Motorvalley	0.880			0.421**			0.592*
	(0.286)			(0.169)			(0.171)
Spingen Turin		2.721***			1.673**		1.589**
		(0.516)			(0.368)		(0.372)
Spingen Milan			0.865			0.526	
			(0.327)			(0.280)	
Spinclock Motorvalley				1.071***			
				(0.0254)			
Spinclock Turin					1.119***		1.064***
					(0.0199)		(0.0239)
Spinclock Milan						1.049	1.129***
						(0.0431)	(0.0183)
Spinoff	0.511***	0.517***	0.505***	0.501***	0.516***	0.503***	0.505***
	(0.0926)	(0.0970)	(0.0854)	(0.0940)	(0.0998)	(0.0856)	(0.0992)
Experienced Entrant	0.590***	0.583***	0.591***	0.590***	0.583***	0.592***	0.584***
	(0.0422)	(0.0438)	(0.0413)	(0.0419)	(0.0439)	(0.0419)	(0.0433)
Experienced Firm	0.443***	0.440***	0.442***	0.443***	0.441***	0.444***	0.440***
	(0.0410)	(0.0401)	(0.0405)	(0.0416)	(0.0405)	(0.0409)	(0.0409)
Parent Duration	0.990**	0.989**	0.990***	0.990**	0.990**	0.990**	0.990**
	(0.00412)	(0.00418)	(0.00394)	(0.00428)	(0.00430)	(0.00400)	(0.00432)
Motorvalley	0.732**	0.732**	0.723***	0.733**	0.733**	0.718**	0.727**
	(0.0964)	(0.0903)	(0.0897)	(0.0970)	(0.0910)	(0.0928)	(0.0959)
Turin area	0.924	0.890*	0.921	0.921	0.895*	0.933	0.890*
	(0.0644)	(0.0607)	(0.0611)	(0.0627)	(0.0597)	(0.0584)	(0.0597)
Milan area	0.864	0.874	0.871	0.864	0.876	0.883	0.877
	(0.0899)	(0.0939)	(0.0987)	(0.0907)	(0.0917)	(0.0919)	(0.0952)
Regional GDP	1.01***	1.01***	1.01***	1.01***	1.01***	1.01***	1.010***
	(0.00203)	(0.00203)	(0.00201)	(0.00202)	(0.00203)	(0.00203)	(0.00202)
Industry density	1.012***	1.012***	1.012***	1.012***	1.012***	1.012***	1.012***
	(0.00391)	(0.00389)	(0.00404)	(0.00394)	(0.00400)	(0.00407)	(0.00397)
Population	3.099	3.671	3.804	3.137	2.965	1.862	3.542
	(10.22)	(11.89)	(12.03)	(9.971)	(9.275)	(5.098)	(11.01)
Related variety	1.000***	1.000***	1.000***	1.000***	1.000***	1.000***	1.000***
	(2.87e-07)	(2.83e-07)	(2.79e-07)	(2.86e-07)	(2.84e-07)	(2.81e-07)	(2.83e-07)
Education	0.195***	0.200***	0.195***	0.196***	0.201***	0.198***	0.201***
	(0.0586)	(0.0614)	(0.0586)	(0.0586)	(0.0618)	(0.0591)	(0.0616)
Entry before WW1	3.626***	3.603***	3.613***	3.627***	3.620***	3.701***	3.598***
	(0.435)	(0.439)	(0.446)	(0.439)	(0.453)	(0.458)	(0.444)
Entry btw Wars	1.991***	1.968***	1.984***	2.008***	1.963***	1.967***	1.978***
	(0.245)	(0.253)	(0.250)	(0.264)	(0.254)	(0.249)	(0.270)
Entry before WW1 * T	0.966***	0.967***	0.967***	0.966***	0.966***	0.961***	0.967***
	(0.00854)	(0.00886)	(0.00939)	(0.00952)	(0.00918)	(0.0120)	(0.00955)
Entry btw Wars * T	0.978**	0.978*	0.978**	0.977**	0.979*	0.979*	0.978**
	(0.0110)	(0.0110)	(0.0108)	(0.0104)	(0.0108)	(0.0109)	(0.0106)
Observations	641	641	641	641	641	641	641

Note: Standard errors clustered at the province level in parentheses. *** p < 0.01; ** p < 0.05; * p<0.1

Table 3. Cox proportional hazard model, hazard ratios. Italian motorcycle producers, 1893-1993. Temporal interactions.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Spinoff Generation	0.707*	0.444**	0.932		0.308***	0.442**	0.438**
	(0.138)	(0.156)	(0.159)		(0.0979)	(0.155)	(0.153)
Spinoff Clock					1.034		
					(0.0392)		
Spingen bef WW1	0.927			0.681***			
	(0.205)			(0.0609)			
Spingen btw Wars		2.244*		0.995	3.434***		
		(0.998)		(0.177)	(1.040)		
Spingen after WW2			0.402*	0.379**			
			(0.196)	(0.154)			
Spinclock btw Wars					0.961		
					(0.0356)		
Spinclock bef Autarchy						2.145	1.905
						(1.031)	(0.893)
Spinclock Autarchy						2.594***	3.403***
						(0.897)	(1.461)
Spinoff	0.506***	0.482***	0.486***	0.482***	0.483***	0.484***	0.465***
	(0.0862)	(0.0849)	(0.0853)	(0.0849)	(0.0868)	(0.0849)	(0.0807)
Experienced Entrant	0.591***	0.590***	0.584***	0.587***	0.590***	0.591***	0.591***
	(0.0415)	(0.0418)	(0.0407)	(0.0410)	(0.0424)	(0.0418)	(0.0405)
Experienced Firm	0.443***	0.446***	0.443***	0.445***	0.444***	0.446***	0.444***
	(0.0410)	(0.0402)	(0.0398)	(0.0400)	(0.0391)	(0.0398)	(0.0396)
Parent Duration	0.990***	0.991**	0.991**	0.991**	0.991**	0.991**	0.991**
	(0.00392)	(0.00393)	(0.00387)	(0.00389)	(0.00406)	(0.00393)	(0.00390)
Motorvalley	0.725***	0.704***	0.705***	0.702***	0.705***	0.702***	0.698***
	(0.0889)	(0.0887)	(0.0880)	(0.0885)	(0.0890)	(0.0891)	(0.0882)
Turin area	0.925	0.929	0.932	0.931	0.924	0.928	0.926
	(0.0649)	(0.0660)	(0.0679)	(0.0668)	(0.0685)	(0.0665)	(0.0654)
Milan area	0.867	0.876	0.863	0.870	0.876	0.876	0.880
	(0.0924)	(0.0949)	(0.0934)	(0.0951)	(0.0964)	(0.0952)	(0.0967)
Regional GDP	1.01***	1.01***	1.01***	1.01***	1.01***	1.01***	1.01***
	(0.00203)	(0.00202)	(0.00202)	(0.00202)	(0.00202)	(0.00201)	(0.00203)
Industry density	1.012***	1.013***	1.013***	1.013***	1.013***	1.013***	1.013***
	(0.00387)	(0.00385)	(0.00380)	(0.00383)	(0.00390)	(0.00384)	(0.00379)
Population	3.060	1.922	2.043	1.865	2.615	2.035	2.117
	(9.998)	(6.346)	(7.090)	(6.313)	(9.130)	(6.767)	(6.974)
Related variety	1.000***	1.000***	1.000***	1.000***	1.000***	1.000***	1.000***
	(2.82e-07)	(2.83e-07)	(2.86e-07)	(2.85e-07)	(2.82e-07)	(2.83e-07)	(2.81e-07)
Education	0.195***	0.191***	0.189***	0.190***	0.189***	0.192***	0.193***
	(0.0582)	(0.0563)	(0.0567)	(0.0566)	(0.0563)	(0.0566)	(0.0583)
Entry before WW1	3.626***	3.749***	3.719***	3.748***	3.696***	3.739***	3.722***
	(0.435)	(0.461)	(0.459)	(0.463)	(0.461)	(0.463)	(0.480)
Entry btw Wars	1.986***	1.964***	1.971***	1.966***	1.944***	1.962***	1.969***
	(0.248)	(0.248)	(0.252)	(0.251)	(0.252)	(0.250)	(0.255)
Entry before WW1 * T	0.966***	0.958***	0.957***	0.957***	0.962***	0.959***	0.959***
	(0.00873)	(0.00808)	(0.00813)	(0.00845)	(0.00619)	(0.00797)	(0.00792)
Entry btw Wars * T	0.978**	0.976**	0.976**	0.976**	0.977**	0.976**	0.975**
	(0.0108)	(0.0106)	(0.0106)	(0.0107)	(0.0107)	(0.0106)	(0.0103)
Observations	641	641	641	641	641	641	641

Note: Standard errors clustered at the province level in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p<0.1$

Table 4. Cox and Gompertz proportional hazard model, hazard ratios. Italian motorcycle producers, 1893-1993. Robustness checks.

VARIABLES	(1)	(2)	(3)
Spinoff Generation	0.297***	0.27***	0.438***
	(0.089)	(0.0782)	(0.116)
Spinoff Clock	1.03	1.05	0.995
	(0.0412)	(0.0436)	(0.0194)
Spingen Motorvalley	0.378**	0.468*	0.364**
	(0.157)	(0.187)	(0.152)
Spingen Turin	0.954	1.719	0.917
	(0.306)	(0.59)	(0.32)
Spinclock Motorvalley	1.083***	1.064***	1.082***
	(0.0292)	(0.0146)	(0.0318)
Spinclock Turin	1.144***	1.098***	1.159***
	(0.0169)	(0.0157)	(0.0174)
Spingen btwWars	3.331**	2.188**	
	(1.608)	(0.842)	
Spinclock BtwWars	0.955	0.955	
	(0.0305)	(0.0322)	
Spingen BefAut			1.812
			(1.075)
Spingen Autarchy			2.786*
			(1.458)
Spinoff	0.492***	0.475***	0.494***
	(0.099)	(0.101)	(0.0996)
Experienced Entrant	0.585***	0.552***	0.586***
	(0.0429)	(0.0427)	(0.0419)
Experienced Firm	0.441***	0.405***	0.442***
	(0.0391)	(0.0346)	(0.0398)
Parent Duration	0.990**	0.99**	0.99**
	(0.0044)	(0.00441)	(0.0044)
Motorvalley	0.722**	0.715***	0.719**
	(0.0943)	(0.0921)	(0.0946)
Turin area	0.893	0.895	0.896
	(0.0662)	(0.0655)	(0.0629)
Milan area	0.878	0.88	0.878
	(0.0995)	(0.0856)	(0.0971)
Regional GDP	1.01***	1.011***	1.01***
	(0.00202)	(0.0022)	(0.00201)
Industry density	1.012***	1.013***	1.012***
	(0.00415)	(0.00428)	(0.00406)
Population	3.852	0.487	2.865
	(13.34)	(1.359)	(9.199)
Related variety	1.000***	1.000***	1.000***
	(2.82e-07)	(3.17e-07)	(2.83e-07)
Education	0.194***	0.169***	0.2***
	(0.0608)	(0.054)	(0.0622)
Entry before WW1	3.635***	3.028***	3.677***
	(0.486)	(0.432)	(0.504)
Entry btw Wars	1.964***	1.703***	1.978***
	(0.281)	(0.215)	(0.284)
Entry before WW1 * T	0.965***		0.961***
	(0.00666)		(0.00847)
Entry btw Wars * T	0.976**		0.975**
	(0.0115)		(0.0114)
Constant		0.34***	
		(0.135)	
Gamma		0.986***	
		(0.00482)	
Observations	641	641	641

Note: Standard errors clustered at the province level in parentheses. *** p < 0.01; ** p < 0.05; * p<0.1

Figure 1. Maximum number of firms active in one year in the motorcycle industry across Italian provinces.