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Firm exit and spatial agglomeration. Evidence on the resilience of Italian provinces*

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Abstract

The paper investigates the effect of spatial agglomeration on firm exit. In particular, the role of specialization and local variety in production is addressed. The extent to which industrial clusters can be actually retained industrial districts is also considered. Empirical evidence is provided for a large panel of Italian provinces and manufacturing sectors over the period 1995-2007. Urbanization economies significantly diminish firm exit of industries at the local level. Specialization also does, but only up to a certain level. Firm exit is also reduced by industrial variety, even far from the local specialization core. Industrial districts, instead, are neither less nor more resilient to industrial dynamics, unless variety is controlled for.

Keywords: Firm exit, Firm survival, Industrial districts, Spatial agglomeration, Related variety, Unrelated variety.

JEL Classification: R11; R12; L11; G20.

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1 Introduction

The analysis of firm exit/survival is by now one of the most debated issue in industrial organization (e.g. Evans, 1987; Geroski, 1995; Yasuda, 2005). Availability of micro-data and advances in econometric techniques have made the literature focus on firm-specific determinants (e.g. Santarelli and Vivarelli, 2007). Industry- and location- (or region-) specific determinants, instead, have been receiving less attention. Furthermore, their analysis has been mainly separated (notable exceptions are Fritsch and Schindele (2010) and Carree et al. (2010)). This is for us quite unfortunate, at least for two reasons.

First of all, the spatial agglomeration of firms has been proved an important source of both positive and negative externalities, whose effect on regional economic performances depends also on their impact on the firms' survival chances. Accordingly, this latter causal mechanism should deserve more direct attention than the indirect one it mainly gets in regional and urban economics (e.g. Frenken et al., 2007; Boschma and Iammarino, 2009). In other words, it would be desirable to further extend the analysis of agglomeration economies to the investigation of firm survival. This extension is possibly more important for industrial districts, whose socio-economic features (Becattini, 1990; Dei Ottati, 1994) intertwine with agglomeration economies and enable firms "idiosyncratic" survival mechanisms to negative economic conditions (e.g. Storper and Christopherson, 1987).

Second, the analysis of industry- and location- specific determinants of firm exit is crucial in front of the current economic crises. Its industrial demography effects seem to have in fact strong local specificities. Recent empirical studies on the Italian industrial districts, for example, seem to suggest they do not show the superior resilience of the past (Bugamelli et al., 2009; CENSIS, 2010). Reconciling industrial organization and industrial district studies in the analysis of firm survival is thus also urged by the investigation of business cycle and economic conditions.

In trying to fill this gap, in the paper we bring together the interlink of industry- and location- specific determinants of firm exit to the front. Furthermore, we control for some firm-specific determinants and for the economic conditions firms face in their industrial and geographical location. Such an exercise is accomplished with respect to a large balanced panel of data for the Italian economy, disaggregated by sector and province, covering 13 years (from 1995 to 2007).

The paper is organized as follows. Section 2 reviews the relevant literature, and integrates it with predictions which emerge by focusing on agglomeration economies. Section 3 presents the dataset and the empirical specification. In Section 4 we discuss the main results. Section 5 concludes.

2 Background literature on firm exit

The theoretical and empirical literature on the determinants of firm exit is abundant. However, clear results about their effects have been obtained only at the firm and industry level. At the local/regional level, instead, further research is needed to disentangle the inner mechanisms at work.

2.1 Firm- and industry-specific factors

In the analysis of business survival chances, the most consolidated hypotheses concern *age* and *size* of the start-ups. As for the former, the "liability of newness" – a positive relationship between firm age and survival rate (e.g. Stinchcombe, 1965; Geroski, 1995) – is tested against the "liability of aging" – a negative relationship between the two (e.g. Hannan, 1998) – with the possibility of non linear effects and U-shaped patterns (e.g. Brüderl and Schussler, 1990; Fritsch and Schindele, 2010). As for the latter, the "liability of smallness" (Aldrich and Auster, 1986), pointing to the advantages of larger firms in terms of economies of scale, access to capital and labor markets, has found empirical support (e.g. Geroski, 1995; Honjo, 2000).

With respect to the firm-specific ones, the analysis of industry-specific determinants has led to relatively less ambiguous results. On the one hand, some few industry characteristics seem to work as clear impediments to firm survival. First of all, this is the case of the *industry start-up (or entry) rate* – both current and lagged (Honjo, 2000), within and across sectors (Dejardin, 2004) – inducing a number of different exit mechanisms.[1] An impediment is also represented by the *industry labor costs*, imposing a burden on those firms which have not yet broken-even (Patch, 1995).

On the other hand, some other industrial characteristics have been argued to work in both increasing and decreasing firm exit. This is particularly so for the *industry growth*. Particularly high in the early stages of the industry life-cycle, its impact on firm survival could be both negative – given the turbulence and uncertainty of the industrial environment (Ilmakunnas and Topi, 1999) – and positive – as price competition is less aggressive (Bradburd and Caves, 1982). Ambiguous is also the expected role of the *technological intensity* of one industry. High-tech sectors tend to be characterized by above-average uncertainty and information asymmetries, which should lead to higher exit rates (Licht and Nerlinger, 1998). However, the technological efforts (R&D) and output (patents and trademark) of the firms increase their mutual absorptive capacity, spur technological spillovers and foster their capabilities to resist change in the industry (Cefis and Marsili, 2006; Jensen

[1] Firm entry can generate a displacement or a "revolving door" effect on incumbent firms (Audretsch, 1995), and impact on, alternatively, their efficiency or life expectancy (Johnson and Parker, 1994). Although with less econometric accuracy, significant effects on firm exit have been found also for previous exits (e.g. Dejardin, 2004; Carree et al., 2010).

et al., 2008).

2.2 Location- and region-specific factors

Although location factors are increasingly more addressed in investigating firm exits, that is still quite far from the potentiality offered by regional and urban studies. First of all, specific local factors could and should be isolated and investigated more directly. *Urbanization economies* and *localization economies* should be clearly distinguished. Unlike the latter, the former accrue to all the local firms from urban size and density. Accordingly, rather than for the negative impact of space limitations only (Fritsch and Schindele, 2010), they could also account for institutional and infrastructural effects, with a positive impact on firm survival (Fotopoulos and Louri, 2000).

Localization economies (or *Marshall-Arrow-Romer externalities*) are instead available to the local firms within the same sector, and arise from labor market pooling, specialized suppliers, and knowledge spillovers. Usually proxied by local *specialization indicators* (e.g. Glaeser et al., 1992), their effect on firm exit is not unambiguous either. Higher specialization might entail learning-by-doing and productivity advantages for local firms. However, over-specializing might adversely lock firms in producing goods facing decreasing market demand and/or increase the competitive pressure for local resources.In brief, specialization interacts with other two industrial-location specific determinants of firm exit: *international openness* and *variety*.

As for the former, it can actually countervail the competitive pressure internal to the local system of production (Fritsch and Schindele, 2010). But it could also increase its exposition to international demand shocks (Staber, 2001; Bugamelli et al., 2009). Controlling for the industrial structure of the local system is therefore crucial in investigating the effects on firm exit of international openness. As for the latter, also investigated under the heading of *Jacobs externalities* (Glaeser et al., 1992), traces of them reducing firm exit have been already found (e.g. Staber, 2001; Gullstrand, 2005; Acs et al., 2007). However, the way these externalities have been examined in industrial organization is far less sophisticated than in studying regional growth, employment and trade (Frenken et al., 2007; Saviotti and Frenken, 2008; Boschma and Iammarino, 2009). In particular, careful attention would deserve the distinction between *related* and *unrelated variety* (Frenken et al., 2007), whose effects on firm exit work through different mechanisms. On the one hand, the more unrelated the sectors a region is involved in – that is the higher its *unrelated variety* –, the more the region can follow a portfolio strategy which could reduce its firm mortality to sector specific shocks. Second, the higher the internal diversification of regional sectors – the higher its *related variety* –, the higher the chances of knowledge spillovers with positive effects on its firms' survival.

Finally, greater attention is required in investigating firm exit in *industrial*

districts (ID). Indeed, very few studies in the firm-exit literature (Staber, 2001; Carree et al., 2010) consider ID as more qualified than simple local industrial clusters, by referring to the statistical efforts of proxing the canonical Becattini's (1990) definition: spatial agglomerations of mostly small and specialized firms, performing complementary activities and embedded in a network of social and economic relations of trust, co-operation and competition. This is very unfortunate, as the pivotal role social elements have in ID introduce further specific determinants of firm exit. First of all, in ID social capital normally attenuates opportunistic behaviors, thus mitigating the risks of hold-up and take-overs. Second, socially embedded inter-firm production linkages enable inter-firm credit relationships (Dei Ottati, 1994), which can act as a risk-sharing mechanism depending on the kind of turbulence the ID is exposed to (Cainelli et al., 2010). On this basis, ID should be expected to reduce firm exit, but by controlling for their production structure and their interaction with the other agglomeration factors.[2]

3 Empirical application

The empirical application refers to the Italian economy, as one of the most popular for agglomeration and ID phenomena. We investigate the determinants of firm exit revealed by 23 manufacturing industries (two-code ISTAT-ATECO 2007) in 103 Italian provinces (equivalent to NUTS 3, and part of the larger NUTS 2 classification (Regions)), over the last 13 years (1995-2007).

Unlike Carree et al. (2010), our focus is on the impact specific elements of spatial agglomeration has on firm exit in manufacturing, controlling for its sectoral heterogeneity. Accordingly, rather than their different sectoral panels, drawing on basically the same sources as theirs, we build up a unique balanced panel dataset of approximately 22,000 observations.[3]

Our panel covers the yearly firm exit rate by province s and sector i – as the dependent variable – and a consistent number of regressors listed in Table 1. Among them, particular attention deserves the variety and ID

[2]In this last respect, Staber (2001) finds that belonging to an ID (the knitwear district of Baden-Württemberg, Germany) reduces firm survival, possibly because of competition effects on local resources. But the variety among the firms' routines counteracts this negative effect. Carree et al. (2010), instead, find that the total number of ID in the Italian provinces reduce the likelihood of firm exit in several sectors of the 12 considered, but without controlling for the other location factors we mentioned above.

[3]Data are taken from the "Movimprese Archive" of the Italian Chamber of Commerce (Camere di Commercio, Uniocamere), the "1991 Italian Industrial census" of the Italian National Statistical Institute (ISTAT) and the yearly series of "Provincial Accounts" (Conti Provinciali) of ISTAT. The choice of working with a unique panel in investigating agglomeration aspects is somehow supported also by Carree et al.'s (2010) results. In their studies, the District variable is one of the few for which the effects are not significantly different across sectors (see Section 4 of their article).

indicators. In particular, the *intra-industry variety* of each two-digit sector i in province s, is calculated as the entropy (Theil, 1972; Attaran, 1986) of the employment shares of its five-digit sub-sectors.[4] Similarly, the *unrelated variety* of each two-digit sector i in province s, is worked out as the entropy of the employment shares of the two-digit sectors of s other than i. Finally, a *related variety* measure is calculated for each province s, as the weighted sum of the entropies of all its two-digit sectors.

As for the ID variable, rather than relying on the presence or counting of ID in the provinces (as in Carree et al. (2010)), for each of them we try to disentangle the extent to which district effects are at work. Accordingly, we build up a *district degree* variable, as the number of ID workers divided by the total manufacturing employment of the province.[5]

Table 1 also reports a number of controls we retain to account for the determinants listed in Sections 2.1 and 2.2. Among the others, we control (partly) for the inner micro dynamics of exit rates introducing the current and lagged *start-up rates* at the sector/province level (one and two lags); the *unit labor cost* in the province, in order to account for the negative impact that agglomeration phenomena can have via the increased pressure on production factors; the percentage change of the Industrial Production Index (IPI) at the national and province level, to account for the effects that cyclical factors and a dynamic environment may have on exit probabilities; technology dummies, to estimate the impact of the technology level on exit rates.[6]

[4] As pointed out by Frenken et al. (2007), the main advantage of entropy as a measure of diversification is that it is decomposable and its decomposability implies that variety at several digit levels can enter a regression analysis without necessarily causing collinearity.

[5] ID have been identified following the criteria of the Italian National Statistical Office (ISTAT), which in turn refers to local labor market areas in Italy, according to the "Sforzi approach" (Boccella et al., 2005; Sforzi, 2009). Both the variety and the ID indicators have been worked out for the year 1991 in order to avoid endogeneity problems, but remain nearly unchanged along the period.

[6] The list of controls slightly differs from that used by Carree et al. (2010), also relying on their own results. In particular, the lagged exit rate is not included, as did not turn out significant in the estimates by means of a one-step system GMM estimator (Arellano and Bond, 1991, 1998; Blundell and Bond, 1998). Lagged cross-sectoral exit rates are excluded as mainly relevant in the relationships between manufacturing and services, while we do have manufacturing sectors only. Excluded are also lagged cross-sectoral entry rates and the number of incumbents, as hardly relevant in the Italian context from Carree et al. (2010). Finally, with respect to them, IPI is preferred to lagged valued added growth and lagged employment rate to account for business cycle, and simple technological dummies to patents, given their limited signalling power for Italian firms.

Table 1: Variables summary

Variable	Formula	Description
Exit rate$_{i,s,t}$	$\frac{\#\text{ exit firms}_{i,s,t}}{\#\text{ active firms}_{i,s,t}}$	Firm exit rate of sector i in province s and year t.
Start-up rate$_{i,s,t}$	$\frac{\#\text{ new firms}_{i,s,t}}{\#\text{ active firms}_{i,s,t}}$	Firms' start-up rate of sector i in province s and year t.
%Δ National IPI$_t$		Percentage change of the Industrial Production Index for Italy in year t.
%Δ Regional IPI$_{s,t}$		Percentage change of the Industrial Production Index in province s and year t.
Local export propensity$_{s,t}$		Value share of exports in total manufacturing production in province s and year t.
Local manufacturing share$_{s,t}$		Employment share of manufacturing in province s and year t.
Local manufacturing productivity$_{s,t}$		Manufacturing value added per worker at constant prices in province s and year t.
ln(Manufacturing labor cost$_{s,t}$)		Log of unit labor cost at constant prices in manufacturing in province s and year t.
ln(Population density$_{s,t}$)		Log of residents in province s and year t per Km^2.
Industry specialization$_{i,s,1991}$	$\frac{L_{i,s,1991}}{\sum_s L_{i,s,1991}} \,/\, \frac{\sum_i L_{i,s,1991}}{\sum_{i,s} L_{i,s,1991}}$	Balassa index of sector i and province s in 1991.
Intra-industry variety$_{i,s,1991}$	$-\sum_{g\in S_i} \frac{p_{g,s,1991}}{P_{i,s,1991}} \log_2(\frac{p_{g,s,1991}}{P_{i,s,1991}})$	Entropy of the two-digit sector i in province s in 1991 ($H_{i,s,1991}$), where $p_{g,s,1991}$ is the share of workers employed in the five-digit sector g in province s on the total number of workers in province s, and $P_{i,s,1991}(=\sum_{g\in S_i} p_{g,s,1991})$ is the same fraction computed with respect to the two-digit sector i, which the sub-sector g belongs to.
Unrelated variety$_{i,s,1991}$	$-\sum_{j\neq i} P_{j,s,1991} \log_2(P_{j,s,1991})$	Entropy computed at the two digit level in province s for sectors different from i in 1991.
Related variety$_{s,1991}$	$\sum_i P_{i,s,1991} \times H_{i,s,1991}$	Weighted sum of the entropy computed for each two-digit sector in province s during 1991.
District degree$_{s,1991}$		Employment share for firms in industrial districts (according to the ISTAT classification which follows the Sforzi approach) on total manufacturing employment in province s in 1991.
Technology dummies		OECD-Eurostat sectoral classification in high-, medium- and low-tech industries.

We estimate the following specification:

$$\begin{aligned}\text{Death rate}_{i,s,t} = {} & \beta_0 + \beta_1 \text{ Start-up rate}_{i,s,t} + \beta_2 \text{ Start-up rate}_{i,s,t-1} + \\ & \beta_3 \text{ Start-up rate}_{i,s,t-2} + \beta_4 \ \%\Delta \text{ IPI}_t + \beta_5 \ \%\Delta \text{ Regional IPI}_t + \\ & \beta_6 \text{ Local exp prop}_{s,t} + \beta_7 \text{ Man share}_{s,t} + \beta_8 \text{ Man productivity}_{s,t} + \\ & \beta_9 \ \ln(\text{Labor cost}_{s,t}) + \beta_{10} \ \ln(\text{Pop density}_{s,t}) + \beta_{11} \text{ Specialization}_{i,s,1991} + \\ & \beta_{12} \text{ Specialization}^2_{i,s,1991} + \beta_{13} \text{ Industry var}_{i,s,1991} + \beta_{14} \text{ UV}_{i,s,t} + \\ & \beta_{15} \text{ RV}_{s,1991} + \beta_{16} \text{ District}_{s,1991} + \beta_{17} \text{ Industry var}_{i,s,1991} \times \text{District}_{s,1991} + \\ & \beta_{18} \text{ Tech dummies} + \beta_{19} \text{ Geographic dummies} + \beta_{20} \ t + u_{i,s} + \epsilon_{i,s,t}\end{aligned}$$

By using a fixed-effect estimator to account for the presence of unobserved heterogeneity, the coefficients on the time-invariant explanatory variables cannot be identified. On the contrary, a random effect estimator rests on the assumption of no correlation between all the covariates and the unobserved heterogeneity for consistency. Likely, a too restrictive condition. Therefore, we also allow for the possibility that the strict exogeneity assumption fails to hold for one or more regressors, by using a *Hausman-Taylor model* (Hausman & Taylor, 1981). Indeed, the results of the Hausman specification tests point to this last model as the most appropriate one.

4 Results

The results we obtain (Table 2) confirm the intertwining of industry and location specific factors in driving firm exit.

A first insight in this respect is the U-shape relationship between the firm exit rate of the Italian provinces and their initial *industry specialization*. As expected, a higher sector specialization entails higher Marshallian externalities, whose productivity effects actually reduce the firms' exit rate, but only up to a certain point.[7] Beyond that, specializing in a certain sector exposes the firms of a local system to an excessive competitive pressure and to the risk of organizational inertia and death.

A related result is that of *export propensity*. While significantly negative without controlling for it (results available from the authors at request), the international openness of a local system looses explicative power once its industry share has been retained. This points to the ultimate reason of its relevance. In brief, it seems the different weight manufacturing has in the provinces to impact on their export propensity, and then on their firm

[7] Although in general non significant, because of data constraints, in the current specification the productivity variable refers to province-level, and is thus not inconsistent with the Marshallian externalities interpretation. It is instead consistent the negative sign of the manufacturing share of the provinces, which captures this kind of externalities to a certain extent.

Table 2: Estimation results

Estimation Method	Hausman-Taylor estimator		
	(1)	(2)	(3)
Start-up rate$_{i,s,t}$	0.092**	0.092**	0.092**
	(0.007)	(0.007)	(0.007)
Start-up rate$_{i,s,t-1}$	0.027**	0.027**	0.027**
	(0.005)	(0.005)	(0.005)
Start-up rate$_{i,s,t-2}$	0.005**	0.005**	0.005**
	(0.002)	(0.002)	(0.002)
%Δ national IPI$_t$	-0.004**	-0.004**	-0.004**
	(0.0005)	(0.0005)	(0.0005)
%Δ regional IPI$_t$	0.037**	0.037**	0.037 **
	(0.009)	(0.009)	(0.009)
Local export propensity$_{s,t}$	0.0005	0.0005	0.0005
	(0.0005)	(0.0005)	(0.0005)
Local manufacturing share$_{s,t}$	-0.066**	-0.069**	-0.068**
	(0.022)	(0.022)	(0.022)
Local manufacturing productivity$_{s,t}$	0.004	0.004	0.004
	(0.004)	(0.004)	(0.004)
ln(Manufacturing labor cost$_{s,t}$)	0.046**	0.045**	0.045**
	(0.009)	(0.009)	(0.009)
ln(Population density$_{s,t}$)	-0.004**	-0.003*	-0.003*
	(0.002)	(0.002)	(0.002)
Industry specialization$_{i,s,1991}$	-0.005**	-0.005**	-0.005**
	(0.001)	(0.001)	(0.001)
Industry specialization$^2_{i,s,1991}$	0.0002**	0.0002**	0.0002**
	(0.00003)	(0.00004)	(0.00004)
Intra-industry variety$_{i,s,1991}$	-0.027**	-0.026**	-0.030**
	(0.001)	(0.001)	(0.002)
Unrelated variety$_{i,s,t}$		-0.009**	-0.010**
		(0.004)	(0.004)
Related variety$_{s,1991}$		-0.004	-0.003
		(0.004)	(0.004)
District degree$_{s,1991}$	0.003	0.002	-0.023**
	(0.006)	(0.006)	(0.011)
Intra-ind. variety$_{i,s,1991}$× Distr. degree$_{s,1991}$			0.011**
			(0.004)
Low-tech	0.009**	0.008**	0.009**
	(0.004)	(0.004)	(0.004)
Medium-tech	0.019**	0.018**	-0.005**
	(0.004)	(0.004)	(0.001)
High-tech dummy	Ref.	Ref.	Ref.
Time dummies	Yes	Yes	Yes
Geographic dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
N. obs.	19,602	19,602	19,602
N. groups	2,198	2,198	2,198
Hausman test (p-value)	0.000	0.000	0.000

Time varying endogenous variables: Start-up rate, Local export propensity, Manufacturing share.
Regressions also include a constant term; standard errors in parentheses.
** significant at 5%; * significant at 10%.

mortality. This is an extremely important point to consider in order to avoid misleading interpretations about the role international trade *per se* has on firm survival (Staber, 2001). *Business cycle conditions*, instead, seem to play a role for firm mortality in Italy (a result which does not emerge from Carree et al. (2010), who use different indicators). With respect to national ones, as expected, firm exit is counter-cyclical. But with respect to local ones, the reverse holds true, pointing to the higher risks and risk-sharing mechanisms in front of, respectively, local booms and recessions.

A second insight about the role of spatial agglomeration is the significant impact the *urbanization economies* of the provinces have in reducing the firm exit of their industries. This is somehow unexpected when compared with other studies(e.g. Fritsch and Schindele, 2010; Carree et al., 2010). However, this result seems to suggest that, rather than larger spatial congestion, denser provinces also have more diffused institutional set-ups, providing firms with important leverages to extend their business (i.e. training and education facilities) and/or resist negative circumstances (i.e. bank loans and insurance services).

A third and more important insight comes from the results of the variety indicators. As predicted, the "internal" variety of the industrial sectors of one province – i.e. the *intra-industry variety* – appears to have a role in attenuating their firm exit. As said, the specialization in one sector might help the industrial demography of one local system, at least up to a certain point, after which over-specializing is detrimental. Consistently, the diversity of the activities of each industry reduces firm exit. Apparently, this variety is thus a source of intra-industry spillovers of which firms benefit to become more long-lived.[8]

A negative impact on the firm exit rate of one local industry is also played by its diversity with respect to the other industries of the same province – the *unrelated variety*, here declined at the industry level. This result is extremely interesting, when compared with the studies on the binding role of the core specialization of the Italian local systems. Indeed, important cross-sectoral spillovers for the firm survival seem to accrue also far from the core sectors. Furthermore, as it is conceptually similar to the unrelated variety of the whole province, the negative sign attached to the industrial one also points to its role in enabling local firms to pursue a portfolio strategy in front of sector specific shocks.

The results about the *district degree* of the provinces require careful attention. At the outset, the prediction of the ecological-evolutionary approach about the higher firm mortality in ID is not confirmed (for a survey, see Staber, 2001). To be sure, the pressure on the local resources seems to play a

[8]The industry specification of the "related variety" indicator - what we called intra-industry variety – is the most consistent with the dependent variable we use. Its standard definition (*a lá* Frenken et al. (2007)), as the *related variety* of the provinces, is actually never significant.

role in increasing firm exit.[9] However, this seems countervailed by the other ID factors favoring survival we pointed to above (Section 2.2). Eventually, the district degree of a province does not seem to have any impact on the firm exit rate of its industries. Indeed, the relative variable gets significant, and with a negative sign, only when its interaction with the intra-industry variety is retained, the latter showing a positive sign.

Considering the size of the correspondent coefficients, along with the average of the relevant variables, this seems to suggest that the ID degree of a province emerges as relevant in reducing firm exit only in those provinces in which the intra-industry variety is very low.[10] In these cases, where the opportunities of Jacobs externalities are nearly absent, it seems that local systems do their best to compensate for them by exploiting their ID features. Possibly by relying more on the effects of their social networks. Conversely, in the presence of high intra-industry variety, the working of the latter ID factors could be even detrimental for the firm survival. Possibly, because the latter implant in the local firms elements of organizational inertia which countervail the dynamic opportunities of the former.

The bottom line is that IDs are neither safer nor more dangerous places for firms to stay in general. In a more subtle argument, IDs contain potential mechanisms favoring the industrial demography of the firms, whose actual working impinges on the level of variety of its industries.

Although mainly used as controls, the results we got with respect to the remaining regressors are also interesting. First of all, the degree of turbulence of one industry in a certain province (proxied by its *start-up rate*) significantly increases its firm exit. As for the *technological intensity* of the industries, instead, the results are not as clear as in other studies (in particular Carree et al., 2010, who find evidence of a reducing exit effect in the Italian provinces, but for Intellectual Property Rights only). In the case of the Italian local production systems, operating in low-technology industries actually increases the firm mortality with respect to the case of high-tech industries. At a first sight, innovation would increase the firms' capacity to change and extend their survival. On the other hand, however, operating in mid-tech sectors does not unambiguously cause a similar disadvantage with respect to the baseline. The uncertainty which accompanies innovation activities might keep a role in increasing firm exit.

Finally, some more indirect evidence can be inferred from the results about the *lagged start-up rates* of the industries of the Italian provinces.

[9] The positive sign of the significant impact the unit cost of labour has on firm exit actually suggests that.

[10] Indeed, the marginal impact of the district degree of the province is actually given by

$$\frac{\partial \text{ Exit rate}_{ist}}{\partial \text{ District degree}_{st}} = -0.023 + 0.011 \times \text{Intra-industry variety}_{ist} \qquad (1)$$

with $Avg(\text{Intra industry variety}_{ist}) = 2.028$.

As in Carree et al. (2010), its impact on the firm exit rate is robustly significant and positive. Assuming that a high entry rate in one year will presumably increase the weight of young firms in the firm population the year(s) after, one can support the "liability of newness" for Italian firms. Similarly, assuming that new firms presumably have a smaller efficient scale than the established ones, the results also provide hints about the "liability of smallness" hypothesis. A more accurate test of these hypotheses would of course require the analysis of firm-micro data.

5 Conclusions

Although industrial demography is having an upsurge of interest, the increasing focus on its firm-specific determinants is somehow obscuring the role of industry and location specific determinants. In the current economic scenario, their analysis is however extremely important in dealing with the resilience of industrial districts and local production systems in general.

The main argument we developed is that agglomeration economies – up to now mainly investigated in regional and urban studies – have also an important role in accounting for firm exit. More precisely, our point of departure is that the location specific determinants of the firms' survival rate intertwine with more standard industrial determinants and help solving the ambiguous effects the latter have been recognized in previous studies.

In developing this argument, we disentangle the expected impact on firm exit of *urbanization economies*, as distinct from *localization economies* and *variety economies*, in turn distinguished into "intra-" and "extra-industry" variety. What is more, we contrasted the previous arguments with those descending from the consideration of actual industrial districts rather than "simple" clusters of firms.

The empirical application we carried out with respect to a large panel of Italian provinces, disaggregated by industrial sector, over the last decade, yielded interesting results with important policy implications.

First of all, agglomeration economies in general significantly attenuate the firm mortality of the industries of the Italian provinces. On the one hand, this is so for their urbanization economies, suggesting a role for infrastructural policies in promoting firms longevity. On the other hand, the same holds true for both the intra-industry and extra-industry (i.e. unrelated) variety of the specialization patterns of the Italian provinces. The role of industrial policies aiming at extending and diversifying the economic activities of a local system thus finds further support. The same implication can be drawn from the results on the role of the industry specialization of the Italian provinces. Indeed, the positive impact the related Marshallian externalities allow to the firms of their industries have been found to hold up to a certain limit, beyond which their impact becomes negative.

A second important result of the paper concerns the impact on firm exit of the industrial district degree of the provinces which host them. Looking at the Italian provinces, we are not able to conclude that this aspect has an unambiguous effect on firm mortality. IDs are neither safer nor more dangerous places for firms to stay in general. On the contrary, ID contain potential mechanisms favoring the industrial demography of the firms. Their actual working however depends on the level of variety of its industries. The relative policy implication is straightforward: industrial policy favoring the constitution and/or the viability of IDs, should not neglect the industry composition of the firm clusters on which they are based.

The third set of results concerns the variables we used as control. On the one hand, we find that an increasing number of start-ups in one industry in a certain province, while positive in some respects, contributes to create more aggressive business ecologies. An aspect that regional start-up policies should carefully retained. On the other hand, we find only weak evidence of the fact that operating in technological sectors might increase the firm survival rate.

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