The Survival of Italian Individual Firms to Local Demand Shocks During the Great Recession*

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General results show that the conditional and unconditional hazard of exit is larger for female, old and foreign-born entrepreneurs. However, when considering the effect of local demand shocks, this appears to be stronger for female, old, Italian entrepreneurs and for entrepreneurs located in highly-exposed labour market areas.

Keywords: Resilience, Micro-firms, Survival, Great Recession

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1 Introduction

The Great Recession, originated from the collapse of the financial market in the US in Fall 2007, also influenced real and financial markets worldwide. Besides financial disruptions, the Great Recession induced a strong negative demand shock, which was not homogeneous across firms, sectors, cities, regions and even countries. Particularly, the Great Recession affected the Italian economy in a severe way in terms of GDP collapse and increase in the unemployment rate as well as in terms of number of firms that left the market. Moreover, because of the peculiar structural features of the Italian economy, that is characterized by a business sector composed prevalently by a large number of micro and small firms, the Italian economy results to be particularly exposed to recession periods, especially so when these periods are prolonged and hit many sectors in the economy.

The aim of this paper is to evaluate the extent to which heterogeneous local demand shocks in the years of the Great Recession contributed to firm's exit for different categories of individual firms in Italy. To this purpose, we exploit very detailed information to build a novel indicator of local demand shock that is based on an estimate of the derived demand for final and intermediate products through input-output relationships.

Several studies have analysed the impact of the Great Recession over different units of analysis (e.g. individuals, firms, regions), mainly focusing on the resilience of the object of the analyses to shocks. At the regional level, Cainelli et al. (2018a), Cellini and Torrisi (2014), Cuadrado-Roura and Maroto (2016), Di Caro (2014, 2017), Fingleton et al. (2012) and Martin et al. (2016) find that employment shocks

depend on the phase of the business cycle and on some region-specific characteristics such as industry structure, product specialization and human capital. Other studies compare the impact of recessionary phases between urban and rural regions (Giannakis and Bruggeman, 2017; Palaskas et al., 2015; Psycharis et al., 2014). At the firm level, many studies have investigated the role of the firm characteristics that allow firms to survive to economic shocks. For instance, Richtnér and Löfsten (2014), focus on the role of soft skills and creative management. Zhu and Ruth (2013), instead, enlarge the focus of the analysis and focus on the resilience in industrial ecosystems. They show that the overall industrial ecosystem is more vulnerable to shocks the higher is the degree of interdependency between firms of the system. Nonetheless, the industrial ecosystem may be more efficient in terms of output potentials and, in the end, this higher efficiency may allow a great capacity to recover. Finally, several studies focus on firm characteristics that may reduce or increase the probability of firm exits after a distress (see for instance Balcaen et al., 2011; Cefis and Marsili, 2019; Coad, 2014; Ebert et al., 2018).

In order to explore the capacity to respond to economic shocks of any kind of socio-ecological system, economists have started using the concept of resilience. Resilience combines several different aspects. To the purpose of this work we briefly define resilience according to Martin (2011) as the capacity of an economy to adapt its structure in terms of firms, industries and institutions, as a consequence of a stress (e.g. a financial crisis) in order to maintain a positive and acceptable economic growth path over time.[1]

[1]Readers interested in an in-depth discussion on resilience and other related concepts, such as vulnerability and exposure, can refer to Modica et al. (2018)

On this strand of literature, several recent studies have assessed and defined the factors that may influence the capacity of the economic system to recover after a shock at the regional level. For instance, Capello et al. (2015) explore the role of financial activities, as well as the quality of production factors, the cooperation networks and the quality of urban infrastructure as factors that may foster or reduce the capacity of European urban systems to resist to economic shocks. Crescenzi et al. (2016), instead, look at the linkage between national macroeconomic conditions and regional factors that affect the regional economic system resistance in the EU27, mainly focusing on the role of human capital as an important positive factor, even though research and development-intensive regions are more exposed to negative shocks, at least in the short term, while Cuadrado-Roura and Maroto (2016) stress the positive role of productive specialization. Finally, Xiao et al. (2017) and Cainelli et al. (2018b) investigate the relationship between industrial relatedness and economic resilience.

Other works that address the effect of the Great Recession on the economic system have investigated instead the role of the industrial sectors and the impact of the crisis on the probability of survive of the firms and their capacity to enter and exit on the market. For instance, Giannakis and Bruggeman (2017) analysed the capacity of industrial sectors to cope with economic shocks in Greek regions. According to their study, the capacity of sectors to respond to crises is region-specific, e.g. agriculture sector is resilient in almost many regions and overall at national level, while food industry declined in aggregated terms, even though it was found to positively react to the shock in more than the half of the studied regions.

Similarly, Palaskas et al. (2015) provide evidence of heterogeneous answer to the crisis on municipal labour markets basis, asserting that, industry specialization and industrial networks can reduce the impact of the shock.

While regional and macroeconomic characteristics have been extensively explored to understand their effects on the impact of the financial crisis on economic growth and welfare of regions, relatively few studies have been conducted on the relationship between firm exit and entry and the capacity to resist to shocks as well as the impact of the Great Recessions on the survival rates of firms. On this line, Clementi and Palazzo (2016) found that aggregate firm exit and entry lead to greater persistence to positive and negative aggregate shocks. Cucculelli and Peruzzi (2018) found instead that firm's survival after the Great Recessions is positive related to pre-crisis improvements in the business model.

Given this evidence we believe that the concept of resilience is tightly connected to the capacity of a region to avoid the loss of production capacity (tangible and intangible) and capabilities because of a shock (Coad, 2014), therefore firm's survival is an important component of resilience. To this reason we rely on the resilience framework, even though we are aware that resilience is not the final goal of this work. In this context, therefore, the focus shifts from the impact of negative economic shocks on the performance of the firms, to the companies' specific reaction characteristics that overall may increase the resilience of firms and their degree of preparedness to future captured by the firms' ability to respond and to survive to new scenarios created by the impact of economic crisis (Cefis and Marsili, 2012). For instance, Hosono et al. (2016) and De Mel et al. (2012) stress on the lack of

access to capital as the main cause limiting firm's investments that can impact on the strategic behaviour of firms in the aftermath of a stress, reducing in this way the resilience of the firms and their capacity to survive to shocks.

For all these reasons, we aim to assess the drivers of firm exit, with a focus in the role played by local demand shocks for different categories of firms. In order to do so, first, we propose a method to determine the exposure of the firms to the Great Recession and consider local demand shocks that propagate along the production chain structure. Our indicator of local demand shocks combines local sectoral shocks in terms of estimated derived demand for intermediate inputs by means of input-output tables and local final demand shocks.

Then, we are able to explain the response of firms to different degrees of exposure to the Great Recession by exploiting information retrieved from the fiscal code of individual entrepreneurs, in particular on the role played by age, gender and country of origin of the entrepreneur. In addition to characteristics internal to the firm, we also account for external factors as determinants of firms' response, such as the specialization of the local labour system where the firm is localized. In this way we are able to assess the capacity of firms to survive to a shock. In more details, we study the impact of the Great Recession on the survival of firms for universe of Italian individual firms by using the Italian database on economic characteristics of the entire universe of micro and small Italian firms (the so-called ASIA dataset). Results suggest that local negative demand shocks have a strong negative impact on the survival of individual firms. This effect is larger and stronger for young entrepreneurs, female entrepreneurs and foreign-born entrepreneurs.

The paper is organized as follows, the next section provides descriptive evidence; Section 3 describes the empirical strategy and shows the results. Finally, section 4 concludes.

2 Descriptive evidence

According to the Italian Institute of Statistics (ISTAT), the collapse of Italian GDP between Q1-2008 and Q2-2009 was about 7.7 percent while the number of employed persons fell by 2.7 percent between September 2008 and August 2010 and, over the same period, unemployment rate increased from 6.8 to 8.4 percent. The recession also had an extraordinary impact on firm exit: overall, about 24 percent of firms that were active in 2007 left the market by 2010 (35 percent by 2012). Exiting firms (by 2012) represented about 22 percent of employment of 2007. However, when focusing only on individual firms, exit rates were even higher. In fact, about 38 percent of individual firms that were active in 2007 have left the market in 2012.

Even though individual firms can be thought as micro firms, i.e. mostly belonging to the group 0-9 employees, they constitute an important component of the Italian economy compared to other industrial EU countries. They accounted in Italy (2007) for the 53 percent of firms in the private sector, covering the 20 percent of total employment in the private sector. Furthermore, 60.9 percent of individual firms only employ one worker (i.e. the entrepreneur). Figure 1 shows the exit rate of individual firms at local labour market level in the period 2007 – 2012.[2] It is interesting to

[2]Our baseline data are localized at the lowest administrative unit (i.e. municipality). In Italy there are as much as about 8000 municipalities, many of which are extremely small in terms of population, area and economic activity. To truly evaluate local economic systems, we aggregate municipalities into labour market areas (LMA) according to the definition provided by the Italian

note that the very well-known differential in the development of the Northern and Southern Italian regions is not clearly evident. A spatial pattern in the distribution of the exit rate of individual firms is not clear, even though some important urban areas (e.g. Torino, Firenze, Roma and Napoli) appear to be particularly badly hit.

[Figure 1 about here]

This is also evident when we differentiate for regional and sectoral characteristics of the individual firms (see Table 1). Aggregate exit rates for Macro Italian regions (e.g. North, Center and South) are similar in all the areas.

[Table 1 about here]

When looking at the sectors, we find that the Great Recession had very heterogeneous effects. For instance, the bubble in the housing market and credit rationing resulted in a particularly high exit rate in the construction sector, while suppliers of the public sector were initially favoured by countercyclical public expenditure and subsequently damaged by the austerity. Furthermore, the collapse in private demand was unevenly distributed across different goods and services (e.g. non-business services vs. medium-high tech manufacturing), an evidence that is in line with the results of Giannakis and Bruggeman (2017).

Therefore, in order to evaluate the different exposure to the crisis of labour market areas (LMA) according to its sectoral composition we define the following exposure indicator:

Institute of Statistics and based on the Population Census of year 2011. More specifically, labour market areas are defined as groups of municipalities with substantial within-area commuting and limited commuting with other areas. According to the 2011 definition there are 611 LMA in Italy, many of which span across different jurisdictions (NUTS3 or NUTS2). Due to changes in the borders of municipalities that occurred over the period of analysis, we exclude from our analysis 21 LMA.

$$Exposure_j = \sum_s \left[\triangle_{07-10} Y_s\% \times \frac{Y_{sj}^{2007}}{\sum_s Y_{sj}^{2007}} \right] \quad (1)$$

where j defines the LMA, s the sector and Y is the employment level. This exposure indicator is a standard shift-share variable that aims at predicting the employment growth of the LMA given the LMA sector mix prior to the shock and the aggregate sector-specific shock. To build this variable we exploit detailed information on local and aggregate employment by industry at the 4-digit NACE rev 2.

[Figure 2 about here]

Figure 2 does not show a clear pattern, with predicted employment change that is scattered without a clear spatial pattern. Table 2 shows the exit rates of individual firms in LMA with different exposure (above and below median) and broken down by different characteristics of the entrepreneur (i.e. sex, country of origin and age). It is interesting to note that the country of origin plays a relevant role. In fact, individual firms whose owner is foreigner show a very high exit rate of (0.58). Also age is an important characteristic, with 'mature' entrepreneurs that show lower exit rates. Regarding sex, even though the differences between female vs male entrepreneurs is small, however individual firms with female ownership show higher exit rates. Finally, Table 3 reflects these differences by profiling and comparing surviving and exiting individual firms.

[Tables 2 and 3 about here]

As a last step, we measure the local demand shock of individual firms. Two main components of local (i.e. same LMA) demand are relevant in this work: i) final demand of households; ii) demand of upstream sectors for intermediate goods and services. In order to estimate the final demand of 'local' households we employ changes in net income earned of population that resides in the municipalities of the LMA (data are retrieved from aggregate personal income tax reports from the Ministry of Economics and Finance) between 2007 and 2010. To estimate the local demand for intermediate goods and services we calculate the growth rate in the derived demand for intermediate inputs by using country-level technical coefficients from the Italian input-output tables (only direct requirements, i.e. matrix A) to weight change in sales (as proxy of production) of local (same LMA) firms over 2007-2010 (see Marin and Modica, 2017).[3] The final indicator is the weighted average of the two demand shocks, weighted with the sector-specific relative importance of final demand over total production at the national level (from input-output tables). The indicator is specific for each sector-LMA pair. Figure 3 provides the average demand shock of LMAs and again these do not show clear spatial patterns.[4]

[Figure 3 about here]

[3]Technical coefficients are calculated as the ratio between the value of intermediate inputs purchased by one sector from another sector and the total gross output of the purchasing sector. In the context of a Leontief production function (i.e. perfect complementarity of input) the matrix of technical coefficients represents the direct requirements of different inputs to produce one euro of output.

[4]In Appendix A we report maps for the the two components of local demand: Figure A1 refers to the estimated growth in the local demand of intermediate products and Figure A2 considers the estimated growth in the local demand for final products.

3 Drivers of survival of individual firms

So far we just provided a descriptive overview of the Italian industrial ecosystem. We recall however that that our final aim is to estimate the extent to which firms with different features were hit by the recession. For this reason we focus on the drivers of firm exit through a survival analysis. In order to select the most appropriate econometric estimator to evaluate the drivers of individual firms' exit, we evaluate the smoothed estimated hazard (i.e. the instantaneous hazard conditional on surviving until a certain age) to understand whether there is or not duration dependence, that is an instantaneous probability of exit that depends on firms' age.

[Figure 4 about here]

Figure 4 reports the smoothed hazard estimates for our sample of individual firms (blue line) and, as a benchmark, the sample of non-individual firms (red line). Overall, we observe very different hazard functions for individual and non-individual firms, with the former having much larger hazard than the latter. Moreover, the hazard for individual firms accelerates very rapidly after age 20, from about 2.5 to about 12 percent around age 60.

[Figures 5 and 6 about here]

In Figure 5 we report the smoothed hazard function for individual firms that belong to different categories: manufacturing vs non-manufacturing (top-left), high vs low exposure (top-right) and macro-region (bottom-left). Even though formal tests of equality of the survival curves (log-rank and regression-based Cox) suggest that

hazard functions are statistically different across the different considered categories, these differences appear to be very small in magnitude.

However, when considering characteristics of the firms (Figure 6), we observe interesting differences. First, the hazard rate of young entrepreneurs (less than 35 years old, top-right) is much larger than the one of old entrepreneurs. However, while the hazard function is increasing monotonically with firm's age for old entrepreneur, the relationship is reversed for young entrepreneurs. When considering the country of origin, entrepreneurs born in Italy have, on average, a lower hazard than foreign-born entrepreneurs. However, this difference fades out with increasing firm age, being not significantly different for relatively old firms. Finally, very small differences in the hazard function are found between male and female entrepreneurs.

3.1 Empirical strategy

To evaluate the driver of individual firm's exit, we consider the proportional hazard model defined as:

$$\lambda(t|X) = \lambda_0(t, \alpha)\psi(X'\beta) \tag{2}$$

where $\lambda(t|X)$ is the instantaneous hazard at time t given a set of covariates X and is a function of the baseline hazard $\lambda_0(t, \alpha)$ multiplied by a scale factor $\psi(X'\beta)$ that is a function of X. As our data exhibit positive duration dependence, we estimate equation 2 by means of a Weibull parametric model that assumes that the baseline hazard $\lambda_0(t, \alpha) = exp(\alpha)pt^{t-1}$, where p is the ancillary parameter for duration dependence. More specifically, if $p > 1$ the model identifies positive duration dependence,

which implies that the instantaneous probability of exiting, given other covariates, increases with firm's age. To allow for within-LMA correlation of disturbances, we cluster standard errors at the LMA level.

Our main independent variable is our proxy of local demand shock (Local demand shock 2007-2010) that measures, as described earlier in the paper, the predicted change in the local demand of a specific sector in the LMA. The smaller the value, the worse is the predicted negative demand shock. To identify the impact of local demand shocks on firm's exit, we control for other confounding factors. We account for the exposure of the LMA to the economic crisis by means of the shift-share variable described in the previous section. Moreover, we account for other initial (2007) 'structural' characteristics: density of businesses (number of firms per square km, in log) to account for agglomeration effects, population density (in log), share of employment in the manufacturing sector and the concentration of the industrial mix (measured as the Herfindahl-Hirschman of 4-digit industry shares). Moreover, we also add firm-level information (measured in 2007): a dummy variable for artisan businesses, the level of employment (in log) to proxy for firm size, the sex of the entrepreneur (dummy for male entrepreneurs), the age of the entrepreneur and a dummy for foreign-born entrepreneurs.[5] In all specification we also include NUTS2 dummies of the main municipality of the LMA and 2-digit NACE rev 2 sector dummies. With the exception of population density (source: Istat), all other variables were constructed from firm-level data on the universe of Italian firms (source: ASIA-Istat).

[5]These three latter variables are only available for individual firms and they are retrieved from the personal fiscal code.

3.2 Results

Baseline results are reported in Table 4, for the whole sample of Italian firms as a benchmark (column 'All firms', including individual and non-individual firms) and our sub-sample of interest, that only includes individual firms (column 'Individual firms'). In the first two columns we employ our baseline specification, while in column 3 and 4 we add a large set of additional control variables as a robustness check.[6] Overall, we observe that firms in sector-LMA pairs with relatively more negative demand shocks are characterized by a relatively larger hazard. This is true for the whole sample of firms as well as for our sub-sample of individual firms and is robust to the inclusion of additional control variables (column 3 and 4). The magnitude of the effect, however, is different across the two samples. To illustrate, we calculate the hazard ratio for an interquartile range of the demand shock variable for the two different samples. The hazard ratio is 0.986 when considering the whole sample and 0.974 for the sub-sample of individual firms.

[Table 4 about here]

These results suggest that, on average, individual firms appear to be more sensitive to local demand shocks than non-individual firms. This result should be interpreted as a greater reliance of individual firms on local demand compared to non-individual firms, whose market of reference go beyond the borders of the LMA.

[6] Additional control variables (at LMA level) refer to different categorical indicators at the LMA level built by Istat. More specifically, these categorical variables refer to: trade openness category, trade balance category, specialized LMA (dummy), labour productivity category, shock to employment category, export performance category, Made in Italy LMA (dummy). Moreover, in this specification we add a series of 14 dummies for firms belonging to different levels of sales in 2007 (source: ASIA-Istat).

This means that the same negative demand shock hits these two categories of firms differently, as long as demand shocks are not perfectly spatially correlated.

Concerning the other control variables that have to do with the industry mix, we observe that the exposure to the crisis of the LMA is negatively related to the hazard rate, even though the relationship is only weakly significant for the whole sample and not significant for the sub-sample of individual firms, while firms in LMAs that were more manufacturing-oriented have a lower predicted hazard. A result that is in line with what expected due to the magnitude of the crisis (e.g. global financial crisis that affected many industrial sectors). The concentration of the industry mix is unrelated with hazard. Business density is, as expected, negatively related to hazard while population density is positively related due to the greater presence of individual activities such as shops in urban areas. Considering firm's characteristics, we observe that, in general, larger firms and artisan businesses have a relatively lower hazard.

For the sub-sample of individual firms, we can also consider the characteristics of the individual entrepreneur: foreign-born entrepreneurs have a systematically higher hazard, while male or young entrepreneurs have a systematically lower hazard. More specifically, the hazard ratio for male entrepreneurs with respect to female entrepreneurs is 0.698, for entrepreneurs with a certain age with respect to entrepreneurs that are 10 years younger is 0.497, for foreign-born entrepreneurs with respect to entrepreneurs born in Italy is 2.98.

In all specifications the ancillary parameter is larger than one, suggesting a positive duration dependence, that is substantially larger for sub-sample of individual

firms than for the whole sample. This result should be interpreted in terms of capacity of individual firms to survive in the very long period. We recall, in fact that, many of Italian individual firms have only one employee, namely the owner. Therefore, the capacity to survive of this kind of firm is strictly related to the work activity of the owner.

[Table 5 about here]

To dig deeper into the heterogeneity of the link between local demand shocks and the survival of individual firms, we estimate our baseline specification for sub-samples of individual firms. As a first step, we evaluate the age of the entrepreneur (using the threshold of 35 years to identify young entrepreneurs) and his/her sex (Table 5). Overall, results appear to be qualitatively similar across different sub-samples in terms of sign and, in most cases, statistical significance, while the magnitude of the estimated coefficients differs in many cases. What is very interesting is that one of the few relevant differences concern our main variable of interest, that is the local demand shock, which turns out to be not significant for young entrepreneurs and negative for old ones and much larger for female entrepreneurs than for male entrepreneurs. One potential explanation for these results is that old entrepreneurs are more connected to the local environment and therefore this increases their exposure to local demand shocks. At the same time, younger entrepreneurs are not so linked to local demand shocks because their attitude is to open more innovative start-up that compete mainly on more geographically dispersed markets, but also because, as reported by (Boyer and Blazy, 2014, p. 676), '*older individuals tend to have a less entrepreneurial attitude than younger ones*' and this may impact the

choice of market penetration strategies.

When considering the role played by gender, we observe that female individual entrepreneurs are more sensitive to local demand shocks than male individual entrepreneurs. This result is in line with the extensive literature on gender-based differences in entrepreneurial success. More specifically, the literature attributes a relatively worse performance of female-led ventures to larger opportunity costs of remaining into business due to family-related commitments (Justo et al., 2015), a higher risk aversion of female entrepreneurs vis-à-vis male entrepreneurs (Fossen, 2012) and a systematically lower work experience compared to their male peers (Rosti and Chelli, 2005).

[Table 6 about here]

As a second step, we consider the country of origin of the entrepreneur and the average level of exposure of the LMA (Table 6). Even though we have observed from descriptive statistics that the rate of exit of individual firms with foreign-born entrepreneurs was substantially larger than for entrepreneurs born in Italy, this phenomenon is not statistically related with local demand shock but has to do with other different reasons.

First, as denoted by previous studies (e.g. Boyer and Blazy, 2014; Cooper et al., 1994; Dadzie and Cho, 1989; Ahn, 2011) if the entrepreneur belongs to a minority this reduces the survival probability of firms. Second, '*the opportunity for foreign entrepreneurs to prosper depends on their ability to establish linkages with the local firm networks*' (p. 1953 Canello, 2016). However, this objective is difficult to achieve and even though this may be a source of stress in periods of economic growth, in

crisis phases the difficulties in creating local link can preserve foreign entrepreneurs from being negatively affected by the propagation of economic shocks through the local firm's network.

Finally, when considering low vs high exposure LMA (using the median value of exposure as threshold), we also observe that demand shocks were a significant driver of firms' exit only for LMAs that were in high exposure, while no significant link is found for low-exposure LMAs. High-exposure LMAs are the ones with an industry mix that was intensive in those sectors that declined the most at the macro level. This means that the local demand shock on individual firms in the LMA has been amplified by the intrinsic fragility of the LMA, resulting into a larger and stronger effect of local demand shocks on exit.

[Table 7 about here]

Finally, in Table 7 we also report results broken down by macro-region. When considering results for different macro-regions, we surprisingly observe that the effect of our measure of local demand shock is very similar in magnitude across different macro-regions, even though it is less precisely estimated for the South macro-region, confirming once again that the Great Recession had a massive impact over the entire economic system. For what concerns the characteristics of the entrepreneur, there are no differences in sign and significance of the coefficients between macro-regions, even though a different magnitude in the estimated coefficient of entrepreneurs born abroad seems to be relevant, with a higher hazard in the Northern regions with respect to the Southern ones.

4 Conclusions

In this paper we develop a novel indicator of local demand shock that considers the expected drop in the derived demand for intermediate and final products for local firms by using detailed LMA-level information combined with input output tables. This indicator appears to be particularly effective in explaining individual firm's exit.

In fact, the aim of this paper was to assess the extent to which heterogeneous local demand shocks in the year of the Great Recession contributed to firm's exit for different categories of individual firms in Italy. In this way we ass able to underline firms characteristics that were able to improve the firms ecosystem to recover or to cope with the crisis.

Nonetheless, Italian individual firms were particularly hit by local demand shocks in the aftermath of the Great Recession. Local demand shocks contribute to explaining hazard, even though the effect is not homogeneous across different categories of individual entrepreneurs. More specifically, the estimated effect is larger and stronger for old entrepreneurs, female entrepreneurs and foreign-born entrepreneurs.

The impact of firm's exit on local and aggregate economic conditions, that is the ultimate target of economic policies, is ambiguous according to the existing literature. On the one hand, exit of low performance firms is seen as a positive selection effect that allows the re-allocation of inputs towards more productive activities. At the same time, however, exit also destroys tangible and intangible assets that cannot be easily transferred, leading to persistent losses of economic valuable inputs.

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Tables and figures

Figure 1: Exit rate (2007-2012) of individual firms

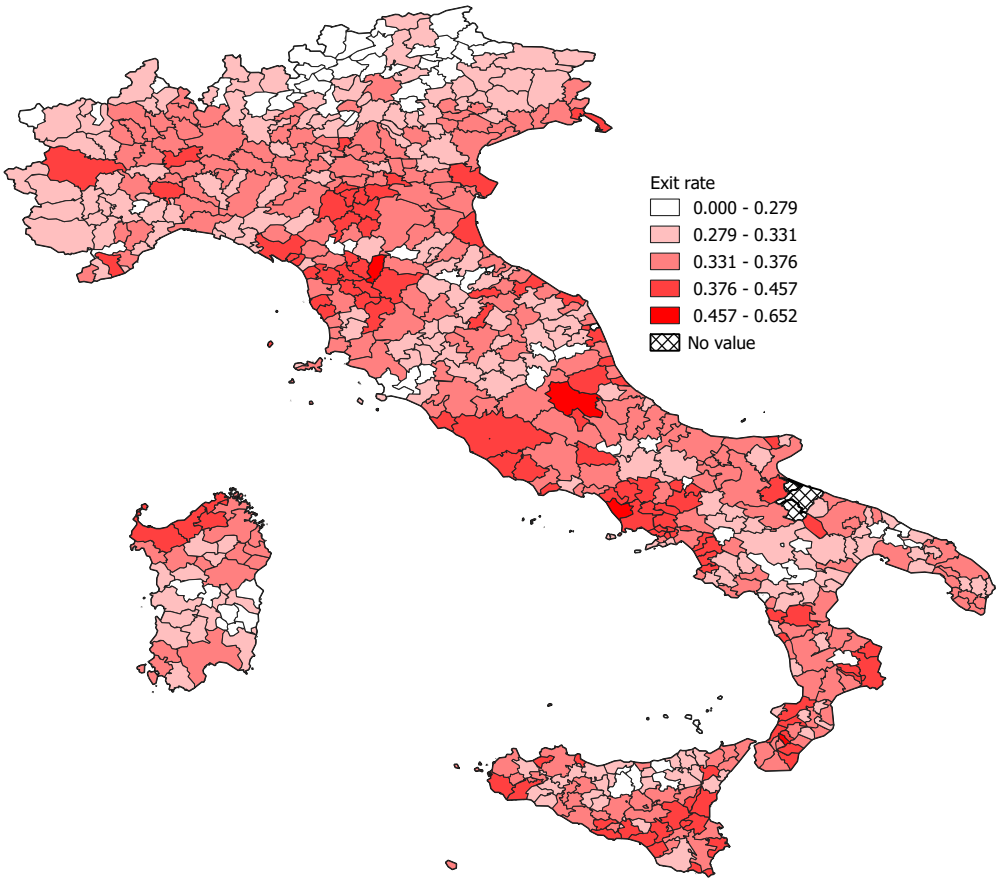

Table 1: Exit rate (2007-2012) of individual firms by sector and region

	Exit rate of individual firms (2007-2012)
Medium-low tech manufacturing	0.3943
Medium-high tech manufacturing	0.4129
Construction	0.4193
Utilities	0.3585
KIBS	0.4156
Other business services	0.3806
Non-business services	0.2791
Nord	0.3709
Centro	0.3978
Sud	0.3930
Total	0.3835

Table 2: Exit rate (2007-2012) of individual firms broken down by different dimensions

	Exit rate of individual firms (2007-2012)
Low exposure LMA	0.3956
High exposure LMA	0.3723
Female	0.4063
Male	0.3752
Italian born	0.3648
Foreign born	0.5761
Old (>35)	0.3644
Young (≤ 35)	0.4476
Total	0.3835

Table 3: Profiling of surviving and exiting individual firms

	Surviving firms	Exiting firms
Average age of the firm in 2007	18.43	16.79
Share of male entrepreneurs	0.7452	0.7196
Average age of the entrepreneur in 2007	44.97	45.58
Share of foreign-born entrepreneurs	0.0609	0.1330

Figure 2: Exposure of individual firms (predicted growth given initial sector mix)

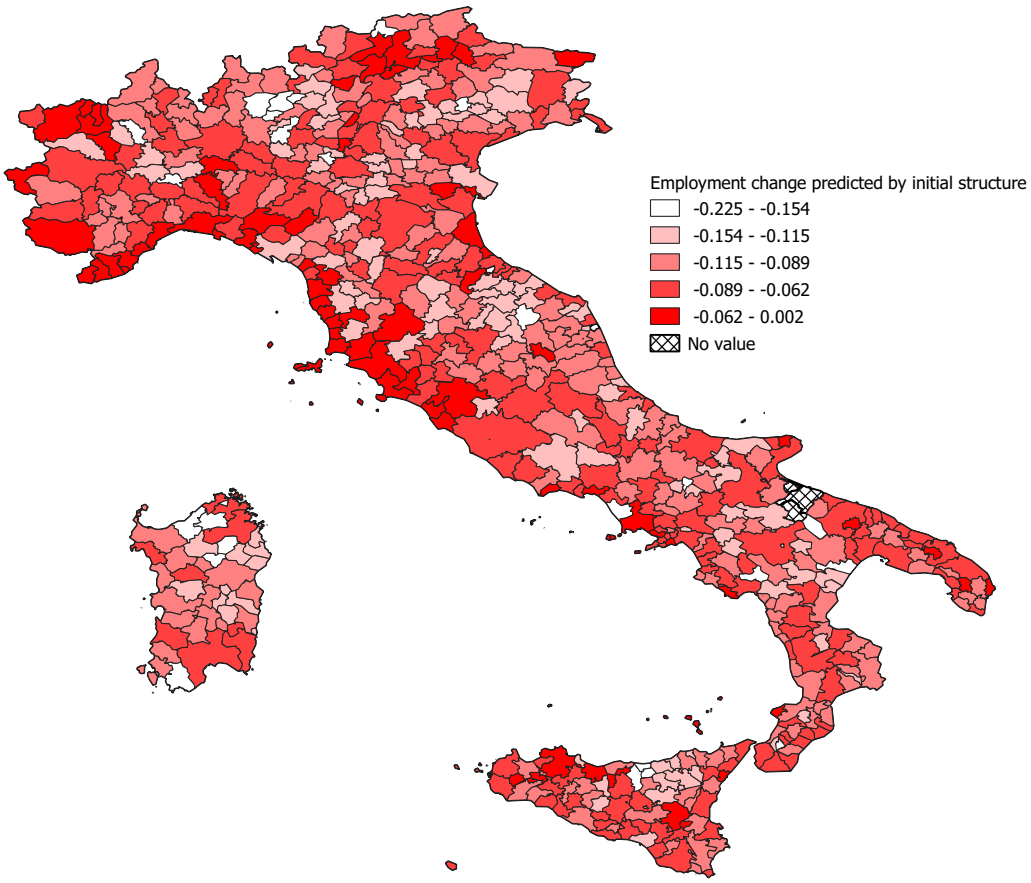

Figure 3: Local demand shock of individual firms - total

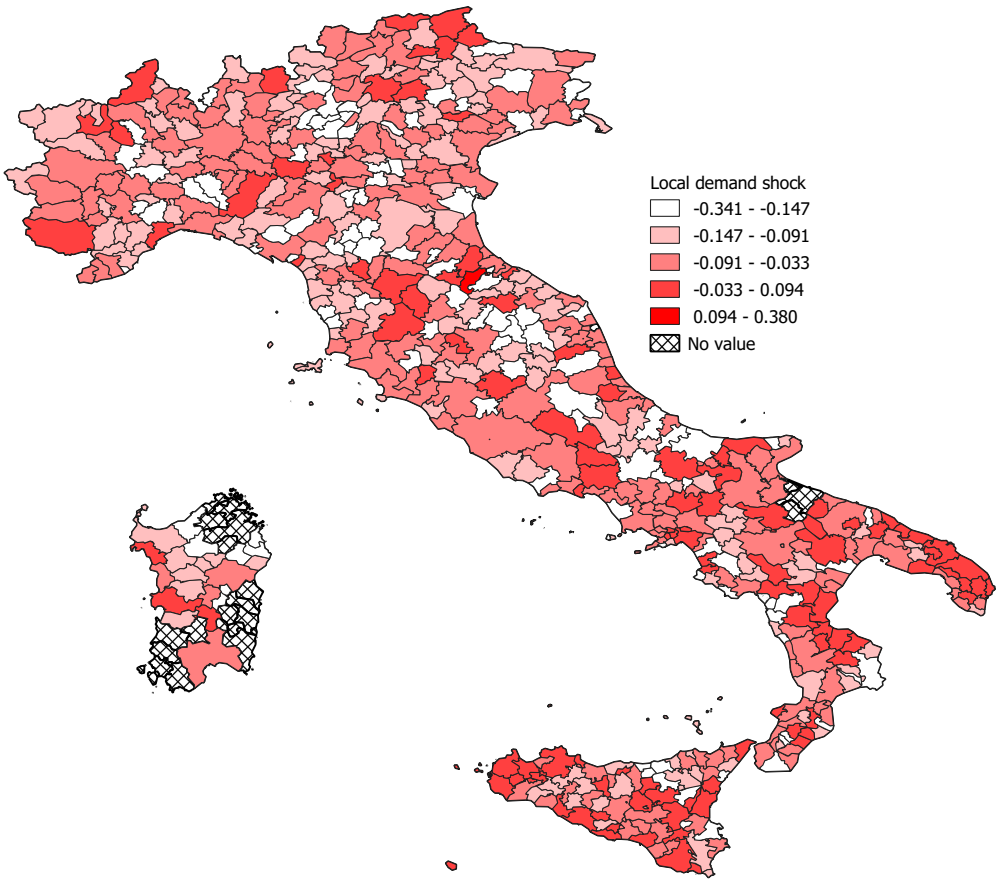

Figure 4: Baseline hazard for individual and non-individual companies

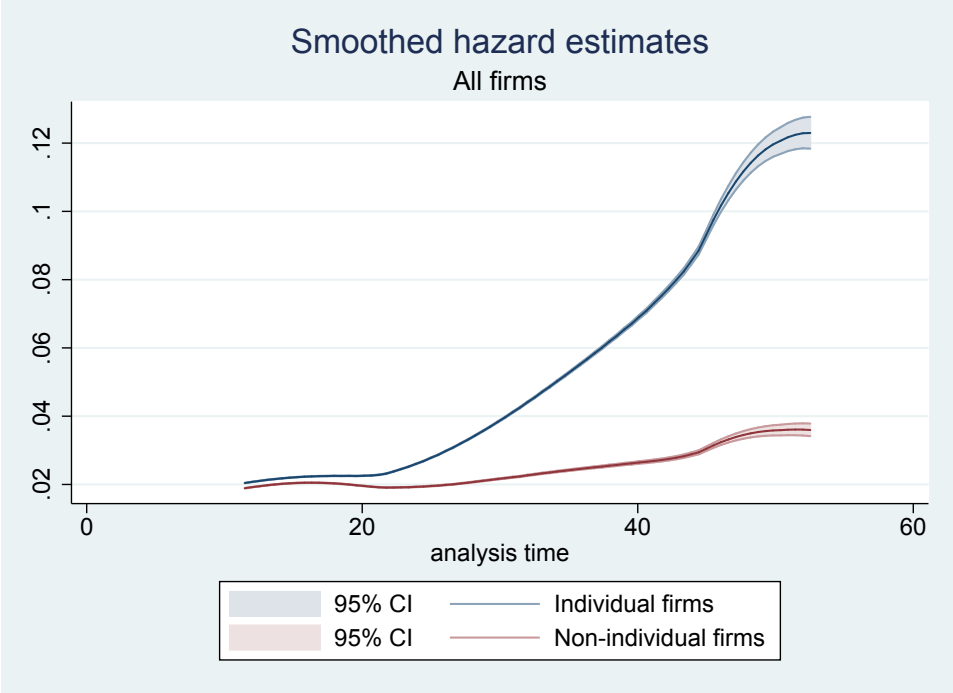

Figure 5: Baseline hazard of individual companies by region

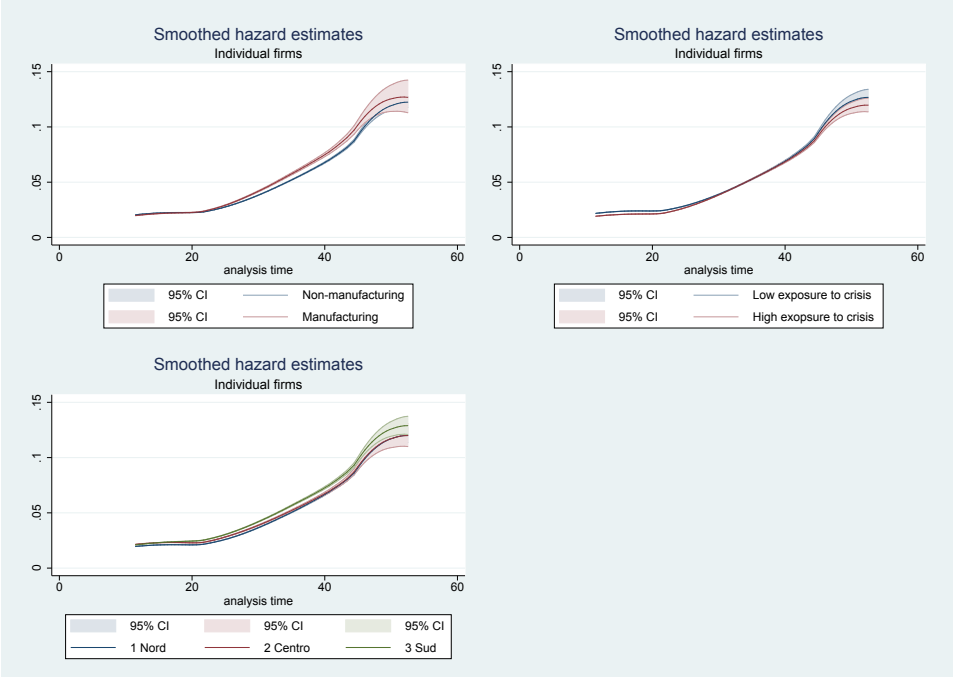

Figure 6: Baseline hazard of individual companies for different characteristics of the entrepreneur

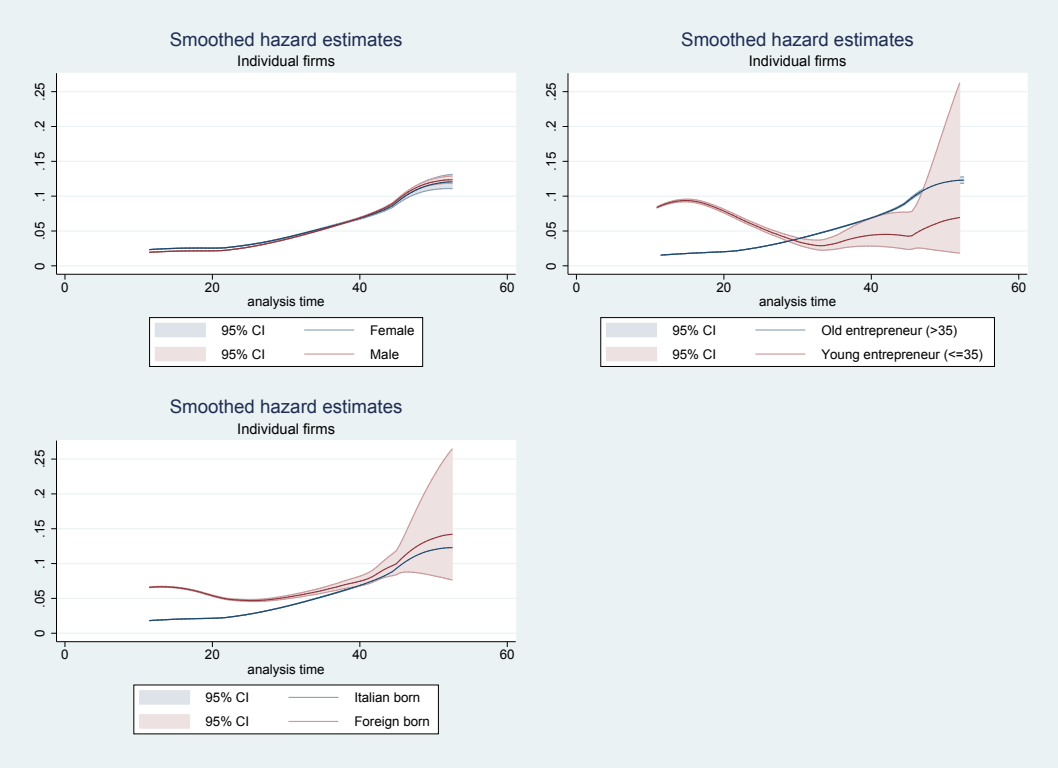

Table 4: Baseline results

	Baseline		Additional controls	
	All firms	Individual firms	All firms	Individual firms
Firms per square km in LMA (2007, in log)	-0.269***	-0.254***	-0.278***	-0.276***
	(0.0440)	(0.0416)	(0.0422)	(0.0402)
Population density in LMA (2007, in log)	0.365***	0.371***	0.372***	0.382***
	(0.0452)	(0.0440)	(0.0436)	(0.0415)
Share of manuf empl in LMA (2007)	-0.148*	-0.197**	-0.222**	-0.276***
	(0.0882)	(0.0772)	(0.109)	(0.0942)
HH index of industry concentration in LMA (2007)	-0.546	0.0722	-0.388	0.00555
	(0.351)	(0.307)	(0.349)	(0.329)
Exposure to crisis of LMA	-0.657*	-0.196	-0.848**	-0.484
	(0.341)	(0.290)	(0.344)	(0.294)
'Artisan' business	-0.456***	-0.501***	-0.487***	-0.476***
	(0.0123)	(0.0142)	(0.0125)	(0.0160)
Firm's employment in 2007 (in log)	-0.519***	-0.402***	-0.271***	-0.0594***
	(0.00559)	(0.00799)	(0.0109)	(0.0127)
Local demand shock 2007-2010	-0.127**	-0.234***	-0.126***	-0.228***
	(0.0497)	(0.0601)	(0.0466)	(0.0531)
Non-individual firm	0.0284		0.123***	
	(0.0200)		(0.0198)	
Male entrepreneur		-0.359***		-0.329***
		(0.0108)		(0.0106)
Age of entrepreneur		-0.0700***		-0.0722***
		(0.000563)		(0.000564)
Foreign born entrepreneur		1.092***		0.995***
		(0.0261)		(0.0241)
Ancillary parameter	1.642	2.327	1.642	2.363
N	3285982	1740128	3285982	1740128

Parametric regression survival-time Weibull model. Standard errors clustered by local labour system in parenthesis. * p<0.1, ** p<0.05, *** p<0.01. Additional control variables: region dummies (NUTS2) and sector dummies (2-digit NACE rev. 2). Additional control variables (at LMA level) in columns 3 and 4: Trade openness category, Trade balance category, Specialized LMA (dummy), Labour productivity category, Shock to employment category, Export performance category, Made in Italy LMA (dummy), sales band in 2007 (firm-level).

Table 5: Individual firms: age and gender of the entrepreneur

	(1) Old (>35)	(2) Young (≤35)	(3) Female	(4) Male
Firms per square km in LMA (2007, in log)	-0.275***	-0.224***	-0.139***	-0.279***
	(0.0433)	(0.0849)	(0.0429)	(0.0475)
Population density in LMA (2007, in log)	0.395***	0.317***	0.272***	0.386***
	(0.0462)	(0.0877)	(0.0434)	(0.0508)
Share of manuf empl in LMA (2007)	-0.202***	-0.121	-0.229***	-0.179**
	(0.0778)	(0.0899)	(0.0817)	(0.0864)
HH index of industry concentration in LMA (2007)	0.0781	-0.225	-0.278	0.243
	(0.305)	(0.579)	(0.320)	(0.321)
Exposure to crisis of LMA	-0.0918	-0.762	-0.199	-0.180
	(0.276)	(0.538)	(0.349)	(0.318)
'Artisan' business	-0.491***	-0.308***	-0.314***	-0.515***
	(0.0174)	(0.0485)	(0.0215)	(0.0175)
Firm's employment in 2007 (in log)	-0.413***	-0.338***	-0.466***	-0.391***
	(0.00769)	(0.0179)	(0.0119)	(0.00796)
Local demand shock 2007-2010	-0.220***	-0.187	-0.336***	-0.179***
	(0.0578)	(0.152)	(0.0987)	(0.0551)
Male entrepreneur	-0.350***	-0.360***		
	(0.0106)	(0.0237)		
Age of entrepreneur	-0.0420***	-0.144***	-0.0734***	-0.0683***
	(0.000708)	(0.00543)	(0.000878)	(0.000597)
Foreign born entrepreneur	1.236***	0.887***	0.752***	1.212***
	(0.0289)	(0.0298)	(0.0272)	(0.0287)
Ancillary parameter	2.261	2.730	2.251	2.366
N	1340448	399680	460128	1280000

Individual firms only. Parametric regression survival-time Weibull model. Standard errors clustered by local labour system in parenthesis. * p<0.1, ** p<0.05, *** p<0.01. Additional control variables: region dummies (NUTS2) and sector dummies (2-digit NACE rev. 2).

Table 6: Individual firms: Italian-foreign and high-low exposure

	(1) Italian	(2) Foreign	(3) Low exposure	(4) High-exposure
Firms per square km in LMA (2007, in log)	-0.261***	-0.104	-0.254***	-0.183***
	(0.0377)	(0.147)	(0.0568)	(0.0514)
Population density in LMA (2007, in log)	0.374***	0.206	0.369***	0.279***
	(0.0395)	(0.163)	(0.0599)	(0.0544)
Share of manuf empl in LMA (2007)	-0.263***	0.218	0.0258	-0.286***
	(0.0687)	(0.230)	(0.0997)	(0.105)
HH index of industry concentration in LMA (2007)	0.229	-0.676	-1.087**	0.886***
	(0.305)	(0.693)	(0.426)	(0.337)
Exposure to crisis of LMA	-0.289	0.546	0.715	-0.0421
	(0.237)	(0.952)	(0.799)	(0.460)
'Artisan' business	-0.513***	-0.324***	-0.513***	-0.489***
	(0.0143)	(0.0319)	(0.0207)	(0.0166)
Firm's employment in 2007 (in log)	-0.415***	-0.332***	-0.430***	-0.381***
	(0.00677)	(0.0247)	(0.0123)	(0.00896)
Local demand shock 2007-2010	-0.247***	-0.127	-0.130	-0.268***
	(0.0617)	(0.153)	(0.0966)	(0.0696)
Male entrepreneur	-0.404***	-0.135***	-0.368***	-0.353***
	(0.0114)	(0.0175)	(0.0191)	(0.00889)
Age of entrepreneur	-0.0691***	-0.0766***	-0.0692***	-0.0708***
	(0.000683)	(0.00165)	(0.000922)	(0.000596)
Foreign born entrepreneur			1.088***	1.098***
			(0.0295)	(0.0399)
Ancillary parameter	2.344	2.356	2.324	2.336
N	1585125	155003	839729	900399

Individual firms only. Parametric regression survival-time Weibull model. Standard errors clustered by local labour system in parenthesis. * p<0.1, ** p<0.05, *** p<0.01. Additional control variables: region dummies (NUTS2) and sector dummies (2-digit NACE rev. 2).

Table 7: Individual firms: by macro-region

	(1) North	(2) Centre	(3) South
Firms per square km in LMA (2007, in log)	-0.358***	-0.0471	-0.266***
	(0.0674)	(0.0552)	(0.0663)
Population density in LMA (2007, in log)	0.461***	0.156***	0.383***
	(0.0688)	(0.0600)	(0.0684)
Share of manuf empl in LMA (2007)	-0.0936	0.0828	-0.623***
	(0.0952)	(0.103)	(0.234)
HH index of industry concentration in LMA (2007)	0.0308	0.655**	-0.802
	(0.521)	(0.312)	(1.131)
Exposure to crisis of LMA	0.470	0.0129	-0.879
	(0.434)	(0.494)	(0.576)
'Artisan' business	-0.465***	-0.527***	-0.492***
	(0.0103)	(0.0303)	(0.0235)
Firm's employment in 2007 (in log)	-0.411***	-0.402***	-0.418***
	(0.00699)	(0.0302)	(0.0112)
Local demand shock 2007-2010	-0.228***	-0.220***	-0.215*
	(0.0657)	(0.0674)	(0.120)
Male entrepreneur	-0.319***	-0.303***	-0.438***
	(0.00831)	(0.0129)	(0.0157)
Age of entrepreneur	-0.0678***	-0.0672***	-0.0754***
	(0.000581)	(0.00131)	(0.00109)
Foreign born entrepreneur	1.286***	1.174***	0.573***
	(0.0387)	(0.0523)	(0.0498)
Ancillary parameter	2.330	2.301	2.377
N	830619	341765	567744

Individual firms only. Parametric regression survival-time Weibull model. Standard errors clustered by local labour system in parenthesis. * p<0.1, ** p<0.05, *** p<0.01. Additional control variables: region dummies (NUTS2) and sector dummies (2-digit NACE rev. 2).