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Survive or Die? A Decade of Tough Competition for Foreign Affiliates

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Abstract

Firms' survival and internationalization are key elements to assess a country's competitiveness. In this paper, we draw on these two strands of literature and study how firms' characteristics affect demographic dynamics. We focus on foreign direct investors' survival probability, modelling it conditional on both parent company and affiliates' set of characteristics. The novelty of our approach is twofold: on the one hand, we generalize the base model used in business demography disentangling the effect of affiliates and parents. On the other hand, we stress the technological level relationships between affiliates and their investors. For the empirical assessment, we use an original longitudinal database (2004 - 2012) for Italy. We show that, larger affiliates of large investors compete better and survive more. Being part of networks of affiliates in the same country and/or sector also decrease the risk of exiting markets. When the investors have a higher (lower) technological level, their affiliates' failure probability increases (decreases). When the investor is more advanced than its affiliates, it considers the investment abroad like a cost-saving, low skills investment. The investor will easily disinvest, moving to a more convenient economic context. Affiliates with a higher level of technology, instead, are considered strategic to the parent company, due to skills, talent or competencies.

KEY WORDS: Business Demography, Survival, Competitiveness, Internationalization
JEL classification: C41, L11, L25, F21

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1 Introduction

A recent literature has highlighted the importance of firms' survival, as well as entry of new firms, start up, incubators etc. for growth and competitiveness of a country (see for instance Bartelsman et al., 2003, Bartelsman et al. 2004). A different strand of literature emphasizes that firms involved in international activities through export or FDI are *different* from purely domestic firms in several aspects: productivity, wages, skill intensity (see for all Mayer and Ottaviano, 2008). Hence, international strategies are one of the main channels driving the firms'success.

In Giovannetti et al. (2011), we draw on these two strands of literature to assess the relationships among firms' characteristics and their competitiveness by analyzing demographic dynamics and survival of firms. In this paper, we focus directly on the investments abroad. Our goal is to model the affiliates' survival probability conditional on both parent company' and affiliates' set of characteristics.

The novelty of our approach is twofold. On the one hand, we generalize the base model used in business demography separating the effect of affiliates and parent companies on the affiliates' survival probability. On the other, we highlight how possible technological differences between affiliates and parents (i.e., affiliates with higher/lower technology level than their parent)affect affiliates' survival probability.

The base business demography model uses size and technology as driving forces of the firm survival; we generalize it, highlighting the different roles of size and technology for parent company and its affiliates, including information on distance from the Head quarter, typology of investment (Greenfield vs. M&A), number of affiliates per country and per country/sector, GDP per capita of country of destination. Moreover, we show that the affiliates' survival probability depends on the relationships between affiliates' investor's technological level; to capture this we include also proxies comparing the two.

We analyse a decade of important transformations for the global economy but we exploit an original longitudinal dataset of Italian outward FDI, for the empirical exercise. The dataset is obtained by merging two different firm-level datasets: AIDA and ICE-Reprint for the period 2004-2012. This allows us to have longitudinal data from balance sheet of both Italian parent companies and their affiliates.

The paper is structured as follows: after a brief overview of two strands of literature (business demography and firms' internationalization), we sketch the econometric techniques used and then present the empirical results. We conclude by drawing some policy implications.

2 A Sketch of the Literature

Survival analysis has a strong tradition in industrial organization. Many of these studies analyze the relationship between the firm survival and firms' characteristics, such as tech and size, innovation and technological level (Agarwal and Audretsch, 2001), and presence in foreign markets or a combination of the above (Giovannetti et al., 2011, Ferragina et al. 2012).

A vast number of recent empirical studies, covering different time periods and countries, finds that size increases the likelihood of survival in the more technological advanced industries, but does not in traditional sectors. Most of these studies are consistent with theories of industry evolution (Agarwal and Gort, 1996, Agarwal, 1998, Audretsch, 1995) and with the theory of strategic niches (Caves and Porter, 1977; Porter, 1979). According to the latter, firms remain small because they occupy product niches that are not easily accessible or profitable for their larger counterparts.

A different strand of the literature has emphasized firms' heterogeneity and focused on the existence of substantial differences between domestic and internationalized firms (Melitz, 2003). To tackle the challenges of globalization, some firms have upgraded quality, others lowered costs, others have merged with foreign firms and/or established subsidiaries abroad.

Triggered by globalization, low transport costs and new technologies, also Italian firms typically characterized by a small dimension and therefore likely to be penalized in their international expansion, have moved to a multi-country dimension. As a consequence, they have modified their internationalization strategies, making them more complex and articulated. Heterogeneity among firms is high in terms of productivity, size and characteristics of the internationalization modes (also regarding countries of destination). At first, Melitz (2003) has modeled firms exports behavior, showing that exporting firms are the most productive. In a similar way, but accounting for more complex modes of internationalization, Helpmann et al. (2004) generalize these results, incorporating horizontal FDI. The idea is that there are relatively few firms able to compete in international markets and these firms are more productive, pay higher wages, employ more skilled workers and invest more in R&D. To the extent that costs of investing abroad are higher than costs of exporting, only the most productive firms will invest abroad, the second most productive will serve foreign markets through exports and possibly imports (or both) and the least productive will 'stay domestic'. Mayer and Ottaviano (2008), for instance, empirically rank exporters as more productive than domestic firms, foreign investors more productive than exporters, and so on. Along the same lines, Helpmann et al. (2004) provide a model for US firms' heterogeneity and FDI. The model *'predicts a pecking order such that the most productive firms should open an affiliate in even the least attractive countries, while progressively less productive firms enter progressively more attractive countries'* (Helpmann et al., 2004; p.206).

3 Survival Analysis

To analyze whether the likelihood of survival depends on firm size, international involvement and technological intensity we use the Analysis of Duration (Lancaster, 1990) that allows us to estimate the length of the time until failure. The variable of interest in the survival analysis is the length of time that elapses from the beginning of some events either until "their" end or until the end of the analysis. Observations will typically consist of a cross section of durations $t_1, t_2, .., t_n \epsilon T$, where T is a random variable (discrete or continuous), and for this type of data the analysis of duration allows one to estimate the probability that the event "failure" occurs next period. In this

paper the dependent variable is the span of survival and is calculated as the difference between time t and the firm's set up year while the "failure" event includes winding-up, failure or end of activity (Agarwal and Audretsch, 2001). The process observed may have started at different points in time and, because its length is not constant over time, the random variable T is unavoidably censored. Let T be a random variable with a cumulative probability

$$F(t) = \int_0^t f(s)ds = Pr(T \geq t) \tag{1}$$

where f(t) is the continuous probability distribution. We are interested in the probability that the period is of length at least t, which is given by the survival function

$$S(t) = 1 - F(t) \tag{2}$$

and the probability that the phenomenon will end the next short interval of time, Δ , is

$$l(t, \Delta) = Pr(t \leq T \leq t + \Delta | T \geq t). \tag{3}$$

The Hazard Rate, i.e. the rate at which spells are completed after duration t, given that they last at least until t, is:

$$\lambda(t) = \frac{f(t)}{S(t)} \tag{4}$$

To measure the effect of different regressors (in our case entry size and technological level) on the survival probability of the phenomenon, we estimate the parameter λ using Maximum Likelihood by the Cox Proportional Hazard Regressions. The hazard function $h_i(t)$ of a firm i is expressed as:

$$h_i(t) = h_0(t)exp(x_i\beta) \tag{5}$$

$h_0(t)$being an arbitrary and unspecified baseline hazard function representing the probability of failure conditional on the fact that the firm has survived until time t, x_i is a vector of measured explanatory variables for the $i - th$ firm and β is the vector of unknown parameters to be estimated. Negative coefficients or risk ratios less than one imply that the hazard rate decreases and the corresponding probability of survival increases. Life-table analysis, estimating the survival rate at time s, where s is defined as the fraction of the total number of firms that survived at least t years, can also be used to show firms survival and failure rates. Life tables give the number of firms that die conditional on their age, i.e. they represent the probability of failure given that the firm has survived t years. At each failure time t, the test statistics is obtained as a weighted standardized sum of the difference between the observed and expected number of exit in each of the k-groups. The null hypothesis is no difference between the survival functions of the k-groups. The weights functions used determine the test statistics (see Klein and Moeschenberger, 2003).

4 The Context and The Data

During the last decade, Italian firms have shown a low capacity to penetrate foreign markets through FDI. This low multinational activity is usually explained by the highly fragmented industrial structure, and by the small size of Italian firms, which makes it more difficult to adopt sophisticated international strategies such as production fragmentation and merge and acquisition of foreign firms. Heterogeneity is high also among sectors (Mariotti and Mutinelli, 2014).

Looking at the geographical distribution of affiliates, the main markets of destination of Italian firms are: US, Germany and France, closely followed by the UK and Spain. Note that Romania, Poland and Hungary rank immediately after and Brazil and China follow closely.

We merge two different longitudinal datasets (AIDA and ICE-Reprint) for the period 2004-2012. AIDA provides balance sheet data of Italian corporates and general partnerships, while the ICE-Reprint database is the census of Italian foreign direct investors and provides information on number of employees, sales and sectors of both investors and affiliates, as well as country of destination and affiliates' birth year (for details, see Mariotti and Mutinelli, 2014). We exploit the fiscal identification numbers which allow us to uniquely identify a firm and we build a consolidated dataset, which provides information on firms' processes of internationalization, economic performance, innovative capacity and growth for investors and affiliates for the period 2004-2012[1].

The dependent variable (span of survival of Affiliates) is calculated as:

$$S_t = A_t - A_0 + 1 \tag{6}$$

where A_t is the year corresponding to the balance sheet at year t and A_0 is the affiliates' birth year. S_t represents the "failure" variable on which the exit probability is worked out. Unfortunately, we cannot distinguish the exit event (i.e. winding-up, failure or end of activity) and we assume the affiliate has shut down when it disappears from the database.

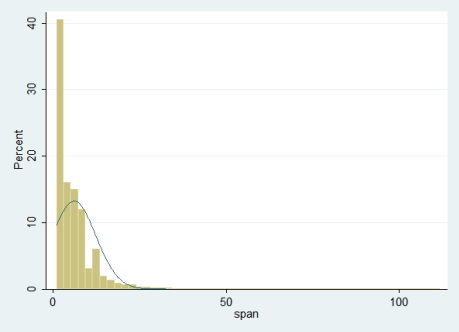
The failure is a censored variable because the exit from the market can happen during or before 2012, the last year of our dataset. Hence, we can avoid biased estimates by distinguishing firms that failed during 2012 from those still alive in 2012 that are no longer included in the dataset as a result of falling outside the sample frame. Fig. 1 shows the span of the Italian affiliates: on average they survive roughly 6 years (in line with Italian firms, see Giovannetti et al. 2011) in international markets.

Since, our data source allows us to disentangle the role of the investors on the affiliates' survival probability, we introduce as explanatory variables:

- investors' and affiliates' size (sales);
- investors' and affiliates' technological level;
- a dummy variable capturing whether they belong to the same sector or are in different sectors.

[1]The complex merging procedure and cleaning of the database is available upon request by authors.

Figure 1: Span



We generalize this base model, adding three technological dummies, built as follows: 1) the affiliates' technology level is higher than that of the parent; 2) the affiliates' technology level is lower; 3) affiliates and parents have the same technological level. These variables allow us to highlight the role of technological process for the delocalization. We maintain that the affiliates' survival probability increases if the affiliates' technology is higher than the investor's because, in this case, it may be difficult for the investor to substitute it. The investment is focused on specific competence that cannot be easily found elsewhere. On the other side, if the affiliate' technological level is low, it is likely that the investors has persuaded a cost saving investment, that can be (easily) dismantled if cheaper alternatives come up. So, we expect to find a negative effect between the affiliate and parent technological level on the affiliates' survival probability.

The generalized survival model includes also distance of country of destination from Italy (in line with a gravity approach), the number of affiliates per investor per country, the number of affiliates per sector and country, as control variables.

Due to high heterogeneity and skewness of the sales distributions, Size represents the affiliates' and investors' total sales in quantiles. For the same reason the country distance proxy (linear distance capital to capital in km) is considered in quantiles.

Table 4 summarizes standard statistics of our variables. The Italian affiliates are really heterogenous. Our *average* affiliate is small (18 thousands euros sales in per year), and its parent is a large investor. Interestingly, 73% of the affiliates have the same technological lever of their investors, while 25% of them show an higher technological level of their investors. Going into detail, this is reinforced by the fact that 66% of the affiliates operate in the same industrial sector of their parent company. The average investor is highly internationalized, and it goes to medium-high developed countries (see De Masi et al. 2013). Indeed, it has roughly 44 affiliates per country, and 30 affiliates per sector. Moreover it has around 11 greenfield investments and, not surprisingly, 30 M&A.

Table 2 reports the life table for the affiliates. It is worth noting that the rate of survival is dramatically decreasing in the very first years of activity dropping to 78.9% in the first year, and only 50% of firms survive in the first 5 years of activity.

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
affilates sales (K euros)	205885	18.08	191.78	0	34219.03
investor sales (K euros)	154284	2825814	11300000	0	67800000
investor higher technological level	223314	0.02	0.16	0	1
affiliate higher technological level	223314	0.25	0.43	0	1
same tachnology level	223314	0.73	0.45	0	1
same sector	223314	0.66	0.47	0	1
distance	223314	3701.20	3685.52	230.02	18572.15
affilates per country (number)	223314	44.24	121.79	1	891
affiliates per sector (number)	223314	30.64	94.38	1	885
Greenfield investments (number)	78110	10.96	21.24	0	146
M & A (number)	78110	30.13	80.80	0	576
country of destination's GDP (per capita)	219728	24598.36	16896.40	118.64	87716.73

Table 2: Life Table

Interval	Beg. Total	Deaths	Lost	Survival	Std. Error	[95% Conf. Int.]
1 2	223314	47027	0	0.7894	0.0009	[0.7877 0.7911]
2 3	176287	22240	0	0.6898	0.0010	[0.6879 0.6917]
3 4	154047	21430	0	0.5939	0.0010	[0.5918 0.5959]
4 5	132617	17223	0	0.5167	0.0011	[0.5147 0.5188]
5 6	115394	18594	0	0.4335	0.0010	[0.4314 0.4355]
6 7	96800	19424	0	0.3465	0.0010	[0.3445 0.3485]
7 8	77376	14007	0	0.2838	0.0010	[0.2819 0.2856]
8 9	63369	13977	0	0.2212	0.0009	[0.2195 0.2229]
9 10	49392	12861	0	0.1636	0.0008	[0.1621 0.1651]
10 11	36531	3638	0	0.1473	0.0007	[0.1458 0.1488]

5 The Results

We firstly discuss the generalized model for the whole sample, then we run sub-groups regressions on micro, small, medium-small, medium-large, and large manufacturing firms to better analyse the effect of the specified set of covariates on affiliates' survival[2]. Similarly we run sub-groups regressions on different technological levels: high, medium-high, medium-low and low technology, following OECD (2009), excluding services and agriculture firms.

5.1 Whole sample

Table 3 summarizes the main results (we report hazard ratios). We run different specifications for the whole sample. The first regression is our generalized model, where we include separately affiliates' and investors' technological level. Regressions 2 to 4 compare investors' and affiliates technological level, introducing the dummies discussed above.

In line with the existing literature (Giovannetti et al., 2011), the larger the size of affiliates the higher their survival probability: on average, all else equal, it increases by 15.9%. For the whole sample, the investors size does turn to play any role on their affiliates' failure probability.

Regression 1 shows, as expected, that being on the technological frontier reduces the affiliates' survival probability (by 23.4%) while the investor' technological level is not relevant. The distance sign and magnitude are as expected, since the probability of survival declines if the investor is far (failure probability increases by 5.2%). This result is in line with the gravity models of international trade and highlights that investments in faraway countries are likely to be more costly and riskier.

A higher number of affiliates per country has a negative effect on the survival probability but a higher number of affiliates per country *in the same sector* has a positive one. In commenting the results we have also to account for the heterogeneity in the number of affiliates per country (ranging from 1 to 885) and a very important role of sectors on the affiliates' survival probability.

From the theory on firms internationalization, we know that the possible existence of sunk costs for greenfield investments, makes it expensive for the investor to shutdown after a short period of time. Our results confirm this, since greenfield investments reduce the failure probability of the firm (on average by 12.1%).

Focusing on regressions from 2 to 4, we can notice that the main results, discussed above, still hold but distance no longer significant while being part of a process of M&A is significant and negatively affects the affiliates survival probability.

[2]We use 5 equally represented classes. In this case, we don't use quantiles but we define a number of classes n such that the proportion of the population (asset size of the firms) in each class j, for each t, is constant and equal to n^{-1} . This allows us to avoid classifying most firms as micro and obtaining a less asymmetric size distribution of firms

In regressions from 2 to 4, we also analyze the relationships between affiliates' and parents' technological level, introducing alternatively the three dummies introduced above: investors' technological level higher (reg. 2), lower (reg.3) and equal to (reg. 4) their affiliates' technological level.

When the parents have a higher technological level, their affiliates' probability to exit jumps dramatically by 163%. While in specification 3 and 4 the effect is the opposite: the failure probability drops by 19-20%. We would like to stress this result, because (we believe) it may be a further driving force of the affiliates success in the market. In other words, when the investor has a technological superiority over the affiliates, this generates a power gap between the two: the investor, that brings the technology, considers the investment abroad like a cost-saving investments with low skills. Therefore, for the investor is likely to move its investment if it finds more convenient situations abroad. An affiliates that brings an higher level of technology turns out to be strategic for the parent company, due to skills, talent, etc. Thus, the probability for the investor to shutdown the affiliates in this case is lower. The same results hold when the investors and the affiliates share the same level of technology, suggesting that they jointly work sharing the production process.

Table 3: Results: Whole Sample

VARIABLES	(1) Manufacture 1	(2) Manufacture 2	(3) Manufacture 3	(4) Manufacture 4
Affilates' Sales (quantiles)	0.841***	0.872***	0.875***	0.882***
	(0.022)	(0.017)	(0.017)	(0.017)
Affiliates' tech level	1.234**			
	(0.102)			
Investor' sales (quantiles)	1.020	1.014	1.015	1.017
	(0.033)	(0.024)	(0.024)	(0.024)
Investor' tech level	0.938			
	(0.080)			
Same sector	0.874	0.919	0.739***	1.017
	(0.073)	(0.051)	(0.059)	(0.101)
Distance (quantiles)	1.052**	1.010	1.011	1.007
	(0.024)	(0.018)	(0.018)	(0.018)
Affiliates per country (number, quantiles)	1.075*	1.111***	1.116***	1.122***
	(0.047)	(0.040)	(0.041)	(0.041)
Affiliates per country and sector (number, quantiles)	0.948	0.902***	0.893***	0.897***
	(0.040)	(0.031)	(0.031)	(0.031)
Greenfield investments (quantiles)	0.879***	0.877***	0.875***	0.868***
	(0.025)	(0.018)	(0.018)	(0.018)
M & A (quantiles)	1.050	1.193***	1.185***	1.194***
	(0.033)	(0.029)	(0.028)	(0.028)
Recipient Country GDP (per capita, quantiles)	1.023	0.981	0.982	0.960*
	(0.030)	(0.022)	(0.023)	(0.022)
Investor's tech level higher		2.636***		
		(0.338)		
Affiliate's tech level higher			0.812**	
			(0.070)	
Same tech level				0.808**
				(0.085)
Observations	23,723	36,788	36,788	36,788

Robust seeform in parentheses
*** p<0.01, ** p<0.05, * p<0.1

5.2 Investor' Size

In table 4, we show the results for the generalized model for investor's size, comparing micro and large parent companies[3].

As affiliates's size grows, their survival rate increases, confirming that size is one of the most relevant variable affecting firms' survival. Distance has a opposite effect as we consider micro and large investors. It is weakly significant (reducing the survival probability) for the micro, while the farest affiliates of large parents have lower probability to die, since they are likely to be key investments.

Interestingly, there is a set of covariates significant for micro (large) but not for large (micro) investors. Specifically, as in regressions from 1 to 3, micro parents affiliates survival probability is affected by the structure of the investment (number of firms in the same country and sector) while large parents affiliates survival is directly affected by their own typology of investment (M&A or Greenfield). The affiliates' survival probability of micro investors decreases as the number of affiliates in the country increases. Focusing on number of affiliates per sector in the country we find an opposite effect: being one of the several affiliates of the same micro investors in the country in same sector reduces the failure probability. In line with the whole sample results, the typology of investment is extremely relevant in decreasing (increasing) failure probability if the investor is large (regressions from 4 to 6): being a greenfield reduces it while being part of a M&A process increases it.

Finally, investors (both micro and large) with a superior technology increase affiliates' failure probability; it is worth noting that this effect is magnified for the large parent companies. On the other hand, the failure probability is reduced when the affiliates have either the same or superior technology over their large parents.

[3]The additional results are available upon request.

Table 4: Results For Investor' Size

VARIABLES	(1) Micro 1	(2) Micro 2	(3) Micro 3	(4) Big 1	(5) Big 2	(6) Big 3
Affiliates' sales (quantiles)	0.824***	0.819***	0.827**	0.872***	0.859***	0.871***
	(0.062)	(0.062)	(0.062)	(0.032)	(0.031)	(0.031)
Same sector	1.211	0.903	1.083	0.850	0.379***	0.842
	(0.199)	(0.217)	(0.311)	(0.099)	(0.052)	(0.156)
Distance (quantiles)	1.097*	1.108*	1.103*	0.898***	0.912**	0.921**
	(0.058)	(0.060)	(0.060)	(0.036)	(0.036)	(0.036)
Affiliates per country (number, quantiles)	1.362***	1.368***	1.382***	0.946	0.963	0.996
	(0.156)	(0.159)	(0.162)	(0.084)	(0.089)	(0.096)
Affiliates per country and sector (number, quantiles)	0.798**	0.790**	0.789**	1.105	1.013	1.025
	(0.090)	(0.090)	(0.091)	(0.094)	(0.094)	(0.100)
Greenfield investments (quantiles)	1.016	1.022	1.017	0.803***	0.796***	0.808***
	(0.059)	(0.060)	(0.060)	(0.033)	(0.032)	(0.032)
M & A (quantiles)	1.072	1.069	1.061	1.188**	1.139*	1.198**
	(0.080)	(0.081)	(0.081)	(0.090)	(0.079)	(0.085)
Recipient country GDP (per capita, quantiles)	1.099	1.112	1.091	0.937	0.972	0.910**
	(0.095)	(0.100)	(0.098)	(0.043)	(0.044)	(0.041)
Investor tech level higher	2.200**			15.954***		
	(0.875)			(3.543)		
Affiliates tech level higher		0.714			0.421***	
		(0.198)			(0.070)	
Same tech			1.079			0.676*
			(0.348)			(0.141)
Observations	4,544	4,544	4,544	9,948	9,948	9,948

Robust seeform in parentheses

*** p<0.01, ** p<0.05, * p<0.1

5.3 Level of Technology

In table 5 we report the results for investor's technological level. We compare the low-tech and high-tech investors.

Affiliates' size reduces the risk of exit from the market and this effect is largest for the high-tech investors. Large and low-tech investors weakly reduce the affiliates risk of exit (regressions from 1 to 3). Operating in the same sector is a strong competitive advantage for the affiliates only if the investor is on the technological frontier (regressions from 4 to 6). Notice that, for these sub-groups being part of a M&A process is always risky for the affiliates. Differently from the previous specifications, the destination country GDP turns out to be very important for the affiliates survival: investing in rich countries reduces the risk of failure when the investors operates in high-tech sectors (regressions from 4 to 6).

The set of covariates on the technological levels comparison shows that affiliates of a low-tech parent,having technological superiority, are more at risk (failure probability increases by 80% on average), while for those sharing the same technological level the risk is lower. On the contrary, high-tech parents investing in technologically superior affiliates consider this as a key investment (the failure probability drops by 53%), while affiliates are more at risk when they have the same high technological level.

Table 5: Sub-Sample Tech - Investors

VARIABLES	(1) Low Tech 1	(2) Low Tech 2	(3) Low Tech 3	(4) High Tech 1	(5) High Tech 2	(6) High Tech 3
Affiliates' sales (quantiles)	0.901**	0.907**	0.907**	0.794***	0.784***	0.793***
	(0.039)	(0.039)	(0.039)	(0.047)	(0.047)	(0.047)
Investor' sales (quantiles)	0.924*	0.923*	0.923*	1.045	1.050	1.059
	(0.041)	(0.041)	(0.041)	(0.058)	(0.058)	(0.060)
Same sector	0.882	1.392	1.392	0.875	0.432***	0.395***
	(0.105)	(0.314)	(0.314)	(0.136)	(0.108)	(0.120)
Distance (quantiles)	1.025	1.012	1.012	1.031	1.041	1.030
	(0.039)	(0.039)	(0.039)	(0.049)	(0.050)	(0.049)
Affiliates per country (number, quantiles)	0.996	1.007	1.007	0.972	0.951	0.975
	(0.076)	(0.077)	(0.077)	(0.093)	(0.092)	(0.093)
Affiliates per sector/country (number, quantiles)	0.966	0.969	0.969	1.008	1.021	1.000
	(0.074)	(0.075)	(0.075)	(0.095)	(0.096)	(0.092)
Greenfield Investments (quantiles)	0.989	0.978	0.978	0.912	0.935	0.924
	(0.044)	(0.044)	(0.044)	(0.058)	(0.059)	(0.058)
MeA (quantiles)	1.216***	1.222***	1.222***	1.351***	1.357***	1.335***
	(0.060)	(0.060)	(0.060)	(0.100)	(0.101)	(0.097)
Recipient country GDP (per capita, quantiles)	1.105*	1.059	1.059	0.857**	0.870**	0.853**
	(0.058)	(0.059)	(0.059)	(0.056)	(0.058)	(0.055)
Investor' tech level higher				1.779*		
				(0.592)		
Affiliate' tech level higher		1.808**			0.445***	
		(0.443)			(0.110)	
Same tech			0.553**			2.287***
			(0.136)			(0.693)
Observations	8,899	8,899	8,899	4,207	4,207	4,207

Robust seeform in parentheses

*** p<0.01, ** p<0.05, * p<0.1

6 Conclusions

Firm's survival is a key aspect for firm's competitiveness both at home and on international markets. To survive in an increasingly competitive environment firms need a mix of strategies including internationalization, technology and skills.

In this paper, we study the relationships among firms' characteristics and their survival probability, focusing directly on their complex internationalization modes. The aim of this paper is to model the affiliates' survival probability conditional on a set of characteristics of both parent and affiliates. We generalize the base model used in business demography, stressing the role of technological level of both affiliates and investors. We focus on the Italian foreing direct investments and we use an original longitudinal database covering the period 2004-2012. We show that, larger affiliates of large investors compete better and survive more. Being part of networks of affiliates in the same country and/or sector also decrease the risk of exiting markets. As expected, distance plays a role: affiliates in farest markets are more at risk. We show that, in general, when the investors have a higher (lower) technological level, their affiliates' failure probability increases (decreases). However, when we compare parent and affiliate technological level, the effects change. When the investor is more advanced than its affiliates, it is likely that the investment abroad is triggered by a cost-saving strategy and involves low skilled employees. The investor, in this case, disinvests and can move to a cheaper country. Affiliates with a higher level of technology, instead, are strategic to the parent company, due to skills, talents or competencies.

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