Entrepreneurship Heterogeneity and Internationalization of Firms: the case of Italy

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Abstract

We analyze the relation between entrepreneurship and firm performance, emphasizing the role of firms mode of internationalization. We stress the multidimensionality of the concept of entrepreneurship, accounting not only for entrepreneur's specific characteristics (age, family firm), but also for her decisions on firm's strategies and her organizational capabilities. To estimate firm performance, we match and merge three different datasets, the Capitalia survey, ICE-Reprint and AIDA for the period 2001-2003, and run a log log quadratic specification, where sales is our dependent variable. The specific characteristics of the entrepreneur do not seem to significantly affect sales, while the mode of internationalization and connected choices play a role. We find evidence of some important non linearities when we assess the effect of the share of skilled workers and managers in determining firm's performance. In summary, firms with a different international involvement seem to need different typologies of entrepreneurs to compete successfully.

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1 Introduction

Entrepreneurship is likely to affect the competitiveness and the economic performance of firms. Though this link has been emphasized since the seminal work of Shumpeter at the beginning of the 1900, it has been long neglected to be resumed only in the last decade (Lisbon Strategy 2000). Indeed, recently, an increasing number of papers has stressed the importance of entrepreneurship in explaining firms economic performance and showing that not only investments (in either physical or human capital) or labor affect performance (Holtz-Eakin and Kao, 2003; Audretsch and Thurik, 2001) but also organizational issues, good management etc..

Recent empirical literature, in general, tend to proxy entrepreneurship by the number of new firms entering the market (Audretsch, 2007) and therefore hiding (masking) the intrinsically multi-dimensionality of entrepreneurship concept. This can be related, on the one hand, to firm strategies and, on the other hand, to attitudes, skills and specific characteristics of the top management.

In this paper, following Biggeri et al. (2007), we emphasize the multidimensionality of the entrepreneurship and we relate the firms' economic performance to entrepreneur's specific characteristics, her decisions on firm's strategies and her organizational capabilities, using different proxies and an original database.

The paper is structured as follows. After a brief review of the literature (section 2), we present the dataset, obtained by matching and merging three different databases, and the methodology in section 3. Results of our estimates are in section 4: we test the hypothesis that heterogenous firms characteristics (internationalization mode, technological level and entrepreneur's age) affect the relationship between entrepreneurship and performance. We show that important non linearities exist in the relationship between firms' performances and education of employees and that firms with a different international involvement need different typologies of management and labor force to successfully compete. Section 5 concludes.

2 The Literature

There is an increasing literature on entrepreneurship but there is little consensus on what entrepreneurship really means and how it can be measured. A variety of

definitions and a correspondingly number of different measures have been proposed (Hebert, Link, 1989).

The Shumpeterian tradition states that entrepreneurship can be represented as a sort of breakpoint in the firm' activity rather than an equilibrating force. In his 1911 seminal book, Schumpeter proposed the "theory of creative destruction", where new firms with entrepreneurial spirit displace less innovative incumbents, ultimately leading to a higher degree of economic growth. More recently, in the same line of thought, Audretsch (1995) has argued that entrepreneurship is an intrinsically dynamic process and has focussed on the fact that higher levels of entrepreneurship are reflected by higher start-up rates or new ideas in the market.

The Shumpeterian definition of entrepreneurship is clear and simple, however, it does not seem to encompass the complexity of the phenomenon that cannot be easily matched with a proxy. Indeed, the concept is multifaceted and depends on skills and characteristics of the top management, as well as specific firm strategies and attitudes (Eurostat 2006; Istat 2006).

From an "economic" point of view, the entrepreneur has to decide on the supply of financial capital, innovation, allocation of resources among alternative uses. Thus, an entrepreneur is someone specializing "in taking responsibility and making judgemental decisions that affect the location, form, and the use of goods, resources or institutions" (Hebert and Link, 1989) and entrepreneurship is the real effect of entrepreneur's characteristics . From the management perspective, the entrepreneur is a "commander in chief", taking opportunities, assembling resources and implementing a practical action plan efficiently and flexibly (Sahlman and Stevenson, 1991) and is therefore "more than" a pure manager. The existing empirical evidence seems to support the view that entrepreneurship serves as an agent of change (Audretsch et al. 2006) and that entrepreneurial firms provide new ideas and experimentation, as well as capacity of taking risks that positively affect the firms' economic performance. In the words of Audretsch (2007) "entrepreneurship reflects a spectrum of different legal, institutional and social factors".
In summary, a crucial feature of entrepreneurship is that it relates several aspects of analysis, both at micro and macro level. At micro level, it involves individual decisions and actions; while, at a macro level it involves industry characteristics, geographical position, institutional framework, etc. While recently applied work

has used a variety of proxies[1], such as self-employment rates, business ownership rates, new-firms birth rates or firms turnover, the ideal measure would need to reflect all the different aspects of entrepreneurship (Audretsch, 2007). None, to our knowledge, has been able to fully account for this multifaceted character (both micro and macro).[2]

In what follows we try to stress this multidimensionality estimating the possible positive impact of entrepreneurship on firms' performance. The theoretical framework is provided by theories on industry evolution (Jovanovic 1982, Audretsch 1995, Klepper 1996), according to which knowledge and entrepreneur's characteristics have spill-overs and create a fertile context for innovation and economic growth. Thus, "human" capital strongly affect the firms' performance, fostering innovation and change[3].

3 The Data and The Model

3.1 Dataset

We match and merge to gain the intersection of three different datasets: Capitalia (2005), ICE-Reprint 2001-2003 and AIDA. AIDA provides standard data on budgets of Italian companies, Capitalia's Observatory on Small and Medium

[1]Audretsch et al. (2002) and Carree et al. (2002) use business ownership rate (number of business owners divided by the total labor force) a measure that ignores the heterogeneity between sectors (different technological levels and concentration) Audretsch (1995) focuses on innovative activity of an industry (R&D expenditures and patenting). This proxy includes only those firms that generate a real change in the industry in which they operate, so it is closer to the Shumpeterian definition. Birch (1999) focuses on growth, defines *gazelles* firms growing for a long period of time and reflecting these successful experiences called entrepreneurship. Recently Reynolds et al. (2000),Lundström and Stevenson (2005), Audretsch et al. (2006) have used a simple and intuitive measure: the number of start-ups. However, it is again a one-dimensional measure.

[2]We are aware of the fact that stressing the multidimensional aspect makes the concept of entrepreneurship more difficult to grasp. However, we prefer to maintain this multifaced perspective rather than emphasizing only one aspect.

[3]Recently, Audretsch and Thurik (2001) have shown that entrepreneurship in Europe and North America has shifted the comparative advantage towards knowledge-based economic activity. According to them, SMEs did not become obsolete because of globalization but their role changed as comparative advantages shifted towards knowledge-based economic activity: large firms in traditional sectors became less competitive, producing in their high-cost domestic countries while small firms spurred their value and importance in knowledge-based economy.

Size Firms is a survey on a representative sample of 4305 Italian firms, providing information on many different aspects, such as R&D, innovation and destination markets for exports[4]. The sample includes all firms with more than 500 employees and, among firms with less than 500 employees, a representative sample selected using a stratified design on location, industrial activity and size. Finally, the ICE-Reprint database is the census of foreign affiliates of Italian firms with a turnover higher than 2.5 millions of euros and provides information also on the number of employees and sales (for details, see Mariotti and Mutinelli, 2005). In this paper, we use ICE-Reprint for information on foreign direct investment, AIDA for data on sales and entrepreneur's age and Capitalia for the other variables. Our consolidated dataset provides information on firms' processes of internationalization, economic performance, innovative capacity and growth and labor force characteristics and has information on a panel of 4305 firms for the period 2001-2003.

3.2 Variables

Our aim is to assess firms performance. The dependent variable we use to proxy firms performance is sales. We regress it on several entrepreneur's specific characteristics, firm's strategies and on her organizational capabilities.

More specifically, we distinguish three sets of variables, each accounting for a different aspect of entrepreneurship:

1. *Entrepreneur's characteristics*: entrepreneurs' age, sex, belonging to a family firm[5];

2. *Entrepreneur's (and therefore firm's) strategies*: investments, R&D expenditures, the quota of self-financing, acquisitions and breaking down, decision to export, to export only to EU25 and/or to invest abroad;

3. *Managerial/organizational capacity and skills*: the percentage of employees with a degree, the share of managers and/or specialized workers over total labor force.

[4]The questionnaire of the Capitalia Survey, available on request, provides detailed information on individual variables, except FDI and budget.

[5]See Barba Navaretti et al. (2007) for a definition of "family firm" using data out of the Capitalia Survey, and Favero et al., 2006

3.3 Model

Let $ln(y_{i,t})$ be the firm's log of sales at time t, our general model cam be written as:

$$ln(y_{i,t}) = \alpha + \sum_{j:1}^{k} \beta_j X_{i,j,t} + \varepsilon_{i,t} + \mu_i + \nu_t \tag{1}$$

where $X_{i,j,t}$ represents the set of covariates (where $j : 1, \cdots, k$) encompassing above.

3.4 Linear and Non-linear Effects

We believe that some of these variables may affect firm's performance in a non linear way, due to possible discontinuity, existence of threshold triggering different behaviors, in other words to problems of aggregating heterogeneous firms. Hence, in the following, to account for the variety of complex economic phenomena for which a linear relationship may be inconsistent we also use non linear functions. Specifically, we use a quadratic form, which allows us to capture decreasing or increasing marginal effects on sales. We split $X_{i,j,t}$ in two matrices, one including variables with only linear effects on sales ($\boldsymbol{R}$) and one variables with also possible non linear effects ($\boldsymbol{Z}$). Model (1) can be the re-written as:

$$ln(y_{i,t}) = \alpha + \sum_{j:1}^{k} [\beta_j R_{i,j,t} + \gamma_j Z_{i,j,t} + \rho_j {Z_{i,j,t}}^2] + \varepsilon_{i,t} + \mu_i + \nu_t \tag{2}$$

The statement that Z_j has a diminishing (or increasing) marginal effects on y is the same as saying that the slope of the function in Figure 1 decreases (increases) as Z_j increases (decreases).

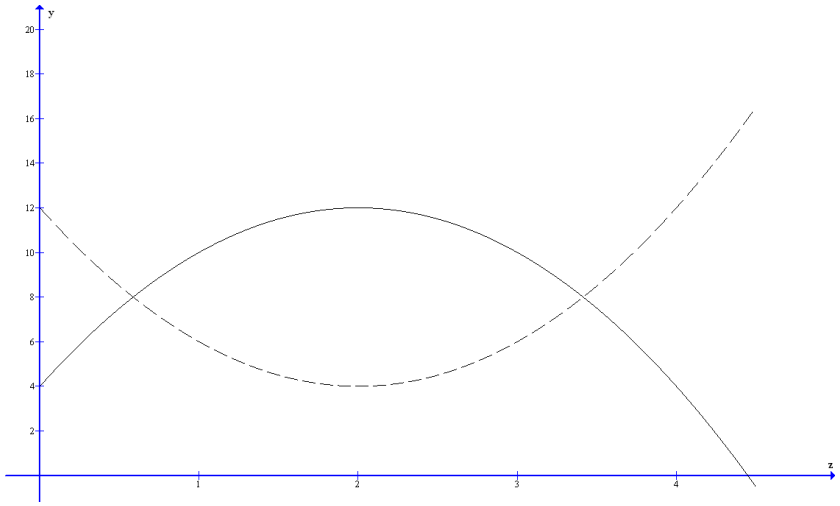
The quadratic function in Figure 1 has an inverted U-shape with a maximum if $\gamma_j > 0$ and $\rho_j < 0$ (continuous line), and a U-shape with a minimum if $\gamma_j < 0$ and $\rho_j > 0$ (dashed line). The turning point is:

$$Z_j* = \frac{|\gamma_j|}{|2\rho_j|} \tag{3}$$

and the slope:

$$slope(Z_j) = \frac{\Delta y}{\Delta Z_j} \approx \gamma_j + 2\rho_j Z_j \tag{4}$$

Figure 1: Quadratic Effects in Z_j



The nonlinearity is characterized by the fact that the change in the dependent variable for a given change in a regressor depends on the starting value of the regressor itself (Wooldridge, 2008). Hence, for small changes in Z_j we can compute the effect on y

$$\Delta y \approx (\gamma_j + 2\rho_j Z_j)\Delta Z_j \tag{5}$$

4 The Results

4.1 Descriptive Statistics

Table 1 reports descriptive statistics. As expected, entrepreneurs are mostly middle aged men[6], since the average age is 55 years old; 69% of firms of our database are family firms. We notice also that, on average, 8% of workers are managers and white collars and around 4% of employees have a degree. Roughly half of the firms can count on self-financing, 13% did an acquisition in the period of observation while less than 5% sold existing activities. Finally, 74.6% of the sample

[6]We do not report statistics for sex, roughly 87% of the entrepreneurs are men. See Giovannetti et al. (2007).

export, while 10.5% invest abroad[7].

We can get some interesting insights (and lines of work as well as testable hypothesis) by dividing the sample according to the international involvements of the firms in our sample (Table 2). The share of employees with degree (our skilled workers) is larger for FDI makers (0.074) and for exporters (0.048) than for the whole sample (0.043), suggesting a "ranking" already emphasized in the literature (Mayer and Ottaviano, 2007; Bernard et al., 2007). Internationalized firms, especially FDI makers, employ more skilled workers (here proxied by employees with degree) because they offshore low value added phases of production and keep at home design, services etc. (workers which usually have a degree but are not necessarily part of the management). If we look at the share of management we find the opposite ranking, this may be due to the different average size of firms with different degree of involvement abroad (De Benedictis and Giovannetti, 2008). In our sample, the share of management is larger for firms operating only in the domestic market: 0.088 for non-exporters, 0.080 for non-FDI makers versus 0.075 for exporters and 0.059 FDI makers[8]. This seems to suggest that Italian non-internationalized firms may need a larger share of white collars and managers to implement commercial strategies. No much note can be guessed by looking at descriptive statistics, hence, to progress we need to move to econometrics.

4.2 The Econometrics

We use a Cross-sectional time-series nonlinear model with feasible generalized least squares (GLS), heteroschedasticity robust method. It allows estimation when cross-sectional correlation and heteroschedasticity across groups is present (random effects). We run a log-log nonlinear specification for the whole sample.
Let $ln(y_{i,t})$ be the firm i log of sales at time t, in model (1) and, as mentioned above, let us split the variables according to their expected linear/nonlinear relationships with sales:

[7] A detailed description of the data we use can be found in De Benedictis and Giovannetti (2008).

[8] It is worth noting that FDI makers are substantially larger than less (or no) internationalized firms. Furthermore, when looking at employment in the different categories between 2001 and 2003, the increase of total labor force is higher and, especially, much less volatile for internationalized firms, suggesting a more heterogeneous behavior for domestic firms in front of challenges of globalization.

Table 1: Descriptive Statistics (2001-2003):

	Whole Sample	Low Tech	High Tech	Young	Mature
Sales (log)	40.900	39.200	44.800	32.900	73.600
	[180.000]	[197.000]	[133.000]	[168.000]	[216.000]
Investment (log)	0.981	0.894	1.173	1.033	0.781
	[5.284]	[4.023]	[7.326]	[5.525]	[4.214]
R&D (%)	0.256	0.182	0.427	0.307	0.062
	[2.571]	[2.834]	[1.819]	[2.851]	[0.848]
Employees w/degree (%)	0.043	0.032	0.066	0.048	0.021
	[0.154]	[0.134]	[0.189]	[0.161]	[0.120]
Family (%)	0.695	0.716	0.650	0.709	0.642
	[0.460]	[0.451]	[0.477]	[0.454]	[0.480]
Age (years)	54.541	54.201	55.291	54.679	53.982
	[13.395]	[13.385]	[13.390]	[13.431]	[13.237]
Management (%)	0.078	0.077	0.080	0.079	0.075
	[0.077]	[0.078]	[0.075]	[0.076]	[0.078]
Self-financing (%)	48.409	46.424	52.725	49.233	17.396
	[41.029]	[40.769]	[41.267]	[41.124]	[20.115]
Acquisitions (%)	0.133	0.123	0.155	0.134	0.130
	[0.340]	[0.329]	[0.362]	[0.341]	[0.336]
Breaking Downs (%)	0.047	0.046	0.051	0.046	0.050
	[0.212]	[0.209]	[0.220]	[0.210]	[0.219]
Export (%)	0.748	0.700	0.855	0.759	0.703
	[0.434]	[0.458]	[0.352]	[0.427]	[0.457]
FDI Makers (%)	0.106	0.088	0.148	0.104	0.116
	[0.308]	[0.283]	[0.355]	[0.305]	[0.320]
Low-Tech Firms (%)	0.687			0.717	0.679
	[0.464]			[0.450]	[0.467]

Note: Standard errors in brackets

$$ln(y_{i,t}) = \alpha + \sum_{j:1}^{k}[\beta_j R_{i,j,t} + \gamma_j Z_{i,j,t} + \rho_j {Z_{i,j,t}}^2 + \delta_j D_{i,j}] + \varepsilon_{i,t} + \mu_i + \nu_t \quad (6)$$

where, $R_{i,j,t}$ includes log of investments and log of R&D expenditures which have a linear impact on sales, $Z_{i,j,t}$ is the set of variables with a nonlinear effect (quota of employees with degree, age of the entrepreneur and management) and $D_{i,j}$ is a set of time-invariant covariates (self-financing, acquisitions, breaking downs, being a family firm, being and exporters and FDI makers).

As easily seen from Table 3, where we consider the whole sample, the dimensions of entrepreneurship regarding international involvement and management capabilities are significant and strongly affect the firms' performance, while the entrepreneurs' characteristics are either not significant (age) or negatively affect performance (family). To be an exporter and/or an FDI maker, on average, in-

Table 2: Descriptive statistics for firms with different modes of internationalization (2001-2003):

	Non-Export	Export	Non-FDI	FDI Makers	Export/Non-FDI	Exp>60% in EU
Sales (log)	17.700	47.600	29.800	133.000	34.100	54.800
	[57.400]	[203.000]	[121.000]	[410.000]	[135.000]	[189.000]
Investment (log)	0.395	1.167	0.751	2.914	0.900	1.241
	[2.534]	[5.882]	[4.766]	[8.216]	[5.483]	[4.940]
R&D (%)	0.061	0.326	0.211	0.654	0.271	0.339
	[0.898]	[2.942]	[2.617]	[2.082]	[3.041]	[3.545]
Employees w/degree (%)	0.026	0.048	0.039	0.074	0.044	0.043
	[0.135]	[0.160]	[0.150]	[0.178]	[0.157]	[0.150]
Family (%)	0.729	0.685	0.713	0.546	0.706	0.673
	[0.445]	[0.464]	[0.452]	[0.498]	[0.456]	[0.469]
Age (years)	55.853	54.159	54.838	52.106	54.481	54.031
	[13.730]	[13.269]	[13.360]	[13.440]	[13.222]	[13.167]
Management (%)	0.088	0.075	0.080	0.059	0.077	0.072
	[0.092]	[0.070]	[0.079]	[0.055]	[0.072]	[0.070]
Self-financing (%)	45.103	49.489	47.853	53.237	48.903	49.107
	[42.054]	[40.637]	[41.266]	[38.597]	[40.939]	[40.389]
Acquisitions (%)	0.083	0.149	0.114	0.300	0.126	0.157
	[0.276]	[0.356]	[0.317]	[0.458]	[0.331]	[0.364]
Breaking Downs (%)	0.026	0.054	0.042	0.096	0.047	0.058
	[0.159]	[0.225]	[0.200]	[0.294]	[0.211]	[0.233]
Export (%)			0.724	0.956		
			[0.447]	[0.206]		
FDI Makers (%)	0.019	0.134				0.125
	[0.135]	[0.341]				[0.331]
Low-Tech Firms (%)	0.820	0.642	0.702	0.566	0.658	0.685
	[0.385]	[0.479]	[0.457]	[0.496]	[0.475]	[0.464]

Note: Standard errors in brackets

creases the sales level by 31.6% and 70.4% respectively. A 1% increase in investment (R&D expenditures) increases sales by 13% (4%), all other constant[9].

Human capital (share of employees with degree) and management are always significant. We mentioned above that these variables can affect sales in a non linear way: a possible discontinuity at individual level, such for instance the existence of thresholds triggering heterogeneous reactions, an "optimal" ratio of managers to workers etc. can indeed imply non linearity at aggregate level. We find evidence of these non linearities. The share of employees with degree shows a maximum (i.e. has a pattern similar to the continuous line in Figure 1): there is a positive effect of hiring skilled workers up to when their share does not exceed 54.50% of the labor force[10]. Above this level the cost of hiring new skilled

[9] Additional diagnostic tests are available upon request.

[10] In table 6 we computed the turning points and the total (linear and nonlinear) composite effect

Table 3: Entrepreneurship and Sales: Whole Sample (2001-2003)

	Whole Sample
Investments	0.13564
	[0.00191]***
R&D	0.04318
	[0.00064]***
Employees w/degree	2.4472
	[0.06864]***
Employees w/degree (square)	-2.24519
	[0.08292]***
Family	-0.23011
	[0.00783]***
Age	-0.00273
	[0.00169]
Age (square)	-0.00002
	[0.00001]
Management	-2.42948
	[0.12221]***
Management (square)	4.02221
	[0.36696]***
Self Financing	-0.00261
	[0.00008]***
Acquisitions	0.64137
	[0.01145]***
Breaking Down	0.48587
	[0.01967]***
Export	0.31695
	[0.00776]***
Fdi Makers	0.70467
	[0.01105]***
Constant	14.31361
	[0.05335]***
Observations	8732
Number of groups	2915

Note: Standard errors in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%

workers seems to be higher than the benefits the firms receive in terms of higher sales.

On the other hand, the share of management (miming a shape such as the dashed line in Figure 1) has a minimum (30.2%). Thus, only if the firms in our sample change their labor composition (i.e. increase the number of managers and white collars) to reach that minimum threshold, the effect on sales will be positive (on average). Below this level the benefits of a new organizational setting do not seem to offset the costs sustained by the firm.

In discussing descriptive statistics we noticed that the average share of skilled workers and managers differ significantly for different levels of international in-

of each variable on the whole sample and different subgroups.

Table 4: Entrepreneurship and Sales (2001-2003)

	High Tech	**Low Tech**	**Young** ($age < 45$)	**Mature** ($age \geq 45$)
Investments	0.14128	0.12358	0.14909	0.13838
	[0.00436]***	[0.00236]***	[0.00365]***	[0.00186]***
R&D	0.04057	0.04585	0.06633	0.0376
	[0.00157]***	[0.00071]***	[0.00116]***	[0.00065]***
Employees w/degree	2.87292	2.24449	0.87335	3.17945
	[0.12802]***	[0.09426]***	[0.10189]***	[0.08971]***
Employees w/degree (square)	-2.52515	-2.09559	-0.72836	-2.96026
	[0.15536]***	[0.10614]***	[0.14692]***	[0.10773]***
Family	-0.30637	-0.25415	-0.07805	-0.29875
	[0.01692]***	[0.00980]***	[0.01380]***	[0.00835]***
Age	0.05334	-0.02983	0.10918	-0.00862
	[0.00357]***	[0.00144]***	[0.01586]***	[0.00367]**
Age (square)	-0.00048	0.00021	-0.0018	0.00001
	[0.00003]***	[0.00001]***	[0.00022]***	[0.00003]
management	-5.36577	-1.48777	-3.44406	-1.82401
	[0.26124]***	[0.11060]***	[0.24823]***	[0.12394]***
management (square)	11.03866	1.86211	8.45569	2.74366
	[0.89837]***	[0.39357]***	[1.01578]***	[0.38171]***
Self Financing	0.00021	-0.00362	-0.00657	-0.00144
	[0.00019]	[0.00010]***	[0.00016]***	[0.00008]***
Acquisitions	0.55312	0.63254	0.8841	0.51413
	[0.02014]***	[0.01243]***	[0.01379]***	[0.01165]***
Breaking Down	0.56655	0.46731	0.50253	0.44883
	[0.03521]***	[0.02994]***	[0.04635]***	[0.02470]***
Export	0.10441	0.45631	0.36023	0.29401
	[0.02717]***	[0.00959]***	[0.01815]***	[0.00841]***
Fdi Makers	0.70436	0.75323	0.48256	0.8294
	[0.01847]***	[0.01025]***	[0.01665]***	[0.01413]***
Constant	12.75769	15.17054	12.46255	14.51064
	[0.11895]***	[0.05352]***	[0.28664]***	[0.12161]***
Observations	2735	5997	2285	6447
Number of groups	913	2002	827	2212

Note: Standard errors in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%

volvements of firms. As a matter of fact, the discussed effects may depend also on other characteristics of the entrepreneur.

Hence, to gain new insights, we further analyze:

- different entrepreneurs' age groups, to see whether the very low numerical value of age coefficient in our estimate depends on heterogeneity of entrepreneurs' (we split the sample considering "young" entrepreneur with less than 45 years and mature otherwise);
- firms in high and low-tech sectors[11];

[11] We build a technological dummy using the Pavitt taxonomy. This taxonomy distinguishes

Table 5: Entrepreneurship and Internationalization Mode (2001-2003):

	Non-Exporter	**Exporter**	**Non FDI**	**FDI Makers**	**Exporter/NO-FDI**	**EXP>60% in EU25**
Investments	0.08626	0.15726	0.13395	0.13339	0.14479	0.18678
	[0.00397]***	[0.00206]***	[0.00206]***	[0.00664]***	[0.00246]***	[0.00293]***
R&D	0.06455	0.0381	0.05129	0.00435	0.04454	0.04796
	[0.00131]***	[0.00063]***	[0.00067]***	[0.00171]**	[0.00071]***	[0.00087]***
Employees w/degree	4.20381	2.43161	2.87146	1.60645	2.56864	1.96902
	[0.49372]***	[0.05884]***	[0.09129]***	[0.13399]***	[0.09105]***	[0.10938]***
Employees w/degree (square)	-3.80487	-2.23223	-2.60023	-1.9015	-2.21328	-1.78795
	[0.51091]***	[0.07926]***	[0.10758]***	[0.21181]***	[0.10865]***	[0.12633]***
Family	-0.53089	-0.14048	-0.25885	-0.07133	-0.1817	-0.15784
	[0.01593]***	[0.00897]***	[0.00929]***	[0.02169]***	[0.01150]***	[0.01096]***
Age	-0.01059	0.00833	-0.00292	0.04349	0.00946	-0.01817
	[0.00424]**	[0.00178]***	[0.00175]*	[0.00610]***	[0.00197]***	[0.00254]***
Age (square)	0.0002	-0.00017	-0.00002	-0.00044	-0.00018	0.00008
	[0.00004]***	[0.00002]***	[0.00002]	[0.00006]***	[0.00002]***	[0.00002]***
management	0.00934	-2.96009	-2.36657	-4.39752	-3.18603	-4.81737
	[0.21339]	[0.12743]***	[0.13003]***	[0.54568]***	[0.14177]***	[0.17087]***
management (square)	1.28477	3.94555	3.99328	5.21874	4.49217	7.68438
	[0.64953]**	[0.39080]***	[0.38089]***	[2.33850]**	[0.40233]***	[0.52000]***
Self Financing	-0.00615	-0.00164	-0.00311	0.00322	-0.00239	-0.00312
	[0.00017]***	[0.00009]***	[0.00009]***	[0.00027]***	[0.00011]***	[0.00013]***
Acquisitions	1.03436	0.57208	0.66001	0.58084	0.56054	0.64148
	[0.05621]***	[0.01193]***	[0.01376]***	[0.02347]***	[0.01177]***	[0.01636]***
Breaking Down	0.73575	0.4939	0.61546	0.19001	0.62579	0.32024
	[0.07183]***	[0.02566]***	[0.02453]***	[0.03881]***	[0.02449]***	[0.03304]***
Export			0.27538	0.54636		
			[0.00890]***	[0.13959]***		
FDI Makers	1.09268	0.69665				0.59171
	[0.12355]***	[0.00844]***				[0.01120]***
Constant	14.5889	14.20927	14.34135	13.78098	14.37702	14.72321
	[0.13357]***	[0.05812]***	[0.05623]***	[0.21676]***	[0.06505]***	[0.08614]***
Observations	1987	6745	7823	909	5863	4223
Number of groups	663	2252	1957	1410	2611	304

Note: Standard errors in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%

- international involvement at different levels (exporters and non-exporters, FDI and non-FDI makers, exporters who do not make FDI and firms that export in the EU25 countries more than 60% of their exports);

Table 4 and 5 present results for the subgroups. As expected, and in line with our general results (Table 3), investment and R&D have a positive and significant

between traditional, scale, specialized and high-tech sectors. Results in Table 4 are reported for a dummy equal to zero when the firm is either in traditional or in scale sectors and one otherwise. Since the scale sectors include also firms that cannot be classified as low tech (like the transport sector), we also run the model using (1) a dummy equal 0 only for traditional sectors and 1 otherwise; (2) the 4 Pavitt classes separately and (3) some relevant sectors (mechanics, textile, clothing and chemicals). Results are robust and available upon request.

Table 6: Composite Effects and Turning of non linearity

	employees w/degree		**management**	
	Effect (0.043)	Turning point (%)	Effect (0.077)	Turning point (%)
whole sample	2.25	54.50	-1.81	30.2
young	0.81	59.95	-2.14	20.37
mature	2.92	53.70	-1.40	33.24
high tech	2.66	56.89	-3.67	24.3
low tech	2.06	53.55	-1.20	39.95
non-exp	3.88	55.24		
exp	2.24	54.47	-2.35	37.51
non-fdi	2.65	55.22	-1.75	29.63
fdi	1.44	42.24	-3.67	42.13
exp/no fdi	2.38	58.03	-2.49	35.46
exp>60	1.82	55.06	-3.74	31.35

Note: composite effects are worked out using the equation (5) where z is the sample average, 0.04 and 0.077 for employees with degree and management respectively. We do not report the calculation for age, available on request.

impact and, interestingly, their magnitude does not vary across subgroups (but for FDI-makers). The share of employees with degree (both levels and square) is positive and significant. However, coefficients vary upon the subgroups considered. Table 6 shows that the coefficient of share ranges from 0.81% for young entrepreneurs to 3.88% for non-exporter. More specifically, assuming that a firm with a young entrepreneur has 4.3% of employees with degree (the sample average), a 1% increase in the share of graduates leads to a 0.81% increase in sales; moreover, return in human capital is increasing up to almost 60% of the labor force. On the other hand, when the firm is run by a mature entrepreneur the same investment in human capital leads to a 2.92% increase in sales; however the increase in return decreases as the share reaches 53.70% of the labor force (see Table 6). These results seem to suggest that a young entrepreneur may have a lack of experience that cannot be completely mitigated by investing in human capital.

The same reasoning can be applied to other variables that have non linear effects. Out of all the results, let us focus on the differences between non-internationalized firms (those that either do not export or do not invest abroad, see Table 5) and those with higher international involvement. The increase in sales due to a 1% increase in the share of skilled workers is 3.9% for domestic firms, which is

higher than the corresponding increase in sales for exporters (+2.3%), FDI-makers (+1.5%) and exporters which to not invest abroad (+2.4%). If we recall that firms that invest abroad and exporters have on average a higher share of labor force with degree (7% and 5%) than those that are not internationalized (less the 3% for non-exporters), we can justify the higher marginal contribution of skilled workers in domestic firms up to around 55% of labor force. Furthermore, internationalized firms need an extended set of competencies that cannot be proxied simply by a degree (Mayer and Ottaviano, 2007, Giovannetti et al 2007)[12].

5 Conclusions

Entrepreneurship is a multifaceted concept and it is expected to strongly affect firm's performance. We emphasized the multidimensional aspects by concentrating on three sets of aspects: entrepreneurs' characteristics, entrepreneurs' strategies and managerial capacity. We find that the effects on sales is, in general, highly significant and in some cases non linear. However, it varies, also significantly, among subgroups and exploiting this information we gain some insights to evaluate the role of the entrepreneur. The entrepreneur's age plays no role fostering the firm's performance: being young does not guarantee the success of the firm. All other constant, firms in international markets seem to perform better than purely domestic firms. In summary, a successful entrepreneur knows how to deal with skilled labor force and with optimal level of management for her/his firm. Moreover, she/he runs an internationalized firm. More specifically, from our results, it emerges that the successful entrepreneur explores new markets and invest in human capital. Firms investing abroad, which are on average larger than non (or less) international firms, indeed, need a lower share of managers and white collars and higher share of skilled workers.

[12]for instance, some skills such as specialized blue collar are crucial to win the challenges of globalization in specific sectors but do not require a degree.

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