

# Why new firms never get large?

## Evidence on post-entry growth of Italian new firms

Andrea Bonaccorsi

Università di Pisa

Silvia Giannangeli<sup>1</sup>

Scuola Superiore di Studi Universitari e di Perfezionamento “Sant’Anna” di Pisa

### Sommario

La recente letteratura microeconomica ha diffusamente affrontato il problema della crescita delle nuove imprese. Questo lavoro contribuisce alla letteratura studiando una pluralità di fattori che influenzano la probabilità di crescita di un campione di nuove imprese italiane nate nel periodo 1999-2000. Lo studio supporta alcuni degli effetti discussi in letteratura, in particolare sulla dimensione iniziale, le risorse finanziarie e gli effetti settoriali. Inoltre, mostriamo che il desiderio di indipendenza e la conoscenza del processo produttivo da parte degli imprenditori, sviluppata attraverso l’esperienza di lavoro pregressa, influiscono significativamente sulla crescita delle imprese. Opportunità di mercato ed idee innovative non hanno alcun effetto sulla crescita.

### Summary

In the microeconomic literature substantial attention is currently paid to the problem of new firms’ post-entry growth. This paper contributes to the literature by examining a large number of factors influencing the probability to grow of a sample of Italian firms born in period 1999-2000. We confirm some of the effects discussed in the literature, particularly on initial size, financial resources and industry effects. Moreover, we show that the need for independence and founders’ knowledge of the production process stemming from previous work experience significantly affect firm growth. Market opportunities and innovative ideas do not significantly influence growth.

[L25] [M13] [C21] [C25]

---

<sup>1</sup> [bonaccorsi@sssup.it](mailto:bonaccorsi@sssup.it), [silvietta@sssup.it](mailto:silvietta@sssup.it). A preliminary version of this paper was presented to the Conference organized by *L’Industria*, Ancona, September 23-25, 2005. Comments from Giovanni Dosi, Massimo Colombo, Fabrizio Onida, Enrico Santarelli, Federico Signorini and Marco Vivarelli greatly improved the paper, although we are entirely responsible for remaining errors. We thank Claudio Gagliardi, Director of Centro Studi and Vice-President, and Domenico Mauriello, Unioncamere; Luca Schionato, Gruppoclas, for giving us access to data, for assistance in data analysis and for supporting the research.

## **1. Introduction**

In the microeconomic literature dealing with the process of entry, exit and growth of firms, substantial attention is currently given to the problem of post-entry performance. What explains the dynamics of survival of newly entered firms, and of growth in size, conditional to survival? Are there systematic factors behind post-entry performance? And, if yes, are they related to characteristics of the firm at the start-up, or rather depend on subsequent events?

These questions have been made crucial by the striking results presented by Bartelsman, Scarpetta and Schivardi (2003) in a recent OECD paper. According to their evidence on ten countries, Europe and USA do not differ greatly with respect to rates of entry and exit and hazard rates, controlling for industry effects. At the same time, there is a very large difference in the rate of growth conditional on survival. As the authors put it: “indeed, firms in the United States enter with a smaller (absolute and relative to industry average) employment size than their counterparts in Europe but, if successful, expand much more rapidly to reach a higher average size. Thus, US firms experience a major increase in employment during the initial years, while employment growth amongst surviving firms in Europe is much more modest” (p.26).

These results call for additional research on the determinants of firm growth in the initial years of life. This usually requires the construction of datasets from field surveys, since statistical data do not provide such evidence.

This paper contributes to the literature by examining a large number of factors influencing the probability to grow and the rate of growth of two cohorts of firms born in 1999 and 2000. A large stratified sample of firms was addressed after two years from creation, obtaining 3,904 usable responses to a structured phone questionnaire. Out of the total sample, 3,354 came from active firms in the final year, while 550 firms exited the industry.

The questionnaire was developed and administered by the Ufficio Studi of Unioncamere, the National Association of Chambers of Commerce. The full dataset was made available to researchers in the context of a programme of studies for the Observatory of New Firms created by Unioncamere.

We confirm some of the effects discussed in the literature, particularly on initial size, financial resources, business strategies and industry effects. However, we show that a number of other effects, such as founders' education, start-up and managerial experience, functional experience and family tradition in entrepreneurship do not play any role on firm probability to grow. Among motivations, the need for independence and personal success, and the need for self-employment, both reduce the probability to grow, while a composite measure of identification of market opportunities increases it significantly. However, when disentangling this measure, the only significant motivation refers to the knowledge of the production process (a fairly traditional

competence and motivation). The paper is organized as follows. In Section 2 we review the literature on several factors influencing post-entry growth, particularly focusing on the role of founders' competencies on firm growth and propose a number of hypotheses. Section 3 reports and discusses some descriptive statistics of the sample. Section 4 describes the estimation procedure and discusses the empirical results and implications. Section 5 concludes.

## **2. Founders' competencies and firm growth**

Once the literature has accepted the notion that growth processes significantly depart from Gibrat's law, the hunting is open for factors that may explain systematic departures from the proportionate effect process.

This has led to a large literature, that explores several aspects by capitalizing on a large number of small or large scale surveys on start-ups.

We focus on the general hypothesis that post-entry growth is significantly influenced by the competencies of the entrepreneurial team. In this context, entrepreneurial competencies refer to the ability to identify, protect and exploit market opportunities, combining the appropriate bundle of resources. We control for a number of intervening factors, including firm size, financial resources, business strategies and industry covariates.

In the following we posit some hypothesis on the role of founders' competencies and discuss them on the light of the existing literature.

### **2.1 Founders' competencies**

Individual competencies are a key factor in determining the post-entry growth of new firms. Knowledge-based theories of the firm posit that the ability to successfully compete on the market crucially depends on the extent to which firms develop internal capabilities and firm-specific assets which can not be imitated by competitors and provide the basis for their competitive advantage (Wernerfelt 1984; Barney, 1991; Dosi, Nelson, Winter, 2000). The ability to efficiently serve a market, organize the production process and, overall, recognize and exploit lucrative market opportunities rely, to a large extent, on tacit knowledge which is acquired and transferred only through experience (Shane, 2003). Individual heterogeneity influencing the discovery and the decision to exploit market opportunities is prone to affect also the fortunes of the new ventures. Indeed, it is hard to accept the assumption, made by neoclassical theories of entrepreneurship, that all individuals face the same entrepreneurial opportunities, and those of them who become entrepreneurs do so because of some individual attributes (e.g. preference for uncertainty). Instead, as both psychological and Austrian theories of entrepreneurship suggest, each individual possesses idiosyncratic information and capabilities that allows the identification

of particular opportunities that other cannot see (Shane, 2000). Individual idiosyncratic prior knowledge creates a “knowledge corridor” that allows to recognize only certain particular opportunities (Venkataraman, 1997).

Small and newly founded entrants must rely on the pool of knowledge and skills of their founders as initial resource endowment in order to face the competitive challenges on the market. We therefore expect that post-entry growth is significantly influenced by competencies of the founding group. In order to test this hypothesis, however, we need to carry out the difficult task of measuring the multifaceted concept of “competence”. In doing so, we rely on the existing literature and empirical evidence on human capital and new venture founding, being aware that an exhaustive and satisfying definition of the complex construct of “individual competence” is still far from being achieved.

### **2.1.1 Education**

A growing stream of theoretical and empirical literature has focused on the effect of founders education on the post-entry growth of new firms (see, among others, Roberts (1991), Bruderl and Preisendorfer (1992), Gimeno, Folta, Cooper and Woo (1997), and Storey (1994) for a survey). Education increases the personal stock of information and skills, including those used to make decisions, solve problems and sell. The information and skills provided by education facilitate, therefore, the successful exploitation of a market opportunity. As Shane (2003) posits, better educated people are expected both to be more likely than others to become entrepreneurs, and to found firms with higher growth expectancies. Moreover, the level of founders’ education is correlated with the availability of personal financial resources (Åstebro and Bernhardt, 2005). In presence of problems in raising the external financial resources needed for organizing the production activity, one should expect that firms created by more educated founders will suffer less from credit constraints and will be better in resorting outside collateral.

Therefore, we posit:

H1: *Firms founded by better educated people are more likely to grow.*

### **2.1.2 Age**

Another factor that influences individual heterogeneity in prior knowledge, information and skills is age. On one hand, age increases individual ability to exploit opportunities, thanks to knowledge and experience accumulated over life. On the other hand, however, opportunity costs and therefore reluctance to bear risk increase with age. The sum of these two effects produces a curvilinear, inverted U-shaped relationship between age and the likelihood of exploiting new entrepreneurial opportunities. The empirical evidence on the effect of age on new firm formation

is controversial (see Storey, 1994 for a survey). We conjecture that the effect of age on firm growth will take the same curvilinear shape as postulated for the case of firm creation. In fact, it can be argued that both effects of experience and risk aversion will play an important role in determining the ability of entrepreneurs of selecting *good* market opportunities and bear the uncertainty often related to opportunities associated to higher revenues. Therefore we postulate:

H2: *The probability to grow for a new firm will be higher if founders do not belong to the extreme regions of the age distribution.*

### **2.1.3 Past individual experience**

Past experience of entrepreneurs is an important factor for survival and growth of new ventures. There are two dimensions of experience that matter substantially for entrepreneurship. On one hand, there is a learning dimension. Through professional experience, entrepreneurs gain practical knowledge for both the *identification* and the *exploitation* of opportunities in a new venture. Knowledge concerning new entrepreneurial opportunities is to a large extent tacit, and prior knowledge of markets, how to serve markets and customer problems turn out to be a key asset enhancing the ability for entrepreneurs to identify and successfully exploit opportunities (Von Hippel, 1988).

On the other hand, there is also a social network dimension. Through experience, they build up a network of professional and social contacts that may be useful for the new activity.

A large literature in mathematical sociology has dealt with the role of social ties in promoting entrepreneurial action. Entrepreneurs are seen as actors that identify and take advantage of “structural holes”, or gaps in the structure of relations between actors (Burt, 1992) and in the quality product space (White, 2002), cut across existing routines in order to reach down and get action (White, 1992), and work as intermediaries for building up trust between actors (Coleman, 1990). According to this view, entrepreneurship is fundamentally an intermediary activity in a larger social structure. Entrepreneurs connect otherwise disconnected actors and in doing this are able to leverage and extract value. In order to do so, they must be themselves part of a social relational structure, that creates opportunities. Although we will not follow these contributions in playing down the role of individual motivation, the emphasis on the structural positions of entrepreneurs in a larger network of social ties is relevant also for economic theory.

Not surprisingly, the literature has found a large number of confirming pieces of evidence (see Shane, 2003, for a review). We consider those factors for which we can provide empirical support in the data.

### *Professional experience*

A typical distinction in the literature on human capital is the one between *generic* and *specific* components of individual human capital proposed by Becker (1975). While the former is made up of general working experience and education, the latter refers to knowledge and skills that directly apply to the specific context of the new venture. Professional experience is one of the sources that convey the latter kind of capabilities. If, in fact, it is argued that founders general career experience *per se* is an enhancing factor for new firms success by reducing the uncertainty about the value of exploiting an entrepreneurial opportunity (Bruderl and Preisendorfer, 1998, 2000 find, indeed, that the number of years of founders' work experience has a negative impact on new venture growth), specific professional experiences endow founders with different degrees of ability in exploiting such opportunities.

*Management or start-up experience* increases the likelihood that a person is more prepared to deal with a wide range of problems concerning the new venture. Founders who were previously employed as managers or have previous start-up experience are expected to be better in organizing heterogeneous inputs and resources in the process of production of goods and services (Shane, 2003). According to Klepper (2002) the most fundamental skill for the creation of a new firm is not really technology, but rather organisation. New entrepreneurs that came out from large automobile companies were those that knew how to make a car, or a laser beam, from the point of view of organizing the processes, motivating people, solving for the constraints, meeting customer needs, and managing to keep the whole business together.

In sum, founders with management or entrepreneurial experience are endowed with many of the skills needed to exploit an opportunity, such as negotiating, leading, planning, decision-making, problem solving and organizing.

We therefore conjecture:

H3: *The presence in the founding team of individuals having either managerial or start-up experiences enhances the probability of growth of new ventures.*

The existing empirical evidence on the relationship between founders previous managerial or start-up experience and the post-entry growth of new firms is not univocal. Some studies do support the presence of a positive link (see Bruderl and Preisendorfer (1998) for a sample of German new firms and Lee and Tsang (2001) for new ventures in China) while others show the inexistence of any significant correlation (Cooper, Gimeno-Gascon and Woo 1994).

A second important qualifier of founders professional experience refers to the *functional area* covered in their previous employment history. In this context, the distinction between jobs dealing mainly with technical tasks and those focusing instead on commercial ones turns out to be crucial in defining the capabilities and skills one founder brings into the new venture. While

technical knowledge is a necessary condition to enable new venture to start the production process, the ability to build, retain and expand social networks, negotiate and sell, often related to commercial experience, is essential for new firms to find markets and customers to their product and services.

While functional experience has been found to influence the decision to start up a company (Roberts, 1991), no clear evidence is available on the impact on growth. To the best of our knowledge, the empirical evidence on the latter point is quite scarce and mainly focused on specific high-technology industries, where findings are ambiguous. Founders technical or commercial expertise is found not to account for firm growth by Stuart and Abetti (1990), whereas Colombo and Grilli (2004) find that past experience in technical tasks, especially if developed in the same industry, is positively related to firm growth. We expect, however, that the impact of relational capabilities on the growth of new firms entering to a large extent low-tech manufacturing and services sectors, as it is the case of new Italian firms in our sample, be larger than in highly specialized sectors adopting advanced technologies.

Therefore, we posit:

H4: *Firms created by people having commercial expertise have higher probability to grow*

#### *Industry-specific competence*

Entrepreneurs having some professional experience in the same industry as the new start-up possess a better knowledge of both the market and the production process that are very likely to positively affect the survival and growing chances of newly established firms. Industry-specific technological knowledge and knowledge of customer needs are core assets to the new firms (Teece, 1986; Helfat and Raubitschek, 2000). Previous industry experience of founders conveys to the new firm a better understanding on how to meet demand conditions in the market place. Knowledge of customers and suppliers acting in the industry is, in fact, intrinsically tacit and therefore very difficult to be gathered by outsiders. Such kind of industry-specific competencies, tending to lower the so-called “liability of newness” affecting market entrants (Stinchcombe, 1965), are the basis for a new entrant’s competitive advantage. Moreover, prior knowledge of the industry may enhance the ability to see unexploited market opportunities (Shane, 2000), both related to technological discoveries or the presence of unexplored market niches, and to successfully exploit them through the creation of a new business venture. The empirical evidence substantially supports the existence of a positive relationship between new firms success and their founders’ pre-history in the industry (for surveys, see Klepper, 2001; Helfat and Lieberman, 2002).

Our research hypothesis is, then:

H5: *Firms founded by entrepreneurs having professional experience in the same industry will be more likely to experience post-entry growth.*

#### *Family experience*

Several authors propose that entrepreneurs may gain knowledge not only from their own experience, but also from the *experience of others*. As an example, individuals that live in families with an entrepreneurial tradition may learn the basics by observing their parents, or by making early experience in the family business. Therefore, family tradition in entrepreneurship is a powerful source of vicarious learning for new entrepreneurs (Reynolds, 1997). In addition, family ties offer a great advantage for networking. The family name and reputation may open doors for suppliers, customers, and also bankers (Aldrich, 1999). Furthermore, being in a family with business experience also helps in establishing social ties that create economic opportunities. The importance of family experience finds strong support in the literature. Not only individuals whose fathers were entrepreneur are more likely to start up their own company, but their performance in terms of survival and growth is also better. Gimeno, Folta, Cooper and Woo (1997) studied the performance of firms founded by members of the National Federation of Independent Businesses, and found that the probability to survive was significantly larger for those members whose parents had also owned their firm. Duchesneau and Gartner (1990) found a similar result by comparing successful and unsuccessful ventures.

This argument has even more strength in the Italian context, where a large number of firms are family-owned and where the transition between generations is a critical factor for firm growth (Traù, 1999; Signorini, 2000).

Our hypothesis is:

H6: *The existence of family tradition in entrepreneurship increases the probability of growth for start-up firms.*

#### **2.1.4 Motivations**

We think that an interesting integration of the human capital and competence-based views of the impact of founders individual characteristics on firms growth would be achieved by assessing the effects of motives underlying the creation of a firm. To our knowledge, the link between motivational factors and venture growth has been scarcely investigated by the literature. We think, however, that this view could give a useful interpretative key of the evidence, as we will see, on the persistence of a huge mass of small and low performing firms in Italian economy.

The evaluation of founders motivations brings into the picture the concept of *opportunity cost* of the entrepreneurial choice and *psychological factors* such as the need for achievement and the desire of independence. Entrepreneurs who create a new venture always face opportunity costs. Opportunity cost evaluation is the building stone of income choice models between self-employment (i.e. entrepreneurial activity) and paid employment, where individuals optimize their payoff conditional on the value of their own skills and resources in the two alternatives contexts (see, as an example, Evans and Leighton, 1989, 1990). This approach explains situations where unemployment, or strong psychological motivations (such as the desire of independence and personal success), are the key factors inducing firm foundation. One should expect that such firms, whose creation was not due to profit expectations but, rather, to the founder's need to exit unemployment or psychological satisfaction from being entrepreneur, will be less motivated to grow. Opportunity costs, however, affect not only firms *entry*, but also *exit* decisions. Indeed, firm exit from the market can hardly be seen as a necessary outcome of a mechanical process of selection, pushing out of the market underperforming firms. Rather, exit decision are a subjective, judgemental choice taken by entrepreneurs whenever the level of performance attained by firms is lower than a certain threshold. Such threshold is not given by any kind of minimal efficiency level in the market, but differs among firms and depends, among others, on perspective founder's income in alternative settings (Gimeno, Folta, Cooper and Woo, 1997). Therefore, the probability of exit from the market is lower for those firms founded by unemployed people or individuals with stronger psychological motivations. We then expect such firms to survive at persistently low level of performance in terms of growth. Vivarelli and Audretsch (1998) found, on a small sample of Italian manufacturing firms, empirical support to this view.

Lower growth may be associated to firms founded by individuals strongly in search for personal achievement also because of their tendency to construct an excessive level of self esteem and locus of control (Dosi and Lovallo, 1995). Individuals characterized by strong psychological motivations hardly involve in counterfactual thinking and tend to be over-confident (Shane, 2003), understating existing obstacles to success or overstating the market value of an opportunity. Such individuals will tend to get involved in entrepreneurial activity even when profit or success expectations are low.

Therefore our hypothesis is:

*H7: Firms founded by people induced by unemployment or need for achievement will be less likely to grow.*

## 2.2 Controls

### 2.2.1 Initial size

The relation between size and growth is the subject of a lot of investigation in the literature, partly motivated by testing Gibrat's law, which assumes independence of growth rates from initial size (Geroski, 1991; 1995; Sutton, 1997; 1999). In general, most studies find that either the rate of growth is independent on size (which is considered a confirmation of Gibrat's law) or small firms grow more than large firms. The independence hypothesis has been rejected by studies that find a significant and negative relation between initial size and rate of growth (Hall, 1987; Acs and Audretsch, 1987; Dunne, Roberts and Samuelson, 1988; Mata, 1994; Mata and Portugal, 1994).

Tests of Gibrat's law usually observe a sample of firms over an interval and regress the log of size at time  $t$  to the log of size at the initial date of the interval. The test confirms independence if the slope is equal to one and rejects it otherwise. There are several limitations in this approach. A well known limitation is that if the sample only includes surviving firms, then factors that may explain survival may also explain growth, leading to a bias. Another limitation is that samples are usually censored, because data are taken on firms beyond a given size, excluding microfirms. As a matter of fact, most estimates of Gibrat's law are based on samples that are not representative of the size distribution, particularly because are based on official data that exclude microfirms or on data from employment and social security sources, which by definition do not include those firms that do *not* have employees.

A typical argument against this criticism is that firms without employees are not real firms. The general flavour of the argument is correct: firms that persistently refuse to hire employees do not have a proper organisation, and must be considered individual self-employment rather than an organisational form. They are subject matter of labour economics, not industrial organisation. But it is difficult to accept the argument when it is used to eliminate from the sample the firms without employees *from the beginning*. On one hand, there are several possibilities to employ people without a formal long term employment contract for which social security payments are due, such as temporary work or contract work. Secondly, it is possible that those that work in the new firm are not employees but founders and partners. For these reasons, using data from social security sources is likely to lead to severe measurement errors. Finally, and more fundamentally, we cannot exclude that firms that start with no employees decide to hire workers *after* the start up stage. There is no way to predict whether a firm with no employees at start up will remain so forever. In fact, what we find in the empirical analysis is that a significant portion of those firms that hire employees at the end of the three year period did not have any at the starting date. Eliminating these firms from the sample creates a severe sample selection bias. It is interesting to

note that almost all empirical studies that have tested Gibrat's law have censored samples either by size, or by age, or by both factors. Further research is clearly needed if we want to get more general results.

Another stream of literature, on the other hand, observes a cohort of newly created firms since their birth and studies their survival and growth (Wagner, 1994; Reynolds, 1997; Harhoff, Stahl and Woywode, 1998, Audretsch, Santarelli and Vivarelli, 1999; Shane, 2001; Lotti and Santarelli, 2004). The goal here is not to estimate the size distribution, but rather to identify those factors that may explain an observed growth path.

The linkage between the two approaches should be clear: if there are systematic factors that explain the probability to grow or the rate of growth, then Gibrat's law does not hold, since it assumes that expected growth rates are not influenced by any variable other than industry characteristics.

We assume, following the literature, a negative relation between initial size and rate of growth.

### **2.2.2 Financial resources**

The acquisition of financial resources is a key condition for growth. For newly established firms, raising financial resources is particularly difficult, for a number of reasons clearly spelled out in the literature.

In fact, any entrepreneurial venture is subject to uncertainty and creates by definition information asymmetry problems. Uncertainty over the final outcome of the venture means that the probability of a loss is significantly greater than zero but this risk cannot be absorbed by insurance schemes or diversification strategies. Information asymmetry means that any external funding agent has structurally less access to information on the venture real prospects than the entrepreneur himself. On one hand, it may be difficult to discriminate between entrepreneurs that have poor opportunities from those that may make large profits, on the other hand, entrepreneurs are bound to over-optimism and excess risk behaviour, particularly if they manage others' money.

For these reasons, self-financing is the most preferred solution for start-ups. Interestingly, this holds true across countries, irrespective of the institutional features of financial systems. At the same time, entrepreneurs need additional capital, to be raised from other equity providers or from banks. The financial structure of the start up is likely to have deep effects not only on survival, but also on growth. Moreover, financial structure, as well as external financial constraints, are also likely to affect the initial size of the new start-up, thus reinforcing its ultimate influence on firms post-entry growth (Colombo, Delmastro, Grilli 2004).

The impact of financial constraints on growth has been demonstrated with respect to small and medium-sized firms, even after their start-up period (Fazzari, Hubbard and Petersen, 1988; Schiantarelli, 1996; Bechetti and Trovato, 2002).

Another stream of literature has investigated the impact of financial constraints on business start-ups. Evans and Jovanovic (1989) and Evans and Leighton (1989) find that the initial level of assets of individuals influences the probability of self-employment. Empirical research has also shown that ventures that start with a larger capital are more likely to survive and grow (Bruderl and Preisendorfer, 1998; Cooper, Gimeno-Gascon and Woo, 1994; Gimeno, Folta, Cooper and Woo, 1997).

This literature is affected by a well-known problem of endogeneity: if the availability of initial capital is dependent on individual income or wealth, it is possible that the same (unobserved) factors, such as individual talent, influence the level of income and growth and the ability to run the company. To overcome this methodological problem, some studies examine the probability of transition to self-employment or the survival of new firms after an unexpected financial gain, such as a lottery winning, a windfall gain or a job bonus. Interestingly, these studies almost invariably find that exogenous arrival of new financial resources increases the probability to start up a company (Holtz-Eakin, Joulfaian and Rosen, 1994; Lindh and Ohlsson, 1996; Taylor, 1999). This confirms that financial constraints may severely influence the creation, survival and growth of new firms.

There are two main reason for this relation. First, entrepreneurs that accept to put at risk a larger share of their personal wealth or persuade others to put their money into the venture are more likely to have a business plan with good prospects. In this sense the level of capital at start up may be considered a signal of the quality of the entrepreneurial project.

Secondly, firms with a larger capital endowment at start up are more likely to collect external funding for growth. Banks are more willing to give credit to those that put more money at risk. Initial capital serves as a buffer against events in the early life of the firm, particularly before large cash in-flows are realized.

Therefore we expect that a higher capital endowment of the firm increases the probability of growth in the two-year period

### **2.2.3 Business planning**

Along with founders' and firm's characteristics, the fortunes of a new venture depend on the actions taken by the founding team once in the market. Due to data limitation, we are not able to fully assess the impact of new firms' business strategies on their growth<sup>2</sup>. Nevertheless, the

---

<sup>2</sup> For a comprehensive classification of strategy components affecting firm growth and a survey of the empirical evidence on their effects, see Storey (1994), p. 144-154.

influence of some dimensions of start-up strategies studied in the empirical analysis are discussed.

In particular, *Formal planning* is expected to exert a positive effect on the ability for a new firm to grow rapidly: strategic planning requires the collection, codification and formalization of the information about markets to enter. It is reasonable, therefore, to expect that firms having undertaken a formal planning are, in a sense, self-selected to grow, as the ‘veil of ignorance’ and uncertainty that by definition characterize the first phases of the life of a new venture tend to be reduced in this case. Moreover, the existence of a formal planning reveals that a specific entrepreneurial project stands behind firm creation, as opposed to self-employment. We therefore expect that formal planning enhances the probability that a new venture will grow rapidly.**2.2.4**

#### **2.2.4. Industry**

Industry-specific conditions are likely to affect new firms performance. A broad stream of literature, both theoretical and empirical, has emphasized the role played by different structural and technological industry characteristics on the fortunes of new entrants. Economies of scale and large sunk costs in the industry may cause a competitive disadvantage of new, small firms, entering the market at a suboptimal scale (Audretsch, 1995). In order to catch-up and not being pushed out of the market, new firms must grow faster. Industry concentration (Audretsch and Mahmood, 1995), technological regimes and knowledge transferability conditions (Gort and Klepper 1982, Winter 1984, Audretsch 1991) and industry growth (Mata and Portugal 1994; Wagner 1994) are also found to affect the patterns of growth and survival of new entrants.

### **3. Data description**

#### **3.1 Data source**

The data come from two surveys conducted by Unioncamere (the Italian Association of Chambers of Commerce) on a sample of new Italian firms born in 1999 and 2000<sup>3</sup>. The database is original in many respects. First, it includes only “truly new” firms, as the sample is drawn from the Italian register of firms after cleaning for “false” entries. False entries consist in firm founded through minor transformations of already existing firms<sup>4</sup>. It has been shown that the share of false entries in each cohort of new Italian firms in period 1998-2000 was, on average, 40%<sup>5</sup>. It stands to reason that the inclusion in the flow of entries of firms who are not really new but are, instead, “continuing” firms adopting a different legal form or location, or just changing the main activity, introduces a bias in the of analysis of new firms behaviour. New legal entities which

<sup>3</sup> Unioncamere carried out several waves of surveys. However in this work we use the surveys on firms born in 1999 and 2000 only, since the questionnaires, which have been partially modified across waves, better suit our research interests.

<sup>4</sup> The cleaning procedure follows the EUROSTAT guidelines, which recommend the classification of a new firm registration as “true” whenever it is not possible to find out an existing firm sharing with the new one two features out of : i) localization, ii) sector of activity, iii) team of founders.

<sup>5</sup> Osservatorio Unioncamere sulla demografia delle imprese (2003), p. 10.

are found not to be truly new firms are deleted from the business register and, therefore, are not part of our sample. Second, the Unioncamere database is built without censoring firms falling under any size threshold. This allows us to gather information also on firms starting their activities without any employee. Most empirical analyses of post-entry growth use data that do not include the smallest firms. In our opinion, the lack of information on the huge flow of firms who enter the market at the smallest sizes introduces a severe bias in existing empirical analyses of new firms behaviour, hindering the full understanding of the patterns of post-entry growth in the universe of new firms. The sample is drawn according to a stratification procedure by sector and geographic area that makes our sample representative of the universe. The questionnaire was submitted to firms in the sample and answers were collected by telephone interviews using the CATI technique<sup>6</sup>.

### 3.2 Post-entry growth of newly born Italian firms: a description of the sample.

Our data consist of a pooled sample of 2001 firms founded in year 2000 and 1903 firms born in 1999, covering all business sectors of the economy. Firms were interviewed in the second year after registration, so that their lifetime was, on average, two years long. Not every firm was still active at the time of the interview, or had started its activity yet. Table 1 shows the sectoral composition of the sample and the share of active firms by sector<sup>7</sup>.

	New firms	Active firms	Share of active firms after two years lifetime
Agriculture, hunting, forestry and fishing	484	417	86.16%
Manufacturing	511	442	86.50%
Constructions	621	541	87.12%
Services	2288	1954	85.40%
Total	3904	3354	85.91%

**Table 1. New and active firms by sector.**

The questionnaire submitted to firms in our sample gathers information on the total number of workers in each firm. These include both dependent and independent workers (the latter category containing founders and free-lances). As a result, our data are only partially comparable with those extracted from other sources (social security agency or ISTAT), that collect information on firms with at least one or more employees. The total number of workers will be adopted in the

<sup>6</sup> Refusal rate is about 11% in the two surveys. The unusually high response rate may be explained considering the institutional role of the Chambers of Commerce in the economic system.

<sup>7</sup> Firms that are classified as non-active by the interviewer (on the basis of firms statements) do not need to be formally deleted from the Businesses Register. Indeed, the definition does not refer to the administrative status of the firm. Non-active firms are those which: i) definitively stopped their activity (11.58%), ii) whose activity is temporarily "suspended" (1.54%), iii) have not started their activity yet (0.79%), iv) other (0.18%).

empirical analysis as our measure of firm size. The following of the section will focus on the descriptive analysis of firm employment and growth.

Data on employment are available only for firms continuing their activity until the end of the sample period<sup>8</sup>. Continuing firms consist of 3354 observations, which account for 5562 workers (including self-employment and independent workers) at the beginning of the sample period. Table 2 provides some descriptive statistics on the employment structure of the sub-sample of active firms.

	<i>Min</i>	<i>Max</i>	<i>Mode</i>	<i>Median</i>	<i>Mean</i>	<i>St. Dev.</i>
Number of founders	1	10	1	1	1.07	0.49
Number of employees at start-up	0	70	0	0	0.45	2.32
Number of employees after two years	0	83	0	0	0.63	2.94
Total number of workers at startup	1	77	1	1	1.66	2.78
Total number of workers after two years	1	87	1	1	1.88	3.32
Absolute growth in total workers	-29	35	0	0	0.23	1.31

**Table 2. Employment structure of surviving firms**

The most evident feature of our sample is the sharp predominance of firms founded by a single individual (91.9% of the whole sample and 91.4% of surviving firms).

Among active firms, 2726 (81.3%) were born with zero employees, and 2484 remain so until the end of the sample period. Among these, 2265 firms can be characterized as *one-man businesses*, where the individual founder is the unique worker of the firm, and the large majority of them (86.8%) remain so for the whole length of the sample period.

Sample statistics show that, as one could expect, firm employment dynamics is intensively driven by the pattern of growth of smaller units.

	Number of firms		Workers at t=0		Workers at t=1		Employment gain		Growth rate
	at t=0		(a)		(b)		(b)-(a)		(b-a)/a
Startup size	In the class	% of the total	In the class	% of the total	In the class	% of the total	In the class	% of the total	
1 worker	2469	73.6	2469	44.4	2968	46.9	499	65.6	20.20%
2 workers	525	15.6	1050	18.9	1154	18.3	104	13.7	9.90%
3 to 5 workers	284	8.5	1016	18.3	1113	17.6	97	12.8	9.50%
Above 5 workers	76	2.3	1027	18.4	1087	17.2	60	7.9	5.80%
Total	3354	100	5562	100	6322	100	760	100	13.7%

**Table 3. Employment growth by size class**

<sup>8</sup> Although it is disputable whether non-active firms can be equated to non-surviving firms, the impossibility to include in our empirical analysis this subsample of firms induces something similar to a “survivorship bias” in our results.

In order to understand whether and how the growth dynamics of large firms differs from that of smaller ones, we classify firms into four different size classes. Table 3 shows the relative importance of the classes and summarizes their growth patterns. Time  $t=0,1$  indicate for both cohorts, respectively, the beginning and the end of the sample period. The first qualifier of the evidence reported in Table 3 is the remarkably low value of the 2-years growth rate of firms in our sample, which equals, on average, 13.7%. This is even more true if we compare this value with the two-years growth rate of Italian firms reported in Bartelsman, Scarpetta and Schivardi (2003), which is around 20-22%. The discrepancy might be due to the fact that the sample analyzed by Bartelsman, Scarpetta and Schivardi (2003) include all firms in the private sector with at least one employee, waving aside *one-man businesses*. The inclusion of the latter is prone to bring down the aggregate growth rate in our sample.

The second interesting result is the increased employment share of smallest firms after two-years lifetime. Moreover, the growth of firms having at least five people working in them is not enough to keep the employment share of that size class constant across the sample period. Unfortunately, we are not able to calculate the *net* employment gain of firms in different size classes due to the unavailability of data on workers of firms that don't survive until the end of the sample period. Therefore, we are unable to say whether larger or smaller firms are "expanding" in terms of the total employment of the cohort. However, it is evident from the descriptive evidence reported so far that as newly founded Italian micro-firms in our sample age, a process of weak growth takes place in favour of the smallest units in the cohort.

In order to better understand the dynamic described so far, we build a transition matrix between size classes, shown in Table 4.

<i>Size class at start-up</i>	<i>Size class after two years</i>				<i>Total</i>
	<i>1 worker</i>	<i>2 workers</i>	<i>3-5 workers</i>	<i>Above 5 workers</i>	
<i>1 worker</i>	2151 <i>87.12</i>	236 <i>9.56</i>	67 <i>2.71</i>	15 <i>0.61</i>	2469 <i>100.00</i>
<i>2 workers</i>	45 <i>8.57</i>	405 <i>77.14</i>	64 <i>12.38</i>	10 <i>1.90</i>	525 <i>100.00</i>
<i>3-5 workers</i>	13 <i>4.58</i>	9 <i>3.17</i>	237 <i>83.45</i>	25 <i>8.80</i>	284 <i>100.00</i>
<i>Above 5 workers</i>	3 <i>3.95</i>	0 <i>0.00</i>	4 <i>5.26</i>	69 <i>90.79</i>	76 <i>100.00</i>
<i>Total</i>	2212 <i>65.95</i>	650 <i>19.38</i>	373 <i>11.12</i>	119 <i>3.55</i>	3354 <i>100.00</i>

**Table 4. Transition matrix between size classes. Frequencies in italics.**

The large majority of firms (85.3% of the sample) does not change size class<sup>9</sup>. Firms “shrinking” from one class to lower ones are 2.2% of the sample. Increases in size classes happen in the 12.5% of observations.

The patterns of growth reported in Table 4 show that firms in the smallest class do experience some limited dynamics. In particular, a small subset of firms born with one or two workers are able to grow until the threshold of 5 workers.

In summary, the evidence showed so far suggests contrasting interpretations. On the one hand, one may conclude that the low average rate of growth of the sample is due to the massive presence of self-employment –or one-man businesses- among entrants. These microscopic firms tend to survive without growing, maybe due to a lack of true entrepreneurial project and willingness to expand. However, the rate of growth of largest firms in the sample does not seem to be so high as to justify the conclusion that “only large firms grow”. On the other hand, there seems to exist a subset of “virtuous” firms that, even if starting activities without any employee, experiences a significant process of growth in the first two years of lifetime. A deeper investigation on the determinants of firms growth is called in order to assess whether factors discussed in Section 2 are able to explain such contrasting evidences.

Finally, a remark is in order. During the observation period, a number of legislative and administrative measures have been implemented for the so-called “emersione”, i.e. the regularization of black economy and un-registered employment positions, particularly in Southern regions (ISTAT, 2003b). The argument might be proposed that micro-firms do not declare their true employees when they are addressed by phone from interviewers. If a legislation has made declaration more convenient, then what they might declare in the follow up is not true growth of employment, but simply the manifestation of already existing economic activity.

We carefully controlled for this “regularization” effect throughout the econometric analysis of the data, but did not find any evidence of growth phenomena induced by legislative measures. In fact, according to official statistics about employment growth in Italy, Constructions is the only sector where a suspiciously high growth in employment took place during the observation period (ISTAT 2003a, 2002). Once Constructions is dropped from the analysis, the results showed in Section 4.2 remain qualitatively unaltered.

Moreover, on the basis of the official statistics on un-registered employment it is not evident that a significant phenomenon of regularization took place during our sample period (ISTAT 2003b). However, if part of the growth is indeed only nominal, this would a fortiori support our findings that post-entry growth is very small for these firms.

---

<sup>9</sup> It would not be correct to say that 85.3% of firms do not grow at all, since the two largest size classes are not single-value: a firm growing from 3 to 4 or 5 workers, or a growing firm starting with more than 5 workers remain in the same size class through the sample period, although experimenting a positive growth rate.

## 4. Empirical results

### 4.1 Methodology and variables description

We will test the hypotheses discussed in Section 2 by estimating the effect of individual competencies-related factors and motivations on the *probability* that a firm will grow *highly* in the first two years of lifetime using a dichotomous response model. We found this approach the most suitable to our data, where the growth dynamics of the sample is largely determined by that of smallest firms. In fact, since firms with one or two workers are more likely to show large percentage increases in employment, the simple regression of our explanatory variables on firm growth rate would be severely influenced by the characteristics of smallest firms. On the other hand, a specification based on a dichotomous choice model distinguishing growing from not growing firms would equally be sensitive to the initial size of the venture. In particular, in this case the analysis would be biased towards larger firms. In general, any definition of firms growth based on a relative measure (as the growth rate) would be biased towards smaller firms, whereas absolute measures of growth would lead to biases towards larger firms. Therefore, we adopt a combination of relative and absolute criteria in order to define high growth firms as opposed to survived firms with no or low growth. Growth in total firm employment is the measure of performance used<sup>10</sup>. We define *high growth firms* those ventures growing at least by 30% *and* by at least two workers in the two year period. All other firms in the analysis are those who survived until the end of the sample period without growing *or* growing less than the specified threshold<sup>11</sup>. According to this criterion, high growth firms amount to the 4.71% of the sample.

We therefore estimate both linear probability models and logistic regressions where the dependent variable is coded 1 if the firm belongs to the *high growth* group.

Independent variables include factors discussed in Section 2 and control variables to take into account possible firm or industry-specific phenomena. Table 5 describes all explanatory variables.

---

<sup>10</sup> Both new employees and independent workers (free-lances and partners) are included in the employment gain.

<sup>11</sup> Shrinking firms, which amount to the 2.68% of the sample, also belong to this group. In our opinion, the selected criterion is valid in distinguishing firms that show significant growth over the sample period from all the others, both in terms of the univariate distribution of absolute and relative growth, and consistent with previous empirical literature (see, as examples, Cooper et al., 1994 and Bruderl and Preisendorfer, 2000). We also adopted different thresholds to test the robustness of results, obtaining larger groups of high growth firms. No significant departures from the results showed in this Section have been observed.

<i>Variable</i>	<i>Description</i>
<b>Founders' characteristics</b>	
Age	Average age in the founding team
Education	Average years of schooling in the founding team
Profit*	1 if the principal motivation for firm creation was the existence of perspective profits
Unempl	1 if the principal motivation for firm creation was founders' unemployment
Indep	1 if the principal motivation for firm creation was the desire of independence
Know	1 if the principal motivation for firm creation was the particularly good knowledge of the production process
Family	1 if the principal motivation for firm creation was family tradition
Manag	1 if at least one among founders had worked as manager or entrepreneur
Comm	1 if at least one among founders had worked as tradesman or salesman
Techn	1 if at least one among founders had worked as blue collar
White_collar	1 if at least one among founders had worked as white collar
No_comp*	1 if none among founders had developed significant work experience
<b>Firm characteristics</b>	
Planning	1 if the firm has undertaken a formal planning at startup
Initial size	Logarithm of the total number of workers in the firm at startup
Capital class1*	1 if firm initial capital was 0-50 millions lira
Capital class2	1 if firm initial capital was 51-100 millions lira
Capital class3	1 if firm initial capital was 101-500 millions lira
Capital class4	1 if firm initial capital was above 501 millions lira
<b>Sectoral dummies</b>	
Agriculture*	1 if firm main activity is ATECO code 011-050
Manufacturing	1 if firm main activity is ATECO code 151-410
Constructions	1 if firm main activity is ATECO code 451-455
Services	1 if firm main activity is ATECO code 501-930

**Table 5. Description of independent variables.** Asterisks \* indicate the categorical variables used as baseline categories in logistic regression.

As far as past professional experience is concerned, we rely on information about the last job carried out by each founder before creating the start-up. On this basis we define the three dummy variables *Manag*, *Comm* and *Techn*. An additional dichotomous variable is built using the information on founders' last job: *White\_collar*. As explained in Table 5, this variable takes value 1 if at least one among founders was previously employed as white collar. We build this fourth variable separately from the others because, on one hand, it will be misleading to merge founders with working experience as white collars with founders with no experience at all (the baseline category). On the other hand, it is very difficult to characterize –in terms of acquired competencies- founders that worked as white collars. In fact, white collars include secretaries, which are very likely to acquire through their work no valuable competencies for the creation and management of a new firm, but also people holding high positions in the organizational hierarchy, dealing with executive or sales duties. The latter are prone to develop through their work the knowledge of how to organize resources, production processes and sales strategies. In turn, this experience may foster their ability to successfully manage new ventures. Given the broad definitions used in the questionnaire to identify previous job positions, and the lack of any

information on the tasks carried out by white collars in the previous organization, we are unable to distinguish their “acquired competencies”. Therefore, we expect, on the basis of the discussion in Section 2, the coefficients of variables *Manag* and *Comm* to be positive and significant, but we do not formulate conjectures on the sign of variable *White\_collar*.

The major data limitation comes from the lack of any information about the sector where founders worked before starting the new venture. Nevertheless, we use, as a proxy of previous industry experience, a dichotomous variable, *Know*, that indicates whether the main motive for the start-up was a “particularly good knowledge of the production process” in the industry. Even if capturing only partially the complex and multifaceted set of capabilities transferred through industry experience, we think that variable *Know* proxies quite well the existence in the founding team of that core technological knowledge (Teece, 1986) which is required to create a product or service in any specific industry. The effect of the presence of other entrepreneurs in the family is captured through the dummy variable *Family*, taking value 1 whenever the main motivation for start-up is family tradition. On the basis of our hypotheses, we expect variables *Know* and *Family* to significantly improve the probability of high growth for new firms.

We will test the hypothesis that firms born because of psychological motivations or unemployment will be less likely to grow using data on the main motivation of firms founding. We grouped all possible answers into three categories: *Unempl*, *Indep*, *Profit*. Variable *Profit* is a composite indicator of the existence of perspective profits for the new firm, encompassing factors related to: i) market opportunities, ii) founders ability to exploit them (firms characterised by *Family*=1 or *Know*=1 are included here), and iii) the more Schumpeterian “pursuit of an innovative idea”. Our hypothesis will be confirmed if firms characterized by *Unempl* or *Indep* will grow less than those created because of profit expectations.

Industry-specific effects have been controlled, due to data limitation on industry covariates, by using a set of sectoral dummies. We are unsatisfied with this approach, since we think it hinders the correct understanding of the interactions between sectoral-specific characteristics and firm growth. We will try, in our future research, to mend this shortcoming. In the present work, we endeavour to assess more deeply the issue of sectoral specificities in the growth dynamics of new firms by running the model on separated sectors (Table 8).

Table 9 and 10 in the Appendix report, respectively, the cross-tabulation of surviving firms by initial size and capital class and some descriptive statistics of the explanatory variables along with their correlation matrix.

Since some of the explanatory variables are built rearranging the information coming from a single question of the survey (in particular, as explained above, we adopt two alternative classifications of firm motivations) we estimate different specifications of the model. The

estimation has been run after deleting from the sample observations reporting missing values in the explanatory variables, thus reducing the number of usable cases to 3064. Since variables *Profit*, *Indep* and *Unempl* are available only for firms born in 2000, the estimation of Model 1 is run on 1535 instead of 3064 observations. Final specifications for Model 1 and Model2 are reported, respectively, in Table 6 and Table 7.

## 4.2 Results and discussion

The estimation results are reported in Table 6-7. Some of our working hypotheses, discussed in Section 2, are validated by the evidence, whereas some others do not find support in the data.

An interesting result of the estimation is the lack of significance of factors associated to individual competencies. The effect of founders' professional experience -captured by variables *Manag*, *Comm* and *Techn*- on firms probability of high growth was showed not to be significant in both models. More generally, and contrary to our expectations, none of the proxy variables associated to previous works carried out by the founders, nor the years of education, have a significant effect on firm probability to grow<sup>12</sup>.

	LPM		Logit	
Age	0.003	0.002	0.160	0.113
Age^2	0.000	0.000	-0.002	0.001
Education	0.001	0.002	0.030	0.056
Indep	-0.022 *	0.012	-0.639 **	0.315
Unempl	-0.022	0.014	-0.666	0.489
Manag	0.005	0.030	0.199	0.572
Techn	-0.002	0.014	0.066	0.401
Comm	0.015	0.027	0.336	0.675
White_collar	-0.010	0.027	-0.224	0.699
Planning	-0.010	0.014	-0.125	0.351
Initial size	0.060 ***	0.016	0.897 ***	0.205
Cap2	0.047 **	0.023	0.981 ***	0.371
Cap3	-0.002	0.020	0.001	0.571
Cap4	0.191	0.132	1.410 **	0.644
Manufacturing	0.060 ***	0.021	1.639 **	0.796
Constructions	0.058 ***	0.021	1.631 **	0.824
Services	0.009	0.013	0.552	0.785
Constant	-0.047	0.059	-7.560 ***	2.634
	Obs	1535	Obs	1535
	F statistic	2.410 ***	Wald statistic	78.420 ***
	R2	0.042	McFadden's R2	0.136

**Table 6. Linear Probability Model (LPM) and Logit specifications for Model 1.** Standard errors in parentheses. \*\*\*, \*\*, \* indicate significant at the 1%, 5% and 10% level of significance.

<sup>12</sup> With the exception of *Comm*, which is found to be significantly and negatively related to firm probability to grow in the LPM on Model 2. However, this result is not confirmed by any other specification.

Interestingly enough, firms born because of strong psychological motivations perform relatively worse than firms whose creation is due to prospective profits or opportunity exploitation (the baseline category of motivational factors in Model 1). This result confirms our hypothesis that firms created for the sake of independence and personal achievement, which are a large share of our sample, exhibit lower probabilities of growth as compared with firms founded on the basis of some prospects of profit.

The empirical evidence does not provide a strong support for the hypothesis that growth is significantly lower for firms created for founders' need to exit unemployment. The coefficient of variable *Unempl* has in fact the expected sign but is not statistically significant. Results of Model 2 confirm, on one hand, the irrelevance of founders previous professional experiences in inducing firm high growth. On the other hand, however, they show that industry-specific experience does affect the probability that the newly founded venture will grow rapidly. As Table 7 shows, the coefficients on the interaction effects between founders' professional experience *and* founders' knowledge of the production process turn out to be positive and significant.

	LPM		Logit	
Age	0.002	0.002	0.074	0.056
Age^2	0.002	0.000	-0.001	0.001
Education	0.002	0.001	0.039	0.030
Know	-0.014	0.018	-0.431	0.517
Family	0.000	0.013	0.014	0.286
Manag	-0.030	0.021	-0.653	0.509
Techn	-0.004	0.011	-0.069	0.250
Comm	-0.032 **	0.016	-1.068	0.759
White_collar	-0.003	0.011	-0.062	0.255
Manag*Know	0.148 *	0.089	1.931 **	0.940
Techn*Know	0.009	0.025	0.300	0.670
Comm*Know	0.020	0.045	0.857	1.375
White_collar*Know	0.078 *	0.040	1.308 **	0.637
Planning	-0.013	0.011	-0.217	0.204
Initial size	0.054 ***	0.012	0.719 ***	0.142
Cap2	0.026 *	0.014	0.547 **	0.249
Cap3	0.052 **	0.022	0.869 ***	0.281
Cap4	0.054	0.094	0.337	0.851
Manufacturing	0.053 ***	0.015	1.251 ***	0.404
Constructions	0.044 ***	0.014	1.154 ***	0.428
Services	0.019 *	0.010	0.657 *	0.398
Year	-0.018 **	0.008	-0.395 **	0.183
Constant	35.960 **	15.753	783.057 **	365.184
	Obs	3064	Obs	3064
	F statistic	3.05 ***	Wald statistic	110.40 ***
	R2	0.042	McFadden's R2	0.083

**Table 7. Linear Probability Model (LPM) and Logit specifications for Model 2.** Standard errors in parentheses.

\*\*\*, \*\*, \* indicate significant at the 1%, 5% and 10% level of significance.

In particular, variables *Manag\*Know* and *White\_collar\*Know* have a positive and statistically significant coefficient. This means that firms founded by people with managerial or startup competencies *and* a good knowledge of the production process have higher probability of fast growth. This result is in line with our expectations and hypotheses. The positive and significant sign of the coefficient of the interaction between *White\_collar* and *Know* is somehow more difficult to interpret. In fact, as discussed in Section 4.1, it is not possible to better characterize the type of competencies yielded into the new venture by founders that were previously employed as white collars. A possible interpretation of our result is that white collars that own the know-how necessary to the production of a good or a service are those –among white collars- that most likely carried out complex tasks in their previous organization, and therefore developed valuable competencies such as managing resources, selling products and organizing the production process. In other words, it is very likely that variable *White\_collar\*Know* “picks up” those, among white collars, that are endowed with the most valuable competencies for the success of the new venture. Contrary to our hypotheses, the ability of entrepreneurs to found high growing firms is not conditional to their relational and commercial skills, nor to their operational or technical expertise. Both coefficients of variables *Comm\*Know* and *Techn\*Know* have a positive sign, but are not statistically significant.

These results are, on the whole, both a confirmation of the importance of founders’ industry-specific experience for firm growth, and a warning against rejecting the hypothesis that professional experience does matter in explaining firms patterns of growth.

As far as the initial size and financial resources are concerned, the empirical results support that higher initial capital and larger start-up facilitate firm post-entry growth. The coefficients of almost all classes of capital are, in fact, positive and statistically significant, meaning that belonging to classes higher than the lowest one (which is the baseline class in both models) increases firm probability of rapid growth. The *Initial size* coefficient is positive and significant in all specifications, suggesting that firm’s initial size is a strong predictor of the probability of growth of new firms. Initial endowment of resources, both a proxy of founders’ involvement in business activity and presence of an entrepreneurial project, and ability to attract external founding, largely affect the fortunes of newly born ventures

On the contrary, the presence of a formal activity of business planning is not associated to growth, contrary to our expectations and to what is currently taught in courses. On one hand, it is possible that the measure is noisy. On the other hand, what founders’ write in their business plan may be so different from reality that the formal document is not so important.

The results on size are striking. In the literature we find consistent evidence that the relation between initial size and growth is negative. While the interpretation of our findings requires

more elaboration, we put forward two possible lines of interpretation. First, we are studying firms that may start with no employees. These firms are usually excluded by most surveys in the existing literature. Therefore results are not directly comparable. Second, and more interestingly, it is possible that there is not a unique growth process underlying the dynamics of all firms following entry, as proposed by the Gibrat literature. It is possible, on the contrary, that multiple growth processes are at work. For example, the growth process of micro-firms below a given organisational threshold may be structurally different, in the long run, from the one of those that start beyond that threshold.

In order to address more directly the issue of sectoral specificities in the growth processes of new firms, we run Model 2 separately for single sectors. In particular, we focus on the structural differences between manufacturing and services sectors. Table 8 shows the results of the Logit estimation<sup>13</sup>. Since the number of observations falls significantly when focusing on separated sectors, some of the dichotomous explanatory variables are dropped because they do not achieve a sufficient variability or because they become perfect predictors of the dichotomous outcome indicator<sup>14</sup>.

	Manufacturing		Services	
Age	0.269 *	0.148	0.026	0.092
Age^2	-0.003 *	0.002	0	0.001
Education	-0.005	0.056	0.026	0.045
Know	-0.658	0.861	-0.557	0.743
Family	-0.867	0.784	-0.012	0.426
Manag	-1.397	1.096	-0.582	0.639
Techn	-0.032	0.524	-0.137	0.396
Comm	-0.902	0.933	-0.69	0.769
White_collar	0.152	0.567	-0.211	0.317
Manag*know	3.572 *	1.884	1.928	1.335
Techn*know	0.384	1.314		
White_collar*know	-0.079	1.468	1.212	0.907
Planning	-0.442	0.411	-0.256	0.282
Initial size	0.775 ***	0.284	0.929 ***	0.213
Cap2	0.91 *	0.547	0.246	0.341
Cap3-4	1.665 ***	0.512	0.494	0.408
Year	0.101	0.404	-0.85 ***	0.27
Constant	210.082	808.14	1695.86 ***	539.356
Obs	412		1736	
Wald statistics	50.05 ***		46.35 ***	
McFadden's R2	0.159		0.077	

**Table 8. Logit estimates of Model 2 for manufacturing and services sectors.** Standard errors in parentheses. \*\*\*, \*\*, \* indicate significant at the 1%, 5% and 10% level of significance.

<sup>13</sup> In manufacturing sectors the share of firms classified as “high growing” is 8.37%, whereas in services is 4.15%.

<sup>14</sup> In order to maximize the number of usable observations, we merge the two highest capital classes. Cap3-4 in table 8 indicates, therefore, that firm initial capital was over 101 million (lira).

Results show the similarity between the aggregate results in Table 7 and the manufacturing sector. In particular, the positive and significant effect of initial size and capital is confirmed. Moreover, the interaction between the industry-specific experience and the managerial or startup competencies is also found to be significantly correlated with larger probability of firm high growth. Results on manufacturing sector reveal also the relevance of founders' age, which was not found in the aggregate results. Contrary to our hypotheses, however, the evidence in favour to a curvilinear relationship between founders' age and firm growth is weak. The coefficient on  $Age^2$  is, indeed, negative but very small. Instead, the average age of entrepreneurs is positively related to firm growth, challenging the view that young entrepreneurs drive firms with the highest potential for growth. Indeed, this result might be due to the fact that young people bear the strongest financial constraints both because of limited access to capital markets and lesser opportunities to self-finance their activities.

Results on services sector reveal, instead, a sharp differentiation of this sector from the aggregate. None among the competencies-related factors is significantly associated with firm probability of fast growth. Initial capital is also found not to affect growth. Only the coefficient of *Initial size* is positive and statistically significant, pointing out the inadequacy of our model to explain the growth process of new firms in the services sectors.

Two major caveats must be taken into account when discussing our results. First, we are unable to control for selection bias. The estimation of a subsidiary selection is in fact hindered by the unavailability of data on initial capital and size for non surviving firms. However, chi-square tests show, at a descriptive level of analysis, that the distribution of the sample between survived and exited firms is fairly independent from most explanatory variables in models 1-2. Second, caution must be used when interpreting our results as *causal* relations. A problem of unobservable individual heterogeneity is obviously present in our dataset, and control variables need to be better specified. We argue, however, that our results are interesting even if interpreted, in a weaker sense, as *associations* between our explanatory variables and observed outcome, that is, between firm and individual-specific characteristics and the growth of new start-up firms.

## 5. Conclusions

The problem of post-entry growth has attracted lot of attention in recent years. It has also important policy implications, since most of the social value of entrepreneurship is attached to the ability of newly created firms to generate employment opportunities beyond those for the founder(s).

Under this respect, the lack of growth of European new firms, as opposed to US ones, may be considered one of the determinants of the gap in productivity growth, and then of the gap in GDP

growth between the two areas since the '90s. New firms are a fundamental vehicle for turnover of industries and for substitution of old, obsolete firms with new and more productive ones. If this process is blocked, so that a large process of generation of new firms is not followed by substantive post-entry growth, then the European economy lacks a fundamental engine of growth.

We have investigated a number of potential determinants of post-entry growth, taking benefit from an unusually rich set of data and using econometric techniques to handle some (inevitable) problems of bias.

We found that structural factors such as initial size and size of capital play a role, while behavioural and competence-based factors are much less important. In particular, age and education of founders, entrepreneurial and managerial experience, family tradition, do not have any role. This is contrary to much existing literature emphasizing individual attributes and competences.

Conversely, our result that initial size matters is orthogonal to much reasoning in the Gibrat's line.

Part of the differences may be due to the fact that we include also firms that have no employees at the foundation. So we provide evidence that is much more general than the one obtained in the literature by censoring samples. If this interpretation is correct, then we are discovering more general processes underlying post entry growth.

In particular, it is possible that the dynamics of growth of microfirms (no employees) is qualitatively different from the one for firms having employees. And that structural factors related to the institutional architecture of financial system in Europe matter more than individual heterogeneity. While more research is needed, this is going to change our understanding of growth processes in firms.

## References

- Acs, Z., Audretsch D.B., Innovation, market structure and firm size, *Review of Economics and Statistics*, 69(4), 1987, 567-74.
- Aldrich H., *Organizations evolving*, London, Sage Publications, 1999.
- Åstebro, T., Bernhardt, I., The Winner's Curse of Human Capital, *Small Business Economics*, 24(1), 2005, 63-78.
- Audretsch D.B., Santarelli E., Vivarelli M., Start-up size and industrial dynamics. Some evidence from Italian manufacturing, *International Journal of Industrial Organization*, 17(7), 1999, 965-983.
- Audretsch, D. B., Mahmood, T., New Firm Survival: New Results using a Hazard Function, *The Review of Economics and Statistics*, 77(1), 1995, 97-103.
- Audretsch, D. B., New-Firm Survival and the Technological Regime, *The Review of Economics and Statistics*, 73 (3), 1991, 441-450.
- Audretsch, D. B., *Innovation and Industry Evolution*, Cambridge, MIT Press, 1995.
- Barney, J., Firm Resources and Sustained Competitive Advantage, *Journal of Management*, 17, 1991, 34-56.
- Bartelsman, E., Scarpetta, S., Schivardi, F., Comparative Analysis of Firm Demographics and Survival: Micro-level Evidence for the OECD Countries, Paris, OECD Economic Department, WP 348, 2003.
- Bechetti L., Trovato G., The determinants of growth for small and medium-sized firms. The role of the availability of external finance, *Small Business Economics*, 19, 2002, 291-306.
- Becker, G. S., Human Capital, New York, *National Bureau of Economic Research*, 1975.
- Bhidé, A., *The origins and evolution of new businesses*, Oxford, Oxford University Press, 2000.
- Birch, D. L., *Job Creation in America: How Our Smallest Companies Put the Most People to Work*. New York, The Free Press, 1987.
- Bruderl, J. and Preisendorfer, P., Network Support and the Success of Newly Founded Business Organizations, *Small Business Economics*, 10, 213-225, 1998.
- Bruderl, J., Preisendorfer, P., Fast growing businesses, *International Journal of Sociology*, 30 (3), Fall, 2000, 45-70.
- Bruderl, J., Preisendorfer, P., Ziegler, R., Survival Chances of Newly Founded Business Organizations, *American Sociological Review*, 57(2), 1992, 227-242.
- Burt R.S., *Structural holes. The social structure of competition*, Cambridge, MA, Harvard University Press, 1992.
- Coleman J.S., *Foundations of social theory*, Cambridge, MA, Harvard University Press, 1990.
- Colombo, M. G., Grilli, L., Does Founders' Human Capital Affect the Growth of New Technology-based Firms? A Competence-based perspective, paper presented at the 10<sup>th</sup> Conference of the Schumpeterian Society, Milan, 9-12 June 2004.
- Colombo, M. G., Delmastro, M., Grilli, L., Entrepreneurs' human capital and the start-up size of new technology-based firms, *International Journal of Industrial Organization*, 22(8-9), 2004, 1183-1211.
- Cooper, A. C., Gimeno-Gascon, F. J., Woo, C. Y., Initial Human and Financial Capital as Predictors on New Venture Performance, *Journal of Business Venturing*, 9, 1994, 371-395.
- Dosi, G., Lovallo, D., Rational Entrepreneurs or Optimistic Martyrs? Some Considerations on Technological Regimes, Corporate Entries, and the Evolutionary Role of Decision Biases, Vienna, IIASA, WP-95-077, 1995.
- Dosi, G., Nelson, R. R., Winter, S. G. (eds), *The Nature and Dynamics of Organizational Capabilities*, Oxford: Oxford University Press, 2000.
- Duchesneau, D., Gartner, W., A profile of new venture success and failure in an emerging industry, *Journal of Business Venturing*, 5(5), 1990, 297-312.
- Dunne, P., Roberts M.J., Samuelson, L., Patterns of Firm Entry and Exit in US Manufacturing Industries, *Rand Journal of Economics*, 19(4), 1988, 495-515.
- Evans, D. S., Leighton, Some Empirical Aspects of Entrepreneurship, *American Economic Review*, 79, 1989, 519-535.
- Evans, D. S., Leighton, Small Business Formation by Unemployed and Employed Workers, *Small Business Economics*, 2, 1990, 319-330.

- Evans, D.S., Jovanovic, B., Estimated Model of Entrepreneurial Choice under Liquidity Constraints, *Journal of Political Economy*, 97(4), 1989, 808-827.
- Fazzari, S.M., Hubbard, G.R., Petersen, B.C., Financing constraints and corporate investment, *Brooking Papers on Economic Activity*, 0(1), 1988, 141-195.
- Geroski, P. A., *Market Dynamics and Entry*, Oxford, Blackwell, 1991.
- Geroski, P. A., What do we know about entry? *International Journal of Industrial Organization*, 1995, 421-440.
- Gimeno, J., Folta, T. B., Cooper, A. C. and Woo, C. Y., Survival of the Fittest? Entrepreneurial Human Capital and the Persistence of Underperforming Firms, *Administrative Science Quarterly*, 42(4), 1997, 750-783.
- Gort, M., Klepper, S., Time Paths in the Diffusion of Product Innovations, *Economic Journal*, 92, 1982, 630-653.
- Hall, P. The relationship between firm size and firm growth in the US manufacturing sectors, *Journal of Industrial Economics*, 3(4), 1987, 583-606.
- Harhoff, D., Stahl, K., Woywodw, M., Legal form, growth and exit of West German firms. Empirical results for manufacturing, construction, trade and service industries, *Journal of Industrial Economics*, 46(4), 1998, 453-488.
- Helfat, C. E., Lieberman, M. B., The Birth of Capabilities: Market Entry and the Importance of Pre-history, *Industrial and Corporate Change*, 11(4), 2002, 725-760.
- Helfat, C. E., Raubitschek, R. S., Product Sequencing: Co-evolution of Knowledge, Capabilities and Products, *Strategic Management Journal*, 21, 2000, 961-980.
- Holtz-Eakin, D., Joulfaian, D., Rosen, H., Sticking it out: Entrepreneurial survival and liquidity constraints, *Journal of Political Economy*, 102(1), 1994, 53-75.
- ISTAT, *Rilevazione trimestrale delle forze lavoro*, Roma, Istituto Nazionale di Statistica, 2003a.
- ISTAT, *La Misura dell'Occupazione non Regolata nelle Stime di Contabilità Nazionale: un'Analisi a Livello Nazionale e Regionale. Anni 1992-2001*, Roma, Istituto Nazionale di Statistica, 2003b.
- ISTAT, *Rilevazione trimestrale delle forze lavoro*, Roma, Istituto Nazionale di Statistica, 2002.
- Klepper, S., The capabilities of new firms and the evolution of the US automobile industry, *Industrial and Corporate Change*, 11(4), 2002, 645-65.
- Klepper, S., Employee Startups in High-tech Industries, *Industrial and Corporate Change*, 10(3), 2001, 639-674.
- Lee, D., Tsang, E. The effects of entrepreneurial personality, background and network activity on venture growth, *Journal of Management Studies*, 38 (4), 2001, 583-602.
- Lindh, T., Ohlsson, D.N., Self-employment and windfall gains: Evidence from the Swedish lottery, *Economic Journal*, 106 (439), 1996, 1515-1126.
- Lotti, F., Santarelli, E., Industry Dynamics and the Distribution of Firm Sizes: A Non-Parametric Approach, *Southern Economic Journal*, 70(3), 2004, 443-466.
- Lotti, F., Santarelli, E., Vivarelli, M., (2001) Industry Dynamics, *Applied Economics Letters*, 8 (7) July, p451-55.
- Mata, J., Firm growth during infancy, *Small Business Economics*, 6(1), 1994, 27-40.
- Mata, J., Portugal, P., Life Duration of New Firms, *Journal of Industrial Economics*, 42(3), 1994, 227-245.
- Osservatorio Unioncamere sulla Demografia delle Imprese, *Le Nuove Imprese in Italia nel Triennio 1998-2000*, Roma, Centro Studi, 2003.
- Reynolds, P., Who starts new firms? Preliminary explorations of firms-in-gestation, *Small Business Economics*, 9, 1997, 449-62.
- Roberts, E., *Entrepreneurs in High Technology*, New York, US, Oxford University Press, 1991.
- Schiantarelli, F., Financial constraints and investment. Methodological issues and international evidence, *Oxford Review of Economic Policy*, 12(2), 1996, 70-89.
- Shane, S., Prior knowledge and the discovery of entrepreneurial opportunities, *Organization Science*, 11 (4), 2000, 448-469.
- Shane, S., Technological opportunities and new firm creation, *Management Science*, 47 (2), February, 2001, 205-220.
- Shane, S., *A general Theory of Entrepreneurship. The Individual-Opportunity Nexus*, Cheltenham, UK, Edward Elgar, 2003.
- Signorini, F., *Lo sviluppo locale. Un'indagine della Banca d'Italia sui distretti industriali*, Roma, Donzelli, 2000.

- Stinchcombe, A., Social Structures and Organizations, in J. March (ed.), *Handbook of organizations*, Chicago: Rand McNally, 1965, 142-193.
- Storey, D. J., *Understanding the Small Business Sector*, London, UK, Thomson Learning, 1994.
- Stuart, R. W., Abetti, P. A., Impact of Entrepreneurial and Management Experience on early performance, *Journal of Business Venturing*, 5, 1990, 151-162.
- Sutton, J., Gibrat's legacy, *Journal of Economic Literature*, 35(1), 1997, 40-59.
- Sutton, J., *Technology and market structure*, Cambridge, MA, MIT Press, 1999.
- Taylor, M., Self-employment and windfall gains in Britain: Evidence from panel data, London, *CEPR, DP 2084*, 1999.
- Teece, D. J., Profiting from Technological Innovation: Implications for Integration, Collaboration Licensing and Public Policy, *Research Policy*, 15, 1986, 285-305.
- Traù, F., (ed.), *La questione dimensionale nell'industria italiana*, Bologna, Il Mulino, 1999.
- Venkataraman, S., *The distinctive domain of entrepreneurship research: an editor's perspective*. In J. Katz, R. Brockhaus, (eds), *Advances in Entrepreneurship, Firm Emergence and Growth*, Greenwich, CT, JAI Press, 1997.
- Vivarelli, M., Audretsch, D. B., The Link between the Entry Decision and Post-entry Performance: Evidence from Italy, *Industrial and Corporate Change*, 7(3), 1998, 485-500.
- Von Hippel, E., *The sources of innovation*, New York, Oxford University Press, 1988.
- Wagner, J., The Post-entry Performance of New Small Firms in German Manufacturing Industries, *Journal of Industrial Economics*, 42(2), 1994, 141-154.
- Wernerfelt, R., A Resource-Based View of the Firm, *Strategic Management Journal*, 5, 1984, 171-180.
- White, H.C., *Markets from networks. Socioeconomic models of production*, Princeton, NJ, Princeton University Press, 2002.
- White, H.C., *Identity and control. A structural theory of social action*, Princeton, NJ, Princeton University Press, 1992.
- Winter, S. G., Schumpeterian Competition in Alternative Technological Regimes, *Journal of economic behaviour and organization*, 5, 1984, 287-320.

## Appendix

<i>Class of initial capital</i>	<i>Class of initial size</i>				<i>Total</i>
	<i>1 worker</i>	<i>2 workers</i>	<i>3-5 workers</i>	<i>Over 5 workers</i>	
<i>Class 1: 0-50 millions</i>	1929 <i>62.96</i>	331 <i>10.80</i>	165 <i>5.39</i>	36 <i>1.17</i>	2461 <i>80.32</i>
<i>Class 2: 51-100 millions</i>	229 <i>7.47</i>	95 <i>3.10</i>	42 <i>1.37</i>	7 <i>0.23</i>	373 <i>12.17</i>
<i>Class 3: 101-500 millions</i>	109 <i>3.56</i>	57 <i>1.86</i>	32 <i>1.04</i>	15 <i>0.49</i>	213 <i>6.95</i>
<i>Class 4: Over 501 millions</i>	2 <i>0.07</i>	2 <i>0.07</i>	7 <i>0.23</i>	6 <i>0.20</i>	17 <i>0.55</i>
<i>Total</i>	2269 <i>74.05</i>	485 <i>15.83</i>	246 <i>8.03</i>	64 <i>2.09</i>	3064 <i>100.00</i>

**Table 9. Distribution of active firms in different size and capital classes at startup.** Relative frequencies in italics.

Spearman's rho: 0.21\*\*\*

	obs	mean	s.d.	min	max	age	education	know	family	indep	unempl	manag	techn	comm	white_colla r	planning
age	3064	39.83	11.11	22	90.00	1.000										
education	3064	11.50	2.98	8	18.00	-0.090	1.000									
know	3064	0.13	0.34	0	1.00	0.002	-0.005	1.000								
family	3064	0.12	0.33	0	1.00	0.052	-0.093	-0.149	1.000							
indep (a)	1535	0.45	0.50	0	1.00	-0.047	-0.051	-0.368	-0.282	1.000						
unempl (a)	1535	0.15	0.36	0	1.00	0.028	-0.015	-0.169	-0.130	-0.383	1.000					
manag	3064	0.05	0.22	0	1.00	0.040	0.046	0.002	0.005	-0.073	-0.049	1.000				
techn	3064	0.31	0.46	0	1.00	0.011	-0.395	0.035	-0.030	0.161	-0.110	-0.141	1.000			
comm	3064	0.04	0.20	0	1.00	0.060	-0.018	0.028	-0.019	-0.011	-0.041	-0.047	-0.122	1.000		
white_collar	3064	0.23	0.42	0	1.00	0.014	0.207	-0.078	-0.086	0.121	-0.035	-0.095	-0.347	-0.105	1.000	
planning	3064	0.80	0.40	0	1.00	0.051	-0.117	-0.020	0.088	-0.034	0.061	-0.056	0.072	-0.012	-0.043	1.000
initial size (b)	3064	0.26	0.51	0	4.34	0.024	0.002	-0.005	0.129	-0.101	-0.018	0.194	-0.039	0.015	0.013	-0.037
cap2 (b)	3064	0.12	0.33	0	1.00	-0.041	-0.002	-0.010	0.007	-0.024	0.008	-0.007	0.008	0.003	0.011	-0.056
cap3 (b)	3064	0.07	0.25	0	1.00	0.008	0.010	0.005	-0.022	0.026	-0.015	0.085	-0.023	0.007	0.048	-0.038
cap4 (b)	3064	0.01	0.07	0	1.00	0.021	0.042	0.022	0.002	-0.025	-0.034	0.064	-0.031	0.006	0.023	-0.018

(a) Variables observed for a subsample of 1535 observations

(b) Correlation coefficient is not calculated among these variables. For Spearman rank correlation coefficient see Table 9

For the sake of simplicity sectoral controls are not displayed

**Table 10. Descriptive statistics and correlation matrix among explanatory variables**