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EUROSISTEMA

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# HIGH-GROWTH YOUNG FIRMS IN ITALY

by Andrea Cintolesi\*, Edoardo Frattola\*, Rosalia Greco♦,  
Francesca Leombroni§, Andrea Linarello♦, Andrea Locatelli\*\*,  
Sara Nesi♦♦ and Simone Zuccolalà§§

## Abstract

High-growth firms (HGFs) are crucial for job creation and economic growth. In this paper, we study their characteristics in Italy using unique firm-level data. HGFs, defined as the top 10 per cent of the distribution of new businesses' three-year revenue growth rate, generate 68 per cent of their cohorts' employment growth and 78 per cent of revenue growth. HGFs are more prevalent in digital-intensive sectors and geographically concentrated in specific regions. They are intangible-intensive, invest more and are more innovative, in the sense that they file more patents and are more likely to be innovative startups. HGF founders are younger, more mobile (especially from South to North), and more likely to have prior entrepreneurial experience. These findings inform policies to promote HGF creation and address regional disparities.

**JEL Classification:** J61, L26, M13, O31.

**Keywords:** high-growth firms, entrepreneurship, innovation, digital intensity, internal mobility.

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\* Banca d'Italia, Florence Branch.

♦ Banca d'Italia, Directorate General Economics, Statistics and Research.

§ Banca d'Italia, Cagliari Branch.

\*\* Banca d'Italia, Trento Branch.

♦♦ Banca d'Italia, Milan Branch.

§§ Banca d'Italia, Naples Branch.



## 1. INTRODUCTION<sup>1</sup>

Young firms play a central role in job creation and innovation (Haltiwanger et al., 2013; Acemoglu et al., 2018). Among young firms, the rapid growth of a small number of enterprises, often referred to as *gazelles*, *scalpers*, or *high growth*, disproportionately contributes to economic and employment growth (OECD, 2021; Haltiwanger et al., 2016).

An emerging view in the literature is that differences in young firms' growth rates are largely driven by ex-ante differences in their characteristics (Sterk et al., 2021) rather than by the subsequent exposure to heterogeneous shocks or the existence of market frictions that tilt the growth path after entry. These ex-ante determinants of ex-post growth dynamics include structural features, such as the sector of entry, as well as entrepreneurs' characteristics, such as demographics or previous business experience (for a review of the literature on successful entrepreneurship, see Sorensen and Chang, 2006). Determining these characteristics is crucial for the formulation of public policies aimed at encouraging the establishment of high growth firms and thus promote economic growth.

In this paper we study *high growth young firms* in Italy. We do so by assembling unique firm-level data that combine several sources of information: financial statements, ownership structure, and patenting activity. We focus on the cohorts of firms created between 2010 and 2015. Following the existing literature, we track them over their first four years of activity and assess their growth in revenue terms (e.g., OECD, 2021). We define "high growth firms" (henceforth HGFs) as those in the top 10 percent of the revenue growth rate distribution over three years starting from the year after entry (Kim et al., 2024). In our data, this set of firms roughly corresponds to those that triple their revenues.

We find that HGFs are on average 3.7 per 10,000 inhabitants. Although HGFs are smaller than non-HGF upon market entry, over the following three years such a 10 percent of firms generate 68 and 78 percent of their cohorts' employment and revenue growth, respectively.

The share of HGFs among young firms is larger in transportation and storage services, in information and communication, as well as in professional and business services, and smaller in real estate and in accommodation and food services. Their sectoral distribution is slightly skewed towards more digital-intensive sectors. HGFs are not homogeneously distributed across the country: their share is higher in North Western and Southern regions.

Using balance sheet data, we document that HGFs are more intangible-intensive than non-HGFs at birth. Intangibles include patents, software, and digital capital, i.e. assets that can lead to innovation and growth (Andrews et al., 2013). We also show that HGFs have higher investment rates, as measured by investment over total assets, and are more likely to make investments worth more than 20 percent of their total assets, a threshold which is usually associated to substantial upgrading of the production processes. Consistent with HGFs making larger investments and undertaking riskier projects, we document that they generate lower returns in the short term relative to non-HGFs, but higher profits over longer horizons.

Next, we show that HGFs are more innovative than non-HGFs. We measure innovation in two different ways. First, we exploit registration into a special section of the Business Register devoted

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<sup>1</sup> We thank Federico Cingano, Andrea Lamorgese, and Enrico Sette for useful comments. We thank Sara Formai who provided software code for ownership data.

to innovative start-ups.<sup>2</sup> Firms enrolled in this special section benefit from fiscal incentives and leaner bureaucratic procedures aimed at facilitating their innovation activity. In order to be eligible to register into the special section, young firms have to meet some requirements regarding innovation inputs (e.g. R&D intensity and/or human capital of their workforce). We find that the incidence of innovative start-ups is higher among HGFs than non-HGFs. While the share of innovative start-ups has increased over time, partly reflecting the policy rollout, this is especially true among HGFs: in 2019 innovative start-ups were four times more frequent among HGFs than non-HGFs. Second, we show that HGFs are more likely to file a patent application in the year of entry than non-HGFs, and that such a difference is persistent over time: in the first four years after entry, HGFs are more likely to have filed at least one patent application than non-HGFs.

Individual personal traits are key determinants of entry into entrepreneurship and subsequent growth. Looking at shareholders' characteristics we document several differences between HGFs and non-HGFs. Although the number of founders is similar, a larger share of HGFs' capital at birth is held by corporate shareholders (12.7 vs. 9.5 percent), and in particular by financial institutions (e.g., private equity and venture capital). Among individual shareholders, HGFs' founders are more frequently male and on average two years younger (41 years old) than non-HGFs' ones. They are also highly mobile: about 18 percent of HGFs' founders established their enterprise away from their region of origin, four percentage points more than non-HGFs' founders. The majority of the migration flows are directed from the South to the Centre-North, where about one fourth of Southern HGFs' founders established their company. Emigration of young, highly educated individuals (the so-called "brain drain") has been depriving Italy of potential entrepreneurs (Anelli et al., 2023) to the advantage of foreign countries. Our findings indicate that brain drain is also occurring within the country. The loss of valuable entrepreneurial talent due to internal migration disproportionately affects Southern regions, further limiting the economic potential of these areas and exacerbating the long lasting divide within the country.

Finally, exploiting ownership data, we show that HGFs founders are significantly more likely to be former shareholders in other firms (i.e. they are serial entrepreneurs).<sup>3</sup> This supports the idea that the accumulation of valuable experience through experimentation facilitates the success of subsequent entrepreneurial activity (Lafontaine et al., 2016).

The paper is organized as follows. Section 2 describes the data and the contribution of high growth firms to job creation and revenue growth. Section 3 describes what are the characteristics of HGFs. Section 4 concludes.

## **2. DATA AND CONTRIBUTION OF HIGH GROWTH FIRMS TO EMPLOYMENT AND REVENUE GROWTH**

We build a comprehensive firm-level panel database combining information on demographics, financial statements and ownership structure for partnerships and corporations. We draw companies'

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<sup>2</sup> The special section of the Business Register devoted to innovative start-ups was introduced by the Start-up Act of 2012. Firms can be enrolled in the special section only for a few years after their establishment.

<sup>3</sup> A large body of literature has documented that aptitude towards risk, strong non-routine cognitive abilities, and education contribute to successful firm performance (Levine et al., 2017; Kerr et al., 2017). Unfortunately, our data do not allow us to observe personal information such as the level of education, but we can recover an individual's previous experience as a shareholder in other firms by exploiting ownership data.



demographics and financial information from the Orbis Historical database and we obtain their ownership structures from Infocamere, i.e. the Business Register information collected by the Italian Chambers of Commerce.

### *Sample construction*

In order to study the characteristics of HGFs, i.e., those that, after birth, experience an episode of exceptional growth, we build our sample following several steps. First, we consider the cohorts of firms born between 2010 and 2015. The birth dates of the firms in our data correspond to their legal registration in the Business Register. Data limitations constrain our choice of the time window. In particular, before 2010, financial and ownership information are incomplete. Since we measure the ex-post growth of new firms four years after entry, we only consider cohorts that we can track before the pandemic outbreak. The first column of Table 1 reports the number of new firms in each birth cohort, according to the Business Register records. We observe about 130,000 newly established firms each year.

Second, there may be a lag between a firm's registration in the Business Register and its "active" status, i.e., the actual start of production and sales of goods and services. The Business Register does not record the date in which firms start their operations, but, as done in official statistics,<sup>4</sup> we select "active" firms based on the availability of information from balance sheet data in Orbis Historical. We therefore exclude firms with zero, missing or estimated data for revenues. Overall, we can recover viable financial information for about 60,000 firms per cohort, which represent roughly 50 percent of the newly established firms (column 2, Table 1).

Third, taking into consideration the fact that firms may be established at any moment during the year and to calculate a meaningful growth rate, we look at financial data the year after entry and we impose a minimum size threshold. After entry, firms can opt to compile their first balance sheet with a duration greater than 12 months (up to 15), introducing potential sample selection in the population of firm for which we have financial data at birth.<sup>5</sup> Moreover, exceptionally high growth rates may be the result of very low initial levels of revenues.<sup>6</sup> To avoid these pitfalls, we use the year after entry as our baseline year and only select firms with at least 50,000 euros in revenues.<sup>7</sup> This leaves us with about 44,000 firms per year (column 3, Table 1).

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<sup>4</sup> According to the Italian Statistical Agency (Istat), an "active" firm is an enterprise that had either non-zero turnover or employment at any time during the reference period. For example, firms can be registered in the Business register but never start their operations, i.e. never become "active". In the more frequent case, however, firms start their operations within the next three years after registration in the Business Register. During this time windows, firms can finalize all necessary steps necessary to start producing their goods and services, such as renting building, installing capital, and hiring workers.

<sup>5</sup> In the first year firms can also compile a balance sheet with a duration lower than 12 months, introducing potential bias when computing ex-post growth rates.

<sup>6</sup> Several works on high growth firms use minimum size thresholds. For example, Istat follows the OECD (2012) methodology to compute high growth rate statistics and selects firms with more than 10 employees at the beginning of the considered period.

<sup>7</sup> We use revenues (as opposed to employment) to compute the size threshold because, according to our data, about 25 percent of firms have no employees in the year after entry. Moreover, the use of employment thresholds is sometimes preferred in cross-country studies because of difficulties in comparing revenues across countries due to exchange rates or inflation; however, such a concern does not apply to our setting. The 50,000 euros threshold corresponds to about the 25th percentile of the revenue distribution in the baseline year (one year after entry). In unreported results, we

**Table 1: Descriptive statistics about the sample selection**

	Business Register		Orbis Historical		
	(1)	(2)	(3)	(4)	(5)
Cohort	New firms (a)	Active firms	Firms with revenues > 50,000	Final sample (b)	of which HGFs
2010	138,719	59,772	45,731	33,482	3,069
2011	128,193	55,375	41,854	31,223	3,233
2012	118,496	52,727	39,984	30,158	3,271
2013	120,485	56,981	43,013	32,869	3,880
2014	126,067	61,870	46,214	35,354	4,169
2015	130,782	67,642	49,738	37,812	4,360
Total	762,742	354,367	266,534	200,898	21,982

Notes: Own elaboration on Business Register (Infocamere) and Orbis Historical data. (a) Only incorporated firms that are required by law to file annual balance sheets. – (b) Firms included in the sample, i.e. with revenues above 50,000 euros in the year after entry and surviving up to four years.

Fourth, we include in our final sample all firms for which we can compute the revenue growth rate over the three following years, i.e., firms that survive at least four years after entry. As an illustrative example, for companies born in 2010 and with more than 50,000 euros in revenues in 2011, we select those for which we are able to compute the revenue growth rate between 2011 and 2014. Our strategy mechanically excludes firms that exit the market within this time window; that is, our final sample includes all active firms with at least 50,000 euros of revenues in the year after entry which survived for at least four years. They are on average 33,000 firms per cohort (column 4, Table 1).

Finally, following Azoulay et al. (2020), we define HGFs by focusing on the upper tail of the overall revenue growth rate distribution. Specifically, we define a high growth firm as one belonging to the top 10 percent of the revenue growth rate distribution across cohorts, which corresponds to a revenue increase of 200 percent in a three-year window.<sup>8</sup> HGFs are about 3,500 per cohort (column 5, Table 1).<sup>9</sup>

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experimented with doubling the threshold and verified that the sectoral and geographical distribution of firms included in the analysis is qualitatively the same.

<sup>8</sup> A revenue increase of 200 percent corresponds to the 89th percentile of the revenue growth rate distribution, which is the actual threshold that we use. For ease of exposition, in the rest of the analysis, we will refer interchangeably to high growth firms as those that triple their revenues or are in the top 10 percent of the revenue growth rate distribution.

<sup>9</sup> In the literature, an alternative definition of high growth firms establishes an absolute growth rate threshold. For example, according to the OECD (2012), "gazelles" are high-growth firms with annualized growth greater than 20 percent over a three-year period in their first five years after entry. This alternative approach is more suitable for cross-country comparison or for studying the evolution of HGFs over time (see, for example, Kim et al., 2024), an interesting question that goes beyond the scope of this paper and that we leave for future research.

**Table 2: Characteristics of HGFs, non-HGFs and exiters**

	(1) HGFs	(2) non-HGFs	(3) Exiters
<i>Sectors</i>			
Manufacturing	13.5 (0.3)	13.3 (0.3)	10.9 (0.3)
Construction	13.9 (0.3)	14.1 (0.3)	15.5 (0.4)
Wholesale and retail trade, repair of motor vehicles and motorcycles	24.9 (0.4)	24.7 (0.4)	26.6 (0.4)
Transportation and storage	7.4 (0.3)	4.0 (0.2)	5.7 (0.2)
Accommodation and food service activities	5.9 (0.2)	9.5 (0.3)	12.5 (0.3)
Information and communication	5.5 (0.2)	4.7 (0.2)	3.7 (0.2)
Real Estate Activities	2.9 (0.2)	5.2 (0.2)	2.3 (0.2)
Professional, scientific and technical activities; administrative and support service activities	14.4 (0.4)	13.4 (0.3)	13.5 (0.3)
Other	11.6 (0.3)	11.1 (0.3)	9.3 (0.3)
<i>Geographical distribution</i>			
North	46.5 (0.5)	45.5 (0.5)	41.0 (0.5)
Centre	23.9 (0.4)	25.9 (0.4)	28.3 (0.5)
South and Islands	29.6 (0.5)	28.7 (0.5)	30.7 (0.5)
<i>Balance sheet characteristics at birth (t=1)</i>			
Revenues ('000 euros)	405.2 (921.9)	751.2 (1,500.1)	636.4 (1,301.8)
Employees (headcounts)	4.4 (8.5)	4.9 (8.9)	5.9 (11.7)
Share of Immaterial assets	7.6 (14.0)	7.2 (13.7)	7.1 (13.8)
Share of Material asset	14.8 (20.4)	15.0 (19.5)	12.6 (17.6)
Investment rate	14.1 (20.9)	9.8 (16.5)	8.6 (22.9)
Dummy Investment rate > 20%	20.1 (40.1)	13.3 (33.9)	11.7 (32.2)
Dummy positive profits	68.1 (46.6)	71.1 (45.3)	56.7 (49.6)
Return on equity	25.0 (365.8)	34.5 (375.3)	36.6 (389.2)
Observations	178,916	21,982	65,758

Notes: Standard deviation in parentheses.

One possible concern about our sample selection procedure is that it can introduce survivorship bias.<sup>10</sup> To investigate this, we compare the pre-growth, sectoral and geographical characteristics of HGFs, non-HGFs, and exiters (i.e. firms that generate more than 50,000 euros in revenue in the year following their foundation but do not survive for at least four years). The latter category comprises approximately 25 percent of the total number of companies with revenues over 50,000 euros in the year after birth (Table A.1 in the appendix). Exiters exhibit characteristics more

<sup>10</sup> Assume an entrepreneur can choose between a risky and a safe project. The riskier option can result in either high growth or default with strictly positive probabilities. In contrast, the safe project yields low growth. In this context, the characteristic of HGFs would be much more similar to firms in the same cohort which exit, rather than to those which survive.

akin to non-HGFs than HGFs (Table 2), thus reassuring us about the concern that their exclusion from the sample might generate a potential selection bias.

### *Descriptive statistics*

Table 3 provides some descriptive statistics for our final sample. In the year following entry the HGFs' average revenues amount to 405.2 thousand euros (as compared to 751.2 thousand euros for non-HGFs), and their number of employees to 4.4 (4.9 for non-HGFs). The average revenues growth rate over the following three years is almost 500 percent for HGFs, as opposed to 15 percent for non-HGFs (173 and 23 percent, respectively, for employment growth).

**Table 3: Descriptive statistics of young firms in the sample**

	non-HGFs	HGFs	Difference
<b><i>Panel (a) : Employment</i></b>			
Pre-growth level (headcounts)	4.9 (8.9)	4.4 (8.5)	-0.552*** (0.1)
3-year growth rate	0.229 (1.132)	1.729 (2.269)	1.500*** (0.011)
Post-growth level (headcounts)	5.4 (10.2)	10.3 (15.5)	4.919*** (0.1)
<b><i>Panel (b): Revenues</i></b>			
Pre-growth level ('000 euros)	751.2 (1,500.1)	405.2 (921.9)	-346.0*** (10.4)
3-year growth rate	0.152 (0.669)	4.956 (3.225)	4.804*** (0.009)
Post-growth level ('000 euros)	829.1 (1,869.5)	2,030.3 (2,943.3)	1,201.1*** (14.4)
Observations	178,916	21,982	200,898

Notes: Standard deviation in parentheses. Each variable is winsorized at the 1 percent level in both tails of its distribution. Growth rates are in percentage points. \*\*\* p-value<0.01 for the T-test of the difference.

We now turn to examining how HGFs contribute to employment and revenue growth. At birth, HGFs are smaller and account for a small share of the employment of young firms in our sample. The first 3 columns of Table 4 show the results of a regression of employment measured in the year after entry on a dummy equal to one for HGFs, controlling for cohort, sector and province fixed effects. At entry (panel a), HGFs employ on average 0.6 workers less, which is about 13 percent less than the average firm size of non-HGFs. When controlling for differences in the sectoral and geographical composition, the size gap is even larger (see column 2 and 3 of Table 4). As a result, in the year after entry, HGFs account for less than 10 percent of the total employment of newly established firms in our sample (Figure 1, panel a).

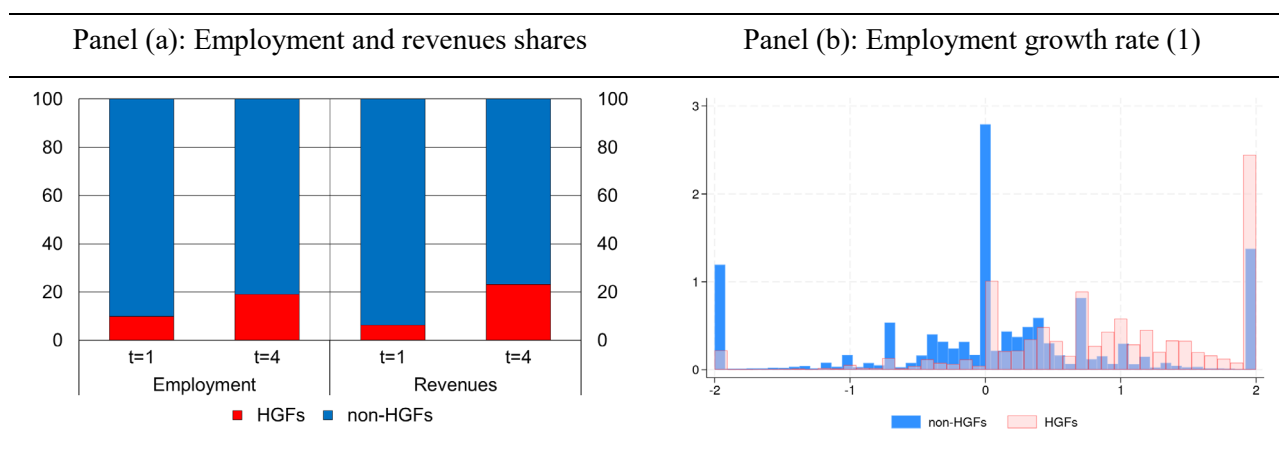
By the end of the growth period, the size gap between HGFs and non-HGFs becomes positive (Table 4, panel b), with HGFs employing on average about 7 more workers than non-HGFs. Overall, four years after entry, HGFs account for about 20 percent of the employment of young firms in the sample. Interestingly, positive employment growth is more common among HGFs, as shown by the distribution of individual employment growth rates (Figure 1, panel b): 83 percent of HGFs increased employment over the three-year period considered, as opposed to 55 percent of non-HGFs. As a result, about 68 percent of the total employment growth recorded for the firms in our sample between the baseline and the following three years is due to the exceptional growth of HGFs.

**Table 4: High growth premium**

	(1)	(2)	(3)	(4)	(5)	(6)
	Employment (headcounts)			Log (revenue)		
<i>Panel (a): firm characteristics in the year after entry</i>						
Dummy HGFs	-0.635 (0.103)	-1.021 (0.098)	-1.089 (0.099)	-0.507 (0.008)	-0.587 (0.008)	-0.600 (0.008)
<i>Panel (b): firm characteristic four years after entry</i>						
Dummy HGFs	7.083 (0.149)	6.500 (0.145)	6.396 (0.145)	1.383 (0.012)	1.304 (0.012)	1.290 (0.012)
<i>Fixed effects</i>						
Cohort	yes	yes	yes	yes	yes	yes
Sector		yes	yes		yes	yes
Province			yes			yes

Notes: Dependent variable at the top of the column. Standard errors in parentheses.

**Figure 1: Employment and revenues shares and employment growth (headcounts) by type of firms**



Notes: (1) Panel (b) plots mid-point growth rates ( $g = (x_1 - x_0) / (\frac{1}{2}(x_1 + x_0))$ ; Davis and Haltiwanger, 1992) which allow to include both firms that reduce their employment to zero and those that increase their employment starting from zero (their mid-point growth rates are -2 and +2, respectively).

We also look at differences in revenues (columns 4-6, Table 4). One year after entry, HGFs generate about 50 percent less revenues than non-HGFs in the sample and account for about 6 percent of the sample's total revenues (Figure 1, panel a). After three years, this share jumps to 23 percent. HGFs account for 78 percent of the overall three-year increase in revenues observed in the sample.

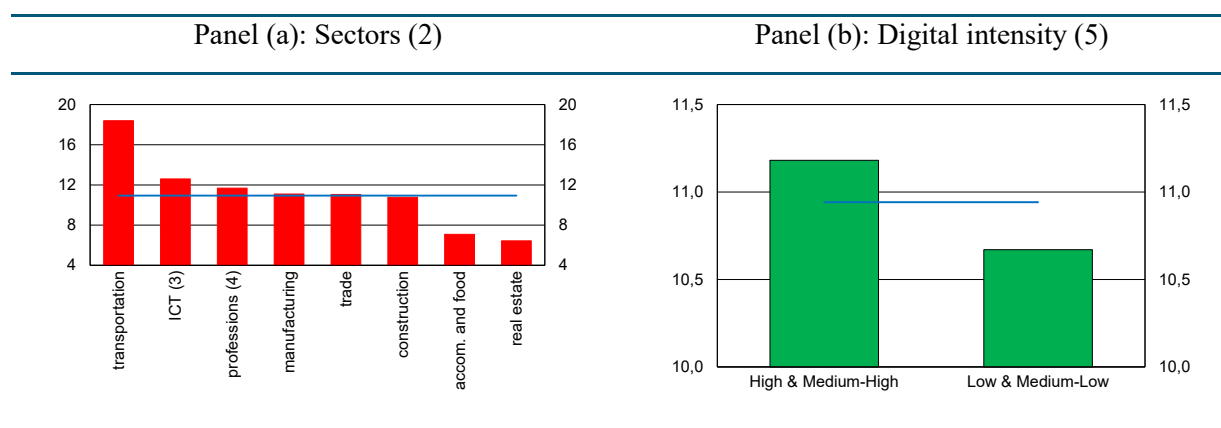
### 3. A PORTRAIT OF HIGH GROWTH YOUNG FIRMS IN ITALY

#### 3.1 SECTORAL AND GEOGRAPHICAL DISTRIBUTION

In our sample there are overall 22,000 high growth young firms, equivalent to 3.7 firms per 10,000 inhabitants. They account on average for 10.9 percent of all young firms.

At the sectoral level, the share of HGFs is higher than the overall average in transportation and storage services (where almost one fifth of all young firms in our sample are high-growth; Figure 2, panel a), in information and communication and in professional and business services (where HGFs represent 12.6 and 11.7 percent of all young firms in the sector, respectively). In the manufacturing and trade sectors, HGFs' incidence is roughly in line with the national average. Overall, the share of HGFs is higher in sectors with above-the-median digital intensity (Figure 2, panel b).

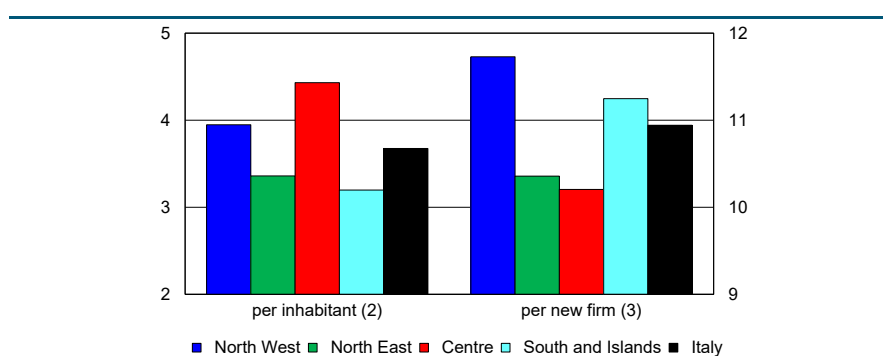
**Figure 2: Share of HGFs by sector (1)**



Notes: Own elaborations on Orbis Historical data. (1) Percentage share of high growth young firms over the total number of young firms in each sector. The blue line corresponds to the overall incidence of high growth young firms (10.9 percent). Values refer to the 2014-2019 period. – (2) Only the eight largest sectors in terms of number of high growth young firms are shown in the figure. – (3) Information and communication services. – (4) Professional, scientific and technical activities; administrative and support service activities. – (5) Using the taxonomy proposed by Calvino et al. (2018), NACE sectors are classified into four quartiles of digital intensity (High, Medium-High, Medium-Low, Low) based on the following indicators: share of ICT tangible and intangible (i.e. software) investment; share of purchases of intermediate ICT goods and services; stock of robots per hundreds of employees; share of ICT specialists in total employment; and the share of turnover from online sales. In this figure, we aggregate the top-2 and bottom-2 quartiles.

HGFs are not homogeneously distributed across the country. The share of HGFs is higher in North Western (11.7 percent) and Southern (11.2) regions than in the Central and North Eastern ones (10.2 and 10.4, respectively; Figure 3). However, because of geographic differences in entrepreneurship rates, a higher share of HGFs among new firms may not correspond to a higher density of HGFs in the territory. Indeed, the incidence of HGFs per 10,000 inhabitants is significantly higher in the Central (4.4) and North Western regions (3.9) than in the Southern and North Eastern ones (3.2 and 3.4, respectively). Almost half of HGFs are located in Campania, Lazio or Lombardy, which are the regions with the highest shares of HGFs per inhabitant and per new firm (Table A.2 in the appendix).

**Figure 3: Geographical distribution of HGFs (1)**



Notes: Own elaborations on Orbis Historical data. (1) Values refer to the 2014-2019 period. – (2) Firms per 10,000 inhabitants. – (3) Right scale; percentage share of high growth young firms over the total number of young firms in each macro-area.

### 3.2 ASSETS, INVESTMENTS AND PROFITABILITY

In Table 5, we look at differences in asset composition, investment, and profitability at birth and over time across cohorts. In the first two panels, we look at the share of immaterial and material assets over total assets. At entry (column  $t=1$  in the table), HGFs are more intangible-intensive than non-HGFs: on average, 7.6 percent of their assets are immaterial, as compared to 7.1 percent for non-HGFs, and this difference is statistically significant. Intangible assets can include patents, software, and digital capital (Crouzet et al., 2022), all assets that can lead to innovation and growth (Andrews et al., 2013). In the following years, the share of immaterial assets decreases for both groups of firms, and the difference between HGFs and non-HGFs becomes negative. These trends, however, conceal very different underlying dynamics: among HGFs, intangible assets increase but less than total assets, while among non-HGFs, intangible assets slightly decline (panel c).

Conversely, we do not find any significant difference in terms of tangible assets at birth (panel b). Over time, the share of tangible assets over total assets decreases among HGFs by almost 1 percentage point, more than among non-HGFs, and as a result, by the end of the growth period, non-HGFs are more tangible intensive.

In panels d and e, we look at investment rates and spikes. Throughout the period of analysis, HGFs invest more over total assets; the difference is large at entry: 14.1 percent for HGFs compared to 9.7 percent for non-HGFs. Investment at the firm level can range from ordinary acquisition of capital to substantial improvement of the production processes, an activity that can be approximated by investment spikes, e.g., an investment rate above a threshold level, defined in the literature at about 20 percent. The share of HGFs with investment spikes is about 7 percentage points higher than that of non-HGFs in the year after entry (20 and 13 percent, respectively); the difference shrinks but remains positive and significant during the period of analysis. Whether this lumpy investment behavior at the firm level is conducive to firm growth is an open question.

Finally, in the last two panels of Table 5, we look at firms' profitability. We look at the share of firms with positive profits as well as the average return on equity. Both indicators point towards a lower profitability of HGFs in the year after entry, a behavior that is consistent with HGFs making higher investments and undertaking risky projects that generate lower returns in the short term but higher on longer horizons. By the end of the growth period, the share of HGFs with positive profits is 14 percentage points higher than that of non-HGFs, and the ROE is 11 percentage point larger.



**Table 5: Assets, investment and profitability over time**

	t=1	t=2	t=3	t=4
Panel (a): Intangible asset over total assets (1) (%)				
non-HGFs	7.189	6.974	6.491	5.973
HGFs	7.612	6.680	6.117	5.653
<i>difference</i>	0.424***	-0.294***	-0.374***	-0.321***
Panel (b): Tangible asset over total assets (1) (%)				
non-HGFs	15.023	15.058	14.855	14.444
HGFs	14.866	14.366	14.012	13.645
<i>difference</i>	-0.157	-0.692***	-0.843***	-0.800***
Panel (c): Log of total assets				
non-HGFs	5.316	5.481	5.578	5.633
HGFs	5.183	5.819	6.238	6.519
<i>difference</i>	-0.133***	0.338***	0.660***	0.886***
Panel (d): Investment over total assets (1) (%)				
non-HGFs	9.752	6.049	4.950	4.327
HGFs	14.128	9.405	7.729	6.425
<i>difference</i>	4.376***	3.356***	2.779***	2.098***
Panel (e): Dummy investment rate > 20%				
non-HGFs	0.128	0.077	0.058	0.047
HGFs	0.196	0.143	0.111	0.084
<i>difference</i>	0.068***	0.066***	0.053***	0.037***
Panel (f): Dummy positive profits				
non-HGFs	0.711	0.698	0.688	0.676
HGFs	0.680	0.767	0.804	0.814
<i>difference</i>	-0.031***	0.068***	0.117***	0.139***
Panel (g): ROE (Profits after taxes / Net worth, %)				
non-HGFs	34.674	22.934	19.089	15.136
HGFs	25.060	29.495	25.338	26.182
<i>difference</i>	-9.614***	6.561	6.248	11.046***

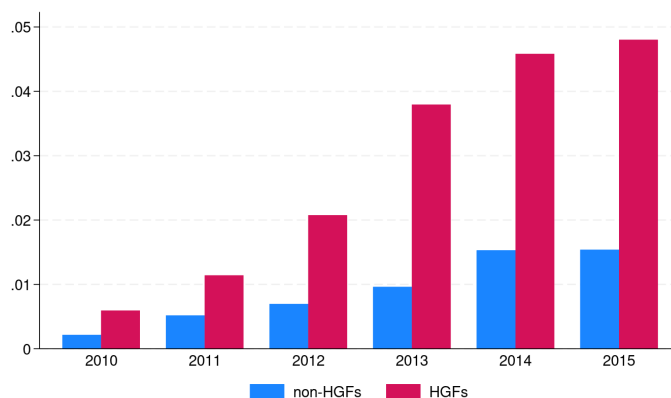
Notes: Averages across cohorts. t=1 correspond to the year after entry. \*\*\* p-value<0.01 for the T-test of the difference. (1) Total assets include cash, accounts receivables, inventories, tangible assets (e.g., property, and equipment), and intangible assets.

### 3.3 INNOVATION

In 2012, Italy introduced the Start-up Act, a specific legal and tax regime to support new business initiatives (the so-called “innovative start-ups”), aimed at encouraging the research and development of products with a high technological content. These firms are registered in a special section of the Business Register within five years from their establishment and benefit from several advantages: incentives to attract venture capital, lower administrative burdens, more flexible corporate and labor regulations, and simpler procedures for credit access (supported by the Central Guarantee Fund for small and medium-sized enterprises). These companies must comply with some innovation requirements, regarding R&D intensity, workforce’s level of education and/or patent/software ownership or usage rights.

Innovative start-ups, by introducing new technologically advanced products into the market, may have greater growth opportunities, compared to more traditional companies. Figure 4 shows the incidence of innovative start-ups among HGFs and non-HGFs included in our analysis. The share of innovative start-ups grows over time in both groups of companies, reflecting the progressive diffusion of the policy, and is more than three times higher among HGFs than among non-HGFs (3.3 and 1.0 percent on average, respectively).

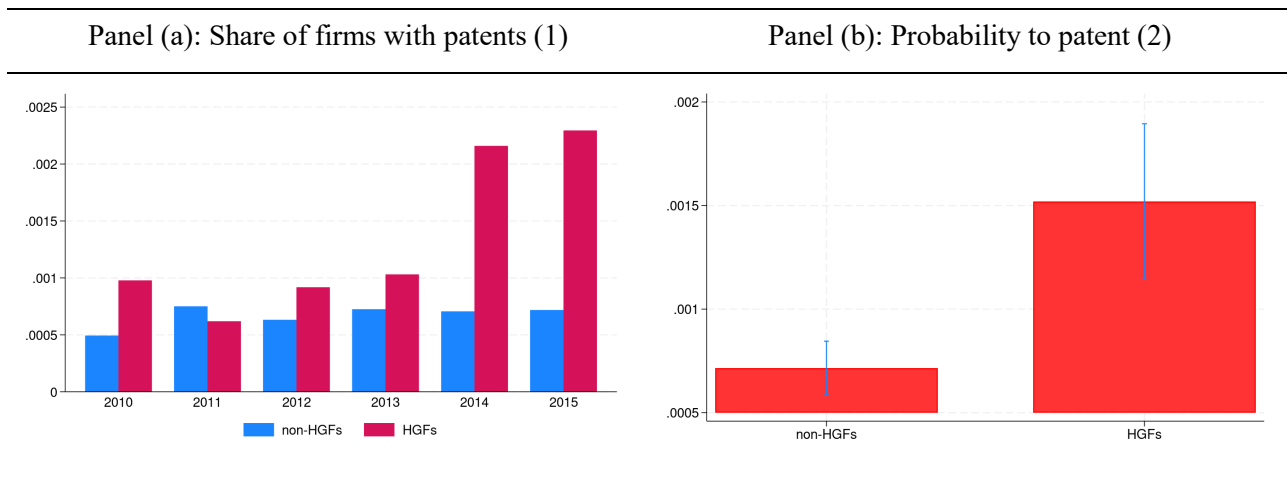
**Figure 4: Share of innovative start-ups by cohort**



Notes: The bars show the share of firms for each cohort and group (HGFs and non-HGFs) registered in the special section of the Business Register for innovative start-ups.

As a further check that HGFs are more innovative, we use Unioncamere data on patent-firm matches for Italian firms. Using patents’ priority date, we build two measures of innovation activity. First, we create a dummy variable equal to one if the firm filed at least a patent application at birth. Second, we create a dummy variable equal to one if the firm has filed a patent application within four years since its establishment. The evidence shows that HGFs are more innovative than non-HGFs: for all cohorts in our sample, the probability that a firm files a patent in the year after entry is higher for HGFs (Figure 5, panel a). This difference is persistent over time: the probability of filing at least one patent application during the four years after the entry is higher for HGFs, even when controlling for regional and sectoral fixed effects (Figure 5, panel b).

**Figure 5: Patent applications**



Notes: (1) Share of firms with patent applications in the year after entry by cohort. – (2) The probability to patent is computed as the marginal effect for HGFs and non-HGFs using the STATA command margins in a regression where the dependent variable is a dummy equal to one for firms with at least one patent application between the year after entry and the three following years, and which includes a dummy for HGFs interacted with cohorts fixed effects, controlling also for sector and province fixed effects. The figure also shows the 95 percent confidence intervals.

### 3.3 CHARACTERISTICS OF THE FOUNDERS

The Infocamere data allows us to compare the founders' characteristics in HGFs vs. non-HGFs. We identify founders as shareholders who own at least 10 percent of the firm's capital in its year of entry.<sup>11</sup> Founders can be either individuals or legal entities. For individuals, we collect demographic characteristics such as sex, age, and place of birth; for corporations, we recover the main economic sector of activity.

Table 6 summarizes differences in founders' characteristics across the two types of firms. Although they have on average the same number of founders, the two groups differ on several dimensions. The probability that a founder is an individual, as opposed to a legal entity, is lower among HGFs than among non-HGFs (83 vs. 88 percent). Additionally, 12.7 percent of HGFs have only corporate shareholders, as opposed to 9.5 percent of non-HGFs. Among corporate shareholders, financial institutions play a distinctive role, as they are better suited to alleviate credit constraints and provide firms with liquidity in the form of equity, which can be used to undertake risky investments. Financial institutions own a significantly larger capital share in HGFs (on average 3 percent, vs. 2.2).<sup>12</sup> Unfortunately, due to data limitations, we cannot further explore such a difference, for instance by assessing causality, i.e. by distinguishing the cases in which the presence of financial institutions is conducive to high growth from those in which a larger share of capital owned by financial institutions simply reflects their ability to cherry-pick start-ups with high growth potential.

<sup>11</sup> We apply such a cutoff in order to identify founders who are likely to have an active role in the firm.

<sup>12</sup> We identify financial corporations based on their sector of economic activity.

**Table 6: Descriptive statistics of shareholders**

	non-HGFs	HGFs	Difference
<i>Panel (a) : Shareholder characteristics</i>			
Average number of shareholders	2.243 (2.180)	2.253 (2.062)	0.011 (0.015)
Individual shareholders (share)	0.877 (0.305)	0.834 (0.344)	-0.043*** (0.002)
Corporate shareholders only (share)	0.095 (0.293)	0.127 (0.333)	0.032*** (0.002)
Average capital shares owned by financial firms	0.022 (0.133)	0.030 (0.153)	0.008*** (0.001)
<i>Panel (b): Individual shareholder characteristics</i>			
Male (share)	0.693 (0.373)	0.726 (0.366)	0.033*** (0.003)
Age	42.579 (10.573)	40.754 (10.437)	-1.825*** (0.079)
Italian (share)	0.933 (0.225)	0.925 (0.240)	-0.008*** (0.002)

Notes: Standard deviation in parentheses. \*\*\* p-value<0.01 for the T-test of the difference.

Focusing on individual shareholders, additional differences between HGFs and non-HGFs emerge (panel b of Table 6). First, consistently with previous findings (e.g. Fischer et al., 1993), women are less represented than men in HGFs. In our sample, 72.6 percent of HGFs founders are male, as opposed to 69.3 in non-HGFs. Additionally, differently from what has been shown for the U.S. (Azoulay et al., 2022), in Italy founders of HGFs are younger than founders of non-HGFs: their average age (41 years) is about two years lower. Foreign founders are on average more frequent in HGFs than in non-HGFs. In the latter pool of firms, Italian founders account for 93.3 percent of all individual founders, while they represent 92.5 percent of HGFs founders. This evidence is in line with the one documented for the U.S., where there is a substantial presence of immigrants among founders in the Silicon Valley (Saxenian, 2002) and in large, successful firms (Azoulay et al., 2022). All these differences are statistically significant and may partially reflect different sectoral and geographical compositions of the two pools of firms. In unreported results, we find that founders' sex, age and birthplace are still significantly different between the two groups in a regression framework controlling for birth cohort, sector, and province fixed effects.

Beside international migration, we explore the dimension of internal geographical mobility of Italian individual founders, by comparing their place of birth with their companies' location.<sup>13</sup> Out of the roughly 30,000 founders of HGFs, about 18 percent established their business out of their macro-

<sup>13</sup> We use the firm's location as a proxy for individual founders' residence, which unfortunately is not observable in our data.

area of birth. The corresponding share for the founders of non-HGFs is 14 percent. High growth entrepreneurs are therefore more likely to operate their business in a different region than their birthplace.

Internal mobility, in Italy historically directed from the South to the Centre-North of the country,<sup>14</sup> may result in a drain of entrepreneurial human resources from the regions of origin. The intensity of migration flows shows indeed a large geographical heterogeneity, to the detriment of the South. This area, which accounts for 35 percent of the Italian population, has given birth to almost 41 percent of the founders of HGFs in our sample (Table 7). However, one fourth of Southern founders of HGFs founded their company in a different macro-area, leading to the loss of about 3,000 successful entrepreneurs in the South, which has not been compensated by the immigration of founders born in the Centre-North; as a consequence, the share of founders of HGFs who operate in the South (32 percent) falls below the population weight of the area. This dynamic benefitted both the Centre and the North, where between one fifth and one fourth of the founders of HGFs was born outside of the macro-area (Figure 6) and where levels of outmigration are much lower (12 percent in the North West and in the Centre and 16 in the North East). Overall, this net outflow from the South to the Centre-North may further exacerbate the long-lasting economic divide between Italian macro-areas (Accetturo et al., 2022).

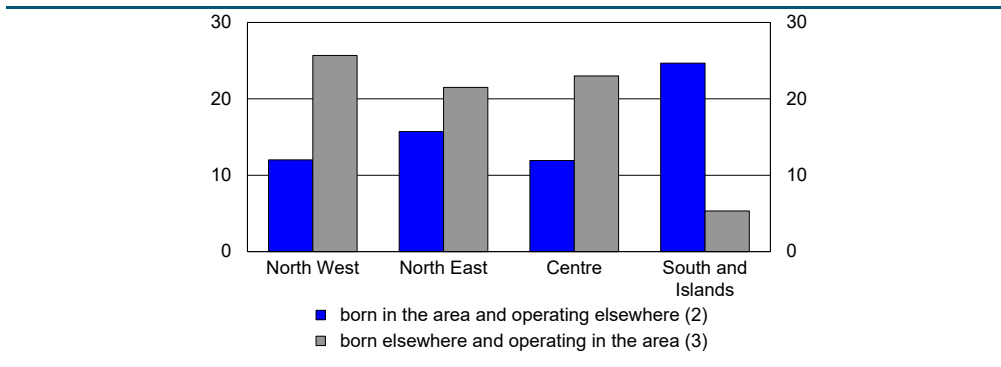
**Table 7: Internal mobility of the founders of HGFs**

		Macro-area of activity				Total
		North West	North East	Centre	South and Islands	
Macro-area of birth	North West	20.0	1.1	1.0	0.6	22.8
	North East	1.6	13.2	0.6	0.3	15.7
	Centre	1.1	0.6	18.3	0.8	20.8
	South and Islands	4.3	1.9	3.9	30.7	40.8
Total		27.0	16.8	23.8	32.4	100.0
<i>Population</i>		<i>26.5</i>	<i>19.2</i>	<i>19.5</i>	<i>34.8</i>	<i>100.0</i>

Notes: All values are percentage shares. Population is measured at the beginning of our period (2010).

<sup>14</sup> See e.g. Istat, *Migrazioni interne e internazionali della popolazione residente*, 2023.

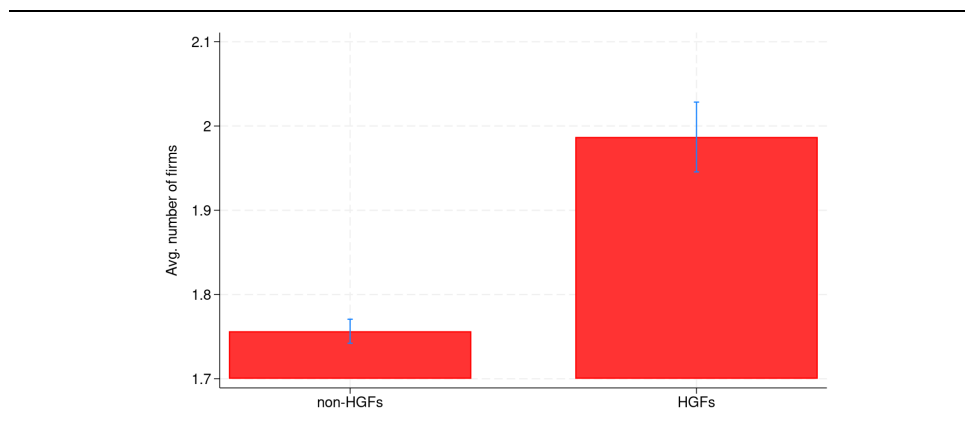
**Figure 6: Founders of HGFs: macro-area of birth and of activity (1)**



Notes: Own elaborations on Orbis Historical and Business Register (Infocamere) data. (1) Values refer to the period 2014-2019. – (2) Share of individuals born in the macro-area who founded a HGF in a different macro-area, over the total number of founders of HGFs born in the macro-area. – (3) Share of individuals born in a different macro-area who founded a HGF in the macro-area, over the total number of founders of HGFs in the macro-area.

We finally check if previous experience as entrepreneurs, a factor that in the literature has been documented to be conducive to firm success (Lafontaine et al., 2016), is higher among founders of HGFs. We do so by collecting information about the number of firms in which the founders of young firms in our sample have been shareholders in the three years before.<sup>15</sup> As shown in Figure 7, we find that, despite being younger, founders of HGFs have on average more previous experience than shareholders in non-HGFs.

**Figure 7: Founders' previous experience in other firms**



Notes: The figure shows the marginal effect for HGFs and non-HGFs using the STATA command margins in a regression where the dependent variable is the number of firms in which the founders of young firms in our sample have been shareholders in the three years before, and which includes a dummy for HGFs interacted with cohorts fixed effects, controlling also for sector and province fixed effects. The figure also shows the 95 percent confidence intervals.

<sup>15</sup> Because information about ownership in Infocamere starts only in 2008, we are not able to measure experience in years.

#### 4. CONCLUSIONS

In this paper, we documented the characteristics of HGFs in Italy: a handful of innovative firms with exceptional growth performance that contribute disproportionately to the creation of employment among young firms. HGFs are smaller at birth, but four years later they account for a sizeable share of employment and revenue among firms of the same cohorts. Their sectoral distribution is slightly skewed towards more digital-intensive sectors, while their geographical incidence is higher in the Southern and North Western regions of the country.

Our analysis shows interesting stylized facts, but there are important topics left for future work. First, we document that HGFs are more innovative, and it would be interesting to explore whether the policy implemented to foster the creation of innovative start-ups (i.e., the Start-up Act) has contributed to generating HGFs. Second, we document systematic differences between founders of HGFs and non-HGFs. In particular, HGFs' founders are younger, but they have more entrepreneurial experience, a fact that deserves a deeper analysis. Designing policies to support the creation of HGFs requires a deeper understanding of the role of past experience. Finally, we find a larger presence of corporate shareholders and financial institutions among the founders of HGFs. The causes and implications of such a finding deserve further analysis in order to better understand how they contribute to high growth and through which channels, for instance, by providing managerial capital or by relaxing financial constraints.

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## APPENDIX

**Table A.1: Active firms and survival rates by cohort**

Cohort	t=1	t=2	t=3	t=4
<i>Panel (a): Active firms by cohort</i>				
2010	45,761	40,999	36,994	33,482
2011	41,872	37,660	34,201	31,223
2012	40,009	36,101	32,991	30,158
2013	43,028	39,157	35,784	32,869
2014	46,235	41,938	38,457	35,354
2015	49,751	45,056	41,329	37,812
<b>Total</b>	<b>266,656</b>	<b>240,911</b>	<b>219,756</b>	<b>200,898</b>
<i>Panel (b): Survival rates</i>				
2010	100.0	89.6	80.8	73.2
2011	100.0	89.9	81.7	74.6
2012	100.0	90.2	82.5	75.4
2013	100.0	91.0	83.2	76.4
2014	100.0	90.7	83.2	76.5
2015	100.0	90.6	83.1	76.0
<b>Total</b>	<b>100.0</b>	<b>90.3</b>	<b>82.4</b>	<b>75.3</b>

Notes: Active firms are defined as those that have positive revenues in the year after entry (t=1).

**Table A.2: Geographical distribution of HGFs and mobility of their founders by region**

	Number		Region's share of young firms (Italy = 100)	Share of HGFs (young firms in region = 100)	Share of founders born in the region but operating elsewhere	Share of founders born elsewhere but operating in the region
	Absolute	Per 10,000 inhabitants				
Abruzzo	460	3.5	2.2	10.5	27.7	27.8
Basilicata	151	2.7	0.7	10.1	48.3	27.5
Calabria	376	2.0	2.0	9.5	51.2	7.8
Campania	2,458	4.3	9.9	12.4	24.7	5.0
Emilia-Romagna	1,545	3.5	7.6	10.1	22.6	32.4
Friuli-Venezia Giulia	294	2.4	1.4	10.3	31.0	33.7
Lazio	3,347	5.8	14.9	11.2	11.8	27.8
Liguria	320	2.1	1.8	8.9	44.1	33.1
Lombardy	4,916	4.9	19.7	12.4	13.3	31.9
Marche	451	3.0	2.8	8.1	28.0	27.2
Molise	117	3.9	0.4	13.5	38.3	42.9
Piedmont	1,057	2.4	5.2	10.2	29.3	29.8
Autonomous Province of Bolzano	213	4.0	0.9	12.0	22.7	35.1
Autonomous Province of Trento	169	3.1	0.8	11.1	29.2	40.5
Puglia	1,273	3.2	5.8	10.9	25.5	8.1
Sardinia	390	2.4	1.9	10.3	24.4	15.2
Sicily	1,275	2.6	5.9	10.8	24.3	6.6
Tuscany	1,221	3.3	6.7	9.1	18.7	24.8
Umbria	240	2.7	1.4	8.8	39.4	31.6
Aosta Valley	23	1.8	0.1	7.8	67.9	71.0
Veneto	1,686	3.5	8.1	10.4	18.7	19.4
<b>Total</b>	<b>21,982</b>	<b>3.7</b>	<b>100.0</b>	<b>10.9</b>	<b>22.6</b>	<b>22.6</b>

Notes: Values refer to the 2014-2019 period.