THE EFFECTS OF HUMAN AND INFRASTRUCTURAL CAPITAL ON THE ENTRY RATES OF NEW TECHNOLOGY-BASED FIRMS AT THE LOCAL LEVEL

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Abstract

The present study explores the impact of the local endowment of both human and infrastructural capital on the creation of New Technology-Based Firms (NTBFs) in the 103 Italian provinces in the period 1996-2005. Our empirical results highlight that both human and infrastructural capital have a significant positive effect on NTBFs' entry rates, albeit their impacts differ between manufacturing and service sectors. More specifically, human capital matters in manufacturing industries while infrastructural capital in services. No complementarities effects emerge between human and infrastructural capital, neither in manufacturing sectors nor in services.

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1. INTRODUCTION

A wide literature has acknowledged the key contribution of young firms operating in high tech sectors to the efficiency of economic systems. Indeed, New Technology-Based Firms (NTBFs) are important sources of new employment (Acs, 2004) and crucial promoters of technological change and innovation in modern economies (see, among the many others, Audretsch et al., 2006; During et al., 2001; Fontes and Combes, 2001; Kirby and Cox, 2006; Kirchhoff, 1994; Spencer and Kirchhoff, 2006). Therefore, exploring which factors contribute to their formation is undoubtedly of great interest for scholars in economics, having also crucial policy implications (Storey and Tether, 1998; Holtz-Eakin, 2000; Colombo and Grilli, 2007).

Previous studies have shown that territorial aspects figure prominently among the determinants of new venture creation (Reynolds at al., 1994). Many theoretical and empirical contributions have examined the effects of a large array of local characteristics, including demand dynamics (Fritsch and Muller, 2007; Nyström, 2007; Okamuro and Kobayashi, 2006); unemployment rates (Carre et al., 2008); human capital (Acs et al., 2007; Acs and Armington, 2004; Audretsch and Fritsch, 1999); infrastructural endowment (Colombo et al., 2004); institutional framework (Sutaria and Hicks, 2004); local innovativeness, in the form of industry R&D spending (Audretsch and Feldman, 1996), patents (Lee at al., 2004) or university research (Anselin et al., 2000); and agglomeration economies (vanOort, 2004; Fritsch and Muller, 2007).

Several empirical works have studied the determinants of new firm creation at local level, but relatively less attention has been devoted to and limited empirical evidence provided on high tech firms. Moreover, only a few works have taken a comparative perspective and investigated the differences between manufacturing and service sectors (for an exception see Verheul et al., 2009). The analysis of such a distinction is likely to become more and more relevant in the light of the increasing weight of service sectors in modern advanced economies, which calls for in deep explorations of the differential drivers of high tech entrepreneurship in the two macro-sectors.

The present study aims at filling these gaps and contributes more generally to the extant literature on the relationship between territorial characteristics and entrepreneurship. Specifically, we study the impact of the local endowment of both human and infrastructural capital on the entry rates of NTBFs in a given area. Indeed, human and infrastructure capital are both key engines of local development and growth (Krugman, 1991; Capello, 2004). Hence, different territories, having different endowments of both type of capital, differently enable discovery and exploitation of technological and market opportunities via new firm creation.

In particular, we explore whether higher entry rates of NTBFs are associated to a larger endowment of human and infrastructural capital at local level and whether both kinds of capital are needed to stimulate

high tech entrepreneurship in a geographical area and whether complementarities effects emerge between the two components.

The empirical analysis is carried out for the Italian case at the NUTS3[1] level. We estimate a series of longitudinal data models having as dependent variable the rate of entry of NTBFs in each province, both with and without controlling for firm exit (for an analogous procedure see Verheul et al., 2009) and by distinguishing between manufacturing and service sectors. The econometric estimates make use of an original database covering the entry of NTBFs in the 103 Italian provinces in the period 1996-2005.

Overall, our results highlight that both human and infrastructural capital have a significant positive impact on NTBFs' entry, albeit their effects differ between manufacturing and service sectors. However, when sectoral specificities are taken into account, human capital seems to play a role only in manufacturing industries, while infrastructural capital seems to be relevant in services. No complementarities effects emerge between human and infrastructural capital, neither in manufacturing nor in service sectors.

The remainder of the paper is organised as follows. In Section 2, we review the extant literature on the relationships between territorial characteristics, namely local endowment of human and infrastructural capital, and entrepreneurial processes in high tech sectors. Section 3 describes the sample and the variables used in the empirical analysis, and provides some descriptive statistics on the rates of entry of high tech start-ups and on the human and infrastructural capital endowment of Italian provinces. In Section 4, we specify the econometric models capturing the determinants at the local level of the creation of high tech start-ups, and illustrate the results of the estimates. Section 5 summarizes the main findings, suggestes avenues for future research, and highlights policy implications.

2. RELATED LITERATURE

The key role of start-ups as a driver of technological change and economic growth has led an increasing body of literature to investigate the determinants of their creation. Much importance has been devoted to knowledge endowment of potential entrepreneurs, which affects their capacity to discover technological and market opportunities to be exploited via new firm creation (Shane, 2000; Shane and Stuart, 2002; Agarwal et al., 2004; Shane and Venkataraman, 2000; Venkataraman, 1997; Klepper, 2001; Colombo and Grilli, 2005; Klepper and Sleeper, 2005). At the same time, the wide and persistent differences across regions and provinces in the rates of new venture creation (Fritsch and Mueller, 2007) seem to suggest that the characteristics of the local environment are important determinants of firm entry in a given geographical area.

More in details, several studies have emphasised the role of the local availability of human capital to spur the creation of new ventures (see for instance Acs and Armintong, 2004 and Glaeser et al., 1992 for the

[1] In the case of Italy, NUTS2 codes correspond to regions, and NUTS 3 to provinces.

US service industry; Fritsch and Falck, 2007 and Fritsch and Mueller, 2007 for the German case; Garofoli, 1994 for the Italian manufacturing industries; Okamuro and Kobayashi, 2006 for the Japanese case). A more educated and skilled population is likely to better discover and exploit technological and market opportunities and implement new ideas into new businesses (Glaeser et al., 1992). In addition, the adaptation and quick reaction to market conditions require firms not only to internally develop knowledge and skills, but also to be able to source them from the external environment they are embedded into, and thus to activate and to engage into external relations with other actors and organizations. The availability of skilled human capital to be involved in the entrepreneurial project may represent a fundamental prerequisite in order to attract and to absorb technical, organizational and relational competences, necessary to support learning and innovation processes, thus becoming an essential asset to the creation of a new venture and its survival (see Pena, 2002 for a similar view). These arguments are particularly relevant for high tech firms because of their reliance upon knowledge, technical skills, and specific competences as a key factor to survive and successfully compete on the market (Nelson and Winter, 1982; Winter, 2006).

The importance of the availability of skilled human capital at local level has also been highlighted by the industrial district literature, especially for traditional sectors (Becattini, 1990; Brusco, 1990), and the spatial cluster one, especially for high tech ones (Saxenian, 1994). As to these latter, the studies on localised (knowledge) externalities have emphasised the benefits accruing to new ventures in high tech clusters. Prominent physical location provides with differential endowments in terms of easier and faster access to technological knowledge, innovative ideas, and availability of highly specialized human resources that are key to successfully launch a new venture (Sorenson, 2003).

Up to now, researchers have devoted less effort to explore the impact of infrastructural endowment (i.e. telecommunication and transport networks) of a geographical area on new venture formation in that area, although it has been acknowledged that such infrastructures are a necessary prerequisite for high tech entrepreneurship (Venkataraman, 2004).

Evidence from the Japanese case suggests that the level of physical infrastructure development in a county plays some role in the locational choices of new ventures (Okamuro and Kobayashi, 2006). Moreover, Colombo et al. (2004) examining the determinants of start-up size of Italian NTBFs, show that they are usually located in areas endowed with efficient infrastructures that enable easier access to large markets, relevant suppliers, and customers as well as needed services. Conversely, the authors highlight that an inadequate availability of infrastructures would hinder investment and prevent the creation of new businesses. Furthermore, a more developed physical infrastructure allows for a faster and more efficient access, and ultimately exploitation, of local sources of knowledge and an easier and quicker accessibility to knowledge sources external to the region/province, thus also enabling an

enlargement of the knowledge base available to firms. Eventually, investments in and the presence of efficient infrastructure networks have also been largely proved to have a positive impact on local development, thus favoring new business creation, which, in turn, positively feeds back on development chances in a cumulative fashion (Rostow, 1960; Gerschenkron, 1962).

Finally, it is worth acknowledging that factors influencing new venture creation may differ across sectors (Malerba, 2002; Breschi et al., 2000), thus suggesting that local opportunities to entrepreneurship are also likely to vary across industries due to heterogeneity in resources endowment across territories (Verheul et al., 2009). Therefore, firms can experience different incentives to entry in a specific sector and location, that is regions or provinces turn out to be differently fertile to entrepreneurship in different fields. As to the Italian case, Verheul et al. (2009) actually show that region-specific factors affecting new venture creation do vary across sectors. In particular, manufacturing sectors are more sensitive to local labour productivity, human capital quality, and network advantages, while commercial and tourism services are more sensitive to the local demand size.

3. DATA, VARIABLES AND DESCRIPTIVE STATISTICS

3.1. Data and variable definitions

In order to analyse the effects of the endowments of human and infrastructural capital on NTBFs' entry rates in Italian provinces, we rely on a unique database that includes firm-level data on the population of the 70,994 NTBFs established in Italy between 1983 and 2006. These firms operate in the following manufacturing and service sectors: computers, electronic components, telecommunication equipment, optical, medical and electronic instruments, pharmaceuticals, aerospace, robotics, R&D and engineering services, software, and Internet services. It is worth noting that our dataset does not include firms operating in the telecommunication services as this is a regulated sector whose entry processes are shaped by different drivers. Indeed, in Italy the entry of new telecommunication operators is conditional to obtaining a license granted by the Communication Regulatory Authority (AGCOM). Given this peculiarity, we decided to exclude this sector from the analysis so as to avoid possible biases in the analysis of purely genuine entry rates.

Data on Italian NTBFs were extracted from the database of the Italian Chambers of Commerce[2], which gathers information on the headquarters and all the local offices of all the firms established in Italy. As the database of the Chambers of Commerce does not allow to distinguish entrepreneurs who created a new firm from workers with atypical employment contracts, a careful activity of data cleaning was undertaken to exclude the latter ones from the database. Such a data cleaning activity was also aimed at

[2] http://www.infocamere.it

dropping all the local offices and the firms that came from minor transformations of already existing companies (e.g. changes in the legal form).

In this paper, we use data on the sector of activity of the firms, the year of foundation and the location of the main office. This information is combined with data on an array of territorial characteristics of Italian provinces[3], which were obtained from the Italian National Institute of Statistics[4] and the Istituto Guglielmo Tagliacarne[5]. As these data on the characteristics of Italian provinces are available for a narrower period, our econometric estimates refer to years from 1996 to 2005.

Firm-level data are aggregated at the province level to build our dependent variable, $EntryRate_t$, which measures NTBF formation in each Italian province in year t in terms of gross entry rate. Following the labour market approach (Audretsch and Fritsch, 1994; Armington and Acs, 2002), we standardize the absolute number of NTBFs created in each province in the sectors listed above, with respect to the size of the work force (i.e. millions of residents aged 18-64) in the province. Previous studies have measured start-ups formation also in terms of net entry rate (e.g. Carree and Thurik, 1996; Carree et al., 2008). Here we cannot use this measure as we do not possess data on the gross exit rates in Italian provinces. However, our dataset allows us to calculate a proxy of NTBFs' yearly exit rates, namely the number of firms exited in each year in the period 1983-2006 out of the population of NTBFs established in Italy since 1983. Hence, we build the variable $ExitRate_t$, measured as the absolute number of exited NTBFs in each province at time t standardized with respect to the total work force, and we use it as a control in our estimates[6]. We have no prediction as to the sign of the coefficient of this control variable. In fact, on the one hand, high exit rates in a given industry and geographical area may reveal a market opportunity as exiting firms may be replaced by new entrants filling in the resulting market room (Verheul et al., 2009). On the other hand, they may point to an unattractive local market, thus inducing potential entrepreneurs to deliberately avoid entering.

As far as the explanatory variables are concerned, $HighHC_t$ reflects the human capital endowment of each province, as measured by an indicator of the intensity of skilled employees in each province at time t. It is calculated as the percentage of employed individuals who possess at least a secondary school degree[7].

[3] See Table A1 in the appendix for a complete list of 103 Italian provinces, including their distribution across the 20 Italian regions (NUTS 2).
[4] http://www.istat.it.
[5] http://www.tagliacarne.it.
[6] Here "exit" includes voluntary closure, liquidation, bankruptcy, but also NTBFs' loss of identity after merging with/being absorbed by other firms.
[7] We are aware that a more appropriate measure for the human capital endowment of Italian provinces would be the share of graduates out of the total work force in each province. Unfortunately these data are not available at province level for the period under scrutiny. It is also worth noting that the number of graduates in Italy is comparatively low with respect to other major European countries. More specifically, according to a recent analysis carried out by Eurostat (2009), in Italy, among individuals with an age comprised between 25 and 34 years old, only 19% have earned a University graduated degree, while the European average is about 30%.

Hence, the higher the value of this variable, the better the quality of the human capital endowment of the province. We then expect the coefficient of this variable to be positive and statistically significant.

$Roads_t$, $Airports_t$ and $TelecomInfrastructures_t$ account for the infrastructural capital endowment of each province. These indexes are three different measures capturing the level of development of transport and telecommunication networks in each province at time *t*. These indexes are calculated considering: i) the number of kilometres of motorways (weighted on some of their characteristics such as the number of lanes and toolgates), state highways, and county roads in the province; ii) the catchment area of the airports in the province and iii) the quality and quantity of the informatics and telematic networks, respectively. The greater the endowment of physical infrastructures, be they roads, airports or telecommunication networks, in a given province, the easier the access of the firms located in the province to both local knowledge sources and sources external to the province, the efficiency of these infrastructures should stimulate firm creation. Hence, we expect the coefficients of the three variables to be positive and statistically significant.

In order to check for the presence of possible complementarities between human and infrastructural capital, the interactive terms between $HighHC_t$ and the three measures of infrastructural capital are taken into account by building the variables $HighHC*Roads_t$, $HighHC*Airports_t$ and $HighHC*TelecomInfrastructures_t$. If complementarities existed, the coefficients of these variables should turn out to be positive and statistically significant.

As to the control variables, our estimates include a series of territorial-specific variables measured at the NUTS3 level, which refer to the characteristics of the local economic system. $Unemployment_t$ is the unemployment rate in each province at time *t*, measured as the number of unemployed individuals out of the total work force. Following previous studies that set forth and tested the so-called "unemployment push" hypothesis (see e.g. Evans and Leighton, 1990; Reynolds et al., 1994), we expect that unemployed workers are more likely to start a new company, as compared to employees, because they are more likely to be dissatisfied with their current labour market position.

As firms enjoy advantages when they are located close to other firms (see Hoover, 1937; Ohlin, 1933), we may expect that if there are many firms in a given area, such a cluster might attract potential entrants to the area. In order to control for possible agglomeration effects, we include the variable $IndustrialIntensity_t$ that is measured as the number of firms located in a given province in year *t* divided by population (in thousands of residents) in the province.

Additionally, new firms formation in a geographical area might be also linked to the level of economic development of the area; thus, we include in our models the control variable $GDPperCapita_t$. This is a measure of the level of economic development of the province and is calculated as the GDP at time *t* of a province standardized with respect to the number of residents in that province.

Also, firms entry rates may be affected by the patent intensity at the local level (see e.g. Armington and Acs, 2002; Choi and Phan, 2006; Fritsch and Falck, 2007); hence, we include in the models also $PatentPerCapita_t$ as a measure of the level of innovativeness of the environment in which potential entrepreneurs are considering to launch a new business. $PatentPerCapita_t$ is calculated as the number of patents granted in the province by the European Patent Office[8], standardized with respect to (millions of) residents in the province.

Next, we control for the effects of research performed by local universities. Indeed, many empirical studies found that companies are more concentrated in the proximity of universities (Audretsch et al., 2005; Bade and Nerlinger, 2000; Rodriguez-Pose and Refolo, 2003; Varga, 2000). The greater the quantity and quality of university research output the greater this effect. Hence, we include in our estimates measures of both size of local universities ($Researchers_t$) and quality (*DTopCitedScientists*) of their research. $Researchers_t$ is calculated as the number of researchers employed in the universities located in each province at time *t* divided by the population (in thousands of residents) of the province, while *DTopCitedScientists* is a time-invariant dummy variable equal to 1 if at least one of the scientists affiliated to the universities of the province is included in the list of the 10,000 top cited scientists as far in 2004[9].

Finally, the estimates include 9 year-dummies, being 2005 the baseline.

Table 1 presents summary statistics for all the variables included in the empirical analysis (but the year-dummies).

[Table 1 about here]

3.2. Descriptive evidence

Information on the population of the NTBFs established in Italy between 1995 and 2006 is used in this section to provide a preliminary description of the entry processes taking place in Italian high tech sectors. Moreover, descriptive evidence on the local endowment of both human and infrastructural capital is presented[10].

Table 2 gives an overview of the highest and lowest provincial entry rates, so as of the local capital endowment, presenting the top 15 and bottom 15 provinces in Italy.

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[8] http://www.epo.org/

[9] It is worth acknowledging that, although some of the largest Italian universities have campuses in different provinces (for instance, Politecnico di Milano has 6 campuses over the Lombardy region in 5 provinces and 1 campus in Emilia Romagna), the data on the characteristics of Italian universities we used to build the variables $Researchers_t$ and *DTopCitedScientists* are available at university level only (i.e. they are not disaggregated by provinces). In order to measure the number of researchers and the presence of one of the top cited scientists of local universities for Italian provinces, for each university we have attributed all the researchers to the main campus. As faculty members are mainly located in the main campus, this approximation can be considered reasonably accurate.

[10] For the sake of synthesis, we present descriptive evidence on the infrastructural capital endowment of Italian provinces referring to an aggregate index, including transport and telecommunications infrastructures (see Table 2 and Figure 1).

[Table 2 about here]

The distribution of entry rates appears to be consistent with the division between Northern/Central and Southern regions. Not surprisingly, entry rates are higher in the Northern part of Italy, including provinces in Emilia Romagna (i.e. Bologna, Modena, Parma, and Reggio Emilia), Friuli Venezia Giulia (i.e. Pordenone and Trieste), Liguria (i.e. Genova), Lombardia (i.e. Como, Milano, and Pavia), Piemonte (i.e. Torino), and Veneto (i.e. Belluno and Treviso). No Southern province ranks among the top 15, which include only two provinces of the Central Italy (i.e. Perugia –Umbria- and Prato - Toscana). Conversely, all the lowest ranking provinces but 2 (i.e. Sondrio and Brescia, which belong to Lombardia) are located in Southern Italy, covering regions such as Calabria (i.e. Catanzaro, Reggio Calabria, and Vibo Valentia), Puglia (i.e. Foggia), Sardegna (i.e. Nuoro and Oristano), and Sicilia, which places seven provinces (i.e. Agrigento, Caltanisetta, Messina, Palermo, Ragusa, Siracusa, and Trapani) out of nine in the lowest part of the table. Figure 1a clearly depicts the severe geographical disparities in entry processes in Italian high tech sectors, which mirror the long lasting inequalities in economic development between the North and the South of the country.

[Figure 1 about here]

A similar North-South divide emerges when considering the local endowment of human and infrastructural capital. As far as the former is concerned, Abruzzo is the only Southern region with provinces ranking in the top-15 (i.e. Chieti, L'Aquila, and Pescara,), while all the other top-15 ranking counties belong to Northern (i.e. Bologna, Genova, La Spezia, Milano, Pordenone, Savona, Trento, and Trieste,) or Central regions (i.e. Ancona, Perugia, Roma, and Terni,). Conversely, only 4 Northern (i.e. Asti, Biella, Bolzano, and Rovigo) and 2 Central provinces (Pistoia and Prato) are ranked among the lowest 15. However, Figures 1b and 1c suggest that North-South inequalities in human capital endowment are less marked than those in infrastructures.

Not surprisingly, the Northern part of Italy is characterised by the highest levels of infrastructural development too (see Table 2 and Figure 1.c). A high infrastructural endowment is seen in several provinces in Emilia Romagna (i.e. Bologna and Rimini), Friuli Venezia Giulia (i.e. Trieste and Gorizia), Lombardia (i.e. Lodi, Milano, and Varese), and Veneto (i.e. Padova and Venezia). A central region, Toscana, has three provinces out of nine (i.e. Firenze, Lucca, and Prato), ranking among the top-15, while, among Southern provinces, only Napoli ranks in the upper part of Table 2. Again, most of the lowest raking provinces (11 out of 15) are located in the South. Finally, provinces hosting some of the Italian major cities (i.e. Milano, Roma, Genova, and Napoli) benefit from a well developed infrastructural network.

4. EMPIRICAL ANALYSIS

4.1. Model specification and methodology

In order to investigate whether both human and infrastructural capital impact on the gross rate of entry of high tech start-ups at the NUTS3 level, we estimate a random effects panel data model with the following specification:

$$EntryRate_{it} = \alpha + \gamma HighHC_{it} + \beta' Infrastructures_{it} + \delta' Z_{it} + \varphi\lambda_t + \eta_i + \varepsilon_{it} \quad (1)$$

As described in Section 3.1, *EntryRate*$_{it}$ is the entry rate of NTBFs in province *i* in year *t*, *HighHC*$_{it}$ measures the local endowment of human capital described in the previous section while *Infrastructures*$_{it}$ is a vector of the three variables measuring the level of development of local infrastructures. Z_{it} is a vector of covariates including the province-specific controls, λ_t is a vector of year dummies, η_i are province-specific effects, assumed to be realizations of i.i.d. random variables with distribution [0, σ_η^2], and, finally, ε_{it} are the usual i.i.d. disturbance terms with distribution [0, σ_ε^2].

Moreover, in order to check for the presence of possible complementarities effects between human and infrastructural capital at local level we estimate a random effects panel data model of the following form:

$$EntryRate_{it} = \alpha + \gamma HighHC_{it} + \beta' Infrastructures_{it} + \vartheta' HighHC * Infrastructures_{it} + \delta' Z_{it} + \varphi\lambda_t + \eta_i + \varepsilon_{it} \quad (2)$$

If such complementarities effects existed, the vector ϑ of the interactive terms should turn out to be positive and statistically significant.

The consistency of the random effects estimator here specified requires the random effects η_i to be uncorrelated with the independent variables. Given the relatively large territorial dimension (103 provinces) relative to the small time dimension (10 years) of our panel data, we choose to model local specific effects by the random effects specification rather than use the alternative of a fixed effects specification that requires estimation of 103 province-specific effects. In this respect, it is worth remarking that the assumption of a random effects specification requires the estimation of only one additional parameter. In addition, we favour a random effects over a fixed effects specification because one potential problem with this latter is that most of the explanatory variables of our models contain relatively limited time-series variations and one covariate is time-invariant (i.e. *DTopCitedScientists*). In this case, including fixed effects may conceal the statistical and substantial significance of the coefficients of these variables (e.g. Beck 2001; Plümper et al. 2005).

4.2. Results

The results of the econometric analysis are reported in Tables 3 and 4. The dependent variable is the gross entry rate of start-ups in all high tech sectors for the models reported in Table 3, while, in Table 4, we distinguish between manufacturing and service sectors. In both tables three models are presented. Models I and II follow the specification (1) discussed in Section 4.1, while models III follow the specification (2).

[Table 3 about here]

Let us first consider the models in Table 3. The estimated coefficients of the explanatory variables measuring the local endowment of human and infrastructural capital have the predicted sign. $HighHC_{t,}$ exhibits positive coefficients in both model I and model II, although significant at conventional confidence levels only in model II. This suggests that the availability of skilled human capital at local level (weakly) fosters the entry of NTBFs.

Also the local endowment of infrastructural capital does play a role in stimulating high tech entrepreneurship in a geographical area. In particular, the level of development of the physical infrastructures that facilitate relations with distant firms and individuals has a positive effect on NTBFs formation. Indeed, in both model I and model II, the coefficients of $Airports_t$ and $TelecomInfrastructures_t$ are positive and significant (at 1% the former and at 5% the latter), while the coefficient of $Roads_t$ is negative albeit not significant. This represents a fairly original result as, to the best of our knowledge, very few works have documented the contribution of infrastructural capital to the creation of high tech firms and, in turn, to the development of the sectors they are active in (see Colombo and Grilli, 2004, p. 1204 for an exception on NTBFs' start-up size).

The impact of both components is also relevant in economic terms. Considering the estimates of model II and taking as benchmark a province in the year 2000 with all the independent continuous (dichotomous) variables set at their mean (median) values, a shift for the variable $HighHC_{t,}$ from its 10^{th} percentile to the 90^{th} one produces an increase in the gross entry rate of +7.77%. An analogous shift from the 10^{th} to 90^{th} percentile for the variables $Airports_t$ and $Infrastructure_t$ accounts for an increase of +6.09% and +9.43%, respectively.

At odds with our conjectures, in model III, the coefficients of the interactive terms $HighHC*Roads_t$ and $HighHC*Airports_t$ are not significant while that of $HighHC*TelecomInfrastructures_t$ is negative and significant. However a Wald test reveals that the three variables are jointly not significant, thus pointing to the absence of any complementarities effect between human and infrastructural capital on the entry of NTBFs.

The coefficients of $Unemployment_t$ result negative and significant in all the models, thus contrasting the "unemployment push" hypothesis illustrated in Section 3.1. Hence, we may argue not only that defensive

motives, that is starting a business as a hedge against job loss or other financial setback (Colombatto and Melnik, 2008), are far from being key drivers of the creation of new ventures in high tech sectors, but also that high unemployment rates deter the birth of new business ventures in technology-intensive industries. The coefficients of $IndustrialIntensity_t$ are always positive but not significant, thus pointing to the absence of relevant localisation economies. Moving to the effect of the level of economic development, consistently with previous works (see, for instance, Carree et al., 2002; Wennekers et al., 2005) we find positive and highly significant coefficients for $GDPperCapita_t$ across all the models[11].

As to the effect of patent activity, $PatentPerCapita_t$ turns out to have positive and highly significant coefficients in all the models. This result contrasts with the findings of Verheul et al. (2009), who examined the entry of new ventures in both high- and low-tech sectors in Italian provinces and found that the effect on entry of patent activity is weak (and, in case of manufacturing sectors, negative). Such opposite results are likely to be a consequence of the different sectors examined, namely manufacturing in general and traditional service sectors (i.e. retailing and wholesaling, hotels and restaurants) in Verheul et al. (2009), and high tech sectors in the present paper, thus pointing to a completely different role played by the local level of technological development on new ventures' formation in technology-intensive industries.

As to the variables capturing the size of local universities and the quality of their research, the coefficients of $Researchers_t$ are never significant while those of *DTopCitedScientists* are positive and significant across all the models, thus suggesting that in high tech sectors would-be entrepreneurs are attracted by areas where local universities perform high quality research. This result is consistent with works linking firms entry into biotechnology in a specific time and location to the geographic distribution of university scientists (Zucker et al., 1996, 1998, 2002). However, such a finding may have an alternative explanation: as researchers from high quality universities are more likely to start new ventures than those from low quality ones (Di Gregorio and Shane, 2003), the high tech companies that spin off from academic research are more often established close to high quality universities. This follows that entry rates are greater in the provinces where such universities are located.

Models II and III also include a measure of NTBFs' exit rates ($ExitRate_t$) as a control variable. The coefficients of this variable turn out to be positive and significant at conventional level in both the models (for analogous results see again Verheul et al., 2009). Thus, in high tech sectors the greater the exit rates, the greater the entry ones. This may be interpreted as a signal that the will to fill in the market room made available by the firms that closed or went bankrupt is one of the determinants of the entry of high tech

[11] Note that we run all the models here presented also substituting the variable $GDPperCapita_t$ with the growth rate of GDP per capita. The coefficients of the variable turn out to be not significant, while no change affects the coefficients of the other explanatory and control variables.

start-ups; also, this is consistent with results suggesting a high degree of turbulence in Italian markets (Breschi et al., 2000; Audretsch, 1997).

Additionally, the year-specific effects from 1996 to 2000, but 1997, are positive and since 1998 they show an increase over time. The year-specific effects start decreasing in 2001 and turns to be negative in 2003 (even though it is worth noting that only the coefficients of $DYear2001_t$ are significant at conventional confidence levels). This may point to the negative impact on the expectations of potential entrepreneurs of the 2001 internet bubble burst, which has deeply affected companies in high tech sectors, in general, and in ICT sectors, in particular.

[Table 4 about here]

In Table 4 we distinguish between manufacturing and service sectors. The most interesting result is that the effects on NTBFs entry rates of the local endowment of both human and infrastructural capital differ between the two groups of industries. Specifically, as to human capital endowment, in services the coefficients of $HighHC_t$ although positive as we predicted, are not significant in all the models. Conversely, in manufacturing, the coefficients of $HighHC_t$ are positive in models I and II and significant (at 10%) in model II. Instead, $Airports_t$ and $TelecomInfrastructures_t$ show positive and highly significant coefficients in models I and II for services, while they do not have significant coefficients in all the models on manufacturing industries. Again the magnitude of the effects is important in economic terms. Repeating the same calculations as those previously exposed, a shift from its 10^{th} to the 90^{th} percentile of the variable $HighHC_t$ ($Airports_t$ and $TelecomInfrastructures_t$, respectively) produces an increase in the gross entry rate of start-ups in manufacturing (services) industries of +11.55% (+7.61% and +12.06%, respectively).

The different roles played by the endowment of human and infrastructural capital for NTBFs in service and manufacturing industries can explain these different findings.

Indeed, the availability of superior competences at local level may not be a prerequisite for starting an entrepreneurial activity in service sectors as service firms may develop their business through interactions at a distance with employees or external freelances. Of course, in order to allow firms benefit from the services offered by these long-distance workers, a proper endowment of long-range transport infrastructures is required together with well developed informatics and telematic networks, as such interactions rely mainly on accessibility to fast-speed Internet connections. This may explain the positive and highly significant coefficients (see models I and II) of $Airports_t$ and $TelecomInfrastructures_t$ in service industries. This also explains the lack of significance of the coefficients of $Roads_t$, a variable capturing the level of development of short-range transport infrastructures.

Differently, employees in manufacturing industries, in general, must be present in their workplace in order to be able to perform their tasks because they usually need to use specific equipments possessed by

their firms. As a consequence, in these sectors a greater availability of skilled human resources at local level, given the low mobility of Italian workers (European Commission, 2006), may be an important determinant of firm entry, while the level of development of transport and telecommunication networks turns out not to be so critical.

As far as the control variables are concerned, $Unemployment_t$ exhibits negative and significant coefficients in all the models, with the exception of Model III for services where the variable is not significant. Instead, $IndustrialIntensity_t$ exhibits positive and not significant coefficients for both services and manufacturing, with the only exception of Model I for manufacturing sectors where the coefficient turns out to be weakly significant.

The positive and significant coefficients of $GDPperCapita_t$ for service sectors suggest that a greater level of local economic development leads to higher entry rates in these industries. This does not hold true for manufacturing sectors, where local economic development does not affect NTBFs creation. These results are consistent with Verheul et al. (2009). Instead, local patent activity is a key driver for firms in both service and manufacturing sectors, as the positive and highly significant coefficients of $PatentPerCapita_t$ suggest. As to the effect of university research, the number of researchers in local universities does not affect firm creation either in service or in manufacturing sectors. Conversely, higher quality of academic research stimulates firm creation in services only as the positive and highly significant coefficients of *DTopCitedScientists* reveal. $ExitRates_t$ exhibits positive and significant coefficients in all the models. It is worth noting that the coefficients of this variable are higher for manufacturing. This may suggest that the presence of sufficient market room has a stronger effect on entry decisions in high capital intensive industries such as manufacturing sectors are. Finally, as to year-specific effects, it is worth noting the difference between manufacturing and services. In service sectors, we find negative coefficients for the dummies referring to the first years of our time window, high positive coefficients for the dummies referring to years 2000 and 2001, probably pointing to lively entry processes of internet-based and software firms triggered by the fast Internet diffusion taking place in Italy in that period, and, again, negative coefficients for the years after 2001, maybe as a consequence of the inhibiting effect on industry dynamics of the explosion of the speculative bubble. Instead, the coefficients of the year dummies in the models on manufacturing industries reveal that the rate of entry of firms in these sectors has considerably decreased in the period 1998-2003.

5. CONCLUSIONS

The aim of this paper was to extend our understanding on the determinants of NTBFs' entry rates at the local level. A large stream of research in entrepreneurship has recently revolved around the determinants of the creation of NTBFs, focusing mainly on the role of individual and sectoral factors shaping entrepreneurial choices. Conversely, the analysis of the territorial factors influencing NTBFs entry in a geographical area is still quietly underdeveloped.

This paper directly addressed this issue and, while controlling for several contextual factors, it has drawn attention to the impact of local endowment of both human and infrastructural capital on NTBFs creation, distinguishing between manufacturing and services sectors. Specifically, we aimed at disentangling whether and how high entry rates of NTBFs in a geographical area are related to well developed infrastructural networks and superior competences and knowledge available at the local level, testing also for the presence of complementarities effects between these two typologies of capital.

For this purpose, we focussed on the 1996-2005 period and calculated the entry rates of NTBFs in Italian provinces by taking advantage of a unique database including firm-level data on the whole population of the NTBFs created in the 103 Italian provinces. The use of such a database represents an unquestionable strength of this study as data on the whole population of Italian new ventures created in high tech sectors are not publicly available. In particular, we estimated longitudinal data models to study those local factors affecting NTBFs entry rates in a province (i.e. at the NUTS3 level), as measured by the absolute number of new firms created in Italian high tech sectors standardised with respect to the size of the total work force in the province.

Findings indicate that both human and infrastructural capital do play a role in shaping entrepreneurial processes in high tech sectors at the local level. Namely, both types of capital turn out to have a crucial influence on entry rates. However, the two kinds of capital seem to impact differently on manufacturing from services industries. Specifically, the availability of superior competences and knowledge at the local level plays a role for manufacturing, while it turns out to be irrelevant in services. The opposite occurs as far as infrastructural capital, as measured by endowment of airports and telecommunication networks, is concerned. A possible explanation points to differences in the ways in which work is organised within manufacturing as compared to service firms. Indeed, while in the former case, the presence of the employees at their workplace is usually a fundamental requisite for carrying out activities, as a large share of personnel generally needs to use specific and unmovable equipments, services firms have higher chances and flexibility to organise their daily activities through long-distance collaborations with external staff members and freelances. As a consequence, in services a greater availability of skilled human resources at local level may be less crucial in determining firm entry. Such an explanation accounts also for the different role played by infrastructural capital in the two markets. Indeed, in order to make such

long distance cooperation effective, firms in service sectors need well-equipped areas in terms of informatics and telematic infrastructures as interactions with their external collaborators may mainly occur through high speed Internet connections. In this vein, we acknowledge the role played by airports as gates to competences and resources dispersed across world's knowledge sources. Such a need of infrastructures enabling long-distance collaborations and exchange is less pressing for firms in manufacturing.

Finally, no complementarities effects arise between the two capital components. Whilst this represents a fairly original result as, to the best of our knowledge, no work has ever investigated for the presence of super-additive effects, our findings also call for further inquiring. If some substitution effects are at work between the two components in fuelling new business creation in high-tech sectors as our results suggest, why do they occur and which is their nature? Are services different from manufacturing industries in this respect?

To conclude, these results are interesting in their own right as they confirm the view that the existence of a proper array of local characteristics is a key driver of territorial dynamics of young firms in high tech sectors. Moreover, they also have important policy implications, as they argue in favour of public interventions that stimulate both the local development of infrastructures so as the formation of proper local knowledge base as a way for promoting the establishment of high tech start-ups in a geographical area, and, ultimately, its economic development. But in this respect, policy makers should be aware that sponsoring one component instead of the other will not exert the same effects on the industrial composition of new ventures creation. As it is widely acknowledged that modern economic systems are shifting towards an increasing weight of services, our work suggests that infrastructural more than local human capital may represent a crucial asset for the production of intangibles, provided that companies can access long-distance competences and skills.

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TABLES AND FIGURES

Table 1: Summary statistics of the variables of the econometric modes.

Variables	*Description*	*Mean*	*Standard deviation*	*Min*	*Max*
$EntryRate_t$	Gross entry rates	5.80	2.96	0.00	23.64
$HighHC_t$	Measure of the endowment of human capital	56.16	5.87	38.39	72.33
$Roads_t$	Measure of the endowment of roads	106.04	41.47	34.42	260.90
$Airports_t$	Measure of the endowment of airports	122.36	105.98	2.05	1015.00
$TelecomInfrastructures_t$	Measure of the endowment of informatics and telematic networks	87.90	50.81	7.22	386.70
$Unemployment_t$	Unemployment rate	9.62	7.04	1.30	33.16
$IndustrialIntensity_t$	Number of firms per (thousands of) residents	88.05	16.93	41.47	130.46
$GDPperCapita_t$	Gross domestic product (in thousands of Euro) per capita	20.02	54.53	85.00	37.60
$PatentPerCapita_t$	Number of patents per (millions of) residents	44.97	51.56	0.00	287.60
$Researchers_t$	Number of researchers per (thousands of) residents	0.74	1.15	0.00	6.85
DTopCitedScientists	Dummy equal to 1 if at least one of the scientists affiliated to the universities in the province is included in the list of the 10,000 top cited scientists	0.16	0.37	0.00	1.00
$ExitRate_t$	Gross exit rates	19.10	19.60	0.00	217.50

Table 2: Provincial entry rates and endowment of infrastructural and human capital.

Province	*Entry rates (average)*	*Province*	*Human capital (average)*	*Province*	*Infrastructural capital (average)*
Belluno	212.93	Roma	70.58	Trieste	247.99
Milano	202.73	Terni	68.45	Roma	201.43
Torino	190.55	Genova	67.44	Lodi	195.18
Bologna	174.03	L'Aquila	65.99	Varese	190.12
Modena	168.29	Savona	65.81	Milano	176.41
Reggio Emilia	150.77	La Spezia	65.73	Firenze	176.18
Prato	138.85	Trieste	65.71	Genova	166.46
Pavia	137.80	Trento	65.64	Gorizia	156.01
Parma	136.74	Perugia	65.46	Rimini	150.07
Como	135.46	Milano	63.73	Bologna	143.49
Trieste	135.34	Pescara	63.25	Lucca	143.34
Pordenone	135.02	Ancona	63.17	Padova	134.61
Genova	132.90	Chieti	63.16	Napoli	132.73
Perugia	132.56	Bologna	62.86	Prato	131.21
Treviso	132.24	Pordenone	62.83	Venezia	130.93
	…		…		…
Catanzaro	49.59	Asti	49.55	Belluno	56.96
Siracusa	49.32	Palermo	48.85	Ragusa	54.19
Messina	49.25	Brindisi	48.37	Caltanisetta	54.14
Nuoro	48.61	Taranto	48.30	Oristano	54.11
Palermo	48.41	Pistoia	47.13	Isernia	54.07
Reggio Calabria	48.15	Trapani	47.06	Sondrio	53.98
Trapani	44.76	Foggia	47.06	Agrigento	53.55
Sondrio	43.38	Biella	47.03	Grossetto	53.41
Brescia	42.02	Nuoro	46.58	Crotone	50.66
Vibo Valenzia	40.39	Bolzano	45.83	Aosta	50.50
Ragusa	39.79	Ragusa	45.30	Sassari	49.61
Caltanisetta	35.64	Rovigo	45.20	Enna	48.40
Oristano	33.44	Sassari	44.06	Potenza	47.50
Foggia	33.01	Prato	43.55	Matera	45.46
Agrigento	25.55	Oristano	39.26	Nuoro	32.19

Note: the 15 provinces with the highest entries rate and endowment of human and infrastructural capital (including transport and telecommunications infrastructures) are presented in the upper part of the table, while the 15 provinces with the lowest entry rates and endowment of human and infrastructural capital are presented in the lower part. For all the variables, the averages cover the period 1995-2006.

Table 3: The determinants of gross rate of entry of high tech start-ups

		Model I		Model II		Model III	
a_0	*Constant*	-0.806	(1.788)	-0.806	(1.535)	-0.896	(2.825)
a_1	$HighHC_t$	0.033	(0.024)	0.032	(0.019)*	0.037	(0.047)
a_2	$Roads_t$	-0.002	(0.003)	-0.003	(0.002)	-0.028	(0.020)
a_3	$Airports_t$	0.002	(0.001)***	0.002	(0.001)***	0.007	(0.008)
a_4	$TelecomInfrastructures_t$	0.006	(0.003)*	0.006	(0.002)**	0.027	(0.013)**
a_5	$HighHC*Roads_t$	-		-		0.000	(0.000)
a_6	$HighHC*Airports_t$	-		-		-0.000	(0.000)
a_7	$HighHC*TelecomInfrastructures_t$	-		-		-0.000	(0.000)
a_8	$Unemployment_t$	-0.050	(0.021)**	-0.055	(0.020)***	-0.051	(0.020)**
a_9	$IndustrialIntensity_t$	0.011	(0.008)	0.008	(0.007)	0.007	(0.007)
a_{10}	$GDPperCapita_t$	0.108	(0.038)***	0.107	(0.036)***	0.116	(0.036)***
a_{11}	$PatentPerCapita_t$	0.016	(0.003)***	0.016	(0.002)***	0.016	(0.002)***
a_{12}	$Researchers_t$	0.074	(0.135)	0.042	(0.114)	0.036	(0.114)
a_{13}	*DTopCitedScientists*	0.854	(0.503)*	0.805	(0.397)**	0.943	(0.401)**
a_{14}	$ExitRate_t$	-		0.011	(0.005)**	0.012	(0.005)**
a_{15}	$DYear1996_t$	0.875	(0.330)***	0.983	(0.318)***	0.999	(0.318)***
a_{16}	$DYear1997_t$	-0.035	(0.274)	0.097	(0.270)	0.136	(0.270)
a_{17}	$DYear1998_t$	0.758	(0.264)***	0.931	(0.266)***	0.969	(0.267)***
a_{18}	$DYear1999_t$	0.878	(0.254)***	1.039	(0.259)***	1.072	(0.260)***
a_{19}	$DYear2000_t$	2.076	(0.284)***	2.243	(0.280)***	2.299	(0.281)***
a_{20}	$DYear2001_t$	1.608	(0.228)***	1.715	(0.236)***	1.744	(0.237)***
a_{21}	$DYear2002_t$	0.276	(0.222)	0.269	(0.230)	0.285	(0.231)
a_{22}	$DYear2003_t$	-0.321	(0.219)	-0.301	(0.227)	-0.288	(0.228)
a_{23}	$DYear2004_t$	0.122	(0.219)	0.139	(0.228)	0.146	(0.228)
R^2		0.56		0.59		0.59	
Wald χ^2 test		465.77 (19)***		654.13 (20)***		679.16 (23)***	
No. of observations		1014		1014		1014	
No. of provinces		103		103		103	

Legend. *Significance level greater than 90%; **Significance level greater than 95%; ***Significance level greater than 99%. Random effects GLS estimates.

Table 4: The determinants of gross rate of entry of high tech start-ups: services vs. manufacturing.

		Model I				Model II				Model III			
		Services		*Manufacturing*		*Services*		*Manufacturing*		*Services*		*Manufacturing*	
a_0	*Constant*	-3.909	(12.039)	-7.024	(12.030)	-4.847	(10.689)	1.184	(8.416)	-16.579	(19.623)	11.342	(15.018)
a_1	*HighHC$_t$*	0.091	(0.154)	0.232	(0.167)	0.098	(0.128)	0.175	(0.096)*	0.266	(0.323)	-0.010	(0.245)
a_2	*Roads$_t$*	-0.001	(0.019)	-0.011	(0.020)	-0.004	(0.016)	-0.019	(0.012)	-0.103	(0.140)	-0.188	(0.104)*
a_3	*Airports$_t$*	0.017	(0.005)***	0.003	(0.004)	0.018	(0.005)***	0.001	(0.004)	0.100	(0.057)*	-0.028	(0.048)
a_4	*TelecomInfrastructures$_t$*	0.050	(0.019)**	0.020	(0.020)	0.055	(0.016)***	0.010	(0.012)	0.147	(0.089)	0.109	(0.068)
a_5	*HighHC*Roads$_t$*	-		-		-		-		0.002	(0.002)	0.003	(0.002)
a_6	*HighHC*Airports$_t$*	-		-		-		-		-0.001	(0.001)	0.000	(0.001)
a_7	*HighHC*TelecomInfrastructures$_t$*	-		-		-		-		-0.002	(0.002)	-0.002	(0.001)
a_8	*Unemployment$_t$*	-0.289	(0.150)*	-0.221	(0.130)*	-0.320	(0.144)**	-0.209	(0.120)*	-0.296	(0.323)**	-0.189	(0.119)
a_9	*IndustrialIntensity$_t$*	0.051	(0.053)	0.088	(0.051)*	0.055	(0.047)	0.021	(0.037)	0.048	(0.047)	0.014	(0.037)
a_{10}	*GDPperCapita$_t$*	0.996	(0.267)***	0.053	(0.247)	0.961	(0.250)***	0.049	(0.202)	1.021	(0.251)***	0.079	(0.202)
a_{11}	*PatentPerCapita$_t$*	0.102	(0.018)***	0.053	(0.017)***	0.093	(0.017)***	0.064	(0.013)***	0.091	(0.017)***	0.068	(0.013)***
a_{12}	*Researchers$_t$*	0.825	(0.910)	0.006	(0.890)	0.731	(0.794)	-0.269	(0.610)	0.736	(0.794)	-0.285	(0.604)
a_{13}	*DTopCitedScientists*	9.417	(3.247)***	-1.153	(3.531)	8.966	(2.728)***	-1.007	(2.040)	9.715	(2.771)***	-0.579	(2.049)
a_{14}	*ExitRate$_t$*	-		-		0.096	(0.063)	0.285	(0.032)***	0.104	(0.063)*	0.301	(0.031)***
a_{15}	*DYear1996$_t$*	-0.238	(2.351)	9.317	(2.111)***	0.697	(2.333)	9.213	(1.922)***	0.720	(2.343)	9.462	(1.930)***
a_{16}	*DYear1997$_t$*	-6.268	(1.983)***	5.774	(1.716)***	-5.516	(2.007)***	6.609	(1.690)***	-5.370	(2.018)***	6.917	(1.700)***
a_{17}	*DYear1998$_t$*	-1.314	(1.921)	8.794	(1.650)***	-0.361	(1.992)	10.091	(1.654)***	-0.214	(2.001)	10.398	(1.664)***
a_{18}	*DYear1999$_t$*	1.837	(1.865)	6.895	(1.584)***	2.767	(1.939)	7.966	(1.622)***	2.906	(1.947)	8.224	(1.631)***
a_{19}	*DYear2000$_t$*	14.734	(2.061)***	5.902	(1.781)***	15.570	(2.074)***	7.307	(1.746)***	15.862	(2.082)***	7.649	(1.752)***
a_{20}	*DYear2001$_t$*	10.473	(1.700)***	5.499	(1.392)***	11.061	(1.765)***	6.315	(1.526)***	11.182	(1.769)***	6.518	(1.534)***
a_{21}	*DYear2002$_t$*	-0.959	(1.663)	3.660	(1.349)*	-0.795	(1.700)	2.899	(1.512)*	-0.736	(1.703)	2.978	(1.518)*
a_{22}	*DYear2003$_t$*	-2.362	(1.642)	-0.881	(1.324)	-2.117	(1.687)	-1.155	(1.495)	-2.076	(1.690)	-1.074	(1.502)
a_{23}	*DYear2004$_t$*	1.250	(1.644)	-0.001	(1.323)	1.483	(1.691)	-0.302	(1.499)	1.448	(1.694)	-0.204	(1.507)
R^2		0.61		0.19		0.62		0.38		0.62		0.39	
Wald χ^2 test		717.67 (19)***		117.04 (19)***		886.78 (20)***		301.87 (20)***		905.29 (23)***		328.90 (23)***	
Wald χ^2 test: $a_5 = a_6 = a_7 = 0$		-		-		-		-		4.98 (3)		5.88 (3)	
No. of observations		1014		1014		1014		1014		1014		1014	
No. of provinces		103		103		103		103		103		103	

Legend. *Significance level greater than 90%; **Significance level greater than 95%; ***Significance level greater than 99%. Random effects GLS estimates.

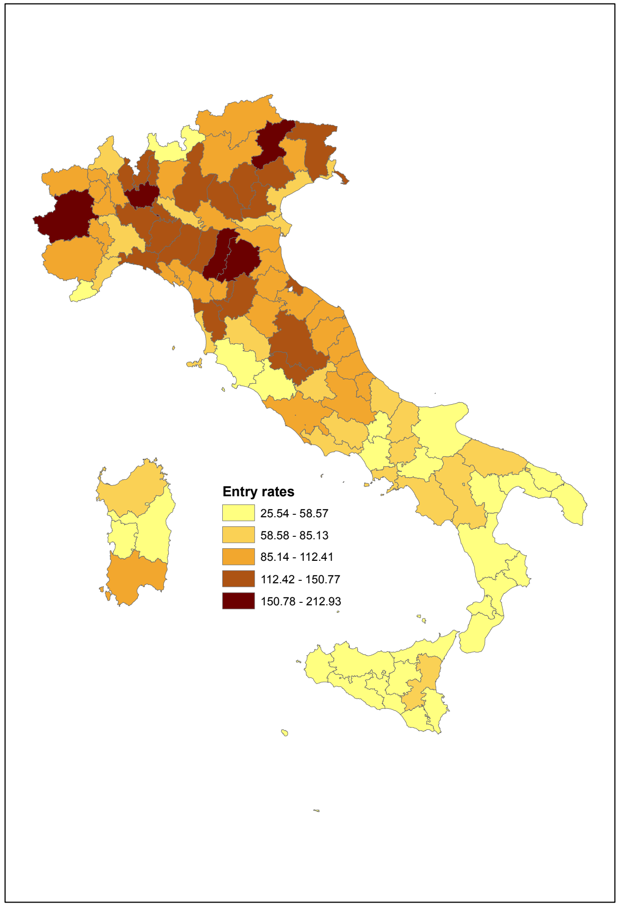

Fig1a: Distribution of entry rates across Italian provinces

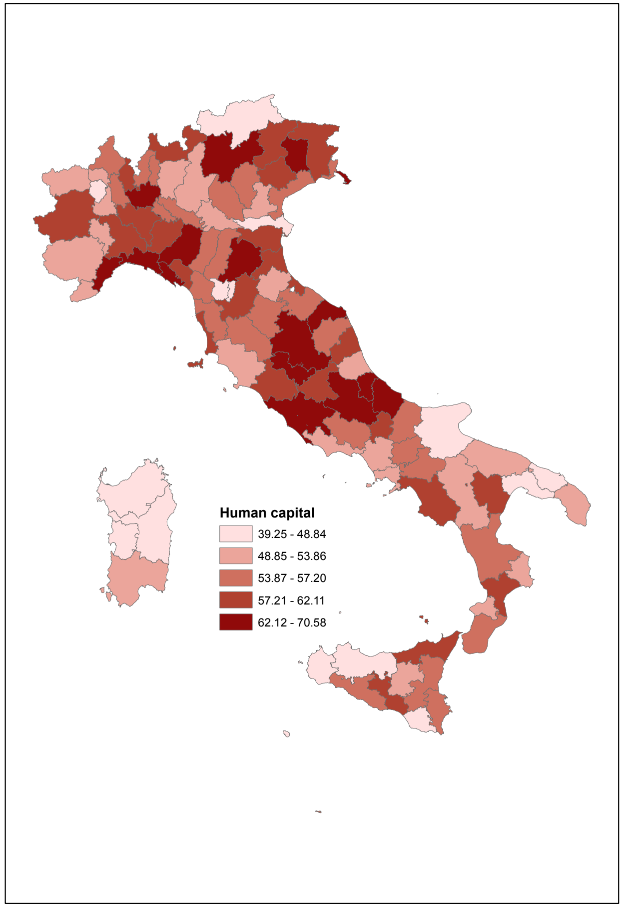

Fig1b: Distribution of human capital endowment across Italian provinces

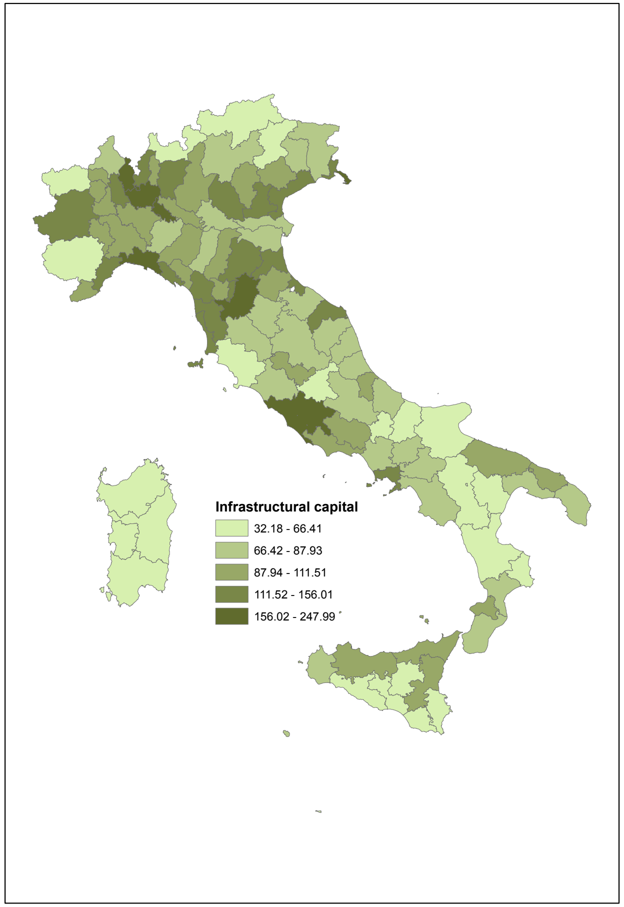

Fig1c: Distribution of infrastructural capital endowment across Italian provinces

APPENDIX

Table A 1: the Italian provinces, regions, and macro-area.

Area	*Region*	*Province*
NORTH	Emilia Romagna	BOLOGNA
NORTH	Emilia Romagna	FERRARA
NORTH	Emilia Romagna	FORLI-CESENA
NORTH	Emilia Romagna	MODENA
NORTH	Emilia Romagna	PARMA
NORTH	Emilia Romagna	PIACENZA
NORTH	Emilia Romagna	RAVENNA
NORTH	Emilia Romagna	REGGIO EMILIA
NORTH	Emilia Romagna	RIMINI
NORTH	Friuli Venezia Giulia	GORIZIA
NORTH	Friuli Venezia Giulia	PORDENONE
NORTH	Friuli Venezia Giulia	TRIESTE
NORTH	Friuli Venezia Giulia	UDINE
NORTH	Liguria	GENOVA
NORTH	Liguria	IMPERIA
NORTH	Liguria	LA SPEZIA
NORTH	Liguria	SAVONA
NORTH	Lombardia	BERGAMO
NORTH	Lombardia	BRESCIA
NORTH	Lombardia	COMO
NORTH	Lombardia	CROTONE
NORTH	Lombardia	LECCO
NORTH	Lombardia	LODI
NORTH	Lombardia	MANTOVA
NORTH	Lombardia	MILANO
NORTH	Lombardia	PAVIA
NORTH	Lombardia	SONDRIO
NORTH	Lombardia	VARESE
NORTH	Piemonte	ALESSANDRIA
NORTH	Piemonte	ASTI
NORTH	Piemonte	BIELLA
NORTH	Piemonte	CUNEO
NORTH	Piemonte	NOVARA
NORTH	Piemonte	TORINO
NORTH	Piemonte	VERBANO-CUSIO-OSSOLA
NORTH	Piemonte	VERCELLI
NORTH	Trentino Alto Adige	BOLZANO
NORTH	Trentino Alto Adige	TRENTO
NORTH	Valle d'Aosta	AOSTA
NORTH	Veneto	BELLUNO
NORTH	Veneto	PADOVA
NORTH	Veneto	ROVIGO
NORTH	Veneto	TREVISO
NORTH	Veneto	VENEZIA
NORTH	Veneto	VERONA
NORTH	Veneto	VICENZA
CENTER	Lazio	FROSINONE
CENTER	Lazio	LATINA
CENTER	Lazio	RIETI
CENTER	Lazio	ROMA
CENTER	Lazio	VITERBO

CENTER	Marche	ANCONA
CENTER	Marche	ASCOLI PICENO
CENTER	Marche	MACERATA
CENTER	Marche	PESARO E URBINO
CENTER	Toscana	AREZZO
CENTER	Toscana	FIRENZE
CENTER	Toscana	GROSSETO
CENTER	Toscana	LIVORNO
CENTER	Toscana	LUCCA
CENTER	Toscana	MASSA-CARRARA
CENTER	Toscana	PISA
CENTER	Toscana	PISTOIA
CENTER	Toscana	PRATO
CENTER	Toscana	SIENA
CENTER	Umbria	PERUGIA
CENTER	Umbria	TERNI
SOUTH	Abruzzo	CHIETI
SOUTH	Abruzzo	L'AQUILA
SOUTH	Abruzzo	PESCARA
SOUTH	Abruzzo	TERAMO
SOUTH	Basilicata	MATERA
SOUTH	Basilicata	POTENZA
SOUTH	Calabria	CATANZARO
SOUTH	Calabria	COSENZA
SOUTH	Calabria	CROTONE
SOUTH	Calabria	REGGIO CALABRIA
SOUTH	Calabria	VIBO VALENTIA
SOUTH	Campania	AVELLINO
SOUTH	Campania	BENEVENTO
SOUTH	Campania	CASERTA
SOUTH	Campania	NAPOLI
SOUTH	Campania	SALERNO
SOUTH	Molise	CAMPOBASSO
SOUTH	Molise	ISERNIA
SOUTH	Puglia	BARI
SOUTH	Puglia	BRINDISI
SOUTH	Puglia	FOGGIA
SOUTH	Puglia	LECCE
SOUTH	Puglia	TARANTO
SOUTH	Sardegna	CAGLIARI
SOUTH	Sardegna	NUORO
SOUTH	Sardegna	ORISTANO
SOUTH	Sardegna	SASSARI
SOUTH	Sicilia	AGRIGENTO
SOUTH	Sicilia	CALTANISETTA
SOUTH	Sicilia	CATANIA
SOUTH	Sicilia	ENNA
SOUTH	Sicilia	MESSINA
SOUTH	Sicilia	PALERMO
SOUTH	Sicilia	RAGUSA
SOUTH	Sicilia	SIRACUSA
SOUTH	Sicilia	TRAPANI