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Historical roots of innovative entrepreneurial culture: the impact of firms using motive power in 1927 on Italian provincial start-up rate

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Abstract

This paper investigates persistence in entrepreneurship across Italian provinces over the 1927-2017 period. We distinguish between a "general" dimension (sociopsychological) and a "specific" dimension (learning) of the role model effect. Based on data obtained from comprehensive survey conducted in 1927 by the Italian National Statistical Institute, we find different drivers of persistence across sectors: the only driver of persistence in high technology sectors is the share of entrepreneurs using motive power ("specific" role model effect), while the share of industrial entrepreneurs ("general" role model effect) is an important driver of persistence in low technology manufacturing and service sectors.

INTRODUCTION

Recent research has documented marked persistence patterns of regional levels of entrepreneurial activity over time in such countries as Germany (Fritsch & Mueller, 2007; Fritsch & Wyrwich, 2014), Sweden (Andersson & Koster, 2011), the Netherlands (van Stel & Suddle, 2008), the UK (Fotopoulos, 2014; Fotopoulos & Storey, 2017) and the US (Glaeser, Kerr & Kerr, 2008). We here investigate the historical roots of contemporaneous provincial differences in new business formation in Italy. In particular, we study whether the persistence of entrepreneurship over time depends on the intensity of the historical technology of the various industries and whether there are differences in the determinants of persistence between sectors with different technological intensity.

Italy represents an interesting case study for several reasons. The country experienced the 1929 world economic crisis, World War II and the end of fascism, the introduction of a new constitutional base, and the reconstruction of the economy. The post war Italian governments adopted a very "dirigiste" industrial policy aimed at shaping the sectoral and geographical distributions of industrial production. They promoted an intense subsidization program in favour of Southern regions, a governmental infrastructural plan with particular emphasis on roads, with the aim of supporting the national motor vehicle industry, and a selective credit policy based on a strict regulation that imposed administrative portfolio constraints on the banking system's activity. All these measures, which were aimed at affecting the geographical distribution of industrial production and its sectoral composition, make it highly unlikely that persistence in Italian provincial entrepreneurship is the result of persistence in its determinants. Therefore, Italy may be considered a suitable context to study whether entrepreneurship is the result of a self-reinforcing process (Minniti, 2005), i.e. if the present start-up rates are higher where entrepreneurs in the past began to transmit their "models" and their knowledge to other potential entrepreneurs. A region with high levels of entrepreneurship may in fact encourage new entrepreneurial initiatives, because it is easy to find an appropriate example or obtain information from other entrepreneurs (Davidsson & Wiklund, 1997; Mueller, 2006), thus the current differences in entrepreneurship among regions may depend on the historical availability of "role models" (Fornahl, 2003; Lafuente, Vailliant, & Rialp, 2007; Sternberg, 2009).

We extend earlier works in two ways. First, we introduce, for the first time, to the best of our knowledge, a measure of the historical technological intensity of regional entrepreneurship in Italy and investigate its effect on the current start-up rates. Thanks to the Industrial Census (*Censimento Generale dell'Industria e dei Servizi*) published in 1932 by the Italian National Institute of Statistics (ISTAT), provincial data are available on the percentage of industrial firms that used motive power in 1927. The use of motive power reflected the diffusion of advanced production technologies in Italian

industry, as also pointed out by Italian statisticians who have commented the Italian Industrial Census, and it may therefore be a good proxy of the propensity of entrepreneurs to adopt new technologies at the beginning of the 20th century.

Second, referring to the literature that focusses on the influence of entrepreneurial role models on the decision to start a firm, we distinguish between a "general" and a "specific" dimension of the role model effect. The "general" dimension is related to the rise of individual self-confidence and of social acceptance of entrepreneurship caused by the observation of the success of other entrepreneurs in a region. This is the sociopsychological dimension of role modelling that Obschonka, Stuetzer, Gosling, Rentfrow, Lamb, Potter & Audretsch (2015) also emphasized. The larger the number of successful entrepreneurs in a region is, the larger the number of individuals who perceive entrepreneurship as a favorable career option because they think: "if they can do it, I can do it too" (Sørenson & Audia, 2000). The "specific" dimension of the role model effect is the one linked to learning and knowledge (Gibson, 2004; Bosma, Hessels, Schutjens, van Praag &Verheul, 2012). The knowledge transmitted through social contact with an entrepreneur is supposed to build a local culture that predisposes entrepreneurs to act upon new knowledge. Innovating entrepreneurs may create a "specific" role model that fosters the development of important capabilities, such as the recognition of entrepreneurial opportunities and the absorptive capacity for new knowledge (Qian & Acs, 2013).

In this framework, the present paper is aimed at investigating the effect of the provincial entrepreneurship rate ("general" role model effect) and of the share of entrepreneurs that used motive power in 1927 ("specific" role model effect) on the current provincial start-up rates (2001-2017) in Italy. We investigate the impact of the effects of the two role models separately for the high and medium high technology manufacturing (HTM) sectors, for the low and medium low technology manufacturing (LTM) sectors and for the service sector. Interestingly, we find evidence of a significant "specific" role model effect, but not of the "general" role model effect, on the current level of new business formation in the HTM sectors. On the other hand, we find evidence of both effects in the LTM sectors. We only find evidence of the "general" role model effect for the service sector. This suggests that the persistence of entrepreneurship over time has different drivers in different sectors. Where technology is very complex, as in the HTM sector, the effect of the general role model may be too weak to increase self-confidence and to sufficiently reduce the fear of failure, while regional start-up rates are likely to depend to a great extent on the presence of a "specific" kind of entrepreneurial culture, i.e. on the knowledge accumulation process activated by entrepreneurs who, in the past, adopted more advanced production technologies.

The paper is organized as follows: the next section presents the conceptual framework and formulates the testable hypotheses; the third section presents the data and the methodology; the fourth section discusses the results, and the last section concludes the paper.

CONCEPTUAL FRAMEWORK AND TESTABLE HYPOTHESES

Many studies have investigated individual entrepreneurial behaviour in its regional context and, in particular, the mutually reinforcing nature of entrepreneurship (for a survey, see Fritsch & Storey, 2014). On the one hand, persistence in the entrepreneurship rates may be explained by the fact that regional determinants of new business formation tend to remain constant over time; on the other hand, it may be the result of the presence of an "entrepreneurial culture" that only changes over a long period of time (Fritsch & Falck 2007, Williamson 2000, North 1994). In particular, regions may be more likely to have higher start-up rates today simply because past entrepreneurship fostered the creation of a regional environment in which one person's decision to start a successful business encouraged others to follow (Fornahl, 2003; Wagner & Sternberg, 2004; Arenius & Minniti, 2005; Minniti, 2005; Lafuente, Vailliant & Rialp, 2007; Nanda & Sørenson, 2010; Chlosta, Patzelt, Klein & Dormannet, 2012; Stuetzer, Obschonka, Audretsch, Wyrwich, Rentfrow, Coombes & Satchel, 2016). Entrepreneurial culture may be defined as an informal institution that is "in the air" in some regions more than in other ones. It is higher where the population has a positive attitude toward entrepreneurial activity, shares entrepreneurial values, such as individualism and autonomy, contains a high number of people who are able to bear risks and many entrepreneurial role models that generate demonstration and peer effects (Sørenson, 2017). The presence of entrepreneurial role models that weaken the social stigma of entrepreneurial failure can also reduce the fear of failure and therefore increase regional entrepreneurship rates (Vaillant & Lafuente 2007, Wyrwich, Suetzer & Sternberg 2016)

Gibson (2004) argued that the term "role model" draws on two prominent theoretical constructs, since individuals are attracted to role models who are perceived to be similar in terms of their characteristics, behaviour or goals (the "role" aspect), and from whom they are able to learn certain abilities or skills (the "model" aspect). Bosma, Hessels, Schutjens, van Praag & Verheul (2012) argued that entrepreneurial role models may perform four interrelated functions: (i) inspiration and motivation (i.e. the role model creates awareness and motivates people to get started), (ii) increasing self-efficacy (i.e. the role model makes people confident that they too can achieve a certain goal), (iii) learning by example (i.e. the role model provides guidelines for action), and (iv) learning by support (i.e. the role model provides hands-on support or advice). The first two functions result (indirectly)

from the role identification theory, whereas the third and fourth are implied by the social learning theory and are related to knowledge transmission.

Among the studies on the relationship between knowledge and entrepreneurship, Qian & Acs (2013) introduced the concept of entrepreneurial absorptive capacity, defined as a critical factor which affects the process of transmitting knowledge spillovers by entrepreneurs. It allows entrepreneurs to understand new knowledge, recognize its value and commercialize it by creating a firm. Since knowledge tends to be 'sticky' in space, the regional knowledge base may represent a determinant of regional innovative start-up rates (Acs, Audretsch, Braunerhjelm & Carlsson, 2009). This knowledge may have different sources, including the educational attainment of the workforce, the presence of private and public research and the work experience of the population (Helfat & Lieberman, 2002). Del Monte & Pennacchio (2020) studied the historical factors that shape the current levels and regional differences in new firm formation in innovative industries in Italy, and found that regional knowledge and creativity affect entrepreneurial activity in the long term. Furthermore, Obschonka, Stuetzer, Gosling, Rentfrow, Lamb, Potter & Audretsch (2015) outlined that regional differences in entrepreneurial culture may be a hidden key factor in moderating the relationship between knowledge and economic activity; specifically, people in some regions may live in a local culture that enables them to act upon new knowledge by starting a new business. Consistently, Fritsch & Wyrwich (2018) found that the interaction of the historical knowledge base with an entrepreneurial tradition has an enduring effect on the formation of innovative new businesses in Germany.

We argue that the historical presence in a region of innovative entrepreneurs may represent a particular kind of role model that fosters the absorptive capacity for new knowledge and that new knowledge may therefore need to be interacted with the historical innovative entrepreneurial tradition to stimulate the birth of innovative new firms. Following the simple sender–receiver model of Wyrwich, Suetzer & Sternberg (2016), an entrepreneur (sender) may transmit two signals to an observing non-entrepreneurial peer (receiver): (1) a "general" signal, i.e. that entrepreneurship is attractive and feasible (sociopsychological dimension); (2) a "specific" signal, i.e. how to become an entrepreneur, and how to organize the resources and the production technology that has to be adopted (learning dimension). The receiver chooses to either engage in entrepreneurship or opt for paid employment. Since sending and receiving information may be considered as a local working process, entrepreneurship may become self-perpetuating over time. As stated in the Introduction, we use the historical entrepreneurship rate (number of entrepreneurs over population) to represent the "general" signal ("general" role model effect) and the historical share of entrepreneurs that used motive power (number of entrepreneurs that used motive power over the total number of entrepreneurs) to represent

the "specific" signal ("specific" role model effect). On the basis of these arguments, we test the following hypotheses:

H1 (a) Nowadays provincial start-up rate depends on the historical entrepreneurship rate ("general" role model effect).

H1 (b) Nowadays provincial start-up rate depends on the historical share of entrepreneurs that used motive power ("specific" role model effect).

We test these two hypotheses separately for the HTM, LTM and service sectors in order to investigate whether persistence in entrepreneurship over time depends on the technology intensity of the various industries, and whether there are differences between the manufacturing and the service sectors. In the case of German regions, Fritsch & Wyrwich (2016) found that not all types of self-employment are equally important for the long-term persistence of regional entrepreneurship: while the overall historical level of self-employment is only weakly related to the current level of new business formation, the share of self-employed males in knowledge-intensive industries has long-lasting effects. We ask whether the differences in the determinants of persistence across industries are related to the complexity of the knowledge base. In particular, in sectors with complex technologies, regional start-up rates are likely to depend to a great extent on the presence of a "specific" kind of entrepreneurial culture, i.e. on the knowledge accumulation process activated by entrepreneurs that in the past adopted more advanced production technologies, more than on a "general" entrepreneurial tradition. Where technology is particularly complex, as in the HTM sector, entrepreneurship requires knowledge transfer, and the effect of the general signal may be too weak to increase self-confidence and to reduce the fear of failure to a sufficient extent to induce the receiver to decide to engage in entrepreneurship. Entrepreneurial activity in less technologically advanced sectors requires less specific knowledge and results in a lower degree of risk. Therefore, the creation of new LTM and service firms may be fostered simply by the presence of role models that make people confident that they too can achieve a certain goal, i.e. the effect of the general signal may be strong enough to foster entrepreneurship[1].

[1] In a different context, Fritsch, Obschonka & Wyrwich (2019) investigated the role of cultural attitudes in favour of entrepreneurial activity for the actual start-up behaviour in Germany, combining historical self-employment data with a psychological measure for entrepreneurial attitudes. They found a positive relationship between the historical level of self-employment in a region and both the level of new business formation and the amount of innovation activity. Their results suggest that the general role model may also significantly affect the HTM sector start-up rates.

EMPIRICAL STRATEGY

Data sources

The empirical analysis was based on a dataset that combined different sources of data. The analysis units were Italian provinces, according to the NUTS 3 classification. By considering the changes that have taken place over time in the administrative partition of Italy, a total of 95 provinces were included in the sample. The data sources were the Italian National Institute of Statistics (ISTAT) and the Business Register of the Chambers of commerce, the latter of which referred to the number of start-ups in the 2000s. The Industrial Census cited above (*Censimento Generale dell'Industria e dei Servizi)* published in 1932, when the famous statistician Corrado Gini (1884 – 1965) was at the head of ISTAT, is an important source of historical data. In the first pages of the Survey, Gini defined the 1927 Census as "a grandiose experiment in the field of economic statistics" since, for the first time ever, a complete survey had been carried out of the industrial and commercial life of the Nation. The Census contains detailed data about the number of establishments, entrepreneurs and employees in Italy, and about the use of motive power. We used the related classification adopted by EUROSTAT[2] for the analyses on the technology intensity of the manufacturing sectors (HTM: high and medium-high; LTM: low and medium-low[3]). A detailed description of all the variables (definitions and sources) and of the summary statistics is reported in Table 1.

[2] https://ec.europa.eu/eurostat/cache/metadata/Annexes/htec_esms_an3.pdf .

[3] see Table A1 in the Appendix for the description of the economic activities included in each group.

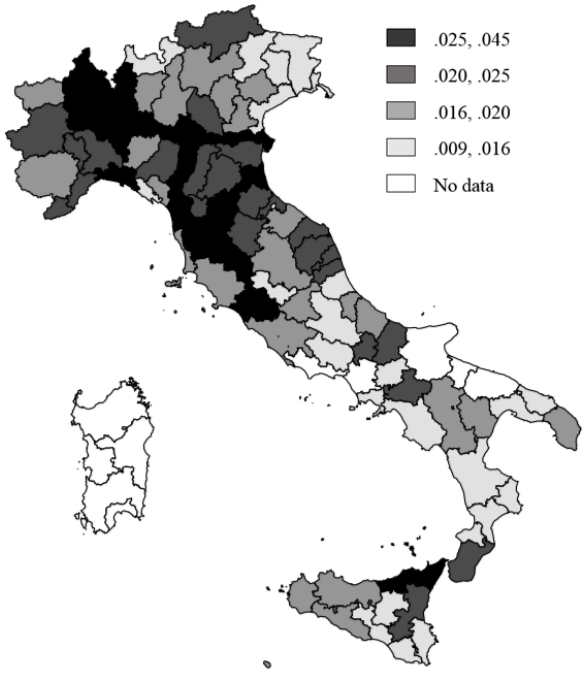
Table 1 Summary statistics

Variables	Definition and sources	Mean	Std. Dev.	Min	Max
Dependent variables					
HTM	Number of startups in High and medium-high Technology Manufacturing sectors divided by active population (per 1,000) (2000-2017) (ISTAT and Business Register)	0.036	0.027	0.000	0.117
LTM	Number of startups in Low and medium-low Technology Manufacturing sectors divided by active population (per 1,000) (2000-2017) (ISTAT and Business Register)	0.433	0.473	0.105	4.532
Manuf	Number of startups in Manufacturing divided by active population (per 1,000) (ISTAT and Business Register) (2000-2017)	0.469	0.483	0.117	4.599
Services	Number of startups in Services divided by active population (per 1,000) (ISTAT and Business Register) (2000-2017)	3.367	0.663	1.810	5.131
Independent variable					
Histentr_ind	Number of entrepreneurs in industry in 1927 over population in 1931 (ISTAT)	0.021	0.006	0.009	0.045
Histentr_ser	Number of service entrepreneurs in 1927 over population in 1931 (ISTAT)	0.024	0.008	0.011	0.066
Histmpower_ind	Number of entrepreneurs using motive power over total entrepreneurs in industry in 1927 (ISTAT)	0.198	0.098	0.020	0.417
Histmpower_ser	Number of service entrepreneurs using motive power over total service entrepreneurs in 1927 (ISTAT)	0.029	0.025	0.002	0.109
Control variables					
Va	Value added per capita (euro) (ISTAT) (2000-2017)	23,921.55	6,512.936	13,369	44,219
Pop	Population 15-64 years old (2000-2017)	374,157.6	442,471.9	55,365	2,842,323
Popdens	Number of inhabitants per square kilometer (ISTAT) (2000-2017)	261.8	349.9	38.9	2635.4
R&D	R&D expenditure as a percentage of the GDP (regional) (ISTAT) (2000-2017)	1.289	0.403	0.640	2.150
Tertiary	Share of persons employed with tertiary degree (ISTAT) (2000-2017)	0.205	0.037	0.140	0.32
Histva	Value added per capita in 1931 (lire) (ISTAT)	3,059.6	724.386	1,874	4,993
Histpop	Population in 1931	482,016.4	359,727.2	133,740	2,068,247
Histpopdens	Number of inhabitants per square kilometer in 1921 (ISTAT)	153.21	106.902	32.100	632.20
Histuniv	Dummy 1 = if in the province there was a University in 1895 (provincial) (ISTAT)	0.206	0.407	0	1
Histilliteracy	Share of illiterate people on total people six years-old and over in 1931	0.196	0.399	0	1
Histfemale_ind	Ratio between the number of female employees and the total number of employees in industry in 1927 (ISTAT)	0.200	0.116	0.033	0.493
Histfemale_ser	Ratio between the number of female employees and the total number of service employees in 1927 (ISTAT)	0.339	0.143	0.181	0.740
Histlargefirm	Number of large firms (over 250 employees) over total firms in 1927 (ISTAT)	0.001	0.001	0.000	0.008
Histcred	Number of firms of the credit sector over total firms in 1927 (ISTAT)	0.010	0.005	0.002	0.026
Histmanuf	Share of manufacturing on total economy in terms of firms in 1927	0.331	0.055	0.09	0.44
Histser	Share of services on total economy in terms of firms in 1927	0.522	0.061	0.200	0.640
HistHTM	Share of High-Tech manufacturing (HTM) on total economy in terms of firms in 1927	0.054	0.012	0.02	0.08
HistLTM	Share of Low-Tech manufacturing (LTM) on total economy in terms of firms in 1927	0.278	0.049	0.07	0.37
Histmpowersett_ind	Share high motive power industries on total Industry in terms of firms in 1927*	0.315	0.051	0.21	0.46
Histmpowersett_ser	Share high motive power services on total services in terms of firms in 1927**	0.004	0.002	0.001	0.01
nw	Dummy: 1= North-West	0.237	0.427	0	1
ne	Dummy: 1= North-East	0.237	0.427	0	1
so	Dummy: 1= Southern	0.309	0.465	0	1

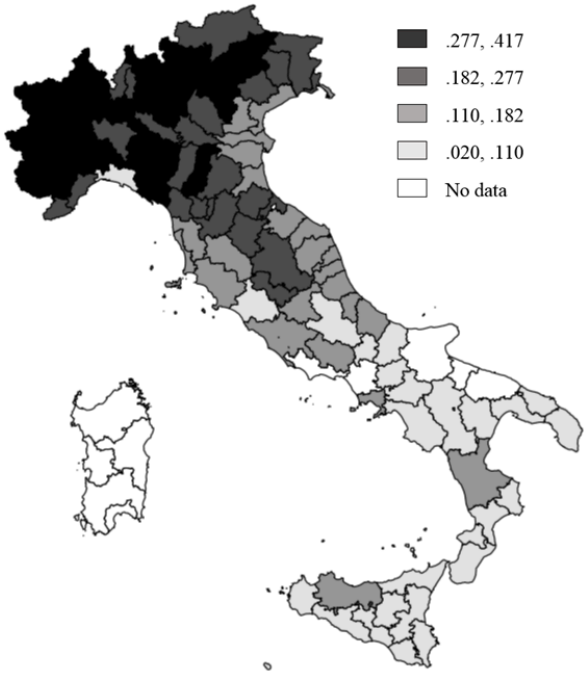
Note: Data related to variables HTM, LTM, Manuf, Services, Va, Pop, Popdens, R&D and Tertiary refer to 2017. All data are at provincial level if not specified otherwise. * High motive power industries are those in sectors with a Histmpower_ind higher than the mean level (25%). ** High motive power services are those in the public performances sector (characterised by a value of Histmpower_ser of 41.9%, that is much higher than the average across services, 3%).

Figure A1. Industrial entrepreneurship rate in 1927 (*Histentr_ind*), industrial motive power entrepreneurship ratio in 1927 (*Hismpower_ind*) and start-up rate in HTM sectors (*HTM*, average 2000-2017)

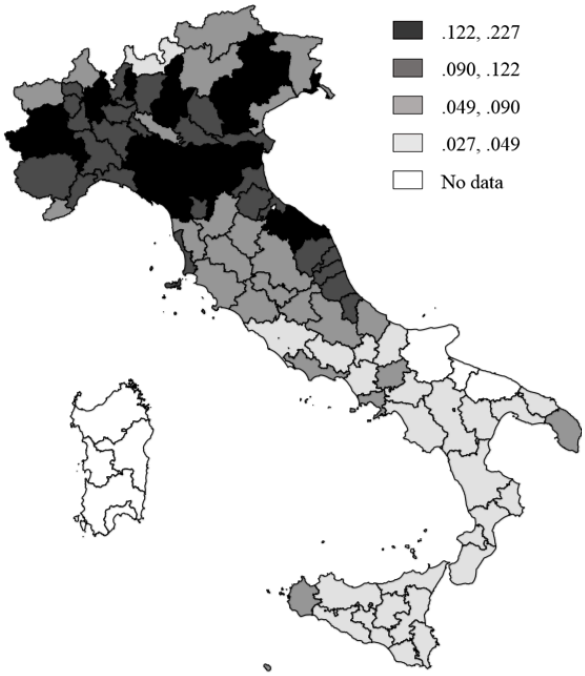
(a) Histentr_ind



(b) Histmpower_ind



(c) HTM (average 2000-2017)



Source: ISTAT

Dependent variable

We estimated the start-up rate at the provincial level (for the years 2000-2017) for different groups: i) the High and medium-high Technology Manufacturing sector (*HTM*); ii) the Low and medium-low Technology Manufacturing sector (*LTM*); iii) the total manufacturing sector (*Manuf*); and iv) the total service sector (*Services*). The start-up rate is given by the number of start-ups divided by the active population (which represents the group of potential entrepreneurs in the population) in each province (NUTS3). Start-ups are measured by newly founded businesses irrespective of the size, operating in all manufacturing and services sectors, according to the entire Business Register of the Chambers of Commerce.[4]

Looking at Figure A1(c), we can see "three Italies" with respect to the start-up rate in the HTM sector in the 2000-2017 period: most of North West Italy, and the Northern Adriatic and Central provinces are characterized by high levels, while the remaining central provinces are characterized by intermediate levels and most Southern provinces by low levels. However, the map also shows important variations between provinces within the macro-areas.

Independent variables

In order to test hypothesis *H1 (a* and *b),* we used our proxy of the "general" role model effect, i.e. the ratio between the number of entrepreneurs in 1927 and the population in the year 1931[5] in industry (*Histentr_ind*) and in services (*Histentr_ser)*, and our proxy of the "specific" role model effect, i.e the ratio between the number of entrepreneurs that used motive power and the total number of entrepreneurs in 1927, in industry (*Histmpower_ind)* and in services *(Histmpower_ser)* as independent variables.

Italy was still an agrarian country at the time of its unification in 1861. The Italian industrial system in 1871 was mainly made up of home-based manufacturing and artisan work, which were carried out in the cities to satisfy the demand of the local population (Cafagna, 1989). During the 1880s, the Italian economy entered into a phase of intensive growth, fostered by the unitary state and by the introduction of new energy sources, especially imported coal and hydroelectricity (Malanima,

[4] Newly founded firms are those founded in each year. Colombelli (2016), and Del Monte and Pennacchio (2020) consider only the innovative start-ups according to the Italian law (Law 221/2012) enrolled in the special section "innovative startups" of Register of the Chambers of commerce. To be defined as innovative, and therefore to be considered eligible for the inclusion in the register, the start-ups have to fulfil at least one of the following requirements: at least 15% of their total costs must go towards R&D activities; more than one third of employees must hold a Ph.D., or be Ph.D. students, or two thirds of employees must hold a Master degree; and they must have registered at least one patent or an original computer program. Both the studies included in their dataset only corporations with a turnover below five million euros that started operating in the previous 48 months.

[5] The data on the population are Census data, which are updated every 10 years.

2013, 2016). Thanks to the changes in the energy exploitation paradigm, the capital per worker began to increase rapidly and, with it, productivity and per capita GDP. The first wave of Italian industrialization was witnessed between 1871 and 1911: industrial production rose by 50 per cent in forty years and then remained substantially stable until 1936 (Daniele & Malanima 2011; Baffigi 2013, 2015)[6]. As stated in the Industrial Census of 1927, the percentage of Italian industrial firms that used motive power reflected the degree of technological advancement of the adopted production methods, which differed to a great extent among sectors. The percentage of industrial firms that used motive power in Italy was on average 17.6%, but there were significant differences between the more technologically advanced Northern area (24.7%), the Center (15.6%) and the more backward areas of the South (8.5%) and the Islands (7.2%). The data reported in Table A2 show that, in the South, manual work prevailed in industries in which the use of motive power was more prevalent in the North (such as in the textile, paper and mechanical industries). Furthermore, it is also possible to note that only about 10% of the mechanical industries used motive power in the South, against about 35% in the North.

Consistently with the data reported above, Figure A1(b) shows a dualistic Italian economy, where the share of entrepreneurs that used motive power in the Western part of Northern Italy is much higher than the average, while most Adriatic and Central provinces show intermediate rates. Figure A1 (a), which shows the total industrial entrepreneurship rate for 1927, describes a far less dualistic country.

In 1927, the Northern province of Varese was the area with the highest share of entrepreneurs who used motive power in Italy. The evolution of its industries represents an interesting example of the link between historic and contemporary variables. Industrialization in this area started at the end of the eighteenth century, with silk spinning, and continued in the nineteenth century, with the impressive development of cotton-textile and mechanical industries. It continued in the twentieth century with an exemplary flowering of manufacturing in several production sectors, such as the rubber-plastic, chemistry, food, wood and building material sectors. Entrepreneurs did not hesitate to commit to pioneering initiatives, such as the introduction of the mechanical spinning and weaving of cotton, and later on to cutting-edge productions in the mechanical-engine sector and, subsequently, to futuristic projects in the aviation field. Today, we also witness the entry into the aerospace system supply chain. The province of Varese is now one of the main industrial districts in Italy, but this is in

[6] During the second Italian industrialization wave, between 1951 and 1971, industrial production rose by 50 % in twenty years.

part due to its ancient passion for anything new, which is also confirmed by the large share of firms that used motive power in 1927.

Controls

We included control variables pertaining to both the current period and to the past in the estimates. As far as the current period is concerned, we controlled for the local economic development, as measured by per capita value added (*Va*), and for the 15-64 year-old population (*Pop*), which may be used to represent the pool of potential entrepreneurs (Fritsch & Falck, 2007). Moreover, we controlled for agglomeration economies, by including the population density (*Popdens*), for regional knowledge, as measured by means of R&D expenditure as a percentage of the GDP (*R&D*), and for the quality of human capital, by including the share of employees with a tertiary degree (*Tertiary).*

As for the past, we controlled for historical differences among provinces in the socio-economic development level and in the industrial structure. Among historical socio-economic variables, we included in our estimates per capita value added in 1931 (*Histva*), population in 1931 (*Histpop*) and the share of illiterate people on total people six years-old and over in 1931 (*Histilliteracy*). Furthermore, we controlled for historical provincial differences in the agglomeration, by including the population density in 1921 (*Histpopdens*), and in the development of the financial system, by including the share of firms in the financial sector (*Histfirms_cred*). Finally, we included a dummy in our estimates for provinces with a long tradition of academic institutions (i.e. that had a University in 1895), which may have fostered the accumulation of large stocks of knowledge over time (Fritsch, 2011). We also included two variables to measure the ratio between the number of female employees and the total number of employees in industry (*Histfemale_ind*) and in services (*Histfemale_ser*) in 1927, since individuals whose parents were both employed may have been able to obtain more financial and psychological support to start a new business.

In order to control for differences in the provincial industrial structure, we included a variable in the estimates to measure the historical presence of large firms, i.e. the number of firms with more than 250 employees over the total number of firms in 1927 (*Histfirms_large*). On the one hand, the high division of labor in large-scale industries may have reduced the availability of skilled labor force and entrepreneurial spirit; on the other hand, institutions may have been tuned to the needs of firms in large-scale industries and not the needs of smaller and younger firms (Glaeser, Kerr & Kerr, 2015; Stuetzer, Obschonka, Audretsch, Wyrwich, Rentfrow, Coombes & Satchel , 2016). In addition, we included the historical share of firms in the manufacturing and service sectors on the total economy (*Hist_manuf* and *Hist_ser* spectively), the share of HTM (*Hist_HTM*) and LTM (*Hist_LTM*) on the total economy and the share of firms belonging to sectors in which the use of motive power was higher than a certain threshold on the total industry (*Histmpowersett_ind*) and on the total services

(*Histmpowersett_ser*) [7]. Finally, we controlled for differences in the geographical location: North-West (*nw*); North-East (*ne*); South (*so*) (Center: reference category) and over time (by introducing year dummies).

Estimated equation

The following equation was estimated for the total manufacturing and service sectors and for different groups of sectors (total manufacturing, HTM and LTM sectors, total services,):

$$Startuprate_{i,t} = \alpha + \beta_0 Histentr_{i,1927} + \beta_1 Histmpower_{i,1927} + \beta_3 Controls_{i,t-1} + u_i + e_{it} \quad (1)$$

Equation 1 was estimated using the proxy to capture the existence of the "general" role model effect (*Histentr)* and the proxy for the "specific" role model effect (*Histmpower).* It should be noted that the dependent variable and a part of the explanatory variables vary across both the provinces (151 provinces) and over time (2000-2017), while the historical variables are mostly measured with reference to 1927 (see Table 1).

Since the main variables of interest are the historical data of 1927, equation (1) cannot be estimated using fixed effects. We therefore estimated a random effect (RE) model (Wooldridge, 2011) with clustered standard errors, which exploits the variability of the time varying dependent and independent variables. However, in order to take into account the issue of unobserved heterogeneity, we checked for robustness of the results using a correlated random effect model (CRE) in which the group-means of the variables which varied within groups were added to regressors (the so-called Mundlak correction). We introduced this correction in order to combine the advantages of both random and fixed effects. This technique was proposed by Mundlak (1978) as a way of relaxing the assumption in the random-effects estimator that the observed variables are uncorrelated with the unobserved variables (Bell & Jones, 2015; Mavromaras, McGuinness, O' Leary, Sloane & Wei, 2013). The introduction of means should capture the correlation between the unobserved heterogeneity and the covariates that could render the random effect model inconsistent. Finally, in order to account for a possible spatial correlation of the dependent variables across provinces, we introduced robustness checks by estimating a spatial lag model[8].

[7] In the case of industry, the threshold is the mean level (25%). In the case of services, since the distribution is highly skewed, we selected the industry with extremely high levels (public performances registers a share of firms using motive power of 41.9%, that is much higher than the average across services, which is 3%). For a list of the sectors included in the variables Hist_HTM, Hist_LTM, Histmpowersett_ind and Histmpowersett_ser see Table A3.

[8] We also estimated a spatial error model and the results, available on request, are very similar.

RESULTS

Table 2 reports the results of the estimation of equation (1) using random effects (RE) and correlated random effects models (CRE) for the HTM sectors (columns 1 and 2), LTM sectors (columns 3 and 4), total manufacturing (columns 5 and 6) and total services (columns 7 and 8), respectively. We report estimations for each group of sectors in which we included our proxies as regressors to capture the existence of the "general" role model effect (*Histentr*) and of the "specific" role model effect (*Histmpower*).

The results clearly show that new business formation depends significantly on the historical entrepreneurship rate (*Histentr_ind* and *Histentr_ser*) in the LTM and service sectors (see Table 2 columns 3, 4, 7 and 8) but not in the HTM sectors (columns 1 and 2). Therefore, the evidence does not support hypothesis *H1(a)* for the sectors with complex technologies. This suggests that the "general" signal, i.e. that entrepreneurship is attractive and feasible, might not be sufficient to increase self-confidence and reduce the fear of failure in sectors where knowledge is more complex and the perceived risk is therefore higher. We have found evidence in support of hypothesis *H1(b)* for both the HTM and LTM sectors: new business formation depends significantly in both sectors on the share of entrepreneurs that used motive power (*Histmpower_ind*). On the other hand, we have not found evidence of a "specific" role model effect for the service sector.

These results suggest that persistence in entrepreneurship varies according to the complexity of knowledge that is transmitted over time. Today, there is more HTM entrepreneurship in those Italian provinces where in the past there was a higher share of innovating entrepreneurs, and not simply where there were "more" entrepreneurs. A possible interpretation of this result is that the historical presence of innovative entrepreneurs, which fostered the absorptive capacity for new knowledge, played a crucial role in stimulating the birth of innovative new firms. We have also found evidence of the "specific" role model effect in the LTM sectors. The importance of the specific role model effect for medium and low technology manufacturing sectors can be explained by considering that some of these sectors, such as the food, textile and paper industries, had relatively high percentages of entrepreneurs that used motive power in 1927, especially in the Northern and Central Italian provinces (see Table A2). Finally, as stated above, we have not found any evidence of a "specific" role model effect in the service sector. Considering that the service activities in 1927 consisted mainly of wholesale, retail and trade services, it is clear that such activities required a limited degree of knowledge complexity and capital intensity, and therefore resulted in a limited degree of risk. On the other hand, manufacturing activities (including the more traditional ones, such as textiles and food industries) required a higher degree of knowledge complexity and the use of specialized employees.

Table 2 Regression results. Dependent variable: Provincial start-up rate

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	***HTM (RE)***	***HTM (CRE)***	***LTM (RE)***	***LTM (CRE)***	***Manuf (RE)***	***Manuf (CRE)***	***Services (RE)***	***Services (CRE)***
Histentr_ind	-0.123	-0.106	0.520**	0.589***	0.445**	0.516***		
	(0.197)	(0.203)	(0.219)	(0.194)	(0.211)	(0.191)		
Histentr_ser							0.172**	0.172*
							(0.076)	(0.093)
Histmpower_ind	0.443***	0.405***	0.369*	0.277*	0.397**	0.303**		
	(0.170)	(0.156)	(0.202)	(0.144)	(0.201)	(0.141)		
Histmpower_ser							0.000	-0.000
							(0.001)	(0.003)
Va	1.033***	0.713**	0.281**	0.185	0.234*	0.136	0.049	0.026
	(0.332)	(0.349)	(0.134)	(0.125)	(0.141)	(0.122)	(0.079)	(0.057)
Pop	-0.266***	-0.298***	-0.281	-0.330***	-0.258	-0.311***	-0.068	-0.078**
	(0.075)	(0.104)	(0.173)	(0.096)	(0.167)	(0.095)	(0.042)	(0.038)
Popdens	0.117	0.108	0.441*	0.471***	0.414*	0.439***	0.145***	0.143***
	(0.106)	(0.145)	(0.243)	(0.129)	(0.235)	(0.127)	(0.052)	(0.053)
R&D	0.164**	0.343**	0.089*	0.121**	0.088**	0.119**	-0.004	-0.008
	(0.079)	(0.137)	(0.047)	(0.049)	(0.044)	(0.048)	(0.027)	(0.022)
Tertiary	0.195*	0.212*	0.076	0.098**	0.088*	0.107**	-0.011	-0.012
	(0.113)	(0.119)	(0.048)	(0.042)	(0.045)	(0.042)	(0.023)	(0.019)
Histva	-1.371**	-1.557***	-0.744	-0.856	-0.703	-0.858	0.517***	0.449**
	(0.534)	(0.578)	(0.495)	(0.549)	(0.480)	(0.537)	(0.180)	(0.219)
Histpop	-0.224*	-0.205	0.073	0.129	0.025	0.085	0.068	0.067
	(0.117)	(0.126)	(0.183)	(0.116)	(0.179)	(0.114)	(0.045)	(0.047)
Histpopdens	0.323**	0.345**	-0.222	-0.233	-0.171	-0.178	-0.146***	-0.141**
	(0.138)	(0.168)	(0.235)	(0.153)	(0.226)	(0.150)	(0.055)	(0.063)
Histuniv	0.131	0.135	-0.074	0.044	-0.063	0.045	-0.028	-0.029
	(0.101)	(0.120)	(0.098)	(0.111)	(0.095)	(0.109)	(0.038)	(0.045)
Histilliteracy	-0.010	0.018	0.186	0.295**	0.172	0.276**	0.184***	0.188***
	(0.115)	(0.140)	(0.125)	(0.131)	(0.118)	(0.127)	(0.049)	(0.058)
Histfemale_ind	0.442***	0.502***	0.142	0.182*	0.149	0.195*		
	(0.108)	(0.112)	(0.118)	(0.106)	(0.115)	(0.103)		
Histfemale_ser							0.124*	0.099
							(0.068)	(0.089)
Histlargefirm	-0.177	-0.033	-1.088**	-0.632	-1.012**	-0.565	-0.346**	-0.301
	(0.517)	(0.601)	(0.519)	(0.553)	(0.508)	(0.542)	(0.170)	(0.233)
Histcred	-0.119	-0.193	0.234	0.195	0.190	0.144	0.074	0.056
	(0.186)	(0.230)	(0.192)	(0.213)	(0.184)	(0.209)	(0.068)	(0.084)
Histmanuf					0.211*	-0.021		
					(0.128)	(0.218)		
Histser							0.031	0.035
							(0.088)	(0.130)
HistHTM	0.244	0.158						
	(0.178)	(0.212)						
HistLTM			0.134	-0.075				
			(0.129)	(0.211)				
Histmpowersett_ind	0.040	0.033	0.025	0.015	0.031	0.019		
	(0.113)	(0.190)	(0.122)	(0.177)	(0.119)	(0.174)		
Histmpowersett_ser							-0.010	-0.009
							(0.013)	(0.020)
nw	-0.221	-0.179	-0.123	-0.138	-0.137	-0.144	0.032	0.029
	(0.204)	(0.200)	(0.183)	(0.186)	(0.173)	(0.181)	(0.066)	(0.077)
ne	0.064	0.046	-0.037	-0.173	-0.023	-0.151	-0.058	-0.079
	(0.131)	(0.153)	(0.160)	(0.142)	(0.153)	(0.139)	(0.047)	(0.058)
so	-0.297	-0.296	-0.401*	-0.200	-0.422*	-0.228	-0.113	-0.076
	(0.212)	(0.215)	(0.238)	(0.201)	(0.236)	(0.196)	(0.070)	(0.083)
Year Dummies	YES	YES	YES	YES	YES	YES	YES	YES
Observations	1,235	1,235	1,235	1,235	1,235	1,235	1,235	1,235
Number of prov.	95	95	95	95	95	95	95	95
R-squared	0.734	0.740	0.556	0.639	0.606	0.676	0.491	0.498

Notes: All variables, except the dummies, are in natural logarithm.
RE=random effects model; CRE=correlated random effects model
*Standard errors clustered at the provincial level in parentheses *** p<0.01, ** p<0.05, * p<0.1*

We have found an interesting result (which is robust across the estimation methods in the HTM industries) when considering the historical control variables: the larger the share of female employees was in 1927 (*Histfemale_ind* and *Histfemale_ser*), the higher the new business formation is nowadays. A possible interpretation of this result is that working mothers, encouraged by the success of their employers, may in turn have encouraged their sons to also become entrepreneurs. However, the existence of such an indirect role model effect requires further investigation in future studies. A complementary explanation of the positive effect of the share of female employees in 1927 on entrepreneurship may be that individuals whose parents were both employed had more financial and psychological support to start a new business. Finally, the historic female employment rate could be a proxy of a less patriarchic society. The persistence of this type of culture may lead to increases in the supply of entrepreneurs to high tech sectors[9].

Regarding the industrial sector, we have surprisingly found that the current HTM entrepreneurship rate is negatively influenced by the past per capita income (*Histpcincome).* However, this result should be considered with caution because we have also found a positive significant effect of current per capita income *(Pcincome*) on the dependent variable. This means that, for a given current per capita income, those Italian provinces that were poorer in the past now register a higher current innovative entrepreneurship rate and that, therefore, in the manufacturing sector, the most innovating provinces are probably those that historically were more dynamic and more able to converge. The current industrial entrepreneurship rates are positively affected by the past and current population densities. Finally, we have found that, in manufacturing, entrepreneurship rates are higher where employees were not concentrated in large firms in the past (as predicted by the literature) and where education and R&D expenditure is now greater. We have found, together with an expected positive effect of the current tertiary education, an unexpected positive effect of the historical illiteracy rate on the entrepreneurship rate for the LTM (in the CRE model). A possible explanation of this result may be that the growth of traditional LTM sectors was driven in many Italian provinces, during the post war period, by new entrepreneurs skilled in exploiting the benefits of backwardness, i.e. of a large availability of manpower at a low cost [10].

The current provincial start-up rates in the service sector depend positively and significantly on both the current and past per capita income (columns 7 and 8). We have found, as expected, a significant positive effect of the current population density, but also a significant negative effect of the past population density on the current entrepreneurship rates. The decision to start a commercial activity in a specific place depends to a great extent on the market opportunities, and the literature on

9 We would like to thank an anonymous referee for suggesting this possible interpretation.

10 See also Sorrentino (1991) to support this interpretation.

the localization of Knowledge Intensive Services (KIS) has emphasized the role played by agglomeration economies and urban areas (Ciarli, Meliciani & Savona, 2012, Polese & Shearmur, 2004; Rodriguez-Pose & Crescenzi, 2008; Shearmur & Doloreux, 2009). The two results could suggest that those provinces that underwent a more relevant urbanization process in the past decades are now those that are characterized by higher entrepreneurship rates. Moreover, we have found, for the service sector, that the past illiteracy rates positively affect the current entrepreneurship rates.

The results of the spatial model reported in Table 3 confirm the main findings reported above and show that, although there is a significant spatial dependence in the service sector, this is not the case in the HTM and LTM sectors. It seems that entrepreneurship tends to remain a local phenomenon in the manufacturing sector, where knowledge is more complex, while entrepreneurship tends to spread to neighboring provinces in the service sector, where we have not found any evidence of a "specific" role model effect.

Table 3. Spatial Lag regression results. Dependent variable: Provincial start-up rate

	(1)	(2)	(3)	(4)
VARIABLES	***HTM***	***LTM***	***Manuf***	***Services***
Histentr_ind	-0.127	0.518***	0.445**	
	(0.181)	(0.191)	(0.189)	
Histentr_ser				0.165**
				(0.0770)
Histmpower_ind	0.433***	0.356***	0.397***	
	(0.136)	(0.137)	(0.136)	
Histmpower_ser				-0.000419
				(0.00299)
Va	1.078***	0.274**	0.234**	0.0490
	(0.257)	(0.117)	(0.115)	(0.0513)
Pop	-0.268***	-0.272***	-0.258***	-0.0690**
	(0.0898)	(0.0899)	(0.0885)	(0.0324)
Popdens	0.1000	0.421***	0.415***	0.146***
	(0.130)	(0.129)	(0.127)	(0.0462)
R&D	0.144	0.0827*	0.0885*	4.75e-05
	(0.0970)	(0.0462)	(0.0454)	(0.0203)
Tertiary	0.193*	0.0721*	0.0878**	-0.00741
	(0.109)	(0.0419)	(0.0411)	(0.0188)
Histva	-1.380***	-0.752	-0.704	0.488***
	(0.497)	(0.509)	(0.500)	(0.176)
Histpop	-0.222**	0.0730	0.0251	0.0705*
	(0.112)	(0.114)	(0.113)	(0.0408)
Histpopdens	0.340**	-0.200	-0.172	-0.140**
	(0.150)	(0.151)	(0.149)	(0.0548)
Histuniv	0.130	-0.0774	-0.0629	-0.0261
	(0.101)	(0.103)	(0.102)	(0.0373)
Histilliteracy	-0.00813	0.183	0.172	0.178***
	(0.122)	(0.126)	(0.124)	(0.0480)
Histfemale_ind	0.450***	0.140	0.149	
	(0.0953)	(0.0960)	(0.0944)	
Histfemale_ser				0.133*
				(0.0744)
Histlargefirm	-0.141	-1.006*	-1.013*	-0.317
	(0.531)	(0.540)	(0.533)	(0.197)
Histcred	-0.133	0.233	0.190	0.0757
	(0.201)	(0.203)	(0.200)	(0.0708)
Histmanuf			0.211	
			(0.210)	
Histser				0.0245
				(0.111)
HistHTM	0.238			
	(0.182)			
HistLTM		0.141		
		(0.204)		
Histmpowersett_ind	0.0428	0.0376	0.0306	
	(0.170)	(0.175)	(0.173)	
Histmpowersett_ser				-0.00815
				(0.0177)
nw	-0.224	-0.140	-0.137	0.0260
	(0.179)	(0.183)	(0.180)	(0.0666)
ne	0.0552	-0.0474	-0.0227	-0.0545
	(0.134)	(0.133)	(0.130)	(0.0486)
so	-0.282	-0.372**	-0.422**	-0.0856
	(0.185)	(0.181)	(0.179)	(0.0632)
Rho (coef. spatial lag)	0.0297	0.148	-0.00170	0.292***
	(0.0965)	(0.0982)	(0.108)	(0.0976)
Year Dummies	YES	YES	YES	YES
Observations	1,235	1,235	1,235	1,235
Number of prov.	95	95	95	95
R-squared	0.735	0.562	0.606	0.505

Notes: All variables, except the dummies, are in natural logarithm.
*Standard errors clustered at the provincial level in parentheses *** p<0.01, ** p<0.05, * p<0.1*

CONCLUSIONS

In this paper, we have investigated persistence in entrepreneurship across Italian provinces over the 1927–2017 period by focusing on the role of past innovative entrepreneurship in fostering the present start-up rates. We have found evidence of the crucial role of this particular kind of entrepreneurship in building a ground that is able to foster the start-up rate of innovating manufacturing firms. We have also found that the current start-up rate in the HTM sector depends significantly on the historical propensity of provincial entrepreneurs to innovate, i.e. on the share of entrepreneurs that used motive power (the "specific" role model effect), and not on the historical manufacturing entrepreneurship rate (the "general" role model effect). On the other hand, we have also found that the "general" role model effect is an important driver of entrepreneurship in both the LTM and the service sectors. According to our interpretation of these results, such differences show that persistence in the HTM sector cannot be explained as just simple imitation or identification effects or as a general "culture" of entrepreneurship. Our results support the hypothesis that learning plays an important role in increasing self-confidence and reducing the fear of failure in sectors where knowledge is more complex and, therefore, the perceived risk is higher. This is in line with the results of Fritsch & Wyrwich (2015), who found that not all types of self-employment are equally important for the long-term persistence of regional entrepreneurship. Since the transmission of competencies requires physical proximity, collective learning at the territorial level may be the basis of a sustained regional competitive advantage. According with our theoretical framework, the higher the riskiness of productive sectors is, the more role model's effects are important. Our results suggest that, although "specific" role model effects are crucial in riskier productive sectors (HTM) to induce individuals to become entrepreneurs, "general" role model effects may be strong enough to decide to become entrepreneurs in those sectors that make use of traditional technology (LTM and services), in which the perceived risk is lower.

Overall, what emerges from this study is that the more complex knowledge is, the more entrepreneurship requires role models based on learning rooted in history. The distribution of entrepreneurs that used motive power in 1927 for advanced production technologies may be considered as a proxy of the historical distribution of innovative entrepreneurship in the country. Even after about 90 years, this distribution still affects new business formation, even though the Italian post war governments adopted a very "dirigiste" industrial policy aimed at shaping the sectoral and geographical distribution of industrial production.

Our analysis suffers from some limitations and some aspects deserve in-depth exploration in future research. For example, it is unclear to what extent the share of firms that used motive power is

a proxy of a specific role model effect linked to the knowledge transfer within specific sectors or rather a proxy of the innovation propensity of entrepreneurs, which may have an effect across different sectors. Further research should test such an effect using historical sectorial data. In addition, innovative start-up rates could be used as a dependent variable for different sectors. Another factor that needs further analysis is what we have named the "working mother effect". Did women employed in 1927 foster total entrepreneurship and female entrepreneurship in particular? It would be interesting to investigate this effect separately for the different sectors. Finally, a limitation of our study is that it has not found an answer to what can be done to improve regional innovating entrepreneurship. Our paper supports the evidence that past attitudes toward using advanced technologies vary considerably by region and are associated with current innovating entrepreneurial activity. Further analyses should be conducted to study whether attitudes toward innovating entrepreneurship are a cause or an outcome. As argued by Fritsch and Storey (2014), if they are a cause, then they should be addressed directly, perhaps through awareness-raising of the benefits of innovating entrepreneurship. If, instead, they are an outcome, then the valid policy response should be to address economic disadvantage issues, thereby directly improving economic conditions. Our paper points out the need to consider the "historical entrepreneurial culture endowment" of a region in industrial plans. A policy maker should be like a good gardener who studies what plants grew in a garden in the past, as he/she is aware that those plants are the most likely to find an environment that is able to foster their growth. The next step should be to find out what can be done to improve that environment, which seems now so much predetermined by history.

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APPENDIX

Table A1. Economic activities by technology intensity

	NACE Rev.2 code	NACE Rev.2 description
High and medium-high technology (HTM) manufacturing	20	Manufacture of chemicals and chemical products;
	21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
	26 to 30	Manufacture of computer, electronic and optical products; Manufacture of electrical equipment; Manufacture of machinery and equipment n.e.c.; Manufacture of motor vehicles, trailers and semi-trailers; Manufacture of other transport equipment
Low and medium-low technology (LTM) manufacturing	10 to 19	Manufacture of food products, beverages, tobacco products, textile, wearing apparel, leather and related products, wood and of products of wood, paper and paper products, printing and reproduction of recorded media; Manufacture of coke and refined petroleum products
	22 to 25	Manufacture of rubber and plastic products; Manufacture of other non-metallic mineral products; Manufacture of basic metals; Manufacture of fabricated metals products, excepts machinery and equipment
	31 to 32	Manufacture of furniture; Other manufacturing
Services	50 to 51	Water transport; Air transport
	58 to 63	Publishing activities; Motion picture, video and television programme production, sound recording and music publish activities; Programming and broadcasting activities; Telecommunications; computer programming, consultancy and related activities; Information service activities (section J)
	64 to 66	Financial and insurance activities (section K)
	69 to 75	Legal and accounting activities; Activities of head offices, management consultancy activities; Architectural and engineering activities, technical testing and analysis; Scientific research and development; Advertising and market research; Other professional, scientific and technical activities; Veterinary activities (section M)
	78	Employment activities
	80	Security and investigation activities
	84 to 93	Public administration and defence, compulsory social security (section O); Education (section P), Human health and social work activities (section Q); Arts, entertainment and recreation (section R)
	45 to 47	Wholesale and retail trade; Repair of motor vehicles and motorcycles (section G)
	49	Land transport and transport via pipelines
	52 to 53	Warehousing and support activities for transportation; Postal and courier activities
	55 to 56	Accommodation and food service activities (section I)
	68	Real estate activities (section L)
	77	Rental and leasing activities
	79	Travel agency, tour operator reservation service and related activities
	81	Services to buildings and landscape activities
	82	Office administrative, office support and other business support activities
	94 to 96	Activities of membership organisation; Repair of computers and personal and household goods; Other personal service activities (section S)
	97 to 99	Activities of households as employers of domestic personnel; Undifferentiated goods- and services-producing activities of private households for own use (section T); Activities of extraterritorial organizations and bodies (section U)

Source: EUROSTAT

Table A2 Percentage of firms using motive power in 1927

Industrial sectors	Italy	North	Centre	South	Islands
Steel and metalworking industries	78.6	81.9	69.9	66.2	68.1
Food and related industries	57.6	68.7	56.5	38.0	36.6
Textile industries	50.1	66.7	35.0	17.0	6.1
Paper industries	48.6	56.1	48.1	29.8	9.9
Chemical industries	45.0	55.7	46.1	26.1	28.2
Polygraphic industries	41.1	46.8	43.9	27.6	24.7
Wood and related industries	21.3	29.4	22.5	6.9	8.9
Mining industries	20.5	23.8	27.5	5.2	18.5
Leather and related industries	19.7	27.2	19.6	10.3	5.0
Industries linked to agricolture	29.5	40.4	13.5	12.8	10.6
Mechanical industries	26.6	35.4	25.1	9.9	8.7
Processing of minerals, except metals	28.9	39,8	35.7	14.4	10.6
Construction industry	5.1	7.3	4.9	2.1	1.7
Clothing and apparel industries	2.5	4.3	1.4	0.6	0.4
Fishing industries	0.2	0.1	0.2	0.6	0.0

Source: ISTAT, Industrial Census (1927).

Table A3. Economic activities in the 1927 Census by motive power intensity and by technology intensity according to current classification

	Sectors in the 1927 Census		**Sectors in the 1927 Census**
High motive power industries * (*Histmpowersett_ind)*	Industries linked to agricolture	**High and medium-high technology (*HistHTM*)*****	Chemical industries
	Food and related industries		Mechanical industries
	Paper industries	**Low and medium-low technology (*HistLTM*)*****	Wood and related industries
	Polygraphic industries		Food and related industries
	Steel and metalworking industries		Leather and related industries
	Mechanical industries		Paper industries
	Processing of minerals, except metals		Polygraphic industries
	Textile industries		Steel and metalworking industries
	Chemical industries		Processing of minerals, except metals
High motive power services ** *Histmpowersett_ser*	Public performances		Textile industries

*High motive power industries are those in sectors with a value of the variable *Histmpower_ind* higher than the mean level (25%).
**The Public performances sector registers a value of the variable *Histmpower_ser* of 41.9%, much higher than the average across services (which is 3%).
*** 1927 Census sectors classified according to the current NACE Rev.2 description.