Persistence in entrepreneurship: An analysis of the determinants of the start-up rate across Italian provinces

Stefania Cosci
(University LUMSA of Rome)
Valentina Meliciani
(University Luiss Guido Carli, Rome)
Marco Pini
(Unioncamere, Rome)

60th Annual Conference of the Italian Economic Association (SIE)

University of Palermo, October 24-26,

Abstract

This paper studies whether and what kind of role models are important to foster the diffusion of an "innovative" entrepreneurial culture over time in a particular region in the manufacturing sector. Based on data provided by a comprehensive survey conducted in 1927 by the Italian National Statistical Institute, we distinguish between a "direct" and an "indirect" role model effect, where the indirect effect comes from working mothers pushed to encourage their sons to become entrepreneurs by the success of their employers. We find evidence in Italy of both the effects since both the provincial entrepreneurship rate in firms using motive power and the provincial share of women employed in industry in 1927 predict the provincial start up rate in more technologically advanced sectors between 2001 and 2017. We also find sectoral differences in entrepreneurship persistence between manufacturing and service sectors.

1.

1. **Introduction**

Recent research has documented patterns of strong persistence of regional levels of entrepreneurial activity over time in countries such as Germany, Sweden and the UK (Andersson and Koster 2011, Fotopoulos 2014, Fotopoulos and Storey 2017, Fritsch and Wyrwich 2014). On the one side persistence might be explained by the fact that regional determinants of new business formation tend to remain fairly constant over time but, on the other side, it might be the result of the presence of an "entrepreneurial culture" that changes only over long periods of time (Fritsch and Falck 2007, Williamson 2000, North 1994).

Several studies have attributed differences in entrepreneurship among regions to the existence and availability of "role models" (Fornahl 2003, Lafuente et al. 2007, Sternberg 2009). A region with high levels of entrepreneurship may encourage new entrepreneurial initiatives because it is easy to find appropriate example or obtain information or resources from other entrepreneurs (Davidsson and Wiklund 1997, Mueller 2006). Gibson (2004) argues 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).

If entrepreneurship can be seen as the result of a self-reinforcing process (Minniti, 2005), we should observe that nowadays' start up rates are higher where entrepreneurs in the past began to transmit their knowledge and their "models" to other potential entrepreneurs. Sorenson (2017) argues that this idea raises something of a chicken-and-egg problem: where does the first start-up come from? We argue that regional persistence in entrepreneurship is more likely to happen in those sectors where the birth of the first start-up is more difficult, because they need more knowledge accumulation, more infrastructures, more skilled labour force or simply because they are riskier and new entrepreneurs are unlikely to be so "brave" to start a new business where there are not role models to help them. We therefore may expect entrepreneurial regional persistence to be higher in manufacture, and especially in high technology sectors, than in the service sector. Fritsch and Wyrwich (2015) investigated the role of different types of self-employment for the persistence of regional entrepreneurship in Germany and found that not all types of self-employment are equally important for the long-term persistence of regional entrepreneurship. They found that the overall level of self-employment (including agriculture and semipublic sectors) is only weakly related to the current level of new business formation while the share of self-employed males in non-agricultural industries and in knowledge-intensive industries have long-lasting effects.

The aim of this paper is investigating whether and what kind of role models are important in fostering the diffusion of an "innovative" entrepreneurial culture over time in a particular region. Does entrepreneurs' attitude to start a new business in more technologically advanced sectors today depend on the attitude of

entrepreneurs to use advanced production technologies in the past? Is the presence of this specific role model crucial for the development of a dynamic and innovating region? Furthermore, does persistence in entrepreneurship differ among sectors according to the degree of knowledge complexity of the sector?

Observing successful entrepreneurs provides potential entrepreneurs with examples of how to organize resources and activities and increase self-confidence in the sense of "if they can do it, I can do it too" (Sorenson and Audia 2000). If this is true, we may also suppose that working mothers observing successful entrepreneurs may perceive entrepreneurship as a favourable career option for their sons in the sense of "if they can do it, my son can do it too". We might therefore distinguish a "direct" and an "indirect" role model effect. Role models may "directly" stimulate workers to become entrepreneurs but also they might stimulate working mothers to encourage their sons to do so.

Based on data provided by a comprehensive survey conducted in 1927 by the Italian National Statistical Institute, we analyse the persistence of regional entrepreneurship by analysing if and in what measure provincial start up rates in Italy over the period 2001-2017 can be predicted by provincial entrepreneurship rate in 1927. More specifically, we are interested in investigating the "direct role model effect" by studying the relationship between provincial start up rate in Italy (2001-2017) in more technologically advanced sectors (high and medium high technology manufacturing sectors) and provincial entrepreneurship rate in firms using motive power in 1927. In addition, we investigate the relative intensity of this effect in the manufacturing and services sectors. The "indirect role model effect" is investigated in this paper by studying the effect of women employment in 1927 on nowadays (2001-2017) Italian provincial start up rate.

As stated above, persistence in entrepreneurship might be explained by persistence over time in its determinants, so it is important to study this phenomenon in nations that have been historically characterized by disruptive shocks of framework conditions. In this respect Italy may represent an interesting case study. The country experienced the 1929 world economic crisis, the World War II and the end of fascism, the introduction of a new constitutional base, and the reconstruction of the economy. Italian post war governments adopted a very "dirigiste" industrial policy aimed at shaping sectoral and geographical distribution of industrial production. They promoted an intense subsidization program in favour of Southern regions, an infrastructural government plan putting huge emphasis on roads with the aim of supporting the national motor vehicle industry and a selective credit policy based on a strict regulation imposing administrative portfolio constraints on the banking system activity. All these measures were aimed at affecting the geographical distribution of industrial production and its sectoral composition.

The paper is organised as follows: Section 2 discusses the relevant literature and formulates the testable hypotheses; Section 3 describes the geographical pattern of entrepreneurship in 1927 and the start-up rate over the period 2000-17; Section 4 presents the data and the methodology; Section 5 discusses the results; the last Section concludes.

2. Entrepreneurial culture and persistence in high technology sector entrepreneurship. Theory and testable hypotheses

Entrepreneurial culture may be defined like an informal institution that is 'in the air' in some regions more than in other ones. It is higher where population has a positive attitude toward entrepreneurial activity, shares entrepreneurial values, like individualism and autonomy, contains a high number of persons able to bear risk and a large number of entrepreneurial role models who generate demonstration and peer effects (Sorenoson 2017, Fritsch and Wyrwich 2016). Bosma et al. (2011) argue 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 role identification theory whereas the third and fourth are implied by social learning theory.

We might argue that the role model effect contains both a "general" and a "specific" dimension. The general dimension is linked to the raise of individual self-confidence and of social acceptance of entrepreneurship caused by the observation of the success of other entrepreneurs in a region. In this case, the success of other entrepreneurs may induce people to start a new business but not necessarily in the same sector. The specific dimension is linked to learning by example or by support: many entrepreneurs find specific information by observing the other ones and this information may foster the birth of new firms in the same sector. Role models, therefore, not only may foster the diffusion of entrepreneurship culture in a region but also they may "shape" that culture.

The aim of this study is to gain a better understanding of the historical roots of contemporaneous regional differences in new business formation in manufacturing high technology sectors. Fritsch and 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 today. Regional start up rates in high and medium high technology manufacturing (HTM)[1] should therefore depend 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. We therefore test the following hypotheses:

[1] See Table A1 for the description of the economic activities included in the group.

H1: nowadays provincial start-up rate in high and medium high technology manufacturing sectors depends on the share of industrial entrepreneurs using motive power (specific role model effect) and not on the overall share of industrial entrepreneurs (general role model effect) at the outset of the twentieth century

We may expect, on the opposite, that less knowledge intensive sectors (low and medium low technology manufacturing sector, LTM) do not "need" the presence of a specific role model in the region where they localize. The creation of new manufacturing firms is fostered by the presence of role models making people confident that they too can achieve a certain goal, but, since they do not need complex technologies, the adoption of advanced production methods (motive power) in the past should be less important.

H2: nowadays provincial start-up rate in low and medium low technology manufacturing sectors depends on the share of industrial entrepreneurs (general role model effect) at the outset of the twentieth century

But are there differences across sectors in persistence? We argue that persistence in entrepreneurship over long time spans is more likely to be found in sectors where production requires more specific entrepreneurial skills and a more specialised workforce. Since services in 1927 consisted mainly in wholesale, retail and trade services, all activities requiring a limited degree of knowledge complexity, capital intensity and risk, while manufacturing activities (including the more traditional ones such as textiles and food industries) required a higher degree of knowledge complexity and the use of specialised employees, we expect a higher degree of persistence in manufacturing with respect to services.

H3: persistence in entrepreneurship is stronger in manufacturing than in service sectors

As stated above, we argue that there is another important dimension of "learning by example" not considered in the literature, that we might name "working mothers effect" ("if they can do it, my son can do it too"). Mothers working in industrial firms, seeing the success of the entrepreneurs of their firms, can learn by example and encourage their sons to become entrepreneurs too. This effect may have been historically very important for two main reasons. Firstly, mothers may be very effective in shaping their sons' dreams since their childhood and, secondly, working mothers' sons, with respect to nonworking mothers' ones, are likely to have two parents transmitting them their working experience and able to give them financial support. Mothers working in manufactures may be attracted to models playing a desirable social role or occupying an attractive position in society (the general role model effect). Role models providing living evidence that certain goals are achievable may therefore encourage them to transmit to their sons the feeling that also their entrepreneurial ambitions may turn into reality. This feeling might be particularly important in the difficult choice to start an innovative and risky activity. Our hypothesis is that women employment rate in manufactures may have amplified the specific role model effect fostering the choice to become an innovative entrepreneur.

H4: provincial start up rate in more technologically advanced sectors has been fostered by women employment rate in manufactures in the past.

3. Entrepreneurial culture in Italy

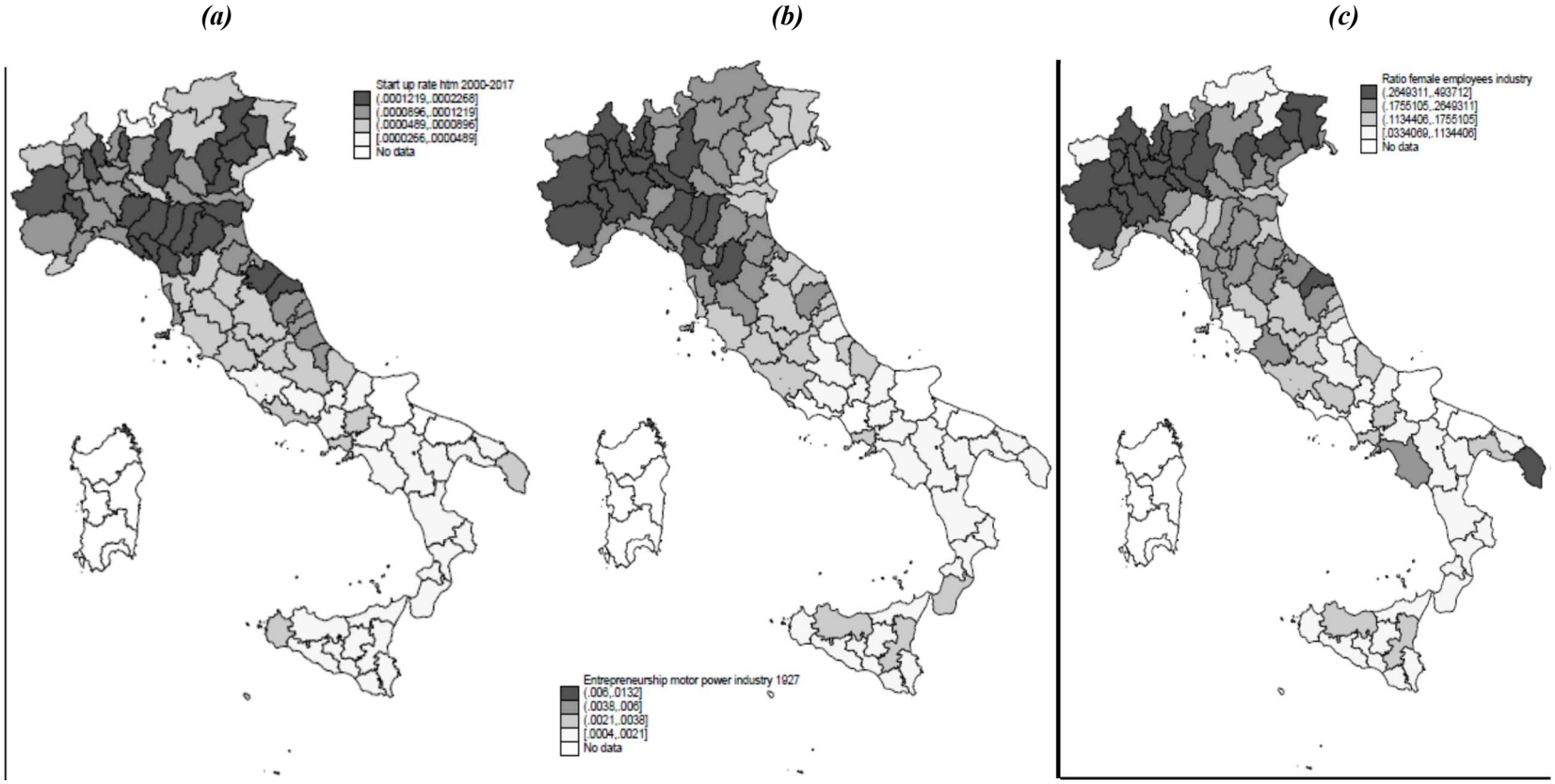
Most interpretative paradigms on development gaps taking into account "cultural" factors have been developed starting from the Italian case: from the amoral familism of Banfield (1958), formulated by observing a small town in Basilicata, to the well-known thesis of Putnam et al. (1993) that, by looking at the differences between the South and the Center-Northern Italy, found that social capital was an important cultural and social structural factor affecting economic growth. Nowadays regional entrepreneurship rates in Italy may depend on role models rooted in the past that influenced, directly or indirectly, the choice to start a new business. It is therefore interesting to analyse the historical distribution of role models across Italian provinces.

In 1932, when the famous statistician Corrado Gini (1884 – 1965) was at the head of ISTAT (Italian National Statistical Institute), an important Census (reporting data collected in 1927) was published. In the first pages of the Survey, Gini defined the 1927 Census "a grandiose experiment in the field of economic statistic" since for the first time it accomplished a complete survey of the industrial and commercial life of the Nation. The Census contains detailed data about the number of establishments, entrepreneurs and employees, and about the use of motive power. Entrepreneurs using motive power in that period were those able to use advanced production technologies and their distribution across Italian provinces may be considered as a proxy of the distribution of innovative entrepreneurship in the country. The Census of 1927 shows a dualistic Italian economy, where the use of motive power was on average much higher in the North and much lower in the South.

When we look at the map (a) in Figure 1 we find "three Italies" with respect to the start-up rate in HTM sectors in the period 2000-2017: most North West and Adriatic Northern and Central provinces are characterised by higher levels, remaining central provinces by intermediate levels and most Southern provinces by bottom levels. The motive power entrepreneurship rate (given by the number of entrepreneurs using motive power in manufacturing sectors over population) in 1927 (map *b*) was higher than the average in the Western part of Northern Italy while most Adriatic provinces showed intermediate rates. When we look at map *c*, we see that Central and Northern Adriatic provinces showed higher than average levels of industrial female employment rate (given by the number of female employed over total employment in manufacturing sectors). The picture emerging from Figure 1 therefore suggests that the direct role model effect, together with the indirect one, might have contributed to shape provincial entrepreneurial culture in a way that still affects Italian provinces' entrepreneurship rate in HTM sectors.

Figure 1

Startup rate in HTM sectors (a), industrial motive power entrepreneurship rate in 1927 (b) and industrial female employment rate in 1927 (c)



4. Data and methodology

The sources of data are the Italian National Institute of Statistics (ISTAT) and the Business Register of the chambers of commerce: this latter with specific regard to the number of startups in 2000s. Data on the economic context refers to ISTAT concerning the labour force survey, the National Accounts at territorial level and some specific survey (e.g., for data on R&D expenditure). For the analyses by technology intensity we used the related classification adopted by EUROSTAT[2].

We estimate the start-up rate for the whole economy and for different groups of sectors (total industry, total services, high/medium-high tech manufacturing (HTM), low/medium-low tech manufacturing (LTM), knowledge intensive services (KIS) and less knowledge intensive services (LKIS) (see Table A1 for the description of the economic activities included in each group). The estimated equation is the following:

$$Startuprate_{i,t} = \alpha + \beta_0 Histentr_{i,1927} + \beta_1 Histmpower_{i,1927} + \beta_2 Histfemale_{i,1927} + \beta_3 Controls_{i,t-1} + u_i + e_{it} \quad (1)$$

where $Starttuprate_{i,t}$ is the number of start-ups divided by active population in province i and time t; the historical entrepreneurship rate, *Histentr,* is given by the ratio between the number of entrepreneurs in 1927 and population in year 1931[3] in province *i*; the historical innovation propensity of entrepreneurs, *Histmpower,* is given by the ratio between the number of entrepreneurs using motive power and the total number of entrepreneurs in 1927; the historical female employment rate, *Histfemale,* is given by the ratio between the number of female employees and the total number of employees in 1927. Control variables are lagged one year and include population density (*Popdens*), labour productivity *(Prod*), R&D over GDP (*R&D*), the percentage of people with tertiary education (*Tertiary*), the unemployment rate (*Unemplrate*) and the geographical location: Southern (*so*), North-East (*ne*) and Nord-West (*nw*) (Centre: reference category). The period of analysis is between 2001 and 2017. Equation (1) is estimated including the overall ratio between the number of entrepreneurs and population in 1927 (*Histentr*), i.e. our proxy for capturing the existence of a "general" role model effect.

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

[3] Data on population are from 1931 since they are Census data available every 10 years

The following equation is estimated using *Histmpentr* , our proxy for the existence of a "specific" role model effect, (i.e. the ratio between the number of entrepreneurs using motive power and population in 1927) instead of *Histentr*.[4]

$$Startuprate_{i,t} = \alpha + \beta_0 Histmpentr_{i,1927} + \beta_2 Histfemale_{i,1927} + \beta_3 Controls_{i,t-1} + u_i + e_{it} \quad (2)$$

A detailed description of all variables is reported in Table 1 and summary statistics are in Table 2. Since the main variables of interest are the historical data of 1927, equations (1) and (2) cannot be estimated using fixed effects. We therefore report estimates using random effects (RE) and robustness checks using Ordinary Least Squares (OLS) with robust standard errors.

Based on our hypotheses, we expect β_0 to be positive and significant in high and medium high tech manufacturing sectors only when we estimate equation 2 (hypotheses 1 and 2). We also expect β_0 to be larger in manufacturing than in services (hypothesis 3). Finally, we expect β_2 to be positive and significant in high and medium high tech manufacturing (hypothesis 4).

5. Results

Table 3 reports the results of the estimation of equation (1) respectively for high/medium-high tech manufacturing (columns 1 and 2), low/medium-low tech manufacturing (columns 3 and 4), total manufacturing (columns 5 and 6) and total services (columns 7 and 8). For each group of sectors, we report estimations including as regressor the overall ratio between the number of entrepreneurs and population in 1927 (our proxy for capturing the existence of a "general" role model effect, *Histentr*) and the ratio between the number of entrepreneurs using motive power and population in 1927 (our proxy for the existence of a "specific" role model effect, *Histmpentr*). Results are based on random model estimations. Robustness checks using Ordinary Least Squares with clustered errors are reported in Appendix (Table A2).

The results clearly show (see Table 3 column 2) a positive and significant relationship between high levels of historical entrepreneurship in firms "using motive power" (*Histmpentr_ind)* and provincial new business formation in HTM sectors today. They also show (see Table 3 column 1) that historical entrepreneurship in general (*Histentr_ind))* does not affect new business formation in HTM sectors today, that rather depends significantly on the historical innovation propensity of entrepreneurs (*Histmpentr_ind).* These results support our first and second hypotheses: in sectors with complex technologies the "general" role model effect does not predict new business formation but what matters is the existence of a "specific" role model based on the transmission of knowledge originated in the past with the use of advanced production technologies.

[4] In this second specification we do not include *Histmpower,* i.e. the ratio between the number of entrepreneurs using motive power and the total number of entrepreneurs in 1927

The results also support the existence of an "indirect" role model effect coming from working mothers pushed by the success of their employers to encourage their sons to become entrepreneurs too (hypothesis 4). In fact, in HTM industries (see Table 3 column1) the larger was the share of female employees in 1927 (*Histfemale_ind*), the higher is new business formation nowadays. This effect is significant only in high and medium high tech manufacturing sectors (the variable *Histfemale_ind* is not significant when we consider LTM sectors, see Table 3 column 3), suggesting that this indirect effect is important when the choice to start a new firm is more difficult and risky. We must notice, anyway, that when we consider female employment in firms using motive power *Histmpfemale_ind*, the female ratio is always significant (also if the effect is weaker in LTM sectors, see Table 3, columns 2 and 4).

Beyond "entrepreneurial culture", persistence might be explained by the fact that regional determinants of new business formation tend to remain fairly constant over time (Fritsch and Falck, 2007). But what is the role of the other possible determinants of the start-up rate? Surprisingly table 3 shows that historical levels of entrepreneurships are the main determinants of new business formation nowadays. In fact, control variables are all insignificant with the exception of population density in services. This result suggests that fostering entrepreneurship in regions where historical rates are not high might be a very difficult task.

Table 3 also shows the existence of significant differences in the role model effect between manufacturing and service sectors (hypothesis 3): while in manufacturing both overall entrepreneurship and entrepreneurship using motive power in 1927 positively affect new business formation (see Table 3 columns 5 and 6), the same effect does not exist in services. Neither historical entrepreneurship in general (*Histentr_ser*) nor historical entrepreneurship using motive power, (*Histmpentr_ser)* are significantly related to nowadays start up rates in the service sector (see Table 3 column 7 and 8). The difference between manufacturing and services suggests that persistence in entrepreneurship might vary according to the complexity of knowledge which is transmitted over time. Going back to the functions of entrepreneurial role models (Boma et al., 2011), it appears that the role identification theory is insufficient to explain persistence over long time spans (an imitation/identification effect is likely to exist both in manufacturing and services) while a prominent role for persistence is played by learning. On the one hand, if we think of the services activities in 1927 these consisted mainly in wholesale, retail and trade services, all activities requiring a limited degree of knowledge complexity, capital intensity and 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 specialised employees. Therefore, it is likely that those geographical areas with high levels of manufacturing entrepreneurship in 1927 transmitted over time specific competencies in entrepreneurs and in the complementary specialised workforce which led to persistence.

Another possible explanation for the lack of persistence in services' entrepreneurship is that the geographical distribution of services has changed significantly with the ICT revolution and the rise of knowledge intensive services including software and communication services. In particular, the literature on the localisation of KIS (Ciarli et al. 2012, Polese and Shearmur 2004, Rodriguez-Pose and Crescenzi 2008, Shearmur and Doloreux 2009) has emphasized the role played by agglomeration economies and urban areas. In order to test whether there are significant differences in persistence

between knowledge intensive services and less knowledge intensive services, Table A2 reports estimations for the two groups of services (columns 1-4); the same table also reports the estimates excluding population density from the regressors to see whether part of the persistence is captured by agglomeration effects (columns 5-8). The results show the absence of persistence in entrepreneurship both in KIS and LKIS sectors when controlling for population density (Table A2, columns 1-4). They also show weak signs of persistence only in less knowledge intensive services (column 7) when excluding population density from the regressors. Overall, it appears that agglomeration economies are a relevant factor for explaining entrepreneurship in both KIS and LKIS, while there is no evidence of persistence in entrepreneurship in KIS. This is not surprising considering that most of these services are the consequence of the diffusion of ICTs and did not exist in 1927. However, also in the case of less knowledge intensive services, signs of persistence are very weak differently from what found in manufacturing sectors.

6. Conclusions

In this paper we have investigated persistence in entrepreneurship across Italian provinces over the time span 1927 – 2017. We have found persistence in low and medium low technology manufacturing sectors and in manufacturing overall while we have found evidence of persistence in high and medium high technology manufacturing sectors only for enterprises using motive power in 1927. We have found no evidence of persistence in service sectors. Surprisingly the results have also shown that historical rates of entrepreneurship in manufacturing are the only predictor for new business formation in Italian provinces in the last century, while innovative effort (proxied by R&D) and education do not matter. In services, differently from manufacturing, the only predictor is population density.

We have interpreted these results referring to the literature on role models (Fornahl, 2003, Lafuente et al. 2007, Sternberg, 2009). In particular, Gibson (2004) distinguishes between the "role" aspect (individuals are attracted to role models who are perceived to be similar in terms of their characteristics, behaviour or goals), from the "model" aspect which stresses the importance of learning certain abilities or skills. Bosma et al. (2011) emphasize that entrepreneurial role models display four interrelated functions, two of which are learning ones. Our results, by showing that persistence in entrepreneurship is found for manufacturing but not for services, support the importance of distinguishing between the identification mechanism (or "role" effect) and the learning mechanism (or "model effect"). Persistence in entrepreneurship over long time spans seems to be the consequence of the existence of a learning mechanism that is more important in sectors where knowledge is more complex and cumulative. Therefore, persistence is likely to be the consequence of the interaction between the territorial knowledge base accumulated over time and the entrepreneurial tradition (Fritsch and Wyrwich, 2018), rather than the simple existence of identification mechanisms. This is in line also with Fritsch and Wyrwich (2015), finding that not all types of self-employment are equally important for the long-term persistence of regional entrepreneurship. Our results also support the existence of an "indirect" role model effect, where the indirect effect comes from working mothers induced to encourage their sons to become entrepreneurs by the success of their employers. This

effect is present only in high and medium high tech manufacturing sectors, where the choice to become entrepreneurs is riskier and is likely to need a stronger support.

Overall what emerges from this study is that the more knowledge is complex, the more entrepreneurship is rooted in history and requires role models based on learning. Entrepreneurs using motive power in 1927, able to use advanced production technologies, and their distribution across Italian provinces may be considered as a proxy of the historical distribution of innovative entrepreneurship in the country. This distribution still affects new business formation after about 90 years despite the fact that Italian post war governments adopted a very "dirigiste" industrial policy aimed at shaping the sectoral and geographical distribution of industrial production.

Policy makers should therefore consider the "historical entrepreneurial culture endowment" of a region in their industrial plans, like the good gardener who studies what plants were in a garden in the past, aware that those plants are the more likely to find an environment able to foster their growth.

References

Andersson, M. and Koster, S. (2011). Sources of persistence in regional start-up rates-evidence from Sweden. Journal of Economic Geography, 11(1), 179–201

Banfield, E.G. (1958). The Moral Basis of a Backward Society. New York: Free Press

Bosma, N., Hessels, J, Schutjens, V., van Praag, M. and Verheul, I. (2011). Entrepreneurship and Role Models Journal of Economic Psychology, 33 (2), 410-424.

Ciarli, T., Meliciani, V., Savona, M. (2012). Knowledge dynamics, structural change and the geography of business services. Journal of Economic Surveys, 26, 445–467.

Davidsson, P. and Wiklund, J. (1997). Values, beliefs and regional variations in new firm formation rates. Journal of Economic Psychology, 18, 179–199.

Fornahl, D. (2003). Entrepreneurial activities in a regional context. In D. Fornahl and T. Brenner (Eds.), Cooperation, networks and institutions in regional innovation systems. Cheltenham, Edward Elgar.

Fotopoulos, G. (2014). On the spatial stickiness of UK new firm formation rates. Journal of Economic Geography, 14(3), 651–679.

Fotopoulos, G. and Storey, D. J. (2017). Persistence and change in interregional differences in entrepreneurship: England and Wales, 1921–2011. Environment and Planning A, 49(3), 670–702.

Fritsch, M. and Wyrwich, M. (2014). The Long Persistence of Regional Levels of Entrepreneurship: Germany, 1925-2005. Regional Studies, 48(6), 955–973.

Fritsch, M. and Wyrwich, M. (2015). The Persistence of Regional Entrepreneurship - Are all types of Self-Employment Equally Important? Jena Economic Research Papers 2015-008, Friedrich-Schiller-University Jena.

Fritsch M. and Wyrwich M. (2016). Does Persistence in start-up activity reflect persistence in social capital? In H. Westlund and J.P. Larson, Handbook of Social capital and regional development. Cheltenham, Edward Elgar.

Fritsch and Wyrwich (2018). Regional Knowledge, Entrepreneurial Culture and Innovative Start-ups over Time and Space – An Empirical Investigation. Jena Economic Research Papers 2018 - 001, Friedrich-Schiller-University Jena.

Fritsch, M. and Falck, O. (2007). New business formation by industry over space and time: A multidimensional analysis. Regional Studies, 41(2), 157–172.

Gibson, D. E. (2004). Role models in career development: New directions for theory and research. Journal of Vocational Behavior, 65, 134–156.

Lafuente, E., Vailliant, Y., and Rialp, J. (2007). Regional differences in the influence of role models: Comparing the entrepreneurial process of rural Catalonia. Regional Studies, 41(6), 779–795.

Minniti, M. (2005). Entrepreneurship and network externalities. Journal of Economic Behavior and Organization, 57(1), 1–27.

Mueller, P. (2006). Entrepreneurship in the region: Breeding ground for nascent entrepreneurs? Small Business Economics, 27, 41–58.

North, D. C. (1994). Economic-performance through time. American Economic Review, 84(3), 359–368.

Polese, M. and Shearmur, R. (2004.) Is distance really dead? Comparing industrial location patterns over time in Canada. International Regional Science Review, 27, 431-457.

Putnam, R.D., Leonardi, R. and Nanetti, R.Y. (1993), Making Democracy Work. Princeton, Princeton University Press.

Rodriguez-Pose, A. and Crescenzi, R. (2008). Mountains in a flat world: why proximity still matters for the location of economic activity. Cambridge Journal of Regions, Economy and Society, 1, 371–388.

Shearmur, R. and Doloreux, D. (2009). Place, space and distance: towards a geography of knowledge intensive business services innovation. Industry and Innovation, 16, 79–102.

Sorenson O. (2017). Regional ecologies of entrepreneurship. Journal of Economic Geography, 17, 959–974.

Sorenson O. and Audia P.G. (2000). The social structure of entrepreneurial activity: Geographic concentration of footwear production in the United States, 1940-1989. The American Journal of Sociology, 106 (2), 424-461.

Sternberg, R. (2009). Regional dimensions of entrepreneurship. Foundations and Trends in Entrepreneurship, 5, Now Publishers.

Williamson, O. E. (2000). The new institutional economics: Taking stock, looking ahead. Journal of Economic Literature, 38(3), 595–613.

Table 1. Variables description

Variable	Definition	Source
Dependent variable		
Startuprate	Number of startups divided by active population (provincial)	Italian National Institute of Statistics (ISTAT) and the Business Register
Independent variables		
Histentr_ind	Number of manufacturing entrepreneurs in 1927 over population in 1931 (provincial)	ISTAT -Census of industrial and commercial establishments 1927
Histmpower_ind	Number of manufacturing entrepreneurs using motive power over total manufacturing entrepreneurs in 1927 (provincial)	ISTAT -Census of industrial and commercial establishments 1927
Histfemale_ind	ratio between the number of female employees and the total number of manufacturing employees in 1927 (provincial)	ISTAT -Census of industrial and commercial establishments 1927
Histmpentr_ind	number of manufacturing entrepreneurs using motive power in 1927 over population in year 1931 (provincial)	ISTAT -Census of industrial and commercial establishments 1927
Histmpfemale_ind	ratio between the number of female employees and the total number of manufacturing employees in firms using motive power in 1927 (provincial)	ISTAT -Census of industrial and commercial establishments 1927
Histentr_ser	Number of service entrepreneurs in 1927 over population in 1931(provincial)	ISTAT -Census of industrial and commercial establishments 1927
Histmpower_ser	Number of service entrepreneurs using motive power over total manufacturing entrepreneurs in 1927(provincial)	ISTAT -Census of industrial and commercial establishments 1927
Histfemale_ser	ratio between the number of female employees and the total number of service employees in 1927 (provincial)	ISTAT -Census of industrial and commercial establishments 1927
Histmpentr_ser	number of service entrepreneurs using motive power in 1927 over population in year 1931 (provincial)	ISTAT -Census of industrial and commercial establishments 1927
Histmpfemale_ser	ratio between the number of female employees and the total number of service employees in firms using motive power in 1927 (provincial)	ISTAT -Census of industrial and commercial establishments 1927
R&D	R&D expenditure as a percentage of the GDP (regional)	ISTAT
Tertiary	Share of persons employed with tertiary degree (provincial) (logarithm)	ISTAT
Prod	Added value per person employed (thousand euro) (provincial)	ISTAT
Popdens	Number of inhabitants per square kilometer (provincial)	ISTAT
Unemplrate	Unemployment rate: share of unemployed persons on total workforce (provincial)	ISTAT
so	Dummy: 1= Southern	
ne	Dummy: 1= North-East	
nw	Dummy: 1= North-West	

Table 2 Summary statistics

	Mean	Std. Dev.	Min	Max
Histentr_ind	0.021	0.006	0.009	0.045
Histmpower_ind	0.198	0.098	0.020	0.417
Histfemale_ind	0.200	0.116	0.033	0.493
Histmpentr_ind	0.004	0.003	0.000	0.011
Histmpfemale_ind	0.236	0.160	0.009	0.635
Histentr_ser	0.024	0.008	0.011	0.066
Histmpower_ser	0.029	0.025	0.002	0.109
Histfemale_ser	0.339	0.143	0.181	1.560
Histmpentr_ser	0.001	0.001	0.000	0.004
Histmpfemale_ser	0.215	0.150	0.000	1.331
R&D	1.289	0.403	0.640	2.150
Tertiary	0.197	0.035	0.140	0.300
Prod	57.711	6.993	43.600	76.260
Popdens	262.117	349.874	39.050	2641.280
Unemplrate	11.792	5.787	3.710	28.310

Note: Data related to variables *R&D, Tertiary, Prod, Popdens and Unemplrate* refers to 2016 CHECK

Table 3. Regression results. Dependent variable: Provincial start-up rate

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES(*)	***HTM***	***HTM Motive power***	***LTM***	***LTM Motive power***	***Manuf.***	***Manuf. Motive power***	***Services***	***Services Motive power***
Histentr_ind	0.045		0.483***		0.439**			
	(0.200)		(0.180)		(0.176)			
Histmpower_ind	0.459***		0.293**		0.309**			
	(0.139)		(0.125)		(0.122)			
Histfemale_ind	0.280**		0.076		0.085			
	(0.115)		(0.101)		(0.099)			
Histmpentr_ind		0.283**		0.302***		0.301***		
		(0.126)		(0.111)		(0.109)		
Histmpfemale_ind		0.190**		0.136*		0.133*		
		(0.081)		(0.072)		(0.070)		
Histentr_ser							0.125	
							(0.085)	
Histmpower_ser							-0.049*	
							(0.027)	
Histfemale_ser							0.002	
							(0.078)	
Histmpentr_ser								-0.020
								(0.022)
Histmpfemale_ser								-0.025
								(0.032)
R&D	-0.026	0.003	0.054	0.058	0.042	0.045	0.004	0.011
	(0.112)	(0.112)	(0.049)	(0.049)	(0.048)	(0.048)	(0.022)	(0.022)
Tertiary	0.143	0.118	0.013	0.015	0.028	0.028	-0.007	-0.005
	(0.118)	(0.118)	(0.044)	(0.044)	(0.044)	(0.043)	(0.020)	(0.020)
Prod	0.088	0.029	-0.216	-0.201	-0.199	-0.187	0.043	0.050
	(0.465)	(0.462)	(0.183)	(0.182)	(0.179)	(0.179)	(0.081)	(0.081)
Popdens	0.023	0.043	0.050	0.048	0.060	0.059	0.079***	0.078***
	(0.070)	(0.066)	(0.060)	(0.057)	(0.059)	(0.056)	(0.025)	(0.023)
Unemplrate	0.123	0.129	0.035	0.037	0.013	0.015	-0.014	-0.012
	(0.080)	(0.081)	(0.030)	(0.030)	(0.029)	(0.029)	(0.013)	(0.013)
So	-0.527***	-0.575***	-0.345**	-0.310**	-0.360**	-0.332**	-0.224***	-0.225***
	(0.187)	(0.186)	(0.160)	(0.158)	(0.157)	(0.154)	(0.059)	(0.059)
Ne	0.221	0.271*	-0.186	-0.242*	-0.163	-0.208*	-0.137***	-0.121**
	(0.148)	(0.146)	(0.129)	(0.126)	(0.127)	(0.123)	(0.049)	(0.048)
Nw	-0.237	-0.180	-0.507***	-0.553***	-0.491***	-0.527***	-0.107*	-0.072
	(0.164)	(0.162)	(0.145)	(0.143)	(0.142)	(0.139)	(0.059)	(0.054)
Observations	1,114	1,114	1,140	1,140	1,140	1,140	1,116	1,116
Number of prov.	95	95	95	95	95	95	93	93

Notes: (*)log values
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

APPENDIX

TableA1. Economic activities by technology intensity

	NACE Rev.2 code	NACE Rev.2 description
High and medium-high technology (HTM)	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)	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
Knowledge-intensive services (KIS)	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)
Less knowledge-intensive services (LKIS)	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)

Table A2. Regression results. Robustness Checks Dependent variable: Provincial start-up rate

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
	KIS	***KIS***	***LKIS***	***LKIS***	***KIS***	***KIS***	***LKIS***	***LKIS***
VARIABLES(*)	***RE***	***OLS***	***RE***	***OLS***	***RE***	***OLS***	***RE***	***OLS***
Histentr_ser	0.089	0.077	0.137	0.148	0.117	0.094	0.171*	0.166
	(0.086)	(0.094)	(0.092)	(0.126)	(0.090)	(0.118)	(0.095)	(0.147)
Histmpower_ser	-0.035	-0.045	-0.053*	-0.045	-0.014	-0.028	-0.030	-0.028
	(0.027)	(0.029)	(0.029)	(0.030)	(0.027)	(0.031)	(0.029)	(0.034)
Histfemale_ser	0.007	-0.019	0.002	0.037	-0.072	-0.105	-0.085	-0.053
	(0.078)	(0.061)	(0.085)	(0.082)	(0.077)	(0.064)	(0.083)	(0.079)
R&D	0.034	0.009	-0.008	-0.009	0.043	0.027	-0.005	0.010
	(0.034)	(0.043)	(0.024)	(0.045)	(0.034)	(0.044)	(0.024)	(0.045)
Tertiary	0.031	0.148**	-0.012	0.095	0.036	0.176**	-0.009	0.125
	(0.034)	(0.070)	(0.022)	(0.077)	(0.034)	(0.073)	(0.022)	(0.077)
Prod	0.241*	0.315	-0.019	-0.506**	0.287**	0.543**	0.009	-0.268
	(0.131)	(0.224)	(0.089)	(0.252)	(0.131)	(0.257)	(0.089)	(0.262)
Popdens	0.073***	0.077***	0.080***	0.081***				
	(0.025)	(0.026)	(0.027)	(0.028)				
Unemplrate	-0.001	-0.206***	-0.019	-0.023	0.006	-0.169***	-0.016	0.016
	(0.023)	(0.054)	(0.015)	(0.057)	(0.023)	(0.056)	(0.015)	(0.058)
so	-0.288***	-0.179**	-0.212***	-0.255***	-0.269***	-0.158**	-0.192***	-0.234***
	(0.061)	(0.074)	(0.064)	(0.079)	(0.064)	(0.076)	(0.066)	(0.082)
ne	-0.022	-0.083*	-0.166***	-0.125**	-0.016	-0.078	-0.160***	-0.120**
	(0.050)	(0.047)	(0.053)	(0.055)	(0.053)	(0.051)	(0.055)	(0.060)
nw	-0.060	-0.075	-0.120*	-0.083	-0.054	-0.069	-0.114*	-0.076
	(0.059)	(0.056)	(0.064)	(0.064)	(0.062)	(0.061)	(0.066)	(0.070)
Observations	1,116	1,116	1,116	1,116	1,116	1,116	1,116	1,116
R-squared		0.533		0.350		0.504		0.298
Number of provinces	93		93		93		93	

Notes: (*)log values
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0