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The missing link? Trust, cooperative norms and industrial growth in Italy's provinces, 1871 – 1911

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Abstract

Despite recent research on the link between social capital and economic growth, the impact of social norms on the first phase of Italy's regional economic divergence remains under researched. This paper fills the gap by drawing on a framework based on sociology, economics and economic history. By following a multi-faceted definition of social capital recently provided by the OECD and by using charity, mutual aid and crime data, this paper estimates differences in the strength of trust and cooperative norms across the country's 69 provinces at ten-year intervals between 1871 and 1911. The impact of trust and cooperative norms is then analysed through regression models of conditional convergence in industrial value added. The results show that, although social-capital regional disparities were indeed large during the late-nineteenth century, they are not strongly correlated with industrial growth. Instead, the evidence provided shows that human capital, innovation capabilities and formal institutions played a major role in determining the economic fortune of Italy's provinces before the Great War.

Introduction

Does social capital foster economic development? The conventional wisdom in the economic discipline is that social capital is an important factor of modern growth.¹ Past and recent analyses focused on Italy's post-WWII regional development suggest that social capital exerted a strong influence on economic growth;² yet, a more nuanced analysis based on the long-term evolution of Italy's economy has recently shown that the role played by social capital might be context-dependent: according to Felice, social capital influenced the pattern of Italy's regional development only after 1970, when the country's regional governments were established and when the fall of business models based on large Fordist firms faded out in a changing global economy.³ However, attempts to capture differences in social-capital endowments across Italian regions before the turn of the twentieth century remain scant. Furthermore, the impact of social capital on economic growth before the Great War is still unexplored.

This paper investigates whether social capital can be considered an important factor of Italy's regional industrial growth before the First World War. By using a methodological framework that draws from economics, economic history and the social sciences, it shows that trust and cooperative norms – which are expected to be the dimensions of social capital most positively correlated with economic outcomes according to the Organization for Economic Cooperation and Developmentⁱ – played a rather marginal role in the early phase of Italy's regional growth, contrary to the conventional wisdom about their importance in shaping economic development. This result tends to confirm the evidence provided by Felice for the long twentieth century.

I provide new estimates of the strength of trust and cooperative norms across Italy's 69 provinces between 1871 and 1911 (at ten-year intervals) based on new primary sources, and explore the correlation between trust and cooperative norms and industrial growth at the provincial level and over time. First, the impact of these dimensions of social capital on industrial growth is analyzed through a

ⁱ Henceforth OECD.

cross-section regression model of conditional convergence. Finally, in order to provide results that are more robust to potential endogeneity and unobserved heterogeneity, an Arellano-Bond model is introduced to estimate the impact of trust, cooperative norms and other factors on regional industrial growth between 1871 and 1911.⁴

The evidence shows that, despite the long-term persistence of regional disparities in trust and cooperative norms and their positive correlation with industrial growth, the latter seems to have been driven by the presence of human capital (adult literacy) and innovation capabilities (patents), as well as the distribution of political voice at the local level (the capability to influence policy captured by electoral franchise). This evidence tallies with a new body of literature that has recently underlined the important role played by innovation capabilities, human capital and formal institutions in the growth of Italy's economy over the long run.⁵

Why is the analysis of social capital as a factor of growth particularly appealing in the context of regional economic divergence or convergence within countries? Social capital is more likely to be the determinant of institutional differences in contexts characterized by homogeneous formal norms – when differences in cooperative behaviors and collective actions can hardly be explained by differences in laws and formal institutions. For this reason, a quantitative estimate of social capital across Italy's regions in the period 1871 – 1911 can improve our understanding of the determinants of the country's widening regional divide in the 20th century. Furthermore the analysis, performed at provincial level (today's NUTS-3),ⁱⁱ allows one to investigate previously unexplored intra-regional differences in social capital. Indeed, much of the previous research has focused on NUTS-2 regional disparities, under the presumption that social-capital regional differences were somewhat inherited from pre-unification regional states.⁶ This article provides a finer level of detail and shows that, indeed, disparities were quite remarkable even within regions of Italy.

ⁱⁱNomenclature of Territorial Units for Statistics.

Literature review: social capital and Italy's regional development

Emanuele Felice has put forward the hypothesis that social capital and informal norms should be considered part of a triad of factors that has been central for Italy's regional growth, especially in its early phase from 1861 and until the Great War.⁷ Originally proposed by Luciano Cafagna and later elaborated by Stefano Fenoaltea, this hypothesis suggests that northwestern regions had an original advantage because of three specific features.⁸ First, they possessed good resource endowments: in particular, water streams represented a source of energy for both traditional and new industries. Secondly, the North of Italy was characterized by relatively high human capital (literacy rates) – a highly immobile factor in the early 19th century. Finally, at least before unification, the Liberal states of the North were characterized by higher levels of social capital, as well as more modern and progressive institutions than the South.⁹ In turn, this triad of good immobile factors attracted capital, labour and technology, which paved the way to the economic progress of the Northwest, leaving the rest of the country behind.¹⁰

The rise of the New Economic Geography has allowed economic historians and economists to explore the role played by resources and market access in Italy's regional development. However, contrary to expectations, the pattern of industrialization before the turn of the 20th century does not seem to have been driven by resource endowments or access to domestic or foreign markets; instead, as the hypothesis on the importance of the triad had originally also put forward, levels of human capital were a primary determinant of industrial location across Italian regions.¹¹ This finding is consistent with the thesis that human capital is a fundamental factor of growth along the trajectories of the Second Industrial Revolution,¹² although recent research has also offered preliminary evidence on the importance of agglomeration economies in the Po Valley and of spatial spillovers.¹³

Felice has stressed the potential role of social capital among the ultimate causes of growth identified by Cafagna and Fenoaltea. In a long-term perspective, social capital may explain why regional

disparities in Italy have persisted to the present day: although human capital has recently become more mobile, and institutions are homogenous across regions of the same country, social capital and institutional efficiency are still immobile – and hence local – factors of growth. In Felice's view, poor social capital may be connected to the lack of autonomous development in the southern regions of the country.¹⁴ The absence of inclusive social norms might have hindered a process of active modernization, i.e. social and economic progress that is prompted by – and is likely to benefit – society at large.¹⁵ Instead, the south of Italy did grow to some extent, but it did so largely as a result of passive modernization. The latter may be defined as improvements adopted insofar as they provide benefits to the ruling elites, but not to the majority of the population, because widespread economic and human development may shake the foundation of their own power (Felice and Vasta 2015). According to this interpretation, substantial improvements in health and schooling were brought about by state intervention;¹⁶ yet, the central government failed to prompt auto-propulsive and sustained economic growth with top-down industrial policy in the post-war period.

Despite these new hypotheses, research on the role played by social capital in Italy's first phase of regional economic divergence remains scant. Detailed contributions focused on Italy's Liberal Age have shown that regional disparities in social capital were indeed large after unification. For example, Galassi collects information on cooperatives between the late-19th century and the Interwar period. He finds that economic cooperation in the south was hampered by low levels of trust, although he does not explore its determinants. According to Galassi, trust looks like a structural feature embedded in society, which may be determined by poor environmental circumstances or cultural factors such as the ones discussed by Putnam et al.¹⁷ Similarly, A'Hearn investigates Italian cooperative banks at the end of the 19th century. He examines the sharp decline of these institutions in the south after the banking crisis of the 1890s, which seems to be at odds with the fact that they were as successful as the northern ones during the 1880s. According to A'Hearn, levels of generalized trust provide a good explanation. The author claims that cooperative banks in the southern regions faced a more mistrustful public. Hence, they had to rely less on deposits and more on different, riskier sources of financing.

When the crisis occurred, they were much more vulnerable than banking institutions in the north, a fact that eventually drove them to collapse.¹⁸ Finally, Guiso and Pinotti have also shown that social capital levels differed to a large extent across Italy's regions prior to WWI, by using a quasi-natural experiment based on the extension of franchise in 1912.¹⁹

Although these different contributions have identified large regional disparities in social capital on the eve of the 20th century, the hypothesis on the importance of social capital for regional divergence before the Great War remains untested, mainly because of the lack of data and measurement problems. This work aims to fill the gap, by connecting social-capital estimates at provincial level with the growth of industry across areas of the country between 1871 and 1911. The figures concerning industrial production are drawn from recent studies, aimed to reconstruct the regional pattern of industrial growth in Italy and to explore its determinants.²⁰

Social capital: a functional definition?

Social capital may be generally viewed as “networks, together with shared norms, values and understandings that facilitate co-operation within or among groups”, a definition originally provided by the OECD.²¹ However, different authors in the past have shown that different features of social capital might have a different impact on social, political and economic outcomes, so that the concept should be further disentangled across its multiple dimensions.²²

Indeed, a recent study sponsored by the OECD provides four distinct definitions of social capital.²³ This approach divides social capital according to two distinct but connected levels. On the one hand, social capital can concern individual vis-à-vis public activities and outcomes (see rows in Table 1 below). On the other hand, a structure of networks or persistent social norms does not necessarily guarantee access to social and economic resources (capital) that individuals or the collectivity can use to increase their well-being or that of society at large (columns in Table 1).

Table 1 – social capital: four definitions. Source: Scrivens and Smith (2013).

	Network Structure and Activities	Productive Resources
Individual	Personal relationships	Social network support
Collective	Civic engagement	Trust and cooperative norms

For example, “it may be more likely that someone who knows a lot of people and socializes often with them (i.e. has a solid network structure) is also able to easily call on his or her friends for emotional, material and professional support (i.e. has access to a large variety of positive network resources). However this is not always the case”.²⁴

While personal relationships and the social-network support that they generate can sometimes lead to the rise of “dark” social capital (criminal organizations come to mind), civic engagement comprises the “activities through which people contribute to civic and community life, such as volunteering, political participation, group membership and different forms of community action” (idem). Although civic engagement may be desirable per se as a dimension of well-being, its presence does not necessarily guarantee high levels of trust and cooperative norms in society. The latter category refers to “the trust, social norms and shared values that underpin societal functioning and enable mutually beneficial cooperation”. This clearly is a collective resource, the kind of social capital that has been found to be correlated with important institutional, social and economic outcomes. Therefore, the present analysis aims to measure differences in trust and cooperative norms across areas of Italy – *beyond* the mere presence of civic engagement – in order to explore the link between social capital and regional economic divergence in Italy’s Liberal Age.

Measuring social capital across Italy’s provinces, 1871 – 1911: data and sources

Given the previous discussion on the importance of analyzing different dimensions of social capital, the present article does not attempt come up with an index that pools together different facets of the concept. Instead, it will focus on two distinct measures of social capital, which are all based on the idea

that trust and cooperative norms are the resources that can, potentially, foster economic development (as briefly explained in the previous section).

Cooperative norms are captured by calculating the arithmetic average between two similar indices, which are reconstructed from different sources. First, I explore data on Italy's independent charity institutions – the *opere pie* – in order to measure what share of their available revenues they actually destined to charity.ⁱⁱⁱ I use three distinct and largely unexplored inquiries^{iv} on the *opere* to reconstruct the first index of cooperative norms. The inquiries were published by Italy's governmental statistical division over the late-19th and early-20th centuries, and refer to the state of the *opere* in 1861, 1880 and 1900.²⁵

By using these sources, it is possible to capture cooperative norms *beyond* the mere presence of civic engagement, which may not necessarily produce collective capital. To be sure, Italy's charity institutions were set up by individual donations, hence their density on the territory can capture civic engagement. However, according to the framework provided by Scrivens and Smith and previously discussed, if society is not able to establish and reinforce cooperative norms, then civic engagement can hardly produce better outcomes. The share of available resources destined to charity should capture fairly well the extent to which society was able to produce effective cooperative norms from civic engagement, by monitoring the administrators of the *opere* and holding them accountable. The idea is that cooperative norms within society could push the *opere* to allocate a large share of their resources to the common good, instead of promoting rent-seeking behavior and patronage.

ⁱⁱⁱ Charity expenditure excludes services such as lending or worship-related expenditure, unless contained in the category “worship and charity” – when it was kept in the total of charity expenditures. Examples of services included in the calculations of charity expenditure are hospitals, orphanages, services for the disabled, school subsidies for the poor and pre-primary schools.

^{iv} Only the 1880 Inquiry on the *opere pie* has been extensively described and analysed by Farrell-Vinay (1997).

A similar index is elaborated through data on Italy's mutual aid societies (see Direzione Generale Della Statistica, various years): this approach relies on the attempt to capture the extent to which society promotes the transformation of civic engagement (produced from personal relationships and networks in this case) into productive cooperative norms – i.e. 'positive' social capital. I measure the expenditure used to support the mutual-aid members' activities, as well as their families and their surrounding communities, as a share of total expenditure. Again, using the number of mutual aid societies per capita or per squared kilometer may capture civic engagement or – in this case – personal relationships and networks that do not necessarily foster trust and cooperation, but rather provide mutual advantages to its members.

The distribution of the two measures of cooperative norms across Italy's provinces is shown in Figure 1. Large disparities across provinces can be discerned, and a clear north-south gradient is observable (the provincial figures are normalized to the value of Italy, which is set equal to 1). More interestingly, this preliminary evidence shakes the view that social capital can be assumed to be a super-provincial phenomenon connected to the long-term persistence of pre-unification formal and informal norms. Remarkable disparities can be seen within regions, although they concern especially the Centre-North of the country; interestingly, the South seems to have been characterized by a homogeneous *low* level of cooperative norms. Finally, Figure 2 shows that the regional distribution of cooperative norms calculated via the *opere pie* data is highly persistent over time – an aspect that is often found to characterize social capital.²⁶

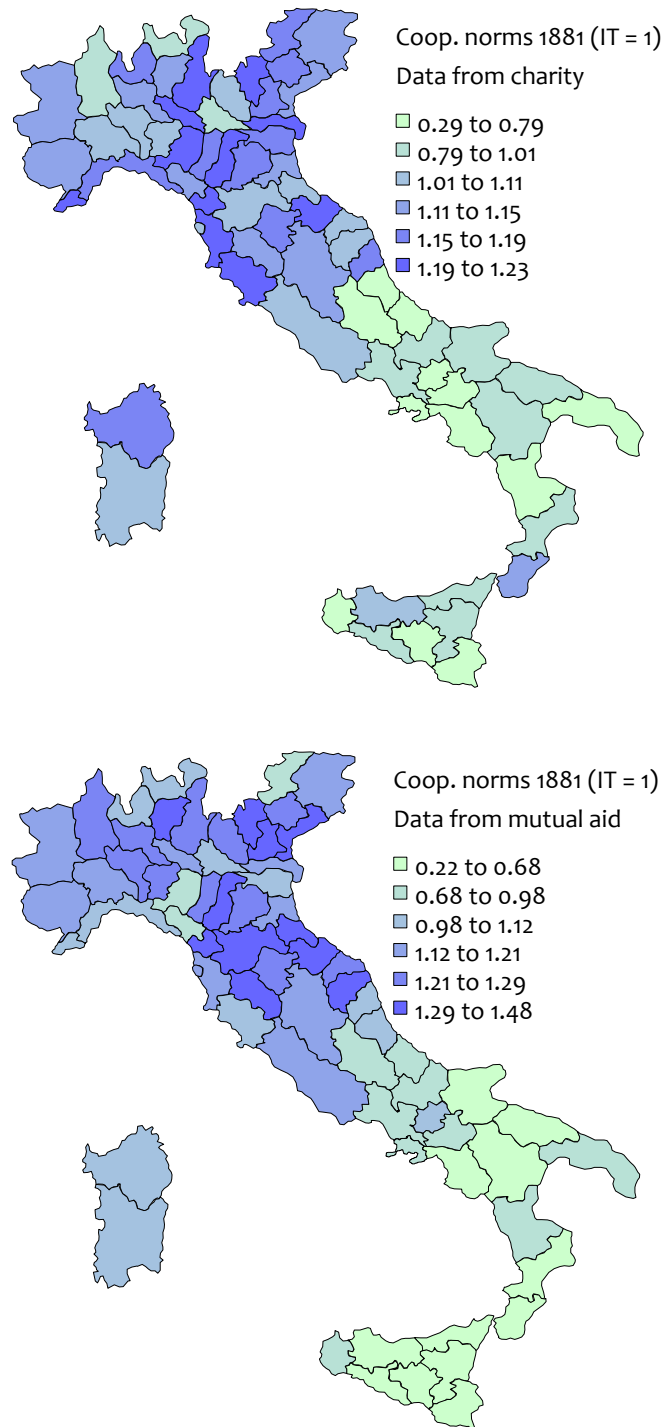


Figure 1 – Cooperative norms in c. 1881 as measured through data on charity institutions (first map) and mutual aid societies (second map). Notes: the provincial values refer to Italy = 1. Sources: see text.

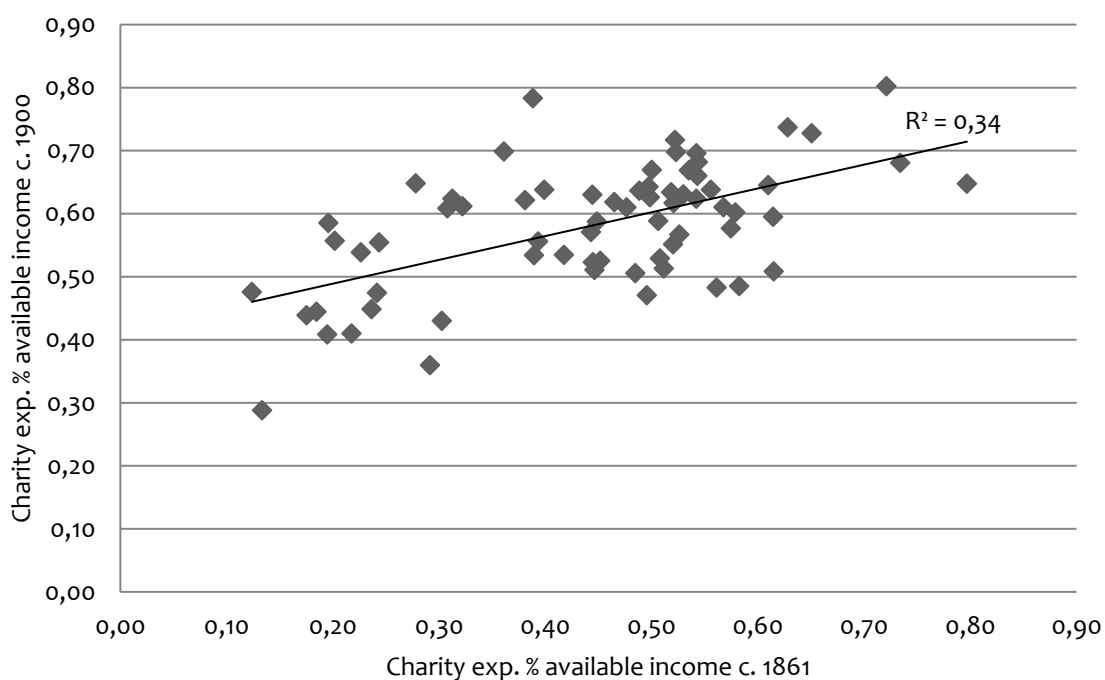


Figure 2 – index of cooperative norms based on the *opere pie*, in 1861 and 1900. Sources: see text. Notes: a simple regression (with robust standard errors) of the ranking of provinces based on this index in 1900 on a similar ranking in 1861 returns a highly significant and positive coefficient ($t = 5.10$).

To what extent did the behavior of charity institutions reflect societal features? Can we be confident that charity institutions operated independently and according to the level of cooperative norms of their society – and were not influenced by formal institutions like the central and local governments?

The *opere pie* reflected a spontaneous interest in the public good, in that their presence was usually due to the decisions of private citizens (*testatori*) to donate part of their wealth for setting up charitable organizations. Additionally, the extent to which they were able to survive and pursue their objectives was partly due to donations (*eredità, lasciti and donazioni*) made by other members of the same community. One may consider the diffusion of *the opere pie* and relative donations as the will to contribute to tackling social issues, as poverty was considered at the end of the 19th century. This precise feature of autonomy also characterizes the *opere* in the long run, despite the state's frequent attempts to tighten its control. Indeed, as the importance and economic strength of the *opere pie* grew quickly after Italy's unification, the government sought to exert more control and regulation on them

– with the aim of reducing administrative inefficiencies and poor effectiveness that characterized certain areas of the country, especially the South. However, in order to avoid any head-on conflict with the Church (to which some of these organizations were linked), the first law on the *opere pie* (1862) did not actually affect their autonomy. Only the Crispi Law of 1890 managed to extend some state regulation to the *opere*, although the charity network was still far from being heavily regulated by 1900.²⁷ The Giolitti Law of 1904 finally placed the *opere* under the supervision of a specific national council (*Consiglio Superiore di Assistenza e Beneficenza Pubblica*). Although the council managed to collect the accounts of the *opere pie* more rapidly, at the end of the Liberal Age the system was still far from efficient and centrally organized. Eventually, the Fascist government abolished the majority of norms that had been established during the previous decades.²⁸ Therefore, the autonomy of these charitable institutions in the long run represents a unique feature for the understanding of the evolution of cooperative norms across Italian regions.

Very similar features are shared by the index of cooperative norms calculated by drawing on mutual aid societies. Mutual aid was certainly important for the development of civil society and cohesion. As Tomassini puts it, “the societies were a school of political democracy with repercussions that had a major impact on the integration of the populace into a liberal political system”. He also stressed that “[...] mutualistic activities that encouraged socializing were particularly widespread. In fact, the predominance of the simple economic organization previously described did not intrinsically limit functions that enhanced social cohesion”. Mutual aid societies also carried out important side-activities, such as educational activities, the provision of small public libraries, excursions, cooperatives and cafes.²⁹

Yet, Tomassini implicitly warns us about another aspect that may bias our assessment of social capital across the regions of Italy. Mutual aid societies in Italy had a precise economic and institutional role. They were set up to protect workers’ interests. Their activities surely influenced the surrounding civil society, but their primary aim was the provision of benefits to members. Therefore, focusing on the number of mutual aid societies may well capture the power of personal relationships and network

structures, but not the importance of cooperative norms. For this reason, this analysis focuses on an index that captures their connection with society at large, as well as the extent to which they aimed to improve the quality of living within their communities – not just that of their members. The share of their expenditure that was actually destined to sociable activities is used with this aim in mind. Several statistics and inquiries on mutual-aid societies were published by the *Direzione Generale della Statistica* roughly every five years, and are used to draw data on their expenditures.³⁰

A third, final measure of social capital, proxying generalized mutual trust in society, draws on the ideas of Nuzzo and Felice:³¹ first, violent crime rates across Italian provinces are measured by relying on the *Annuario Statistico Italiano* and the *Annali di Statistica* (various years). Differently from Nuzzo, who includes also extortion and fraud, I only include reports of homicides of any kind – often linked to crimes such as theft – to avoid underreporting.³² Secondly, the index of trust is obtained by transforming crime rates through the formula in Equation 1 below, following Nuzzo:

$$(1) \quad trust_{it} = 1 + (1 - crime_{it})$$

The idea behind this index is that trust depends on past experience about other people's behavior, so that one can proxy trust by using a measure that captures the degree of reliability of other individuals on the territory.³³ This measure of trust, contrary to the previous ones, is likely to be affected by the growth rate of industrialization and economic activity to a large extent. Therefore, results based on its analysis should be taken with caution. The distribution of trust across Italian provinces is shown in Figure 4 below.

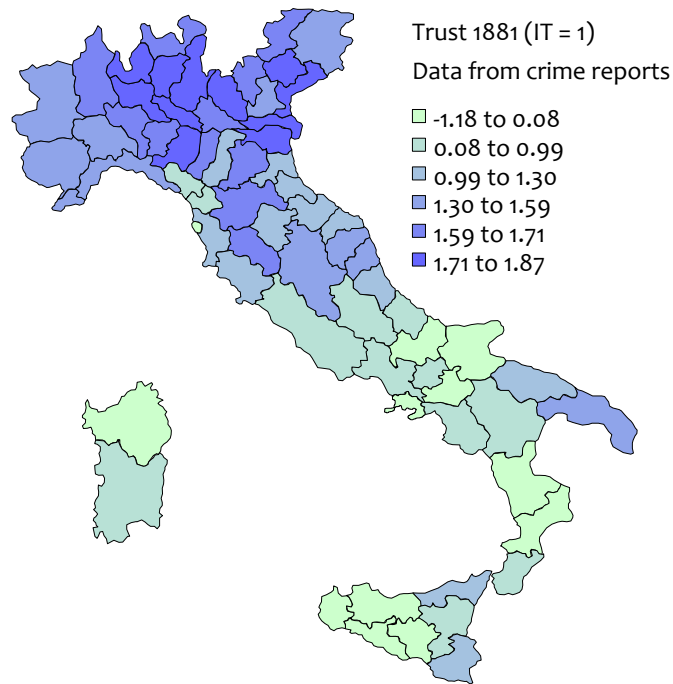


Figure 4 – distribution of trust across Italy’s provinces, 1881 (Italy = 1). Sources: see text.

Values at benchmark years for each index (1871, 1881, 1891, 1901 and 1911) were reconstructed by means of linear interpolation. There is a positive and clear correlation between the average annual growth of industrial value added in the period 1871 – 1911 and the strength of cooperative norms in 1871 (Figure 5). However, the correlation between literacy and industrial growth is even stronger (Figure 6), which calls for a further and comprehensive investigation of the factors behind the regional pattern of growth of industry. Finally, it is worth noting that the correlation between industrial growth and water endowments to be exploited through hydroelectric power plants (a variable that is described fully in the next section) is rather low, contrary to previous expectations (index of correlation equal to 0.20 with a p-value of 0.13).

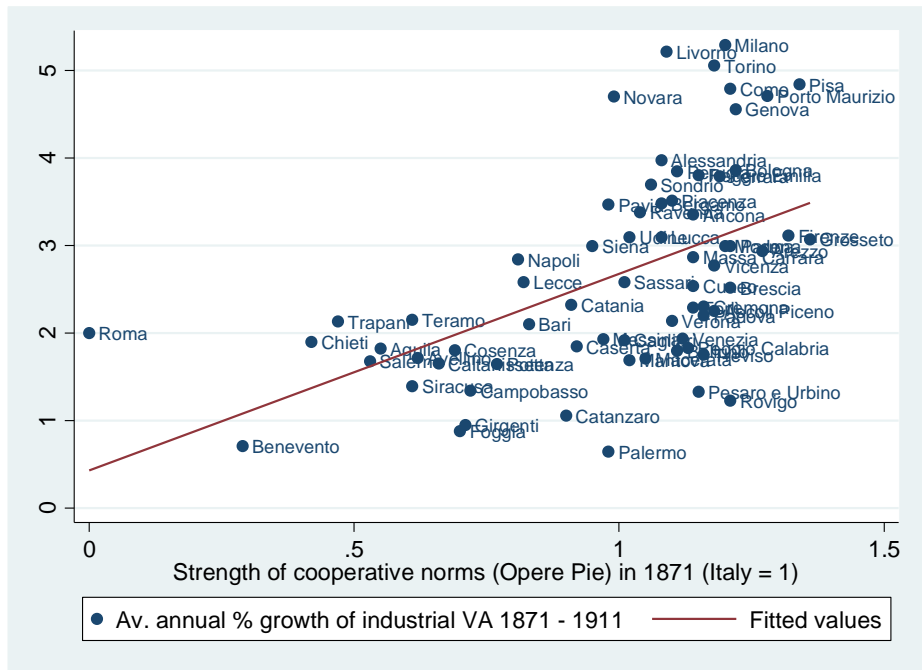


Figure 5 – correlation between the strength of cooperative norms in 1871 and average annual growth of industrial value added over 1871 – 1911. Notes: the strength of cooperative norms here is measured through data from the *opere pie*. Sources: see text.

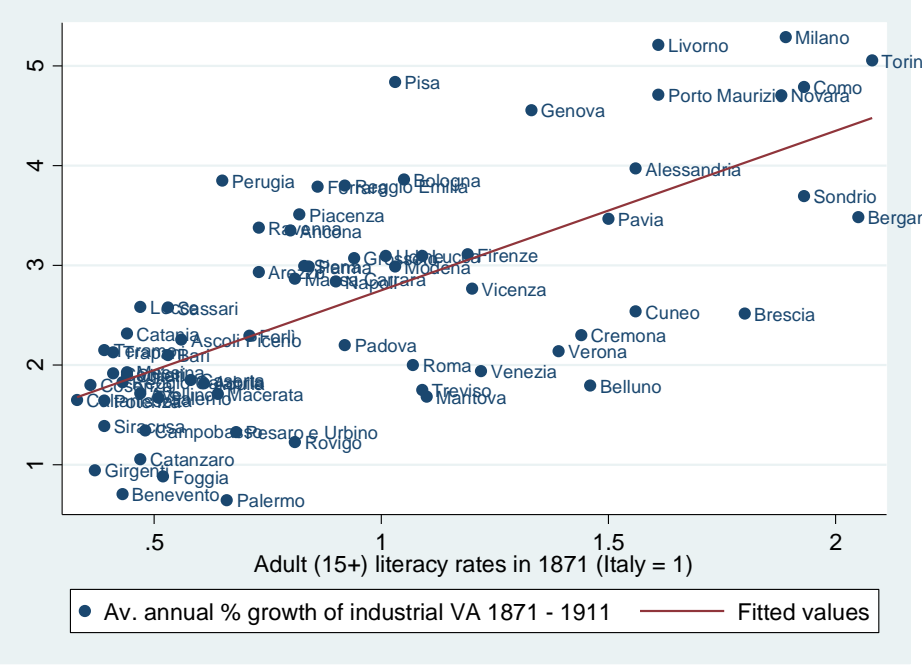


Figure 6 – correlation between the adult (15+) literacy rates in 1871 and average annual growth of industrial value added over 1871 – 1911. Sources: see text.

Methodology: regression analysis through a model of conditional convergence

Regression analysis can be used to study how differences in trust and cooperative norms across Italian provinces correlate with industrial growth. A simple bivariate regression of provincial values of industrial growth on social-capital endowments would allow one to estimate to what extent industrial growth accelerates if trust and cooperative norms increase (equation 2); yet, multivariate regression analysis should be used to rule out the possibility that a strong correlation between trust (or cooperative norms) and industrial growth simply is the result of improved human capital – or other factors strongly correlated with social capital and omitted from the analysis (a problem commonly known as omitted variable bias). Indeed, if higher levels of social capital are strongly associated to higher levels of human capital we need to control for this mechanism by including an index of human capital, in order to verify whether a direct relationship between trust and cooperative norms and industrial growth before WWI actually existed.

$$(2) \quad indgr_{1871-1911_i} = \beta_0 + \beta_1 trust_coop_{1871_i} + \varepsilon_i$$

Indeed, the correlation between the index of trust and cooperative norms and literacy rates is equal to 0.64 for the whole sample of provinces at ten-year intervals between 1871 and 1911. This descriptive result calls for the use of multivariate regression analysis. Furthermore, the latter can shed light on the relative importance and magnitude of trust and cooperative norms as factors of growth – and compare their impact on industrial development to that of human capital and other dimensions of the triad discussed earlier.³⁴ In order to do so, trust and the two indices of cooperative norms are always taken separately in the following analysis.

A model of conditional convergence is initially used to test the effect of trust and cooperative norms on the growth of industrialization. The idea of conditional convergence is that, in a set of countries or regions, those that are characterized by a lower initial level of development will grow faster in the period analyzed, but conditional on the presence of similar factors endowments like human capital, social capital and institutions.³⁵ This hypothesis needs to be taken into account in order to identify

correctly the correlation between industrial growth and trust and cooperative norms by avoiding omitted variable bias, as explained the previous paragraph. The outcome of interest is the average annual change in industrial value added per capita between 1871 and 1911, obtained from Ciccarelli and Fenoaltea.³⁶ This is regressed on the initial level of industrial value added per capita in 1871, as well as trust and cooperative-norms variables and other potential determinants of growth in the same year (Equation 2 below).

$$(3) \quad indgr_{1871-1911_i} = \beta_0 + \beta_1 ind_{1871_i} + \beta_2 trust_coop_{1871_i} + \beta_3 X_{1871_i} + \varepsilon_i$$

The vector of control variables includes the other central variables of the triad previously discussed. The adult literacy rate (15+) captures human capital (constructed from census data), while the production of hydroelectricity per capita (watt per inhabitant) measured in 2009 proxies the availability of water resources.³⁷ Needless to say, measuring the flow rate of water streams would represent a better proxy for studying the impact of water resources on industrialization. Although an attempt to measure water availability through modern flow-rate data is currently being carried out, data remain unavailable for several areas of the country; why using modern data on production instead of contemporary figures? The problem is that we expect the growth of industrialization to reverse-cause the production of energy via demand: instead, if modern data reflect capacity because of saturated production, then using watt per capita produced through hydroelectricity should be a good proxy for water availability more generally. Indeed, data from SVIMEZ show that the production of hydroelectricity across Italian regions has been characterized by a plateau in the last ten years, which suggests that all the possible sources have been extensively used independently of technological

constraints;³⁸ hence contemporary production captures total available water resources (the provincial data used come from *Gestore Servizi Energetici* and are transformed in logs³⁹).^v

In a second model, a wider set of control variables is included to further limit omitted variables bias: a proxy for electoral franchise (the share of adult males allowed to vote in local elections in the population) is included as it should capture institutional differences due to formal norms, as well as potential political participation and political voice that can influence public policy.⁴⁰ Indeed, Cappelli has shown that franchise played a role (although to a limited one) in the municipalities' effort to provide primary schooling in late-nineteenth-century Italy.⁴¹ Other controls include the share of labour force employed in agriculture (data provided by Anna Missiaia⁴²), population (residents) density and a proxy for the child dependency ratio^{vi} from census data, patents per million inhabitants (data provided by Alessandro Nuvolari and Michelangelo Vasta⁴³) and an index of land inequality. This latter is constructed as the ratio between large landowners (paying 40+ Lire of state and provincial land tax, own elaboration from the Jacini Inquiry)^{vii} and total landowners (census data).⁴⁴ Table 2 shows a summary of the variables included in the statistical analysis, the results of which are discussed in the next section. All the variables but the initial level of industrial value added are normalized to the value of Italy (equal to 1).

^v The squared term of the variable is included to capture nonlinearities. For example, a few provinces (Novara, Torino and Sondrio especially) are characterized by a very high value of hydroelectric energy production compared to their average pace of industrial growth.

^{vi} For convenience, the index is proxied by the ratio between the number of school-age children (6 to 10 years old) and total population (residents).

^{vii} The Jacini Inquiry represents a monumental publication on the state of Italy's agriculture in the late-nineteenth century, which was prompted by the agrarian crisis that affected Italian landowners to a large extent.

Table 2 – summary statistics, Italy’s provinces in 1871 – 1911.

Variable	Mean	SD	Min	Max
Annual % GR of ind. 1871 - 1911	2.64	1.16	0.65	5.29
Industrialization 1871 (VA p.c. in 1911 Lire)	48.88	15.57	25.95	91.14
Trust (IT = 1) 1871	0.97	0.87	-1.37	1.96
HC (IT = 1) 1871	0.93	0.49	0.33	2.08
Hydro. power 2009, IT = 1	2.39	6.2	0	41.09
Electoral franchise (IT = 1) 1871	0.96	0.48	0.07	2.39
Share LB agric. (IT = 1) 1871	1.02	0.24	0.21	1.55
Pop. density (IT = 1) 1871	0.94	0.65	0.17	3.64
Dependency ratio (IT = 1) 1871	1	0.06	0.88	1.19
Patents per million inh. (IT = 1) 1871	0.66	1.21	0	7.14
Land inequality (IT = 1) 1871	1.09	0.96	0	3.13

Results

Table 3 presents the results based on an Ordinary Least Square (OLS) regression across Italian provinces for the whole period 1871 – 1911. Column 1 explores the role played by each factor of the triad previously discussed, but it includes only trust as a dimension of social capital. Column 2 shows the same approach, but with cooperative norms replacing trust as a measure of social capital. In columns 3 and 4 the same models are used, but the full set of control variables is added to both equations.

Table 3 – OLS cross-section regression of average annual industrial growth rates (1871 – 1911) on the triad of factor endowments in 1871.

Dependent variable: annual % GR of ind. 1871 - 1911	(1)	(2)	(3)	(4)
Industrialization 1871	-0.0008 (-0.0113)	0.0019 (0.0258)	-0.0211* (-0.2830)	-0.0175 (-0.2356)
Trust (IT = 1) 1871	0.0178 (0.0133)		0.1119 (0.0837)	
Coop. norms (IT = 1) 1871		0.9146* (0.2023)		0.7843 (0.1735)
HC (IT = 1) 1871	1.6258*** (0.6907)	1.2907*** (0.5483)	1.0330** (0.4389)	0.8466* (0.3597)
Hydro. power 2009, IT = 1	0.0010 (0.0051)	0.0112 (0.0604)	-0.0359 (-0.1933)	-0.0302 (-0.1621)
Hydro. power 2009, IT = 1 (sq.)	-0.0002 (-0.0365)	-0.0002 (-0.0349)	0.0002 (0.0469)	0.0003 (0.0501)
Electoral franchise (IT = 1) 1871			0.6158** (0.2551)	0.6436** (0.2666)
Share LB agric. (IT = 1) 1871			-0.5447 (-0.1105)	-0.4675 (-0.0949)
Pop. density (IT = 1) 1871			0.0900 (0.0508)	0.0562 (0.0317)
Dependency ratio (IT = 1) 1871			1.3242 (0.0708)	0.9725 (0.0520)
Patents per million inh. (IT = 1) 1871			0.4416*** (0.4606)	0.4142*** (0.4321)
Land inequality 1871 (IT = 1)			-0.0392 (-0.0326)	-0.0224 (-0.0186)
Observations	69	69	69	69
R-squared	0.463	0.490	0.597	0.612

Notes: Robust normalized beta coefficients in parentheses. *** p<0.01, ** p<0.05, * p<0.1

In all estimates, the coefficient of the initial level of industrial value added (1871) is negative, as expected. This effect is not precisely estimated: in all specifications but one the estimated marginal impact of the per-capita industrial value added in 1871 is not statistically different from zero. This means that the econometric model does not provide firm evidence about the actual sign of the relationship between initial industrial development and industrial growth between 1871 and 1911.^{viii} What factors did actually determine convergence and divergence? Contrary to the conventional wisdom in economics and the hypotheses recently put forward by the literature on Italy's regional development, trust and cooperative norms did not have a major impact on the industrial fortune of Italy's provinces. Column 1 shows that the level of trust in 1871 had a very small impact on industrial growth in the following decades. Furthermore, the coefficient is statistically equal to zero in all models. The strength of cooperative norms in 1871 does correlate positively with industrial growth over the period 1871 – 1911 (column 2). However, its coefficient is about a third of that of human capital, which in addition remains statistically significant across all the different equations. Indeed, the 95-percent confidence interval for the estimated marginal impact of human capital on industrial growth includes always positive values, independently of the model chosen.

Finally, it is worth noting that, when all the control variables are included, the marginal impact of the strength of cooperative norms becomes statistically equal to zero (p-value equal to 0.107). The fullest models (columns 3 and 4) show that moving from the least human-capital-endowed province (Caltanissetta) to the one characterized by the maximum value (Torino) in 1871 would increase the average growth rate of industrial value added per capita (1871 – 1911) by c. 2 percent *annually*. Given

^{viii} Given this result, the coefficient reported in column 3 stands as a preliminary, although weak, piece of evidence that the industrial value added across the provinces that possessed similar endowments in 1871 converged over the period analysed. Instead, the coefficient obtained through a simple bivariate regression of the growth of industrial value added between 1871 and 1911 on the initial level of industrial value added in 1871 is *positive* and statistically significant at the 5-percent level.

the observed variation of average annual industrial growth rates across Italian provinces in the period under study (0.65 to 5.39 percent), human-capital endowments seem to have played a central role compared to social capital and natural (water) resources.

The positive and statistically significant coefficient of the density of patents per million inhabitants confirms the importance of innovation capabilities in the process of Italy's regional growth during the Second Industrial Revolution. For example, rising its value from the mean (0.66) to the value of Torino (7.14) would rise the average annual growth of industrial value added by c. 3.5 percent. These results tally with recent evidence on the positive impact of Italy's innovation system on provincial economic growth during the Liberal Age.⁴⁵

Electoral franchise also had a positive impact on industrial growth. Clearly, a wider franchise limited political inequality and the confinement of decision-making to local ruling elites, like landowners. As Engerman and Sokoloff have first put forward, restricting the power of local elites allows society to invest in public goods that are key to fostering economic growth, like infrastructure and education. If the elite retains its power, it will seek to limit public-good investment to avoid a change in the balance of power that, in the long run, will prompt its decline by empowering the masses.⁴⁶ Although the main determinant of regional differences in the provision of primary schooling across Italian provinces in the Liberal Age was fiscal capacity, limited local franchise might have further hampered the development of primary education in rural areas and in the South of the peninsula.⁴⁷ Once formal local institutions are taken into account, more informal norms are not found to play a decisive role in fostering industrialization among Italy's provinces during the Liberal Age. The appendix shows that the results do not change even if we take into account further potential problems with the regression analysis used in the present section.

Conclusions

This work has provided the first systematic assessment of social capital disparities across Italian provinces in the Liberal Age (1871 – 1911). It confirms previous hypotheses on the extent of social-capital regional disparities in Italy during this period. However, it also shows that differences in the strength of trust and cooperative norms were large within Italian regions, which undermines the idea that social capital was exclusively inherited from late-medieval institutions, like some recent contributions have claimed.⁴⁸

Despite the presence of large and persistent disparities in the strength of trust and cooperative norms across Italian regions, the poor explanatory power of social capital in the context of the country's regional divergence before WWII⁴⁹ is confirmed by the regression analysis used in this paper. This result contrasts in part with the evidence recently provided by Ciccarelli and Fachin, who found social capital to be an important determinant of regional growth^{ix} – although to a lesser extent than human capital.⁵⁰ According to the evidence provided by the present article, the latter is found to be the most prominent factor of economic growth among the ones explored by Stefano Fenoaltea, in line with recent research on the relationship between human capital accumulation and regional inequality. This finding is reinforced by the positive association between the intensity of innovation capabilities (measured by patents per million inhabitants) and industrial growth during the spread of the Second Industrial Revolution (in line with recent evidence provided by Nuvolari and Vasta). Finally, the relevance of local institutional mechanisms (like political voice captured by local electoral franchise) confirms the evidence on the importance of formal institutions (North's rules of the game) in shaping Italy's economic fortune in the long run.⁵¹ Therefore, as far as the Liberal Age (1871 – 1911) is concerned, the evidence is consistent with Felice's idea that social capital started to exert and

^{ix} It is also worth noting that Ciccarelli and Fachin include variables drawing on electoral franchise in their "social capital" calculations. According to the framework provided by this paper, this approach might confound two related but different aspects, i.e. social capital and formal institutions.

important impact on Italy's regional growth only when regional governments were established in 1970 and when Italy's growing industrial districts started to rely on informal norms, networks, contracts and cooperation to reduce transaction costs (Felice 2012). This result on Italy's Liberal Age, although preliminary, suggest that investigating the relationship between formal and informal norms is important: in particular, a more thorough investigation of the way that informal norms influenced Italy's formal institutions and its innovation system should be tackled by future research.

Appendix: addressing unobserved heterogeneity and reverse causality in the regression analysis

Despite the consistency of the econometric results in cross-section models of regional convergence, further problems may arise because of observed heterogeneity: although several factors that might have influenced the pattern of growth across Italian provinces have been included, the omission of some unobserved – and hence unmeasurable – determinants can introduce bias in the estimated relationships. Such factors could include access to market, or the influence of climate on agricultural productivity. One way to improve the model presented above is to include dummy variables that can capture province-specific features that do not change over time (e.g. geography and climate but also, to some extent, market access given the relatively short period of time analysed). Results based on such a panel-data strategy confirm the previous findings: even within provinces, human capital exerted a positive effect on industrial growth, while the result concerning trust and cooperative norms remains far weaker and statistically equal to zero.^x

A second problem with the cross-section estimation is endogeneity. The identification of the relationship between human (or social) capital and industrial growth might be biased if industrial growth can also reverse-cause higher levels of social and human capital. Although the construction of the cross-section model used should limit the impact of such an issue, the panel structure of the dataset can be elaborated via an Arellano-Bond estimator, which provides two advantages over the cross-section model. On the one hand, the inclusion of lagged (previous) values of industrial growth can shed light on the pattern of economic divergence and convergence across Italian provinces. Secondly, this estimator limits the problem of endogeneity by using lagged values of the independent (endogenous) variables as instruments for their current values.

The Arellano-Bond is a first-difference panel-data model, which explores the impact of a one-unit change in the *difference* of each independent variable between t and $t - 1$ (e.g. 1871 – 1881) on a

^x These results are highly consistent with those achieved by using the model presented in the following paragraph, and therefore are excluded for the sake of brevity.

one-unit change in the *difference* of the dependent variable in the same period (see Table 4). The specification chosen assumes endogenous literacy, trust and cooperative norms and electoral franchise. It confirms the central role played by human capital in the process of regional divergence between 1871 and 1911, while trust and cooperative norms do not stand out as important factors of industrial growth during Italy's Liberal Age. This set of estimates show that, *within* each province, the initial level of industrialization prompted faster industrial growth; yet, the initially fast-growing provinces were also characterized by a negative premium on industrial growth over time. This evidence is consistent with a type of convergence in the medium and long run that is conditional on factor endowments – a result that was already suggested by the cross-section model. As expected, more limited franchise and political voice, a higher share of the labour force employed in agriculture, and a higher dependency ratio (which all characterized the more disadvantaged regions) are associated to a faster pace of industrial growth: once we hold the initial level of industrialization constant, the most disadvantaged provinces tended to grow faster. Interestingly though, provinces that were endowed with solid innovation capabilities (high value of patents per inhabitants) and higher human capital (literacy) could sustain a higher rate of industrial development in the medium-long run.

The coefficient of human capital in Table A2 looks exceptionally large. However, one must bear in mind that this is a first-difference model. The first difference of literacy rates (with the value of each province normalized to that of Italy = 1) ranges between -0.20 and +0.13, while the first difference in the dependent variable ranges between c. -6.00 and +6.00. Therefore, given the coefficient from the Arellano-Bond model (c. 16.00), the maximum difference in the rate of industrial growth that human capital can explain in this model is c. 5.30 percentage points – about half of its total observed variation over time and *within* provinces. This result is consistent with the first model, which showed that human capital can explain a large share of the variation in industrial growth *across* Italian provinces.

Table A2 – Arellano-Bond model explaining average annual industrial growth rates (1871 – 1911).

Dependent variable: annual % GR of ind. 1871 - 1911	(1)	(2)
Annual % GR of ind. (Lag 1)	-0.5805*** (0.094)	-0.5806*** (0.088)
Ind. VA per inhabitant (Lire 1911)	0.0927*** (0.017)	0.0925*** (0.016)
Trust (IT = 1)	-0.3848 (0.804)	
Coop. norms (IT = 1)		0.8455 (1.716)
HC: adult literacy (IT = 1)	17.1014*** (3.988)	16.6063*** (3.750)
Electoral franchise (IT = 1)	-4.1645** (1.804)	-3.9911** (1.695)
Share LF agriculture (IT = 1)	6.0150* (3.230)	5.5429* (3.228)
Pop. density (IT = 1)	-6.3008 (5.167)	-5.7659 (5.173)
Dependency ratio (IT = 1)	5.7857* (3.137)	6.3741* (3.519)
Patents m. inhabitants (IT = 1)	1.5594 (1.379)	1.4700 (1.316)
Year (linear trend)	-0.1462*** (0.029)	-0.1449*** (0.027)
Constant	254.0302*** (54.363)	250.1248*** (52.350)
Observations	138	138
Number of provinces	69	69

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

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