



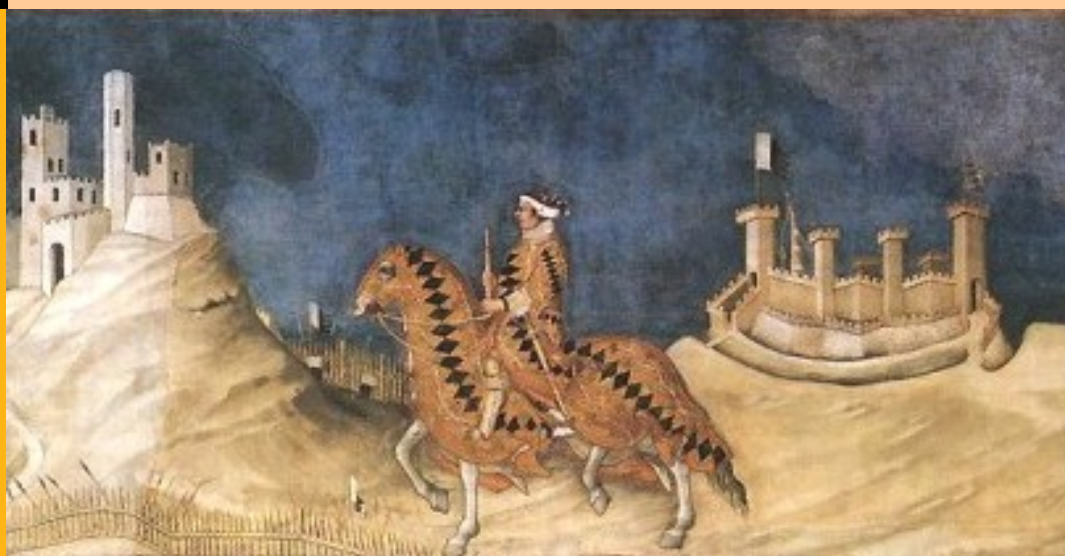
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Escaping from a human capital trap? Italy's regions and the move
to centralized primary schooling, 1861 - 1936

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Abstract - The present paper explores the role of public policy in the development of Italy's human capital in the late 19th century and the Interwar period. It aims at understanding whether a system of decentralized primary education slowed down regional convergence in schooling. This work puts forward the hypothesis that, under such a system, the country was subject to a human capital trap – since poor and backward areas could not afford to invest a suitable amount of resources in schooling. Additionally, it investigates whether a more centralized system, introduced in 1911, loosened up the trap, fostered the accumulation of human capital and reduced the country's regional disparities. Original qualitative evidence and new data on schooling confirm the existence of such a trap, and underline the positive role of centralization in the Interwar period. The econometric model implemented strengthens these findings: poor regions could not improve the quality of education, which in turn would give rise to a vicious circle. Centralized primary education certainly fostered the development of Italy's schooling in the Interwar period. However, human capital regional disparities across the country persisted, a result that calls for further research on the topic.

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1. Introduction

Human capital is one of the central drivers of economic performance. A line of research dating back to the work of Lucas (1988) and Romer (1990) suggests that a more educated labour force can greatly improve a country's rate of growth. Yet, theoretical models do not provide clear insights into the way human capital actually affects economic performance (Thirlwall 2006, Todaro and Smith 2006). Becker et al. (1990) underline the inverse relationship between fertility and human capital that is responsible for the presence of different growth equilibria across countries. This has recently become a key-feature of the Unified Growth Theory, which aim is to merge different stages of economic development in a single and comprehensive model of growth (Galor 2005). Based on the US during the 20th century, Goldin and Katz (2009) put forward that education is likely to supply skills that are required in order to meet the demand generated by technological progress. Other works in a historical perspective provide further insights into the way education and human capital can promote economic growth. In spite of different (and not necessarily mutually exclusive) views on the issue, improved human capital prompted by the Enlightenment might

explain why the Industrial Revolution was mainly a European phenomenon (Landes 1999, Mokyr 2004, Mokyr 2009). In fact, a number of Northern European countries had already achieved diffused literacy and numeracy by the early 19th century (A'Hearn, Baten and Crayen 2009, Morrison and Murtin 2009). Therefore, the central role of skilled labour in modern economic growth calls for a better understanding of the way education systems have shaped human capital in the past (cf. Hanushek 2009). Although from 16th to the 18th century much of the improvement in schooling and literacy was sparked by private institutions, the rise of modern states and the will to provide mass education prompted the intervention of government policy. Whether to implement a decentralized education system vis-à-vis a more centralized one became a crucial choice, because of the intrinsic tension between private demand for education and externalities brought about by the accumulation of human capital (Mitch 2013). Historically, different countries have reacted to a variety of economic and political factors; hence it is quite difficult to identify the circumstances under which diverse education systems succeed or fail. Go and Lindert (2010) stress that the US did well in adopting schooling via grassroots efforts, but they also admit that the mid-19th century was characterized by the *uneven* rise of education across states. By the same token, Mitch (1986) claims that the education system in the United Kingdom, largely based on local incentives and tuition fees, benefited from substantial state intervention in the form of subsidies during the 19th century – especially as far as pupils-to-teacher ratios are concerned. Along the same lines, a recent strand of research focuses on the reconstruction of routes to mass education in different world regions, towards a better understanding of the way public policy can shape schooling and human skills and, in turn, economic development (cf. Xuyi, Foldvari and Van Leween 2012 for an overview on Qing China; Go and Park 2012 for colonial Korea and Chaudhary et al. 2012 for the BRICs in the early 20th century).

The evidence on human capital in 19th century Italy does not depict a rosy picture. The second population census (1871) described the country's literacy rates as a “warning scream in Italy and Europe”. The data, firstly published in 1861, had revealed that about 17 million people out of less than 22 million were illiterate.¹ Italy's backwardness in the 19th century has been endorsed by comparative studies on different dimensions of the

¹ The data discussed by the report were based on the whole population. They included children aged 0 – 6 (not subject to compulsory schooling) and therefore the figures were largely inflated.

Human Development Index: as far as literacy rates are concerned, data drawn from Crafts (1997) and A'Hearn, Auria and Vecchi (2011) confirm that Italy was among the most disadvantaged countries in Europe (Figure 1).

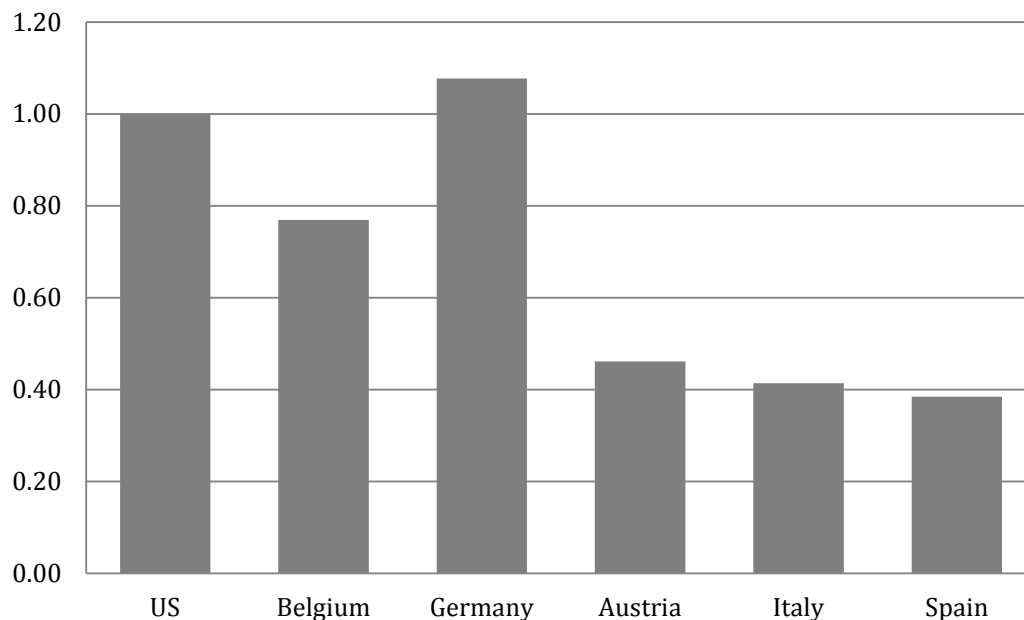


Figure 1: Literacy rates in first comer and latecomer countries (Britain = 1) during the period 1860 – 1870 (data refer to different benchmark years within this range). Sources: A'Hearn, Auria and Vecchi (2011) for Italy and Crafts (1997) for other countries.

Although several factors might help to explain the country's scarcity of human capital, the most peculiar certainly is Italy's legacy of pre-unification states: regional data show that its performance was largely affected by regional disparities, which persisted beyond the Great War (Conte, Della Torre and Vasta 2007, Felice 2007, A'Hearn, Auria and Vecchi 2011, Felice and Vasta 2012). In fact, the convergence process remained largely incomplete in the Interwar period, in spite of the fact that literacy measures are subject to an upper-bound of 1.00 (Figure 2).



Figure 2: Adult Literacy Rates (15 +) across different regions compared with Italy's weighted mean (Italy = 1) in 1871, 1911 and 1931. Source: Vasta (mimeo). NB: the country's maps have been drawn by relying on ISTAT (2001), "Variazioni", which does not include Istria after 1921.

Therefore, understanding why regional disparities in education persisted throughout time is of primary importance in order to comprehend Italy's development. The historiography has pointed out the role of public policy – and the will to maintain a decentralized education system until the early 20th century: Zamagni blames the government for its late decision to step in, taken only after “the failure of the alternative” had become clear (Zamagni 1993). Vasta pushes this argument forward. In his view, centralization was extremely urgent: decentralized primary schooling was not only a burden on modernisation, but also a possible constraint for long-term regional convergence given the prominent role of human capital in the Second Industrial Revolution (Vasta 1999). A'Hearn, Auria and Vecchi have recently reflected upon Italy's poor performance in human capital accumulation, but the role of the school system remains largely unexplored (A'Hearn, Auria and Vecchi 2011). A new analysis focused on the different dimensions of the Human Development Index, conducted by Felice and Vasta, shows that “convergence in education was significant in the Liberal Age mostly as a consequence of the huge differentials in 1871”, but that “much more could be done” (Felice and Vasta 2012). This claim seems to be supported by Battilani (2011), who finds evidence of large disparities in tax revenues and public expenditure by municipalities across Italian regions after the Unification. However, these hypotheses have not yet been tested, and the role of the country's education system in the accumulation of human capital has been under researched to a great extent.

This paper carries out a new exploration of the role of Italy's primary school system. It seeks to answer the following research questions: did decentralized primary schooling inhibit regional convergence in education? And if so, did centralization improve the pace of convergence and the country's performance? The results are tied to the new interpretation of Italy's long-term regional disparities and of their potential determinants: human capital is found to be a central factor of growth across Italy's regions – especially as far as the period from the late 19th century to the Second World War is concerned (Felice 2012). Therefore, understanding the dynamics of human capital convergence is of twofold importance: on the one hand, this research sheds light on Italy's pattern of human capital accumulation, in line with the international research briefly sketched; on the other hand, it provides new insights into the potential causes of the country's long-term regional income disparities – a topic that is central in the historiography of Italy's long-term economic development.

Two different hypotheses are tested. The first is that decentralized primary education locked Italy's regions in a human capital trap: if municipalities had to bear the burden of expenditure, poor and rural areas were not likely to supply a desirable amount of schooling. This in turn would depress literacy and subsequent economic growth, and hence instigate a vicious circle. The second hypothesis is that the Daneo-Credaro reform, passed in June 1911, weakened the human capital trap and fostered the supply of education in the years following the Great War.

The results confirm these hypotheses. The evidence of a significant relationship between the municipalities' spending capacity and the level of schooling is proved, while the econometric results suggest that centralization fostered the supply of schooling and mitigated the relationship between school supply and the municipalities' available resources. These findings are strengthened by the fact that the amount of available resources is found to be independent from a proxy for the municipalities' political will to invest in education. However, the evidence on the pace of convergence after the Daneo-Credaro reform is mixed, and needs to be further explored. The paper is organized as follows: section (2) discusses Italy's system of primary schooling (1859 – 1911) and surveys some qualitative evidence on the presence of a human capital trap; section (3) presents the methodology adopted in order to test the two hypotheses; section (4) describes the range of primary sources explored; section (5) reports both

descriptive and econometric evidence; finally, section (6) provides interpretations and concludes.

2. Italy's primary schooling: 1859 - 1911

Italy's national primary school system was established by the Casati Law during the process of unification (1859) and later extended to the other regions that became part of the Kingdom. Under this system, education had to be offered free of charge – proportionally to the municipalities' spending capacity and according to their people's need.² The first-grade primary school (lasting two years) was mandatory, while second-grade schools (two additional years) would only be set up in municipalities exceeding 4,000 inhabitants or in localities where high schools had already been established (cf. Coccia and Della Torre 2007).

Soon after the system was settled, the Ministry of Education began to collect data and reports on the state of primary schooling across the country's provinces. The first inquiry, published in 1865, confirmed the dramatic state of Italy's education that had been pointed out by the first census. A great deal of attention was paid to the role of teachers and to pedagogical aspects. The inquiry was coupled by a statistical publication, with plenty of data on the number and quality of teachers, schools, enrolments and actual attendance, public expenditure and salaries. This early account identified some of the major problems which would be addressed in the following decades. The most pressing issue was the presence of remarkable regional disparities in enrolments: only the North-Western provinces of Italy had Gross Enrolment Ratios (GER)³ substantially larger than 50% in 1863 (Figure 3).

² This liberal approach was a result of the limited state budget, the predominant role of liberal parties and the widespread perception that private education would play a significant role in educating Italy's citizens.

³ GER is defined as the total of pupils enrolled as a share of pupils aged 6 – 10 (it does not account for actual attendance).

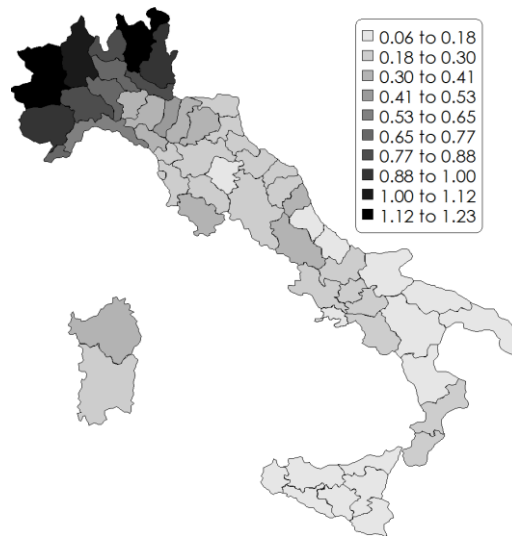


Figure 3: Pupils enrolled in state primary schools as a % of those aged 6 – 10 across Italian provinces, 1862 – 63 (data on pupils aged 6 – 10 refer to 1861). The datum for Lazio and Veneto (Centre and North-East of Italy) is not reported in 1870 as these regions became part of the Kingdom of Italy in 1866 and 1870 respectively. Source: Statistica del Regno d'Italia, "Istruzione (1862 – 63)" and "Censimento 1861".

The picture does not change when actual attendance is taken into account, by mapping the number of pupils actually attending classes during the summer, as a share of those subject to compulsory schooling (Figure 4).

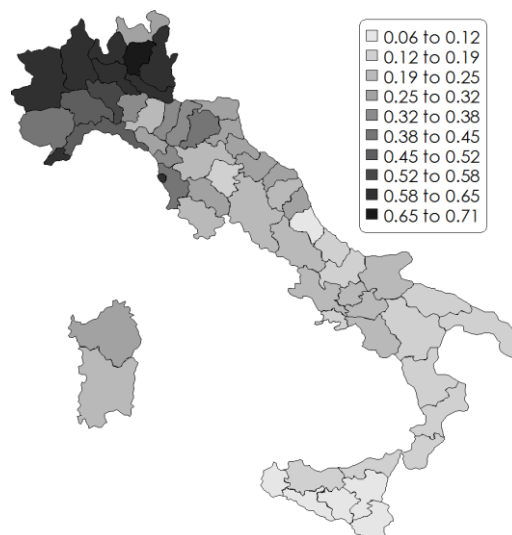


Figure 4: Pupils attending in summer months as a percentage of those aged 6 – 10, 1862 – 63. Source: Statistica del Regno d'Italia, "Istruzione (1862 – 63)" and "Censimento 1861".

The inquiry blamed poverty and low living standards as the main factors behind the disappointing levels of attendance. The countryside was characterised by the widespread employment of child labour, especially during the summer. In some regions,

children had to work for most of the year.⁴ City councils played a negative role as well. On the one hand, their balance sheets were constrained: investing in new infrastructures and enforcing compulsory education was costly. On the other hand, schooling was not perceived as a valuable investment. This was especially the case where schools had barely existed before the unification of the country – there where the clergy often saw state education as a factor of secularization. Therefore, the political party in power could easily lose preferences in future elections by promoting schooling.

Poor-quality teaching was another disappointing feature of the system. Yet, as many of the inspectors admitted, teachers could not really be blamed for that. The salary they earned would barely suffice for survival: they had to give private lessons in order to achieve a more decent standard of living. Furthermore, teaching methods were often obsolete: the inquiry witnessed that individual and mutual teaching⁵ were still very much in fashion during the second half of the 19th century.

The report concluded with some advices on how to improve the school system. Firstly, it strongly advised the government to strengthen the sanctions concerning the lack of attendance. Secondly, it put forward the idea to cluster different municipalities in *consortia*, partnerships that could be set up in order to share the burden of school building – a point that would be picked up by policy-makers only in the early 20th century. Thirdly, the inquiry pointed out the need to provide economic support to the most disadvantaged municipalities. Fourthly, the condition of teachers had to be strongly improved, otherwise job insecurity and extremely low wages would continue to depress school enrolments. Finally, the need to boost the training of more qualified teachers through normal schools was underlined. The inquiry also put forward that private education would become more important over time and raise the country's educational attainments. However, enrolments in private schools represented roughly 13.6% of the total; this figure would soon decline, with private education ending up playing only a marginal role in Italy's system.

⁴ In regions like Tuscany the grain-harvesting during summer months was accompanied by grape-harvesting, olive-harvesting and chestnuts collection during the whole autumn. This basically left only a few months for schooling.

⁵ The individual method consisted in face-to-face interaction between the teacher and each student within the class. Mutual teaching meant the teacher instructed a group of students whom, in turn, would be able to teach the rest of the class.

A further inquiry into primary education was conducted in the years 1868 – 1872 and discussed in deep by Gerolamo Buonazia,⁶ the supervisor. He remarked those disappointing features that were widely known to depress the development of education. However, the report explored an aspect that had been previously neglected: the poor quality of school buildings. Schools across the country were often overcrowded, dirty and insalubrious. They lacked the basic furniture and didactic material essential to attend classes fruitfully. In fact, low attendance was still a plague. Most pupils would attend school just as far as they were too little to work – roughly from the age of seven to that of nine. Additionally, they often reverted to a state of illiteracy after they had complied with compulsory primary education. This was due to the fact that their literacy skills were never nourished beyond the time spent in class – an interesting case of human capital depreciation. The teachers’ average salary was still humble, sometimes quite miserable: the wage of non-qualified⁷ rural teachers was often found to be below the minimum established by the Casati Law: 500 Lire for males and 333 for females (Figure 5). An estimate of the average salary of teachers in Italy (492 Lire) compares quite poorly with wages characterizing other sectors of the economy in 1871 ca. (Table 1).

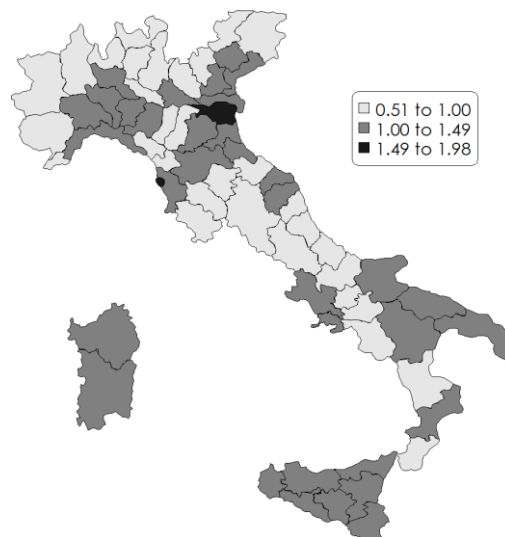


Figure 5: Teachers’ salary across Italy’s provinces relative to the national datum, 1869 – 70. Light provinces identify regions where the salary was below the national average (492 Lire), while darker provinces stand for areas where teachers earned as much as or more than the national average. Source: MPI, “Documenti” and Felice (mimeo).

⁶ Buonazia was an Italian pedagogue, who took charge of state inquiries on schooling under the Ministry of Public Education during the 1860s and 1870s.

⁷ Non-qualified teachers were those that had not attended normal schools and did not get a formal degree.

Index	Textile	Commerce and Service	Construction	Primary Sch. Teachers (Weighted Average)
Average annual wage (1871) in different sectors, current Lire	274 L.	414 L.	453 L.	492 L.
No. of provinces where the provincial (average) salary of teachers was higher than the sector's wage reported in each given column	66	56	44	36

Table 1: Average annual salary of teachers in Italy (1869 – 70) compared to other wages (1871) in current Lire (weighted average based on Italy's provinces). Source: MPI, "Documenti". The average salary is obtained by dividing the wage bill by the number of teachers reported. Other figures on wages are kindly provided by Felice (mimeo). It is worth noting that data on textiles, the construction sector, commerce and services are drawn from wage reports concerning Lombardia, one of the wealthiest regions of Italy in 1871. Therefore, although they do not concern skilled occupations, their value might not reflect that reported for other Italian provinces.

Buonazia stressed the need to address these points by implementing new measures. He suggested introducing exams in order to release students from compulsory schooling – so that nobody with insufficient literacy would be allowed to quit. Additionally, the issue of quality teaching needed to be dealt with by increasing the number of normal schools and qualified teachers, as well as their salary. In fact, at the end of the 1860s more than 21% of teachers had no formal degree – which means they could not expect to earn much more than the minimum wage.

Although a good deal of attention was paid to the role of economic factors in explaining poor enrolment ratios and low attendance, the government kept on focusing on the enforcement of formal norms – not least because of political reasons and the pressure of liberal and catholic parties against a more robust intervention. In the policy-makers' opinion, the enforcement of compulsory education by the city councils needed to be more effective. Along these lines, a new bill draft was discussed soon after the publication of the Buonazia inquiry in 1873, but its approval was delayed by a few years.

In fact, the Casati Law was only amended in 1877, by the Coppino Law. This measure was passed in order to enforce compulsory attendance in the rural and most disadvantaged areas of the country. A third inquiry, still supervised by Buonazia,

followed in 1878. The story told had not yet changed. Most of the schools were ineffective because of the grimy and decaying venues. They were poorly attended and teaching was rarely competent. Once more, the report suggested finding a way to push the municipalities to spend more on education and enforce the law on compulsory attendance. Another point is worth some attention: for the first time an official inquiry took a more robust stance towards the role of the state in the provision of basic education. In fact, it underlined that the government had always generously funded secondary schooling. Therefore – Buonazia suggested – a share of these resources could be redirected to fund primary schooling, so that issues brought about by economic disparities could be addressed more effectively.

The Torraca inquiry, published in 1897, witnessed the state of primary schooling twenty years after the Coppino Law was passed. This provided very picturesque reports on the state of Italy's schools. The inspector from Campobasso claimed that 60.65% of the school in the district were sub-optimal, while 69% of the furniture and didactic material was deemed to be barely sufficient or insufficient. The report on Oristano portrayed schools as "narrow and unhygienic hovels with no roof and dirt-patched and muddy floors, characterised by unhinged, broken-glass windows". Reports from Sanremo, Melfi and Avellino described schools with no toilets. The inspector from Susa found some schools set up into stables, where "the noise of animals – oxen, donkeys, sheep, chickens etc. – was a continuous source of distraction". According to this account, these conditions were difficult to improve: in fact, local politicians would just claim that the children were not at all affected by this kind of environment – *just because* they had always been taught in that way. The inspector from Vasto described "miserable and dirty rooms that lacked air and light, and which were dripping moisture". The report by an inspector from Gaeta sheds light on the reasons why schools were often called 'killer schools': "many [children] had their head covered by vivid and purulent sores, which stench infected the air: I made sure they would leave me alone". Very often administrative inefficiencies were also spotted. Sometimes the schools were established in leased buildings. Yet, these contracts were not aimed to save money. Instead, local elites normally forced the city councils to pay a rent higher than the market price in order to establish a school in friends' or acquaintances' venues – so they could reinforce and strengthen their patronage network.

Thus, Torraca called for a new law in order to make school building more widespread, so that the use of leasing contracts would be reduced. However, the bureaucracy concerning the requests for mortgages and subsidies also needed to be simplified. In fact, the applications took normally two years or more to be revised and approved.

As a matter of fact, on the eve of the 20th century state intervention became to be seen as the only viable solution to the problem of Italy's primary education. Enrolments in private schools had dropped to 7.3% of the total, and the Torraca inquiry had just shown that the quality of teaching in private institutions was quite poor.⁸ Moreover, a demand-side shift was very unlikely to improve educational attainments or to reduce regional disparities in schooling. In fact, the first wave of income growth affected mainly the North-Western regions of the country. Economic development lowered the opportunity cost of education there because of increased industrialization, which in turn brought about an increased demand for skilled labour and the shift to a less agricultural economy. Although economic growth at the beginning of the 20th century was largely due to traditional sectors like textile – which admittedly did not require skilled labour – new industries (chemicals, steel and electro-mechanics) and ancillary services such as transport and banking pushed for growing human capital (cf. Becker et al. 2009 for a similar analysis in the case of 19th century Prussia). Therefore, as the North-West forged ahead, the South of the country lagged behind: regional disparities were very likely to persist throughout the 20th century in the absence of substantial government policies.

In this context, the state slowly stepped in by approving the Nasi and the Orlando Laws (1903 and 1904 respectively) and by passing a Special Law for the South of Italy (1906). In a nutshell, these interventions were aimed to improve the condition of teachers and to promote school buildings in the most backward regions. A decisive step was taken when the Corradini inquiry was published in 1910. This represented another effort to explore and understand the causes of Italy's sluggish performance in primary education. Although the report largely confirmed what other studies had already revealed, this work had a central political role in promoting and accelerating the process that led to

⁸ According to the report, this happened mainly because of a lack of checks and the role of the clergy, with its focus on catechism.

centralized primary education – so much that the new bill, which would be approved soon thereafter, was often called the Corradini Law within political circles (Cives 1990).

The Daneo-Credaro⁹ bill was passed on June 4, 1911. It was a reform that largely changed the system, the result of a delicate compromise between different ideological and political views on education and on the role of the state. The parliamentary debates of 1910 clearly show that not even Daneo and Credaro agreed on some specific points concerning the new law, although they had largely designed the centralized system. Exploring these different perspectives reveals the mixed and peculiar character of Italy's new primary schooling system. The most controversial feature of the reform was probably the revised role of the provincial schooling board: the *Consiglio Scolastico Provinciale* (CSP) became an intermediate body between the municipality and the state – something similar to the *consortia* that the inquiry published in 1865 had proposed. The *Consiglio* was redesigned to manage the resources destined to primary education and hire the teachers. It allowed a great deal of administrative decentralization that largely limited the power of the city councils. Yet, the system became financially far more centralized than it had ever been: the state was fully committed to pay the teachers' salary. By contrast, school-building was still largely managed by the municipalities, although they could apply for interest-free state loans. According to the bill, the municipalities' resources had to be consolidated and paid to the Treasury (art. 17). The government would then redistribute the funds to the provinces (art. 19), which in turn would finance education (art. 20). It is worth noting that provincial capitals and other major administrative centres were excluded from the CSP system. Yet, every city could formally apply to be included in (or excluded from) its relative CSP within three years after the reform was approved. As Figure 6 shows, municipalities belonging to the North of Italy largely retained their autonomy.

⁹ Edoardo Daneo and Luigi Credaro were ministers of education in 1909 – 1910 and 1910 – 1914 respectively.



Figure 6: Italy's primary schooling system after the Daneo-Credaro reform. The new law made provincial and district capitals retain their autonomy in the provision of primary education (big light dots), but many smaller municipalities in the North of the country decided not to be administered by the state system (small dark dots). Source: Ministero della Pubblica Istruzione (MPI), "Relazione sul Numero, la Distribuzione e il Funzionamento delle Scuole Elementari". Roma, 1923.

The qualitative evidence discussed so far points out the problems that a decentralized education system brought about in 19th century Italy – the potential existence of a human capital trap, i.e. a tight relationship between the municipalities' economic

resources and the supply of schooling, an important issue given the country's economic disparities. The Daneo-Credaro reform of 1911 centralized the system in order to overcome this impasse. Yet, the research questions discussed in section (1) remain open: did the Casati Law really slow down regional convergence in schooling? Did the Daneo-Credaro reform change this pattern in the Interwar period?

3. Methodology

Since this paper aims to understand whether decentralized primary schooling hampered the supply of education across Italy's regions (and whether the Daneo-Credaro reform changed this mechanism in 1911) it does not focus on output measures of human capital. This approach is twofold: on the one hand, the analysis can be focused on schooling – on which the reform likely had more immediate effects. On the other hand, this is likely to scale down problems of endogeneity, which are more likely to rise by regressing output measures on the municipalities' available resources. Therefore, the role of decentralized and centralized primary education is assessed by looking at: (1) the number of schools per 1,000 pupils subject to compulsory schooling;¹⁰ (2) Gross Enrolment Ratios; (3) the ratio between the number of pupils subject to compulsory schooling and the teachers employed. These indices provide a comprehensive picture of Italy's supply of schooling by the government sector.¹¹ Taking into account more than one index is crucial, because the Daneo-Credaro reform had different effects on different dimensions of schooling.

The econometric model used in this paper follows Clay, Lingwall and Stephens (2012) and draws largely from Gujarati and Porter (2003). Firstly, it tests whether the municipalities' spending capacity (*econ*) explains the variation in the supply of schooling (*sch*) across Italy's regions. If a strong relationship between the municipalities' spending capacity and the supply of schooling really existed, the sign of

¹⁰ The pupils subject to compulsory primary education are estimated by considering the age class 6 – 10 for Italy's Liberal age (1861 – 1921) in order to allow a diachronic analysis – as the age for compulsory schooling grew from two years to four or six (depending on the curriculum) during the period. Instead, for the Fascist period the number of pupils subject to compulsory education is directly drawn from the inquiries and statistics, and refers to the age class 6 – 14, introduced by the Gentile reform in 1923. The choice of using pupils aged 6 – 10 instead of population as a denominator for indices is justified by the fact that different Italian regions might have been characterized by a different demographic structure, like a different share of young people on total – which seems to be suggested by data analysis.

¹¹ Although private education played some role in the early stage of Italy's development, its share declined quickly over time. Additionally, private schooling was marginally affected by the major reforms that led to centralization – hence it will not be taken into account.

this coefficient is expected to be positive (schools per 1,000 pupils and GER) or negative (pupils-to-teacher ratio) according to the index of schooling employed. The value of the coefficient should be large and statistically significant, and it should not be affected by changes in the specification of the model (Equation 1):

$$(1) sch_{it} = \beta_0 + \beta_1 econ_{it} + \beta_2 ref_t + \beta_3 (econ_{it} * ref_t) + \beta_4 X_{it} + \beta_5 \delta_i + \varepsilon_{it}$$

Secondly, the role of the Daneo-Credaro reform is assessed by including a dummy variable (*ref*) for post-1911 years. This term is also multiplied by the municipalities' available resources in order to include an interaction term in the regression (*econ* * *ref*). This kind of approach stands for a generalization of the Chow Test: if both the reform dummy and the interaction term are significant, then two different regressions fit the pattern observed in the data better than a single one (Gujarati and Porter 2003: 306 – 310) and therefore a structural break can be identified in the series. This implies that the time-dimension is implicitly taken into account by the specification and there is no need to include a time-trend in the model. In terms of the hypotheses this paper seeks to test, the interaction term reveals what happened to the human capital trap after 1911: once this interaction is taken into account, the marginal effect of the municipalities' economic resources on schooling is conditional on the value of the dummy (Equation 2):

$$(2) \partial sch_{it} / \partial econ_{it} = \beta_1 + \beta_3 d_t$$

If the Daneo-Credaro reform was really effective β_3 will show the opposite sign of β_1 (which means the reform reduced the role of the municipalities' spending capacity). The effectiveness of centralization depends on the magnitude of β_3 . The closer it is to β_1 , the more effective the reform was in reducing the effect of regional economic disparities on the given measure of schooling.

The specification adopted is based on longitudinal data: the panel structure can be used in order to control for geographical and unobservable features by using regional time-invariant Fixed Effects or Random Effects. Other specifications of the baseline model implement a variety of controls in order to reduce potential omitted variable bias.

4. Sources and data

The data and evidence used in this work are drawn from different and largely unexplored primary sources. The most important ones are the state inquiries on primary education – published regularly between 1865 and 1923. These report a great amount of data, which in turn is complemented by other statistics on education published on a quite regular basis by the Italian government from 1863 to 1941.¹² Both the qualitative and quantitative evidence on Italy's primary schooling is entirely drawn from these publications.

The municipalities' spending capacity is reconstructed by looking at government publications concerning their budget, which figures are conveniently aggregated by provinces and regions (in current Lire). Most of the information is directly available, but data from early years (1861 – 1871) for Veneto and Lazio had to be estimated – as they only became part of the Kingdom of Italy in 1866 and 1870 respectively. The proxy for the municipalities' spending capacity is obtained by summing up different kinds of ordinary revenues,¹³ net of capital flows and excluding extraordinary revenues. The data concerning expenditure on education are also collected from this source.

The econometric model implements different control variables. The first concerns the opportunity cost of education, and it is measured by the share of agricultural labour force on total active population (of all age classes). This captures an effect repeatedly described by the inspectors of education. On the one hand, farmers would not easily let their children attend school because they were needed as additional and cost-free labour force at home. Thus, giving up on the job for attending schools was extremely costly, a cost that increased because of the very poor quality of education. On the other hand, people did not expect to gain much from school in a largely agricultural society, since the demand for skilled labour was likely to be limited. Data on the regional labour force in agriculture are obtained from different secondary sources. Figures concerning the year 1871 had not yet been estimated, so they were calculated by following the methodology applied by Zamagni (1987) and Felice (2011).¹⁴ The 1881 figure is drawn

¹² A more detailed and comprehensive list of primary sources can be found in the references.

¹³ Revenues included property rents, taxes from various sources, over-taxes on land and consumption and "other incomes".

¹⁴ Fenoaltea has followed a different procedure concerning the number of workers in the textile industry in order to estimate industrial value added. However, the methodology applied by Zamagni and Felice

from Zamagni, while data for successive benchmark years are collected from Felice (2009, 2011) and SVIMEZ (2011).

The second main control variable is included in order to deal with a potential problem underlying data on the municipalities' revenues. The city councils were allowed to establish over-taxes in order to fund investments in public goods that, according to the law, had to be provided at the municipal level. The problem arises since the amount of resources they actually extracted via over-taxes was highly discretionary. In fact, A'Hearn, Auria and Vecchi (2011: 166) put forward that the amount of investment in schooling was not driven by the municipalities' spending capacity. According to their hypothesis, different municipalities had different preferences concerning the optimal level of investment in human capital – which in turn depended on the extent of political fractionalization brought about by land and social inequality (cf. Engerman and Sokoloff 2002 for an overview). Therefore, the South of the country would not invest enough in education as a result of social fractionalization, because ruling elites would not accept to provide public goods to the majority of citizens. Instead, the ruling class of the North – characterized by fewer social inequalities and by a higher level of social capital (cf. Guiso and Pinotti 2013) – would converge on a larger share of resources being invested in schooling and human capital accumulation. Giving in to such a model implies that the differences observed in per capita municipal revenues across Italy's regions were due to the amount of resources that municipalities wanted to spend on education, and not the other way around.

Although the role of social inequalities and political preferences at the local level is worth being explored, this hypothesis has not yet been robustly tested. A'Hearn, Auria and Vecchi rely on a comparison between over-tax revenues from land and over-tax revenues due on consumption. According to authors, the larger share of income due to land over-taxes in Northern regions means that governing elites were more willing to tax themselves in order to provide mass education and widely accessible public goods. Although this proxy is conceptually sound, the index used is flawed: Italy's cadastre (*catasto*) was not harmonized across different regions until the mid-20th century. Thus, comparing over-tax revenues from land (inherently different across regions) with

should be more suitable in this context. In fact, their estimates rely on industrial censuses, and therefore they are preferred in order to understand the extent of industrialization across Italy's regions. The two different methodologies are described in Fenoaltea (2001) and Zamagni (1987) respectively.

overt-tax revenues due on consumption (which system was more homogeneous across regions) does not necessarily capture what A'Hearn, Auria and Vecchi are trying to observe, and leads to a bias.

In order to take this alternative hypothesis into account, an index of political preference toward investments in human capital is taken into account – the expenditure on education as a share of the municipalities' available resources. An alternative, new index following A'Hearn, Auria and Vecchi is also elaborated: the share of all over-taxes collected by municipalities (not only on land, but also consumption duties) on their total revenues. This approach largely scales down the bias due to heterogeneous cadastres, and highlights whether different municipalities belonging to different regions had alternative preferences toward investments in education. Section (5) presents the results.

Overall, the analysis is developed by focusing on the benchmark years for which data on schooling were fully available, i.e. 1863, 1870, 1877, 1884, 1895, 1907, 1912, 1921, 1928, 1930 and 1935. Financial figures and data on control variables were normally available in neighbouring years – although few of these had to be re-aligned to the figures on schooling by means of linear interpolation. The complete panel is made up of 16 to 18 regions (depending on the period, as the number grew in the Interwar years) and 11 benchmark years – six before the Daneo-Credaro was passed and five afterwards.

5. Evidence and results

This section presents descriptive evidence on the existence of a human capital trap across Italy's regions and on the effects of the Daneo-Credaro reform after 1911. The analysis is based on figures regarding the municipalities' balance sheets and primary schooling. Figure 7 plots an index of the municipalities' total available resources in 1870 and 1928: data from the municipalities are aggregated by region and divided by the respective population. The municipalities' spending capacity differed considerably across regions, with no sign of convergence over the long-run. In fact, an index of sigma-convergence developed following Williamson (1965) and Felice and Vasta (2012) takes

value 0.369 in 1895, 0.312 in 1912 and 0.379 in 1928.¹⁵ These findings suggest that poor areas could hardly afford a suitable amount of investment in education under a system of decentralized primary schooling, and that this condition did not improve throughout the late 19th and early 20th century.



Figure 7: Municipalities' available resources (aggregated by region) divided by regional population in 1870 and 1928 (Italy = 1). Original data in current Lire. Source: MAIC and Ministero delle Finanze, "Bilanci Comunali".

The scatter plot in Figure 8 shows that the municipalities' spending capacity was by no means correlated with – let alone determined by – the councils' political will to invest in education, as A'Hearn, Auria and Vecchi (2011) put forward. The expenditure on education as a share of total ordinary revenues is very weakly correlated to the municipalities' per capita revenues over the whole panel, with ρ equal to -0.08.

¹⁵ The index is calculated as: $\vartheta = \sqrt{\sum_{i=1}^n (y_i/y_m - 1)^2 * p_i/p_m}$ where y denotes the index concerned and p the population for a given region (i) and for Italy (m).

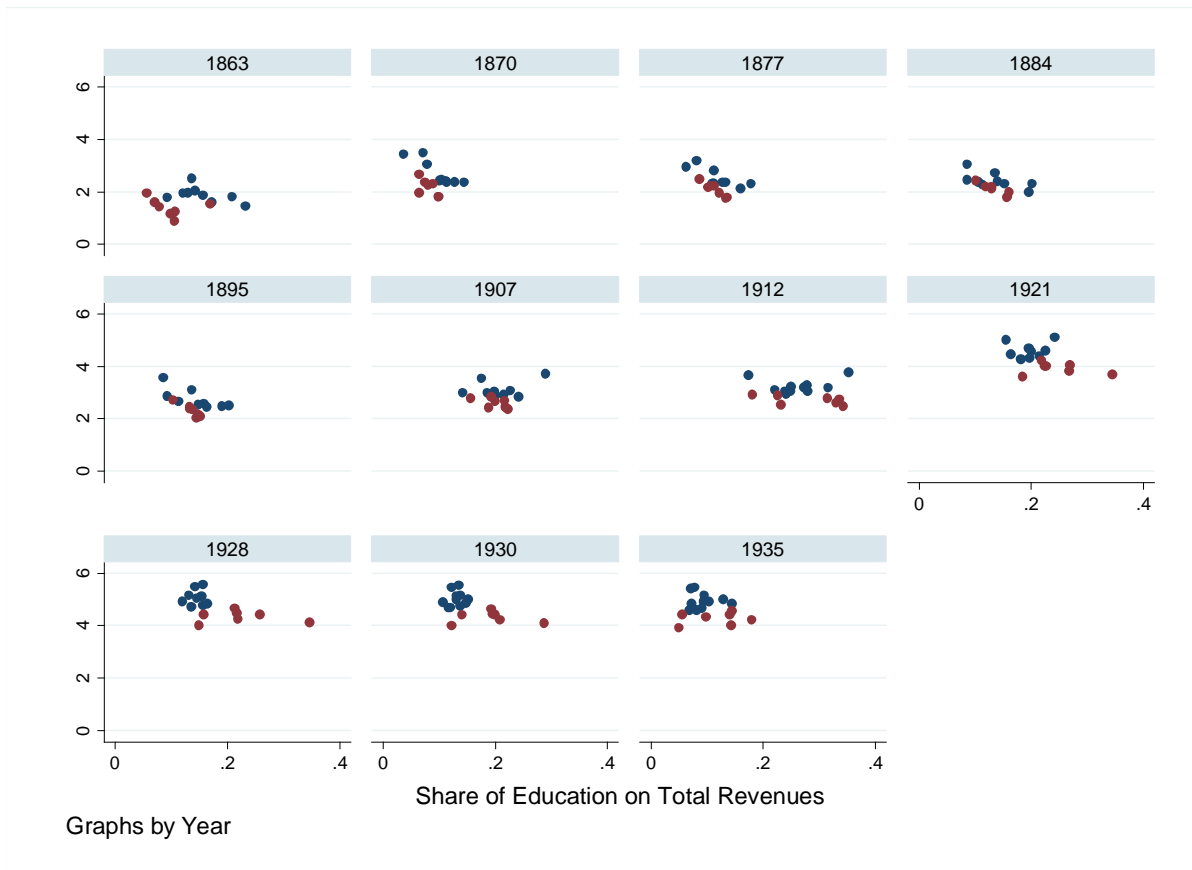


Figure 8: Correlation between the municipalities' spending capacity (logarithm, Y) and the city councils' will to invest in education (X) for each benchmark year (Southern regions in red). Source: see Figure 7.

Figure 9 suggests that the share of ordinary revenues collected thanks to over-taxes is also weakly correlated with the municipalities' spending capacity, with ρ equal to 0.24 for the whole panel. All in all, this evidence implies that public resources were not highly dependent on the political will of ruling elites. These certainly retained a role, but the most prominent factor in determining the extent to which municipalities *could* invest in public goods and schooling was their relative wealth and economic progress.

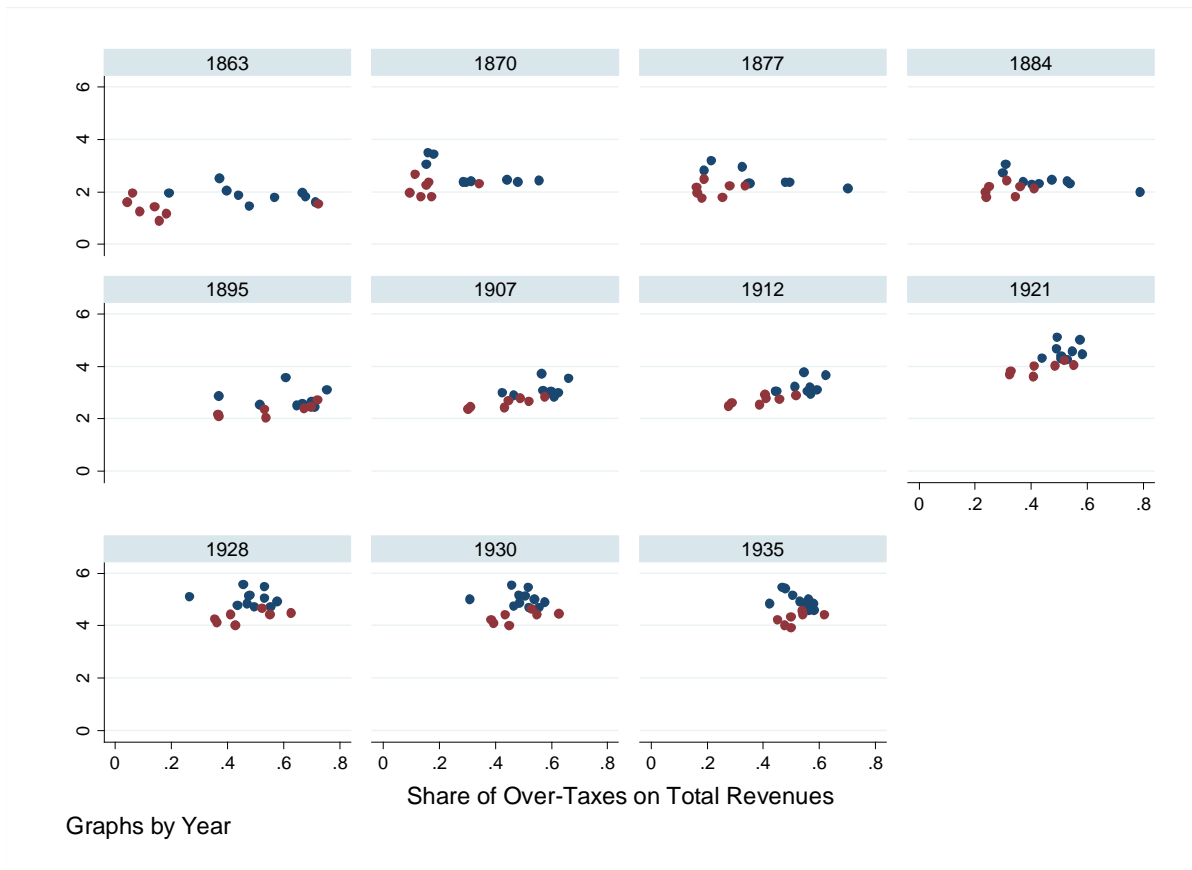


Figure 9: Correlation between the municipalities' spending capacity (logarithm, Y) and the share of total ordinary revenues collected via over-taxes (X) for each benchmark year (Southern regions in red).

Source: see Figure 7.

The evidence against the role of political factors is backed up by Figure 10, which shows the municipalities' total expenditure on education as a share of their total available resources across different Italian regions. There is no evidence of a clear-cut divide between the North and the South of the country in 1870 and 1895 – although regional disparities admittedly existed. As a matter of fact, Southern municipalities spent as much as they could given their resources. The share of Southern regions had grown considerably by 1928 because of state transfers, introduced after the Daneo-Credaro reform had largely centralized the system and loosened the human capital trap (Coccia and Della Torre 2007).



Figure 10: Expenditure on education (share of total available resources) in 1870, 1895 and 1928 (Italy = 1). Source: MAIC and Ministero delle Finanze, “Bilanci Comunali”.

Did the regional pattern of per capita expenditure in education change over time? Figure 11 outlines the regional distribution of the municipalities’ expenditure on education divided by the number of pupils subject to compulsory schooling. The index of sigma-convergence confirms the effect of the Daneo-Credaro reform on per capita expenditure. Between 1895 and 1912 the index grows from 0.448 to 0.656 (thus highlighting divergence) while from 1912 to 1928 it drops to 0.313. This suggests that centralization really fostered convergence in the municipalities’ spending on primary schooling.



Figure 11: Expenditure on education per pupil aged 6 – 10 in 1870, 1895 and 1928 (Italy = 1). Original data in current Lire. Sources: MAIC and Ministero delle Finanze, “Bilanci Comunali”.

The descriptive evidence provided suggests the validity of both hypotheses put forward. Decentralized primary education was likely to hamper convergence in schooling as it locked Italy's regions in a human capital trap, because of large wealth and income disparities. The results of centralization are very much discernible in the municipalities' balance sheets. Yet, the effects on the actual supply of education need to be further explored.

Figure 12 displays the number of state schools per 1,000 pupils subject to primary education in 1877, 1907 and 1930. The first row of Table 2 reports the pattern of regional sigma-convergence. There is no sign of a marked discontinuity after 1911 – overall convergence seems to follow a linear trend throughout the whole period. This is quite consistent with the fact that school building and maintenance was still managed by the city councils, hence economic disparities retained a role and might have hampered convergence even after 1911. Additionally, it is worth noting that the Daneo-Credaro reform had different effects in different macro-areas of Italy. Southern regions did not catch-up with the North-West. Instead, Central regions performed well and converged with the North fully, with a remarkable acceleration after 1911. This is a point worth stressing: the improvement observed must be greatly attributed to public policy, since Central regions would not manage to converge in terms of income per capita until well after WWII (Felice 2011).



Figure 12: State schools per 1,000 pupils compelled in 1877, 1907 and 1930 (Italy = 1). Source: DGS, "Statistica della Istruzione Elementare" (1877); MPI, "L'Istruzione Primaria e Popolare in Italia" (1907); ISTAT, "Statistica dell'Istruzione Elementare" (1930).

Index of Schooling \ Year	1877	1895	1907	1928	1935
Schools per 1,000 pupils	0.329	0.281	0.241	0.235	0.227
GER	0.454	0.344	0.236	0.139	0.117
Pupils per Teacher	0.372	0.339	0.452	0.226	0.195

Table 2: Indices of sigma-convergence for three different measures of schooling in benchmark years, 1877 – 1935. Source: see text.

The Gross Enrolment Ratio (GER) seems to underline a similar trend (Figure 13). The convergence of Central regions might have been largely due to the fact that the North-West had already reached a steady-state in the late 19th century (its GER oscillating around 1.00). In spite of this catch-up potential the Southern regions converged slowly, as the index of sigma-convergence suggests (second row of Table 2).



Figure 13: Gross Enrolment Ratio (age 6 – 10) in 1877, 1907 and 1930. Source: DGS, “Statistica della Istruzione Elementare” (1877); MPI, “L’Istruzione Primaria e Popolare in Italia” (1907); ISTAT, “Statistica dell’Istruzione Elementare” (1930).

Figure 14 highlights a somewhat different pattern. The number of pupils subject to primary schooling per teacher employed had already dropped significantly at the national level during the late 19th century, possibly as a result of tightened enforcement due to the Coppino Law. Yet, regional disparities had not faded out. In fact, between 1895 and 1907 regional disparities in the supply of teachers actually widened. Here centralization might have played a major role. From 1907 to 1928 the dispersion

around the mean halved and reached a much lower level than the one characterising 1877 (third row of Table 2).



Figure 14: Pupils aged 6 – 10 per teacher in 1877, 1907 and 1930. Source: DGS, “Statistica della Istruzione Elementare” (1877); MPI, “L’Istruzione Primaria e Popolare in Italia” (1907); ISTAT, “Statistica dell’Istruzione Elementare” (1930).

To sum up, the evidence on schooling confirms the preliminary findings obtained by exploring the municipalities’ balance sheets. Decentralized primary education slowed down regional convergence in the supply of teachers. It was also likely to inhibit convergence in the number of schools and enrolments. In fact, although the indices concerning the number of schools and enrolments points out convergence throughout the whole period, a great deal of the pre-1911 catch-up could be the result of a marked acceleration between 1895 and 1907, when the state had already begun to invest more on education – as outlined in section (2). Finally, it is worth noting that sigma-convergence captures the extent to which the dispersion around the mean changed, but it does not identify the mechanisms behind it.

The econometric model described in section (3) offers further insights into the patterns observed. Table 3 shows econometric results based on a pooled regression, which does not exploit the panel structure of the data. The three columns test for the presence of a relationship between the municipalities’ spending capacity and each dimension of schooling, including the reform dummy and the interaction term that capture the marginal impact of resources on schooling after 1911.

The relationship between resources and schooling is strong in all cases – the coefficients are statistically significant and have the right sign, which confirms the existence of a human capital trap. The effect of the municipalities' spending capacity seems to be very large. According to the estimates, three additional Lire per capita would increase the number of schools per thousand pupils by one unit. This is in line with the data. For example, the regions of Piemonte and Liguria in the North-West experienced a growth in the municipalities' resources equal to 8.43 and 17.44 per capita Lire respectively during the years 1877 – 1907, while the number of schools growing by 2.82 units per thousand inhabitants in Piemonte and 6.58 in Liguria.

The dummy for centralization is also significant and has the correct sign independently of the index of schooling considered. Additionally, its effect seems to be large: an observation in the post-1911 period has a premium of 9 schools per 1,000 pupils, +42.8% of enrolments and 68.49 fewer pupils per teacher. The interaction term is significant and large: it basically offsets the effect of economic resources in the case of enrolments and pupils per teacher – while it reduces the marginal effect of the municipalities' spending capacity on schools to a lesser extent. All in all, these results show that the Daneo-Credaro reform largely weakened Italy's human capital trap and that, although schooling did grow in the post-1911 period, this pattern is not explained by the municipalities' spending capacity.

The results must prove to be robust with regard to the inclusion of specific control variables. Regional (time-invariant) Fixed Effects (FE)¹⁶ are introduced in order to control for geographical differences and other potentially unobserved factors that are constant over time. Expenditure on education as a share of total available resources is used as a proxy for the municipalities' different political will to invest in public goods, as sketched in section (4). The opportunity cost of education is proxied by the share of labour force employed in agriculture. The same model includes a dummy to capture the effect of decreased birth rates during the Great War,¹⁷ while a proxy for urban population density is used in order to capture the effect of agglomeration on the supply

¹⁶ The Hausman test – normally conducted in order to choose between Fixed (FE) and Random Effects (RE) models – could not be performed, as the specification failed to meet the asymptotic assumptions required. Given that, a FE model was chosen to provide consistent estimates. It is also worth stressing that, for this particular specification, FE and RE basically led to the same results.

¹⁷ The dummy is equal to 1 if pupils subject to compulsory schooling in a given year were born in 1915 – 1918.

of schools and teachers.¹⁸ The specification adopted does not include Time Fixed Effects. The reason is that the relevant time dimension should be captured effectively by the reform dummy and by its interaction with the observations concerning the municipalities' resources. Table 4 reports the results based on this augmented specification.

Variables	(1) Schools per 1,000 pupils	(2) GER	(3) Pupils per Teacher
P.C. Municipalities' Resources by Region	0.326*** (0.000)	0.018*** (0.000)	-3.112*** (0.000)
Reform Dummy (1911)	9.015*** (0.000)	0.428*** (0.000)	-68.494*** (0.000)
Interaction Revenues * Reform	-0.258*** (0.002)	-0.016*** (0.000)	2.984*** (0.000)
Constant	9.224*** (0.000)	0.353*** (0.000)	129.878*** (0.000)
Observations	179	179	179
Adj. R-squared	0.616	0.483	0.377

Robust p-values in parentheses

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

Table 3: Regression output with different schooling indicators (pooled data), 1862 – 1936.

¹⁸ This control variable has been elaborated for each region according to the information contained in the censuses. However, these do not report urbanization rates; instead, they focus on a measure of agglomeration. Unfortunately, these publications often classify very small villages as “centres”, so that the proxy used might be highly biased at the source.

Variables	(1) Schools per 1,000 Pupils	(2) GER	(3) Pupils per Teacher
P.C. Municipalities' Resources by Region	0.427*** (0.000)	0.015*** (0.005)	-2.698*** (0.004)
Reform Dummy (1911)	11.238*** (0.000)	0.438*** (0.000)	-48.538*** (0.000)
Interaction Resources * Reform	-0.361*** (0.001)	-0.015*** (0.005)	2.589*** (0.003)
Share of LF in Agriculture	-0.078 (0.395)	-0.001 (0.929)	-0.872 (0.457)
Population Density in Urban Centres	-0.025 (0.459)	0.001 (0.503)	-0.633 (0.159)
Born during WWI	-1.853 (0.108)	0.001 (0.976)	1.931 (0.592)
Share of Education on Total Revenues	-5.504 (0.324)	0.129 (0.623)	-147.873*** (0.006)
Constant	15.720* (0.051)	0.318 (0.546)	245.040** (0.026)
Observations	179	179	179
Number of regions (FE)	18	18	18
Adj. R-squared	0.757	0.614	0.464

Robust p-values in parentheses

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

Table 4: Regression output with different schooling indicators (adding control variables and regional fixed effects), 1862 – 1936.

The core results turn out to be robust to the inclusion of regional Fixed Effects and of other control variables. The role of institutional features remains unclear: in fact, the proxy for the municipalities' political will to invest a larger share of economic resources in education is significant only in the case of pupils-to-teacher ratio: an increase of 1% in the share would reduce the number of pupils per teacher by 1.47. This result is likely to capture the ability to enforce compulsory education, hire qualified teachers and solve coordination problems linked to misaligned incentives. In fact, the reports by the inspectors of primary education pointed out the role of city councils in the promotion of schooling among citizens. In particular, the enforcement of compulsory schooling was seen as a crucial matter – together with the capability to establish fruitful agreements between the households and the schools. Very often (and especially in rural communities) parents

would not easily allow their children to attend schools. By contrast, the schools had to enforce the rules on compulsory attendance. This was a pressing problem during the harvesting months when agricultural activities would largely depress school attendance. Therefore, some city councils proposed innovative solutions. In some rural centres of the provinces of La Spezia and Alessandria, for example, pupils attended schools for a very limited amount of hours so they could also work with their parents. Similar experiences in other areas are assumed to be quite common, although it remains unclear how widespread these arrangements exactly were.

The proxy for the opportunity cost of education has not proved to be significant. Probably, the main reason behind this result is that this factor is more likely to impact on measures of human capital other than the supply of schooling. It might also be a simple matter of measurement – a scatter plot suggests that a negative relationship actually exists, but it might be weakly identified. Finally, the effects of the Great War on birth rates are discernible – although the statistical significance of the variable remains weak.

Table 5 provides a robustness check. It tests for the role of the other major reform approved during Italy's Liberal Age: the Coppino Law passed in 1877, with which the state continued to bet on a decentralized system by tightening control and enforcement over the municipalities. However, it also provided for the first subsidies to be distributed by the government: in fact, according to the Corradini Inquiry, state subsidies equalled 23 million Lire in 1878 – 88, 18 million in 1889 – 98 and 22 million in 1901 – 08. Therefore, the Coppino Law gave a first substantial contribution to the municipalities' spending capacity.

Does this reform constitute a first structural change? A second model, which employs the same methodology described in section (3), is used to assess the impact of this reform. It defines a dummy for the Coppino Law, which takes value equal to 1 for the years 1878 – 1911, so it does not overlap with the effects of the Daneo-Credaro reform after 1911. This term is also interacted with the municipalities' resources in order to understand whether the marginal effect of economic disparities was in any way offset by the bill. All the other variables and controls remain the same. The model uses Random Effects, preferred to Fixed Effects based on the Hausman test.

	(1)	(2)	(3)
Variables	Schools per 1,000 Pupils	GER	Pupils per Teacher
P.C. Municipalities' Resources by Region	0.302** (0.012)	0.010* (0.063)	-4.564*** (0.005)
Reform Dummy (post-1911)	13.940*** (0.000)	0.541*** (0.000)	-91.751*** (0.000)
Interaction Revenues * Reform	-0.236* (0.056)	-0.009* (0.082)	4.359*** (0.007)
Coppino Law Dummy (1878 – 1911)	4.448*** (0.000)	0.174*** (0.001)	-79.038*** (0.000)
Interaction Revenues * Coppino Law	0.036 (0.773)	0.003 (0.600)	3.703** (0.017)
Share of LF in Agriculture	0.044 (0.553)	0.003 (0.585)	-1.037 (0.253)
Population Density in Urban Centres	-0.033* (0.089)	0.000 (0.826)	-0.205 (0.200)
Born during WWI (dummy)	-1.873 (0.103)	-0.006 (0.832)	3.861 (0.281)
Share of Education on Total Revenues	-14.573*** (0.001)	-0.223 (0.406)	-113.520*** (0.003)
Constant	8.880* (0.092)	0.193 (0.621)	256.370*** (0.001)
Observations	179	179	179
Number of regions (RE)	18	18	18

Robust p-values in parentheses

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

Table 5: Regression output with different schooling indicators (adding control variables, regional random effects and the effect of the Coppino Law), 1862 – 1936.

These findings comfort the evidence provided by the previous model. Although the Coppino Law improved the supply of schooling in 1878 – 1911, its effects were far less remarkable than those achieved by the Daneo-Credaro reform after 1911 (the premia given by the Coppino Law dummy being smaller than the ones concerning post-1911 years). Furthermore, the marginal effect of municipalities' resources on schools and enrolments was not affected by the reform. The case of teachers is different: the Coppino Law influenced pupils-to-teacher ratios, a result that is only indirectly connected to the enforcing character of the reform itself. In fact, during the late 19th century the state pushed for more qualified training for teachers working in primary schools, as the inquiries clearly

underline – hence, this might be the main driver of pre-1911 catch-up.

Although the results on the role of centralization appear to be robust, no firm conclusion has yet been reached about regional convergence in primary education. In fact, the sigma-convergence observed in Table 2 highlights what it seems to be a long-term linear trend in the number of schools available and gross enrolments, while the Daneo-Credaro reform likely had more substantial effects as far as the supply of teachers is concerned. As it has been previously noted, the pattern of sigma-convergence observed may actually depend on reduced dispersion within a given group of regions, rather than between the North and the South – and it might be driven by the North-Eastern and Central regions of the country, as the maps presented by this section suggested. Therefore, the econometric model previously adopted has been modified to identify the existence of diverse trends in the data – one for the country as a whole, one for North-Western regions and one for the South. In order to do so, time dummies are introduced in order to capture a given trend, and interacted with the municipalities' spending capacity (*rev*). Furthermore, dummies for Southern and North-Western regions have been added (*south* and *northwest*)¹⁹ and also interacted with each time dummy in order to identify the specific regional patterns of school supply (Equation 3). Table 6 presents the results.

$$(3) sch_{it} = \beta_0 + \beta_1 econ_{it} + \beta_2 X_{it} + \partial_1 1870 + \dots + \partial_{10} 1935 + \alpha_1 (econ_{it} * 1870) + \dots + \alpha_{10} (econ_{it} * 1935) + \beta_3 south_i + \gamma_1 (south * 1870) + \dots \gamma_{10} (south * 1935) + \beta_4 northwest + \rho_1 (northwest * 1870) + \dots + \rho_{10} (northwest * 1935) + \varepsilon_{it}$$

¹⁹ This model cannot be implemented through Fixed Effects because of the reduced number of degrees of freedom.

Variables	(1) Schools per 1,000 Pupils	(2) GER	(3) Pupils per Teacher
P.C. Municipalities' Resources by Region	0.083 (0.597)	-0.017** (0.042)	9.632*** (0.000)
1870	5.645*** (0.000)	0.184*** (0.001)	-1.388 (0.888)
1877	8.735*** (0.000)	0.400*** (0.000)	-15.493* (0.083)
1884	9.450*** (0.000)	0.434*** (0.000)	-10.691 (0.117)
1895	7.972*** (0.000)	0.363*** (0.000)	-9.758 (0.280)
1907	7.453*** (0.000)	0.476*** (0.000)	-10.677 (0.276)
1912	6.343*** (0.000)	0.436*** (0.000)	-1.954 (0.448)
1921	26.937*** (0.000)	0.766*** (0.000)	-24.358** (0.016)
1928	18.169*** (0.000)	0.596*** (0.000)	-29.748** (0.036)
1930	23.046*** (0.000)	0.750*** (0.000)	-33.088** (0.037)
1935	31.692*** (0.000)	0.874*** (0.000)	-46.083** (0.021)
Rev* 1870	-0.167 (0.202)	0.012* (0.072)	-9.059*** (0.000)
Rev* 1877	-0.110 (0.402)	0.008 (0.167)	-9.683*** (0.000)
Rev* 1884	0.041 (0.725)	0.011* (0.053)	-11.039*** (0.000)
Rev* 1895	0.040 (0.769)	0.018** (0.017)	-10.426*** (0.000)
Rev* 1907	0.112 (0.600)	0.017* (0.078)	-10.289*** (0.000)
Rev* 1912	0.163 (0.426)	0.020** (0.037)	-10.543*** (0.000)
Rev* 1921	-0.139 (0.406)	0.015* (0.073)	-9.768*** (0.000)
Rev* 1928	-0.054 (0.736)	0.018** (0.041)	-9.754*** (0.000)
Rev* 1930	-0.067 (0.676)	0.018** (0.044)	-9.754*** (0.000)
Rev* 1935	-0.092 (0.568)	0.017** (0.048)	-9.718*** (0.000)
Share of LF in Agriculture	0.101 (0.181)	-0.002 (0.366)	-0.576** (0.047)

Variables	(1) Schools per 1,000 Pupils	(2) GER	(3) Pupils per Teacher
Share of Education on Total Revenues	5.931 (0.656)	0.742 (0.133)	-90.698 (0.306)
Population Density in Urban Centres	-0.021* (0.068)	-0.000 (0.351)	-0.002 (0.968)
South (Dummy)	-0.785 (0.440)	-0.011 (0.742)	86.446*** (0.000)
South*1870	-2.448*** (0.001)	-0.114*** (0.000)	-29.926*** (0.000)
South*1877	-2.950*** (0.003)	-0.219*** (0.000)	-56.335*** (0.000)
South*1884	-2.971*** (0.006)	-0.233*** (0.000)	-67.043*** (0.000)
South*1895	-1.824** (0.021)	-0.218*** (0.000)	-69.829*** (0.000)
South*1907	-1.119 (0.255)	-0.199*** (0.001)	-71.179*** (0.000)
South*1912	-0.699 (0.579)	-0.190*** (0.004)	-71.511*** (0.000)
South*1921	-8.551*** (0.000)	-0.397*** (0.000)	-78.904*** (0.000)
South*1928	-2.928 (0.143)	-0.189** (0.043)	-72.809*** (0.001)
South*1930	-7.090*** (0.001)	-0.209** (0.020)	-74.677*** (0.000)
South*1935	-10.455*** (0.000)	-0.183** (0.011)	-76.312*** (0.000)
Northwest (Dummy)	10.545*** (0.000)	0.585*** (0.000)	-88.556*** (0.000)
Northwest*1870	-1.448*** (0.000)	-0.062*** (0.000)	46.545*** (0.000)
Northwest*1877	-3.617*** (0.000)	-0.201*** (0.000)	67.117*** (0.000)
Northwest*1884	-4.336*** (0.000)	-0.252*** (0.000)	71.915*** (0.000)
Northwest*1895	-2.695*** (0.009)	-0.311*** (0.000)	69.632*** (0.000)
Northwest*1907	-2.112*** (0.000)	-0.349*** (0.000)	68.146*** (0.000)
Northwest*1912	-1.976*** (0.000)	-0.372*** (0.000)	67.516*** (0.000)
Northwest*1921	-7.166*** (0.000)	-0.603*** (0.000)	68.214*** (0.000)
Northwest*1928	-1.146 (0.125)	-0.598*** (0.000)	71.819*** (0.000)

Variables	(1) Schools per 1,000 Pupils	(2) GER	(3) Pupils per Teacher
Northwest*1930	-6.011*** (0.000)	-0.596*** (0.000)	73.267*** (0.000)
Northwest*1935	-5.674*** (0.000)	-0.530*** (0.000)	71.283*** (0.000)
Constant	-0.842 (0.798)	0.335* (0.080)	138.037*** (0.007)
Observations	179	179	179
Adjusted R-squared	0.859	0.871	0.818

Robust P-Values in parentheses (clustered by year)

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

Table 6: Regression output with different schooling indicators and two different trends, 1862 – 1936.

The data confirm by and large what the previous specifications had shown: the Daneo-Credaro Law impacted on the role of economic disparities, and brought their marginal effect close to zero. The regional trends are significant, and their comparison sheds some light on the long-term effect of the reform.

Figure 16 plots the estimates of GERs based on the explanatory power of time-trends only (which also capture, in the present specification, the effects of government's reforms): although the South followed a trend in pre-1911 years, it converged with the North largely as a result of a remarkable acceleration on the eve of the 20th century and, especially, in the years that followed centralization.

Figures 15 and 17 present the same kind of evidence regarding schools per pupil and pupils-to-teacher ratios. In pre-1911 years, regional time-trends (and thus state reforms) do not explain any of the growth observed in schooling: instead, this was due to the municipalities' spending capacity to a larger extent. As far as schools per pupils are concerned, the impact of the Daneo-Credaro reform is clearly discernible – as the number of schools 'explained' by the trend dramatically increases between 1912 and 1921. The same holds true for the number of teachers: the ratio drops significantly in the same years, which followed centralization.

It is worth noting that the 1911 bill expanded the supply of education in North-Western

regions as much as it did in the South. In fact, the two areas followed a similar trend in the Interwar period: this pattern may reflect the impact of the reform in rural areas of the North, previously neglected by the school system because of a lack of resources and monitoring capabilities by local councils.

Therefore, the idea of convergence does not stand as a useful benchmark to evaluate the effects of the Daneo-Credaro reform. In fact, the convergence between the South and the rest of the country remained largely incomplete after the Great War, as the Literacy Rates presented in section (1) suggest.

But concluding that the Daneo-Credaro reform did not introduce important novelties and did not have a relevant impact on the regional distribution of primary education would be misleading. In fact, the new piece of legislation changed the system, and the pace of schooling increased remarkably nation-wide, as the general trend underlined by the time-dummies clearly demonstrates; additionally, it allowed the South to experience an unprecedented growth in the supply of education. The absence of a clear improvement in the pace of convergence is actually due to another, very much positive effect of the reform: centralization brought schooling in areas that had been previously left alone – e.g. rural areas that greatly benefited from the new system of *consortia* introduced after 1911 – and therefore favoured Southern *as well as* Central and Northern regions.

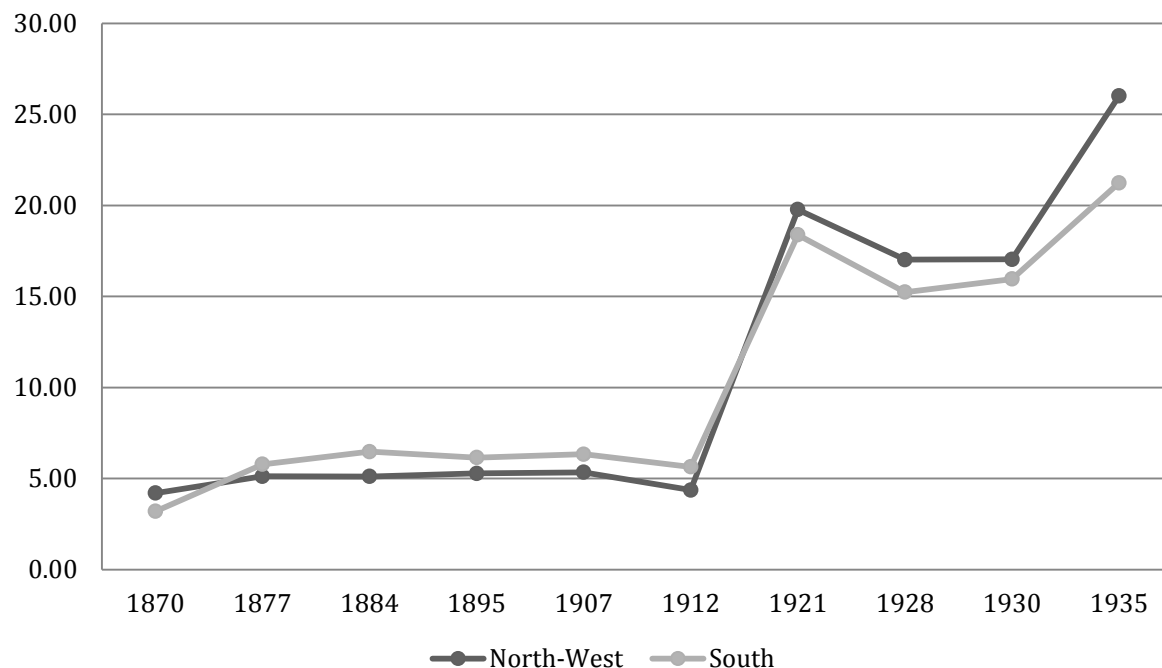


Figure 15: The North-West's number of schools per 1,000 pupils subject to compulsory schooling compared to that of Southern regions (estimates based on time-trends only). The Y axis shows the additional amount of schools per 1,000 pupils with respect to the benchmark year, 1863. OLS estimates obtained with Time-Fixed Effects and specific regional trends. Sources: see text.

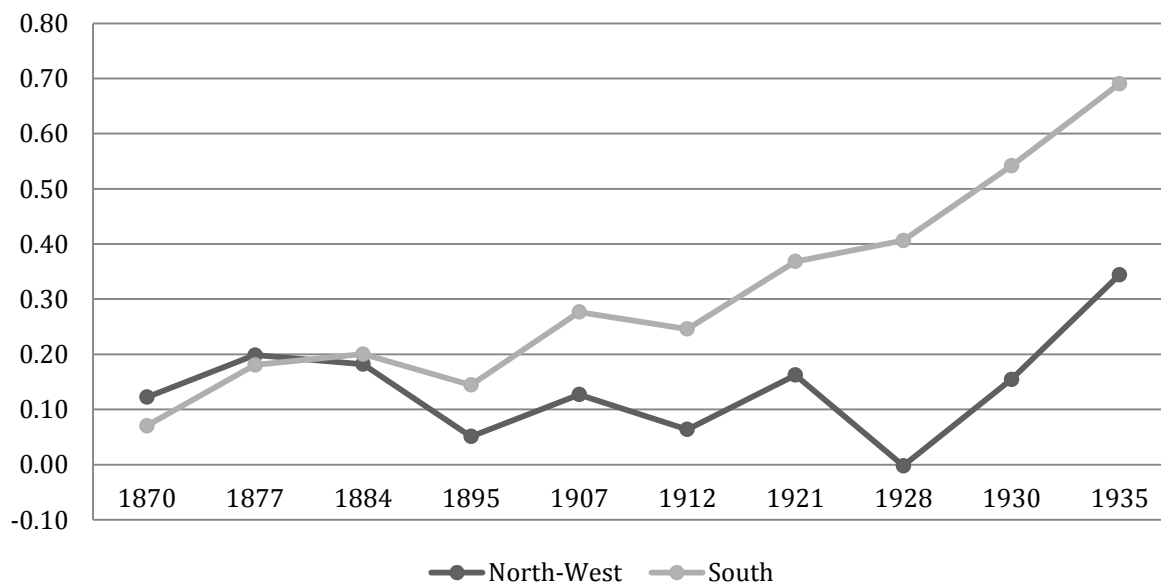


Figure 16: The North-West's trend of Gross Enrolment Ratios compared to that of Southern regions (estimates based on time-trends only). The Y axis shows additional gross enrolments (%) with respect to the benchmark year, 1863. OLS estimates obtained with Time-Fixed Effects and specific regional trends. Sources: see text.

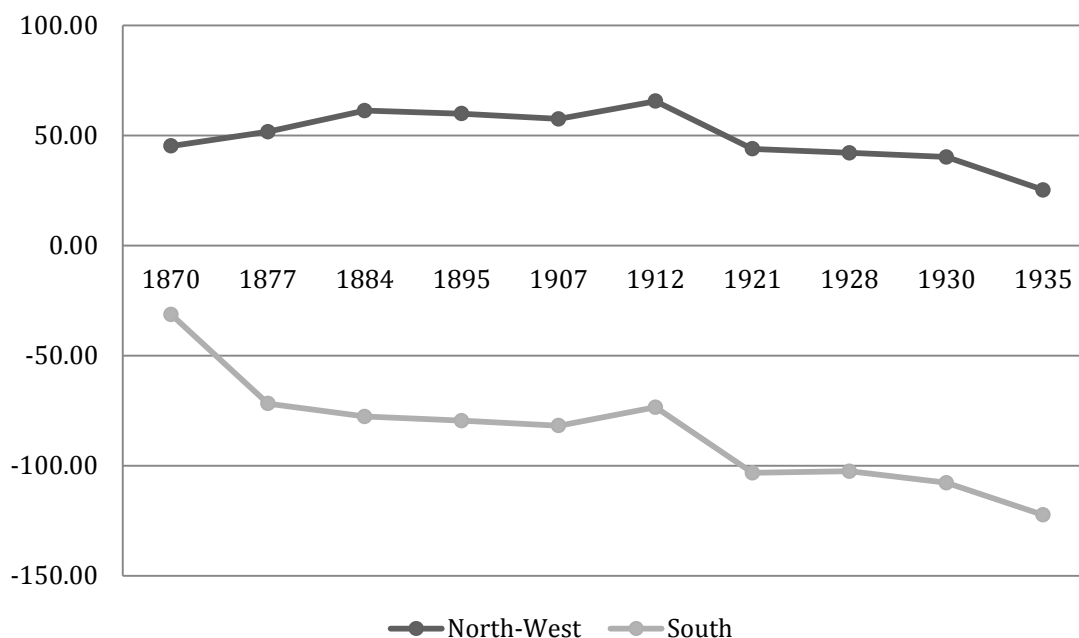


Figure 17: The North-West's trend of pupils subject to compulsory schooling per teacher compared to that of Southern regions (estimates based on time-trends only). The Y axis shows the amount of pupils per teacher with respect to the benchmark year, 1863. OLS estimates obtained with Time-Fixed Effects and specific regional trends. Sources: see text.

6. Interpretations and conclusions

The problem of Italy's regional disparities is more pressing today than ever before. The long-term persistence and the widening of regional inequalities after the recent financial and economic downturn calls for a better understanding of their causes. This research focuses on the education system and on its influence on regional disparities in human capital, largely inherited from pre-unification states. It argues that decentralized primary education slowed down convergence up to the Great War – because of the implicit relationship between the supply of schooling and the municipalities' spending capacity: a human capital trap. The system was largely centralized in 1911 as a result of the Daneo-Credaro reform, and the evidence provided shows that the new law constituted a step forward. The trap was weakened by levelling disparities in expenditure and by reducing the influence of local available resources.

However, the effects of the reform were partly limited by a variety of factors. The Great War and the Spanish flu might have had disruptive effects on its implementation and on the

accumulation of human capital. After that, changes in the political arena, a new reform of primary schooling (the Gentile Law of 1923) and the growing attention paid to the military sector at the end of the 1930s limited the scope and effectiveness of the reform to just a few years – roughly between 1920 and 1935 (De Fort 1996). This limited impact could not fully re-shape the pattern of human capital disparities observed across Italy's regions. Moreover, the negative effects of decentralized primary education were likely to be self-reinforcing, and to be felt well beyond 1911. Firstly, schooling requires teachers: since in Italy's case they were recruited from a large pool of illiterates, they might have limited the quality of education with subsequent effects on enrolments and human capital accumulation. This problem likely affected the Southern regions and rural areas of the country, where human capital and teachers had been lengthily insufficient prior to the unification of the Kingdom of Italy. Secondly, low educational levels might have influenced the development of local institutions – which qualitative and quantitative evidence put forward as potential determinants of human capital accumulation.

By contrast, the position of North-Eastern and Central regions improved by a large extent – they caught up fully, and independently of the indicator of schooling analysed. The measures introduced in 1911 were more beneficial there than in Southern regions. Additionally, since Central regions would converge to the income levels of the North-West only in the post-WWII period (Felice 2011), the catch-up in schooling must be largely attributed to the Daneo-Credaro reform. This is in line with recent interpretations of regional disparities in the long-run (Felice and Vasta 2012): the likely accumulation of human capital in the Interwar period might have sparked off a virtuous circle that allowed Central regions to close the gap with the Industrial Triangle of Piemonte, Lombardia and Liguria during the post-WWII Golden Age (1950 – 1973).

All of this leads to the following question: what if Italy's education system had been centralized before 1911? This paper has provided a first, preliminary answer to this question, which is reinforced by the analysis conducted on the Coppino Law at the end of section (5). Although the reform approved in 1877 did not affect the system as much as the Daneo-Credaro reform did in 1911, it certainly provided a first contribution to the

development of Italy's human capital. If the state had intervened before and more decidedly, one may put forward, the human capital gap across Italian regions on the eve of the Second World War might have been reduced to a large extent – and the country's performance largely improved.

Finally, the present research has shown that regional convergence remained largely incomplete on the eve of World War II. Yet, this pattern was not caused by the disappointing performance of Southern regions in response to centralization. Instead, estimated regional trends suggest that the Daneo-Credaro reform boosted education both in the North and the South of the country, possibly because of the large impact it had in rural areas – which helped overcoming bottlenecks due to grassroots efforts to supply schooling. Therefore, the idea of convergence might not be the most suitable category to evaluate the results of the Daneo-Credaro reform during the Interwar period.

More in-depth research on this topic is needed, especially to gain a better understanding of the role of local institutions – only briefly taken into account by this work. These might have persisted well beyond 1911 and might have even influenced the way centralization was actually implemented in different areas. The issue of regional disparities remains central in Italy's economic history and in today's public policy. This paper suggests that, although a decentralized administrative system can theoretically provide good incentives in promoting economic activity and enhance the meeting of supply and demand, it also conceals undeniable dangers.

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