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REGIONAL DISPARITIES IN ITALY OVER THE LONG RUN: THE ROLE OF HUMAN CAPITAL AND TRADE POLICY

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Abstract: *The well known Italian dualism in terms of development disparities between the North and the South has been one of the most debated issues in economics over the last few decades. In the aftermath of the Unification of Italy, the gap between North and South in terms of human capital stock was more relevant than the dualism in terms of GDP per capita. In 1871 the percentage of population able to read and write was 57.7% in the North-West and only 15.9% in the South, while there is no evidence of income disparities. Interestingly, in 1951 income per capita in Southern regions was only about 50% of that of the North. Bearing this evidence in mind, and using a novel panel dataset, we investigate the pattern of regional development focusing on the role of initial human capital conditions as a major driver of growth over the period 1891–1951. We provide further empirical evidence on the impact of protectionist trade policies in the late 19th century on long run development. We find that a numerically large human capital stock in the North provided fertile soil for early industrialization, while the protection of agriculture resulted in an incentive for the South to specialize further in the primary sector, which turned out to be harmful in the long run.*

Keywords: REGIONAL DISPARITIES, HUMAN CAPITAL, TRADE POLICY

JEL classification: R11, J24, O24

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1. INTRODUCTION

The economic and financial crisis of 2009 has focused the attention of economists on the analysis of long run growth potential. At the local level, some regions are suffering more than others because of their economic structure, and most policy interventions are actually aimed at providing temporary relief, with no particular reference to the fundamental structures of regional economies. In terms of regional disparities, the lack of a long run perspective could prove to be particularly harmful, resulting in myopic and often ineffective policies.

A large body of literature has, in fact, tackled the issue of finding the driving forces of regional growth and the ensuing pattern of convergence/divergence (Abreu et al., 2005). This literature has provided sound evidence on the determinants of regional growth over a relatively short time period, but it has often neglected the questions of *why* and *when* regional disparities emerged and *how* they evolved in the long run, albeit with a few notable exceptions. Acemoglu and Dell (2009) have proposed theoretical arguments in favour of a negative relationship between the quality of institutions and regional disparities. Tabellini (2009), building on Putnam's (1993) hypothesis, has provided evidence of the influence of past institutions on current economic development in European regions. Combes et al. (2008) analyze spatial inequalities in France, finding strong support for the economic geographic view, according to which the decrease in transport costs first tends to increase regional disparities, then subsequently reduces them. Esposto (1997) and Fenoaltea (2003) studied Italian regions over the period 1891–1931, establishing that the dramatic increase in regional disparities started in the early 20th century and coincided with the country's industrialisation.

Building on this literature, our aim is to disentangle the origins of regional disparities in Italy in the aftermath of Unification, which took place in 1861. In particular, we set out to highlight two specific aspects of regional disparities in Italy. Firstly, that the Northern population was more educated on the eve of the industrialisation wave, and therefore constituted a more productive factor than did the Southern labour force. This implies that the initial human capital gap may have an important factor in determining the subsequent diverging pattern of development. Secondly, in the crucial years of industrialisation (1891–1911), high trade duties were imposed on agricultural goods and the products of some fledgling industries considered to be strategic (e.g., chemicals, iron, steel, textiles), mostly located in the North. Such protectionism preserved high profits in the primary sector and did not promote structural change in the South. In sum, protectionist trade policies were beneficial in the short run but, by blocking structural change, had negative effects in the long run.

In 1871 the percentage of Italian population able to read and write was 57.7% in the North-West and only 15.9% in the South. Over time this initial gap was partially bridged; by 1951 literacy rates were around 75% in the South and more than 90% in the rest of the country, although the convergence rate in human capital stock was probably too low to promote convergence in development.

The model we have in mind is similar to the one proposed by Ngai (2004), where different timings of the transition from a Malthusian to a Solow economy was a consequence of barriers (economic, technological, social, political, etc.), which increased the opportunity cost of the switch. In our paper we investigate the hypothesis that a low initial level of human capital stock and protectionist trade policy were barriers to the industrial transition of Southern regions.

The remainder of the paper is organized as follows. In the section below we review the conditions of regional economies in Italy in the aftermath of Unification, while in section 3 we consider econometric evidence on the long run impact of initial human capital conditions. In section 4 we provide evidence on the growth impact of trade policy, as well as its joint impact of initial human capital disparities on structural change. Section 5 contains our conclusions.

2. ITALY IN THE AFTERMATH OF UNIFICATION

Prior to the Unification of 1861 Italy was comprised of two main states: the Kingdom of Sardinia, in the North and in most of the central part of the country, and the Kingdom of the Two Sicilies, in the South¹. In the aftermath of Unification, disparities between the two parts of the country in terms of GDP per capita were not significant, as reported in Figure 1. Interestingly, the gap between North and South started to be relevant in conjunction with the early stages of industrialisation. Figure 2 documents the contraction of industrialisation indexes occurring in the South during the period 1891–1911, and their increase in the North. Questions as to why this happened are crucial.

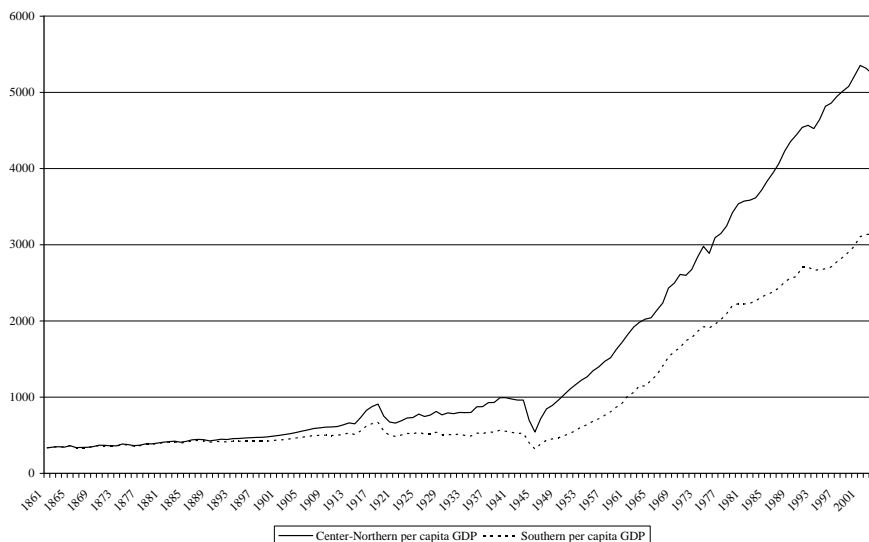
Several theories have been proposed to explain the divide. The “geography view”, reviewed in Fenoaltea (2006), highlights the importance of natural resources, easily available in the North (Rapp, 1975; Fenoaltea, 1999), as well as the North’s geographical proximity to the European core (Malanima, 2002). The “institutions view” strongly emphasises the role of social capital (notably higher in the North) and past *de jure* institutions in lowering transaction costs, thus boosting private investment and entrepreneurship (Putnam, 1993; Percoco, 2009).

Here, we further advance the hypothesis that a low level of initial human capital stock and protectionist trade policies for agriculture in the 19th-20th centuries enveloped the South in a low industrialisation equilibrium, which negatively affected the level of development in the long run.

Considering data for 1891 in terms of index number (per worker value added in comparison to average national per worker value added), substantial uniformity may be noted in the level of productivity among regions. The comparison among all Italian regions (Figure 3a) shows the absence of a clear North-South dualism in terms of productivity: Lazio was the most productive region, while the regions of Puglia, Sicily and Sardinia were characterized by higher productivity levels than those of Lombardy and Piedmont.

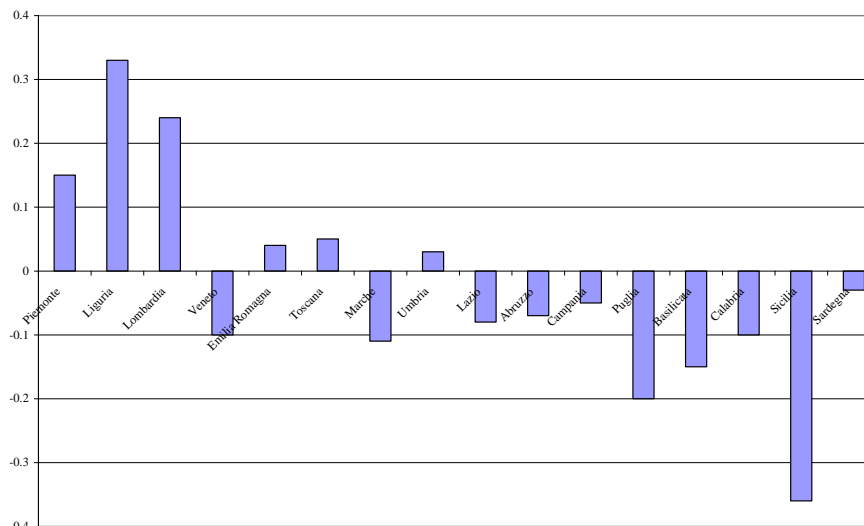
¹ Rome and the Church State were annexed in 1870.

Figure 1: Per capita GDP in Italian macroareas (at 1911 prices)



Source: Daniele and Malanima (2007).

Figure 2: Variation of the index of industrialisation, 1891–1911

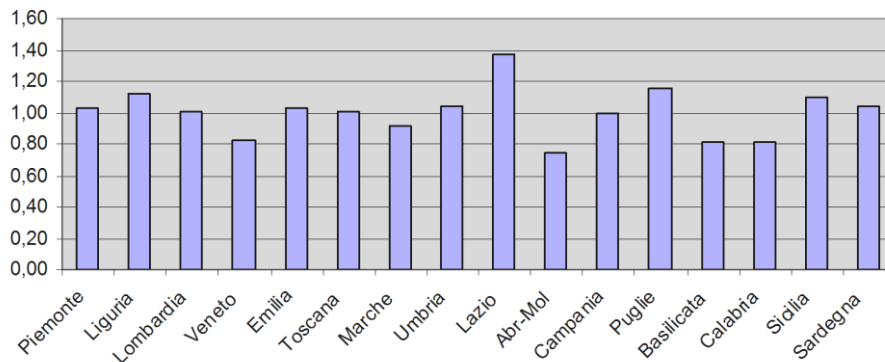


Notes: The index of industrialisation is the ratio between the regional share of industrial value added and the regional share of male population older than 15 years. The graph displays the absolute variation of the index between 1891 and 1911. Source: Fenoaltea (2006).

The scenario is, however, completely different when considering regional data on literacy rates (Figure 3b). The comparison in this case already shows a significant disparity among regions. In particular: (1) the spatial distribution of

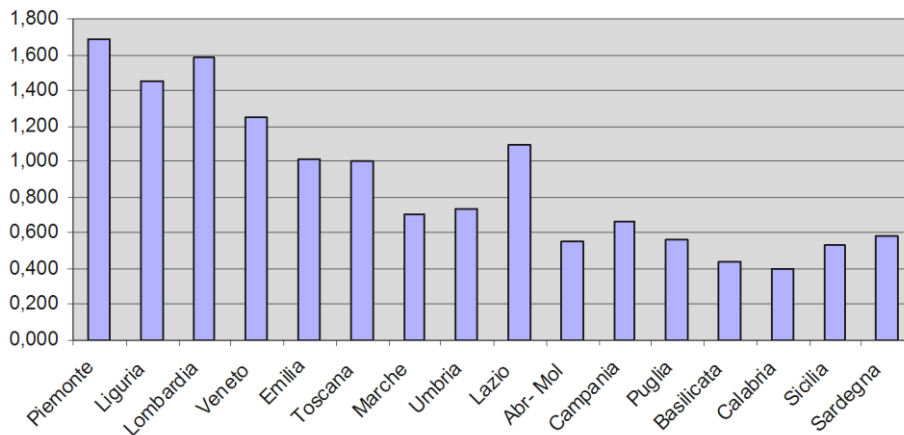
the gap shows the existence of two different clusters: Northern regions plus Tuscany and Lazio characterized by a high level of education, and Southern regions plus Marches and Umbria with a literacy rate clearly lower than the average; and (2) the magnitude of the gap underlines that in 1891 the literacy rate in the Northern regions was almost twice that in the South of Italy.

Figure 3a: Value added in 1891 (Italy=1)



Source: Felice (2007).

Figure 3b: Literacy rate in 1891 (Italy=1)



Source: Felice (2007).

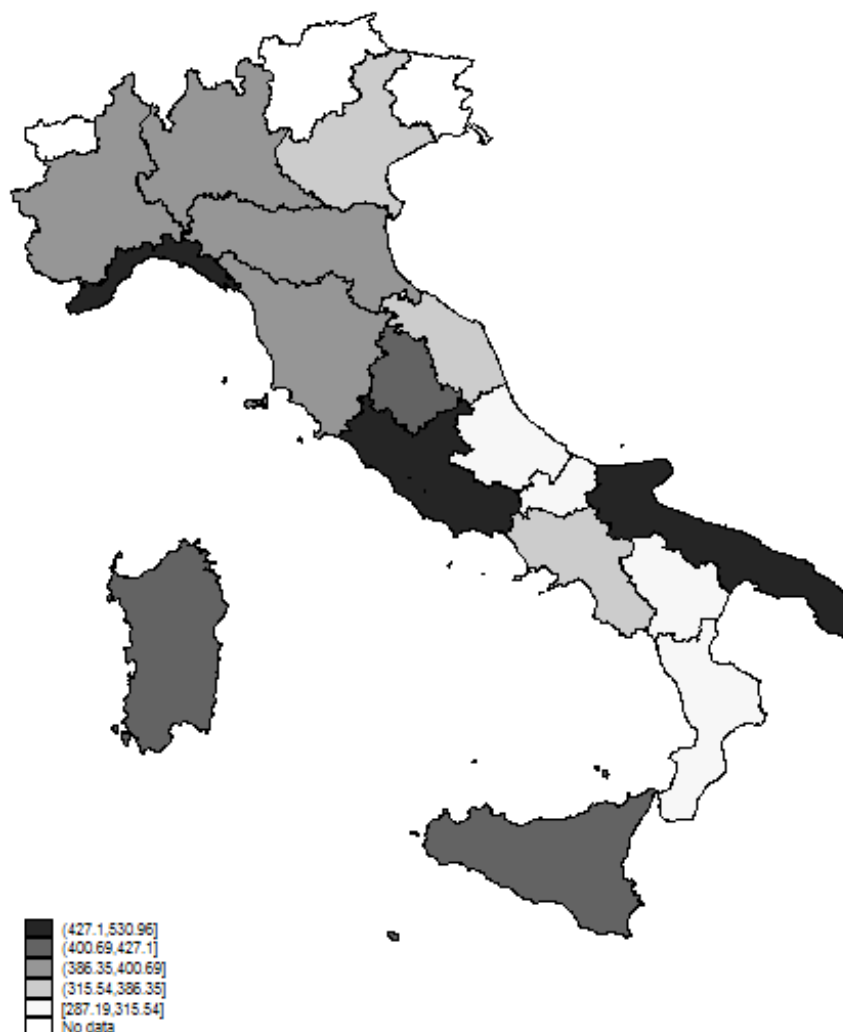
Differences in terms of the spatial distribution of the two indicators are clearly identified when the cartographic representation is taken into account.

The number of classes in the clustering process is defined by Sturges' formula (Sturges, 1926):

$$n^{\circ} \text{ classes} = 1 + \left[\left(\frac{10}{3} \right) * \log(n^{\circ} \text{ observations}) \right]$$

This formula allows us to define the optimal number of classes with respect to the number of observations, which, in our case, coincides with the number of Italian regions. Employing the above formula five different clusters are identified. They show the spatial distribution of the indicators, considering potential agglomeration phenomena in terms of per worker value added (Figure 4a), literacy rate (Figure 4b) and agricultural specialization (Figure 4c).

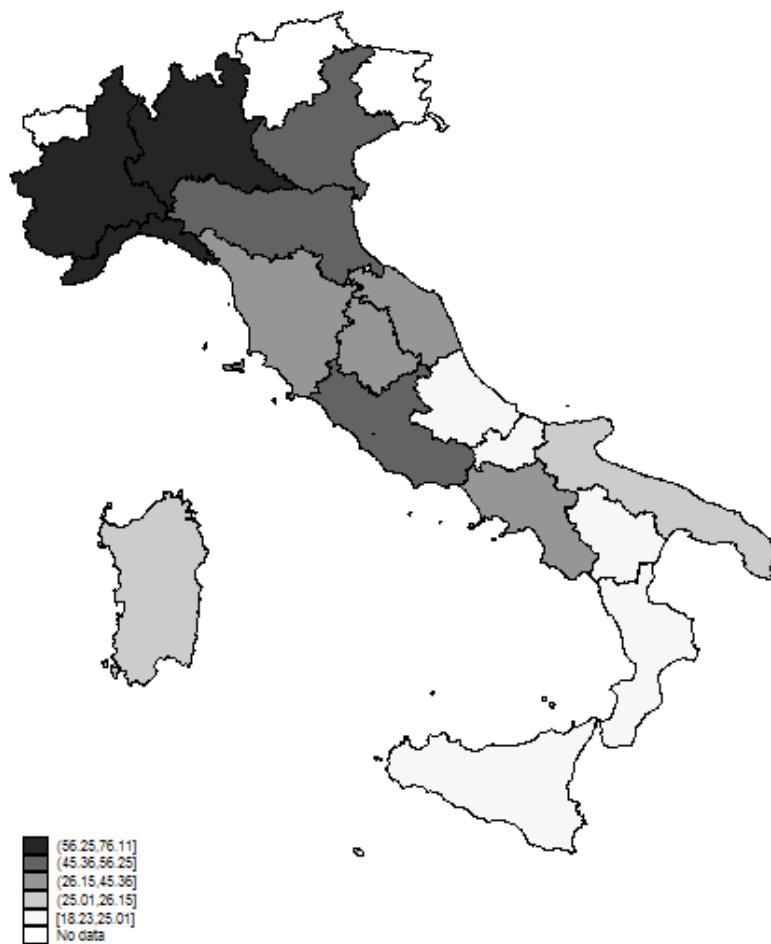
Figure 4a: Per worker value added in 1891 (in Liras)



Such an assumption does not propose that human capital was the only determinant of divergence in regional economic trends. On the contrary, the rise of regional inequality in Italy is due to a complex system of factors. In particu-

lar, on the eve of Italian Unification the country had a relatively small degree of protectionism, with an average trade tariff of 7% (Federico and O'Rourke, 2000). Starting, however, with the signing of a new treaty with France in 1877, and the consequent increase in tariffs in 1878, free trade was replaced by increasingly protective policies. In a certain sense Italy anticipated protectionist policies implemented by other countries in the 1890s (Blattman et al., 2002). In 1887, landowners sitting in parliament succeeded in gaining approval for an increase in wheat duties, along with high duties on textiles, iron and steel, a tariff structure that was to remain in force up to World War I².

Figure 4b: Literacy rate in 1891 (in percentage)



² Interestingly, the involvement of land elites in the process of tariff setting is worthy of further investigation with regard to the political economy of tariffs in Italy (Nunn and Trefler, 2007).

Figure 4c: Specialization in agriculture in 1891

The effect of trade policy in the late 19th century has been the subject of a number of studies. Recently, O'Rourke (2000) found a positive effect of trade tariffs on growth in the last part of the century³. As for Italy, Pescosolido (1998), Sapelli (1991) and Zamagni (1993) point out the positive role of protectionism in stimulating strategic industries, such as the iron and steel industries. Gerschenkron (1962) argues that Italy could have benefited from protectionism of highly skilled intensive sectors, such as engineering and chemicals. Similar arguments are also at the heart of Fenoaltea's (1973) analysis. In assessing the effect of trade policy in a static computable general equilibrium model, Federico and O'Rourke (2000) find little evidence in support of the hypothesis that protectionism blocked structural change⁴.

³ For additional reviews, see also Tena (2006; 2007).

⁴ For a different application of a general equilibrium model in the case of the American autarky experience in 1807–1809, see Irwin (2005).

Previous literature has, in fact, neglected the use of panel models because of the lack of historical data at the regional level. However, recent findings in economic history allow us to conduct econometric analysis to disentangle the effect of trade policy and initial human capital stock on the development process of Italian regions. Our argumentation strategy consists in, firstly, assessing separately the role of initial human capital stock and trade policy. To this end, we make use of two datasets which allow us to exploit all the available information. The first—with a higher number of variables—consists of an unequally spaced panel spanning the period 1891–1951 and reporting information only for the census years. The second—with a lower number of variables—consists of regional yearly time series over the period 1891–2004.

As a second step in our argumentation, we consider jointly initial human capital stock and trade policy as determinants of structural change in a unified framework.

In the section below, we start using the first dataset to corroborate our hypothesis on the relevance of initial conditions in human capital stock.

3. HUMAN CAPITAL AND REGIONAL PRODUCTIVITY GAPS

3.1. Data

New growth theory and, in particular, endogenous growth models emphasize human capital as a key factor for stimulating growth (Lucas, 1988; Romer, 1986 and 1990). We intend to contribute to this literature by highlighting the long run impact of human capital in Italian regions. The analysis is based on data from several studies in the economic history field that analyze long run trends in terms of regional economic, demographic and social conditions. Regional value added data and sectoral shares are from Felice (2005a). Sectoral shares are defined as the ratio between sector value added and total value added in the region. Value added in manufacturing and services are from Felice (2005b), while agricultural value added is from Federico (2000).

All indicators are defined in per capita terms based on the level of annual population for a time interval starting from 1891 to 1951; they are defined at the end of each period and at 2008 prices. Due to incomplete data the analysis is performed over an unequally spaced panel that considers for the available number of regions (Piedmont, Lombardy, Veneto, Liguria, Emilia Romagna, Tuscany, Umbria, Marches, Abruzzo, Molise, Campania, Puglia, Calabria, Sicily and Sardinia, except for Valle d'Aosta, Trentino Alto Adige and Friuli Venezia Giulia) the following years: 1891, 1911, 1938 and 1951.

To test the impact of education on regional development in terms of path dependence, we consider the literacy rate in 1871 as the number of individuals over six years in age who were able to read and write (Felice, 2005b). This methodological choice reflects the aim of the analysis. This paper strives to test whether the pre-conditions of regional development in terms of education affected the divergent long run development trends between the North and South of Italy. This hypothesis is supported by the evidence discussed in section 2

regarding the initial characteristics of the Italian regions. The main idea is that whereas just after Unification the gap between northern and southern regions in per worker value added was negligible, there was already a huge difference in terms of human capital. Based on this historical evidence we infer that the differences in human capital were at the root of the subsequent North-South dualism. In order to test this hypothesis we use the level of education in 1871 as a proxy for these preconditions, and we analyse its effect on the level of regional value added in the following period. This approach allows us to test for the persistence in the effect of education on regional development.

In order to isolate the effect of human capital, we will control variability among sectors in terms of different degrees of specialization by introducing a vector, $spec_{rst}$, that measures shares of value added related to region r , sector s at time t as a regressor.

3.2. Human capital and the productivity growth rate

We attempt to assess the effect of education on productivity, highlighting sectoral specialization. The path-dependence perspective implies that the analysis focuses on the effect of education in terms of initial conditions (i.e., education in 1871) on subsequent regional development. To this end, the time invariant level of education will be multiplied by temporal dummy variables. The interaction terms allow us to estimate the effect of education in 1871 on productivity levels during subsequent periods by inserting the time invariant level of education in 1871 as an explanatory variable of the fixed effect regression.

In the last part of the analysis the time invariant level of education of 1871 is introduced through an interaction term with sector specializations. In this framework the interaction term captures the joint effect of education and specialization, while the coefficients related to specialization could be interpreted as the effect of sector specialization when the level of education is equal to zero.

The analysis is based on a balanced sample that provides observations for all Italian regions and at four points in times: 1891, 1911, 1938 and 1951. Table 1 reports summary statistics.

Table 1: Dependent variables: overall, between and within variation

		Mean	Std. Dev.	Min	Max	Observations
growth	Overall		2.953737	4.511958	13.32600	N = 48
	Between	8.435217	0.342550	7.979523	9.07903	n = 16
	Within		2.934658	4.869186	12.68218	T = 3
$\ln va_{it}$	Overall		2.524667	5.660144	13.33394	N = 64
	Between	8.157901	0.231009	7.798435	8.57666	n = 16
	Within		2.514582	5.569116	12.91517	T = 4

Notes: N stands for the total number of observations, n is the number of regions in the sample and T is the number of temporal observation for each region.

Note that Table 1 emphasizes the relevance of a fixed effect estimation due to the predominance of the within variability in the sample for the two fundamental dependent variables.

Our analysis builds on the classical production function framework with the aim to analyse the persistence of initial human capital stock. We begin by estimating the impact of initial conditions in terms of human capital on long run growth. The aim is to evaluate the effect of the preconditions, in terms of human capital, on the variation of regional productivity over time after controlling for the structure of the economy. In particular, we estimate an equation in the form:

$$growth_{r,t} = \alpha + \beta_1 va_{rt-1} + \sum_{t=1891}^{1951} \beta_{2t} educ_{r71} \cdot d_t + \sum_{s=1}^3 \beta_{3s} spec_{rst-1} + \gamma_t + \gamma_r + \varepsilon_{st} \quad (1)$$

where *growth* is the log of the average annual growth rate of region *r*, *va*_{*rt-1*} is the log of value added, *educ*_{*t*} is the log of the level of education in 1871 or 1891, *d*_{*t*} is a vector of time dummy variables, γ_t and γ_r are year and region fixed effects, and ε_{st} is a well behaved error term that captures potential shocks in productivity. Variables *spec*_{*rst-1*} are the log of sectoral shares (with *s*= agriculture, manufacturing, service). Note that this specification contains both region- and year-specific fixed effects so as to minimize the problem of omitted variable bias.

Table 2, columns 1 and 2, reports the estimation results of equation (1). The magnitude of coefficients is not easily definable given the high standard errors, but it is possible to infer the sign and the statistical significance of the relations. Coefficients of specialization are statistically significant for all sectors, meaning that a general increase in the level of sector specialization positively affected productivity. Considering the coefficients for education in 1871, it is clear that the effect on productivity level just after World War I is negligible, while the effect on productivity level after World War II becomes relevant and statistically significant. This evidence can be interpreted as a result of the progressive increase in labour market skills requirements.

After World War II, Italy embarked upon the well known “economic boom”, characterized by a speeding up of industrialization and a progressive rise in the economic significance of the tertiary sector. The new economic conjuncture reasonably provoked an increase in the average labour skills requirements and a higher relevance, in terms of labour market participation, of higher educated workers.

Regions traditionally characterized by a higher level of education faced a comparative advantage in terms of quality of human capital, and they were reasonably able to benefit from the opportunities of the “new economy”, both in terms of capacity of innovation in traditional sectors and the possibility to rely on a wider range of new activities.

Table 2: Productivity, human capital and sector specialization

	growth		$\ln va_{rt}$		
	(1)	(2)	(3)	(4)	(5)
$\ln spec_{ragrt-1}$	.53** (.24)	.62* (.33)			
$\ln spec_{rindt-1}$	.50** (.21)	.57** (.22)			
$\ln spec_{rtert-1}$	1.49** (.71)	1.3** (.56)			
$\ln spec_{ragrt}$			-.05 (.15)	-.05 (.16)	.08 (.39)
$\ln spec_{rindt}$			.35** (.14)	.34** (.14)	-.92** (.41)
$\ln spec_{rtert}$			-1.1*** (.15)	-1.2*** (.20)	-.30 (.51)
$\ln educ_{r71} * d_{11}$	-.04 (.14)		.00 (.04)		
$\ln educ_{r71} * d_{51}$	.50** (.21)		.29*** (.15)		
$\ln educ_{r91} * d_{11}$		.0084 (.1332)		.00 (.04)	
$\ln educ_{r91} * d_{51}$		.42** (.18)		.19** (.08)	
$\ln educ_{r71} * \ln spec_{ragrt}$					-.00 (.22)
$\ln educ_{r71} * \ln spec_{rindt}$					.79*** (.26)
$\ln educ_{r71} * \ln spec_{rtert}$					-.33 (.33)
Obs.	48	48	48	48	64
R ²	0.99	0.99	0.99	0.99	0.99

Notes: Robust standard errors in parentheses. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. All regressions include year and region fixed effects. All models have time and region specific fixed effects.

Column 2 of Table 2 reports the same type of regression using the regional level of education in 1891, about 20 years later. These additional estimates can be considered as robustness checks, given the reasonable persistence in the level of education; the sign and the statistical significance of all coefficients remain unchanged.

3.3. Human capital and the productivity level

In the previous specification we analysed the effect of education in 1871 on growth rate then on the variation of value added over time. The analysis of the effect of human capital on productivity is further investigated taking as a dependent variable the level of value added in each year, rather than its variation over time. This analysis is designed to isolate the effect of human capital on annual productivity.

The second estimated equation is:

$$va_{rt} = \alpha + \sum_{t=1891}^{1951} \beta_{1t} educ_{r71} \cdot d_t + \sum_{s=1}^3 \beta_{2s} spec_{rst} + \gamma_t + \gamma_r + \varepsilon_{rt} \quad (2)$$

where the dependent variable is the log of value added per capita of region r at time t , $educ_t$ is the log of the level of education in 1871 or 1891, d_t is a vector of time dummy variables, γ_t and γ_r are year and region fixed effects, and ε_{st} is a well behaved error term that captures potential shocks in productivity. Variables $spec_{rst-1}$ are logarithms of sectoral shares (with $s=$ agriculture, manufacturing, service). It should be noted also that equation (2) has region- and year-specific dummy variables in order to minimize the omitted variable bias.

Columns 3 and 4 in Table 2 report estimates for this specification. The quality of the estimates is generally improved as revealed by the magnitude of the standard errors.

Column 3 reports estimates related to the effect of education in 1871 on productivity level. The effect of specialization in agriculture is negligible, while the effect of an increase in industrial specialization remains positive and statistically significant. The data refer to approximately a half century, from 1891 to 1951, a period characterized by a progressive industrialization process. The different capacity of each region to cope efficiently with this economic change will be one of the most relevant stimuli to productivity growth.

An interesting result is related to the effect of specialization in services: The high coefficient is statistically significant but shows a negative sign. Interpreting this estimate could be controversial. The main point is that in the time period under consideration the tertiary sector was not highly productive, consisting mainly of personal service activities. The increase in the share of the service sector as ancillary to industrial development has been a feature of the decades starting from the 1960s, years that lie outside our sample.

The level of education in 1871 is still not significant for productivity in 1911, although it is positive and highly statistically significant after the World War II, when the increase in labour market complexity required more highly skilled workers. Even in this case the fourth column of Table 2 reporting estimates of the education level in 1891 could be interpreted as a robustness check for the analysis of the effect of human capital quality levels on productivity and confirms the results reported in the third column.

3.4. Human capital, productivity level and sectoral structure

The regression in question emphasizes the positive effect of industrial specialization on value added, suggesting a relevant impact of the manufacturing sector on total regional productivity. This conclusion is reasonable for the time period under scrutiny, which is characterized by low value added in agriculture. Further analysis suggests possible correlations between sector speciali-

zation and education level. This specification allows us to investigate another channel through which education affects value added, i.e., by stimulating specialization in more productive sectors.

Table 3 shows the level of correlation between the education level in 1871 and specialization for each sector. The education level is closely correlated with industrial specialization, while the correlation is negligible for services and negative for agriculture.

To test the effect of initial education on productivity we will provide a further specification of the model to allow for an interaction term between education level in 1871 and sector specialization. The main aim of this new specification is still to analyze whether the level of value added is affected by education in 1871, but in this case the focus is on the channel through which such an effect appears. As emphasised by the coefficients shown in Table 3 the correlation between sector specialization and education in 1871 is an important dimension, and it could be an important source of variability in the regional economic performance. We will try then to account for the simultaneous effect of specialization and education in 1871 through an interaction term.

The estimated equation takes the form:

$$va_{rt} = \alpha + \sum_{t=1891}^{1951} \beta_{2t} educ_{r71} \cdot spec_{rst} + \sum_{s=1}^3 \beta_{3s} spec_{rst} + \gamma_t + \gamma_r + \varepsilon_{st} \quad (3)$$

where the dependent variable is the log of value added per capita of region r at time t , $educ_t$ is the log of the level of education in 1871 or 1891, $spec_{rst}$ is the variable related to sector specialization, γ_t and γ_r are year and region fixed effects, and ε_{st} is a well behaved error term that captures potential shocks in productivity.

By inserting an interaction term for sector specialization and education in 1871 we are able to account for the time invariant level of education in 1871 in the fixed effect regression. In order to interpret consistently this effect the variable related to sector specialization is also considered in the regression as it is time-variant. Note that the robustness of the estimation requires that both the terms of the interaction term are inserted individually. In our case the time invariant variable related to education in 1871 is already included in the fixed effect then the interaction term is perfectly identified.

The estimates reported in column 5 show that the interaction term capturing the simultaneous effect of education in 1871 and sectoral specialization is negligible for agriculture and services, while it is positive and statistically significant for industry. This result becomes even more important when considering the value of specialization as a baseline for evaluating the value added of education in determining the level of productivity.

The coefficients relating to sector specialization may not appear to be easily interpretable: They are completely different from the one already presented. In order to justify their retention it is necessary to interpret them as a baseline of the interaction term, for in this sense they are able to capture the effect of sector specialization when the level of education is equal to zero.

Allowing for this interpretation, the coefficient relating to industrial specialization becomes negative, meaning that industrial specialization has a negative and statistically significant effect in the presence of zero education. Comparing this estimate with the positive sign of the interaction term implies that the possibility to affect productivity through industrial specialization is strictly related to human capital endowments. As expected, human capital plays a less fundamental role in agriculture or services.

This last specification of the model highlights a significant joint relevance of education and industrial specialization. Regions with more educated labour forces tend to specialize in industry, and regions with a large initial stock of human capital obtain benefits from industrial specialization. In both cases it is possible to show a significant interaction between human capital and industrial specialization, positively affecting productivity level.

Important spatial implications are connected to this assumption. Figure 2 shows that in 1871 Northern regions were significantly more educated than Southern ones, and our results suggest a higher correlation between education level and industrial specialization. This is probably because regions with a more qualified human capital were able to switch from an agriculture-based economy to a more productive, industry-based economy. Data actually support this hypothesis, given that more productive Northern regions in 1951 were characterized by a higher level of industrial specialization, while the less productive Southern regions remained devoted to agriculture.

In this section we have provided evidence on the relevance of the 1871 level of human capital stock for subsequent development in Italian regions. In the following section, we will provide evidence on the effect of trade policy on long run development and structural change.

4. TRADE POLICY AND REGIONAL GROWTH

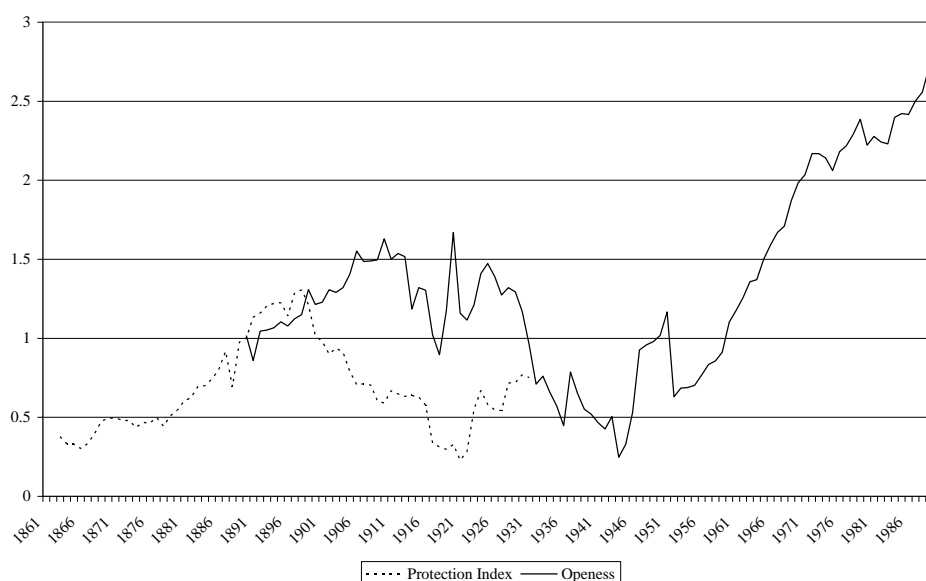
It is common to think of the positive effects of trade liberalization in terms of economic efficiency and short run growth (Giavazzi and Tabellini, 2005). Free trade is generally considered to increase economic performance and social welfare in trading countries, and a large body of literature has focused on the growth and development implications of trade. Little work, however, has been produced on the effect on regional disparities.

In developed countries such as the U.S., the increase in trade openness has resulted in a widening gap between skilled and unskilled workers. Studies have found the increase in income inequality to be as much as 20% (Feenstra and Hanson, 1999; Borjas et al., 1997; Baldwin and Cain, 2000).

It has also found, however, that trade does not increase inequality⁵ within all countries (White and Anderson, 2001; Ravallion, 2001; Dollar and Kraay, 2002), while there is some evidence in the literature an increase in inequality in developing countries (Calderon and Chong, 2001). Interestingly, Spilimbergo et al. (1999) and Fischer (2001) find that the effect of openness on inequality increases as human capital endowment increases. While the link between trade and inequality has attracted the interest of a number of scholars, the impact of trade openness on regional disparities has received comparatively less attention.

Krugman and Elizondo (1996) propose a theoretical framework in which international trade may act as an equilibrating force in regional disparities as long as more supplies are sourced from abroad and more output is sold abroad. Opposing this conclusion, and by considering the sectoral composition of regional economies and trade, Paluzie (2001) found that an increase in manufacturing trade exacerbates regional disparities if workers in agriculture are relatively immobile in relation to manufacturing. Similarly, Rodriguez-Pose and Gill (2006) find that regional disparities are likely to increase as trade in primary sector goods loses importance in the composition of total trade.

Figure 5: Temporal pattern of the index of protection



Notes: Both indexes are normalized at 1891 level.

Sources: Federico and O'Rourke (2000) and Rossi et al. (1993).

Such studies constitute the basis of our further analysis of long run regional disparities in Italy. In particular, Figure 5 depicts the temporal pattern of

⁵ As is standard in the literature, in this section we use the term "inequality" to indicate inter-individual income differences, while we use "disparities" to refer to interregional disparities.

the protection index (defined by the average duty as a percentage of goods value) and of trade openness (defined as the ratio between the sum of imports and exports and total GDP). Both indicators show the effect of 19th century protectionism in terms of increasing duties or contraction of the share of international trade on GDP. It is interesting to note that, despite the increase in protectionism during the period 1878–1898 (with relatively high tariffs also in the following fifteen years), trade openness slightly increased. This has led Federico and O'Rourke (2000) to question the effectiveness of protectionism in Italy. On this point we assume an agnostic view and choose not pursue the argument. Rather, we introduce both measures in our regression analysis.

Our dependent variable is GDP per capita at 1911 prices over the period 1891–1990 (Daniele and Malanima, 2007). The index of protection is from Federico and O'Rourke (2000) and covers the years 1863–1932, while the index of trade openness (defined as the ratio between the sum of total imports and total exports to total GDP) is calculated from data in Rossi et al. (1993) and covers the years 1891–1990. All variables are annual.

The reason why we make use of a different dependent variable is that in assessing separately the role of trade policy we want to exploit all the information available, which, in this case, exists on a yearly base.

Following Acemoglu et al. (2005), we can test the impact of trade policy on regional development by estimating the following regression equation:

$$\ln gdp_{rt} = d_t + \delta_r + \sum_{t=1891}^{1990} \beta_{1t} South \cdot d_t + \beta_2 South \cdot trade_t + \varepsilon_{rt} \quad (4)$$

where the dependent variable is the logarithm of GDP per capita in region r at time t , d_t is a vector of time dummies and δ_r a vector of regional fixed effects, $South$ is a dummy variable taking the value of 1 for regions in the South and 0 otherwise, and $trade$ is either the logarithm of trade openness or of the index of protection.

The results for models 1 and 2 in Table 4 disclose a positive impact of protectionism on GDP per capita in Southern regions. In fact, we found a positive and significant coefficient for the term $South \cdot Protectionism$, implying that higher tariffs lead to higher GDP in the South. Similarly, the coefficient for $South \cdot Openness$ is negative and significant, implying that lower openness to international market leads to higher GDP in Southern regions. In models 3 and 4, we propose a specification in which trade is interacted with the logarithm of productivity in industry in 1891, instead of $South$. Both estimated coefficients confirm the positive effect of protectionist policy in regions with a high level of productivity in the manufacturing sector in 1891.

Taken together, models 1–4 point out the benefits of trade policy in the South, possibly because of high tariffs for agricultural goods, and in highly productive regions, possibly because of tariffs on chemicals, iron, steel and textiles.

Table 4: Regional development and trade policy

	GDP per capita			
	(1)	(2)	(3)	(4)
South*Protectionism	0.08** (0.03)			
South*Openess		-0.04** (0.02)		
Productivity in industry 1891*Protectionism			0.16** (0.07)	
Productivity in industry 1891*Openess				-0.26** (0.07)
Observations	656	1600	656	1600
R-squared	0.90	0.98	0.93	0.99

Notes: All regressions include year and region fixed effects. All continuous variables are in logs. All models have an interaction term between South and a full set of time dummies, although not reported in the table. Robust standard errors in parentheses. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Table 5: Regional growth and trade policy

	GDP growth			
	(1)	(2)	(3)	(4)
Log GDP per capita t-1	-0.04** (0.01)	-0.02* (0.01)	-0.03* (0.01)	-0.02* (0.01)
South*Protectionism t-1	0.01** (0.00)			
South*Openess t-1		0.01** (0.00)		
Productivity in industry 1891*Protectionism t-1			-0.01 (0.02)	
Productivity in industry 1891*Openess t-1				-0.00 (0.00)
Observations	656	1600	656	1600
R-squared	0.93	0.93	0.93	0.93

Notes: All regressions include year and region fixed effects. All continuous variables are in logs. All models have an interaction term between South and a full set of time dummies, although not reported in the table. Robust standard errors in parentheses. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

In Table 5 we assess the impact of trade policy on growth in a convergence regression function. In model 1 we found a positive effect of protectionism on regional growth in the South, while the results of model 2 propose a contrasting (negative) effect. The reasons for such opposite results are not clear, however they could be traced in Figure 5, which shows in the years 1891–1901 and 1911–1918 a substantial co-movement of the protection and of the openness indexes, possibly because total imports and exports respond not only to trade

policy but also to other socio-economic variables. Models 3 and 4 also present unsatisfactory results in terms of the signs and significance levels of the coefficients.

Taken together, results in Tables 4 and 5 point to a positive effect of protectionism on Southern GDP, although the effect on the short run growth process is unclear or negligible.

Table 6: Trade policy and structural change

	Growth of manufacturing share			
	(1)	(2)	(3)	(4)
Education in 1871	[0.16]	[0.19]	[0.11]	[0.18]
Openess*Education in 1871	0.71* (0.32)			
Protection*Education in 1871		0.11** (0.05)		
Share of industry t-1			-0.09*** (0.01)	-0.08*** (0.01)
Share of Industry (t-1)* Education in 1871			0.01*** (0.00)	0.01*** (0.00)
Agriculture protection*South			-0.04** (0.01)	
Change in agriculture protection*South				-0.03** (0.01)
Observations	48	48	48	48
Adj. R-squared	0.42	0.39	0.42	0.40

*Notes: All regressions include year and region fixed effects. All continuous variables are in logs. The row for Education in 1871 report the p-values of the test for joint significance of the variable interacted with a full set of time dummies. All models have an interaction term between South and a full set of time dummies, although not reported in the table. Robust standard errors in parentheses. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.*

Our argument is that initial conditions on human capital stock and protectionist trade policy blocked the industrialization of the South by providing incentives to remain specialized in agriculture through a positive short run effect on GDP. In order to put together the two separate pieces of evidence we estimate the following specification using the dataset described in Section 3:

$$\Delta spec_{r,ind,t} = d_t + \delta_t + \sum_{1911}^{1951} \beta_{1t} educ_{r71} \cdot d_t + \beta_2 educ_{r71} * trade_t + \varepsilon_{rt} \quad (5)$$

where the dependent variable is percentage change in the manufacturing share. Because of the structure of the dataset, the variable *trade* is averaged over the years. Columns 1 and 2 in Table 6 reports estimates that confirm the hypothesis that high protection generally leads to larger changes in manufacturing shares of Italian regions. In column 3, however, we show the results of a model that can test our hypothesis more explicitly, i.e.:

$$\Delta spec_{r,ind,t} = d_t + \delta_t + \sum_{1911}^{1951} \beta_1 educ_{r71} \cdot d_t + \beta_2 educ_{r71} \cdot spec_{r,ind,t-1} + \beta_3 South \cdot trade_t + \beta_4 spec_{r,ind,t-1} + \varepsilon_{rt} \quad (6)$$

Here *trade* is the average tariffs on agricultural goods, as in Federico and O'Rourke (2000). Our a priori assumption is that higher protection of agricultural goods leads to lower growth of industry share in the South – a corollary of our hypothesis that trade policy blocked structural change in the South. Interestingly, we find a slight process of structural convergence, as the coefficient associated with $spec_{r,ind,t-1}$ is negative and significant, while the coefficient β_2 is positive and significant, implying a diverging pattern of industrialization imposed by initial disparities in literacy rates. Also to be noted is the coefficient for the variable $South \cdot trade_t$, which is negative and significant at 5%. Results are also confirmed in model 4, where we select the change in agriculture protection instead of its level.

Taken as a whole, these results show that our argument is reasonably corroborated by data, suggesting that initial human capital conditions and protectionist trade policy slowed industrialization and structural change in Southern regions, resulting in an increase of regional disparities in the long run.

5. CONCLUDING REMARKS

Estimation results support the positive effect of human capital both on productivity levels and on the growth rate of productivity. The model introduces education level in 1871 and 1891 as a proxy for human capital stock in each region, evaluating how much the traditional education level affected the regional development path. Not inserting a continuous variable for education level reflects limited data availability, as well as a deliberate methodological choice.

Introducing education through an interaction term in a fixed effect framework allows for controlling for both for region and year fixed effect, as well as for evaluating the effect of education in 1871 over the years. The results can be interpreted in terms of a path dependence assessment of the role of regional gaps in human capital level on long run regional development rates.

The methodology is particularly relevant for considering the regional structural gaps analyzed in the first part of the paper. It has been underlined that just after the unification process the main source of heterogeneity among regions was not related to differences in productivity but to those in education level. In addition, the cluster structure of this heterogeneity has been analyzed through a cartographic representation, showing that the well known North-South duality was negligible in terms of productivity performances, but was already in force in terms of human capital differentials.

This empirical evidence in the first part of the analysis suggested a significant correlation between educational gaps and divergent development trends between the northern and southern parts of Italy. The estimates obtained further

confirm this evidence of the crucial role of education in influencing the regional development rate.

Deepening the analysis, a higher correlation between education level and industrial specialization has been shown. Such evidence, combined with the stronger effect of industrial specialization on total productivity, leads to the conclusion that sectoral specialization can be considered the main channel through which education affects productivity. The general conclusion is that regions with more educated labour forces can specialize in more productive sectors.

Moreover, it is suggested that the ineffectiveness of industrial policy in the south of Italy over past decades was probably due to the lack of adequate preconditions in terms of human capital. This conclusion constitutes a proof of the crucial effect of education on local development. However, an open question persists: Does education fully explain the heterogeneity in sector specialization among regions?

The answer is clearly negative: Education level is a significant variable, allowing some regions to deal with a structural change in their economies. Other policies, however, naturally played a fundamental role in the definition of national economic equilibria. The above analysis has attempted to assess the effect of intra-national trade as a fundamental determinant of the regional economic structure.

Our findings show that the short term effect of protectionism on GDP is positive and statistically significant, but focusing on its variation over time the impact remained positive only in the South of Italy. Such empirical evidence suggests a positive correlation between the level of GDP and protectionism for both agricultural and industry-based economies, although when we look at the variation in GDP over time it is clear that this effect is no longer relevant for industrial regions. This system of incentives, together with the lacking human capital, blocked the industrialization process in the South of Italy. The lesser endowments of human capital made coping with structural change difficult, while protectionism encouraged southern regions to specialize in agriculture.

The results of our analyses suggest these dual overall conclusions:

- Human capital was a fundamental determinant in the divergence between North and South of Italy; it prevented southern regions from switching from a low value added agriculture-based economy to a higher value added, industry-based economy
- Protectionism incentivised southern regions to focus on agriculture, with the positive effect of protectionism on the agriculture-based economy (as compared to its negligible effect on the industry-based economy) providing a justification for local governments to block industrial development.

The well known North-South duality depends on regional structural characteristics in terms of human capital differentials, but it was exacerbated by a national trade policy that stimulated the persistence of agricultural specialization in regions where traditional gaps could imply higher opportunity costs in modifying the structure of the economy.

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LES DISPARITÉS RÉGIONALES A LONG TERME EN ITALIE : LE RÔLE DU CAPITAL HUMAIN ET DES POLITIQUES COMMERCIALES

Résumé - Les disparités régionales italiennes sont marquées par le dualisme traditionnel entre le Nord et le Sud qui a fait l'objet de nombreux débats durant ces dernières décennies. Au lendemain de l'unification italienne, l'écart entre le Nord et le Sud en termes de capital humain était bien supérieur à celui du PIB par habitant. En 1871, la population capable de lire et d'écrire s'élevait à 57,7% dans le Nord contre 15,9% dans le Sud, tandis que les disparités en termes de revenu étaient quasiment nulles. En 1951, le revenu par habitant dans le Sud ne représentait plus que 50% du revenu par habitant dans le Nord. En tenant compte de ces éléments et en utilisant de nouvelles données en panel, on étudie les disparités régionales italiennes entre 1871 et 1951 en se focalisant sur le capital humain. On montre que, dans le processus de formation des disparités Nord-Sud, les politiques commerciales protectionnistes n'ont pas été anodines. Dans le Nord, la dotation importante en capital humain a conduit à libérer les terres agricoles et à favoriser un processus d'industrialisation précoce et ouvert. Dans le Sud, à l'inverse, la protection de l'activité agricole en relation avec la faible dotation en capital humain de la population a conduit à entretenir une spécialisation dans le secteur primaire.