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Past dominations, economic and social regional differences

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To my parents.

Abstract

Does history affect current levels of economic development and individuals' behavior? This study demonstrates that it does. In particular, we focus on the connection between economic performance and the quality of government institutions in Italian NUTS3 regions, from one side, and on the relation between shirking behavior of teachers in Italian public schools and the level of social capital across different regional environments, on the other side. In order to address likely endogeneity problems, we use the histories of the different foreign dominations that ruled Italian regions over seven hundred years before the creation of the unified Italian State: in fact, the political fragmented history of Italy provides a rich source of variation at a regional level. Our results suggest that past historical institutions play a significant role on the current public administration quality and that the quality of institutions matter for development. Also, we show that the current social capital level has a strong effect on the absenteeism rate of teachers in Italian schools. Overall, we demonstrate, once again, that history can be used to find suitable instruments.

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Executive summary

Italy is characterized by a persistent duality between the *Mezzogiorno* and the Northern Italian regions. Differences refer to levels of per capita income, unemployment rates but they also refer to human and social capital levels. The scope of this thesis is to study whether Italian regional institutions matter for economic development, from one side, and to analyze whether local social capital levels affect workers' behavior in Italian public school, on the other side.

To this aim, in Chapter 1, we review the vast literature on the relation between institutions and economic performance and on the causal effect of social capital on workers' behavior, in terms of shirking attitude. Both of these connections are plausibly affected by endogeneity issues; to this aim, we also review several studies on the use of history to find suitable instruments and we provide a deep analysis of Italian history during seven centuries before its Unity. In fact, Italian pre-unitary history, characterized by a highly fragmented political setting with many foreign administrators that implemented highly heterogeneous formal institutions, may have persistently influenced current institutions and social behaviors.

In Chapter 2, we provide an empirical analysis of the connection between economic performance and the quality of government institutions for a sample of Italian NUTS3 regions: although since 1861 (year of the Italian Unification) Italian government has been the same and has been highly centralized in almost all current Italian regions, regional institutions perform very differently, suggesting an important role of local "informal" factors. Thus, we consider the literature that exploits the effects played by informal institutions on economic and social outcomes (Putnam, 1994; Guiso et al., 2008; Tabellini, 2010). Our data demonstrate, once again, the important differences across Italian regions in terms of public services provision, also considering homogeneous institutions with limited discretional power (Italian provinces). We start with an OLS analysis that, controlling for several local controls, demonstrates a clear positive correlation between institutional quality and economic performance, consistently with literature findings (Acemoglu et al., 2001). To address endogeneity issues, we perform the same analysis with an IV strategy, exploiting Italian past dominations as instruments. In terms of the empirical strategy, the wide variability among past sovereigns permits the creation of instruments able to capture exogenous variation in Italian regional institutional quality. Our instruments are built taking into account (in two different ways) past administrations that ruled Italian provinces from 1100 to 1800. Our IV results confirm the OLS ones, suggesting that past historical institutions play an important role on the current institutional settings and show that the latter has a significant effect on the Italian regional economic development. In addition, we are able to identify a

clear negative effect of Spanish and Papal State past administrations in current institutional quality.

In Chapter 3, we investigate whether the regional level of social capital affects the degree of teachers' absenteeism rates in Italian schools. The Italian sample represents a good candidate to examine the different functioning and effectiveness of local educational institutions in a developed economy. Data show that Italian teachers seem to have different patterns of absence rates in different areas of the country, suggesting, also in this case, that local informal determinants may be relevant. Our findings confirms that, among these local factors, a role is also played by social capital. Indeed, different studies show as sick leave absenteeism rates, also in Italy, may be influenced by worker's shirking behavior (Ichino and Maggi, 2000), and the latter seems to be different between the private and the public sector (Scoppa and Vuri, 2014).

Our baseline model is an OLS regression of teachers' absenteeism at school level on the indicator of local social capital levels (Cartocci, 2007), controlling for a large number of school, student and area characteristics. The teachers' days of absence are distinguished into three categories, sick leaves, maternity leaves plus a residual category, and we focus on the former variable as suggested by the literature on shirking. Also in this case, one of the main problems of our empirical analysis is the likely endogeneity of our social capital variable, mainly due to locational sorting problems (Ichino and Maggi, 2000; Bradley et al., 2007; Cornelissen et al., 2017). Indeed, it is possible that poor performers (in terms of absence rates) sort themselves in schools where the social capital is low, since in schools with a stronger monitoring, workers are more likely to pay formal or informal sanctions. In order to control for this problem we use different strategies. First, we use a large set of local and school characteristics that may differently affect teachers' behavior and social capital levels. Second, we exploit the presence of absenteeism rates of two different workers' categories working in the same school. In fact, together with teachers, for each school we also have the absence rate of the ATA (administrative, technical and auxiliary) staff. This enables us to control for school components, such as management, that may affect the shirking behavior. Finally, since we cannot exclude that unobserved heterogeneity or reverse causality are still a source of bias for our estimates, we also compare our OLS results with IV estimates. Again, our identification strategy relies on the instrumental variables identified in Chapter 2. In this case, we use the wide historical variability to capture exogenous variation in local social capital differences. Overall, our IV results confirm the OLS ones. They suggest that past historical institutions play a role on the current social capital level and show that the latter has a significant effect on the absenteeism rate of teachers in Italian schools.

Chapter 1

Literature review

"The same institutions function very differently in different environments,
suggesting that informal institutions play an important role."
Tabellini, 2010, p. 678.

1.1 Introduction

In this Chapter, we provide an overview of the literature connected to two important branches of economic analysis. First, we study the correlation between Italian regional institutional quality and economic development. As we will see, the studies focused on this relation are based on between-country analysis. Italy, instead, represents an ideal case to perform a within-country analysis: in fact, despite its *de iure* unitary institutional setting since Italian Unifications (1861), its local institutions seem to function very differently and, in addition, it is characterized by a great variability in social, cultural and economic indicators across regions.

The second point that we analyze is related to the connection between regional social capital and workers' shirking behavior in Italy. Also in this case, we are going to see that the same formal public (educational) institutions show very different characteristics in terms of teachers' absenteeism, despite their common national regulations. We will see that Italian data offer the possibility to exploit schools differences in relation to social capital disparities in the different provinces.

Both these relations suggest that some informal factors matter for the functioning of seemingly identical organizations. In addition, since those analyses might be affected by problems of endogeneity, mainly due to reverse causality and locational sorting, we address them exploiting the great fragmentation of Italian past political history to find an exogenous set of instrument (see on this Putnam, 1994 and Tabellini, 2010). In particular, our IV

strategy will be based on the past dominations that ruled Italy during its pre-unitary period. To have a clear idea of our instruments, this Chapter provides also a deep analysis of many centuries of Italian history.

The second Chapter is devoted to the analysis of the first topic, while the third one deals with the second topic.

1.2   On history, institutions and economic outcomes

As said, the first topic of our study (discussed in Chapter 2) analyzes the relation between the quality of public sector and the regional economic productivity. In studying this, we overcome endogeneity issues through an instrumental variables technique exploiting Italian history. This section provides an overview of the growing literature that investigates how history (and historical institutions) may influence existing institutions and, through this channel, current economic outcomes.

On this, a seminal contribution has been given by Acemoglu et al. (2001). According to them, different types of colonization policies, generating different types of past institutions, produced important differences in current institutions and, by this channel, different development levels.

The first kind of identified policies are related to the "extractive states", that they exemplify with the Belgian colonization of the Congo. In these colonizations, settlers did not stimulate protection for private property, and, at the same time, did not produce guarantees against government expropriation. Instead, the main scope was the exploitation of local resources (both human and natural), to transfer them to the motherland. Another possibility was to generate stable settlements and, by consequence, stable institutions (the examples are Australia or United States). Acemoglu et al. (2001) claim that "The colonization strategy was influenced by the feasibility of settlements. In places where the disease environment was not favorable to European settlement, the cards were stacked against the creation of Neo-Europes, and the formation of the extractive state was more likely"(p.1370). Thus, the new-born institutions were mainly defined by the local environment and by the possibility to settle stable community and exploit economic resources. Another important element is the persistence: the quality of these administrations persisted over time and determined and affected strongly the quality of current institutions. In fact, establishing institutions with clear rules on government power restrictions and on property enforcement is costly; thus, there is no convenience to change them into extractive ones (if they are established) nor to put them in place in a second moment (elites would prefer to exploit extractive institutions

for personal benefit).

On the same subject, Engerman and Sokoloff (2000) underline the great importance of differences (economic, cultural and social) in the environment in which European colonizers arrived. These were relevant for building different degrees of inequality, persisting over time and producing, through the institutional creation process, great disparities in the economic development.

Countries with colonies in Central and South America, characterized by the production of sugar and other valued crops (with an extensive use of slaves), produced the most important source of income from the new colonies. The inequality of slavery (and in human capital), together with the disparities in income, caused the evolution of institutions oriented to protect the benefits of elites, with very few opportunities for the majority of population to participate in the decisional process of society.

A second category of colonies is the Spanish America: Spain concentrate its effort on colonies in which endowments were characterized by the presence of mineral resources (e.g. Peru), distributing a large amount of this resources (together with land resources) among a privileged minority. The results have been the creation of extensive estates (or mines) that persisted over time, with a connected inequality in the wealth distribution. Another element, that enhanced this process, has been the restrictive immigration policy implemented by Spain. These first two categories produced an unequal distribution of wealth, human capital, and political power.

The third category of colonies were those of North America, in which there was not a population to exploit nor a favorable climate for crops production. Thus, their development was based on workers of European origin, with similar levels of human capital and, for this reason, generating a relative homogenous population (also from a wealth point of view). According to Engerman and Sokoloff (2000), in sum, societies with high levels of inequality were suitable for the creation of advantaged small elites that, over time, created a political system that preserved those benefits. By contrast, societies characterized by homogeneous population with greater equality, elites were not able to force an unequal distribution of political and economic power: in this contest, rules and laws generated a system with equal rights to all population. These differences, persisting over time, generated disparities in current institutions and in the economic development. Thus, both Acemoglu et al. (2001) and Engerman and Sokoloff (2000) focus their analyses on the environmental features of the new territories. A different aspect is analyzed by Berkowitz et al. (2003). They underline the importance of colonizers' history in shaping persistent (but not irreversible) institutions.

In particular, they define the "transplant" institutions as a set of legal rules exported from an origin country (e.g. France or England) to a transplant country. They underline the important role played by the legal order in strongly conditioning the legal and economic development of the country. But if the law, in transplant countries, was not adapted to local needs and features (or if origin countries imposed it via colonization in populations not familiar with the new law), the new legal order would function less effectively generating many problems to the following development of the country. On the same aspect, La Porta et al. (2008) concentrate their study on the legal traits provided by colonizers. They explain how the origin of laws in a State is highly correlated with subsequent legislation system and, by consequence, with economic outcomes. They define the concept of *legal origin*, with a broad definition, as "a style of social control of economic life (and maybe of other aspects of life as well)" (La Porta et al., 2008, p. 286). Their reasoning states that differences between common law and civil law are related to the different strategy and ideas that England and France developed many centuries ago. This different way of thinking resulted in "specific legal rules, but also into the organization of the legal system, as well as the human capital and beliefs of its participants" (La Porta et al., 2008, p. 286). With the colonization process (but also through trades, missionaries, migrations and so on), common law and civil law systems were exported ("transplanted"), together with rules, religion, language, human capital and ideologies. Even after the ending of the colonization period, legal European heritage was persistent and strongly influenced local evolution of the legal system. These differences in historical evolution of the legal and social (broadly defined) systems affected also economic rules and produced very different economic and social outcomes.

Tabellini (2010) applies a similar methodology to Acemoglu et al. (2001), but performs its analysis at within-country European level. In particular, his focus is the role of "informal" institutions. According to him, similar institutions, functioning differently, have been influenced by different historical traits and events. He studies the role of culture in shaping within country differences, that, by consequence, influence current economic development. He explains the role of history (measured as regional literacy rates at the end of the 19th century and political institutions indicators in the period from 1600 to 1850) in shaping cultural differences, controlling for country fixed effects, regional human capital and past economic development. Overall, Tabellini (2010) finds that higher illiteracy and worse political institutions are correlated with less trust, respect of other and confidence in the individual, that, in turn, are correlated with lower economic indicators. This study demonstrates the correlation between history and informal institutions but underline also

the great importance of social capital, that also may affect individuals' behavior. We discuss in detail the literature related to the latter point in the next section.

1.3 On social capital, working behavior and shirking

In this section we review the vast literature on social capital, shirking behavior and working productivity, that will contribute to the motivation of Chapter 3. Recent studies, but also many articles in several newspapers, have discussed about absenteeism propensity of Italian workers, especially in the sector of the public administration, often seen as a potential fertile environment to put in practice opportunistic behaviors. Thus, due to its important role in public debate, our choice is to focus on the relation between social capital and shirking, that we measure with the sickness absenteeism rate. As we are going to see, Italy is an interesting case study, characterized by a great variability in social capital levels and, at the same time, in absenteeism rates within different groups of workers: we exploit a large dataset on Italian schools, thus, our attention will be devoted to absenteeism rate in a specific sector of public administration, crucial for students' education.

We start our review from the seminal contribution of Ichino and Maggi (2000) on absenteeism phenomenon in private firms. They begin their analysis considering that there are important regional differences in shirking behavior (measured as sickness absences and misconduct episodes) among employees of a large Italian bank.[1] In the North, the average number of absenteeism episodes due to illness is equal to 1.90, while, in the Southern areas, the same indicator is equal to 2.91; even the average of misconduct episodes[2] shows important differences: 0.007 for North and 0.015 for South. They identify four main potential explanations to these differences. First, individual preferences for shirking versus working can differ according to the region of birth: this is due to the individual background (birth-environment may affect individual preferences or shirking preferences may be correlated with some individual characteristics, like sex or age, more present in the South). The second possibility is related to locational sorting: workers with low-shirking attitudes may tend to migrate to the Northern part of Italy (where they can be more productive), while those with high-shirking attitude may tend to relocate to the South, or both. It may happen for individual's choice or due to managerial choices. Third, Northern and Southern branches of the bank can be characterized by different local attributes (i.e. local area vari-

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[1]Data refer to years between 1975 and 1995, with 28,642 employees observed over 442 branches spread all over Italy. Data on absenteeism are available for years 1993-1995, while data on misconducts are available for the whole period.

[2]In this case, their indicator is equal to 1 if the worker has had at least one episode of misconduct.

ables, such as unemployment rate, local amenities or willingness of medics to justify "fake" illness episodes, and branch-specific variables, like the quality of managers in the branch), producing higher incentives to shirk in the South. Fourth, group-interaction effects may affect shirking behavior (imitation), in the sense that a worker's incentive to shirk is stronger when her/his co-workers shirk more and vice versa. The richness of their analysis relies on the availability of data on movers between branches: it allows them to take into account the so-called "reflection problem" described by Manski (1993).[3] They find that, controlling for work environment, in Southern areas shirking is higher than in the North due to differences in the individual backgrounds between workers born in the North and ones born in the South. At the same time, controlling for individual features, also working environment plays a significant role: shirking is higher when people work in Southern branches. Then, they focus on movers between branches to distinguish the different role of group-interaction effects, sorting and local attributes.[4] They find that group-interaction effects are significant with a clear positive relation between movers' shirking level and average shirking level of their working group. Local attributes are significant determinants of individual shirking behavior; however, their relation with shirking is not always positive: in fact, some of them, such as unemployment, are negatively correlated. They control for a set of branch-level variables (such as branch size, fraction of managers, fraction of females, average age and average years of education) and for a set of local variables (like yearly rainfall, yearly average temperature, unemployment rate, crime rate and hospital beds per capita). The scope of these controls is related to the fact that they may affect the incentive to shirk or they may be potentially linked to the incidence of real illness episodes, producing overestimation issues. In addition, they also argue about ISTAT data on mortality for illness: the mortality rate in the North is even higher than in the South and life expectancy indicators are similar in both areas, indicating that illness probability should be in principle the same in the different regions. Overall, according to Ichino and Maggi (2000), individual background is the most important element in explaining North-South shirking differential. Group-interaction and sorting effects both play an important role, even if not as important as that of individual background; local attributes do not contribute to explain the regional differential. Their conclusions are also consistent with Putnam (1994): regional differential in the degree of

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[3]Manski (1993) defined the "reflection" problem as the issue that we encounter when we try to make inference about the possible effects of the average group behavior on individuals' behavior. To implement this endogenous analysis, we need to have information about the composition of the group: according to Manski (1993), variables defining the group and outcomes variables must be moderately related in the population object of analysis.

[4]In particular, in their dataset, 13% of employees working in the north are born in the south, while 8% of southern workers are born in the north.

civic-ness affects social interactions in a different way. In particular, they claim that their study is an attempt to disentangle two components of civic-ness: individuals' preferences and group-interaction effects.

Among local factors considered by Ichino and Maggi (2000), one of the most relevant is unemployment. Scoppa and Vuri (2014) perform a specific study on this, connected to shirking in the workplace in Italy. They underline the importance of the threat of unemployment in reducing shirking incentives: in areas with high unemployment rate, workers may experience great difficulties in finding a new job, in case of dismissal. Thus, their goal is to study the impact of unemployment at Italian local level on individual shirking behavior, also considering that Italian workers' mobility is very low.

Similarly to Ichino and Maggi (2000), they use sickness absenteeism as a proxy for shirking behavior. In fact, since workers are fully covered by Italian national welfare system when absent for illness episodes (without an efficient monitoring system), they may be willing to take more days off than what is strictly necessary, due to the high degree of protection of Italian legislation. They distinguish between small (with less than 15 employees) and large firms; in fact, Italian law on labor protection foresees lower guarantees for small firms' workers (i.e. they may be, in principle, more exposed to the risk to be fired). An important assumption that Scoppa and Vuri (2014) do "is that firms effectively adopt the strategy of firing employees who are more frequently absent" (p. 3). Those elements are relevant for our scope, since the public sector is the most protected by Italian laws and the probability of firing a public worker is very low. They find that the individual absenteeism rate[5] is affected negatively and strongly by the provincial (NUTS3) unemployment rate: in Southern areas with high unemployment, shirking is lower than in Northern areas, although Southern regions are generally characterized by higher rate of opportunistic behavior (as we have seen in Ichino and Maggi (2000): an unemployment rate 10 percentage points higher than another one corresponds to a 17% less in absenteeism. Second, as expected, the impact of unemployment on shirking behavior is stronger in small firms than in large ones. Besides, they find that females, blue-collar workers and tenure are positively correlated with higher absenteeism rates. Third, for public employees, whose probability to be fired is very low, unemployment rate in their local labor market has no effects on their absenteeism rates. Finally, as in Ichino and Maggi (2000), they consider the possibility that real illness episodes may influence their results and, thus, they include in their model the same health variables: life expectancy and mortality rate. Following them, in Chapter 3, we are

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[5]Absenteeism is measured as the fraction of weeks of absences from work over the total number of weeks actually worked during one year.

going to control for those variables as well, to be sure that our estimates for Italian schools are capturing shirking behavior. Although these two variables show a strong significant effect on absenteeism rate, results remain unchanged, confirming that their findings are not capturing "real" illness episodes.

A different aspect of workers' behavior has been analyzed by Mas and Moretti (2009): in this case, authors want to focus their attention on the relation between changes in productivity and peer effects.

Their study underline that workers' effort devoted in the workplace may depend on the productivity of their coworkers. In particular, they claim that peer effects in the workplace may avoid free-riding episodes. In particular, their aim is to analyze this relation within a retail firm, evaluating also the effects of the introduction of a high-productivity worker on the productivity of his/her coworkers. They clarify that the presence of peer effects at workplace may be connected to three potential explanations. First, social pressure: it occurs when a worker is performing lower than her/his peers and she/he could feel shame or may receive (social) sanctions or loss in reputation being observed by her/his coworkers. Second, prosocial behavior: it may arise whether a worker experiences disutility (and guilt) acting in a non-cooperative way, even if no one observe her/him behavior. Third, knowledge spillovers, that may occur when there is an exchange of information between workers highly localized.

They study the productivity of cashiers in a supermarket chain.[6] For a given number of customers, if one checker is working slowly, other checkers will have to work harder; thus, it can be source of potential negative externalities due to free-riding (low productive) behavior.

They find that a worker is influenced by the presence of a skilled peer when that peer is able to observe her/him, but this effect is not present if the skilled peer cannot observe her/him. This result demonstrates that social pressure is operating in the workplace and that it can reduce potential negative effects deriving from free-riding production processes: thus, social considerations can motivate workers, and even replace monetary incentives. However, they find no evidence of prosocial behavior. Besides, they find that peer effects vary depending on the workers' skill level: low performers are more responsive to the intro-duction of a new productive (high skilled) worker. In general, substituting a low performing worker with a more productive one generates an increase of 1 percent in the effort gener-

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[6]In particular, they collect data over a two-year period, observing the number of items scanned by each worker, and the exact length of the transaction. In total, they observe 394 cashiers. The productivity indicator is calculated as the number of items scanned per second within ten minutes.

ated by other workers. According to their conclusions, positive peer effects can dominate free-riding, suggesting that some social factor is affecting workers' behavior.[7]

Peer effects interactions have been studied also by Cornelissen et al. (2017). In particular, they disentangle peer effects into peer pressure and knowledge spillover. Peer pressure is defined as the guilt or shame that workers may feel when they are less productive, compared to their coworkers; as in Mas and Moretti (2009), peer pressure is seen relevant in explaining the importance of social incentives, other than pecuniary rewards, to stimulate workers' productivity. Knowledge spillover, instead, takes place when workers may learn useful skills from their coworkers. Both these elements imply that workers' productivity is positively correlated to their colleagues' productivity. Cornelissen et al. (2017) aim at investigating peer effects at global level taking into account a representative set of workers, firms and sectors.[8] Besides, they focus their attention on wages, rather than on productivity, checking if workers are rewarded also on the basis of the additional group productivity generated by their peer-activity. They use the dataset of the German social security records containing information about all German workers and firms by sectors. They concentrate their analysis on the period 1989-2005, for workers aged 16-65 in the city of Munich and its districts.

Also in this case, one of the main issues is sorting: high quality workers may be willing to move to the best peer groups or firms. To deal with it, they control for a great set of worker, firm and time-variant fixed effects. Overall, they find only small peer effects in wages, because, in their opinion, "many of the occupations in a general workplace setting may not be particularly susceptive to social pressure or knowledge spillover" (p. 4). Different results in previous studies, according to Cornelissen et al. (2017), are due to analysis conducted on specific working environment (like supermarkets in Mas and Moretti, 2009) in which workers may directly observe their coworkers' outcomes. In a different specification of their analysis, they focus their attention on the same working categories treated in previous studies (low skilled occupations in which workers can observe and judge coworkers' outcome) and they find larger peer effects. Thus, although they are not able to extend conclusions of previous studies to a wider scale, they claim that those conclusions may be valid at sector-level, other than at firm-level. They conclude that larger peer effects occur in low skilled occupations in which workers can evaluate easily the peers' productivity, results of repetitive and manual activities. A possible explanation is that low ability workers increase their effort more than

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[7]See also Tabellini (2010) on this.

[8]Previous studies on this subject, like Mas and Moretti (2009), focused their attention to specific economic sectors.

higher ability workers, in response to an increase in peer quality (like in Mas and Moretti, 2009). An alternative interpretation is that low ability workers suffer from the pain of peer pressure more than high ability workers do.

We see that a number of studies rely on the relation between productivity, social pressure and free-riding in private firms, but, as said, our focus is the relation between social capital and shirking at school. In this view, Bradley et al. (2007) investigates how peer and group interaction effects can affect absenteeism behavior, as Ichino and Maggi (2000), but in a specific school environment. To this aim, they use a rich dataset of matched schools and teachers from the Queensland Government of Australia, exploiting personnel records obtained from Education Queensland's human resource information system, for school years 2001 and 2002, for all teachers employed in the local public school system. Data are able to track each teacher throughout the period and, for each teacher, they have data on individual (age, gender, tenure) and workplace characteristics.

As in the previous studies that we have seen, they measure absences due to reported illness.[9] Due to the difficulties in disentangling shirking from real illness episodes, they look for peer (or group-interaction) effects on individual absenteeism: a significant positive relation between individual and group absenteeism increases the probability that they are observing shirking rather than illness episodes. However, as we have already seen, in this kind of analysis, identification issues may arise because of the Manski (1993) reflection problem: then, as in Ichino and Maggi (2000), they mitigate this element by considering movers among schools. Another source of endogeneity bias arises if relevant school variables are omitted. Including districts fixed effects, they find that, for primary and secondary school teachers, absenteeism rate significantly increases for older age groups, with no significant gender differences. This finding can be partially explained by the fact that people accumulate leave before retirement or due to a progressive decreasing in the enthusiasm for teaching.

Their results are important also considering contract status. First, workers with temporary contracts take significantly fewer days of absence than their colleagues on permanent contracts: this behavior is probably explained by an attempt to secure their job position. Second, people paid more for additional task performed showed a lower absenteeism rate: thus, a performance-related policy may be helpful in reducing shirking. Considering local characteristics, they see that teachers in rural areas show lower absenteeism rates. Possible explanations are a greater commitment of teachers for taking their job position in these

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[9]They measure absenteeism rate as the individual number of illness days per quarter.

localities or a wider sense of community involvement (social capital). Those conclusions are in line with our Chapter 3 findings. Overall, Bradley et al. (2007) find that absenteeism can be explained by teachers' characteristics, contract status and the remoteness of the school; at the same time, group interaction effects also play an important role, suggesting that staff relations and quality of management may influence the degree of absenteeism.

On the same subject we find also Chaudhury et al. (2006).[10] According to them, absence rates are generally higher in poorer regions; men and better educated teachers are absent more often and teachers from the local area are absent less often. They specify that teachers and health workers are extremely unlikely to be fired for absence and that punishment due to absenteeism is rarely applied. This lack of punishment systems do not affect workers' behavior and, in this case, neither temporary teachers show lower absence rates than their colleagues. Interestingly, they find that teachers are less absent in schools where the parental literacy rate is higher, indicating an important role of parents control in teachers behavior. The correlation may be explained by a greater demand for education, a stronger monitoring ability by educated parents, a more stimulating working conditions for teachers (i.e. children motivation of literate parents can be higher) and a sort of selection effect (educated parents may decide to leave schools with high absence rates). Their findings suggest an important role for non-monetary motivations: it can be seen as an important effect of higher human capital endowment, producing a sort of "social pressure" on teachers. Another important element is due to infrastructures. They find evidence of an important role for the quality of infrastructure at school in reducing absenteeism rates: moving from a school with the poorest infrastructure index to one with the highest results in a reduction of absenteeism rate of 10 percentage points. We also include an education infrastructure index in our analysis.

Finally, since our analysis will be focused on schools, we include in our review also two contributes about the relation between students' results and teachers' absenteeism: Duflo et al. (2012) and Herrmann and Rockoff (2012). The first study provides another attempt to estimate absenteeism determinants in developing countries, underlining, in this case, the importance of monetary incentives and monitoring. They underline that access to primary school in those countries have been recently improved but, at the same time, the quality of teaching is still poor in several areas. This issue can be partially explained by teach-

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[10]They describe the results of an experiment based on unannounced visits (three per teacher in different periods) to primary schools and health clinics in Bangladesh, Ecuador, India, Indonesia and Peru, collecting about 35,000 observations.

ers' absenteeism.[11] They test the effects of monitoring together with the implementation of monetary incentives on para-teachers' (teachers with temporary and flexible contracts) absenteeism rates and quality of teaching in non-formal education centers (NFEs). In particular, they study the effects of an experimental incentive program applied to teachers by the NGO *Seva Mandir* in the rural villages of Rajstan region, in India.[12] During the 30 months of experiment, there were about 20 percentage points of difference in absenteeism between treated schools (21% of absenteeism rate) and control group schools (42%). At the end of the program, children from the treated schools had a higher probability (10% more) to move to formal public primary schools. Although child attendance was not significantly different in treatment and comparison schools. they find that treatment schools had more teaching days. Thus, the increase in the number of days that the school was open resulted in more days of instruction per child (precisely, a child in a treatment school receives 30% more in terms of days of instruction). In terms of quality of learning, they also verify that children in treatment schools gained 0.17 standard deviations of the test score distribution overall. In addition, the program increased the probability of graduation in government schools: students from treated schools graduated 62% more than those enrolled in control schools did.

Herrmann and Rockoff (2012) analyze the relation between absenteeism and productivity, in terms of students' achievement, trying to disentangle the effect of absenteeism before exams and that after them: only absenteeism before exams can affect students' marks at school.[13] In those terms, their approach is similar to Mas and Moretti (2009).

Overall, they find a significant negative relation between students' productivity and teachers' absences; besides, according to them, productivity losses are greater for experienced teachers and decreasing in absence duration: probably managers make higher efforts in looking for better substitutes only for long assignments. At the same time, substitutes can learn on the job, and thus their productivity increases over time. In addition, they underline that absences are mainly determined by workers' preferences for shirking, job characteristics and a daily stochastic component (related to health conditions). Finally,

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[11]They quote a survey conducted by Kremer et al. (2005) that revealed that about 24% of teachers were absent in India during school hours.

[12]In treated schools, teachers were paid based on school attendance (verified through a photograph made by a student at the start and at the end of each school day), while in comparison schools they were paid at a fix rate. *Seva Mandir* fixed the monthly base salary for teachers at Rs. 1,000 for at least 20 days of work per month. In the treatment schools, teachers received a Rs. 50 bonus for each additional day of attendance in excess of the 20 days and a fine of Rs. 50 for each day of absence in the 20 days of basic monthly work.

[13]They exploit a panel dataset from New York City, the biggest school district in the USA, for school years 1999/2000 to 2008/09, focusing on math and English teachers.

they find a positive correlation between teachers' absences and students' ones and that workers with graduate degrees are characterized by fewer workdays missed. In sum, they conclude that there is evidence of: 1) a positive correlation between teachers' absences and students' ones; 2) teachers with graduate degrees are characterized by fewer workdays missed; 3) a positive relation between tenure and absenteeism; 4) younger female teachers experience higher absenteeism rates. Overall, they find that an additional day of missed work by a regular teacher is related to a decrease in student test scores of 0.0017 and 0.0006 standard deviations in math and English respectively.

In sum, we have seen that many studies highlight the importance of social aspects in explaining workers' behavior and teachers' absenteeism; we are going to see in Chapter 3 that our results will stress the key role of social capital in Italian teachers' shirking.

1.4 Italy: one country, many past bureaucracies

Since our identification strategy is based also on historical instrumental variables, in this section, we describe some historical states that ruled Italy in the past. The Italian unification process took place in 1861, approximately two hundred years later than most large European Western States and under the aegis of an absolutist state, the Kingdom of Sardinia.[14] In order to classify the bureaucracies in the different regimes, we focus on three main characteristics: meritocratic recruitment, predictable career ladders and compensation practices. In fact, these are considered as crucial element in order to identify the presence of a professional bureaucracy in a state, while the latter is usually correlated with a higher efficiency in public goods provision and, therefore, with economic performance.[15] We begin our analysis with the Kingdom of Sardinia, the state which unified the whole peninsula, the description of the other states is also given below.

- **Kingdom of Sardinia.** In this State the nobility loyal to the Crown had the leadership of the public apparatus creating a sort of *bureaucratic aristocracy.* Thus, the relationship of loyalty to the king was prominent, but elements of new bureaucratic professionalism and the presence of a career ladder in the modern sense can be also identified.

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[14]The two belated nations in Western Europe are Italy and Germany, whose unification took place after 1815. For most remaining states, the process of state formation started earlier. See Flora et al.(1999)

[15]Weber has been probably the first to stress the idea that the presence of a professional bureaucracy, also called *weberian* bureaucracy, in a state leads to more efficiency in public goods provision and it is therefore good for its development. For more on this see Evans and Rauch (1999) and, more recently, Chong et al. (2014).

- **Habsburg in Lombardy and Venetia.** Unlike most pre-unitary Italian states, the social origins of the Austrian bureaucracy were not from the noble but from the middle-class. In general, the Habsburg bureaucracy is known as well functioning.[16] The Austrian regime introduced new procedures for the employment in the public sector based on meritocratic rules with the enhancement of educational requirement for access to the place, the apprenticeship, the mobility between offices and positions. The latter rule was implemented in order to broke the link of the official with the territory of origin, and oppose the "nobilato" (or *bureaucratic aristocracy*) offices. Thus, renewed Austrian rule in the Italian territory had given space to the needs of the new bourgeois groups among bureaucrats and gave raise to the most efficient and professional bureaucratic apparatus of the peninsula.

- **Kingdom of Naples (then Kingdom of the Two Sicilies).** The public sector organization has been described as mostly inconsistent and contradictory. Along with some of the characteristics of a bureaucratic professionalization (mobility in the office, residence requirement, service mentality to the state) we also observe old and inefficient administrative practices that survived any innovations attempt. This was observed especially in the peripheral areas where bureaucrats were still selected for the most part among noble families, and behaved more like the old Spanish bureaucracy than the more modern Bourbon.

- **Papal States.** Until the eve of the unification of Italy, this was the pre-unitary state with the most corrupt and primitive bureaucratic apparatus. Senior officials were all of noble extraction and up to half of the 1800 general rules of recruitment and promotion did not existed: "...offices had poured in a state of widespread abandonment, the *raccomandazione* was the key input for a career in public administration, the pay gap between ecclesiastical and civil employees (for the benefit of the first) was significant, the prevailing corruption and dishonesty, failure to comply with office hours and duties of the employee, the held disastrous archives were the most visible signs of primitivism of the administrative model".[17]

- **Minor States.** In the minor states we observe the influence of two different external models. Both the Duchy of Parma and Piacenza and the Grand Duchy of Tuscany

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[16] "The Habsburg Empire is historically known as a multi-ethnic state with a relatively well functioning, respected bureaucracy". See Becker et al. (2016), p. 2. They investigate if the Habsburg Empire, with its localized and well-respected administration, increased citizens' trust in local public services.

[17] Melis, 1996, p. 17.

introduced the Austrian model as in the Lombardy and Venetia, while the Duchy of Modena and Reggio Emilia and that of Lucca created their bureaucratic apparatus influenced by the King of Sardinia model.

This was the situation inherited in 1861 by the Kingdom of Sardinia. In terms of number, compared to other European countries, the pre-unitary Italian public sector did not appear oversized. More precisely, in 1859, two years before the unity, the number of employees in the public sector in pre-unitary states reached a total of 42,586.[18] The largest number (17,123) was in the Kingdom of the Two Sicilies, 7,409 in Lombardy-Venetia, 7,240 in the Kingdom of Sardinia, 5,273 in the Papal States, 3,149 in Tuscany , 1,398 in the Duchy of Modena and, finally, 995 in the Duchy of Parma.

The design of the new Italian state and its bureaucracy organization was inherited from that of the Kingdom and it was based on the French model, that is, that of a highly centralized state that left a low level of autonomy to peripheral areas.[19] Indeed, the implementation of a federal state rather than a centralized one was seen by Piedmont as a dangerous strategy given the territorial differences of the country and, in particular, of the southern areas.

Therefore, why even so many years later, in vast areas of the country we still apparently observe the persistency of old institutions?[20] It is possible to trace the roots of this phenomenon on the choices made by the Savoy Crown immediately after the unification process. First, the Public sector employees prior to unification were kept in place and became the bureaucrats of the newborn state but, in most cases, they were hostile to changes. Second, monitoring and enforcing activities were reduced rather than increased by the central Government. This resulted in significant differences in administrative practices and procedures (*"prassi amministrative"*) within the country, with even the same Prefects, the State's representatives in the provinces, acting differently "...depending on the latitude where they were called to work".[21] Finally, unlike its French model, the new Italian state did not create the equivalent of the "grands corps" or the *oxbridge* school, that in France and UK were used to select and for the initial training of senior officials in the PA ranks. Conversely, since the beginning of the unitary experience, in Italy the selection and training

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[18]This does not include magistrates and teachers. See Melis (1996).

[19]Flora et al. (1999). See also La Porta et al. (1999) for a description of the French origins of the Italian legal system.

[20]Transplanted appear when "...changes in the law on the books...(have)...relatively little impact on the effectiveness of (legal) institutions." (Berkowitz et al., 2003). On this, see also Roland and Verdier (2003).

[21]"[. . .] as happened in Palermo where the prefect Torelli perpetuated the Bourbon practice to hold public hearing on fixed days, and he did it, as the Bourbon viceroy had done for decades, ritually seated in the throne room." Melis, 1996, p. 84.

of bureaucrats has been governed by the administration itself, with serious consequences of social isolation of the bureaucracy, with the career ladder mainly determined by seniority rather than merit (Melis, 1996, p. 43).

In sum, since its infancy, the Italian Government has suffered from lack of rules enforcement from the centre to the periphery and this is often named by historians as an example of *weak centralism* (Melis, 1996). Compulsory schooling laws provide a good example of how difficult the enforcement of the new rules was. We use this example because the newly born Italian Government and its Ministry of Education were highly committed to fighting illiteracy, a problem that plagued vast areas in the country, and many data and documents are available.

The first law after the unification occurred in 1877 and established three years of compulsory schooling and, for the first time, with penalties for non-compliance.[22] Before that 1877 reform, the obligation was therefore only *pro-forma.* In 1904 it was required to bring compulsory schooling to fifth grade (and 12 years of age). In 1923 the limit has been further extended to 14 years olds and in 1948 it also became a constitutional law.[23] All these policies remained largely unattended for a long time as the different laws have been only very weakly enforced. Illiteracy remained a widespread and persistent phenomenon that survived the WWII and, still in 1960, only three out of ten Italians have attended the full eight years of compulsory schooling.[24] In fact, almost 70 years had to pass in order to observe full enforcement of the compulsory schooling law in Italy: the cohort born in 1976, that is, those who obtained the compulsory school license of 8 years of schooling in 1990 has finally fully attended 8 years of compulsory schooling as required by the 1923 law.[25]

We use these information to build two set of instruments. The first is composed by dummy variables identifying the different dominations ruling Italy in the period 1459-1559 (see section 2.4.1 of Chapter 2). The second is, instead, made using the full set of information based on the number of years for which each domination ruled Italian provinces in the period 1100-1800 (see section 2.4.2 of Chapter 2).

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[22]The origin of the Italian public school system is identified in 1859, that is, just before the birth of the Italian State in 1861. It was the Piedmont parliament that in 1959 approved/passed the law stating that primary education was free for all pupils but only for the first two years (in rural areas and small towns) or 4 years in larger urban areas.

[23]"Primary education, given for at least eight years, is compulsory and free of tuition." Italian Constitution, Article 34, 1948.

[24]Only during the 1960s things have improved even if not quickly. In 1963, the year of implementation of a new reform of the schooling system, among those born of 1949, 45% completed compulsory schooling. For the cohort born in 1952, the first to benefit from this reform, the percentage of students completing compulsory schooling was only 61.82%.

[25]See Malanima and Daniele (2011)

To this aim, we briefly describe some historical facts that occurred in the Italian provinces between the 10th and the 17th century. Moreover, this information would also help us in defining the influence that the different historical institutions may have had in each territory.

1.5 Italian past dominations: a variety of administration styles

During this long period the Italian peninsula has been characterized by a series of continuous administrative and border changes. Therefore, we need to make some simplifying assumptions in order to use these information. First of all, problems arise since, in many cases, the borders of modern provinces do not perfectly correspond to those of the ancient states. We solve this issue by assigning the province to the domination that administrated the majority of its territory.[26]

A second difficulty concerns the real power and influence exerted by the political dominator. In particular, historians suggest that many formally independent state/areas were, in fact, strongly influenced by foreign domination. Nevertheless, since the degree of foreign influence varies significantly (across periods and provinces) in this study we consider as independent also the provinces that were influenced by foreign powers. We believe this choice is the one least affected by a lack of objective criteria. To construct our instruments[27] we finally identify ten main political dominations of the Italian provinces: Republic of Venice, Hapsburg-Austrian, Savoy, Papal state, the Normans, the Swabian, the Anjou, Aragonese, Bourbons, Independents. In the following we describe the different dominations starting with that located in the Northern, Centre and Southern part of Italy.

We open our brief historical description with the Republic of Venice. The Serenissima, as it was also known, has represented a great exception in the Italian political scenario. In fact, it has been the only state to preserve a full independence (not only de iure but also de facto) until 1797 when, with the Campoformio Treaty, it became part of the Austrian Empire. The Republic had an original form of government: it was oligarchic and the chief was the Doge. Even if this system was not democratic, it guaranteed a strong political stability that helped Venice to remain independent against the different foreign powers

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[26]We prefer this choice to the alternative used by De Blasio and Nuzzo (2010), that attributes to the entire province the characteristic (regime) that was in place in the provincial capital (in the middle ages).

[27]We have to thank Pierpaolo Merlin and Giangiacomo Ortu that helped us to find historical sources and discussed with us the most plausible simplifications we had to make. Needless to say, all errors or omissions are our full responsibility.

during these centuries. Trade (with East and Far East) represented the major source of its economic prosperity and the Republic had also different colonies in the Mediterranean Sea. Only from 1453, when the Turks conquered Constantinople, Venice began to lose its commercial power at sea and to become more important in the Veneto and in Lombardy. If the Republic managed to preserve its territories for centuries, it was thanks to its highly efficient administration[28]. For these reasons, their policy should have had a positive impact on the institutional organization and we expect a positive effect both on institutional setting and on workers' behavior.

The 16th century, instead, has been characterized, in part of the North-East, by the Hapsburg dynasty. They were in fact the foreign power that dominated Italy since 1713 after the Utrecht Treaty. With this agreement the Hapsburg conquered the Duchy of Milan, Sardinia (until 1720), the Kingdom of Naples (until 1734) and, since 1720, Sicily (until 1734 as well). In addition, their influence was also strong on Tuscany and on the Duchy of Parma and Piacenza. The Trentino, the Alto Adige and almost the whole Venezia Giulia were part of the Austrian Empire. This situation remained stable for the whole century; during this period the Empire was ruled by two important monarchs (Mary Theresa of Austria and Joseph II) and the chancellor Kaunitz, that managed to give their Empire a good administrative and bureaucratic organization in their territories including Italy. In addition, they implemented a strong and efficient judiciary system and they even attempted several economic reforms in favor of industry. In addition, it is also considered a period of religious tolerance during which Joseph II abolished the death penalty and the feudal privileges[29]. In sum, the Austrian policies should have had a positive effect on local institutions and culture. On this, see also Becker et al. (2016).

The influence played by the Savoy dynasty[30] is more ambiguous. It governed in the Aosta Valley during the whole period considered but very early, at the end of the 12th century, it gradually extended its territories to include almost the whole Piedmont. It became the only state, together with Venice, to have an autonomous policy without foreign influences. These territories have seen the formation of a modern organization, similar to those of the rest of Europe, with the gradual passage from a feudal state to a modern one. In 1720 the Duchy managed to obtain the Kingdom of Sardinia with the royal title but their role in the administration of these territories is more ambiguous and it is fair to say that we can talk about a modern state (with a real eradication of feudalism form of government) existed

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[28]Cozzi and Knapton (1986).
[29]Montanelli and Gervaso (2010).
[30]See also Merlin (1994).

only in the Northern territories. The government was characterized by a strong central power, an authoritarian bureaucracy and the fight against local nobility. Mainly during the 1700s (during the reign of Vittorio Amedeo) we witness the rise of the middle class with an increasing role of the University of Turin in creating a class of bureaucrats. Together with these reforms, mainly concentrated on a specific area close to Turin, the Savoy kingdom has also concentrated a lot of efforts in foreign policy since territorial expansion has always represented one of the main political objectives, maybe more than development policies. For all these reasons, we expect their overall impact on the institutional organization and culture to be ambiguous.

In the Centre of Italy, a significant role over these centuries has been played by the Papal State. The territories of the Church included Lazio, Umbria, Marche and Emilia Romagna for the most part of the period examined. The Papal state is almost unanimously considered by historians as a bad administrator. In the few occasions in which it gave evidence of good administration, it was limited on the city of Rome. In all the other territories, for the whole period, there was a perpetual diarchy between the religious and local powers. Often, this situation resulted in anarchy[31]. The church and, therefore, the Government did not help improve the population educational levels the Counter-Reformation negatively influenced this area (and the Spanish dominated ones) more than other parts of the country. At the beginning of 1700, the Papal State had very few positive aspects: "Negative balance of payment, wealth drain towards foreign countries, famines, lack or failure of any commercial, manufacturing and credit activities, public debt, administrative and fiscal disorganization [. . .]".[32] Therefore, the Papal state is expected to have had a negative influence on institutions (broadly defined).

In the Southern part of the country we find a more heterogeneous situation with different dominations that ruled and influenced the area during the observed period. The 12th century saw the Normans conquer the whole Mezzogiorno defeating Byzantines (in the South of Italy) and Arabians (in Sicily) under the leadership of the Altavilla family. Their purpose was to form a state that was independent from little feudatories and administrated by high quality civil servants. Especially with William II, the Normans show their respect for population and for the national laws. Even if they were good administrators, it was a very troubled period for the Kingdom of Sicily because of the continuous internal (between sovereign and feudatories) and external fights.[33] Overall, due to continuous wars of the

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[31]Caravale and Caracciolo (1978).
[32]Caravale and Caracciolo (1978).
[33]Montanelli and Gervaso (2010).

period the net effect of this otherwise good administration is therefore ambiguous.

After Normans, we find the Hoenstaufen of Swabia that conquered the control of the South of Italy in 1194 after the weddings between Henry IV and Constance of Altavilla, last descendent of the Norman family. The Swabians kept the control of the Kingdom of Sicily (including the whole Mezzogiorno) until 1266. This is identified as a positive domination, especially for the role played by Frederick II, the emperor defined Stupor Mundi for his (also good administrative) qualities. His Constitution of Melfi was a new legal code for his Kingdom of Sicily and brought revolutionary changes, in particular, in reducing the influence of feudatories in his territories. His objective was to create a secular and well-ordered State and founded the University of Naples to shape a new ruling class that was able to administrate the territory and tried to stimulate the arts. In addition, he stimulated commercial links with all the Mediterranean countries. Unambiguously, we expect Swabian policies to have a positive impact on institutions and local culture.

The Mezzogiorno had to change its administration again in 1266, when the Anjou family, part of but independent from the regnant family of France, conquered Southern Italy, with the help of Pope Clement IV. Their policies were based on a strong fiscal system, but also on the regular fights against local feudal nobility that sometimes resulted in continuous rebellions in Naples and in Sicily (then conquered by Spanish in 1282)[34] and, therefore, in formal anarchy. In addition, the entire territory was under a strict military control that forced population to live in a sort of perpetual state of siege with virtually no freedom. The main purpose of this policy was to abolish the modern state constructed by Swabians during the previous century. The continuous wars caused a drop in agriculture productivity and a huge amount of public expenditure allocated to military expenditure. Under the first years of Anjou domination, the Kingdom was considered unanimously as one of the biggest Southern European and Mediterranean powers. Two centuries after, it is the big and sick Kingdom placed in the middle of three seas.[35] With these premises, our judgment about Anjou is negative.

The Aragonese governed the South of Italy since 1442 (Sicily since 1282, Sardinia since 1420). This political situation remained stable until 1502, when all these territories went to the Spanish Crown. Since 1526 on, the Duchy of Milan too was conquered by Spain but, administrated by a governor, Milan had a wide autonomy at the bureaucratic level. The Aragonese period was relatively stable and positive period. Galasso (1992) emphasizes two policies adopted by Iberian monarchs: they built the basis for a modern absolutist state and

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[34]During the Vespro War. In 1442 Spanish conquered all the rest of Kingdom of Naples.
[35]Our translation from Galasso (1992).

considered their southern Italy territories as part of the Kingdom and not just a colony to exploit, while inefficiencies were probably due to the low quality of civil servants[36]. During the Spanish period the bureaucratic reforms continued with the same logic. The purpose was to strengthen the presence of the State in the different provinces and to guarantee the education of civil servants with the adequate administrative skills.[37] However, since the second half of 16th century we observe a change: the viceroys began to strongly repress opponents and heretics, while feudal policies negatively affected the agricultural sector. Indeed, a well-organized bureaucracy loyal to the crown was needed and created but mainly to extract revenues through taxes and finance the expensive Spanish military campaigns. Philip II long war and money necessity are a well-documented example of this change in policies. The most cited example of an inefficient institution harmful for growth is the *Mesta*, a privilege conceded by the king to the shepherds not enforcing property rights. [38] Thus, the role played by the Spanish and Aragonese is overall negative.

The successors of the Spanish domination were the Bourbon family that in 1734 started to rule over the Mezzogiorno. Artisans and merchants, the only categories that could give energy to the economic system, were absent. They inherited badly administrated territories and a critical economic situation worsened with the expulsion of the Jews, ordered by Carlo of Bourbon because of his great devotion to the Pope, that were able to guarantee a minimum of industrial activity. The Bourbon administrators tried to improve, with ambiguous results, the conditions of the City of Naples but put no or low efforts in the rest of the territories. In addition, they did not improve the educational system that Carlo Bourbon did not consider important. In sum, we do not expect a positive effect in the South of Italy of the Bourbon administration.

As we see, different foreign dominators administrated in a very different way Italian territories: thus, their legacy on local culture may have influenced both current institutions and habits (workers' behavior in our analysis).

About this, a fundamental study has been Putnam (1994). According go them, Italy's divide in terms of social capital ("civicness", following their definition) began in the Middle Ages, when German Empire (in the North) and Byzantine Empire (in the South) went in crisis, leaving free initiative to local (and foreign) entities. In the South, these facts

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[36]From Galasso (1992): "The efforts made by the Aragonese dynasty were noticeable and rich of results."

[37]Galasso (1994).

[38] The King of Spain derived a significant part of his revenue from the Mesta, the national association of migratory shepherds, have often been blamed for the stagnant Spanish agricultural productivity. See North and Thomas (1976) p. 4 and Drelichman (2009). The negative effects of these new rules of the Spanish domination have particularly affected Sardinia, where a previous administration during the period of Giudicati had brought positive results.

led to the born of the Norman power, creating a regime administratively and economically advanced, tolerant from a religious point of view. The Kingdom of Sicily (that incorporated southern Italian regions and Sicily) was one the richest and advanced organized state of the 12th century, besides it was based on an autocratic organization. Putnam (1994) defined it as a mix of "feudal, bureaucratic and absolutist" state, without any possibility to generate any sort of communal entity, as in the North. It generated a strict and strong vertical social hierarchy in which feudal aristocracy had the power, even after the different dominations that succeeded during centuries. Basically, wealth was based on land. In the North, by contrast, the fall of the Empire generated many entities characterized by self-government communal republics, unique in Europe. In this case the solution to the lack of power was devoted to an "horizontal collaboration". The rural nobility contributed to form the new urban ruling elite, instead of creating a feudal power, based on an electoral system and with precise limits to their powers. "The practices of civic republicanism provided a breadth of popular involvement in public decision making without parallel in the medieval world" (Putnam, 1994, p. 129). This general involvement produced the perfect environment for the origin of a great associational life for mutual assistance: it was the creation of the "civic community", following the definition of Putnam (1994), with a high degree of social mobility. Also, public administration in those employeescomuni was composed by professionals, generating a ruling class with specific tasks. This civic commitment was accompanied by the development of the commerce and the economic activities in general that, in turn, stimulated, for the first time, the credit. It was a natural extension of the the associational network: in fact, credit activities required trust among economic actors. The most important difference can be explained by the sentence "in the North, the people were citizens; in the South, they were subjects" (Putnam, 1994, p. 134). According to them, since the thirteenth century, this dualism changed into a more diversified scenario. The Pope started to build his temporal power, ruling his territories as a feudal king but in a less efficient and less centralized way than Norman administration. Putnam (1994) see perfectly the parallelism between civic degree in the medieval period and the current social capital endowments in Italian regions: Southern Norman regions corresponds perfectly to the seven regions with the lowest social capital levels (followed by the Papal provinces). Even after many centuries of wars and changes in the administration powers, in the North, the civic heritage shaped societies until today. At the same time, in the South, the power of the feudal nobility remained unchanged and was made even stronger by different administrations; they were all foreign dominators and had the interest to maintain the *status quo* and to

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reinforce conflicts among subjects. After this reasoning, Putnam (1994) main conclusion is that in regions with more civic (social) capital, institutions perform better: in fact, with more civic capital, citizens demand more effective services and expect better governments, from one side, while public officers and administrators are advantaged by the better social environment aimed at enhancing the common interest, from the other side.

Chapter 2

Past dominations, current institutions and the Italian regional economic performance

> *"Different patterns of institutions today are deeply rooted in the past because once society gets organized in a particular way, this tends to persist."*
> Acemoglu and Robinson, 2013, p. 43.

2.1   Introduction

In this Chapter we investigate if the quality of the public sector has a significant role in the economic development of the Italian regions. To this aim, we first assess the existence of large differences in the performances of local institutions in providing public goods. Second, we identify in the different realms and foreign dominations that ruled the Italian peninsula in the past centuries a crucial factor which helps explain current institutional performance.

Our analysis is related to the growing literature that dates back to the end of the nineties and investigates how history (and historical institutions) may still influence existing institutions and, through this channel, current economic outcomes. Seminal contributions in this area are those by Engerman and Sokoloff (1997, 2000), Acemoglu et al. (2001, 2002), La Porta et al. (1999, 2008) and, more recently, Acemoglu and Robinson (2013). In this framework, good/bad institutions or, more broadly, social infrastructures, characterized by different levels of efficiency and effectiveness, have a fundamental effect on the observed differences in productivity or per capita GDP.[1]

Italian data are most suitable for studying the role that the quality of institutions

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[1]For a survey see Nunn (2009) and see also Hall and Jones (1999). Recent studies also focus on the role of the quality of institutions on subjective well-being finding a positive association between happiness and specific measures of institutions. On this see Bjornskov et al. (2010).

(broadly defined) have in economic development. First, with few exceptions, Italian regions have formally identical central Government institutions since 1861. Second, in spite of this apparent institutional homogeneity, there exists a deep, persistent duality in the Italian economy between the developed North-Centre and the less developed South unlike most within-country data sets. Finally, while the dual character of the Italian economy has been often associated to regional differences in fundamentals such as social and human capital endowments, a satisfying explanation of the persistence of the regional divide has not yet been put forward.[2] Therefore, the Italian regional sample represents a good candidate to examine different functioning and effectiveness of local institutions in a developed economy.

In defining and testing an explanation based on the role of institutions in economic development, we face two main problems. The first concerns the measurement of institutional quality, the second has to do with endogeneity.[3] To deal with the first problem, a well-known difficult empirical issue, we calculate an index of institutional quality defined as the outcome of public policies via principal component analysis. We identify the Italian NUTS3 regions or provinces as the ideal level of geographical disaggregation for an analysis of the role of local institutions. Indeed, Guiso et al. (2004) already show the presence of significant heterogeneity in the quality of the provision of public service, measured as the number of years necessary to complete trials, in Italy at NUTS3 level. Moreover, the provision of various public services planned by Italian provinces is, at least for the most part, very limited in scope and should not involve complex policy decision processes. In particular, provinces are directly involved in four main areas of public service: environment, health, energy policy and educational infrastructure. Given the strong influence exerted by the central government upon the provision of these public goods at the provincial level, we should expect highly homogeneous outcomes across different areas *a priori*. As we shall see shortly, this is not the case and we therefore use this as a quality of the overall Italian public sector proxy. In fact, we observe that the same formal institution seems to function very differently in different environments, suggesting that some location-specific informal

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[2]In particular, within the large literature on social capital and development, studies on the Italian regions' case dates back to Banfield (1958) (see also Putnam (1994)), and Italian data still represent one of the most commonly used dataset in these empirical analysis. On differences in social capital endowments across Italian regions see among the many others the recent papers by Guiso et al. (2008); Tabellini (2010); De Blasio and Nuzzo (2010). On Italian regional dispersion of educational attainments see Di Liberto (2008).

[3]While within-country studies are also likely to be plagued by parameter heterogeneity problems that may affect empirical investigations on this topic. As stressed by Eicher and Leukert (2009) empirical cross-country analyses that use both developed and developing countries show parameter heterogeneity problems since it is unclear whether the identified institutions also hold explanatory power in advanced countries and whether they matter to the same degree across all countries or, conversely, a different set of institutions matters in advanced vs. developing countries.

factor plays an important role.

Besides, the use of NUTS3 regions helps us to deal with our second concern, the endogeneity problem between economic outcomes and institutional quality, since it enables us to better identify our chosen instruments at a fine geographical level and take advantage of the local/area variability. More precisely, our identification strategy relies on instrumental variables and exploits the Italian past history to build different sets of instruments.[4] Indeed, unlike most European countries, Italian history has been characterized by high levels of political fragmentation that gave origin to administrations of different kind. Since the Middle Ages the Italian peninsula has been also subjected to different waves of colonisations and the numerous dominators that governed over centuries had very different cultural and political features and implemented highly heterogeneous formal institutions in the administrated territories. The two extreme cases are identified by the State of the Church, that was an example of corrupt institutions and administrative inability, and Austria that is usually portrayed as a good administrator that did not implement exploiting or extracting policies.[5]

Thus, we focus on the different dominations as the critical historical events that matter for current institutional settings but do not plausibly influence current economic performance. In fact, in this study the current functioning of similar formal institutions at the local level are thought to be, at least in part, the result of the previous existence of highly heterogeneous formal institutions created by historical accidents across the Italian regions. In this respect, our study is related to the recent literature that explores the role played by informal institutions in economic outcomes, where the informal element affecting the functioning of similar formal institutions is thought to reflect local differences in social capital, and that in our context is more easily associated with specific features such as managerial practices, culture or citizens behavior (for example, Guiso et al. (2008), and Tabellini (2010).

It is also related to the specific literature developed by legal scholars on *transplant institutions* that focuses on the importance of legal institutions and cultural transmission. In other words, these studies stress how societies are governed by both formal and informal norms and institutions and assume that the informal legal order may slowly evolve over time significantly affecting the effectiveness of formal institutions. They thus depart from other research that implicitly assume that "...the quality of law on the books ensures the

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[4]On this see Acemoglu et al. (2001), Rodrik et al. (2004), Pande and Udry (2005),Guiso et al. (2008), Tabellini (2008), Bosker and Garretsen (2009) among the others.

[5]For details on this see Chapter 1.

laws will actually be enforced."[6] With respect to the Italian case a similar process is well documented by historians. In fact, the way in which the unification process was implemented in Italy after 1861 caused a long lasting influence of the old institutions, in particular within public sector activities: "... the map of the institutions in the territory had to take into account the many existing particularities, giving rise to a reality more varied and uneven than suggested by rules and the same formal structures ... The result was an administrative practice in many cases ambiguous ... affected by the crucial influence of local contexts."[7]

In terms of the empirical strategy, the wide variability among sovereigns permits the creation of instruments able to capture exogenous variation in regional Italian institutional quality. More precisely, in this study we identify two different candidates and therefore build two different sets of instruments. Our first instrument set uses a series of dummy variables that identify, for each province, the administration that occurred during the period of the Spanish domination in Italy, 1560-1659. This choice is based on two main reasons. First, during this period the Italian peninsula was ruled by different formal governments and each dominance has lasted for a sufficiently long period. Indeed, each province experienced the same formal government for the whole period. Second, Spain has been often portrayed by historians as having negatively affected the dominated areas also through its legacy of inefficient bureaucracy.

Our second approach follows a different path with respect to previous studies which are typically based on specific historical events. Instead, here we build a matrix indicating, for each province, the kind and the duration (in years) of domination that ruled during the period between the 12th and 18th centuries. To this aim we collect data for all different regimes that governed each Italian province over seven centuries before the creation of the unified Italian State.

Overall, results confirm our expectations. Considering our first stage results, we find that if a province has been dominated by the Papal State, the Spanish rule or the Normans it has had a negative impact on institutional quality, while results on the other dominations are less clear-cut. Finally, second stage results suggest that the impact of improving the public sector performance of Crotone (the province showing the lowest indicator) to the level of Cremona (the highest) is significant and equivalent to a 55% decrease in the gap

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[6]See in particular Berkowitz et al. (2003). On this see also Roland and Verdier (2003) and Banerjee and Iyer (2005).

[7]"All'atto pratico la mappa delle istituzioni sul territorio dovette tenere conto dei molti particolarismi esistenti, dando luogo a una realtà di fatto più varia e difforme di quanto non suggerissero le norme e gli stessi assetti formali... Ne derivò una prassi amministrativa in molti casi ambigua ... condizionata dall'influsso determinante dei contesti locali." Melis, 1996, p. 78.

between productivity levels measured as added value per worker. These results are robust to the inclusion of different additional controls such as past economic development, human capital, physical capital, geography, crime and different social capital and cultural proxies.

Moreover, our analysis seems to confirm previous evidence that disputes the role of social capital measured by widely used indicators that capture the role of generalized morality and interest in politics, and find that its effect is significantly weakened when a measure of the quality of government institutions is introduced in the analysis.[8]

The structure of this study is based on six different sections. The following section introduces the descriptive analysis, while the third section shows the preliminary OLS results. The empirical strategy and related IV results are described in the fourth section, while the fifth contains our robustness checks. Conclusions are in section six.

2.2 Data and measures of institutional quality

In our empirical analysis, our main productivity measure is total value added per capita in 2001 that represents a standard proxy of an area economic performance. We also exploit new value added historical series recently calculated by the Istituto Tagliacarne (2011) and use its 1936 value as a control for past economic development. This research centre has constructed regional NUTS3 series starting from the unification in 1861. We could not use pre-1936 data since the geographical identification of regions has significantly changed over time and 1936 represent the first available year with regional geographical borders corresponding almost exactly with the current ones.[9] Figure 2.1 shows, not surprisingly, that productivity in 2001 is not evenly spread across Italian provinces. The darker the color in the map, the higher the productivity levels and this map clearly shows the expected significant differences between the Northern provinces and those of Centre and South of Italy. The only exception is given by the province of Rome that exhibits high levels of productivity, a result that is influenced by the presence of the capital city. Areas characterized by high levels of productivity are Piedmont and Lombardy, with Milan as leader.

We now turn to the analysis of our main control variable. We need to measure the quality of institutions, a variable that cannot directly be observed. In fact, the measurement of public sector performance is a well-known difficult empirical issue and here we follow an approach that calculates the quality of public expenditure defined as the outcome of public

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[8]See Tabellini, 2010.

[9]Original data are in Italian lira and they have been converted in euros, current value (base year=2005). Deflator provided by ISTAT.
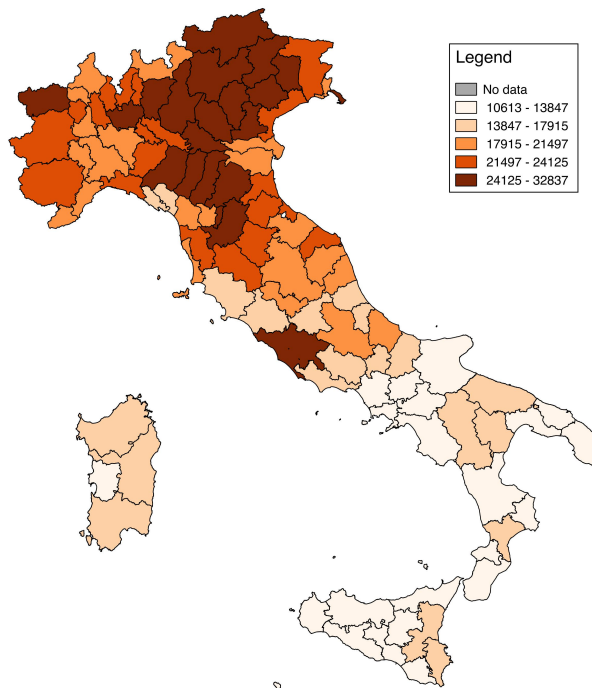
Figure 2.1: Value added per capita: territorial distribution

Notes: Total per capita value added distribution across the 103 Italian provinces (in Italian lira) 2001. Description of data sources in Appendix A.

policies.[10] Note that the focus on a single country analysis allows us to overcome the Glaeser et al. (2004) critique against the use of policy outcome variables to measure institutions.[11]

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[10]See Afonso et al., 2005. They distinguished between measures of public sector performance, defined as the outcome of public policies, from public sector efficiency, defined as the outcome in relation to the resources employed. Due to data constraint on costs of public services we follow the first approach and identify as a proxy of the quality of institutions different measures of the level of efficiency characterizing certain public services provided by the local governments.

[11]In particular, Glaeser et al. (2004) criticize the use of outcome variables in the Acemoglu et al. (2001) cross-country study since they "...do not code dictators who choose to respect property rights any differently than democratically elected leaders who have no choice but to respect them." (Glaeser et al., 2004, p. 273). The dictatorship-democracy argument is not relevant in our within-country context. Second they also argue that these measures rise with income and the analysis suffer from reverse causality. With respect to the latter criticism, note that the positive link between income and policy outcomes is not obvious at regional level. Recent estimates from the Banca dItalia (2009) suggests for Italy the existence of a significant redistribution scheme based on transferring large amount of resources from richer to poorer areas, while also

We identify the Italian 103 NUTS3 regions or provinces as the ideal level of geographical disaggregation for our analysis. Reasons are twofold. First, even if provinces have a limited importance in the Italian administrative structure, they are directly involved in the provision of four important areas of public service:[12]

1. Environmental protection;

2. Energy policy;

3. Health system quality:

4. Educational infrastructure.

Second, unlike the regional NUTS2 level of administration, the provision of public services provided by provinces is more limited in scope and should not involve complex policy decision processes. [13] Thus, we should expect at least fairly homogeneous performance levels across the different areas. As we shall see, this is not the case: we observe that the same institutions function very differently in different environments, and these differences are highly persistent over time. As stressed by Glaeser et al. (2004), persistency is an important characteristic, since it implies that these measures can be "....plausibly interpreted as reflecting durable rules, procedures or norms that the term institutions refers to."[14]

To create our quality of institutions indicator we firstly focus on 13 different output indicators that relate on our four areas of public service provision. These data are provided by the National institute of statistics and, since they are not collected on a regular basis, they relate to years ranging from 1996 to 2001. In detail, the area corresponding to Environment is composed by six indicators: functioning purification plant every 100 plants, purification plants under construction every 100 existing plants, tons of wastes for separate refuse collection for 100 tons of urban wastes, plants of urban waste disposals every 1,000,000 citizens, yearly average capacity of incineration plants for 100 tons of urban wastes and dumps for special wastes every 10,000 km2. The area of the Energy policy is represented by the gross

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EU policies provide financial incentives for Italy's poorer areas: in both cases, these policies focus on the efficient management of essential public services at the local level.

[12]As specifically indicated by the Italian legislation (Art. 19 Single Act 267/2000 on the local administrations). The number and territorial definition of Italian provinces have changed during time but, due to data availability, we follow the administrative structure in force until 2005. NUTS3 regions include between 150 to 800 thousand inhabitants. As an example, the nominal counterpart to a NUTS3 region in a few large countries is County in US, Departements in France and Landkreise in Germany.

[13]This is not the case at NUTS2 level of disaggregation, since Italian regions have different formal institutional settings (regioni a statuto speciale vs. regioni a statuto ordinario).

[14]Glaeser et al., 2004, p. 274.

production of electric energy from renewable sources, as a share of total production of electric energy. The third area, Health, is composed by the utilization rate of beds in the public health institutes and by the number of workers in the residential socio-assistential health point every 1,000 citizens. Finally, the area corresponding to Education presents four indicators: the percentage of (public) primary schools provided with meals and equipped with a school-bus, the percentage of special classrooms in (public) secondary schools and the number of teachers for every 100 students.

We also include a measure of judicial inefficiency. We take this measure from Guiso et al. (2004) and it is calculated as the mean number of years it takes to complete a first-degree trial by the courts located in a province. Previous studies on the Italian case often use this indicator to measure institutional quality.[15] Indeed, the judicial system works very differently in the different areas of the country, with judges in southern regions usually taking much longer to complete investigations. Differences are striking: Siena, the most efficient province, shows a value of 1.4, while Enna, the least efficient, 8.32. Note that for all our public sector output indicators we observe a significant variability across the different regions.

Following previous studies, we use all these 14 indicators and then estimate their first principal component score. We find that the correlations of the different indicators with the first principle component have in most cases the theoretically expected sign.[16] The use of a synthetic index offers different advantages. First of all, it considers important and heterogeneous areas of public service provisions and, for this reasons, it is more likely to affect the overall economic regional performance. Secondly, it is less likely to be influenced by specific local factors not necessarily related to the efficiency with which the public service is offered.[17]

Figure 2.2 focuses on the territorial distribution of our key public sector performance indicator and it enables us to geographically identify these areas. As above, the Italian peninsula map tells us that low quality institution areas are mostly located in the South,

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[15]See Tabellini (2010) and Giordano and Tommasino (2011)

[16]See for example Tabellini (2010). Moreover, the Kaiser-Meyer-Olkin measure of sampling adequacy is 0.78 and it meets the minimum criteria. In a previous draft of this work we have used a different methodology and a different set of indicators to calculate our institutional quality indicator obtaining almost identical results.

[17]In fact, observed regional differences in the provision of Environment and Energy services may be influenced by geography while Educational infrastructures and/or the Health indicators by specific local demographic characteristics. For example, even if we do not expect this would significantly drive our results, the measure on *purification plants under construction every 100 plants* might be related to possible demographic shifts across regions. Italy has experience significant demographic shifts across regions during the 50s and 60s that decreased from the 1970s onwards.

while the high quality club is mainly formed by provinces located in the North and Centre of the country. Our best performing province is Cremona (North), while the area with the lowest value of institutional quality is Crotone (South).
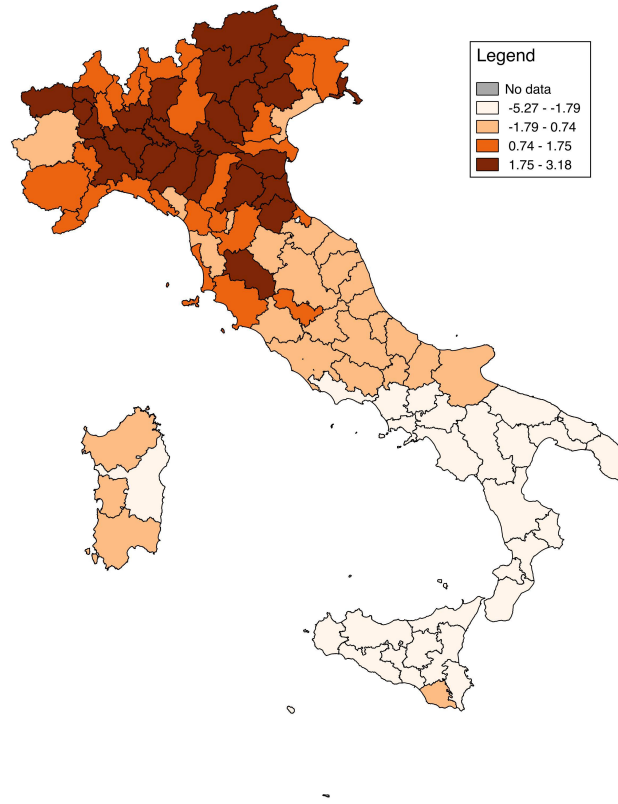
Figure 2.2: Institutional quality: territorial distribution

Notes: Territorial distribution across the 103 Italian provinces of our quality of institutions indicator. Description of data sources in Appendix A.

Finally, in Figure 2.3 we identify a clear positive correlation between productivity, measured as per capita total value added, and our main measure of institutional quality and shows that, with few exceptions, low levels public service provision are geographically located in the southern part of the country (the latter identified by red dots, and the remaining provinces by black triangles).

Figure 2.3: Productivity and quality of Institutions

Notes: Per capita (total) value added (in Italian lira) in 2001 (vertical axis), quality of institutions indicator (horizontal axis). Red dots identify Southern provinces, black triangles identify Centre and Northern provinces. Description of data sources in Appendix A.

Next, we describe our remaining additional controls. In general, we need to control for additional factors that may be related to both past institutions/dominations and current economic outcomes. For example, excluding geography or other social and human capital from the analysis could significantly bias our results on the performance of institutions indicator as the latter could also capture their effects on per capita value added.

To this aim, we firstly control for factors related to both the location and the geographical features of the province introducing two standard geographical variables: the latitude (standardized in a range between 0 and 1) and the local average temperatures recorded between the period 2000-2009, with Trapani (South) showing the highest temperatures and Aosta (North) the lowest.

Second, since our public sector performance indicator could also capture the effect of alternative social capital dimensions in our empirical analysis we also introduce some proxies for the latter. Indeed, the role of social capital in economics is a highly debated issue and

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this is also certainly due to its "vague and excessively broad definition."[18] As a result, even the choice of an additional social capital indicator is not straightforward since one of the main concerns in this empirical literature is also how to measure it.

Theoretically, social capital may promote institutional effectiveness through its effects on the behavior of bureaucratic elites. It does so through many possible channels since it fosters the ability of bureaucrats to co-operate and work together more efficiently. Second, public administrations involve complex institutional arrangements and these organizations are beset by the classic principal/agent problem where senior managers (principals) are responsible for overseeing the work of a very large number of lower-rank administrative personnel (agents). Social capital affects the amount of time and resources principals must devote to monitoring, and with high social capital the organization they control will be more efficient and productive, as the expectations that agents have about the behavior of their colleagues and supervisors are different.[19]

Moreover, our measure institutional quality could also capture differences in *informal institutions* across Italian regions. In fact, following Tabellini (2010), in empirical terms informal institutions may be captured by observing the different functioning and effectiveness of the same formal institutions. Again, the concepts of informal institutions encompass a wide range of concepts and the terms informal institutions and social capital are often used interchangeably. For example, the term informal institutions has been also applied to a vast array of different phenomena including crime and corruption.[20] The most intuitive definition is possibly that of 'socially shared unwritten rules' in contrast to the written rules or formal institutions.[21] However, detailed analysis of these issues go beyond the scope of this research. We only stress here that, together with our main indicator of institutional quality, we also include standard measures of social capital as additional variables in order to control for alternative correlated channels that may have been affected by the different past institutional differences and influences the economic performance.

To this aim we use a synthetic social capital index at regional NUTS3 level, provided

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[18]See Guiso et al. (2011). On this see also Knack (2002) and Bjornskov (2006).

[19]"As a result, the provision of collective goods will be slower and more expensive than in more civic polities." See Boix and Posner, 1998, p. 692. On this, see also Ichino and Maggi (2000) who show that prevalence of shirking within large Italian banks can be explained by the effect of peer pressure.

[20]"In (WWII) postwar Italy norms of corruption were more powerful than the law of the state: the latter could be violated with impunity, while anyone who challenged the conventions of the illicit market would meet certain punishment." Helmke and Levitsky, 2004, p. 726.

[21]"We employ a fourth approach. We define informal institutions as socially shared rules, usually unwritten, that are created, communicated and enforced outside of officially sanctioned channels. By contrast, formal institutions are rules and procedures that are created, communicated, and enforced through channels widely accepted as official." Helmke and Levitsky (2004), p.727. See also Glaeser and Shleifer (2002).

by Cartocci (2007), which merges data on 1) blood donations, 2) sport participation, 3) dissemination of newspaper and 4) voter turnout. The main advantage of this indicator is that it covers different aspects of social capital. In particular, blood donations data are used to assess the role of "generalized morality", sport participation is assumed to influence social capital since it supports the building of groups of mutual interest and promotes pro-social while diminishing anti-social behavior and, lastly, both newspaper dissemination and voter turnout should capture people's "interest in politics". Table 2.1 shows a well-known result: synthetic descriptive statistics on our social capital indicator suggests that Italian regions are, as expected, highly heterogeneously endowed. Again, Vibo Valentia and most southern provinces show the lowest values, while North-Centre provinces have the highest (in particular Bologna and Parma are top of the league).

Table 2.1: Descriptive statistics

Variables	Obs.	Mean	Std. Dev.	Min	Max
				Molise	Lombardy
Private physical capital	19	1.E+01	0.88	9.25	13.14
				Crotone	Cremona
Institutional Quality (1996-2002)	103	-6.E-09	2.15	-5.27	3.18
				Sondrio	Catanzaro
Extortions (1999-2001)	103	6.31	3.84	1.70	20.99
				Trieste	Vibo Valentia
Religious weddings	103	0.80	0.09	0.57	0.94
				Ragusa	Bolzano
Latitude (stand)	103	0.63	0.27	0.00	1.00
				Aosta	Trapani
Average temperature (2000-09)	103	13.47	2.88	3.60	18.30
				Caltanisetta	Rome/Trieste
Average years of education (2001)	103	8.96	0.45	7.94	10.09
				Vibo Valentia	Bologna
Social Capital	103	-0.0003	3.13	-6.43	5.47
				Several cities	Milano
Urbanization 1300	93	17.37634	23.98	1*	150
				Several cities	Napoli
Urbanization 1600	93	21.64516	37.67	1*	280

Notes: Min and Max indicate the two provinces where we observe the highest and the lowest values. Urbanization 1300 and 1600 in thousands. *Provinces not specified (there is not a unique province with a minimum value of *less than or equal to 1000 inhabitants*). Private physical capital is calculated at NUTS2 level. Data definitions and sources are described in Appendix A.

In this study we also include the rate of extortions over 1,000 inhabitants: our variable indicates Treviso as the province with the lowest crime rate, and Catania as the poorest performer with an overall large standard deviation value that suggests a relatively high variability across provinces. This measure could therefore capture the effect of corruption

and the presence of organized crime groups.[22]

Another control considered in our analysis is the rate of religious weddings on total weddings. In fact, the identity of former sovereigns and dominations may affect economic outcomes through their legacy on cultural features and this element may capture cultural differences. As expected, even if all Italian provinces are catholic we nevertheless observe significant differences across regions, mainly between northern and southern areas of the country, with Vibo Valentia (South) having almost all church weddings, 94%, and Trieste (North) with only 57%.[23] The links between religion, social capital and other social and economic outcomes is a highly debated issue. On one side we include Putnam (1994) view that classifies "hierarchical" religions and, thus, also Catholicism as being detrimental for horizontal ties and trust.[24] On the other, in his seminal contribution on social and human capital, Coleman (1988) argues that broad-based churches enable to develop social capital in the forms of community relationships, trust, norms and sanctions and thus, at micro level, he suggests that Catholic schools or other faith communities promote weak-ties social capital and exert a beneficial effect on students attainment.[25] Therefore, *a priori*, we cannot exclude either a positive or negative sign on this variable in our regression analysis.

Finally, we also control for both physical (private) and human capital. The former is one of the most important indicators in standard growth analysis and it is likely to be correlated with institutional quality. Our measure of physical capital has been taken from Marrocu and Paci (2010) that calculate both private and public physical capital series for Italian NUTS2 regions using the perpetual inventory method. When we introduce this control we loose one observation, Valle d'Aosta, an oft cited outlier among Italian regions.[26] Human capital is measured as average years of education in 2001 and, according to Glaeser et al. (2004), it represents one of the main controls in the analysis on institution and development.[27] Census data indicate that with approximately 8 years of education, Caltanisetta

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[22]The introduction of a proxy for organized crime is also justified by other reasons. As stressed by an anonymous referee, one of the variables used to construct our quality of institution indicator, waste management, has recently emerged as a business into the hands of organized crime in many southern areas of the country.

[23]The Italian National Institute of Statistics has just released data indicating that the number of civil marriages has just passed (50.1 percent) in the north for the first time in 2011 that of religious marriages. In southern areas religious marriages are still 76 percent of total marriages.

[24]On this see also Knack and Keefer (1997) and La Porta et al. (1999).

[25]On this, see also Granovetter (1973) and Pugh and Telhaj (2008).

[26]With approximately 115 thousand inhabitants Valle d'Aosta is the least populated region in Europe and the least densely populated region in Italy.

[27]In Glaeser et al. (2004) the exclusion of human capital is one of their main arguments against the Acemoglu et al. (2001) results: including education in the standard framework of the Acemoglu et al. (2001) paper, they find that institutions have no predictive power on subsequent growth. However, Acemoglu et al. (2005) answered these objections, providing additional evidence (with human capital) that confirmed their

and Agrigento (both in Sicily) are the provinces with the lowest educational endowments, while the highest levels are found in Rome, 10.1 years followed by Trieste, 9.9 years. This variable is important since recent evidence stresses as the two things, institutional quality and human capital, may be closely interrelated: better educated countries almost invariably have better governments.[28]

Secondly, there is a growing literature that, while stressing the role of educational policies and schooling, seems also to dispute the role of cultural or institutional factors on growth and development. For example, using county-level data from late 19th-century Prussia, Becker and Woessmann (2009) find that, after controlling for the positive effect of literacy on economic success, there remains no significant difference in economic outcomes between Protestant and Catholic counties. Their results seem to invalidate the widespread idea, originated from Max Weber's theories that attributed the higher economic prosperity of Protestant regions to a Protestant work ethic.[29] Thirdly, unlike most industrialized countries, Italian regions show a high heterogeneity in terms of their human capital endowments, which are considered by a large literature as one of the main determinants of productivity. In general, compulsory schooling was enforced in Italy quite late in the 19th century.

All these indicators but physical capital are measured at regional NUTS3 level and full details are in Appendix A. As expected, A.1 indicates that all these factors are highly correlated.

2.3   OLS results

We set the scene with ordinary least squares estimates in order to check the relations between the quality of institutions and economic outcomes using the following specification: our productivity variable of the 103 Italian provinces on our measure of the performance of the public administration, plus a set of relevant control variables:

$$Y_i = \alpha + \beta QUAL\_INST_i + X_i' \gamma + \epsilon_i \qquad (2.1)$$

In equation (1) Y_i is the log of the outcome variable for province i, $QUAL\_INST_i$ represents our measure of the performance of the public administration and X is a vector of plausible alternative important determinants. Our main coefficient of interest is β that we expect to

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(2001) results.

[28]Botero et al. (2013) show as this empirical regularity holds in both dictatorships and democracies.

[29]On this see also Botticini and Eckstein (2012). They identify in a shift in Jewish religious leadership that required every Jewish man to read and to study the Torah in Hebrew and to send his sons from the age of six or seven to primary school the cause of the following development of institutions that fostered contract enforcement.

be positive and significant, thus confirming a positive correlation between productivity and our institutional quality variable. In Table 2.2 we start including the results obtained by the most parsimonious specification that introduces our measure of $QUAL\_INST_i$ as the only regressor and then we add our additional regressors.

Model 1 shows that our quality of institutions variable has a positive and significant coefficient. In model 2 we start introducing the 1936 value of per capita value added and physical capital. Both variables are in logarithms in our regression analysis. As expected, the value of our main regressors decreases, but it is still positive and significant. Model 3 further introduces human capital (measured as average years of education) and shows that, with the exception of physical capital that is not significant in our analysis, the coefficients of the set of basic regressors are significant and with the expected sign.[30]

From now on, we then include further additional regressors to this set of basic controls. Models 4 to 6 include geography, here measured by local average temperature and latitude. Even when included jointly, our geographical controls do not show a significant coefficient. Model 7 includes our proxy for crime, corruption and extortions, that is negative as expected but not significant. Conversely, our main social capital indicator in model 8 is positive and significant while religious weddings do not seem to affect significantly observed productivity.

In general, with the exception of social capital, all additional controls are never significant and, most importantly, they leave both our quality of institution indicator and the basic set of additional control coefficients significant and with the expected sign. However, endogeneity is likely to plague all OLS results and in the following sections we therefore describe how we deal with this issue.

2.4 Does history matter? Empirical strategy and IV estimates

As said above, in this framework the main difficulty is to assume that the impact on economic performance runs through institutional settings and not *vice versa*. Quoting Acemoglu et al. (2001), "At some level it is obvious that institutions matter... Nevertheless, we lack reliable estimates of the effect of institutions on economic performance. It is quite likely that rich economies choose or can afford better institutions."[31] Needless to say, endogeneity is also likely to arise since measured quality of institution proxies may capture the effect of other factors omitted from the regression analysis or from measurement error. Both

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[30]Note that excluding physical capital from the analysis never modify both the OLS and the following IV results.

[31]Acemoglu et al., 2001, p. 1369.

Table 2.2: OLS estimations

Dependent variable: VA per capita 2001	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Institutional quality	0.1143***	0.0805***	0.0659***	0.0583***	0.0641***	0.0584***	0.0617***	0.0479***	0.0679***
	(0.006)	(0.008)	(0.008)	(0.011)	(0.009)	(0.012)	(0.009)	(0.011)	(0.008)
Value added p. c. 1936		0.3802***	0.2170***	0.2030***	0.2107***	0.2028***	0.2079***	0.2087***	0.2327***
		(0.064)	(0.072)	(0.074)	(0.073)	(0.074)	(0.072)	(0.071)	(0.073)
Physical capital (private)		0.0007	0.0090	0.0084	0.0098	0.0086	0.0091	0.0142	0.0063
		(0.014)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Education (average years)			0.1717***	0.1648***	0.1706***	0.1650***	0.1715***	0.1541***	0.1864***
			(0.044)	(0.044)	(0.044)	(0.045)	(0.043)	(0.043)	(0.045)
Latitude				0.0877		0.0837			
				(0.095)		(0.115)			
Temperature					-0.0029	-0.0004			
					(0.005)	(0.006)			
Extorsions							-0.0046		
							(0.003)		
Social Capital								0.0165**	
								(0.007)	
Religious weddings									0.2097
									(0.180)
Observations	103	102	102	102	102	102	102	102	102
R-squared	0.785	0.843	0.864	0.866	0.865	0.866	0.867	0.872	0.866

Notes: Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

of these econometric problems are likely to affect estimates in this setting. In particular, Efendic et al. (2011) applies meta-regression analysis to the empirical literature that investigates the effect of institutions on economic performance and find that empirical studies on institutions and development that account for endogeneity tend to report a substantially smaller effect of institutional quality on economic performance than do OLS studies and results from studies not addressing this issue should be treated with great caution. In our study we therefore use a two-stage least square approach. In particular:

$$\text{First stage: } QUAL\_INST_i = \delta + \theta HIST_i + X_i'\gamma + v_i \tag{2.2}$$

$$\text{Second stage: } Y_i = \alpha + \beta QUAL\_INST_i + X_i'\gamma + \epsilon_i \tag{2.3}$$

where, HIST refers to some historical events/variable that may plausibly be assumed to have influenced current institutional quality and that affects current productivity through that, while X includes the usual additional covariates.

Indeed, in macro empirical analysis history matters since it enables researchers to find good instruments and to get through one of the main difficulties they have to face in these cases.[32] Having said that, how to specifically construct the instruments' set is not a straightforward choice since we need to identify plausible critical historical facts that do not directly affect today's output but have led to divergent political and economic development paths across Italian regions through their persistent influence on the current performance of governing institutions. In our search for good instruments we rely on Italian history and its wide variability among dominators. In particular, since the end of the Roman Empire pre-unitary Italy has suffered over many centuries of political fragmentation and different dominations, and we use the latter in order to identify two plausible instruments sets.

First of all, we explore the reasons why historical institutions may still affect the performance of current institutions. We offer an explanation based on the *transplant institutions* studies that focus on the importance of the legacy of informal institutions, that is, old norms and beliefs, that may persist even after a change in formal rules.[33] Indeed, the process of the unification of Italian regions may be seen as a typical example of transplant institutions. The newborn Italian state implemented what has been called by historians a *weak centralisation* model: it is, adopted centrally determined formal rules, based on the French model, but with no effective enforcement.[34]

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[32]On this see also Angrist and Pischke (2010).
[33]For references see footnote 7.
[34]See Melis (1996).

In particular before the Italian unification process, the numerous independent states and dominations were organized very differently and the transplant of the new post-unification formal institutional model did not eliminate the old administrative practices and procedures. Reasons are manyfold. First of all, as said above, the post-unitary Governments were not effective in monitoring and enforcing the new rules in the different territories. In fact, the public sector employees prior to unification were kept in place and became the bureaucrats of the newborn state and, in most cases, they were hostile to changes. Second, since the beginning of the unitary experience, the selection and training of bureaucrats has been governed by the administration itself, with serious consequences of social isolation of the bureaucracy, with the career ladder mainly determined by seniority rather than merit. Details of these processes are described in Chapter 1. As a result, significant differences in administrative practices and procedures within the country persisted, and we claim that they still affect territorial public provision processes.[35]

Thus, we focus on past dominations/fragmentation as instruments, that is, on historical facts that took place in the distant past, when the Italian peninsula was seen (at least for its most part) by foreign realms as a conquered land. However, unlike colonization processes in the New World, Italian territories were not unknown lands and their assets and wealth were well known to the conquerors of those times. We do not have data on value added or GDP at any reasonable geographical level before the unification. Following Tabellini (2010), we use data on past urbanization as a proxy for regional economic development levels. Data from Malanima (2005) show that the territorial distribution in the past was unlike that observed today. This is documented by Figures 2.4a and 2.4b that shows the situation of the Italian peninsula in 1300 (the first data available) and 1600 (the century where the Spanish power in Italy was at its peak), respectively.

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[35]Melis, 1996, p. 43.

(a) 1300   (b) 1600
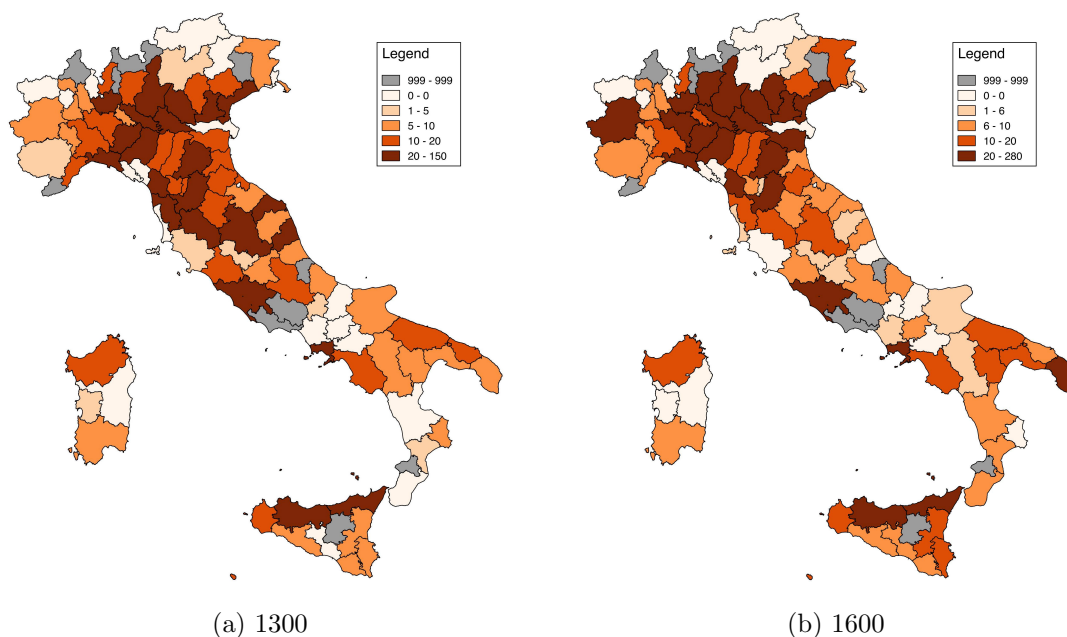
Figure 2.4: Province main town population in 1300 and 1600, in thousands.

Notes: Population in thousands. Description of data sources in Appendix A.

Still in 1800 the largest Italian cities were located in the centre (Rome) and south (Naples and Palermo) of the Italian peninsula and it is only after the beginning of the industrialization process, started in Italy at the very end of the nineteenth century, after the unification, that we observe a significant increase in the population of northern urban areas.[36] This is also confirmed by the few historical data available, such as per capita productivity in agriculture, that show that economic differences across regions in pre-unitary and pre-industrial Italy did not resemble current regional differences, with standards of living close to subsistence in both northern and southern parts of the country.[37] Overall, the observed different political powers in Italy were unlikely in the past to opt for good institutions since they perceived to benefit more from property rights and investment opportunities in the north rather than in the south. Rather, it seems that institutions became important only later, when the industrial revolution started.

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[36]On this see also Tabellini (2010). Data are missing for ten provinces, equally distributed across the peninsula.

[37]"...in 1861 (Italy) was a poor and densely populated country, with standards of living very close to subsistence, in both North and South." Malanima and Daniele (2011). This study also shows that, unlike productivity and GDP, in terms of culture and social indicators the North-South pre-unitary divide was significant. See also Ciccarelli et al. (2010).

Finally, we claim that many historical processes affecting Italy at the time have been determined by external factors. The defeat of the Spanish Armada in 1588 by the English fleet is one example. As stressed by Acemoglu and Robinson (2013) accidental events such as bad weather and strategic mistakes by the Duke of Medina Sidonia played a large role in the Spanish defeat. The Duke of Medina has been put in charge of the Spanish Armada at the last minute due to the sudden death of a more experienced commander. This event had an enduring influence on the Spanish power and, therefore, also on its Italian territories.[38] In sum, we claim that, conditional on our set of controls, our instruments choice is plausible and robust to most possible problems.[39]

2.4.1   First approach: dummy variables

In this section we describe the first approach that takes a picture of the Italian political situation in which different areas were ruled by different Governments for a significantly long time. That is, for each province, we identify the administration that ruled during a specific period of time and create a series of dummies, each representing a different domination, whose influence is assumed to have persisted over time.[40] In this case, in order to avoid arbitrary choices, the specific historical period should be selected following certain criteria. These are described below:

- It has to be necessarily a period before the Italian Unity (1861). Since then, almost all current provinces had the same political structure and formal institutions.

- We need to focus on a period when the Italian peninsula was dominated/ruled by different formal governments.

- Each domination must have lasted for a sufficiently long period. Although it is no guarantee, it is at least plausible that the longer the domination the greater its influence.

- Each province must have had the same formal government for the whole period.

A good candidate that meets all these criteria is certainly the historical period during which a large part of the Italian peninsula was dominated by the Spanish rule, namely,

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[38]"...in 1588, the lucky rout of the Spanish Armada, an attempt by King Philip II of Spain to invade England, sent political shockwaves around Europe." See Acemoglu and Robinson (2013), p. 19.

[39]Needless to say, since the exclusion restriction cannot be tested, our claim is open to criticism. On the growing concern among researchers about the difficulty of picking instruments that "perfectly" satisfy the exclusion restriction and a recent proposal for a test see Riquelme et al. (2013).

[40]For details, see also Table A.4, in Appendix A.

the period 1560-1659. During this period, considered as crucial by historians and political scientist in terms of territorial consolidation of most Western Europe states, Italy was very far from starting any state formation process.[41] Figure 2.5 (Part A) shows the Italian peninsula after the Cateau-Cambresis peace treaty (1559) that gave to Philip II of Spain the possession of the three kingdoms of Naples, Sicily and Sardinia, the Duchy of Milan and the so-called "State of Presidi" in Tuscany.[42]

Figure 2.5: Italy during the period 1560-1659 (part A) and corresponding current provinces (part B)

Notes: Part A: Italian dominations during the period 1560-1659 - historical map from Dunan et al. (1965). Part B: corresponding current Italian provinces with Spanish, Papal, Austrian, Venetian, Sabaudian domination and other Independent provinces.

The Spanish kingdom had a great influence in Italy for a long period of time, mainly during the 16th and part of the 17th century. Not many years after Columbus sailed for the Americas, in Italy the Spanish troops had direct control over 140,000 km^2 (almost half) of the Italian peninsula and the Spanish influence was very strong in most of the Italian territory. Still, a significant part of the (northern) Italian peninsula maintained a certain degree of independence, in particular, the Republic of Venice (with all the Veneto and a great part of Lombardy), the Duchy of Savoy (with Piedmont, Nice and Savoy), the Grand-duchy of Tuscany, the Duchy of Parma and Piacenza, the Duchy of Mantua and Monferrato

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[41]Rokkan consider the period from 1600 to 1800 as crucial for the state formation of Western Europe nations. See Rokkan (1999)

[42]This was a very small area of great strategic and military importance on the Maremma coast in Tuscany created by the will of King Philip II of Spain, and then entrusted with the Neapolitan territories.

administrated by Gonzaga-Nevers, the Republic of Lucca and the Republic of Genoa.

Moreover, another reason that justifies our choice is that the Spanish hegemony in Italy has been often portrayed by historians as having negatively affected the dominated areas also through its legacy of inefficient institutions and bureaucracy and the implementation of extractive policies in foreign territories.[43] More precisely, early modern Spain has been one of the first state to develop an organized bureaucracy often described by many historians as "...a rent-seeking organization indulged with anachronistic privileges by a revenue-hungry Crown."[44] Indeed, especially during these years, Spain had to finance continuous military activities and its bureaucracy is often described as geared mainly for tax collection.[45]

Some descriptive analysis offers additional hints. Figure 2.6 identifies in black all provinces in which the Spanish power have ruled for more than 150 years. Conversely, red triangles pinpoint the provinces that were ruled for less than 150 years by the Spaniards or not conquered at all. Most provinces ruled by the Spanish for a long time are now characterized by low levels of productivity and low levels of institutional quality. Moreover, with the exception of some area located in the Northern part of the country (Lombardy and Piedmont) most ex-Spanish colonies were located in the south. In order to identify the different administration/domination prevailing in each Italian province, in our first approach we construct a series of six dummies, that is, Spanish, Papal, Austrian, Venetian, Sabaudian and, finally, Independent areas. Figure 2.5 (Part B) allows to easily identify the geographical location of these dominations.

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[43] A well documented example is the Mesta, an inefficient institution with imperfectly stipulated property rights, where the Spanish Crown had granted to the shepherds guild (Mesta) the right to drive their sheep across agricultural land. See North and Thomas (1976).

[44] Drelichman (2009), p. 235, has a an alternative and more positive interpretation of the Spanish bureaucracy. However, his analysis focuses almost exclusively on historical documents and data related to Spain, thus excluding evidence on Spanish colonies. But a less conventional historical point of view on the Spanish domination and bureaucracy in Italy can also be found. For example, Croce (1922) maintained that the Spanish misgovernment was more a myth than a real historical fact. Moreover, Croce (1922) supported the idea that Italy would have been able to become independent from Spain as the Netherlands did, but it was too politically divided and weak. It is also said that, despite being administrated by the domination of Madrid, unlike the feudal domination applied in the Mezzogiorno, provinces in the Northern area of the Italian peninsula ruled by Spain enjoyed a relative autonomy. On this see also Sella and Capra (1984).

[45] During Philip II's reign (1556-1598) that leads Spain into the final phase of the Italian Wars and ended with the Treaty of Cateau-Cambresis, Spain was at peace for only six months. See Drelichman and Voth (2011).
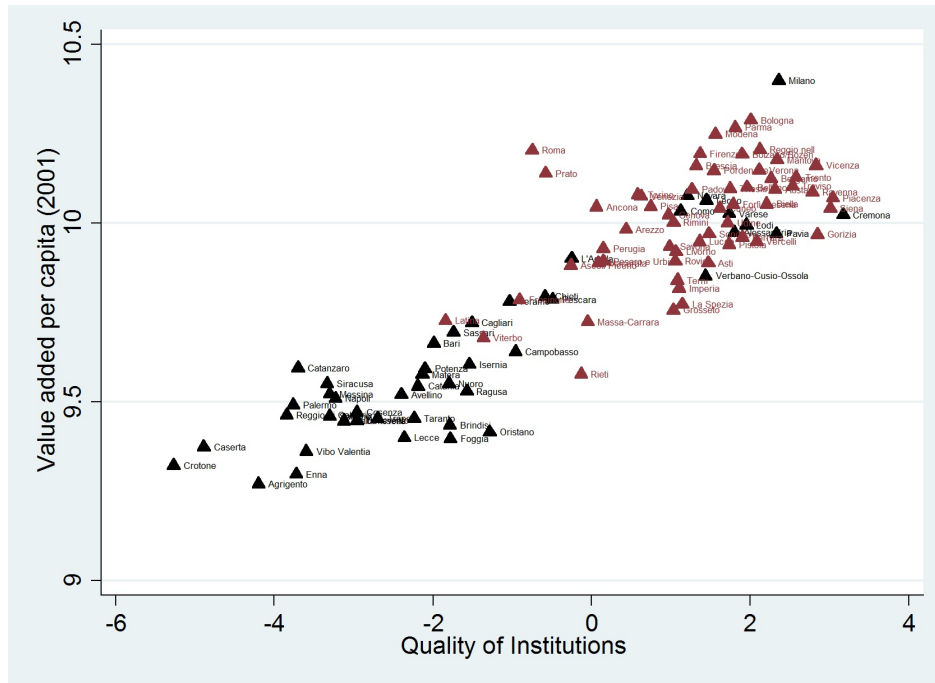
Figure 2.6: Former Spanish provinces

Notes: In black Italian provinces under the Spanish control, in red the remaining provinces during the period 1560-1659.

In Table 2.3 we show our IV estimator results: for each model, the first column reports the first stage estimates, namely the effect of dominations on current quality of institutions, and the second one reports the second stage estimates. The Pagan and Hall's test results always accept the null of no heteroskedasticity, and we also report the p-value of the Sargan test of over-identifying restrictions to check the validity of our instruments. Moreover, since the feature that makes our instruments plausibly exogenous, that is, the fact that they occurred in the distant past, may also make them weak we also control for this problem.[46]

For each specification, we test for underidentification and for weak instruments. The instrument relevance issue in IV estimates has recently received increased attention by applied researchers, since weak instruments problems imply that the sampling distributions of IV statistics are non-normal and standard IV point estimates, hypothesis tests, and confidence intervals are unreliable. We firstly test for underidentification using the Anderson canonical correlations test. Except in model 4 Table 2.3, the p-values always reject the null.

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[46] "Finding exogenous instruments is hard work, and the features that make an instrument plausibly exogenous for example, occurring sufficiently far in the past to satisfy a first order condition or the as-if random coincidence that lies behind a quasi-experiment can also work to make the instrument weak." Stock et al. (2002), p.2. On this, see also Acemoglu et al. (2012).

Table 2.3: IV estimates - First approach: standard set of control variables

Dependent variable: VA per capita 2001	(1) I stage	(1) II stage	(2) I stage	(2) II stage	(3) I stage	(3) II stage	(4) I stage	(4) II stage	(5) I stage	(5) II stage
Austria	0.7473 (0.865)		0.2819 (0.700)		0.1006 (0.658)		-0.4381 (0.514)		-0.2417 (0.654)	
Papal State	-1.0348* (0.530)		-0.8665** (0.421)		-0.7999** (0.395)		-0.4798 (0.309)		-0.7846** (0.384)	
Savoy	0.3455 (0.735)		-0.3721 (0.634)		0.1467 (0.610)		-0.2882 (0.475)		-0.3051 (0.619)	
Spain	-2.9796*** (0.424)		-1.8620*** (0.370)		-1.4589*** (0.363)		-0.8063*** (0.293)		-1.3248*** (0.357)	
Venice	0.3900 (0.577)		0.4264 (0.472)		0.3961 (0.442)		-0.5061 (0.361)		0.2155 (0.436)	
Physical capital (private)			0.1970 (0.164)	-0.0065 (0.015)	0.2328 (0.154)	-0.0013 (0.015)	0.1427 (0.120)	0.0043 (0.014)	0.2565* (0.150)	-0.0047 (0.016)
Value added per capita 1936			4.0434*** (0.613)	0.2094** (0.096)	1.8067** (0.827)	0.1479* (0.083)	0.0403 (0.678)	0.2000*** (0.075)	1.4740* (0.815)	0.1518* (0.085)
Education (average years)					1.7939*** (0.478)	0.0876 (0.060)	0.6348 (0.398)	0.1365** (0.055)	1.5769*** (0.473)	0.0775 (0.065)
Latitude							5.5026*** (0.693)	-0.1254 (0.251)		
Temperature									-0.1482** (0.059)	0.0067 (0.007)
Institutional Quality (TSLS)		0.1267*** (0.009)		0.1106*** (0.014)		0.0993*** (0.018)		0.0945** (0.041)		0.1084*** (0.023)
Institutional Quality (LIML)		0.127		0.115		0.106		0.205		0.119
CLR (95%)		[0.110; 0.147]		[0.0862; 0.157]		[0.0695; 0.165]		[-inf; +inf]		[0.0708; 0.218]
Observations	103	103	102	102	102	102	102	102	102	102
R-squared	0.486	0.775	0.682	0.818	0.724	0.840	0.836	0.852	0.742	0.828
first-stage F statistics		18.34		8.399		5.717		1.617		3.899
Anderson Rubin P-value		0		2.78e-07		6.23e-05		0.0470		0.000524
Sargan statistic		2.410		4.435		4.249		7.995		3.564
Sargan P-value		0.661		0.350		0.373		0.0918		0.468
Pagan-Hall P-value		0.252		0.159		0.202		0.226		0.340

Notes: Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Institutional quality assumed endogenous. Excluded instruments are the dummies Austria, Papal State, Savoy, Spain and Venice (Independent states not included) each representing a different domination that ruled Italian provinces during the period 1560-1659.

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However, nonzero correlations are not sufficient for strong identification and we also always report first-stage F statistics based on Cragg and Donald (1993). For our most important results we also discuss the test statistic proposed by Stock and Yogo (2005), where the null hypothesis being tested is that the estimator is weakly identified in the sense that it is subject to bias that the investigator finds unacceptably large. As a possible measure of whether a set of instruments is strong we check if the TSLS relative bias is at most 20% if not instruments are weak.

As a rule of thumb, we firstly check if the first-stage F-statistic is larger than ten.[47] Finally, since we only have one endogenous variable we also conduct inference that is robust to weak instruments using Moreira's (2003) conditional likelihood ratio (CLR) test statistics.[48] The latter enables us to create confidence intervals robust to weak instruments that we include among results, together with Limited Information Maximum Likelihood (LIML) estimates since they are more robust to weak instruments than standard IV.[49]

In the first stage we always exclude the Independent areas dummy from the analysis to avoid multicollinearity. Model 1 in Table 2.3 shows the results of the parsimonious specification. First stage results indicate that the dummies referred to the Spanish domination and the Papal state are significant, both with a negative sign. This implies, as expected, a negative correlation between these past administration and current institutional quality.[50] The remaining historical dummies show most of the time the expected sign, but they are not significant. Second stage results suggest that the influence of the quality of governing institutions on per capita VA is significant and positive, as expected. Finally, the over-identification restriction is not rejected, while the first stage F-statistics and the CLR test suggest estimates are free from weak instruments problems.[51]

In the following models we add our basic set of additional controls, that is, past economic development and both physical and human capital. Model 2 firstly introduces physical capital and the 1936 value added measure while model 3 further includes our human capital indicator. In model 2 second stage coefficients are both positive and with the expected

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[47]In particular, Staiger and Stock (1997) and Stock and Yogo (2005) develop a test for weak instruments that, in its simplest form, rejects the null hypothesis of weak instruments if the first-stage F is bigger than ten.

[48]Moreira (2009) shows Monte Carlo simulations results where the CLR test for the endogenous variable's coefficient has good power overall in over-identified models and dominates the Anderson-Rubin and score tests. On this, see also Murray (2006).

[49]Reasons are twofold. First of all, the CLR test is centered around the LIML estimator. Secondly, LIML estimates are more robust to weak instruments than standard IV.

[50]On the expected role of the different dominations see Appendices B1 and B2.

[51]Unfortunately, while providing a foundation for building confidence intervals, the conditional likelihood test does not provide point estimates. For more on this see Murray (2006).

sign while in model 3 human capital is not significant. Moreover, our first stage F-test are now lower than 10, but our CLR confidence intervals are still bounded and above zero, suggesting a positive and significant role for our quality of institutions variable.

However, weak instruments problems seem to arise when we introduce geography in our models. In particular, models 4 and 5 include respectively latitude and average temperatures in our analysis. Model 4 shows that latitude is not significant and, by introducing this control, we see that our first stage F-statistics drops dramatically and that the confidence intervals provided by the Moreira test are unbounded. It implies that we cannot rule out the possibility of no relationship between current institutional quality and per capita VA. On the other hand, model 5 shows that the coefficient on average temperatures is not significant, while confidence intervals provided by the Moreira test now are bounded and above zero.

Overall, this analysis suggests a negative and significant impact of Papal and Spanish administration in our models and a positive and stable coefficient of Institutional quality in all the specifications. On the other hand, models with geographical controls seem to suffer from weak instruments problems.

2.4.2 Second approach: years matrix

The dummy approach adopted so far may be subject to various criticisms. First of all, this method considers just a picture of the Italian history that, even with reasonable criteria of choice, limits our analysis to a short and specific period. Second, a system based on dummies is implicitly assuming that each different regime had the same importance and impact. Conversely, in principle it is likely that longer domination and regimes could have had a greater impact and left more persistent and lasting effects. Indeed, this could be the case for northern regions ruled by Spain: in this case the Spanish domination has been shorter than in southern areas. Finally, in the dummy approach the *Mezzogiorno* is considered entirely as part of the Spanish domination and this implies that there is almost no variability in that area.

Therefore, unlike previous studies, that usually focused on specific historical events, in choosing our second instruments set we follow a different path and collect data for all different regimes that governed each Italian province over seven centuries before the creation of the unified Italian State. Our historical analysis goes as far as it can in order to capture the main characteristics of past Italian dominations. In particular, we consider the period between 1100 and 1800 where the historical lower bound is determined by the high political

instability of the Peninsula from the Holy Roman Empire downfall until the Norman rise (about 1100) and also by the absence of reliable historical documents. The upper bound has been chosen, again, because since 1800 the Napoleonic era had established a situation of dramatic changes and instability in the Italian politics with a series of wars that persisted until the Italian Unity in 1861.[52] In sum, this approach enables us to overcome different criticisms that characterize the dummy approach. First of all, it injects some variability in southern areas. Another advantage is that it takes into account all possible different influences that a specific territory has had during a long period of time, seven hundred years, thus introducing a more detailed analysis. Finally, it considers and weights the different levels of persistence that each domination has exerted on territories.

During these 700 years we have identified the following dominations: the Normans, the Swabians, the Anjou, the Spanish (Aragonese until 1502), the Bourbons, the Papal State, the Savoy, the Austrians and the Republic of Venice.[53] Secondly, we have constructed a matrix that assigns to each province the number of years during which each regime has persisted in a specific territory. More historical details can be found in Appendix A. Note that, as expected, in specific cases we had to rely on some simplifying assumptions. Problems also arise for small states, whose regimes were, in some cases, highly influenced by foreign powers and could thus be considered as ruled by them. Nevertheless, if not formally dominated, we identify these difficult cases as part of the independent states class.

Table 2.4 offers some descriptive statistics of our new set of instruments. The mean values column suggests a strong persistence of the Papal state and the Spanish domination in their territories. Moreover, we observe that some provinces have not experienced any change in regimes during the whole 700 years: this is true for provinces ruled by the Republic of Venice, the Savoy, the Papal state and it is also the case for some independent territories.

Table 2.5 replicates the previous Table 2.3 analysis changing our set of instruments based on history. Considering first stage results (first column in each model) in the most parsimonious specifications we observe a negative and significant coefficient on Normans, Spain and the Papal state dominations.[54] Thus, our result on Normans seems to confirm previous studies on the Italian case that, following Putnam (1994), usually identify the Norman Kings as having negatively affected social capital levels and, through that, devel-

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[52]It can also be said that the French revolution has triggered the Italian Unity: "...the French revolution certainly had immediate as well as long term effects on all national movements, particularly on those leading to the unification of Italy and Germany." Rokkan, 1999, p.37.

[53]Authors (1997)

[54]Again, to avoid perfect multicollinearity we exclude Independent states from the regression analysis.

Table 2.4: Descriptive statistics - Dominations

Dominator	Average length of time in power	Shortest period (years)	Longest period (years)
Normans	33	0	114
Swabians	22	0	166
Anjou	43	0	176
Spanish	125	0	411
Bourbons	20	0	66
Papal	100	0	700
Independent	247	0	700
Venetian	40	0	700
Austrian	34	0	437
Savoy	31	0	700

Notes: The average length of time in power refers to the average number of years, across our 103 Italian provinces, during which these dominations/administrations ruled in the Italian peninsula during 1100-1800.

opment.[55] In particular, Putnam identifies the collapse of the Holy Roman Empire and the two political regimes that followed in Italy, the Norman Kings in the southern areas and the independent towns in the North, as the critical historical juncture that have influenced the degree of local civic commitment. In this view, independent towns were characterized by high levels of civicness, unlike southern regions ruled by the Norman autocratic regime, and civic capital is considered not only highly persistent over time, but also a key factor to explain current differences in Italian regional economic performance.

Our analysis offers a more complex picture, where different dominations and historical events seem to matter. In particular, the Spanish domination is, again, negative and significant in both models 1 and 2, but the most robust indicator is that of the Papal state, negative and significant in all specifications. Thus, unlike micro evidence that suggests potentially positive outcomes of broad-based churches and religious identity on different social outcomes, our macro evidence is consistent with those found in other recent studies that suggest a negative role of theocracies on economic outcomes.[56] In particular, Rubin (2011) identifies in the greater degree to which political authorities were dependent on the dictates of the religious authorities for legitimacy in early Islam one of the main reasons why economic development retarded in the Middle East relative to Western Europe. In the

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[55]Among the most recent studies see Guiso et al. (2008), De Blasio and Nuzzo (2010) and Giordano and Tommasino (2011).

[56]See for example Pugh and Telhaj (2008), Botticini and Eckstein (2012) and Becker and Woessmann (2009) who investigate the role of religion and its role on education educational outcomes for development.

Table 2.5: IV estimates – Second approach: standard set of control variables

Dependent variable: VA per capita 2001	(1) I stage	(1) II stage	(2) I stage	(2) II stage	(3) I stage	(3) II stage	(4) I stage	(4) II stage	(5) I stage	(5) II stage
Normans	-0.0310**		-0.0311**		-0.0291**		-0.0108		-0.0284**	
	(0.014)		(0.013)		(0.013)		(0.011)		(0.013)	
Swabians	0.0052		0.0030		0.0031		-0.0011		0.0003	
	(0.004)		(0.004)		(0.004)		(0.003)		(0.004)	
Anjou	0.0032		0.0044		0.0038		-0.0070*		0.0029	
	(0.004)		(0.004)		(0.004)		(0.004)		(0.004)	
Spain	-0.0063***		-0.0052***		-0.0044***		-0.0006		-0.0032**	
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)	
Bourbons	0.0038		0.0081		0.0089		0.0166		0.0103	
	(0.017)		(0.016)		(0.016)		(0.013)		(0.015)	
Papal state	-0.0031***		-0.0028***		-0.0028***		-0.0011*		-0.0026***	
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)	
Venice	-0.0001		0.0001		0.0002		-0.0012		-0.0000	
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)	
Austria	0.0022		0.0014		0.0010		-0.0010		0.0005	
	(0.002)		(0.002)		(0.002)		(0.001)		(0.002)	
Savoy	-0.0002		-0.0012		-0.0004		-0.0002		-0.0013	
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)	
VA per capita 1936			1.3798***	0.3194***	0.1250	0.1949***	-0.5101	0.2029***	0.0418	0.1934***
			(0.627)	(0.074)	(0.735)	(0.073)	(0.625)	(0.072)	(0.720)	(0.073)
Physical capital (private)			0.0858	-0.0019	0.1172	0.0057	-0.0521	0.0082	0.1349	0.0055
			(0.140)	(0.014)	(0.135)	(0.013)	(0.117)	(0.013)	(0.132)	(0.013)
Education (average years)					1.2370***	0.1447***	0.5514	0.1635***	1.0916***	0.1431***
					(0.416)	(0.048)	(0.366)	(0.045)	(0.412)	(0.047)
Latitude							5.6842***	0.0775		
							(0.918)	(0.139)		
Temperature									-0.1193**	-0.0001
									(0.054)	(0.005)
Institutional Quality (TSLS)		0.1229***		0.0912***		0.0766***		0.0601***		0.0771***
		(0.007)		(0.010)		(0.011)		(0.021)		(0.013)
Institutional Quality (LIML)		0.124		0.0941		0.0796		0.0613		0.0813
CLR (95%)		[0.110; 0.138]		[0.073; 0.118]		[0.055; 0.107]		[-0.007; 0.132]		[0.052; 0.115]
Observations	103	103	102	102	102	102	102	102	102	102
R-squared	0.785	0.780	0.798	0.840	0.816	0.862	0.872	0.866	0.826	0.862
First-stage F statistic		37.69		12.73		9.502		3.818		7.782
Anderson canon. P-value		0.00		0.00		0.00		0.00		0.00
Sargan statistic		7.659		12.21		11		12.26		11.05
Sargan P-value		0.468		0.142		0.202		0.140		0.199
Pagan-Hall P-value		0.409		0.403		0.291		0.165		0.370

Notes: Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Institutional quality assumed endogenous. Excluded instruments are the variables Normans, Swabians, Anjou, Bourbons, Austria, Papal State, Savoy, Spain and Venice (Independent states not included) that identify the number of years during which each regime has persisted in a specific territory during 1100-1800.

Papal state the Pope was both the political and religious authority and the administrative hierarchy of the government was fully subordinate to the administrative hierarchy of the religion. As also documented in Chapter 1, this caused the Pope territories to have the most inefficient and corrupt bureaucratic apparatus on the eve of the Italian unification process. It is also widely documented how the Counter-Reformation negatively influenced this area and the Spanish dominated ones.[57]

Further, second stage results now offer a more consistent picture. First of all, as before our institutional quality coefficients are always positive and significant in all specifications. Results are also confirmed for our geography variables in models 4 and 5 that are never significant in our second stage. Thus, it seems that the inclusion of our main controls, quality of institutions, past development levels and human capital, leaves no significant role for further geography or additional factors. Interestingly, Acemoglu et al. (2001) and Acemoglu and Robinson (2013) find similar results when they control for geography in their cross-country dataset.[58]

Second, in this set of results educational levels are always positive and significant, with numbers implying a 30% increase in productivity levels if the province with the lowest human capital endowments (Caltanisetta and Agrigento, both located in Sicily) would invest more in human capital accumulation than other areas and catch up with the best performer, that is, Rome.

Third, the over-identification restriction is not rejected and the strength of the instruments is higher than the first approach. Except for model 4, the Cragg-Donald test implies that the TSLS relative bias is at most 10% in models 1 and 2, and 20% in models 3 and 5. More importantly, confidence regions constructed using the CLR test always show bounded confidence intervals but, as before, we cannot exclude the possibility that there exist no relationship between quality of institutions and total per capita VA when latitude is included among regressors.

Overall, the value of the coefficient on our main indicator now assumes plausible values even if, it is fair to say that, given the weak instrument problem, the point estimates have to be taken with a grain of salt. These values would imply that the difference between the performance of the governing institutions in Crotone (the province showing the lowest indicator) and that of Cremona (the highest) explains between approximately 50% to 60% of the gap in productivity levels.

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[57]For more on this see Section 1.2.

[58]See also Rodrik et al. (2004).

2.5 Robustness checks

Since the second set of instruments suffers less from weak instrument problems we focus on this to examine whether our previous results on the overall positive role of institutional quality for development are robust to a number of changes in the model specification, in particular, to the inclusion of further social capital and cultural controls, and the use of different measures of past regional economic performance.[59]

We start from the first concern, that is, that regional differences in the performance of the public sector are acting as a proxy of alternative indicators that may be correlated with our measure of government performance.

In general, our analysis is related to the vast literature on social capital and development, where the specific analysis of the Italian regions dates back to Banfield (1958) and Putnam (1994) who also firstly raised the hypothesis that the observed within-country heterogeneity in the quality of institutions could be traced back to their distant histories. In these studies differences in economic performance across Italian regions are explained by different social capital endowments, with the latter showing a high persistency over time.[60] In principle it might be that, once the role of widely used measures of social capital and culture is taken into account, no role is left for the performance of institutions as an independent determinant of economic development. To address this question, we therefore include in our basic IV specifications our alternative cultural and social capital indicators at regional NUTS3 level.

The main indicator is the composite measure of social capital provided by Cartocci (2007), described in Section 2.2, which should capture the role of specific *generalized morality*, *pro-social behavior* and *interest in politics*. To set the scene, in Table A.2, in Appendix A, we firstly replace our institutions indicator by this social capital indicator (models 1 and 2). As previously found in other studies, the coefficient on social capital is always significant and it has the expected positive sign even controlling for past development levels or further additional controls.[61] However, once we add our main index of institutional quality indicator to the picture things significantly change. In particular, we find that our standard social capital indicator is never significant and this result does not change if social capital is introduced in the model as both an endogenous or exogenous regressor. Almost identical

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[59]Results using the first approach are nonetheless almost identical and results available upon request.

[60]More recent papers are Guiso et al. (2008), Tabellini (2010), De Blasio and Nuzzo (2010), Mauro and Pigliaru (2011) and Giordano and Tommasino (2011).

[61]Results with additional controls are not included here. The same variable has been used in Mauro and Pigliaru (2011) and Giordano and Tommasino (2011).

results are found when the remaining two proxies, the catholic weddings and extortions indicators, are included in our specification (models 4 and 5 respectively).

Overall, results on our quality of institutions indicator are invariably positive and significant and suggest that the effect of "broadly defined" social capital on output is likely to operate mainly through the functioning of government institutions.[62] Similar evidence on a regional Italian sample has been found in Tabellini (2010). In this case results show that introducing a measure of the number of years needed to complete a first-degree civil lawsuit in courts significantly weakens the effect of culture, a variable that closely resembles what in other studies is called "social capital": as in our case the coefficient of the latter becomes negative and insignificant.[63]

As a final check, we substitute our previous indicator of past development, per capita VA in 1936, with a proxy available of regional pre-unitary economic development in a similar period of time as our dominations/fragmentation instrument set.[64] This indicator should enable us to further reduce the risk of invalid instruments, while supporting the assumption that dominations affect current development levels only through our current quality of institution variable. In this case, several *caveats* should be borne in mind. First, as said in Section 2.4, urbanization is an imperfect measure of past GDP and this is why our previous analysis includes the alternative 1936 VA measure. Second, our data on Italian political fragmentation cover a long period ranging from 1100 to 1800 and we do not have data for our first century, 1100. The most plausible choice in this setting is thus to use in our regression analysis the oldest possible data available, that is, the 1300 urbanization levels.

Table A.3, in Appendix A, shows our final set of results. Regression models always include the basic set of controls, that is, quality of institutions, human capital and past development, while they introduce one by one the remaining regressors (models 2 to 6): latitude, average temperatures, extortions, social capital, religious weddings. Moreover, a final regression (model 7) includes both 1300 cities urbanization and per capita VA in 1936. Our institutional quality coefficient is always significant and positive, and coefficient values do not change significantly in the different models. The new proxy of 1300 development levels is always positive and significant, even when including per capita VA in 1936. Con-

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[62]On this see Knack (2002) and Tabellini (2008) that both find culture to be strongly correlated with the functioning of government institutions across U.S. States (the former) and in a cross-country sample (the latter).

[63]In Tabellini (2010) culture is measured by the first principal components extracted from four cultural variables (control, obedience, respect, trust). In this case, social capital is mainly captured by trust (having trust in other people) and respect.

[64]See Malanima (2005). See also section 2.4.

versely, additional controls in models 2 to 6 are always non significant. The Sargan statistics always show that our set of instruments is valid while, as before, in few specifications we find low values of our first stage F-statistics but CLR confidence interval always bounded and greater than zero.

2.6   Conclusions

This Chapter investigates whether the quality of the public sector plays a role in the economic development of the Italian regions. In order to control for endogeneity problems we exploit the wide variability among sovereigns observed in Italy during seven hundred years, identifying for each province the kind and the duration (in years) of domination that ruled during the period between the 12th and 18th centuries. We create two different sets of instruments aimed at capturing exogenous variation in regional Italian institutional quality.

We find robust evidence of a negative effect of Spanish, Norman and Papal dominations in our first stage results. Most of all, second stage regressions show that the public administration performance matters for explaining current regional economic performance. This result is robust to varying model specifications and set of instruments. Our set of controls in the second stage regressions includes measures of past economic development, geography, human and physical capital and additional indicators of social capital and culture.

Moreover, our analysis suggests that the inclusion of our main controls, namely the quality of institutions, past development levels, and physical and human capital, leaves no significant role for further geography or additional factors. They also suggest that the effect of "broadly defined" social capital on output is likely to operate mainly through the functioning of government institutions as we find that our standard social capital indicator is never significant.

In sum, our analysis indicates that the difference in the quality of institutions explains a significant part of the observed gap in Italian regional productivity levels and implies a significant role of past historical institutions on the current PA performance. Finally, we offer some suggestions to understand why old norms and institutions persisted. A deeper understanding of the cultural and institutional channels behind this strong persistence is an important issue that should be further investigated in the future.

Appendix

A   Appendix

Table A.1: Correlation matrix

	Institutional Quality	Physical capital	Total VA per capita (2001)	Total VA per capita (1936)	Average temperature	Latitude	Religious weddings	Social capital	Education (2001)	Extortions (1999-2002)	Urbanization 1300
Institutional Quality (1996-2002)	1										
Physical capital	0.3843	1									
Total Value Added per capita (2001)	0.7362	0.5963	1								
Total Value Added per capita (1936)	0.7138	0.4124	0.8277	1							
Average temperature	-0.6504	-0.1454	-0.5069	-0.5834	1						
Latitude	0.8933	0.3708	0.7241	0.7526	-0.7776	1					
Religious weddings	-0.6449	-0.1857	-0.6255	-0.65	0.3791	-0.5677	1				
Social Capital	0.8627	0.2662	0.6708	0.6715	-0.5096	0.7526	-0.7084	1			
Average years of education (2001)	0.7545	0.2774	0.8284	0.8125	-0.5728	0.7652	-0.7268	0.7286	1		
Extortions (1999-2002)	-0.586	-0.2056	-0.5143	-0.4943	0.4386	-0.6275	0.3441	-0.54	-0.4648	1	
Urbanization 1300	0.2205	0.291	0.4446	0.3615	0.0241	0.1864	-0.2571	0.2397	0.3609	-0.2196	1

Table A.2: IV estimates – Second approach: additional controls

Dependent variable: VA per capita 2001	(1)		(2)		(3)		(4)		(5)	
	I stage	II stage	I stage	II stage	I stage	II stage	I stage	II stage	I stage	II stage
Normans	-0.0415*		-0.0441**		-0.0174		-0.0305**		-0.0261**	
	(0.022)		(0.022)		(0.012)		(0.013)		(0.013)	
Swabians	-0.0040		-0.0041		0.0042		0.0026		0.0031	
	(0.007)		(0.007)		(0.003)		(0.004)		(0.004)	
Anjou	0.0007		0.0007		0.0038		0.0027		0.0031	
	(0.007)		(0.007)		(0.004)		(0.004)		(0.004)	
Spain	-0.0087***		-0.0074***		-0.0026**		-0.0045***		-0.0044***	
	(0.002)		(0.002)		(0.001)		(0.001)		(0.001)	
Bourbons	0.0138		0.0215		0.0025		0.0107		0.0078	
	(0.027)		(0.027)		(0.014)		(0.016)		(0.016)	
Papal state	-0.0039***		-0.0036***		-0.0018***		-0.0029***		-0.0027***	
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)	
Venice	-0.0030*		-0.0025		0.0008		0.0001		0.0000	
	(0.002)		(0.002)		(0.001)		(0.001)		(0.001)	
Austria	0.0030		0.0013		0.0008		0.0014		0.0010	
	(0.003)		(0.003)		(0.001)		(0.002)		(0.002)	
Savoy	-0.0022		-0.0038*		0.0004		-0.0003		-0.0002	
	(0.002)		(0.002)		(0.001)		(0.001)		(0.001)	
Value added per capita 1936			1.9525*	0.3600***	0.0628	0.1926***	0.1735	0.2069***	0.0390	0.1931***
			(1.033)	(0.078)	(0.651)	(0.071)	(0.735)	(0.074)	(0.738)	(0.072)
Physical capital (private)			-0.2910	0.0249*	0.1874	0.0087	0.0736	0.0007	0.1217	0.0065
			(0.231)	(0.015)	(0.120)	(0.014)	(0.140)	(0.014)	(0.135)	(0.013)
Education (average years)					0.7529*	0.1381***	1.3988***	0.1535***	1.2396***	0.1502***
					(0.381)	(0.045)	(0.440)	(0.048)	(0.416)	(0.048)
Social capital		0.0866***	0.2833***	0.0579***		0.0085				
		(0.006)	(0.056)	(0.007)		(0.010)				
Religious weddings							2.3501	0.2831		
							(2.102)	(0.182)		
Extortions									-0.0372	-0.0032
									(0.034)	(0.004)
Institutional Quality (TSLS)						0.0663***		0.0837***		0.0714***
						(0.021)		(0.012)		(0.013)
Institutional Quality (LIML)						0.0818		0.0877		0.0746
CLR (95%)						[0.018; 0.181]		[0.062; 0.118]		[0.045; 0.108]
Observations	103	103	102	102	102	102	102	102	102	102
R-squared	0.728	0.686	0.742	0.810	0.857	0.868	0.819	0.861	0.819	0.865
First-stage F statistic		27.68		10.87		3.263		8.788		7.129
Anderson canon. P-value		0.00		0.00		0.00		0.00		0.00
Sargan statistic		11.64		15.06		12		9.886		10.77
Sargan P-value		0.168		0.0579		0.151		0.273		0.215
Pagan-Hall P-value		0.355		0.914		0.580		0.296		0.312

Notes: Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Social capital assumed endogenous in models 1 and 2. Institutional quality assumed endogenous in models 3 to 5. Excluded instruments are the variables Normans, Swabians, Anjou, Bourbons, Austria, Papal State, Savoy, Spain and Venice (Independent states not included) that identify the number of years during which each regime has persisted in a specific territory during 1100-1800.

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Table A.3: IV estimates – Second approach: including urbanization as a proxy for past development levels

Dependent variable: VA per capita 2001	(1) II stage	(2) II stage	(3) II stage	(4) II stage	(5) II stage	(6) II stage	(7) II stage
Urbanization 1300	0.0017***	0.0017***	0.0019***	0.0017***	0.0017***	0.0018***	0.0015***
	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Education (average years)	0.1453***	0.1632***	0.1342***	0.1474***	0.1423***	0.1580***	0.0766
	(0.048)	(0.042)	(0.045)	(0.049)	(0.048)	(0.050)	(0.049)
Physical capital (private)	0.0009	0.0041	0.0042	0.0016	-0.0013	-0.0029	-0.0080
	(0.015)	(0.014)	(0.014)	(0.015)	(0.017)	(0.015)	(0.014)
Latitude		0.0950					
		(0.144)					
Temperature			-0.0113*				
			(0.006)				
Extortions				-0.0014			
				(0.004)			
Social capital					-0.0037		
					(0.012)		
Religious weddings						0.2548	
						(0.200)	
Value added per capita 1936							0.2433***
							(0.075)
Institutional Quality (TSLS)	0.0932***	0.0758***	0.0841***	0.0910***	0.0994***	0.0997***	0.0835***
	(0.012)	(0.021)	(0.013)	(0.014)	(0.024)	(0.012)	(0.011)
Institutional Quality (LIML)	0.0948	0.0797	0.0855	0.0935	0.107	0.101	0.0853
CLR (95%)	[0.070; 0.124]	[0.023; 0.152]	[0.058; 0.119]	[0.063; 0.131]	[0.048; 0.207]	[0.076; 0.133]	[0.061; 0.113]
Observations	92	92	92	92	92	92	92
R-squared	0.854	0.865	0.867	0.856	0.849	0.851	0.876
First-stage F statistic	9.154	3.424	7.150	6.194	2.761	8.362	8.329
Anderson canon. P-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sargan statistic	3.809	4.520	2.838	4.008	3.589	3.125	5.080
Sargan P-value	0.874	0.807	0.944	0.856	0.892	0.926	0.749
Pagan-Hall P-value	0.522	0.483	0.554	0.463	0.637	0.609	0.662

Notes: Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. First stage not reported. Institutional quality assumed endogenous. Excluded instruments are the variables Normans, Swabians, Anjou, Bourbons, Austria, Papal State, Savoy, Spain and Venice (Independent states not included) that identify the number of years during which each regime has persisted in a specific territory during 1100-1800.

Table A.4: Dummy approach - Dominations by province

Province	Domination	Province	Domination	Province	Domination
Agrigento	SPA	Genova	IND	Potenza	SPA
Alessandria	SPA	Gorizia	AUS	Prato	IND
Ancona	PON	Grosseto	IND	Ragusa	SPA
Aosta	SAV	Imperia	IND	Ravenna	IND
Arezzo	IND	Isernia	SPA	Reggio di Calabria	SPA
Ascoli Piceno	PON	La Spezia	IND	Reggio nell'Emilia	IND
Asti	SAV	L'Aquila	SPA	Rieti	PON
Avellino	SPA	Latina	PON	Rimini	IND
Bari	SPA	Lecce	SPA	Roma	PON
Belluno	AUS	Lecco	SPA	Rovigo	VEN
Benevento	SPA	Livorno	IND	Salerno	SPA
Bergamo	VEN	Lodi	SPA	Sassari	SPA
Biella	SAV	Lucca	IND	Savona	IND
Bologna	PON	Macerata	PON	Siena	PON
Bolzano/Bozen	AUS	Mantova	VEN	Siracusa	SPA
Brescia	VEN	Massa-Carrara	IND	Sondrio	VEN
Brindisi	SPA	Matera	SPA	Taranto	SPA
Cagliari	SPA	Messina	SPA	Teramo	SPA
Caltanissetta	SPA	Milano	SPA	Terni	PON
Campobasso	SPA	Modena	IND	Torino	SAV
Caserta	SPA	Napoli	SPA	Trapani	SPA
Catania	SPA	Novara	SPA	Trento	IND
Catanzaro	SPA	Nuoro	SPA	Treviso	VEN
Chieti	SPA	Oristano	SPA	Trieste	AUS
Como	SPA	Padova	VEN	Udine	VEN
Cosenza	SPA	Palermo	SPA	Varese	SPA
Cremona	SPA	Parma	IND	Venezia	VEN
Crotone	SPA	Pavia	SPA	Verbano-Cusio-Ossola	SAV
Cuneo	SAV	Perugia	PON	Vercelli	SAV
Enna	SPA	Pesaro e Urbino	PON	Verona	VEN
Ferrara	IND	Pescara	SPA	Vibo Valentia	SPA
Firenze	IND	Piacenza	IND	Vicenza	VEN
Foggia	SPA	Pisa	IND	Viterbo	PON
Forlı-Cesena	IND	Pistoia	IND		
Frosinone	PON	Pordenone	VEN		

Notes: AUS=Austria; IND=Independent; Papal state=PON; SAV=Savoy; SPA=Spain; VEN=Venetian

Table A.5: Second approach - Matrix of dominations

Province	NOR	SWA	ANG	SPA	BOR	PON	VEN	AUS	SAV
Agrigento	94	72	36	411	66	0	0	14	7
Alessandria	0	0	0	171	0	0	0	0	94
Ancona	0	0	0	0	0	600	0	0	0
Aosta	0	0	0	0	0	0	0	0	700
Arezzo	0	0	0	0	0	0	0	0	0
Ascoli Piceno	0	0	0	0	0	443	0	0	0
Asti	0	0	0	0	0	0	0	0	226
Avellino	114	52	176	271	66	0	0	21	0
Bari	114	52	176	271	66	0	0	21	0
Belluno	0	0	0	0	0	0	300	0	0
Benevento	114	52	176	271	66	0	0	21	0
Bergamo	0	0	0	0	0	0	372	0	0
Biella	0	0	0	0	0	0	0	0	423
Bologna	0	0	0	0	0	294	0	0	0
Bolzano/Bozen	0	0	0	0	0	0	0	437	0
Brescia	0	0	0	0	0	0	374	0	0
Brindisi	114	52	176	271	66	0	0	21	0
Cagliari	0	0	0	389	0	0	0	7	80
Caltanissetta	94	72	36	411	66	0	0	14	7
Campobasso	114	52	176	271	66	0	0	21	0
Caserta	114	52	176	271	66	0	0	21	0
Catania	94	72	36	411	66	0	0	14	7
Catanzaro	114	52	176	271	66	0	0	21	0
Chieti	114	52	176	271	66	0	0	21	0
Como	0	150	0	173	0	0	0	87	0
Cosenza	114	52	176	271	66	0	0	21	0
Cremona	0	0	0	173	0	0	10	87	0
Crotone	114	52	176	271	66	0	0	21	0
Cuneo	0	0	114	0	0	0	0	0	418
Enna	94	72	36	411	66	0	0	14	7
Ferrara	0	0	0	0	0	202	0	0	0
Firenze	0	0	0	0	0	0	0	0	0
Foggia	114	52	176	271	66	0	0	21	0
Forlì-Cesena	0	0	0	0	0	294	0	0	0
Frosinone	0	0	0	0	0	700	0	0	0
Genova	0	0	0	0	0	0	0	0	0
Gorizia	0	0	0	0	0	0	0	300	0
Grosseto	0	0	0	150	63	0	0	30	0
Imperia	0	0	0	0	0	0	0	0	0
Isernia	114	52	176	271	66	0	0	21	0
La Spezia	114	52	176	271	66	0	0	21	0
L'Aquila	0	0	0	0	0	0	0	0	0

Continued on Next Page

Table A.5 – Continued

Province	NOR	SWE	ANG	SPA	BOR	PON	VEN	AUS	SAV
Latina	0	0	0	0	0	700	0	0	0
Lecce	114	52	176	271	66	0	0	21	0
Lecco	0	0	0	173	0	0	0	87	0
Livorno	0	0	0	0	0	0	0	0	0
Lodi	0	0	0	173	0	0	0	87	0
Lucca	0	0	0	0	0	0	0	0	0
Macerata	0	0	0	0	0	443	0	0	0
Mantova	0	0	0	0	0	0	0	93	0
Massa-Carrara	0	0	0	0	0	0	0	0	0
Matera	114	52	176	271	66	0	0	21	0
Messina	94	72	36	411	66	0	0	14	7
Milano	0	0	0	173	0	0	0	87	0
Modena	0	0	0	0	0	0	0	0	0
Napoli	114	52	176	271	66	0	0	21	0
Novara	0	0	0	173	0	0	0	25	62
Nuoro	0	0	0	389	0	0	0	7	80
Oristano	0	0	0	293	0	0	0	7	80
Padova	0	0	0	0	0	0	300	0	0
Palermo	94	72	36	411	66	0	0	14	7
Parma	0	0	0	0	5	0	0	64	0
Pavia	0	166	0	173	0	0	0	87	0
Perugia	0	0	0	0	0	430	0	0	0
Pesaro e Urbino	0	0	0	0	0	169	0	0	0
Pescara	114	52	176	271	66	0	0	21	0
Piacenza	0	0	0	0	5	0	0	64	0
Pisa	0	0	0	0	0	0	0	0	0
Pistoia	0	0	0	0	0	0	0	0	0
Pordenone	0	0	0	0	0	0	292	226	0
Potenza	114	52	176	271	66	0	0	21	0
Prato	0	0	0	0	0	0	0	0	0
Ragusa	94	72	36	411	66	0	0	14	7
Ravenna	0	0	0	0	0	291	68	0	0
Reggio di Calabria	114	52	176	271	66	0	0	21	0
Reggio nell'Emilia	0	0	0	0	0	0	0	0	0
Rieti	0	0	0	0	0	700	0	0	0
Rimini	0	0	0	0	0	294	0	0	0
Roma	0	0	0	0	0	700	0	0	0
Rovigo	0	0	0	0	0	0	300	0	0
Salerno	114	52	176	271	66	0	0	21	0
Sassari	0	0	0	389	0	0	0	7	80
Savona	0	0	0	0	0	0	0	0	0
Siena	0	0	0	0	0	0	0	0	0

Continued on Next Page

Table A.5 – Continued

Province	NOR	SWE	ANG	SPA	BOR	PON	VEN	AUS	SAV
Siracusa	94	72	36	411	66	0	0	14	7
Sondrio	0	0	0	0	0	0	0	0	0
Taranto	114	52	176	271	66	0	0	21	0
Teramo	114	52	176	271	66	0	0	21	0
Terni	0	0	0	0	0	602	0	0	0
Torino	0	0	0	0	0	0	0	0	549
Trapani	94	72	36	411	66	0	0	14	7
Trento	0	0	0	0	0	0	0	0	0
Treviso	0	0	0	0	0	0	461	0	0
Trieste	0	0	0	0	0	0	0	418	0
Udine	0	0	0	0	0	0	380	0	0
Varese	0	0	0	173	0	0	0	87	0
Venezia	0	0	0	0	0	0	700	0	0
Verbano-Cusio-Ossola	0	166	0	173	0	0	0	87	0
Vercelli	0	0	0	0	0	0	0	0	373
Verona	0	0	0	0	0	0	300	0	0
Vibo Valentia	114	52	176	271	66	0	0	21	0
Vicenza	0	0	0	0	0	0	300	0	0
Viterbo	0	0	0	0	0	700	0	0	0

Notes: NOR=Normans; SWA=Swabians; ANG=Angiò; SPA=Spain; BOR=Borboni; PON=Papal State; VEN=Venice; AUS=Austria; SAV=Savoy

Table A.6: Variables description

Variable	Level	Description	Source
Total value added per capita	NUTS3	Italian lira, constant prices (base year 2000), 2001 data (and 1936 among controls).	Fondazione Istituto Tagliacarne (2006).
Indicator Environment	NUTS3	Composite indicator of: functioning purification plant every 100 plants;	ISTAT (2008) data
		purification plants under construction every 100 existing plants;	ISTAT (2008) data
		plants of urban waste disposals every 1,000,000 citizens;	ISTAT (2008) data
		yearly average capacity of incineration plants for 100 tons of urban wastes;	ISTAT (2008) data
		tons of wastes for separate refuse collection for 100 tons of urban wastes;	ISTAT (2008) data
		dumps for special wastes every 10,000 km^2.	ISTAT (2008) data
Indicator Energy	NUTS3	gross production of electric energy from renewable sources (share of total production).	ISTAT (2008) data
Indicator Health	NUTS3	utilization rate of beds in the public health institutes. number of workers in the residential socio-assistential health point every 1,000 citizens.	ISTAT (2008) data ISTAT (2008) data
Indicator Education	NUTS3	% of public primary schools provided with meals.	ISTAT (2008) data
		% of public primary schools equipped with school-bus. % of special classrooms in public secondary schools. number of teachers every 100 students.	ISTAT (2008) data ISTAT (2008) data ISTAT (2008) data
Judicial inefficiency	NUTS3	Mean number of years it takes to complete a first-degree trial by the courts located in a province; it has been computed using courts-level data on the length of trials and then averaging out across courts located in the same province.	Guiso et al. (2004)
Private physical capital	NUTS2	Elaboration on data provided by ISTAT for the national capital stock at 1995 constant prices.	Marrocu and Paci (2010)
Education (average years)	NUTS3	It is measured as the average years of schooling of the labor force.	Elaborations on ISTAT (2001)
Latitude (standardized)	NUTS3	Absolute value of the latitude of each province main town, scaled to take values between 0 and 1, where 0 is the southernmost area, 1 the northernmost	ISTAT (2013)
Average temperature	NUTS3	Average temperature: average temperature during the years 2000-2009, all in centigrade.	ISTAT (2013)
Religious weddings	NUTS3	Religious weddings quota over total, in 2001.	Detotto and Sterzi (2010)
Extortions (1999-2001)	NUTS3	Average rate of extortions over 10,000 inhabitants.	Fiaschi et al. (2011)
Social capital	NUTS3	Broad measure of social capital at regional NUTS3 level that merges data on: 1) blood donations, 2) sport participation, 3) dissemination of newspaper and 4) voter turnout.	Cartocci (2007)
Urbanization 1300 and 1600	NUTS3	Population size (in thousands) for each province (NUTS3 region) main town respectively in 1300 and 1600.	Paolo Malanima "Italian Urban Population 1300-1861, (The Database)", author's personal webpage.

Chapter 3

Shirking and social capital: evidence from Italian school workers

"...missed workdays have an economically important
negative impact on productivity in teaching"
Herrmann and Rockoff, 2012, p. 776.

3.1 Introduction

One of the elements that plays a key role in the students' outcomes at school is the teachers' behavior, including their absenteeism attitude. In fact, many studies find evidence that teachers' absenteeism is usually correlated with a lower students' performance, trying to analyze its determinants (Miller et al., 2008; Duflo et al., 2012; Herrmann and Rockoff, 2012).

Absenteeism in schools may depend on various factors: the workplace environment and the managerial practices adopted by the school principal (Di Liberto et al., 2015; Bradley et al., 2007; Gaziel, 2004), school and students characteristics (Herrmann and Rockoff, 2012), local characteristics and non-monetary incentives (Chaudhury et al., 2006). However, we have still no evidence on the role played by the local social capital on teachers' shirking behavior.

Italian *Mezzogiorno* is characterized by a persistent underdevelopment under several dimensions, compared to northern Italian regions: lower levels of per-capita income, higher unemployment rate and lower human capital (see previous Chapter). Social capital level is not an exception, together with workers' absenteeism rates: we observe that the same schooling institution seems to function very differently in different environments, suggesting

that some local specific informal factors are playing an important role. Therefore, the Italian regional sample represents a good candidate to examine different functioning and effectiveness of local educational institutions in a developed economy. In this respect, as in the case analyzed in the previous Chapter, our study can be classified within the literature that exploits the effects played by informal institutions on economic outcomes: also in this case, the informal habits may have had a crucial role in shaping the functioning of similar formal institutions (schools) because of local differences in social capital (Putnam, 1994; Guiso et al., 2008; Tabellini, 2010).

This Chapter investigates whether the regional level of social capital affects the degree of teachers' shirking rates in Italian schools. To this aim, we use a dataset provided by the Italian Ministry of Education (MIUR) that includes data on the level of workers' absences for each school in Italy during the school year 2010/11. MIUR dataset contains absences distinguished in three categories: sick leaves, maternity leaves and other kind of leaves. In particular, the richness of those data relies on the possibility to distinguish between the absenteeism rates of two workers' categories with different skills: teachers and ATA (administrative, auxiliary and technical staff). It allows us to exploit the differences in the behavior of two groups within the same working environment to explain how different social capital levels may affect differently school workers depending on their skill level, and to control for working characteristics that the two categories experience in the same working environment.

Following the literature, worker's shirking has been often measured by the sick leave absenteeism rate (Ichino and Maggi, 2000; Scoppa and Vuri, 2014; Bradley et al., 2007). In fact, most public sector workers, as school ones, are typically covered by the national insurance system when sick (as in the Italian case); however, their effective state of health cannot be efficiently and costless monitored. This implies an incentive to take more days off than what it is necessary, preserving the whole wage and causing direct pecuniary costs (the cost of a substitute) and other non-pecuniary costs (organizational) to the school (Ichino and Maggi, 2000; Ichino and Riphahn, 2005; Scoppa and Vuri, 2014). For those reasons, we use sickness absenteeism as measure of potential shirking behavior among school workers.

We must be aware that poor performers are likely to sort themselves in schools where work environment is more cheat-friendly. In fact, in schools with a stronger monitoring, workers are more likely to pay formal or informal sanctions. This may generate locational sorting (Ichino and Maggi, 2000; Bradley et al., 2007; Cornelissen et al., 2017). We mitigate this problem since we are able to identify the absence rates of two workers' categories:

this enables us to control for school components, such as management, including ATA (administrative, auxiliary and technical staff) absenteeism rate within our controls.

Evidence of different behavior among workers with different skills has been found by Mas and Moretti (2009) and Cornelissen et al. (2017). In particular, Mas and Moretti (2009) find evidence of significant differences in pro-social effects[1] depending on workers' skills (performance): low skilled workers are more responsive to changes in the average productivity of coworkers than high skilled workers. The same evidence can be found in Cornelissen et al. (2017): workers with low performance (respect to coworkers' level or to a social norm) may experience feelings of guilt or shame due to "peer pressure" and these effects are larger for low skilled occupations. In our case, those elements may result in a different role of social capital for skilled (teachers) and low-skilled (ATA) workers in Italian schools. In this respect, Chaudhury et al. (2006) find evidence, instead, that high absence rates are associated to better educated teachers. Thus, the role of social capital on the different working categories is unclear; we will see that in our case, social capital has a negative correlation with absenteeism rate for teachers but shows a non significant coefficient for ATA workers. In particular, we find that a unitary increase in social capital level corresponds to a decrease between 0.22 and 0.36 teachers' sickness absences.

An important component of workers' behavior is the individual background (Ichino and Maggi, 2000; Chaudhury et al., 2006) that, in our case, cannot be fully exploited, since our data are at school level. Although with our data we are not able to control for individuals' background, they allow us to investigate the effect of cultural norms in a specific area and work environment, rather than peer effect at the individual level. Thus, our empirical strategy will, firstly, control for (observed and unobserved) workplace characteristics and organizational arrangements including in our model the ATA absenteeism rate; second, we will control for a set of local and school characteristics that may differently affect teachers' and ATA behavior. Finally, since we cannot exclude that unobserved heterogeneity or reverse causality are still a source of bias for estimates, we are going to implement an IV strategy, exploiting historical data used in in the previous Chapter: Italian past dominations. We expect past dominations to be correlated with local social capital, but uncorrelated with the teachers' absenteeism.

The Chapter is organized as follows. The next section is dedicated to an explanation of workers' contractual features in Italian schools. The third section is devoted to data description and analysis. Section 3.4 contains the model specification while section 3.5

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[1]Mas and Moretti (2009) define pro-social effects as cases where workers experience disutility if their peers observe them in free-riding behaviors, with formal or informal sanctions.

explains our main findings. Finally, we state our conclusions.

3.2   Italian school legislation

As said, in Italy school personnel is organized in two categories: ATA and teachers. The administrative, technical and auxiliary staff (ATA) includes all workers in charge of general school administration and logistic tasks. Precisely, they are classified in four areas:

- Area A: in this area, we find the Schooling collaborator (CS), the lowest level among ATA; this position requires the achievement of three schooling years of secondary education;

- Area AS: in this area, the working profile is identified with the Schooling collaborator specialized in agricultural firms (CR); this figure is present only in agriculture professional schools and requires a professional diploma (secondary education) in the field of agricultural studies;

- Area B: in this area we find different profiles; the Administrative assistant (AA), present in all schools, requires a full diploma (5 years of secondary education); the Technical Assistant (AT), present in secondary schools, works in the school laboratories and requires a full diploma, with a specific curriculum depending on the typology of the laboratory; cook (CU), only in boarding schools, requires a diploma from an hospitality training institute; nurse (IF), only in boarding schools, requires a bachelor degree in nursing sciences; cloakroom attendant (GU), only in boarding schools, requires a diploma in the fashion sector;

- Area D: in this area we find the apical profile of school administration, the director of general and administrative services (DSGA); each school has its own DSGA and it has a degree in law, in political sciences or in economics.

ATA workers can be hired from two different rankings at province level. The first is a permanent ranking: people can enter this ranking through a selection based only on qualifications for profiles of Areas A and B.[2] Candidates may access this selection (published yearly from the Schooling regional office) only if they can demonstrate a previous experience of, at least, 24 months in public schools in the same profile for which the candidate wants to apply. Permanent rankings are used to hire ATA with long-term contracts on the basis

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[2]This selection process is regulated by the Legislative Decree 16th of April 1994, number 297, article 554.

of the annual needs of the school system. The second ranking, instead, is temporary (it lasts 24 months) and is used to hire short-term workers.[3] A specific procedure is dedicate for hiring the DSGA: rankings for this position are made by ordinary selections based on qualifications and tests and are used both for short-term and long-term contracts.

Past selection processes for ATA were regulated by the Decree of the President of the Republic 31st of May 1974, number 420.[4] This decree established a set of rules for school "non-teaching" workers (since 1990s they are defined ATA). This Decree distinguished between administrative workers and workers with more practical and manual tasks. The first were hired evaluating their qualifications and through a public selection process at provincial level; to access those selections, the law required an upper secondary school diploma. Second kind of non-teaching workers, instead, were selected through a simple process evaluating their qualifications. Candidates with a lower secondary diploma could access those selections, but they had to demonstrate at least an experience of two years in the same role. The same decree regulated also non-teaching workers' turnover: in particular, they were able to ask for moving to other schools in the same provinces; after their requests, the provincial school officer was able to establish a ranking based on tenure and other qualifications. In this way, non-teaching workers were assigned taking into account their requests but with a priority related to their ranking position and upon vacancies availability. Workers willing to move from other provinces were assigned with a lower priority.

Teachers, instead, are selected, obviously, with higher requirements, due to the intellectual nature of their job. Their selection is distinguished between primary school and secondary school level. For the first, it is required a bachelor degree in Education or a Diploma in Education (the latter only for those that achieved it before the schooling year 2001-2002). Secondary school teachers, instead, must have a master degree in the field corresponding to the teaching discipline. The Ministerial Decree 10th of September 2010, number 249, has established a new set of rules, introducing the TFA (active training internship), a compulsory training of 1,500 hours to obtain the teaching qualification to be undertaken after the achievement of a master degree.

Past selection processes for teachers were regulated by the Decree of the President of the Republic 31st of May 1974, number 417.[5] Primary school teachers were selected by a public selection at provincial level, while secondary school teachers through a public selection at

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[3]It is regulated by the Ministerial Decrees 75/2001 and 35/2004.

[4]Decreto Presidente della Repubblica 31 Maggio 1974, n. 420: *Norme sullo stato giuridico del personale non insegnante statale delle scuole materne, elementari, secondarie ed artistice*

[5]Decreto Presidente della Repubblica 31 maggio 1974, n. 417: *Norme sullo stato giuridico del personale docente, direttivo ed ispettivo della scuola materna, elementare, secondaria ed artistica dello Stato*

regional level. Both of them required an academic degree and were selected after a successful achievement of a written test, a course lasting four months and a final oral examination, and considering their qualifications. Teachers were assigned to each school on the basis of their ranking position, resulting from the selection process. Successful candidates were appointed for a probationary period lasting one school year. The same decree regulated also teachers' turnover, with no differences compared to ATA.

Several laws has been issued during 1980s and 1990s aimed at modifying the ATA and teachers' selection process but none of them has modified the entry requirements.

3.3 Data

Our data on schools and teachers characteristics come from the MIUR (2012) dataset. Then, we have merged this dataset with the variables on Italian history and area controls already described in the previous chapter.

Our main indicator is the sickness absenteeism rate for teachers. In Table 3.1, we can see the main statistics of this indicator. We have 10,197 observations, corresponding to almost all the Italian public schools (primary, lower and upper secondary school levels, including students aged 6 to 19 years old), except for schools of the provinces of Aosta, Trento and Bolzano, that, due to their status as autonomous provinces, are not included in ministerial data[6].

Table 3.1: Descriptive statistics: main variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Teachers' absenteeism rate	10,197	8.187	3.572	0	25
ATA absenteeism rate	10,197	15.063	8.463	0	56
Teachers' absenteeism rate (prov)	100	7.818	1.566	4.78	13.09
				Cuneo	*Reggio Calabria*
ATA absenteeism rate (prov)	100	15.044	2.095	10.05	20.86
				Cuneo	*Agrigento*
Social capital	100	-0.075	3.136	-6.43	5.47
				Vibo Valentia	*Bologna*

Notes: Additional controls statistics reported in Table B.1.

Teachers absenteeism rate measures the average number of days of absence per teacher, within a school year, for each school of the Italian public educational system. Its mean is 8.19, i.e. each teacher, on average, takes around 8 days of sickness absences per year. Its standard deviation is 3.57. The minimum value is zero, while the greatest value is 25. The

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[6]In addition, for 1,191 schools absenteeism rates are not available, while 37 schools have been detected as outliers. So, our data correspond to the 89.3% of Italian public institutes.

second indicator measures the absenteeism rate of ATA workers; we can immediately see that ATA indicator presents an average of 15.06 sickness days per year (almost double if compared to teachers' rate) and a standard deviation of 8.46, indicating clearly that, for ATA workers, the phenomenon has a greater variability across Italian schools. Then, we can analyze the same phenomenon at provincial level, in order to evaluate potential territorial differences. First of all, we see that the lowest value for teachers' absenteeism rate (4.78) corresponds to Cuneo, while the province showing the highest absenteeism rate is Reggio Calabria (13.09). For ATA workers, the province with the lowest absenteeism rate is again Cuneo (10.05), while the province of Agrigento is the poorest performer (with a value of 20.86). As we can notice, Cuneo is in the northern part of Italy, while Reggio Calabria and Agrigento are southern provinces. This consideration suggests a possible territorial characterization of absenteeism phenomenon; to explore this aspect, we have represented our data in a series of maps.

(a) Teachers   (b) ATA
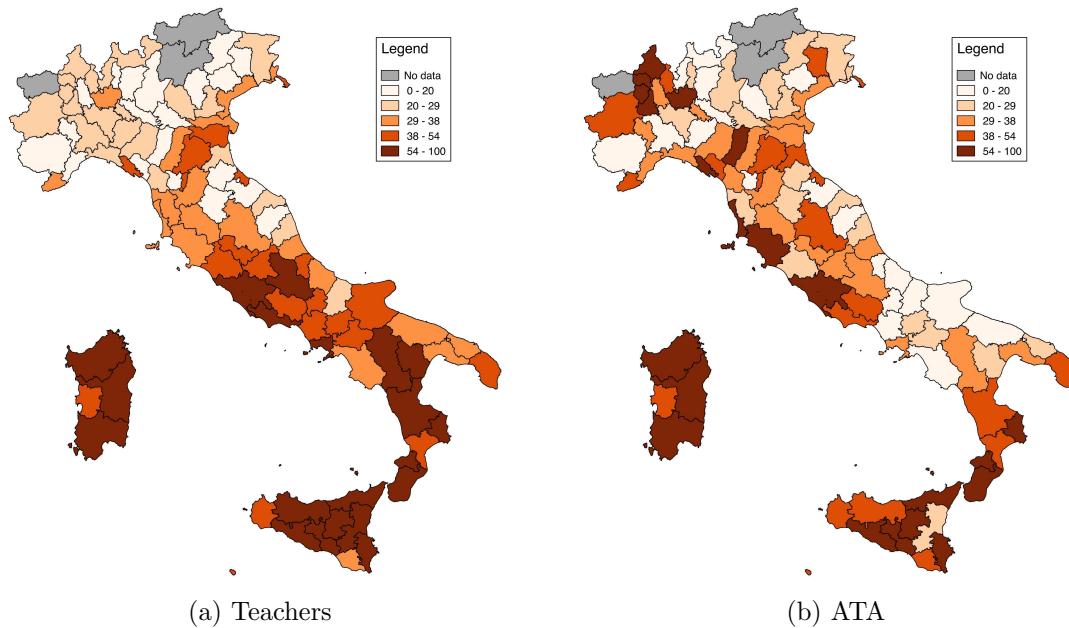
Figure 3.1: Absenteeism differential across Italian provinces

Notes: Territorial distribution across the 103 Italian provinces of our indicator of absenteeism rate. Description of data sources in Appendix B.

As we have seen, there are great differences in the statistical distributions of absenteeism rates between ATA and teachers. In order to make absenteeism rates of our two categories

comparable, we have rescaled our absenteeism rates, to make both distributions ranged between 0 and 100.

The first map, Figure 3.1a, represents the territorial distribution of absenteeism rate for teachers. It shows clearly that darker colors (highest rates) are mostly distributed in central and southern areas, in particular Sicily, Sardinia, Calabria, Basilicata, Campania and Lazio. Figure 3.1b, representing the territorial distribution of absenteeism rate for ATA workers, tells a different story. In this case, we do not have a clear territorial characterization, and the map indicates that the phenomenon is quite random across Italian provinces. In Figure 3.2, we have represented the differential between teachers' absenteeism rate and ATA absenteeism rate. In this case, we have a sort of summary of the previous two rates. The most important element is, again, the strong dualism between the Centre-North and southern areas; thus, not only northern areas show a lower absenteeism rate for teachers, but in the northern Italy we have also evidence of a smaller absenteeism differential compared to the other provinces: in those areas the two working categories behave in a similar way. Darkest areas, in this case, are indicating that teachers have an average absenteeism rate higher than that of ATA, corresponding almost exactly to the *Mezzogiorno*.
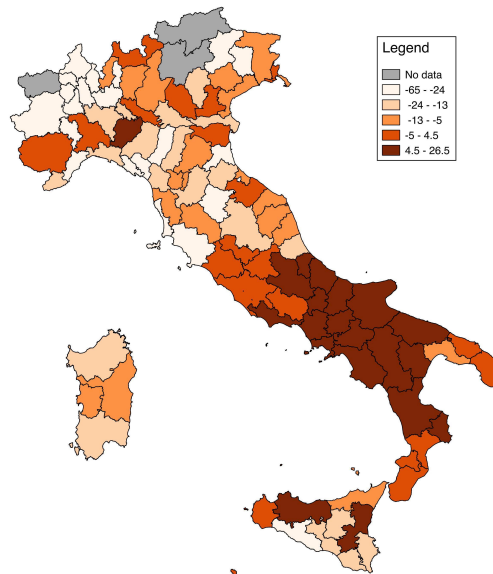

Figure 3.2: Absenteeism differential across Italian provinces - teachers vs ATA

Notes: Territorial distribution across the 103 Italian provinces of the differential between the absenteeism rate for teachers and the absenteeism rate for ATA. Description of data sources in Appendix B.

Since our focus is the relation between absenteeism and social capital, in Figure 3.3, we plot our indicator of absenteeism for teachers and our social capital variable.[7] In addition, we distinguish between Southern areas (red dots) and other provinces (black triangles). First of all, we can find a clear negative correlation between teachers' absenteeism and social capital, as expected. Second, we can clearly observe two different groups: almost all the Southern provinces are characterized by low levels of social capital (with few exceptions) and high absenteeism rates (as previously stated).

Figure 3.3: Teachers' absenteeism rate and social capital

Notes: Teachers absenteeism rate (vertical axis) and our social capital indicator (horizontal axis). Red dots identify Southern provinces, black triangles identify Cental and Northern provinces. Data sources are described in Appendix B.

In Figure 3.4, we repeat the same analysis but considering the absenteeism rate for ATA workers. In this case, it is still evident a strong dualism between the two groups of provinces, but there is not a clear graphical correlation.

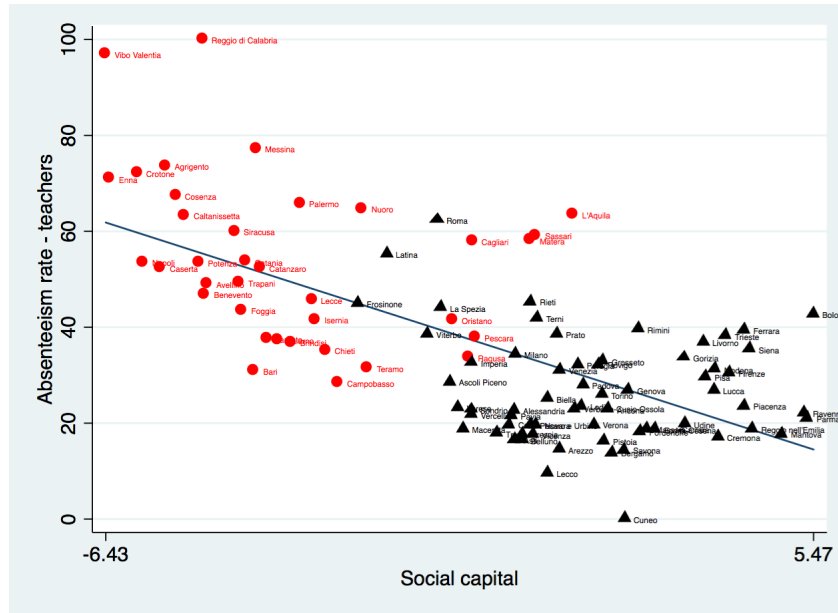[7]Social capital indicator is the same used in the previous chapter and it belongs to Cartocci (2007).
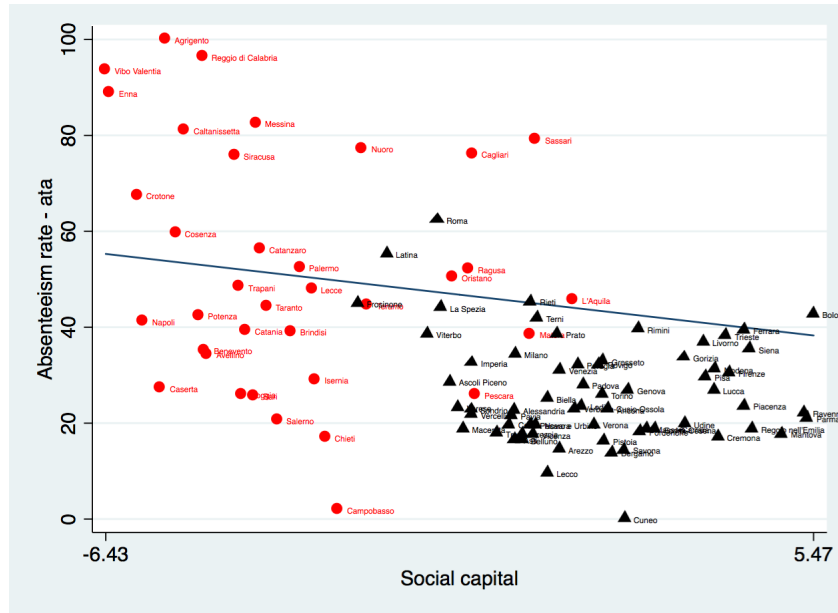
Figure 3.4: ATA absenteeism rate and social capital

Notes: ATA absenteeism rate (vertical axis) and our social capital indicator (horizontal axis). Red dots identify Southern provinces, black triangles identify Centre and Northern provinces. Description of data sources in Appendix B.

In Tables 3.2, 3.3 and 3.4 we can see a more detailed analysis of absenteeism rate. In the first one, we see the great differences for teachers' absences across Italian macro-regions: in the Central and Southern regions teachers show respectively 8.27 and 9.20 days of sickness absences; in the Northern areas, this average is, instead, lower and equal to 6.81. As said, absences for ATA workers are much higher in all areas but North-South differences are less remarkable.

Table 3.2: Absenteeism rate, by macro-region

Variable	Obs	Mean	Std. Dev.	Min	Max
		North			
Teachers' absenteeism rate	3602	6.806774	2.817927	0	22
ATA absenteeism rate	3602	14.63937	7.48799	0	50
		Center			
Teachers' absenteeism rate	1858	8.267313	3.341308	0	24
ATA absenteeism rate	1858	15.41362	7.884136	0	54
		South			
Teachers' absenteeism rate	4737	9.20456	3.817461	0	25
ATA absenteeism rate	4737	15.24805	9.325534	0	56

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In Table 3.3, we distinguish our data by school type. In this case, we see that teachers show the same average in all school levels but in primary schools: in the latter, in fact, teachers are absent 9.42 days on average, about 2 days more than their colleagues in other school levels. The same conclusion may be reached also for ATA workers. *Istituti comprensivi*[8] show instead a middle value of other school levels. This fact may be explained by the presence of younger students: in primary schools pupils are aged between 6 and 11 years old, thus, they (and their teachers) are more exposed to diseases, typical of this age. In addition, in higher school levels, early leavers and school tracking may play an important role: students in upper secondary school are the least disadvantaged and, are usually the best students, also with a high socio-economic background. For this, they may be plausibly characterized by strong parental monitoring that keeps teachers under a stricter control, limiting their potential shirking attitude.

Table 3.3: Absenteeism rate, by school type

Variable	Obs	Mean	Std. Dev.	Min	Max
Istituti comprensivi					
Teachers' absenteeism rate	5057	8.078011	3.474121	0	25
ATA absenteeism rate	5057	15.09719	8.344254	0	56
Primary schools					
Teachers' absenteeism rate	1996	9.423848	3.640996	0	24
ATA absenteeism rate	1996	15.5481	8.576543	0	52
Lower secondary schools					
Teachers' absenteeism rate	1071	7.737628	3.622267	0	22
ATA absenteeism rate	1071	14.64986	9.507483	0	52
Upper secondary schools					
Teachers' absenteeism rate	2073	7.493086	3.423531	0	25
ATA absenteeism rate	2073	14.72697	8.037495	0	53

Finally, in Table 3.4, we can see a further detail for upper secondary schools. Compared to other school types, in lyceums ATA workers has a higher absenteeism rate on average (even though this difference is very small), while teachers take fewer days of absences: this fact may be due to the traditional, better environment in lyceums, often characterized by better performing students and better school principals[9] that seem to affect teachers but not ATA.

Our main regressor is social capital. We use a synthetic social capital index at NUTS3

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[8]In these schools, different levels of education (usually primary and lower secondary levels) coexist and are managed by the same school principal.

[9]See on this Di Liberto et al. (2013)

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Table 3.4: Absenteeism rate, by upper secondary school type

Variable	Obs	Mean	Std. Dev.	Min	Max
		Lyceum			
Teachers' absenteeism rate	822	6.954988	3.185177	0	22
ATA absenteeism rate	822	14.96229	8.395654	0	53
		Professional schools			
Teachers' absenteeism rate	895	7.76648	3.458316	0	22
ATA absenteeism rate	895	14.60559	7.725996	0	48
		Other schools			
Teachers' absenteeism rate	356	8.048221	3.695779	0	25
ATA absenteeism rate	356	14.48876	7.968504	0	47

level, provided by Cartocci (2007), the same used in the previous chapter. It contains data on 1) blood donations, 2) sport participation, 3) dissemination of newspaper and 4) voter turnout. In particular, as blood donations data are used to assess a measure of "generalized morality" and sport participation is assumed to influence social capital since it supports the building of groups of mutual interest and promotes pro-social behavior, they are both important in our contest. In fact, both elements should play a significant role in explaining different (opportunistic) behaviors among working groups. Again, in Table 3.1 we can see some statistics about our social capital indicator: Italian regions are, as in the case of absenteeism rates, highly heterogeneously endowed. Again, Vibo Valentia and most southern provinces show the lowest values, while North-Centre provinces have the highest ones (in particular Bologna shows the best performance).

Besides, our analysis includes, firstly, a number of school controls. In particular, we need to control for:

- Gender: a greater proportion of female teachers may be correlated with higher absenteeism rates (Bradley et al., 2007; Herrmann and Rockoff, 2012).

- Age: Bradley et al. (2007) find that absenteeism is higher for older teachers. The reason is that they experience a gradual decline of enthusiasm on the job. Also, Herrmann and Rockoff (2012) find that productivity losses from absenteeism are greater for more experienced teachers.

- Temporary versus permanent contracts: presenteeism effect is usually seen as an attempt to secure a permanent contract. See Bradley et al. (2007); Ichino and Riphahn (2005); Scoppa and Vuri (2014).

- Type of school: According to Bradley et al. (2007), the magnitude of these effects are lower for primary school teachers, thus, we need to insert school type controls.

- School size: it could be important because monitoring power could decrease for big schools, more difficult to manage, or increase due to a better organization.

To this aim, we consider some variables related to school teachers: number of teachers in the school, share of teachers with a short term contract, share of female teachers, share of teachers aged over 55 and teachers' turnover rate. The first one could be considered as an indirect measure of the school size: bigger schools may, in principle, be better organized and with stronger monitoring power. The second one is particularly important because it could capture the incentives for teachers with a short term contract to work hardly and fairly to gain a new contract: thus, also according to Bradley et al. (2007), we expect a negative effect of this on the teachers' absenteeism rate. The share of female teachers can give us important information about the composition of teachers' groups: we see that, on average, female teachers are about the 80% of total teachers; in this case we should expect a positive correlation with absenteeism rates[10]. Teachers aged over 55 years old measures the share of "old" teachers working in the school. As we know from other studies[11], Italian schools are strongly characterized by the presence of aged teachers: it is confirmed in our statistics, indicating that, on average, 33% of teachers are in this range (this share is 37% for southern provinces), with a maximum value of 87%. We expect a negative effect of this indicator. Those hypothesis are consistent with correlations found in Table B.2. Last, teachers' turnover may be a potential effect produced by a negative working environment: for instance, bad managerial practices or social problems among students (requiring more demanding teaching practices) may create some incentives for teachers to move[12]; at the same time, some teachers (willing to be more absent) may decide to leave their school also because of a strong monitoring control applied by the school principal against opportunistic behavior. For these reasons, we have no expectations on what correlation there may be between this variable and absenteeism rates, although our correlation matrix suggests a positive one. Since Italian school principals have little control on teachers' transfers, turnover is almost exclusively voluntary.

Also, we insert some local factors as additional controls. Firstly, we cannot exclude geography and other economic and social controls, because it could bias our results as

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[10]See Miller et al. (2008); Herrmann and Rockoff (2012)

[11]See for instance Di Liberto et al. (2013)

[12]See on this Barbieri et al. (2013): they find evidence that teachers' mobility is driven mainly by geographical distance from the place of birth and by difficulties in teaching in the school.

social capital could capture their effects on absenteeism rates. To this aim, we control for factors related to both the location and the geographical features of the province introducing a geographical variable: the temperature. It allows us to control for geography and, at the same time, for a measure of climate, that could be important for explaining absences[13]. Also, from the correlation matrix in Table B.2, we notice that the correlation between climate and absenteeism is relevant. We also insert two dummy variables indicating whether the school area is mountain and/or rural: both of them may be measures of school remoteness that may be an incentive to shirk. At the same time, as found out by Duflo et al. (2012), rural areas are often characterized by higher social monitoring and, in this way, they could in principle discourage shirking behavior.

As said, Italian peninsula shows also great differences in unemployment rates: as stressed by Scoppa and Vuri (2014) there is an inverse relationship between regional unemployment and absenteeism at individual level and, following Ichino and Riphahn (2005), employees' sickness absences are positively related to the degree of job security. Scoppa and Vuri (2014) provide evidence on the impact of unemployment on workers' absenteeism at individual level. Controlling for a number of individual and firm characteristics, they find that the individual absenteeism rate is negatively and strongly related to the provincial unemployment rate. In particular, in high unemployment southern areas, shirking is dramatically lower than in northern areas, notwithstanding South Italy is characterized by lower levels of social capital and more widespread opportunistic behavior. This effect is larger in magnitude in small firms, in which the protection from dismissals for employees is lower. In addition, as a further evidence of the role played by the unemployment as deterrent for shirking, they show that public employees, almost impossible to fire, are not affected by local unemployment. For this reason, we introduce a control for the unemployment rate, measured at province level. We also insert a typical economic measure, to take into account economic wellbeing of Italian provinces: the added value per capita.

In addition, we need to take into account a possible overestimation of the absenteeism phenomenon: both Ichino and Maggi (2000) and Scoppa and Vuri (2014) argue about the possible overestimation of their results due to real illness episodes within absenteeism rate measurement. To control for this, Scoppa and Vuri (2014) insert in their model two variables related to life expectancy and mortality rate at regional level. We follow this reasoning and we insert the mortality rate at NUTS3 level.

Then, as said, we also consider some cultural controls, already adopted in the previous

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[13]See Miller et al. (2008)

chapter: extortion rate (to capture the effect of corruption and the presence of organized criminal groups) and alcohol consumption rate. The first one is the rate of extortions over 1,000 inhabitants: Treviso is the province with the lowest crime rate, while Catania as the poorest performer; the variability across provinces is quite high for this indicator. Also, the alcohol consumption rate is a measure of "bad habits" among society and we include it in our controls. We also control for a composite indicator of educational infrastructures, from the previous chapter: the percentage of (public) primary schools provided with meals and equipped with a school-bus, the percentage of special classrooms in (public) secondary schools and the number of teachers for every 100 students. This aspect could be relevant in reducing absenteeism rates, as underlined by Chaudhury et al. (2006).

Finally, we take into account some students' characteristics: the retention rate[14] and the early leavers. Retention rate is measured as the percentage of rejected pupils in the school year 2010/2011, while the early leavers indicators is the average percentage of early leavers during the first three years of upper secondary school. Both these variables can be seen as indicators of difficulties in the management of students' performance or in the social environment of the school: we expect, in this case, a positive correlation with absenteeism.

3.4 OLS specification and results

We firstly estimate an ordinary least squares regression, exploiting our information on both teachers and ATA employees separately and adding several controls:

$$Y_{ij} = \alpha + \beta SK_j + \gamma X_i^{'} + \delta Z_j^{'} + \theta S_j^{'} + \upsilon_{ij} \tag{3.1}$$

where Y_{ij} is the ATA or teachers' absenteeism rate in the school i in province j. SK_j is the indicator of social capital in province j, X_{ij} is a set of school-teachers controls (number of teachers in the school, share of teachers with a short term contract, share of female teachers, share of teachers aged over 55 and teachers' turnover rate), Z_j a set of local controls (temperature, mortality rate, rural dummy, mountain dummy, unemployment, added value) and S_j an additional set of local social controls (extortion rate, alcohol consumption rate and educational infrastructures index).

Note that the identification strategy of the effect of social capital spillovers here adopted exploits the variability of absence rates across schools, but the independent variable of

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[14]Data for students' retention rate are available only for 3,615 observations, corresponding to 2,461 on 3,376 Upper secondary schools and 1,154 on 5,582 *Istituti Comprensivi.*

interest only varies across regions. To account for this, we always cluster the standard errors at the regions NUTS3 level.[15]

In Table 3.5, we analyze the main results of this OLS specification with the absenteeism rate for teachers as dependent variable, while Table B.3 displays the same models with ATA absenteeism as dependent variable.

Table 3.5: OLS regressions - Dep. var.: Teachers' absenteeism rate

VARIABLES	(1) TEAC	(2) TEAC	(3) TEAC	(4) TEAC	(5) TEAC	(6) TEAC
Social capital	-1.2764***	-1.2474***	-1.1445***	-0.6699***	-0.7445***	-0.7935***
	(0.168)	(0.168)	(0.168)	(0.228)	(0.249)	(0.267)
Log of Number of teachers			1.3660	1.8552***	1.9179***	0.7200
			(0.923)	(0.644)	(0.620)	(0.685)
Teachers short term contract (%)			0.0152	0.0199	0.0178	0.0436
			(0.029)	(0.022)	(0.022)	(0.029)
Female teachers (%)			0.0849***	0.0892***	0.0910***	0.0824***
			(0.019)	(0.012)	(0.012)	(0.027)
Teachers over 55			0.1387***	0.1078***	0.1060***	0.1318***
			(0.027)	(0.022)	(0.021)	(0.028)
Teachers turnover (%)			0.2118***	0.1970***	0.2006***	0.1526**
			(0.043)	(0.041)	(0.040)	(0.064)
Average temperature 00-09				0.9182***	0.9159***	0.7419***
				(0.257)	(0.245)	(0.259)
Mortality rate, 09-11				0.0699**	0.0682*	0.0483
				(0.034)	(0.036)	(0.037)
Rural area				-0.7366	-0.7623*	-0.6785
				(0.449)	(0.428)	(1.007)
Mountain area				2.1389***	2.2181***	2.8054***
				(0.727)	(0.725)	(0.699)
Unemployment rate, 2009				0.5565***	0.6220***	0.4333**
				(0.199)	(0.217)	(0.183)
Added value per capita, 2010				0.0002*	0.0002*	0.0001
				(0.000)	(0.000)	(0.000)
Extortion rate					0.1501	0.0749
					(0.102)	(0.106)
Alcohol consumption rate					0.1112	0.1122
					(0.099)	(0.099)
Educational infrastructures					0.4909	0.7629
					(1.499)	(1.368)
Retention rate						0.2093***
						(0.032)
Early leavers						-0.0517
						(0.115)
Dummy School level		Yes	Yes	Yes	Yes	
Observations	10,197	10,197	10,135	10,135	10,135	2,931

Notes: Standard errors in parentheses, clustered at province level: *** p<0.01, ** p<0.05, * p<0.1.

Both from literature and from descriptive statistics, we expect a negative sign on β, suggesting lower absenteeism rates in areas with higher social capital levels. We discussed

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[15]See Angrist and Pischke (2008)

this conclusion in the introduction, supported by many studies.[16]

As we see, results are consistent with descriptive statistics and expectations. In all specifications for teachers, social capital has a negative and significant coefficient. In model 2, we introduce a set of school type dummies: *Istituto comprensivo*, Primary schools (pupils aged 6 to 11 years old) and Lower Secondary schools (students aged 11 to 14 years old).[17] Including dummies for school type, we obtain almost the same results. In model 3, we include our school-specific controls. We find a positive and significant correlation for the coefficients of the share of female teachers, the share of "elder" teachers and the turnover rate: the first could be seen a symptom of the lack of family services, forcing female teachers to be more absent for children care and their education. Also, the share of "elder" teachers displays a positive and significant coefficient. Both elements are consistent with Bradley et al. (2007) and Herrmann and Rockoff (2012). The turnover rate shows a positive correlation as expected. Then, in model 4, we add our geographical controls. We see that climate shows a positive and significant correlation with absenteeism. That is not surprising: in areas in which temperature is higher, usually people are less productive and it could be an incentive to shirk (Shi and Skuterud, 2014). With the inclusion of the mortality rate, although it shows a positive and significant correlation with absenteeism, our social capital indicator still maintains a significant coefficient, confirming that our absenteeism indicator is capturing real shirking. Rural area dummy is not significant while mountain area coefficient is positive and significant, suggesting higher absenteeism in those schools, likely stimulated by greater difficulties in arriving in remote areas. In this specification, we also insert two economic measures: the local unemployment rate and the added value. The unemployment rate, that we expected to be negatively correlated with absenteeism, shows instead a positive coefficient: our analysis is based, as said, on a public workplace, thus unemployment is not acting as a threat for shirking.[18] In addition, Italian *Mezzogiorno* is characterized by lower levels of economic development and this may contribute to explain higher absenteeism: this element is consistent with Chaudhury et al. (2006), that find that high absence rates are associated to poorer regions. This is partially confirmed by the added value per capita, that shows a positive coefficient but very small and very weakly significant. In model 5, we include in the analysis our additional social controls. None of them is significant. Finally in model 6, we insert our measure of students' characteristics[19]: as

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[16]See for instances Chaudhury et al. (2006)

[17]We are omitting the dummy variable related to the Upper Secondary schools (14 to 19 years old) to avoid multicollinearity problems.

[18]See Scoppa and Vuri (2014).

[19]In this case, our sample is much smaller because, as discussed, students' data are available only for some

expected, the retention rate is positively correlated with the absenteeism rate, while early leavers coefficient is not significant. The main point is that, also controlling for a number of characteristics, our main indicator of social capital is very stable.

Models in Table B.3, for ATA workers, overall show the same results, except for the social capital that has a non-significant coefficient. Also this result was expected after the descriptive analysis. This difference between the two models may suggest a possible different effect of social capital on absenteeism rate, depending on the workers' skill level: precisely it seems that social capital is playing an important role for high-skilled workers, while it is not relevant for low-skilled ones. Nevertheless, this element goes beyond the purpose of this study: since our main scope is the analysis of teachers' behavior, responsible for students' performance, we focus our attention on this point, using ATA absenteeism only to control for school unobservable factors.

In fact, as previously said, and following Ichino and Maggi (2000), the analyzed relation may present some issues:

- First, sorting problems may arise: in fact, it is plausible that bad teachers (or ATA) could be willing to go to schools (characterized by low levels of monitoring) in which they could, in principle, apply opportunistic behaviors.

- Second, we may face problems due to omitted variables, mainly related to local factors (the most important could be the quality of managerial practices of headteachers) and individual worker characteristics that we cannot observe.

- Third, reverse causality: social capital influences absenteeism rates but, in principle, we cannot exclude that the correlation could go in the opposite direction.

- Group-interaction effects: individuals' behavior may influence group's behavior and viceversa, generating "reflection problems"; as we know from Ichino and Maggi (2000) and Bradley et al. (2007), group interaction effects are a source of endogeneity, thus, estimates of average regional social capital may be biased, due to the so-called "reflection problem", identified by Manski (1993). However, we claim to avoid this kind of problem: our data, in fact, are at school level (and not at individual one), thus, although we are not able to explore group-interaction effects, at the same time, we do not experience reverse causality among individuals' and groups' behavior.

schools, mainly in the upper educational levels. For this reason, we do not include school type dummies in this model.

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For these reasons, we define a new model, inserting the absenteeism rate for ATA workers among our controls. Thus, we define the following alternative model:

$$Y_{kij} = \alpha + \beta SK_j + \mu Y_{aij} + \gamma X_i' + \delta Z_j' + \theta S_j' + \upsilon_{ij} \qquad (3.2)$$

Where Y_{kij} is the teachers' absenteeism rate in school i in province j, while Y_{aij} is the ATA workers' absenteeism rate in school i in province j. This strategy has many advantages. It allows us to consider the different behavior of two groups of workers within the same school (working environment): in fact, we are unable to observe all workers and school characteristics (among the most relevant, as said, the quality of managerial practices of school principals) and with this model, we claim to consider all features of working environment. In fact, in this way, we are controlling for all unobservable elements within school common factors affecting the behavior of both workers' categories. At the same time, we control also for sorting effects. Our approach should be able to mitigate this issue, assuming that mobility among schools is the same for both teachers and ATA, and to control also for omitted variables problems.

Note that this model uses only skills variation within a given school in a given province to identify spillovers effect. Variation in personnel composition within schools are fixed and comes primarily from the school size. The crucial assumption here is that absenteeism behavior due to school factors is the same for skilled and unskilled workers.

We can see the new set of results in Table 3.6, applying the same specifications explained in Table 3.5.

In the first column, we report the basic model of regression (2), while in the second we insert dummy variables for the different school types. As we can see, social capital coefficient is always negative and significant as expected and like in the previous version of our model: also controlling for (unobservable) school (working) environment factors, social capital remains important in explaining shirking. Also, as anticipated by the descriptive analysis, ATA absenteeism indicator presents always a positive and significant coefficient: schools with high absenteeism rates for ATA show high absenteeism rates also for teachers. In model 1, our main coefficient (maximum value among the six models) indicates that one unit more of social capital index corresponds to 0.31 days less of sickness absences per school.

In model 3, we add our school-teachers controls. We find exactly the same results compared to the previous specification, with very minor changes only in the magnitude of the coefficients. In model 4, we introduce geographical and economic controls, again with

Table 3.6: OLS - Dep. Var.: Teachers absenteeism rate

VARIABLES	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS
Social capital	-1.2542***	-1.2262***	-1.1187***	-0.6705***	-0.7192***	-0.7527***
	(0.149)	(0.149)	(0.150)	(0.210)	(0.228)	(0.248)
ATA absenteeism rate	0.1836***	0.1784***	0.1702***	0.1508***	0.1492***	0.1405***
	(0.014)	(0.014)	(0.013)	(0.013)	(0.012)	(0.023)
Log of Number of teachers			0.8184	1.3776**	1.4236**	0.2947
			(0.862)	(0.632)	(0.606)	(0.683)
Teachers short term contract (%)			0.0173	0.0214	0.0194	0.0518*
			(0.028)	(0.022)	(0.021)	(0.028)
Female teachers (%)			0.0776***	0.0829***	0.0842***	0.0735***
			(0.019)	(0.012)	(0.012)	(0.026)
Teachers over 55			0.1246***	0.0988***	0.0967***	0.1319***
			(0.026)	(0.021)	(0.020)	(0.027)
Teachers turnover (%)			0.2127***	0.1992***	0.2011***	0.1579**
			(0.039)	(0.038)	(0.038)	(0.061)
Average temperature 00-09				0.8435***	0.8381***	0.7168***
				(0.224)	(0.215)	(0.233)
Mortality rate, 09-11				0.0581*	0.0557*	0.0332
				(0.030)	(0.032)	(0.033)
Rural area				-0.6008	-0.6296	-0.4704
				(0.415)	(0.398)	(0.958)
Mountain area				2.0021***	2.0678***	2.7227***
				(0.702)	(0.696)	(0.655)
Unemployment rate, 2009				0.4915***	0.5463***	0.3754**
				(0.181)	(0.202)	(0.172)
Added value per capita, 2010				0.0002	0.0002	0.0001
				(0.000)	(0.000)	(0.000)
Extortion rate					0.1317	0.0709
					(0.090)	(0.097)
Alcohol consumption rate					0.0795	0.0982
					(0.090)	(0.091)
Educational infrastructures					0.4777	0.9074
					(1.353)	(1.250)
Retention rate						0.1943***
						(0.031)
Early leavers						-0.0487
						(0.113)
Dummy School level		Yes	Yes	Yes	Yes	
Observations	10,197	10,197	10,135	10,135	10,135	2,931

Notes: Standard errors in parentheses, clustered at province level: *** p<0.01, ** p<0.05, * p<0.1.

the same results of Table 3.5. Even for models 5 and 6, we cannot identify any change in the interpretation of our results. In sum, even controlling for ATA absenteeism rate, our results are very stable and confirm a strong negative correlation between social capital levels and teachers' shirking. Model 4 is the that with the minimum value of our main coefficient: it indicates that one unit more of social capital index corresponds to 0.17 days less of sickness absences per school. In sum, our OLS results suggest that if a school locate in Vibo Valentia (showing the lowest social capital level) were instead located in Bologna (the best performer for social capital), its absenteeism rate would decrease by a value between 0.60 days (in model 1) and 0.32 (in model 6).

3.5   IV strategy

Including ATA absenteeism among our controls helped us in dealing with sorting and omitted variables issue. However, those estimates do not address the issues of unobserved endogeneity: we still might have problems due to reverse causality.

For this reasons, we go ahead and we implement an IV strategy, exploiting the full historical dataset used in the previous Chapter in the second approach (see section 2.4.2). In this case, our main instruments (past dominations) are used to estimate social capital. Thus, we claim that past dominations have influenced current absenteeism rates only through the social capital levels. With our IV strategy, we may also address potential remaining reflection problems Mouw (2006), since our analysis is cross-sectional.

Our model is now defined as follows:

$$\text{First stage:} \qquad SK_j = \zeta + \lambda HIST_i + \mu y_{aij} + \gamma X_i' + \delta Z_j' + +\theta S_j' \epsilon_j \qquad (3.3)$$

$$\text{Second stage:} \qquad y_{kij} = \alpha + \beta SK_j + \mu y_{aij} + \gamma X_i' + \delta Z_j' + +\theta S_j' v_{ij} \qquad (3.4)$$

where HIST refers to the set of historical variables, as defined in the previous chapter.

The importance of past administrations in the social capital endowments has been stressed by Putnam (1994). According to this study, there is a strong parallelism between civic degree in the medieval period and the current social capital endowments in Italian regions: the *Mezzogiorno* includes perfectly the seven regions with the lowest social capital levels (followed by the Papal provinces). Even after many centuries, in the North, the civic heritage shaped societies and habits until today. At the same time, in the South, the power of the feudal nobility persisted and was even reinforced by the different administrations; they were all foreign dominators and had the interest to maintain the *status quo* and to

reinforce conflicts among subjects, to have better opportunities to exploit these territories. After this reasoning, Putnam (1994) main conclusion is that in regions with more civic (social) capital, institutions perform better: in fact, with more civic capital, citizens demand more effective services and expect better governments, from one side, while public officers and administrators are advantaged by the better social environment aimed at enhancing the common interest, from the other side. The same aspect is treated by Tabellini (2010): according to him social capital (trust and respect) is associated to less free-riding propensity, important also for the participation of individuals in group activities and the behavior of public officials. In addition, past political institutions are important determinants of current cultural aspects. Thus, Italian past administrations may have had an important role in shaping historical traits at local levels and, through this, they may have affected persistent social capital levels. This cultural traits, in turn, may be important determinants of current workers' behavior.

In Table 3.7, we may find our IV results. First stage results are less informative than our previous chapter findings: only Bourbons domination has a positive correlation with social capita, while all other dominations seem to have had a negative effect. Thus, overall, our instruments, although giving us a technical help to solve endogeneity issues, are not able to supply us with an historical explanation of differences in social capital levels across Italian provinces.

The odd columns of Table 3.7 reports second stage results. We start from a very basic model, including only social capital as main explanatory variable, school type dummies and ATA absenteeism, to control always for unobserved working environment factors. Social capital coefficient, in all specifications, is fully significant and very stable, indicating, again, a clear negative correlation between social capital level and teachers' absenteeism rate. Also ATA absenteeism keeps its positive correlation. In model 1, our main coefficient (assuming the maximum value among our specifications) indicates that one unit more in social capital index results in 0.36 less days of absences per school. Following the same specifications implemented in the previous section, in model 2, we add our school controls: again, we find the same significant coefficient of the OLS strategy, with the only exception that now we find that also school size (in terms of number of teachers) show a positive correlation, although partially significant. In model 3, we insert geographical and economic controls. Also in this case, there are no differences compared to OLS results. In model 4, we add our social controls: as before, none of them is significant (only alcohol consumption shows a very slight significant coefficient). This model shows the minimum value of our main coefficient,

Table 3.7: IV regressions - Dep. Var.: Teachers absenteeism rate

VARIABLES	(1) I_Stage	(2) IV	(3) I_Stage	(4) IV	(5) I_Stage	(6) IV	(7) I_Stage	(8) IV	(9) I_Stage	(10) IV
Normans	-0.0397*** (0.003)		-0.0392*** (0.003)		-0.0228*** (0.003)		-0.0195*** (0.003)		-0.0232*** (0.005)	
Swabians	-0.0038*** (0.001)		-0.0039*** (0.001)		-0.0059*** (0.001)		-0.0041*** (0.001)		-0.0046*** (0.001)	
Anjou	-0.0064*** (0.001)		-0.0064*** (0.001)		-0.0045*** (0.001)		-0.0071*** (0.001)		-0.0058*** (0.001)	
Spain	-0.0099*** (0.000)		-0.0098*** (0.000)		-0.0056*** (0.000)		-0.0063*** (0.000)		-0.0060*** (0.000)	
Bourbons	0.0205*** (0.004)		0.0204*** (0.004)		-0.0021 (0.003)		0.0104*** (0.004)		0.0101 (0.007)	
Papal state	-0.0050*** (0.000)		-0.0050*** (0.000)		-0.0038*** (0.000)		-0.0033*** (0.000)		-0.0033*** (0.000)	
Venice	-0.0039*** (0.000)		-0.0039*** (0.000)		-0.0019*** (0.000)		-0.0031*** (0.000)		-0.0030*** (0.000)	
Austria	0.0004 (0.000)		0.0004 (0.000)		-0.0007* (0.000)		-0.0016*** (0.000)		-0.0007 (0.001)	
Savoy	-0.0020*** (0.000)		-0.0019*** (0.000)		-0.0015*** (0.000)		-0.0011*** (0.000)		-0.0012*** (0.000)	
Social capital (TSLS)		-1.4563*** (0.162)		-1.3323*** (0.176)		-1.0029*** (0.340)		-0.8989** (0.398)		-1.2917*** (0.493)
Social capital (LIML)		-1.4077***		-1.3327***		-0.9448***		-1.1000***		-1.6660***
CLR (95%)		[-1.506; -1.324]		[-1.447; -1.236]		[-1.187; -0.717]		[-1.442; -0.793]		[-2.258; -1.129]
ATA absenteeism rate	-0.0031*** (0.001)	0.1784*** (0.013)	-0.0028*** (0.001)	0.1703*** (0.012)	-0.0026*** (0.001)	0.1539*** (0.011)	-0.0033*** (0.001)	0.1515*** (0.010)	-0.0045** (0.002)	0.1344*** (0.016)
Log of Number of teachers			0.0407 (0.039)	0.9816* (0.567)	0.1739*** (0.040)	1.4282*** (0.489)	0.1515*** (0.039)	1.3873*** (0.510)	0.1721* (0.068)	0.3237 (0.631)
Teachers short term contract (%)			0.0062*** (0.002)	0.0329 (0.021)	0.0007 (0.002)	0.0061 (0.019)	-0.0012 (0.002)	0.0053 (0.019)	-0.0013 (0.003)	0.0302 (0.027)
Female teachers (%)			0.0029** (0.001)	0.0688*** (0.012)	0.0021* (0.001)	0.0777*** (0.011)	0.0019 (0.001)	0.0778*** (0.011)	-0.0005 (0.002)	0.0604** (0.024)
Teachers over 55 (%)			-0.0026* (0.001)	0.1212*** (0.025)	-0.0076*** (0.001)	0.0781*** (0.019)	-0.0086*** (0.001)	0.0912*** (0.020)	-0.0047 (0.003)	0.0995*** (0.025)
Teachers turnover (%)			0.0047* (0.003)	0.2177*** (0.034)	0.0015 (0.002)	0.1887*** (0.033)	0.0019 (0.002)	0.1922*** (0.032)	-0.0058 (0.004)	0.1189** (0.048)
Average temperature 00-09					-0.0091 (0.011)	0.8217*** (0.204)	0.0057 (0.011)	0.8213*** (0.186)	0.0031 (0.021)	0.6055*** (0.185)
Mortality rate, 09-11					0.0409*** (0.001)	0.0625** (0.032)	0.0260*** (0.002)	0.0617* (0.034)	0.0237*** (0.003)	0.0693 (0.045)
Rural area					0.2200*** (0.037)	-0.7557* (0.412)	0.1514*** (0.036)	-0.7028* (0.388)	0.0997 (0.080)	-0.0598 (0.838)
Mountain area					-0.0519* (0.031)	1.6442*** (0.497)	-0.0617** (0.036)	1.2083** (0.500)	-0.1379** (0.058)	2.1648*** (0.610)
Unemployment rate, 2009					-0.0760*** (0.007)	0.3541** (0.183)	-0.0314*** (0.007)	0.5343*** (0.181)	-0.0243** (0.014)	0.3040* (0.156)
Added value per capita, 2010					0.0000*** (0.000)	0.0001 (0.000)	0.0000*** (0.000)	0.0001 (0.000)	0.0000** (0.000)	0.0001 (0.000)
Extortion rate							-0.0062 (0.004)	0.1171 (0.092)	-0.0013 (0.009)	0.0352 (0.096)
Alcohol consumption rate							0.0610*** (0.006)	0.1201** (0.068)	0.0512*** (0.011)	0.1212 (0.079)
Educational infrastructures							0.8412*** (0.063)	0.4527 (1.354)	0.9461*** (0.118)	2.1047 (1.497)
Retention rate									-0.0007 (0.004)	0.1963*** (0.030)
Early leavers									0.0078 (0.009)	-0.0760 (0.096)
Dummy School level		Yes		Yes		Yes		Yes		
Observations	10,197	10,197	10,135	10,135	10,135	10,135	10,135	10,135	2,931	2,931
R-squared	0.803	0.140	0.804	0.155	0.826	0.186	0.833	0.187	0.828	0.153
first-stage F statistics		46.42		40.51		7.590		4.561		4.570
Kleibergen-Paap P-value		8.61e-07		6.10e-06		0.000782		0.00700		0.00889
Hansen J statistic		16.99		16.54		9.146		10.30		7.325
Chi-sq(3) P-val		0.0302		0.0353		0.330		0.245		0.502
Pagan-Hall P-value		0		0		0		0		0

Notes: Standard errors in parentheses, clustered at province level: *** p<0.01, ** p<0.05, * p<0.1. Social capital assumed endogenous. Excluded instruments are the variables Normans, Swabians, Anjou, Bourbons, Austria, Papal State, Savoy, Spain and Venice (Independent states not included) that identify the number of years during which each regime has persisted in a specific territory during 1100-1800.

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and indicates that one unit more in social capital index results, in this case, in 0.22 less days of absences per school. Finally, in model 5, we control for retention rate and early leavers, with analogous results compared to the previous OLS analysis. In sum, controlling for a number of geographical, school and social factors, we can confirm our previous results even in the IV specifications. Considering also in this case the worst and the best social capital performer, our IV results suggest that if a school locate in Vibo Valentia were located in Bologna, its absenteeism rate would decrease by a value between 0.70 days (in model 1) and 0.43 (in model 5).

For each model, as in the previous chapter, we test for underidentification and for weak instruments. We firstly test for underidentification using the Kleibergen-Paap test [20]. The p-values always reject the null, suggesting that our model is not underidentified. However, this element is not sufficient for strong identification and we always report first-stage F statistics based on Cragg and Donald (1993). As a rule of thumb, then, we check if the first-stage F-statistic is larger than ten. Except for models 4 and 5, we always note that F-statistic si larger than ten. Since we only have one endogenous variable we also conduct inference that is robust to weak instruments using Moreiras (2003) conditional likelihood ratio (CLR) test statistics. It allows us to create confidence intervals robust to weak instruments that we include among results, together with Limited Information Maximum Likelihood (LIML) estimates. As we can note, LIML estimates are always bounded and with the same sign of our social capital coefficient, considering their confidence intervals, and they are very similar to TSLS estimates. Finally, we also report the p-value of the Hansen-j test of over-identifying restrictions to check whether our instruments are together coherent[21] and it show that, overall, our set of instruments is coherent: only the first two specifications show a p-value lower than 0.05 and greater than 0.01.

3.6 Robustness and Extensions

In this section, we repeat our analysis distinguishing our specifications by the different school levels. We have already seen in the descriptive analysis that the different school types show different characteristics: in particular, primary schools have a higher average absenteeism rate compared to other schools. Thus, we want to check whether different

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[20]See Kleibergen and Paap (2006): this test allows to determine whether the minimal canonical correlation between the endogenous variables and the instruments is statistically different from zero and is an alternative to the Anderson canonical test; we need to use it, in this specific case, because our IV regressions are made implementing clustered standard errors at NUTS3 level.

[21]On this, see Parente and Silva (2012)

regressions for different school types produce different results and, at the same time, we can evaluate if our previous results on the overall negative role of social capital for absenteeism rate are robust to different subsamples.

Table B.4, in Appendix B, reports our robustness analysis. First, in models 1 to 3, we focus on school type "Istituto comprensivo": we note that, again, the social capital coefficient is negative and significant in all specifications. There are no changes at all also in the other coefficients.

Then, we move to the analysis of other school levels. As above, there are no significant changes in the signs nor in the significance of our coefficients. However, specifications for primary and lower secondary schools highlight some problems in the social capital LIML coefficient, showing CLR positive signs in the upper bound when we control for local factors. *Istituti comprensivi* and upper secondary schools represent the model that are better defined and clearly confirm our previous findings. Overall, the best models are also the ones that show a slight increase in the magnitude of the social capital coefficient. Besides, in last specifications for upper secondary schools, we insert in all regressions a set of dummy identifying the different upper secondary school types: Lyceums, Professional schools and other schools. We can see that Professional schools and other schools dummies (Lyceum is the omitted dummy) show a full significant and positive coefficient: absenteeism rate is strongly correlated with those school types, in line with our hypothesis in the descriptive statistics.

3.7   Conclusions

In this Chapter, we have studied the relation between social capital and shirking (measured as the average number of sickness days per teacher per school) among Italian teachers in public schools. To this aim, we have used a unique dataset provided by MIUR, containing information of all Italian public schools for the year 2010-11. Our overall results suggest that local social capital level plays an important role: in fact, it is negatively and significantly correlated with teachers' absenteeism rate. Social capital coefficient is stable controlling for a number of different school and area controls. In particular, it remains significant also adding ATA absenteeism rate in our model: this important control allows us to take into account potential locational sorting issues, considering all school (unobservable) common factors between the two working categories. The school size, the share of female teachers, the share of teachers over 55 and the teachers' turnover rate show all a positive correlation with teachers' absenteeism rate. These results are coherent with previous studies (for instance,

Bradley et al., 2007 and Herrmann and Rockoff, 2012). Unemployment rate has a positive correlation, indicating that it contributes in explaining shirking and that it is not acting as a "treat" for opportunistic workers: since our observations are public schools, this result is not in contrast with Ichino and Maggi (2000) and Scoppa and Vuri (2014). It is worth noting that we also control for the regional mortality rate, to distinguish our measure of shirking from real illness episodes: the inclusion of this variable does not change our results, suggesting that we are capturing real shirking behavior.

Finally, to solve endogeneity problems, mainly caused by potential reverse causality, we apply an instrumental variables approach, exploiting historical data on past dominations in the pre-unitary Italy, already used in the previous chapter. However, our results remain unchanged. Unfortunately, in this study, our set of instruments does not allow to fully exploit the historical variability of our past administrations: almost all dominations show the same positive correlation, without a clear distinction between "bad" and "good" ones. Overall, our instruments seem to be more suitable for current institutional quality estimation than social capital one.

In sum, our study demonstrates that differences in social capital levels affect absenteeism rates. In particular, we find that a unitary increase of social capital index results in a decrease of teachers' absenteeism rate equal between 0.36 and 0.22. Further efforts can be devoted to analyze why different school workers groups with different skills (teachers and ATA) seem to behave differently.

Appendix

B   Appendix

Table B.1: Descriptive statistics: additional controls

Variable	Obs	Mean	Std. Dev.	Min	Max
Log of Number of teachers	10147	4.122	0.407	1.39	5.63
Teachers short term contract (%)	10197	10.899	10.178	0	100
Female teachers (%)	10147	81.416	14.705	22.5	100
Teachers over 55 (%)	10136	33.061	11.745	2.2	87.433
Teachers turnover (%)	10145	6.299	5.824	0	100
Mortality rate	100	103.403	14.236	81.055	142.062
Rural area	10197	0.235	0.424	0	1
Mountain area	10197	0.361	0.480	0	1
Unemployment rate, 2009	100	7.956	3.662	2.09	17.64
Added value per capita, 2010	100	21857.13	5611.00	13097.14	45839.81
Average temperature 00-09	100	13.718	2.501	6.1	18.3
Extortion rate	100	6.362	3.697	1.71	19.45
Alcohol consumption rate	100	23.686	5.864	13.15	37.3
Educational infrastructures	100	2.017	0.516	0.78	2.91
Retention rate	7918	0.458	1.848	0	31.28
Early leavers	9942	3.446	4.453	0	70.56

Notes: Min and Max indicate the two provinces or schools where we observe the highest and the lowest values.

Table B.2: Correlation matrix

	Teac. abs.	ATA abs.	Social capit.	N. of teac.	Short contr.	Fem. teac.	Over 55	Teac. turn.	Av. temp.	Mort. rate	Rural area	Mount. area	Unem. rate	Added value	Ext. rate	Alc. cons.	Educ. infr.	Ret. rate	Early leav.
Teachers' abs. rate	1																		
ATA abs. rate	0.1975	1																	
Social capital	-0.2859	-0.0315	1																
N. of teachers	-0.078	0.0621	0.2757	1															
Teachers short term	-0.1169	-0.058	0.2463	0.0143	1														
Female teac.	0.0648	0.0315	0.121	-0.1342	-0.2327	1													
Over 55	0.1667	0.0553	-0.3268	-0.1709	-0.4316	-0.0725	1												
Teachers turnover	0.1075	-0.0197	-0.1247	-0.1665	0.152	0.0128	-0.0857	1											
Average temp.	0.3093	0.0831	-0.6146	-0.1908	-0.2211	-0.0876	0.2828	0.0936	1										
Mortality rate	-0.0856	0.0148	0.4502	-0.0028	0.1086	0.044	-0.0231	-0.0285	-0.2836	1									
Rural area	0.0327	-0.0421	-0.0594	-0.3638	0.1268	0.1022	-0.0893	0.0954	0.0499	0.1361	1								
Mountain area	0.075	-0.0029	-0.048	-0.219	0.086	-0.0019	0.0186	0.0371	-0.0443	0.127	0.3006	1							
Unemp. rate	0.2956	0.0686	-0.7577	-0.2688	-0.2407	-0.1319	0.3102	0.108	0.6753	-0.3113	0.0659	0.0625	1						
Added value p. c.	-0.1825	0.0109	0.6333	0.3381	0.1939	0.1463	-0.2601	-0.1049	-0.4842	0.0318	-0.2086	-0.096	-0.6671	1					
Ext. rate	0.2201	0.0388	-0.5659	-0.199	-0.1666	-0.0891	0.2526	0.1059	0.4824	-0.1569	0.0783	0.0072	0.5059	-0.5163	1				
Alcohol cons. rate	-0.2295	-0.0119	0.7082	0.2028	0.2093	0.0805	-0.321	-0.1438	-0.5446	0.2395	-0.0489	-0.0604	-0.6572	0.5123	-0.5408	1			
Educ. infrastr.	-0.2541	-0.0315	0.8064	0.251	0.2587	0.1198	-0.2554	-0.0951	-0.6355	0.4793	-0.0153	-0.0095	-0.8319	0.6498	-0.5403	0.6616	1		
Retention rate	0.0366	-0.0026	-0.1133	0.0276	0.0887	-0.2455	-0.0047	0.0257	0.1384	-0.0628	-0.0157	-0.0038	0.1495	-0.1148	0.0936	-0.0759	-0.1368	1	
Early leavers	0.0104	0.003	-0.0598	0.1371	0.1708	-0.5118	0.0131	0.0167	0.1194	-0.047	-0.136	-0.0423	0.1408	-0.0645	0.033	-0.0417	-0.1088	0.3266	1

Table B.3: OLS regressions - Dep. var.: ATA absenteeism rate

VARIABLES	(1) ATA	(2) ATA	(3) ATA	(4) ATA	(5) ATA	(6) ATA
Social capital	-0.1205	-0.1193	-0.1515	0.0036	-0.1696	-0.2905
	(0.137)	(0.136)	(0.137)	(0.201)	(0.210)	(0.224)
Log of Number of teachers			3.2168***	3.1661***	3.3133***	3.0272***
			(0.629)	(0.492)	(0.479)	(0.982)
Teachers short term contract (%)			-0.0124	-0.0100	-0.0111	-0.0585*
			(0.024)	(0.024)	(0.024)	(0.035)
Female teachers (%)			0.0426***	0.0421***	0.0457***	0.0634***
			(0.016)	(0.015)	(0.015)	(0.022)
Teachers over 55			0.0829***	0.0597***	0.0620***	-0.0000
			(0.022)	(0.022)	(0.020)	(0.029)
Teachers turnover (%)			-0.0056	-0.0145	-0.0037	-0.0379
			(0.035)	(0.034)	(0.033)	(0.058)
Average temperature 00-09				0.4957*	0.5216**	0.1784
				(0.254)	(0.237)	(0.273)
Mortality rate, 09-11				0.0780**	0.0838**	0.1071**
				(0.032)	(0.036)	(0.041)
Rural area				-0.9001	-0.8897	-1.4812*
				(0.572)	(0.550)	(0.793)
Mountain area				0.9069	1.0078*	0.5881
				(0.573)	(0.533)	(0.695)
Unemployment rate, 2009				0.4306**	0.5077***	0.4117*
				(0.197)	(0.178)	(0.238)
Added value per capita, 2010				0.0002***	0.0002***	0.0002***
				(0.000)	(0.000)	(0.000)
Extortion rate					0.1233	0.0281
					(0.125)	(0.158)
Alcohol consumption rate					0.2124***	0.0994
					(0.080)	(0.087)
Educational infrastructures					0.0888	-1.0286
					(1.361)	(1.578)
Retention rate						0.1070***
						(0.040)
Early leavers						-0.0215
						(0.121)
Dummy School level		Yes	Yes	Yes	Yes	
Observations	10,197	10,197	10,135	10,135	10,135	2,931

Notes: Standard errors in parentheses, clustered at province level: *** p<0.01, ** p<0.05, * p<0.1.

Table B.4: Robustness checks

VARIABLES	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV	(8) IV	(9) IV	(10) IV	(11) IV	(12) IV	(13) IV
		Istituti comprensivi			Primary schools			Lower secondary schools			Upper secondary schools		
Social capital (TSLS)	-1.6686***	-1.6849***	-0.9079**	-1.1965***	-1.1427***	-1.1236*	-1.3249***	-1.2804***	-0.9874	-1.2493***	-1.2567***	-1.6049***	-1.5592***
	(0.177)	(0.181)	(0.389)	(0.214)	(0.294)	(0.592)	(0.237)	(0.244)	(0.654)	(0.166)	(0.163)	(0.514)	(0.467)
Social capital (LIML)	-1.6123***	-1.6367***	-1.1057***	-1.0897***	-1.1507***	-0.8984*	-1.2058***	-1.1166***	-1.0888*	-1.3069***	-1.2316***	-1.4763***	-1.3040***
CLR (95%)	[-1.747; -1.496]	[-1.809; -1.493]	[-1.536; -0.707]	[-1.308; -0.877]	[-1.418; -0.893]	[-1.847; 0.043]	[-1.494; -0.924]	[-1.448; -0.792]	[-2.346; 0.168]	[-1.515; -1.113]	[-1.450; -1.027]	[-2.200; -0.814]	[-2.070; -0.600]
ATA absenteeism rate	0.1794***	0.1725***	0.1573***	0.1617***	0.1609***	0.1481***	0.1979***	0.1646***	0.1496***	0.1578***	0.1477***	0.1300***	0.1277***
	(0.013)	(0.013)	(0.014)	(0.021)	(0.020)	(0.019)	(0.028)	(0.027)	(0.022)	(0.026)	(0.024)	(0.023)	(0.023)
Log of N. of teachers		1.4623**	1.4059**		0.8357	1.5113		3.3481**	3.9506***		-0.2642	0.4154	0.0354
		(0.738)	(0.604)		(1.384)	(1.211)		(1.342)	(1.491)		(0.844)	(0.835)	(0.799)
Teachers short cont. (%)		0.0769***	0.0654***		0.1123	0.0921		0.0385	0.0398		0.0276	-0.0050	-0.0032
		(0.025)	(0.021)		(0.108)	(0.126)		(0.049)	(0.046)		(0.035)	(0.034)	(0.035)
Female teachers (%)		0.1239***	0.1404***		-0.1417**	-0.0998		-0.0234	-0.0686		0.0940***	0.1017***	0.1135***
		(0.015)	(0.013)		(0.072)	(0.084)		(0.079)	(0.070)		(0.027)	(0.026)	(0.027)
Teachers over 55 (%)		0.1105***	0.0859***		0.0594	0.0460		0.2123***	0.2022***		0.1575***	0.1416***	0.1154***
		(0.028)	(0.024)		(0.038)	(0.033)		(0.052)	(0.046)		(0.032)	(0.034)	(0.036)
Teachers turnover (%)		0.2254***	0.1817***		0.3046***	0.2974***		0.1371*	0.1254		0.1758***	0.1907***	0.1912***
		(0.032)	(0.030)		(0.093)	(0.084)		(0.079)	(0.078)		(0.067)	(0.064)	(0.064)
Average temp. 00-09			1.1331***			0.5879***			0.2197			0.4610*	0.6528***
			(0.161)			(0.186)			(0.256)			(0.248)	(0.211)
Mortality rate, 09-11			0.0544			0.1385***			0.0819			0.0846	0.0739
			(0.035)			(0.047)			(0.057)			(0.052)	(0.045)
Rural area			-0.8110*			-1.4912*			-0.1938			-1.0310	-1.0826
			(0.422)			(0.823)			(1.446)			(1.259)	(1.448)
Mountain area			1.3252***			0.5226			1.6786			2.0930**	1.9151**
			(0.496)			(1.042)			(1.051)			(0.733)	(0.749)
Unemployment rate, 2009			0.3854**			0.7409***			0.7522**			0.5148***	0.4112**
			(0.165)			(0.267)			(0.296)			(0.187)	(0.179)
Added value p. c., 2010			0.0001			0.0003**			0.0000			0.0001	0.0001
			(0.000)			(0.000)			(0.000)			(0.000)	(0.000)
Extortion rate			0.2390**			0.0117			-0.2920**			-0.0436	-0.0547
			(0.099)			(0.129)			(0.146)			(0.119)	(0.117)
Alcohol consumption rate			0.1144			0.1890**			-0.0197			0.2120**	0.2246***
			(0.075)			(0.096)			(0.138)			(0.086)	(0.080)
Educational infrastr.			0.5566			-1.2900			0.8253			2.9375*	2.2675
			(1.138)			(2.401)			(2.644)			(1.669)	(1.614)
Retention rate													0.0977**
													(0.047)
Early leavers													-0.2262
													(0.149)
Dummy Profes. School										4.9066***	4.6775***	4.7327***	
										(0.898)	(1.093)	(0.977)	
Dummy Other Schools										3.3241***	4.2229***	4.4881***	
										(0.631)	(0.786)	(0.774)	
Observations	5,057	5,056	5,056	1,996	1,996	1,996	1,071	1,068	1,068	2,073	2,015	2,015	1,789
R-squared	0.138	0.162	0.208	0.083	0.089	0.131	0.101	0.125	0.147	0.102	0.121	0.142	0.146
first-stage F statistics	46.15	39.82	4.466	44.16	39.20	4.603	44.10	36.18	4.168	55.44	53.32	5.168	5.456
Kleibergen–Paap P-value	0.00	0.00	0.0183	0.00	0.00	0.00	0.00	0.000177	0.00777	0.00	0.00	0.00596	0.00506
Hansen J statistic	16.89	16.92	9.980	10.85	11.75	11.33	14.24	12.21	9.590	11.81	9.088	6.387	6.602
Chi-sq(3) P-val	0.0313	0.0309	0.266	0.210	0.163	0.183	0.0757	0.142	0.295	0.160	0.335	0.604	0.580
Pagan-Hall P-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Notes: Standard errors in parentheses, clustered at province level: *** p<0.01, ** p<0.05, * p<0.1. Social capital assumed endogenous. Excluded instruments are the variables Normans, Swabians, Anjou, Bourbons, Austria, Papal State, Savoy, Spain and Venice (Independent states not included) that identify the number of years during which each regime has persisted in a specific territory during 1100-1800. First stage results omitted.

Table B.5: Variables description

Variable	Level	Description	Source
Absenteeism rate - ATA	School	Average number of sickness leaves per ATA worker	MIUR data
Absenteeism rate - teachers	School	Average number of sickness leaves per teacher	MIUR data
Log of Number of teachers	School	Logarytm of the number of teachers	Elaborations on MIUR data
Teachers short term contract (%)	School	% of teachers with a short term contract	MIUR data
Female teachers (%)	School	% of femal teachers	MIUR data
Teachers over 55 (%)	School	% of teachers aged over 55 years old	MIUR data
Teachers turnover (%)	School	% of teachers moved to another school	MIUR data
Retention rate	School	% of rejected students	MIUR data
Early leavers	School	% of early leaver students (average of first three years of upper secondary school)	MIUR data
Unemployment rate	NUTS3	% of people aged 15-64 unemployed actively seeking employment, 2009	ISTAT
Added value per capita	NUTS3	Added value per capita, 2010	ISTAT
Social capital	NUTS3	Broad measure of social capital that merges data on 1) blood donations, 2) sport participation, 3) dissemination of newspaper and 4) voter turnout	Cartocci (2007)
Extortion rate	NUTS3	Average rate of extortions over 10,000 inhabitants	Fiaschi et al. (2011)
Average temperature 00-09	NUTS3	Average temperature (centigrades) during the years 2000-2009	Elaborations on ISTAT (2013)
Mortality rate, 09-11	NUTS3	Average mortality rate in the period 2009-11, per 10,000 inhabitants	ISTAT
Rural area	LAU2	=1 if municipality located in a rural area; 0 otherwise	ISTAT
Mountain area	LAU2	=1 if municipality located in a mountain area; 0 otherwise	ISTAT
Alcohol consumption rate	NUTS3	Share of people that consume alcohol between meals per 100,000 inhabitants	Detotto, C., Sterzi, V. (2010)
Educational infrastructure	NUTS3	It merges: % of public primary schools provided with meals; % of public primary schools equipped with school-bus; % of special classrooms in public secondary schools; number of teachers every 100 students	Chapter 2
Normans	NUTS3	Number of years of Norman domination	Chapter 2
Swabians	NUTS3	Number of years of Swabian domination	Chapter 2
Anjou	NUTS3	Number of years of Anjou domination	Chapter 2
Spain	NUTS3	Number of years of Spanish domination	Chapter 2
Bourbons	NUTS3	Number of years of Bourbons domination	Chapter 2
Papal state	NUTS3	Number of years of Papal domination	Chapter 2
Venice	NUTS3	Number of years of Venitian domination	Chapter 2
Austria	NUTS3	Number of years of Austrian domination	Chapter 2
Savoy	NUTS3	Number of years of Sabaudian domination	Chapter 2
Independent	NUTS3	Number of years of independence	Chapter 2

Note: MIUR data are all referred to schooling year 2010/2011

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