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Past Dominations, Current Institutions and the Italian Regional Economic Performance

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ABSTRACT

Past Dominations, Current Institutions and the Italian Regional Economic Performance^{*}

We study the connection between economic performance and the quality of government institutions for the sample of 103 Italian NUTS3 regions, including new measures of institutional performance calculated using data on the provision of different areas of public services. In order to address likely endogeneity problems, we use the histories of the different foreign dominations that ruled Italian regions between the 16th and 17th century and over seven hundred years before the creation of the unified Italian State. Our results suggest that past historical institutions play a significant role on the current public administration quality and show that the latter makes a difference to the economic performance of regions. Overall, our analysis confirms that the quality of institutions matters for development, and that history can be used to find suitable instruments.

JEL Classification: O11, O43, C26

Keywords: economic development, institutions, history, instrumental variables

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“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, 2012, p. 43.

1 Introduction

In this paper 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, 2002), Acemoglu et al. (2001, 2002), La Porta et al. (1999, 2008) and, more recently, Acemoglu and Robinson (2012b). 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 (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 repre-

¹For 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 Bjrnkov et al. (2010).

²In particular, within the large literature on social capital and development, studies on the Italian regions' case dates back to Banfield (1958) (see also Putnam, 1995), 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).

sents 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 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 admin-

³While 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.

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

istrations 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 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

⁵For details on this see Appendix B1.

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

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 Crotona (the province showing the lowest indicator) to the level of Cremona (the highest) is significant and equivalent to a 55% decrease in the gap 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.

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 G. (1996), p. 78.

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 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 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

⁸See Tabellini (2010).

⁹Original data are in Italian lira and they have been converted in euros, current value (base year=2005). Deflator provided by Istat.

the quality of public expenditure defined as the outcome of public policies.¹⁰Note 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

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

¹⁰See 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.

¹¹In particular, Glaeser et al. (2004) criticise 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 Bank of Italy (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 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.

¹²As 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.

¹³This 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).

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 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

¹⁴Glaeser et al. (2004), p. 274.

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

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 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, 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).

Finally, in Figure 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).

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

¹⁶See 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 (Di Liberto and Sideri, 2011) we have used a different methodology and a different set of indicators to calculate our institutional quality indicator obtaining almost identical results.

¹⁷In 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.

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 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

¹⁸See Guiso et al. (2011). On this see also Knack (2002) and Bjrnkov (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.

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 by Car-tocci (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 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).

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,

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).

²²The 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.

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’s (1993) 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, Caltanissetta 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

²³The 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.

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

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

²⁶With approximately 115 thousand inhabitants Valle dAosta is the least populated region in Europe and the least densely populated region in Italy.

²⁷In 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 (2001) results.

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 et al. (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. The main descriptives are in Table 1 while, as expected, Table 2 indicates that all these factors are highly correlated.

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:

$$Y_i = \alpha + \beta QUAL_INST_i + X_i' \gamma + \epsilon_i \quad (3.1)$$

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 be positive and significant, thus confirming a positive correlation between productivity and our institutional quality

²⁸Botero et al. (2012) show as this empirical regularity holds in both dictatorships and democracies.

²⁹On this see also Botticini and Eckstein (2011). They identify 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.

variable. In Table 3 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.

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

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

³¹Acemoglu et al. (2001), p. 1369.

quality of institution proxies may capture the effect of other factors omitted from the regression analysis or from measurement error. Both of these econometric problems are likely to affect estimates in this setting. In particular, Efendic et al. (2010) 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:

$$\text{First stage: } QUAL_INST_i = \delta + \theta HIST_i + X_i' \gamma + v_i \quad (4.1)$$

$$\text{Second stage: } Y_i = \alpha + \beta QUAL_INST_i + X_i' \gamma + \epsilon_i \quad (4.2)$$

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

³²On this see also Angrist and Piescke (2010).

³³For references see footnote 7.

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

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 manifold. 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 Appendix B1. 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 colonisation 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 6 and 7 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. 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

³⁴See Melis (1998).

³⁵Melis (1998), p. 43.

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.

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 (2012b) 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

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

³⁶On 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.” Daniele e Malanima (2012). 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).

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 (2012b), p. 19.

³⁹Needless 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).

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, 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 4 (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

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 km² (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

⁴⁰For details, see also Table 9, in Appendix D1.

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

⁴²This 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.

Duchy of Mantua and Monferrato 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 5 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 4 (Part B) allows to easily identify the geographical location of these dominations.

⁴³A 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 (1973).

⁴⁴Drelichman (2008), 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).

⁴⁵During 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).

In Table 4 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 4, the p-values always reject the null. 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 Moreiras (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

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 and Robinson (2012a).

⁴⁷In 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.

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

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 4 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 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.

⁴⁹Reasons 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.

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

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

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.

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

⁵²It 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." Flora et al. (1999) p.37.

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 B2. 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 5 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 6 replicates the previous Table 4 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 (1993), usually identify the Norman Kings as having negatively affected social capital levels and, through that, development.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

⁵³I percorsi della Storia - Atlante, De Agostini, 1997.

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

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

characterized by high levels of civiness, 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 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 Appendix B1 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 (2012b) 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

⁵⁶See for example Pugh, G. and Telhaj, S. (2008), Botticini and Eckstein (2011) and Becker and Woessmann (2009) who investigate the role of religion and its role on education educational outcomes for development.

⁵⁷For more on this see Appendix B2.

⁵⁸See also Rodrik et al. (2004). Finally, note that in a previous draft of the paper we find a very similar result introducing a simple dummy for southern regions. See Di Liberto and Sideri (2011).

implying a 30% increase in productivity levels if the province with the lowest human capital endowments (Caltanissetta 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 Crotona (the province showing the lowest indicator) and that of Cremona (the highest) explains between approximately 50% to 60% of the gap in productivity levels.

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 (1993) who also firstly raised the hypothesis that the observed within-country heterogeneity in the quality of

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

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, which should capture the role of specific *generalized morality, pro-social behavior* and *interest in politics*. To set the scene, in Table 7 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 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

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

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

⁶²On 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).

⁶³In Tabellini (2010) culture is measured by the first principal components extracted from four cultural variables

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 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 8 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. Conversely, 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.

6 Conclusions

This paper 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 be-

(control, obedience, respect, trust). In this case, social capital is mainly captured by trust (having trust in other people) and respect.

⁶⁴See Malanima (2005). See also section 4.

tween 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.

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A Data sources

Dependent Variable

- Total value added per capita: Italian lira, constant prices (base year 2000), 2001 data (and 1936 among controls). Source: Fondazione Istituto Tagliacarne (2006). <http://www.tagliacarne.it>.

Institutional quality indicator: single components

1. Environment:

- 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.
- dumps for special wastes every 10,000 km².

2. Energy:

- gross production of electric energy from renewable sources (share of total production).

3. Health:

- utilization rate of beds in the public health institutes.
- number of workers in the residential socio-assistential health point every 1,000 citizens.

4. Education:

- % 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.

All these indicators are elaborations from ISTAT (2008) data.

We also include:

- Judicial inefficiency: from Guiso et al. (2004), calculated as the 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.
- Private physical capital: from Marrocu and Paci (2010), calculated by applying the perpetual inventory method, which states that the value of the capital stock at time t is equal to the value at time $t-1$, augmented by investment and diminished by depreciation, both measured at time t . The capital stock for the year 1995 (i.e. the initial year on which the reconstruction of the series is based) is represented by the datum provided by ISTAT for the national capital stock at 1995 constant prices.

Additional controls

5. Education (average years): it is measured as the average years of schooling of the labor force, that is:

$$\text{Average years of schooling} = \sum_j YR_j * HK_j \quad (\text{A.1})$$

where j is the schooling level, YR_j is the number of years of schooling represented by level j , and HK_j is the fraction of the labour force for which the j th level of education represents the highest level attained. Within the Italian system, primary school lasts eight years, the secondary level is usually attained after five years, and university courses take four to six years.

6. Latitude (standardized): 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.
7. Average temperature: average temperature during the years 2000-2009, all in centigrade. Source: ISTAT (2013) data.
8. Religious weddings: religious weddings quota over total, in 2001. Source: Detotto, C., Sterzi, V. (2010)
9. Extortions (1999-2001): average rate of extortions over 10,000 inhabitants. Source: Fiaschi, D., Gianmoena, L. and Parenti, A. (2011)
10. Social capital: 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. Source: Cartocci (2007).
11. Urbanization 1300 and Urbanization 1600: population size (in thousands) for each province (NUTS3 region) main town respectively in 1300 and 1600. Source: Paolo Malanima "Italian Urban Population 1300-1861, (The Database)", author's personal webpage.
12. private physical capital stock (Source: Marrocu et al., 2010).

B Historical (stylized) facts

B.1 Bureaucracies in pre-unitary states and the post-unification process

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.⁶⁵ 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.⁶⁶ 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.
- **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.⁶⁷ 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

⁶⁵The 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 See Flora et al.(1999)

⁶⁶Weber 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. (2012)

⁶⁷"The Habsburg Empire is historically known as a multi-ethnic state with a relatively well functioning, respected bureaucracy". See Becker et al. (2011) p. 2. They investigate if the Habsburg Empire, with its localized and well-respected administration, increased citizens trust in local public services.

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 professionalisation (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".⁶⁸
- **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 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 42,586.⁶⁹ The largest number (17 123) was in the Kingdom of

⁶⁸Melis (1998) p. 17.

⁶⁹This does not include magistrates and teachers. See Melis (1998).

the Two Sicilies, 7409 in Lombardy-Venetia, 7240 in the Kingdom of Sardinia, 5273 in the Papal States, 3149 in Tuscany , 1398 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.⁷⁰ 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?⁷¹ 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”.⁷² 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 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, 1998, 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, 1998). Compulsory schooling laws provide a good example of how difficult the

⁷⁰(Flora et al. (1999). See also La Porta et al. (1999) for a description of the French origins of the Italian legal system.

⁷¹Transplanted 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).

⁷²“... 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 1998, p. 84.

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.⁷³ 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.⁷⁴ 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.⁷⁵ 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.⁷⁶

⁷³The 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.

⁷⁴“Primary education, given for at least eight years, is compulsory and free of tuition.” Italian Constitution, Article 34, 1948.

⁷⁵Only 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%.

⁷⁶See Daniele and Malanima (2012)

B.2 The construction of the second set of instruments

In order to clarify how our second set of instruments have been constructed, 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.

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 construct the matrix. 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.⁷⁷

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 matrix⁷⁸ 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, and Independents. In the following we describe the different dominations starting with that located in the Northern, Centre and Southern parts 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

⁷⁷We prefer this choice to the alternative used by De Blasio and Nuzzo (2009), that attributes to the entire province the characteristic (regime) that was in place in the provincial capital (in the middle ages).

⁷⁸We 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 in order to construct our matrix. Needless to say, all errors or omissions are our full responsibility.

system was not democratic, it guaranteed a strong political stability that helped Venice to remain independent against the different foreign powers 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 administration⁷⁹. For these reasons, their policy should have had a positive impact on the institutional organization and we expect a positive effect.

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 privileges⁸⁰. In sum, the Austrian policies should have had a positive effect on local institutions. On this, see also Becker et al. (2011).

The influence played by the Savoy dynasty⁸¹ 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

⁷⁹Cozzi and Knapton (1986).

⁸⁰Montanelli and Gervaso (2003).

⁸¹See also Merlin (1994).

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 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 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 anarchy⁸². 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 [. . .]”.⁸³ Therefore, the Papal state is expected to have had a negative influence on institutions.

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

⁸²Caravale and Caracciolo (1978).

⁸³Caravale and Caracciolo (1978).

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 fights⁸⁴. Overall, due to continuous wars of the 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.

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)⁸⁵ 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.

⁸⁴Montanelli and Gervaso (2003).

⁸⁵During the Vespro War. In 1442 Spanish conquered all the rest of Kingdom of Naples.

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 seas⁸⁶. 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 (2005) emphasizes two policies adopted by Iberian monarchs: they built the basis for a modern absolutist state and 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 servants⁸⁷. 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.⁸⁸ 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.⁸⁹ 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

⁸⁶Our translation from Galasso G. (2005).

⁸⁷From Galasso (2005): The efforts made by the Aragonese dynasty were noticeable and rich of results.

⁸⁸Galasso G. (1994).

⁸⁹The 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 (1973) 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.

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.

C Figures and Tables

C.1 Figures

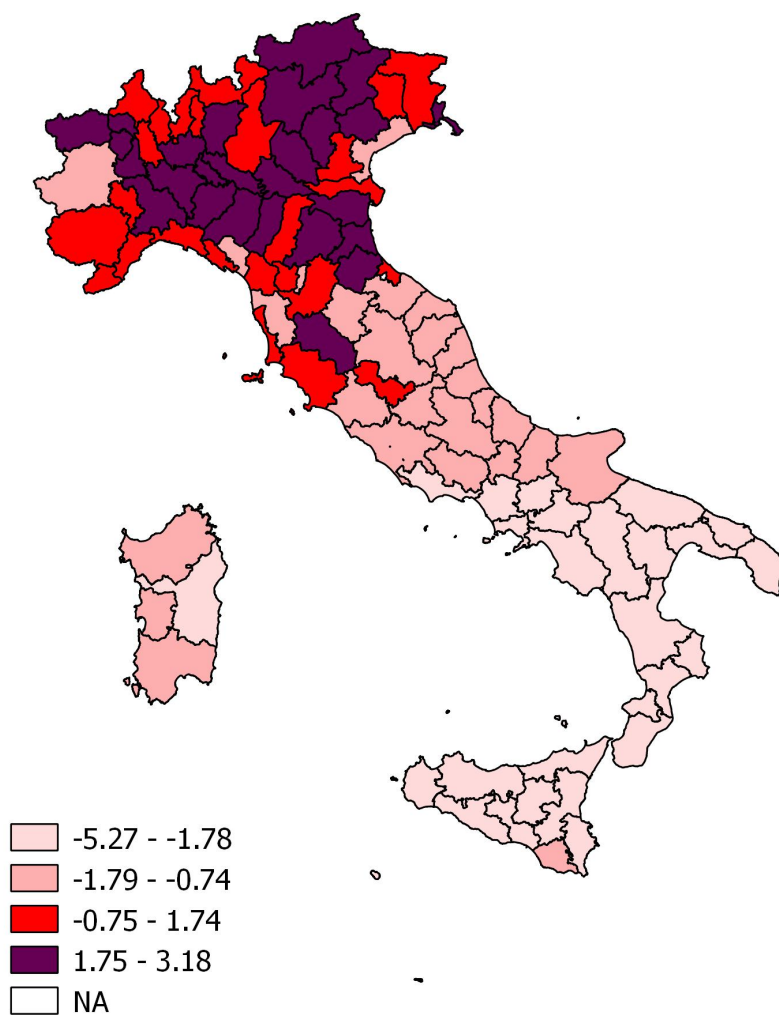


Figure 2: Institutional quality: territorial distribution

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

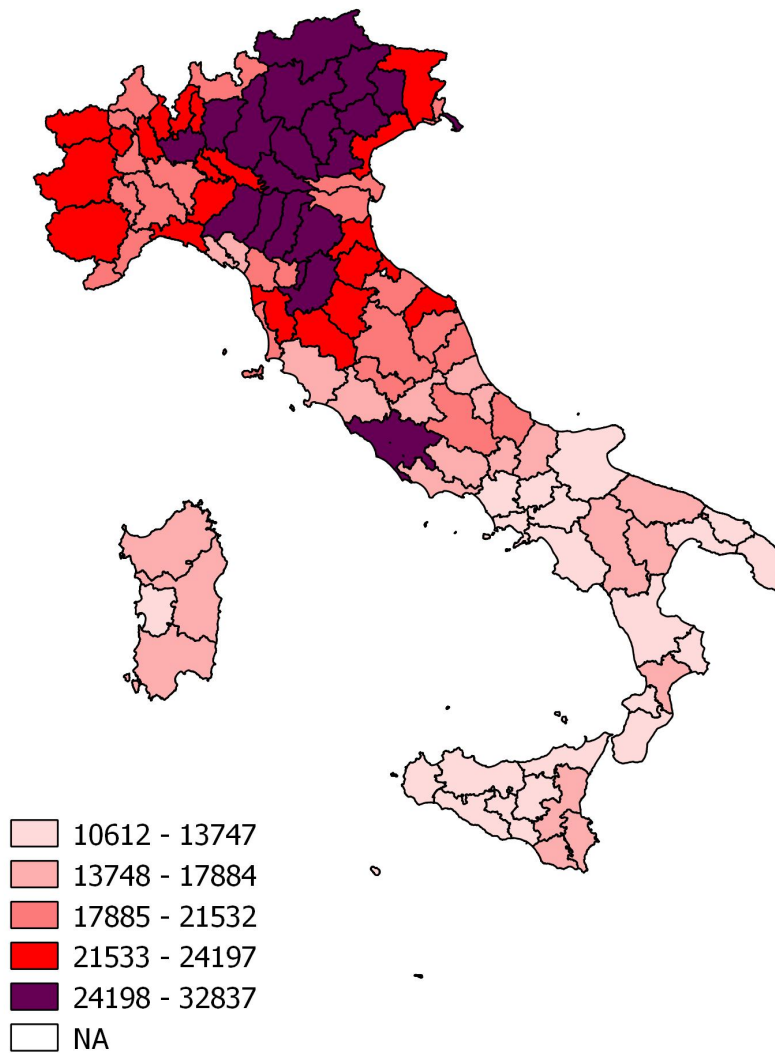


Figure 1: Value added per capita: territorial distribution

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

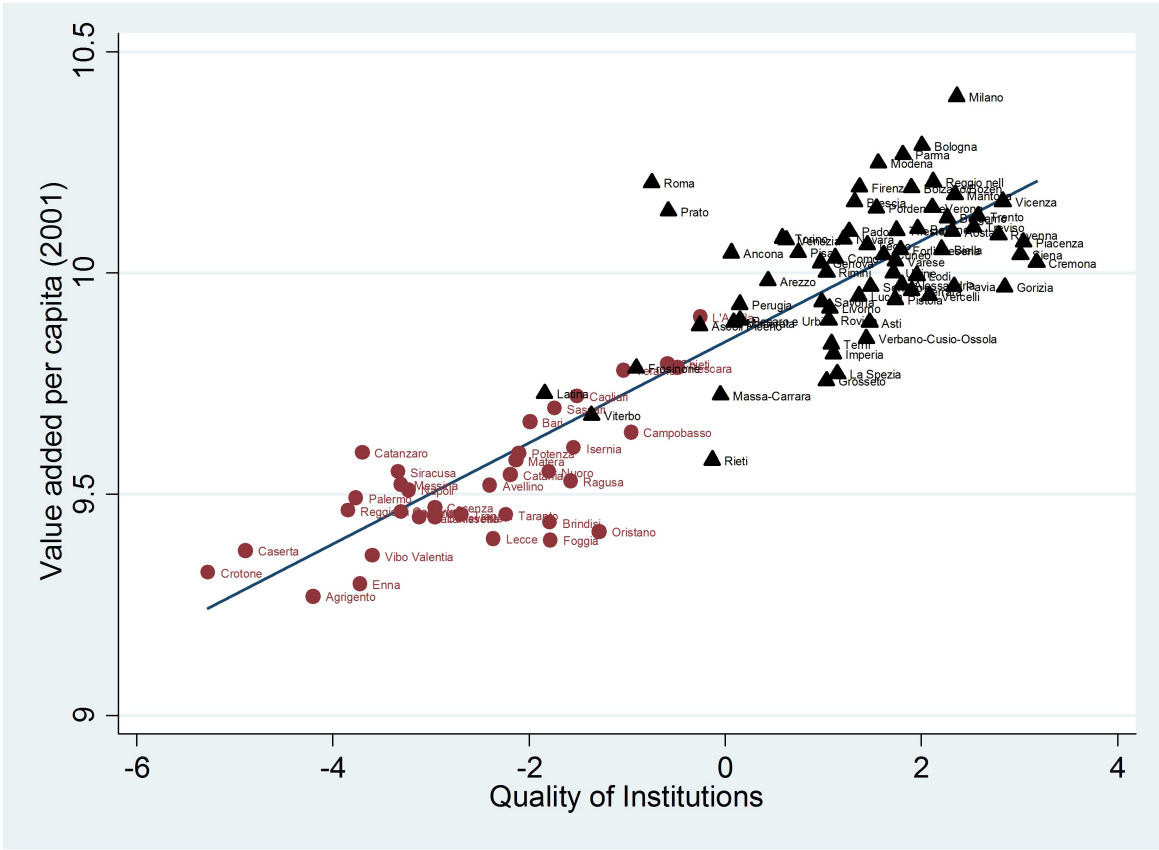


Figure 3: Productivity and quality of Institutions

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.



Figure 4: 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 Dunaan et al. (1965). Part B: corresponding current Italian provinces with Spanish, Papal, Austrian, Venetian, Sabaudian domination and other Independent provinces.

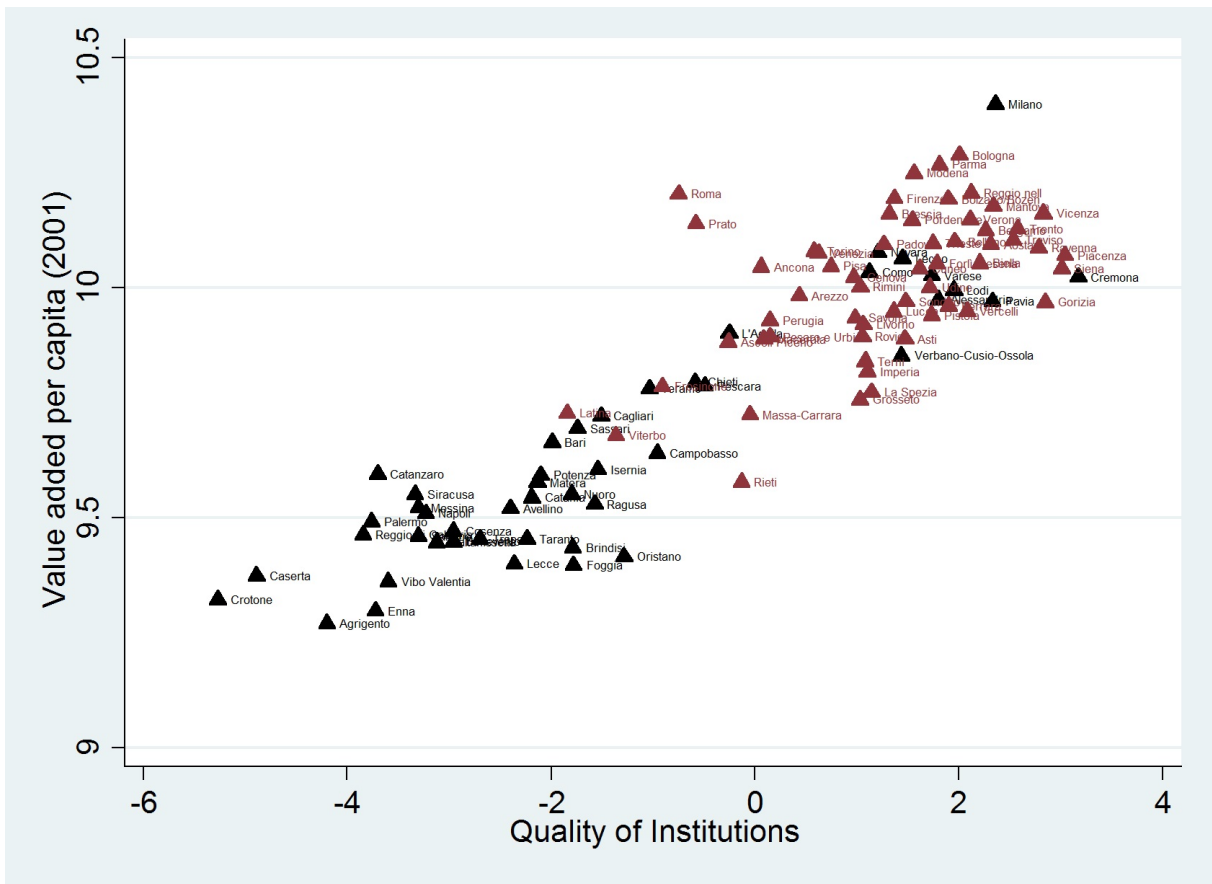


Figure 5: Former Spanish provinces

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

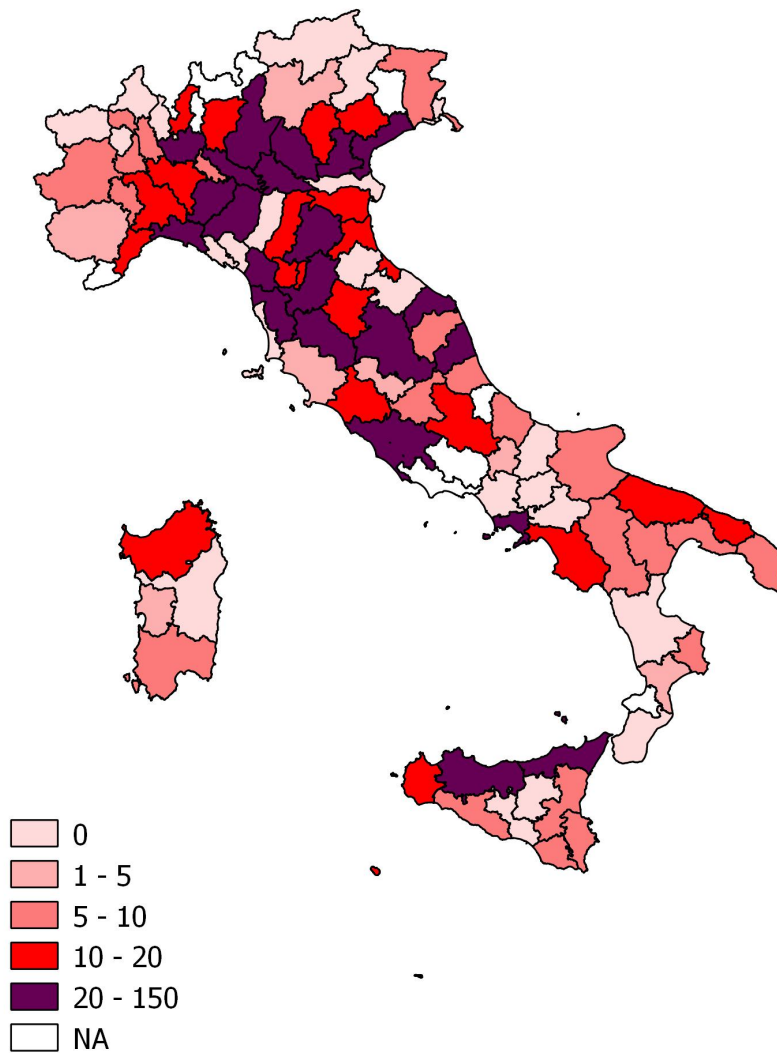


Figure 6: Urbanization 1300

Notes: Province main town population in 1300, in thousands. Description of data sources in Appendix A.

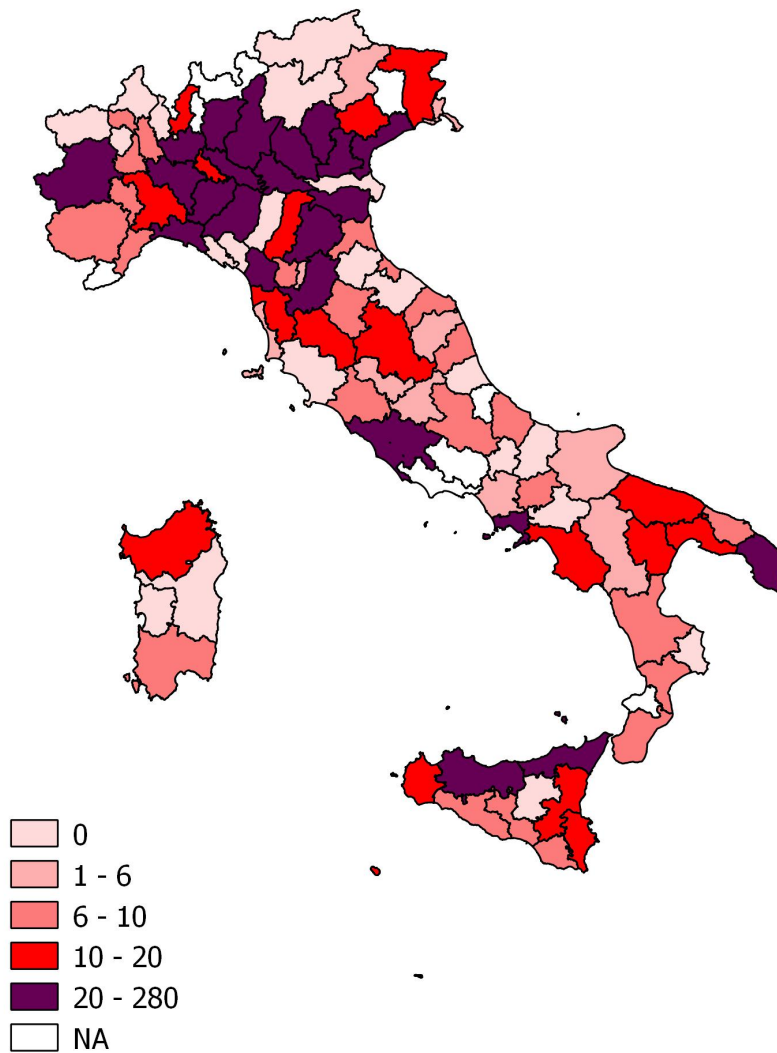


Figure 7: Urbanization 1600

Notes: Province main town population in 1600, in thousands. Description of data sources in Appendix A.

C.2 Tables

Table 1: Descriptive statistics

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

Table 2: 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 3: OLS estimations

Dependent variable: VA per capita 2001	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Institutional quality	0.1143*** (0.006)	0.0805*** (0.008)	0.0659*** (0.008)	0.0583*** (0.011)	0.0641*** (0.009)	0.0584*** (0.012)	0.0617*** (0.009)	0.0479*** (0.011)	0.0679*** (0.008)
Value added per capita 1936		0.3802*** (0.064)	0.2170*** (0.072)	0.2030*** (0.074)	0.2107*** (0.073)	0.2028*** (0.074)	0.2079*** (0.072)	0.2087*** (0.071)	0.2327*** (0.073)
Physical capital (private)		0.0007 (0.014)	0.0090 (0.013)	0.0084 (0.013)	0.0098 (0.013)	0.0086 (0.013)	0.0091 (0.013)	0.0142 (0.013)	0.0063 (0.013)
Education (average years)			0.1717*** (0.044)	0.1648*** (0.044)	0.1706*** (0.044)	0.1650*** (0.045)	0.1715*** (0.043)	0.1541*** (0.043)	0.1864*** (0.045)
Latitude				0.0877 (0.095)		0.0837 (0.115)			
Temperature					-0.0029 (0.005)	-0.0004 (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.

Table 4: IV estimates - First approach: standard set of control variables

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
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*		-0.8665** (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)
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)
Education (average years)					1.7939*** (0.478)	0.0876 (0.060)	0.6348 (0.398)	0.1365** (0.055)	1.5769*** (0.473)
Latitude							5.5026*** (0.693)	-0.1254 (0.251)	
Temperature									-0.1482** (0.059)
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 (LJML) 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
R-squared	0.486	0.775	0.682	0.818	0.724	0.840	0.836	0.852	0.742
first-stage F statistics		18.34		8.399		5.717		1.617	
Anderson Rubin P-value		0		2.78e-07		6.23e-05		0.0470	
Sargan statistic		2.410		4.435		4.249		7.995	
Sargan P-value		0.661		0.350		0.373		0.0918	
Pagan-Hall P-value		0.252		0.159		0.202		0.226	

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.

Table 5: 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.

Table 6: IV estimates - Second approach: standard set of control variables

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
Normans	-0.0310** (0.014)		-0.0311** (0.013)		-0.0291** (0.013)		-0.0108 (0.011)		-0.0284** (0.013)
Swabians	0.0052 (0.004)		0.0030 (0.004)		0.0031 (0.004)		-0.0011 (0.003)		0.0003 (0.004)
Anjou	0.0032 (0.004)		0.0044 (0.004)		0.0038 (0.004)		-0.0070* (0.004)		0.0029 (0.004)
Spain	-0.0063*** (0.001)		-0.0052*** (0.001)		-0.0044*** (0.001)		-0.0006 (0.001)		-0.0032** (0.001)
Bourbons	0.0038 (0.017)		0.0081 (0.016)		0.0089 (0.016)		0.0166 (0.013)		0.0103 (0.015)
Papal state	-0.0031*** (0.001)		-0.0028*** (0.001)		-0.0028*** (0.001)		-0.0011* (0.001)		-0.0026*** (0.001)
Venice	-0.0001 (0.001)		0.0001 (0.001)		0.0002 (0.001)		-0.0012 (0.001)		-0.0000 (0.001)
Austria	0.0022 (0.002)		0.0014 (0.002)		0.0010 (0.002)		-0.0010 (0.001)		0.0005 (0.002)
Savoy	-0.0002 (0.001)		-0.0012 (0.001)		-0.0004 (0.001)		-0.0002 (0.001)		-0.0013 (0.001)
VA per capita 1936			1.3798** (0.627)	0.3194*** (0.074)	0.1250 (0.735)	0.1949*** (0.073)	-0.5101 (0.625)	0.2029*** (0.072)	0.0418 (0.720)
Physical capital (private)			0.0858 (0.140)	-0.0019 (0.014)	0.1172 (0.135)	0.0057 (0.013)	-0.0521 (0.117)	0.0082 (0.013)	0.1349 (0.132)
Education (average years)					1.2370*** (0.416)	0.1447*** (0.048)	0.5514 (0.366)	0.1635*** (0.045)	1.0916*** (0.412)
Latitude							5.6842*** (0.918)	0.0775 (0.139)	
Temperature									-0.1193** (0.054)
Institutional Quality (TSLS)		0.1229*** (0.007)		0.0912*** (0.010)		0.0766*** (0.011)		0.0601*** (0.021)	
Institutional Quality (LIML)		0.124		0.0941		0.0796		0.0613	
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
R-squared	0.785	0.780	0.798	0.840	0.816	0.862	0.872	0.866	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.

Table 7: 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* (0.022)		-0.0441** (0.022)		-0.0174 (0.012)		-0.0305** (0.013)		-0.0261** (0.013)	
Swabians	-0.0040 (0.007)		-0.0041 (0.007)		0.0042 (0.003)		0.0026 (0.004)		0.0031 (0.004)	
Anjou	0.0007 (0.007)		0.0007 (0.007)		0.0038 (0.004)		0.0027 (0.004)		0.0031 (0.004)	
Spain	-0.0087*** (0.002)		-0.0074*** (0.002)		-0.0026** (0.001)		-0.0045*** (0.001)		-0.0044*** (0.001)	
Bourbons	0.0138 (0.027)		0.0215 (0.027)		0.0025 (0.014)		0.0107 (0.016)		0.0078 (0.016)	
Papal state	-0.0039*** (0.001)		-0.0036*** (0.001)		-0.0018*** (0.001)		-0.0029*** (0.001)		-0.0027*** (0.001)	
Venice	-0.0030* (0.002)		-0.0025 (0.002)		0.0008 (0.001)		0.0001 (0.001)		0.0000 (0.001)	
Austria	0.0030 (0.003)		0.0013 (0.003)		0.0008 (0.001)		0.0014 (0.002)		0.0010 (0.002)	
Savoy	-0.0022 (0.002)		-0.0038* (0.002)		0.0004 (0.001)		-0.0003 (0.001)		-0.0002 (0.001)	
Value added per capita 1936			1.9525* (1.033)	0.3600*** (0.078)	0.0628 (0.651)	0.1926*** (0.071)	0.1735 (0.735)	0.2069*** (0.074)	0.0390 (0.738)	0.1931*** (0.072)
Physical capital (private)			-0.2910 (0.231)	0.0249* (0.015)	0.1874 (0.120)	0.0087 (0.014)	0.0736 (0.140)	0.0007 (0.014)	0.1217 (0.135)	0.0065 (0.013)
Education (average years)					0.7529* (0.381)	0.1381*** (0.045)	1.3988*** (0.440)	0.1535*** (0.048)	1.2396*** (0.416)	0.1502*** (0.048)
Social capital		0.0866*** (0.006)		0.0579*** (0.007)	0.2833*** (0.056)	0.0085 (0.010)		0.2831 (0.182)		
Religious weddings										
Extortions										
Institutional Quality (TSLS)						0.0663*** (0.021)		0.0837*** (0.012)		-0.0372 (0.034)
Institutional Quality (LIML) CLR (95%)						0.0818		0.0877		0.0714*** (0.013)
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.

Table 8: 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*** (0.001)	0.0017*** (0.000)	0.0019*** (0.001)	0.0017*** (0.001)	0.0017*** (0.001)	0.0018*** (0.001)	0.0015*** (0.000)
Education (average years)	0.1453*** (0.048)	0.1632*** (0.042)	0.1342*** (0.045)	0.1474*** (0.049)	0.1423*** (0.048)	0.1580*** (0.050)	0.0766 (0.049)
Physical capital (private)	0.0009 (0.015)	0.0041 (0.014)	0.0042 (0.014)	0.0016 (0.015)	-0.0013 (0.017)	-0.0029 (0.015)	-0.0080 (0.014)
Latitude		0.0950 (0.144)					
Temperature			-0.0113* (0.006)				
Extortions				-0.0014 (0.004)	-0.0037 (0.012)		
Social capital							
Religious weddings						0.2548 (0.200)	
Value added per capita 1936							0.2433*** (0.075)
Institutional Quality (TSLS)	0.0932*** (0.012)	0.0758*** (0.021)	0.0841*** (0.013)	0.0910*** (0.014)	0.0994*** (0.024)	0.0997*** (0.012)	0.0835*** (0.011)
Institutional Quality (LIML)	0.0948 [0.070; 0.124]	0.0797 [0.023; 0.152]	0.0855 [0.058; 0.119]	0.0935 [0.063; 0.131]	0.107 [0.048; 0.207]	0.101 [0.076; 0.133]	0.0853 [0.061; 0.113]
CLR (95%)							
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.

D Instruments sets

D.1 Dummy approach

Table 9: 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
Forl-Cesena	IND	Pistoia	IND		
Frosinone	PON	Pordenone	VEN		

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

D.2 Matrix approach

Table 10: 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
Forl-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

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Table 10 – Continued

Province	NOR	SWE	ANG	SPA	BOR	PON	VEN	AUS	SAV
La Spezia	114	52	176	271	66	0	0	21	0
L'Aquila	0	0	0	0	0	0	0	0	0
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

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Table 10 – Continued

Province	NOR	SWE	ANG	SPA	BOR	PON	VEN	AUS	SAV
Savona	0	0	0	0	0	0	0	0	0
Siena	0	0	0	0	0	0	0	0	0
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=Angi; SPA=Spain; BOR=Borboni; PON=Papal State; VEN=Venice; AUS=Austria; SAV=Savoy