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Abstract

In this paper, we study how the birth of the first universities in Italy affected the emergence of the Italian free cities-states (the *commune*) in the period 1000-1300 a.d. Exploiting a panel dataset of 121 cities, we show that after the foundation of a new university the distance between each city in the sample and the university negatively predicts the timing of the birth of communal institutions in the city. Our evidence is consistent with the idea that universities in the Middle Ages provided the necessary juridical knowledge and skills to build legal capacity and develop broader-based institutions.

JEL-Codes: I200, I230, K000, N330.

Keywords: institutional change, education, human capital accumulation, communal movement.

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1. Introduction

In this paper, we explore the relation between the development of higher education institutions and the emergence of broad-based political institutions. To do this, we exploit a historical case study and investigate the role of the birth of the first universities in Italy and the consequent diffusion of a new set of legal knowledge on the profound process of institutional evolution that involved northern-central Italian cities in the late medieval period, also known as the communal movement.

The emergence of the free city-states (communes) between the XIth and the XIVth century represents a fundamental episode in the history of the Western world: it constituted a dramatic change in the city institutional setting with respect to the *status quo* feudal regime. While under feudal institutions the city was ruled by an authoritarian leader (the lord or the bishop) free of checks and balances, under the communal institutions citizens started to take part into the administration of the public affairs, personal freedoms were defended by constitutional limitations against abuses, and the government of the city was exercised by citizens' representatives whose actions were checked by collective assemblies. This particular institutional setting has been unprecedented in Western history with the only exception of the ancient Greek democracies and constituted the first form of state with the capacity of public provision of public goods since the fall of the Roman Empire (Berman, 1983). Historical and economic research (Coleman, 1999; Tabacco, 1979; Jones, 1997; Menant, 2005; DeLong and Shleifer, 1993) document that cities adopting communal institutions reached higher levels of urbanization and rates of growth than the cities governed by autocratic leaders. Guiso, Sapienza, and Zingales (2016) and Putnam, Leonardi, and Nanetti (1993) show that the communal experience has had a long-term impact on trust and social capital: cities that adopted communal institutions in the Middle Ages have comparatively higher social capital today than other cities. Hence, by understanding the causes which may have favored the emergence of these institutions and investigating the mechanisms that have led to their establishment, we can learn something about the drivers of institutional change and state formation.

Exploiting a panel of 121 northern-central Italian cities observed over a period of 300 years from the beginning of the XIth to the end of XIIIth century, we document that the birth of the first universities and the diffusion of legal education favored the transition from the autocratic regime to self-government. In particular, we show that after the foundation of the first Italian university, in 1088, the distance from Bologna – a proxy for the cost of university

attendance for the administrative elite in a city – of the various cities in the sample is negatively associated with the probability of adopting communal institutions. Our case study is built on a unique and original dataset combining rich historical information on the communal experience and additional historical characteristics at the city level. While we are cautious in interpreting this finding as causal, we show that our results are robust to an array of alternative specifications and robustness checks.

The university of Bologna, founded in 1088, was the first in the western world. In Italy, it was followed by (in chronologic order): Modena (1182), Vicenza (1204), Arezzo (1215), Padova (1222), Naples (1224), Vercelli (1228), Siena (1246), Piacenza (1248), and Macerata (1290). The university of Bologna was born as a law school where scholars and students applied their knowledge and skills to the codification of the ancient Roman Justinian Code (the *Corpus Iuris Civilis*, i.e. the body of the Civil Law) and produced a systematized and coherent body of juridical knowledge. Such work provided a method of analysis and synthesis that was valid for a vast array of situations and disciplines. Since then, law and jurisprudence were taught and learnt for the first time as a distinct subject of study organized as a structured set of general principles and implemented to general and unprecedented situations (Berman, 1983). Hence, universities accommodated the need for written and enforceable contracts and facilitated the dispute resolution essential in a period of growing economic exchange. The university graduates offered their skills, method, and knowledge to the management of the public affairs and of the private business.

The intuition underlying the interpretation of our results is that in the 11th century legal scholars trained in the newly founded universities provided Italian cities with the human capital necessary to invest in legal capacity and, in particular, to establish coherent and effective constitutional agreements. Consistently with the predictions of the literature on state capacity (Besley and Persson, 2009), in the communal regime we observe complementarities between legal and fiscal capacity: the development of the former affecting the latter and enabling the public provision of defense that was fundamental for the consolidation of the free city-states. This view is consistent with historical studies documenting the important role of the diffusion of the universal knowledge in the emergence of the medieval communes (Berman, 1983; Bellomo, 1999; Van Zanden, 2009; Padoa-Schioppa, 2005; Menzinger, 2005; Cobban, 1975).

Our work contributes to the literature on social science showing that education is a fundamental driver of desirable institutional change (among the others, Lipset, 1959; Barro, 1999; Glaeser, Ponzetto, and Shleifer, 2007). While, to the best of our knowledge, we are the

first to empirically studying the impact of the first law school on the emergence of new political institutions, the effects of the historical diffusion of universities in Europe was already explored by other papers. In particular, Cantoni and Yuchtman (2014) suggest that the establishment of universities in Germany was key to the expansion of the economic activity and to the development of the markets, whereas Huff (2003) maintains that universities represented an essential spur to technical change and to the production of scientific knowledge. Belloc, Drago, and Galbiati (2016) provide a companion investigation of the process that led to the emergence of communal institutions.

The paper is structured as follows. Section 2 presents the historical background. Section 3 describes the dataset employed in the paper, while Section 4 explains the empirical strategy and illustrates the results. Section 5 reports concluding remarks.

2. Historical Background

Our study focuses on the emergence of communal institutions in northern-central Italy that, during the Middle Ages, belonged to the Holy Roman-German Empire. Despite its territory was formally under the authority of the emperor, the empire was never (unlike the Norman Kingdom in the south of Italy) a unified central state with a centralized bureaucracy. This territorial political fragmentation was the result of a process that started in the IXth century after the fall of the Carolingian Empire. During the Carolingian period, the feudal lords, the local representative of the emperor, administered civil and penal justice, levied taxes, and exercised the executive power. In the absence of a centralized bureaucracy, the local power of the feudal lords grew to the point that the emperor accorded the right to transfer their domains to their heirs (Tabacco, 1979). Hence, under the feudal regime, the cities in the empire were governed by autocratic leaders ruling free of checks and balances (Bloch, 1961; Ascheri, 2009). The autocratic leader was the bishop in the episcopal see cities and the feudal lord in the non-episcopal see cities; they were the supreme political authority and governed in the name of the emperor (Pellegrini, 2009). In the administration of justice, they largely followed local customs and applied customary laws (e.g. the Salic law of the Frankish Empire). These laws maintained rights and duties at the community level, demanded clan loyalty, and neglected concepts such as individual responsibility. Basic public goods, such as defense, were privately provided by the autocratic leaders as form of protection of their own property. Legal rules and judicial procedures were transmitted, for the most part, orally and were applied without the support of written official documents (Berman, 1983; Wieacker, 1995;

Storti, 2012). This system based on unwritten law embodied in customs left a large arbitrariness to the feudal leaders.

At the turning of the first millennium, northern-central Italy experienced a period of important economic growth, sustained by the revival of the medium and long distance trade, and a consequent increase in the demographic rates, which favored the flourishing of life in the city and a spur in the rate of urbanization (Epstein, 1993 and 2000; Verhulst, 1999). A dynamic elite of merchants, craftsmen, and bankers emerged and conquered a leading role in the economic, social, and political scene (Pirenne, 1925 (2014)). To regulate the new and growing set of economic relations in the cities, citizens started to constitute private associations and agreed on common rules aimed at providing mutual help and at cooperating in the common interest (Tabacco, 1979). Yet, at the beginning, these agreements and associations operated only privately: despite their social and economic importance, until the birth of the commune, citizens remained excluded from the government of the public affair and from the administration of law (Ascheri, 2009; Pellegrini, 2009).

Since the XIth century, citizens managed to extend the private arrangements into sworn pacts of mutual defense allegiances which applied to the whole city (Ascheri, 2009; Galizia, 1951): gradually, these pacts and agreements evolved into communal institutions. Under the communal regime, the city was ruled by a general council of elected officials (the *consules*). The political and the juridical structure largely varied from city to city, but some common features were the following: a legislative body to which all citizens (excluding women and minorities) was taking resolution that were systematically recorded (Senatore, 2008), the *consules* exerted the executive power under the limitations of a constitution (the *statutum*). The *statutum*, at the very beginning, was a document where the *consules* swore the obedience to the communal rules, the observance of certain norms of conduct, and the extension of their rights and duties. Later the *statutum* became a much more complete document that encompassed the laws governing every aspect of the life in the city (private, family, commercial, penal law, etc). Under the communal institutions, the protection of the personal freedoms was guaranteed by law and special courts were established to judge when citizens' rights were violated (Galizia, 1951). Citizens could also appeal against abuses of power by government officials. Finally, with the emergence of the commune, the fiscal authority was transferred from the hands of the feudal leader to the communal institutions. This event has a crucial relevance. Under the feudal regime, taxation was usually an arbitrary expropriation by the lord or the bishop taking the form of income tax, custom tax (*salaria*), and tolls. For instance, the feudal leaders used to impose a tribute (*taglia*) on every saving or property in

the territory under their jurisdiction, and there was practically no redistribution (Cavazzuti and Di Pietro, 1994). The *corvées* (compulsory services, usually consisting in work-days of cultivation at no salary in the land of the lord or the bishop) are another example of such expropriation of private resources by the feudal leaders. By contrast, under the communal regime, taxes were collected for purposes of common interest such as the construction or the maintenance of the wall of the city (Menziger, 2005). Thus, we observe the emergence of a complex public legal and political ordering that locally applies to all citizens and that takes the place of an arbitrary system in the interpretation of customary law.

The establishment and the functioning of such a complex political and legal setting required the development and the diffusion among citizens of an adequate juridical knowledge necessary for the design, the writing, and the interpretation of the rules of the system (Ascheri, 2009). This need was accommodated by the birth of the first universities in the western world. At the beginning, the establishment of this institution was favored by the German emperors that saw in the discovery of the ancient Roman law a mean to legitimate their fight against the Pope that characterized the XIth and XIIth centuries. University scholars rediscovered and codified the ancient Roman law, the *corpus iuris civilis*, a code issued at the beginning of the VIth century by order of the Emperor Justinian I (Berman, 1993). The *corpus iuris civilis* provided medieval jurists a structured model for contracts, procedures, and property, family and public law. University graduates in law acquired a method of analysis and synthesis, which had application well beyond the local jurisprudence and was soon transplanted to other disciplines as well. As a consequence, they developed the skills to deal with unprecedented and sometimes complex situations, and offered their expertise to the management of the public administration and to the organization of the private corporations. Hence, lawyers and scholars trained in the new universities played a crucial role in the transition from the feudal regime to the city self-government. Legal historians (Berman, 1983) maintain that the emergence of the free cities would have not been possible without the diffusion of the academic lawyers. After training in the universities, where they learnt Roman law, jurisprudence, and newly developed legal instruments, legal scholars contributed to the elaboration of the city constitutions (the *statuta*) and regulations by adapting general principles of the ancient Roman law (Ascheri, 1996).¹ The jurists had in fact the methodological skills and knowledge to reconcile the re-discovered Roman law, which

¹ For instance Iacopo Baldovini, a famous scholar from Bologna, played an important role in conforming the *statuta* of the city of Genova to the principles of Roman law (Piergiovanni, 1988).

worked as a universal law (*jus commune*), with local customs and rules (*jura propria*) (Berman, 1983; Bellomo, 1999; Storti, 2012, Ascheri, 1996). In addition, the development of the juridical knowledge favored the emergence of the law of merchants (Greif, 2000) that, in turn, strengthened the economic importance of the merchant urban elite (Milgrom et al., 1990; Greif et al., 1994).

Juridical skills were also fundamental to settle disputes and to define the rules to regulate social and economic interactions within a large community of citizens: not only a set of rules could be agreed on and enforced universally, but also a conceptual framework and a set of tools of interpretation were available to be applied to new situations. Such developments reduced the uncertainty in economic transactions and sustained economic activity. Finally, students were organized in guilds and could actively participate in the administration of the university institutions: they could sign contracts with the professors, discuss the *curricula*, regulate lodging rents, etc. (Berman, 1983). These embryonic forms of self-organization provided a model for the implementation of the city self-government.

3. Data Description

Our empirical investigation focuses on the northern-central Italian cities between 1000 and 1300. In particular, we include in our sample of cities all the cities for which the available historical documents allow us to verify the three following pieces of information: that they existed at the beginning of the XIth century, when they acquired communal institutions (possibly never), and whether or not they were seats of a bishop in the sample period. The resulting sample consists of 121 cities, 70 episcopal cities and 51 non-episcopal cities.²

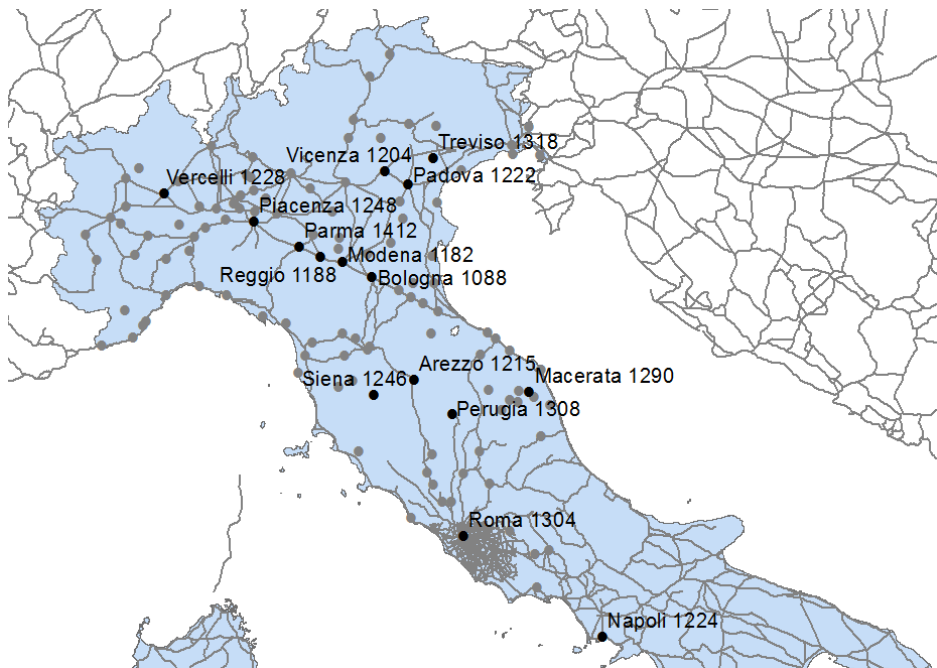
First, for all the cities in our sample, we need to know whether or not they acquired communal institutions and, if they did, in which year. Following the historical records, we set the institutional transition in the first year in which the sources provide reliable evidence of the presence of the *consules*, the *statutum*, an official document signed by the commune's representatives, or any other fact testifying that the communal experience has begun. Details are in Belloc, Drago, and Galbiati (2016) that also provides information, for each city in the sample, on the episcopal (or non-episcopal) status in 1000.

² Appendix A reports the list of cities in our dataset, the year of transition to communal institutions (if any) and whether or not they were seats of a bishop in 1000. Details on the sample restrictions are reported in Belloc, Drago, and Galbiati (2016).

Second, we need to know whether or not each city in the sample hosted a university: if it did, in which year the university was founded; if not, its distance from the cities where universities were located. To set the precise date of foundation of medieval universities is not always straightforward. Scientific schools for higher education already existed in the ancient times (Christian cathedral schools, ecclesiastical school, *scholae monasticae*). They differed, however, from the modern universities by the fact that the latter had the power to confer a particular juridical status to students at the end of the *curriculum studiorum* (Treccani, 2013). The first universities accordingly defined were born in Europe starting from the late XIth century. These schools had two distinguishing characteristics: they were organized as *studia generalia* and as *magistrorum et scholarium*. *Studium generale* originally meant a space where students from every district or region were welcome to attend lectures, while *universitas magistrorum et scholarium* were the guilds of teachers and scholars. The titles awarded by the universities were recognized by the Pope or the emperor, had universal validity, and conferred a *ius ubique docenti* (Treccani, 2013). In some cases, universities were just the evolution *ex consuetudine* of ecclesiastical schools; new-born universities, by contrast, needed a papal or imperial permission and, hence, their foundation can be precisely dated. To ensure a high degree of accuracy of our data, we have included in our data only the dates of university foundation for which the historical sources ensure a good degree of accuracy. These sources are listed in Appendix B. The oldest university in the world, according to several consistent sources, is the university of Bologna established in 1088: this is our first and main treatment. According to the collected historical sources, the establishment of the university of Bologna was followed by the foundation of the universities of Modena (1182), Vicenza (1204), Arezzo (1215), Padova (1222), Naples Federico II (1224), Vercelli (1228), Siena (1246), Piacenza (1248), and Macerata (1290). Figure 1 shows the location of the university cities.

Finally, for each city in the sample we need the distance from the existing universities located in other cities. Following the literature (Cantoni and Yuchtman, 2014), we consider the distance from the university as a proxy of the cost of university attendance for the administrative elite in a city. In computing this distance, we have tried to reproduce the effective route an individual travelling in the Middle Ages would tread and to capture the time lapse necessary to reach destination depending on the feasibility of the path, not just the space between the two geographical points. To this aim, we have considered two pieces of information: the network of Roman roads existing in the Middle Ages (information is taken from DARMC, 2016), depicted in Figure 1, and the orography (data from SRTM, 2016).

Figure 1



Note: Map of northern-central Italy. Black bullets indicate university cities (the date of university foundation is reported on the right of the city name); gray bullets indicate other cities in the sample. The map also shows the network of Roman roads.

Consider, for instance, Sarsina, which was not on a Roman road, and Bologna, which was on the Roman road called *via Aemilia*. To calculate the distance between Sarsina and Bologna, we have first measured the distance between Sarsina and the closest point on *via Aemilia* and, then, we have added the length of the path on the *via Aemilia* running from that point to Bologna. Similarly, take Fano, which is on the Roman road called *via Flaminia*. To compute the distance from Fano to Bologna, we have added the length of the path on *via Flaminia* connecting Fano and Rimini (on the way to Bologna) to the length of the path on *via Aemilia* running from Rimini to Bologna. Finally, we have penalized the resulting distance to take into account any inclination of the Earth surface. We have applied a coefficient between zero and one to routes with a negative slope, a coefficient equal to one to routes with a zero slope, and a coefficient greater than one to routes with a positive slope, with the penalty coefficient being the larger, the greater the degree of sloping. Of course, our distance proxy computed as above described is not the same if we move, for instance, from Sarsina to Bologna or the other way round. Our preferred measure considers the distance from any city in the sample to the university city; our results that follows would not change should we consider the inverse distance. The same procedure is adopted to compute the distance between each city and the

most important medieval ports, Pisa, Genova, and Venezia and that between each city and the transit points to the Champagne fairs (Moncenisio and San Gottardo).

Finally, we collect data on two additional city characteristics: the status of Etruscan city (*Etruscan*) and the city's elevation in meters (*Elevation*). Information on the Etruscan origins of the cities have been collected by the authors through a careful reading of the history sources; geographical characteristics of the cities have been taken from Istat (2009).

4. Empirical Strategy and Results

4.1 Basic Empirical Model and Identification

To assess the impact of the foundation of a university on the probability of institutional change, we exploit a source of variation that combines the temporal variation of the foundation of the university of Bologna with the geographical distance between each city in the sample and Bologna. More specifically, we estimate the following model:

$$y_{it} = \alpha_i + \beta_t + \gamma \text{Bologna}_i \times \text{Post1088}_t + \varepsilon_{it}, \quad (1)$$

where i and t denote respectively the city and the year. The dependent variable, y_{it} , is a dummy variable equal to one if city i established communal institutions in year t and equal to zero otherwise. Since we are interested in studying the effects of the university on the probability of institutional change, if the transition occurred in city i at time t , no time is defined for that city after t .³ $\text{Bologna}_i \times \text{Post1088}_t$ is the interaction between the distance from city i to the university of Bologna and a dummy equal to zero when t is smaller than 1088 (year of foundation of the university of Bologna) and equal to one after that. α_i and β_t are, respectively, city and period fixed effects. The estimated coefficient γ is expected to be negative indicating that the positive effect of the establishment of the university is decreasing with the distance from it. In another specification, we replace Bologna_i with University_i , which is the minimum distance between city i and a university city (any), also interacted with Post1088_t . We also try a model where $\text{Bologna}_i \times \text{Post1088}_t$ is substituted for a set of 10 different variables, each representing the interaction of two variables: the distance between each city in the sample and a university city (Bologna, Modena, Vicenza, Arezzo, Padova, Naples, Vercelli, Siena, Piacenza, and Macerata) and a dummy equal to one in the corresponding year of university foundation and to zero otherwise. Model (1) and its

³ The reversal from communal to feudal political regimes is not historically observed in the cities of our sample (see Belloc, Drago and Galbiati, 2016, for details).

variations are estimated by OLS to accommodate a large set of year and city fixed effects (see also Belloc, Drago and Galbiati, 2016). For each model estimation, we compute both standard errors clustered at the city level and Conley's standard errors adjusted for potential spatial dependence between observations (Conley, 1999).

The key identifying assumption for estimating model (1) is that the underlying transition probability for cities located at various distance from the university of Bologna would not change after the foundation year were the university not being established. Violations of this assumption include the endogeneity of the university foundation: before the transition to a commune, if the university were founded in Bologna and not in other cities for reasons related to the communal process (for instance, the increase in commerce), the estimated coefficient in model (1) would reflect reverse causality. More in general, the estimated coefficient might reflect unobservable trends that affect both the university foundation and the institutional transition. Since, with the exception of Pisa, Imola, Genova, and Lucca, all the transitions occurred after the foundation of the university of Bologna in 1088, our design does not allow to check the presence of pre-trends including leads in equation (1).⁴ Nevertheless, we show that our results are not substantially altered when we exclude cities close to Bologna (within the first 5th, 15th and 25th percentiles of distribution of the cities' distance from Bologna), or when we drop, region by region, cities belonging to each of the 11 regions in our sample of interest.⁵ These exercises ensure that our previous results are not entirely driven by cities that have a particular location very close to/far from Bologna. Indeed, the probability of institutional change in northern-central Italian cities could well be affected by an ongoing historical process (e.g. political turmoil) that involved the area of Bologna around the year 1088 and was yet not the consequence of the university foundation. In such a case, the found association between the distance variable and the probability of transition to communal institutions would be just the spurious result of a different relation. However, were this process to exist, it would be likely to had involved also other cities in the area surrounding Bologna. By showing the robustness of our conclusions to the exclusions of cities in this area, we are likely to rule out this possibility.

Moreover, we replicate our regressions also including the distance from other important cities or connection points to the medieval trade routes (Pisa, Venezia, Genova, and the

⁴ It is difficult to support the parallel trends assumption: our dependent variable is a dummy and the graph showing the evolution of transition before and after 1088 for cities, for example, below and above the median of the distance from Bologna is uninformative.

⁵ The Italian regions are the 20 first-level administrative divisions of the state.

alpine passes) interacted with the dummy variable equal to one in the year of foundation of the university of Bologna onwards and to zero otherwise. This exercise is aimed at testing whether the effect of the distance from the university of Bologna on the transition probability to communal institutions is purely driven by the presence of the university or, on the contrary, this result is produced by other confounding events coincidentally occurred at the same time in cities characterized, for instance, by high levels of growth and urbanization, flourishing commerce, and vivid economic activity.

4.2. Results

Table 1 shows the estimated coefficient γ from model (1). Conley's standard errors corrected for spatial dependence are reported in round brackets; standard errors clustered at the city level are in square brackets. The distance from Bologna is measured in hundreds of kilometers. Therefore, the estimated coefficients indicate the decrease in the probability of a transition for a city 100 km far from Bologna (or another university city in the robustness checks) in the period following its foundation. In column (1), we report results on the full sample and, in the following columns (2)-(4), those obtained after excluding cities within the first 5th, 15th, and 25th percentiles of the cities' distance from Bologna (columns (2)-(4)). The estimated coefficients in columns (1)-(4) are negative and quite precisely estimated suggesting that it is not the variation between the group of cities very closed to Bologna and those very far from it that drives the results.⁶ To interpret the basic result in column (1), consider two cities whose distances from Bologna is equal, respectively, to 50 and 150. The estimated value, for example in column (1), suggests that after the foundation of the university of Bologna, the probability of a transition for the second city is – every year – 0.18 percentage points lower than that of the first city. In other words, by increasing the distance from Bologna by 100 km the probability of a transition decreases by 0.18 percentage points every year.

As a robustness check, we verify that our findings are unchanged when we exclude, group by group, cities belonging to each Italian region in the sample of interest (11 regions). Results are showed in Table 2. The relevant coefficients are negative, similar in size to the baseline coefficients and always statistically significant (with the only exception of the last

⁶ In the results reported in column (4), the effect is not precisely estimated (large standard errors), but at the same time not statistically different from those estimated in columns (1)-(3).

Table 1. Main results

| | (1) | (2) | (3) | (4) |
|----------------------------------|-----------------------------------|--|---|---|
| | Full sample | Excluding cities within 5th percentile | Excluding cities within 15th percentile | Excluding cities within 25th percentile |
| <i>Bologna</i> × <i>Post1088</i> | -0.0018** (0.0008) [0.0009] | -0.0018* (0.0009) [0.0010] | -0.0022** (0.0011) [0.0012] | -0.0015 (0.0011) [0.0012] |
| Observations | 25,787 | 24,705 | 22,213 | 20,038 |
| R-squared | 0.026 | 0.027 | 0.027 | 0.026 |
| Cities | 121 | 115 | 103 | 91 |

Notes: Estimation by OLS of model (1). City fixed effects always included. The dependent variable is a dummy=1 if city i became a commune at time t and =0 otherwise. Conley's standard errors corrected for spatial dependence with threshold distance of 100 km are reported in round brackets; standard errors clustered at the city level are in square brackets. *** = significant at 1%; ** = significant at 5%; * = significant at 10%. Statistical significance is indicated employing the Conley' standard errors.

column where we exclude cities located in Lazio; here the coefficient is only marginally significant).

In the following exercise, we look at whether the birth of the university of Bologna impacted differently cities that in 1000 were governed by secular leaders and cities that instead were ruled by bishops. In Table 3, we report results from estimation of model (1) after interacting $Bologna_i \times Post1088_t$ with $Bishop_i$, that is a dummy equal to one if city i was an episcopal city in 1000 and to zero otherwise. We observe that the effect of the establishment of the university of Bologna is stronger for non-episcopal cities than for episcopal ones. The triple interaction between the distance from Bologna, the dummy for 1088 and the dummy for episcopal see city is indeed positive and quite precisely estimated. This effect is not explained (see columns (2)-(4)) by other predetermined geographical and historical variables potentially correlated with the episcopal status of the city (the presence of a Roman road, the elevation, and the status of Etruscan city in the past).

To rationalize this latter finding, one must consider that one of the differences between cities governed by the feudal lord and cities ruled by bishops was that in the latter group schools of higher education (the cathedral schools) generally existed well before the foundation of medieval universities (Berman, 1983). Despite the curriculum taught in these schools did not include the study of the ancient Roman law, we might expect the level of

Table 2. Excluding cities region by region

| <i>Panel A</i> | | | | | | |
|----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|----------------------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | Full sample | Piemonte | Lombardia | Trentino- Alto Adige | Veneto | Friuli-Venezia Giulia |
| <i>Bologna</i> × <i>Post1088</i> | -0.0018** (0.0008) [0.0009] | -0.0019** (0.0009) [0.0009] | -0.0018** (0.0009) [0.0009] | -0.0017** (0.0008) [0.0009] | -0.0018** (0.0009) [0.0010] | -0.0016* (0.0008) [0.0009] |
| Observations | 25,787 | 22,668 | 21,740 | 24,583 | 23,105 | 24,588 |
| R-squared | 0.026 | 0.030 | 0.031 | 0.030 | 0.030 | 0.030 |
| Cities | 121 | 105 | 101 | 117 | 110 | 117 |
| <i>Panel B</i> | | | | | | |
| | (7) | (8) | (9) | (10) | (11) | (12) |
| | Liguria | Emilia- Romagna | Toscana | Umbria | Marche | Lazio |
| <i>Bologna</i> × <i>Post1088</i> | -0.0020** (0.0008) [0.0009] | -0.0019* (0.0010) [0.0011] | -0.0015* (0.0009) [0.0009] | -0.0019** (0.0008) [0.0009] | -0.0018** (0.0008) [0.0009] | -0.0016 (0.0010) [0.0011] |
| Observations | 24,118 | 22,511 | 23,256 | 25,188 | 22,730 | 23,383 |
| R-squared | 0.030 | 0.029 | 0.029 | 0.030 | 0.031 | 0.031 |
| Cities | 113 | 104 | 107 | 118 | 107 | 111 |

Notes: Estimation by OLS of model (1). City fixed effects always included. The dependent variable is a dummy=1 if city i became a commune at time t and =0 otherwise. The name of the region in the column title indicates the region excluded in estimation. Conley's standard errors corrected for spatial dependence with threshold distance of 100 km are reported in round brackets; standard errors clustered at the city level are in square brackets. *** = significant at 1%; ** = significant at 5%; * = significant at 10%. Statistical significance is indicated employing the Conley' standard errors.

human capital in episcopal cities to be higher than in cities with a secular government (for instance, a larger share of the population could read and write the holy scriptures). Hence, the differential effects reported in Table 3 can be explained in a framework where the aggregated stock of human capital exhibits decreasing marginal returns in the process of institutional formation at the city level.⁷ One further explanation for the reduced effect of university proximity in episcopal see cities could be that the presence of bishops in those cities and their control on the cathedral schools imposed stronger barriers to the initial penetration of the secular juridical culture that could be perceived as a threat to the religious justification of power.

⁷ This hypothesis does not exclude the presence of externalities not associated with the process of institutional change or the presence of increasing returns.

Table 3. Differential effects

| | (1) | (2) | (3) | (4) |
|--|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| | Interaction with Bishop | Interaction with Elevation | Interaction with Roman road | Interaction with Etruscan |
| <i>Bologna</i> × <i>Post1088</i> | -0.0033*** (0.0010) [0.0010] | -0.0032*** (0.0011) [0.0011] | -0.0032*** (0.0010) [0.0010] | -0.0031*** (0.0010) [0.0010] |
| <i>Bologna</i> × <i>Post1088</i> × <i>Bishop</i> | 0.0023*** (0.0007) [0.0007] | 0.0023*** (0.0006) [0.0007] | 0.0022*** (0.0006) [0.0007] | 0.0021*** (0.0006) [0.0007] |
| <i>Bologna</i> × <i>Post1088</i> × <i>Elevation</i> | | -0.0001 (0.0009) [0.0013] | | |
| <i>Bologna</i> × <i>Post1088</i> × <i>Roman road</i> | | | -0.0153 (0.0379) [0.0366] | |
| <i>Bologna</i> × <i>Post1088</i> × <i>Etruscan</i> | | | | 0.0013 (0.0014) [0.0016] |
| Observations | 25,787 | 25,787 | 25,787 | 25,787 |
| R-squared | 0.027 | 0.027 | 0.027 | 0.027 |
| Cities | 121 | 121 | 121 | 121 |

Notes: Estimation by OLS of modification of model (1). City fixed effects always included. The dependent variable is a dummy=1 if city *i* became a commune at time *t* and = 0 otherwise. Conley's standard errors corrected for spatial dependence with threshold distance of 100 km are reported in round brackets; standard errors clustered at the city level are in square brackets. *** = significant at 1%; ** = significant at 5%; * = significant at 10%. Statistical significance is indicated employing the Conley' standard errors.

4.3. Distance from main trade routes

As we have seen in Section 2, the communal movement took place during a period of strong revival of international trade when merchants become part of the leading urban elites (Pirenne, 1925). Merchants faced a growing incentive to invest in political participation and to impose constraints on the executive to protect their own interests as it is well described for the case of Venice by Puga and Trefler (2014). If this is the case, since the city of Bologna was positioned on an ancient Roman road (the *via Aemilia*) in the center of northern Italy, our results would just capture the effect of the city distance from the main trade routes. In the following exercise, we thus check whether our results hold even when we control for the distance from the main points of connection to international trade routes.

To this aim, we include in our model an additional variable interacting the 1088 time dummy with the cities' distance from the most important coeval ports and merchant centers, Pisa, Genova, and Venezia (see Greif, 1989, and Puga and Trefler, 2014), and from transit points to the Champagne fairs (Moncenisio and San Gottardo), which represent the main

Table 4. Distance from main trade routes

| | (1) | (2) | (3) | (4) | (5) |
|--|-----------------------------------|------------------------------------|-----------------------------------|------------------------------------|------------------------------------|
| | $z = \text{Pisa}$ | $z = \text{Genova}$ | $z = \text{Venezia}$ | $z = \text{Moncenisio}$ | $z = \text{S. Bernardo}$ |
| <i>Bologna</i> × <i>Post1088</i> | -0.0014* (0.0008) [0.0013] | -0.0038*** (0.0009) [0.0011] | -0.0025** (0.0010) [0.0014] | -0.0031*** (0.0010) [0.0011] | -0.0040*** (0.0010) [0.0011] |
| <i>Bologna</i> × <i>Post1088</i> × <i>Bishop</i> | 0.0013 (0.0020) (0.0023) | 0.0057*** (0.0017) [0.0015] | 0.0035** (0.0014) [0.0017] | 0.0058*** (0.0021) [0.0018] | 0.0052** (0.0022) [0.0018] |
| <i>Distance from z</i> × <i>Post1088</i> | -0.0028** (0.0008) [0.0013] | -0.0013*** (0.0005) [0.0006] | -0.0008* (0.0004) [0.0007] | -0.0015*** (0.0006) [0.0006] | -0.0015** (0.0006) [0.0007] |
| <i>Distance from z</i> × <i>Post1088</i> × <i>Bishop</i> | 0.0011 (0.0016) [0.0018] | -0.0017* (0.0009) [0.0009] | -0.0007 (0.0007) [0.0010] | -0.0013 (0.0010) [0.0009] | -0.0010 (0.0010) [0.0010] |
| Observations | 25,787 | 25,787 | 25,787 | 25,787 | 25787 |
| R-squared | 0.030 | 0.031 | 0.030 | 0.031 | 0.031 |
| Cities | 121 | 121 | 121 | 121 | 121 |

Notes: Estimation by OLS of modification of model (1). City fixed effects always included. The dependent variable is a dummy=1 if city i became a commune at time t and = 0 otherwise. Conley's standard errors corrected for spatial dependence with threshold distance of 100 km are reported in round brackets; standard errors clustered at the city level are in square brackets. *** = significant at 1%; ** = significant at 5%; * = significant at 10%. Statistical significance is indicated employing the Conley' standard errors.

coeval trade platforms in Europe (Milgrom et al., 1990). As we show in Table 4, while the distance from the main ports or connection points to the international trade routes has an impact on the probability to adopt a communal regime, the additional effect of the distance from Bologna remains substantially unchanged. This result is consistent with the idea that the spread of juridical knowledge mattered for the process of institutional change on the top of the economic changes, which characterized Italian cities in the same period.

4.4. Short vs. Medium-Long Run Effect

In this section, we investigate the dynamics of the effect we have previously found. To this goal, we adopt the following model:

$$y_{it} = \alpha_i + \beta_t + \sum_{s=0}^{10} \gamma_s \times \text{Bologna}_i \times D[1088 + s \times 20]_t + \sum_{s=0}^{10} \gamma_s \times \text{Bologna}_i \times D[1088 + s \times 20]_t \times \text{Bishop}_i + \varepsilon_{it}. \quad (2)$$

The aim of this exercise is to empirically assess the effect of the distance from the university of Bologna on the transition probability in each 20-year interval starting from 1088 (hence, for instance, $\text{Bologna}_i \times D1088_t$ is equal to the distance between city i and Bologna from 1088 to 1107 and to zero otherwise, $\text{Bologna}_i \times D1108_t$ is equal to that distance from 1108 to 1127

Table 5. Short vs. medium-long run effect

| | (1) | (2) | (3) | (4) |
|--------------------------------|------------------------------------|--|---|---|
| | Full sample | Excluding cities within 5th percentile | Excluding cities within 15th percentile | Excluding cities within 25th percentile |
| <i>Bologna</i> × <i>D</i> 1088 | -0.0024** (0.0012) [0.0014] | -0.0032** (0.0014) [0.0017] | -0.0035* (0.0019) [0.0021] | -0.0031 (0.0022) [0.0022] |
| <i>Bologna</i> × <i>D</i> 1180 | -0.0057*** (0.0017) [0.0020] | -0.0057*** (0.0017) [0.0020] | -0.0077*** (0.0026) [0.0028] | -0.0075*** (0.0029) [0.0030] |
| <i>Bologna</i> × <i>D</i> 1128 | -0.0069*** (0.0026) [0.0026] | -0.0054* (0.0028) [0.0024] | -0.0076** (0.0031) [0.0030] | -0.0069** (0.0034) [0.0031] |
| <i>Bologna</i> × <i>D</i> 1148 | -0.0018 (0.0020) [0.0021] | -0.0019 (0.0022) [0.0023] | -0.0015 (0.0023) [0.0025] | -0.0023 (0.0031) [0.0033] |
| <i>Bologna</i> × <i>D</i> 1168 | -0.0055* (0.0029) [0.0026] | -0.0062* (0.0033) [0.0029] | -0.0054* (0.0029) [0.0030] | -0.0024 (0.0017) [0.0021] |
| <i>Bologna</i> × <i>D</i> 1188 | -0.0002 (0.0025) [0.0026] | -0.0003 (0.0028) [0.0029] | -0.0013 (0.0036) [0.0038] | 0.0007 (0.0037) [0.0040] |
| <i>Bologna</i> × <i>D</i> 1208 | -0.0004 (0.0018) [0.0019] | -0.0003 (0.0019) [0.0020] | -0.0002 (0.0023) [0.0025] | 0.0006 (0.0026) [0.0028] |
| <i>Bologna</i> × <i>D</i> 1228 | 0.0002 (0.0019) [0.0019] | -0.0000 (0.0020) [0.0020] | -0.0011 (0.0024) [0.0025] | -0.0014 (0.0027) [0.0029] |
| <i>Bologna</i> × <i>D</i> 1248 | -0.0018** (0.0008) [0.0007] | -0.0019** (0.0008) [0.0007] | -0.0023** (0.0009) [0.0009] | -0.0018* (0.0010) [0.0010] |
| <i>Bologna</i> × <i>D</i> 1268 | -0.0018** (0.0008) [0.0007] | -0.0019** (0.0008) [0.0007] | -0.0023** (0.0009) [0.0009] | -0.0018* (0.0010) [0.0010] |
| <i>Bologna</i> × <i>D</i> 1288 | -0.0018* (0.0009) [0.0009] | -0.0018* (0.0010) [0.0009] | -0.0023** (0.0011) [0.0012] | -0.0020 (0.0013) [0.0015] |

Table 5. Short vs. medium-long run effect (cont.)

| | (1) | (2) | (3) | (4) |
|---|-----------------------------------|--|---|---|
| | Full sample | Excluding cities within 5th percentile | Excluding cities within 15th percentile | Excluding cities within 25th percentile |
| <i>Bologna</i> × <i>D1088</i> × <i>Bishop</i> | 0.0020* (0.0011) [0.0010] | 0.0020* (0.0011) [0.0010] | 0.0022* (0.0012) [0.0011] | 0.0019 (0.0012) [0.0011] |
| <i>Bologna</i> × <i>D1180</i> × <i>Bishop</i> | 0.0032*** (0.0010) [0.0010] | 0.0032*** (0.0010) [0.0010] | 0.0034*** (0.0011) [0.0011] | 0.0032*** (0.0012) [0.0012] |
| <i>Bologna</i> × <i>D1128</i> × <i>Bishop</i> | 0.0040*** (0.0014) [0.0015] | 0.0037*** (0.0014) [0.0015] | 0.0040*** (0.0014) [0.0016] | 0.0035** (0.0014) [0.0015] |
| <i>Bologna</i> × <i>D1148</i> × <i>Bishop</i> | 0.0019 (0.0015) [0.0015] | 0.0018 (0.0015) [0.0015] | 0.0016 (0.0015) [0.0015] | 0.0017 (0.0015) [0.0016] |
| <i>Bologna</i> × <i>D1168</i> × <i>Bishop</i> | 0.0047** (0.0020) [0.0020] | 0.0047** (0.0020) [0.0020] | 0.0043** (0.0020) [0.0020] | 0.0031* (0.0018) [0.0018] |
| <i>Bologna</i> × <i>D1188</i> × <i>Bishop</i> | 0.0010 (0.0019) [0.0019] | 0.0010 (0.0019) [0.0019] | 0.0011 (0.0020) [0.0020] | 0.0009 (0.0021) [0.0020] |
| <i>Bologna</i> × <i>D1208</i> × <i>Bishop</i> | 0.0006 (0.0010) [0.0011] | 0.0006 (0.0010) [0.0011] | 0.0005 (0.0011) [0.0012] | 0.0002 (0.0011) [0.0012] |
| <i>Bologna</i> × <i>D1228</i> × <i>Bishop</i> | -0.0010 (0.0014) [0.0014] | -0.0010 (0.0014) [0.0014] | -0.0009 (0.0014) [0.0014] | -0.0011 (0.0014) [0.0014] |
| <i>Bologna</i> × <i>D1248</i> × <i>Bishop</i> | 0.0013*** (0.0005) [0.0005] | 0.0013*** (0.0005) [0.0005] | 0.0013*** (0.0005) [0.0005] | 0.0011** (0.0005) [0.0005] |
| <i>Bologna</i> × <i>D1268</i> × <i>Bishop</i> | 0.0013*** (0.0005) [0.0005] | 0.0013*** (0.0005) [0.0005] | 0.0013*** (0.0005) [0.0005] | 0.0011** (0.0005) [0.0005] |
| <i>Bologna</i> × <i>D1288</i> × <i>Bishop</i> | 0.0027* -0.0014 [0.0014] | 0.0026* -0.0014 [0.0014] | 0.0027* (0.0014) [0.0015] | 0.0025* (0.0014) [0.0015] |
| Observations | 25,787 | 24,705 | 22,213 | 20,038 |
| R-squared | 0.031 | 0.031 | 0.032 | 0.031 |
| Cities | 121 | 115 | 103 | 91 |

Notes: Estimation by OLS of modification of model (1). City fixed effects always included. The dependent variable is a dummy=1 if city *i* became a commune at time *t* and = 0 otherwise. Conley's standard errors corrected for spatial dependence with threshold distance of 100 km are reported in round brackets; standard errors clustered at the city level are in square brackets. *** = significant at 1%; ** = significant at 5%; * = significant at 10%. Statistical significance is indicated employing the Conley' standard errors.

and to zero otherwise, and so on). Results for the full sample are in column (1) of Table 5: with the exception of the point estimate in the second decade after 1088, all the other point estimates are not statistically different from each other. While the lack of power when splitting our treatment for many periods limits the precision of the estimates, we observe a negative effect of the distance on the transition probability for all the periods from 1088 onwards. The effect is especially large 20 years after the foundation of the university of Bologna and starts to decrease several decades later. Interestingly, from Table 5 we note that also the differential effect between episcopal and non-episcopal cities is quite persistent. These results are consistent with the idea that human capital accumulation fostered the transition to the commune in the long-run. In the last three columns ((2)-(4)), we repeat this exercise dropping cities close to Bologna, percentile by percentile, as we did in Table (1). Previous results are widely confirmed.

4.3. The role of the other universities

Following the birth of the university of Bologna, several other universities were founded in northern-central Italy in our period of interest. Although, the identifying assumption in the presence of several universities is even more demanding than that we employed in the previous sections, it is interesting to understand if our conclusions remain unchanged when, in model (1), we consider the distance from any university founded in the sample period. Results are reported in Table 6 which essentially replicates Table 3 after replacing the variable $Bologna_i$ with $University_i$, that is equal to the minimum distance between city i and a university city, interacted with $Post1088_t$. As we can see, our previous results are essentially unchanged. One interpretation is that the foundation of other universities did not affect the cost of attendance over time. Another explanation is that Bologna, being the first university founded in Italy, played a greater role. When we include in the regression separately a different variable for the distance of each of the 10 universities founded in northern-central Italy in the 1000-1300 period interacted with a dummy variable equal to one in the year of university foundation onwards and to zero otherwise, we find that only the proximity to Bologna has a statistically significant effect (results not shown for reasons of space). This evidence is consistent with the idea that the university of Bologna, relative to other universities founded later, had a key role in the process of generating juridical human capital for the formation of communal institutions.

Table 6. Distance from the closest university

| | (1) | (2) | (3) | (4) |
|---|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| | Interaction with Bishop | Interaction with Altitude | Interaction with Roman road | Interaction with Etruscan |
| <i>University</i> × <i>Post1088</i> | -0.0036*** (0.0009) [0.0008] | -0.0035*** (0.0010) [0.0008] | -0.0036*** (0.0010) [0.0008] | -0.0035*** (0.0010) [0.0008] |
| <i>University</i> × <i>Post1088</i> × <i>Bishop</i> | 0.0023*** (0.0007) [0.0007] | 0.0023*** (0.0007) [0.0007] | 0.0023*** (0.0007) [0.0007] | 0.0022*** (0.0008) [0.0007] |
| <i>University</i> × <i>Post1088</i> × <i>Elevation</i> | | -0.0167 (0.0389) [0.0354] | | |
| <i>University</i> × <i>Post1088</i> × <i>Roman road</i> | | | -0.0001 (0.0010) [0.0011] | |
| <i>University</i> × <i>Post1088</i> × <i>Etruscan</i> | | | | 0.0013 (0.0014) [0.0015] |
| Observations | 25,787 | 25,787 | 25,787 | 25,787 |
| R-squared | 0.030 | 0.030 | 0.030 | 0.030 |
| Cities | 121 | 121 | 121 | 121 |

Notes: Estimation by OLS of modification of model (1). City fixed effects always included. The dependent variable is a dummy=1 if city i became a commune at time t and = otherwise. Conley's standard errors corrected for spatial dependence with threshold distance of 100 km are reported in round brackets; standard errors clustered at the city level are in square brackets. *** = significant at 1%; ** = significant at 5%; * = significant at 10%. Statistical significance is indicated employing the Conley' standard errors.

Concluding remarks

In this paper, we argue that identifying the relation that links the process of the communal movement and the birth of the first universities in the medieval northern-central Italy is a suitable design to understand the relationship between the diffusion of high education and the institutional evolution toward broad-based institutional settings. We have presented historical and empirical evidence consistent with the idea that a shock to human capital accumulation represented a stimulus to the adoption of more democratic institutional forms. While our findings should be taken with caution because of the difficulty to disentangle causal relationships in this context, our results suggest that the wider diffusion of juridical knowledge played an important role in favoring the emergence of more inclusive institutions in the Italian Middle Ages over and above the role of the revival of the international trade that also characterized Italian cities in the same historical moment.

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Appendices

Appendix A: Transition dates

| <i>City</i> | <i>Year</i> | <i>Episcopal</i> | <i>City</i> | <i>Year</i> | <i>Episcopal</i> | <i>City</i> | <i>Year</i> | <i>Episcopal</i> |
|----------------------------|-------------|------------------|----------------|-------------|------------------|-------------------------|-------------|------------------|
| Acqui Terme | 1135 | Yes | Fondi | - | Yes | Pistoia | 1105 | Yes |
| Alassio | - | No | Forli | 1182 | Yes | Prato | 1107 | No |
| Alba | 1169 | Yes | Fossombrone | - | Yes | Ravenna | 1109 | Yes |
| Albenga | 1098 | Yes | Galliate | - | No | Reggio Nell'Emilia | 1136 | Yes |
| Aquileia | - | Yes | Garlasco | - | No | Rieti | 1171 | Yes |
| Arezzo | 1098 | Yes | Genova | 1080 | Yes | Rovereto | - | No |
| Ascoli Piceno | 1183 | Yes | Gorizia | - | No | Rovigo | - | No |
| Asiago | - | No | Grado | - | Yes | Saluzzo | - | No |
| Asti | 1095 | Yes | Grosseto | 1204 | No | San Colombano Al Lambro | - | No |
| Bergamo | 1098 | Yes | Iesolo | - | Yes | San Gimignano | 1199 | No |
| Biella | 1245 | No | Imola | 1084 | Yes | San Severino Marche | 1170 | No |
| Bologna | 1116 | Yes | Imperia | - | No | Sant'Angelo Lodigiano | - | No |
| Bolzano | - | No | Ivrea | 1171 | Yes | Sarsina | - | Yes |
| Brescia | 1127 | Yes | La Spezia | - | No | Savona | 1191 | Yes |
| Bressanone | - | Yes | Livorno | - | No | Senigallia | - | Yes |
| Camerino | - | Yes | Lodi | 1142 | Yes | Siena | 1147 | Yes |
| Caravaggio | 1182 | No | Lucca | 1081 | Yes | Sora | - | Yes |
| Carpi | - | No | Lugo | - | No | Soresina | - | No |
| Castiglione Delle Stiviere | - | No | Macerata | 1138 | No | Stradella | - | No |
| Cento | - | No | Mantova | 1115 | Yes | Subiaco | 1193 | No |
| Cesena | 1176 | Yes | Massa | - | No | Sutri | - | Yes |
| Chiavari | 1243 | No | Milano | 1097 | Yes | Tolentino | 1166 | No |
| Chieri | 1150 | No | Modena | 1135 | Yes | Tortona | 1122 | Yes |
| Chioggia | - | No | Monselice | - | No | Treia | 1157 | No |
| Chivasso | - | No | Montefiascone | - | No | Trento | - | Yes |
| Civitavecchia | - | Yes | Narni | - | Yes | Treviglio | - | No |
| Codogno | 1232 | No | Nepi | 1131 | Yes | Treviso | 1150 | Yes |
| Comacchio | - | Yes | Novara | 1116 | Yes | Trieste | 1295 | Yes |
| Como | 1109 | Yes | Novi Di Modena | - | No | Valenza | 1204 | No |
| Corridonia | - | No | Novi Ligure | 1135 | No | Ventimiglia | 1149 | Yes |
| Crema | 1185 | No | Numana | - | Yes | Vercelli | 1141 | Yes |
| Cremona | 1098 | Yes | Ormea | - | No | Veroli | - | Yes |
| Empoli | - | No | Orvieto | 1157 | Yes | Verona | 1136 | Yes |
| Fabriano | 1234 | No | Padova | 1138 | Yes | Viadana | - | No |
| Faenza | 1141 | Yes | Parma | 1149 | Yes | Vicenza | 1147 | Yes |
| Fano | 1114 | Yes | Pavia | 1106 | Yes | Viterbo | 1099 | No |
| Feltre | - | Yes | Perugia | 1139 | Yes | Vittorio Veneto | - | Yes |
| Fermo | 1199 | Yes | Pesaro | 1182 | Yes | Voghera | 1136 | No |
| Ferrara | 1105 | Yes | Piacenza | 1126 | Yes | Volterra | 1170 | Yes |
| Fiesole | - | Yes | Pinerolo | 1220 | No | | | |
| Firenze | 1125 | Yes | Pisa | 1081 | Yes | | | |

Notes: Sample period (1000-1300). Year is the year when the first evidence of the commune was found in historical sources. '-' denotes the city never becomes a commune within the sample period. Episcopal 'Yes' denotes that the city was seat of a bishop (70 cities); Episcopal 'No' that the city was not seat of a bishop (51 cities). Sources are reported in Belloc, Drago, and Galbiati (2016).

Appendix B: Sources for university foundations

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