State-Building and the Origin of Universities in Europe, 800-1800*

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Abstract

Universities are an important but understudied institutional innovation in European history. Universities contribute to innovation, economic growth, state capacity, and play an essential role in social and political progress. What specific factors led to the initial emergence of universities and their subsequent spread throughout Europe? We argue that universities emerged as a consequence of the increased competition between secular and ecclesiastical rule. The Catholic Church maintained a near monopoly over the training of legal, theological, and philosophical experts and the supply of legitimizing ideology for political authority, requiring secular rulers to cooperate with ecclesiastical rulers. Increased demands by secular rulers for the independent supply of an administrative workforce and new governance frameworks, paired with socio-political shocks that weakened the Church' control over legal training, led to increased competition between secular and ecclesiastical rule and a flourishing of universities. We collect original data on university creations and closures from 800-1800 and combine these with data on European cities and early-modern state-building. We find universities were more likely to emerge in cities that were centers of ecclesiastical rule and in cites with self-governance institutions. The competition between ecclesiastical and secular demands was heightened with changing power-dynamics caused by the reformation. Lastly, we provide preliminary evidence that universities significantly increased local state capacity.

Key Words: Universities, State-Building, State Capacity, Education

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1 Introduction

European political and economic history has featured many institutional innovations—ranging from constitutional rule, parliaments, representative democracy, to the publicly traded stock company—that spread to much of the rest of the world, either through voluntary adoption or coercion [Van Zanden et al., 2012, Stasavage, 2010, North and Weingast, 1989, Acemoglu and Robinson, 2006, Gelderblom et al., 2013].

Another institution that took shape in North Africa and Western Europe during the Middle Ages, and is now prevalent across the world, is the university. Today, universities are the dominant institutional locus that combines technical training, advanced human capital formation, and scientific research.[1] They play a crucial role in countries' political economy, driving innovation and economic growth [Cantoni and Yuchtman, 2014, Valero and Reenen, 2016, Andrews, 2017] and fostering social and political change, e.g., through modernization, protest movements, and democratization [Hollenbach et al., 2018, Sanborn and Thyne, 2014, Dahlum and Wig, 2019, Dahlum, 2019].

In this paper, we explore the historical origins of universities in Europe. Why and how did universities emerge in the first place? Which economic, social, and political conditions are most important in explaining the emergence and spread of this particular institutional innovation across Europe?

We contend that one useful lens to understand the creation of universities are the demands of a competitive state-building environment in Western Europe—specifically competition between secular and ecclesiastical rulers. In the early Middle Ages, the Catholic Church enjoyed a near monopoly over the supply of literate, numerate, and specialized legal, theological, and philosophical experts. This provided the Church substantial influence over secular rulers' state-building attempts. Given the widespread adoption of Christianity, it reduced the ability of secular authorities to develop new frameworks for legitimizing rule outside the purview of the Church. Moreover, it ham-

[1] Universities are by no means the exclusive public or private institution that engages in scientific research. Scientific academies, publicly funded research institutes, and many private businesses also contribute to scientific innovation. Nonetheless, universities are the dominant institutional form that combines the training of scientific experts with research.

pered the ability of secular rulers to adjust existing theories of governance to address new policy challenges without the Church's input. In addition, it enabled ecclesiastical authorities to influence the staffing of rudimentary secular bureaucratic structures and limited the state's ability to build autonomous capacity. Given the fractionalized and weak nature of European secular political authorities in the early Middle Ages, rulers were willing to cede these non-coercive and non-extractive dimensions of state-building to the Catholic Church.

We argue that when secular rulers gained political power, as they consolidated and differentiated their authority, the secular demand for a differentiated, well-trained, and loyal bureaucracy grew. As political rulers slowly attempted to disassociate from the Church and further develop forms of secular rule, the need for theories of political legitimacy, independent from orthodox Catholic doctrine, intensified. Similarly, *bellicist* pressures from external and internal war [Tilly, 1990], the desire to regulate long-distance trade [Cantoni and Yuchtman, 2014], and the development of new forms of solving intra-elite conflict [Stasavage, 2010] led to increasing demand for trained civil servants and administrators. These developments generated an incentive to break or re-negotiate the collaborative relationship with the Catholic Church and establish a new supply of trained legal experts and theories of political legitimacy and governance. This competitive environment generated an opening for the creation of separate corporate entities—in the form of the university—and fostered its spread across Europe. The move from a collaborative to a more competitive relationship with the Catholic Church in the realm of legal statecraft and human resources was particularly pronounced when and where the power of ecclesiastical rulers was weakened due to exogenous socio-political shocks.

To empirically explore the explanatory power of our argument, we collect original data on university creations and closures from 800-1800. We combine these data on the number and locations of universities with detailed data on European cities that could have served as potential locations for universities [Bosker et al., 2012] and data on early-modern state-building (e.g., from Dincecco and Onorato 2018 and Nüssli 2011). Our unit of analysis is the city, nested in a state, covering the centuries 800-1800.

First, we show that the early establishment of universities is related to ecclesiastical

rule, in form of bishop and archbishop seats, representing the out-sized role the Catholic Church played in the training of legal experts throughout Europe. Second, we explore how different dimensions of secular state-building generated a growing demand for universities. In particular, we find that university creations are more likely in cities where forms of self-governance are present. In contrast, we find little evidence that traditional *bellicist* forces [Tilly, 1990] are important determinants of university creations. We then use the socio-political shock of the reformation to better test the theoretical mechanisms. We contend that the reformation significantly changed the power balance and heightened conflict between the Catholic Church and secular rulers. We show that there is no difference in pre- and post-reformation effects of local ecclesiastical and secular institutions when it comes to the creation of cities' first universities (i.e., the extensive margin). On the other hand, when it comes to the likelihood of additional university creations or the incidence of universities (i.e., the intensive margin), these institutions are particularly important after the reformation. Lastly, we provide evidence for a different sample of German towns and universities, that university creations are associated with subsequent improvements in administrative capacity and the attraction of tail-end human capital that is essential for state-building.

Overall, our findings suggest that universities emerged out of a process of cross-domain competition and played a crucial role in the creation of the modern territorial state, by supporting a qualitative expansion of statecraft. This result was less borne out of territorial competition between secular rulers but rather competition between functionally distinct types of authority: ecclesiastical versus secular power.

This paper makes several contributions to the literature. We add to the already existing research on the historical origins of institutions by theorizing and empirically investigating the previously understudied origins of universities. Existing work has focused on the historical roots of the rule of law, parliamentary practice, and legal systems [Van Zanden et al., 2012, Stasavage, 2010, North and Weingast, 1989, Acemoglu and Robinson, 2006]. This work has mostly neglected universities, although they constitute an essential institutional innovation originating in Western Europe and are likely to have

downstream effects on many of the institutions commonly studied.[2]

Second, whereas a small body of work on universities specifically exists, it is historical in nature [Rüegg, 2004, de Ridder-Symoens, 1996, 2003], focused on specific regions in Europe [Cantoni and Yuchtman, 2014], or limited in the scope of quantitative analysis [Riddle, 1989]. To our knowledge, this paper is the first to offer a broad quantitative investigation of university creations through all of Europe from 800–1800.

Third, we contribute to the growing scholarship on state-building, which has exerted much effort to understand the macro-historical patterns of the emergence of the modern, centralized state [Tilly, 1990, Herbst, 2000, Gennaioli and Voth, 2015, Abramson, 2017, Acharya and Lee, Dincecco, 2015, Besley and Persson, 2011], focusing specifically on warfare as a core causal force and the creation of tax capacity as a key signifier of modern stateness [Levi, 1989, Queralt, 2015]. We broaden this debate by considering the rise of universities as a core aspect of the European state-building process. Universities played a crucial role in the development of modern state machinery and statecraft. Our findings force us to consider a broader understanding of state capacity that emerged in tandem with classic coercive and extractive powers. The mechanisms we identify in this paper also highlights the importance of competition between functionally different forms of authority—secular and ecclesiastical rule—in parallel to standard *bellicist* arguments about competition between functionally identical but territorially separate political authorities [Grzymala-Busse, 2020]. Future research will have to determine to which extent the competition between secular and ecclesiastical rule had similar affects in other parts of the world.[3]

2 The Origin of Universities

The university, in its modern form, is a ubiquitous institution across the world [Hollenbach et al., 2018, Valero and Reenen, 2016]. At its core, universities engage in the creation and certification of human capital and the production of scientific research.

[2]There is some disagreement if centers of higher learning in the Middle East during Islam's Golden Age should be classified as universities [Huff, 2003]. There is little debate, however, that the European university would become the dominant type in its specific form.

[3]See Kuru [2019] for an important recent contribution on the Islamic world along those lines.

Complementing its educational and research missions, universities as organizations are corporate entities that often enjoy a certain degree of autonomy from government interference [Huff, 2010]. This typically comes in the form of legal regulations that guarantee academic freedom with respect to teaching and research, additionally safeguarded via secure employment for university staff. Riddle defines the university as "...a corporate entity with some degree of autonomy, teaching a diversity of subjects and typically offering advanced degrees" [Riddle, 1989, p.14]. While in reality states vary substantially in the extent they grant autonomy and financial security to universities [Hollenbach et al., 2018, Spannagel et al., 2020], this basic institutional form is surprisingly common across the world. The university's institutionalized role in modern scientific research only took shape over the course of the 18^{th} and 19^{th} century, partly in response to the intellectual developments of the Enlightenment and the Industrial Revolution. Other core features of universities, however, notably the training of specialized experts, were present starting in the 11^{th} and 12^{th} century [Riddle, 1993].

The first European universities emerged in the 11^{th} and 12^{th} century as replacements for education supplied traditionally through monastic and Cathedral schools [de Ridder-Symoens, 1996]. The emergence of urban centers in Europe led to more commercialized urban economies and an increasingly complex administration of cities and principalities throughout Europe. All while the Catholic church's governance structure became more complicated. These concurrent developments led to a rising demand for literate individuals trained in Canon and Roman law. Monastic orders that had traditionally been the centers of training for literate experts in ecclesiastical and secular rule in the early Middle Ages, however, embarked on a period of internal reform and retreat from the world. An increasing demand for literate individuals thus went unmet. As a consequence, cathedral schools and growing urban centers became focal points for the academic exchange among Canon law scholars outside of monastic orders. Eventually, Cathedral schools and informal congregations of scholars would formally incorporate as "universities", mirroring existing guild structures, to give an organizational form to their enterprise [de Ridder-Symoens, 1996].

At this point, universities engaged in the training of students in the fields of law,

theology, and medicine (later adding the arts). Training was officially certified via the conferral of degrees. Functionally, universities offered an organizational structure for scholars to engage in the exchange of training and degrees for student fees. While the earliest European universities emerged autonomously through the entrepreneurial activities of local scholars, this changed subsequently. As early as the 13^{th} century, universities sought official sanctioning by a higher political authority, typically a secular lord or the church, to add value to their degrees, instead of relying solely on reputation [Riddle, 1989].[4] In later centuries, this top-down sanctioning process became the standard procedure for university creation. The power to endow universities was then held by either the pope or a powerful secular lord. Receiving official sanction brought important benefits to universities. It allowed for the conferring of degrees that would be automatically recognized by ecclesiastical and secular authorities, creating a path of employment for university students. It also allowed students to retain income from church benefices while at university [Riddle, 1993, p.50]. Consequently, this generated a stable demand for the services offered by universities. A second privilege conferred to medieval universities was a limited form of academic freedom, which allowed subjects from different regions of Europe to travel freely for the purposes of furthering their education. Early universities may have been the first pan-European institutions, which could sell their services broadly.

As the European state-system crystallized and the modern state emerged as the dominant political form, states established well-defined national borders and differentiated central state bureaucracies [Tilly, 1990, Spruyt, 1994]. At the same time, universities increasingly institutionalized and became the main suppliers of trained administrators and producers of governance ideologies, which offered legitimizing arguments for political authority independently of the church. As the importance and strength of nation states grew, universities developed into narrower national institutions, often created and maintained at the behest of secular rulers [Fletcher, 1982, Riddle, 1989]. While absorbing the intellectual currents of the Enlightenment and the modern scientific method, the

[4]Note that universities maintained a degree of institutional autonomy, despite seeking official sanctioning, as opposed to institutions of higher learning in the Middle East or East Asia [Huff, 2010, Kuru, 2019].

influence and involvement of state authorities in the internal management of universities grew. By the turn of the 18^{th} century, for example, universities in some states were seen as stalwarts of the ancién regime, defending the privileges of the ruling elite at the expense of the rising interests of the commercial, urban elite. In France, this led to a temporary abolishment of the traditional university after the French Revolution, to the benefit of Academies of Science and the newly created Écoles Polytechnique. The institution of the university, however, proofed adaptable and resilient.

Over the course of the 18^{th} and 19^{th} century, universities across Europe began to increasingly internalize the core ideas of the Enlightenment, incorporating and elevating the natural and applied sciences. In part, these changes reflected new demands due to the Industrial Revolution, which led to internal reforms and new waves of university creations. These developments culminated in its clearest form in the shape of the modernized German universities of the late 19^{th} century, which would be imitated around the world.[5]

The historical development of the university has been covered fairly well in the literature. Several path-breaking volumes have chronicled the different waves of university creations, the institutional evolution of universities, and their role with respect to the state and society [Rüegg, 2004, de Ridder-Symoens, 1996, 2003]. Research in political science, economics, and economic history has also begun to unpack the effects of universities on various economic and political outcomes. Given that the modern university took on a new relevance and role in the wake of the Industrial Revolution, several studies have tried to ascertain the role of universities for technological innovation and economic growth [Valero and Reenen, 2016, Andrews, 2017, Cantoni and Yuchtman, 2014].

In political science, research on universities has been part of a larger program on the role of education for politics. Most famously, modernization theory [Lipset, 1981] stresses the importance of literacy and broad-based education for the process of modernization and democratization. The link between mass-level education and democratization has been investigated in multiple studies [Sanborn and Thyne, 2014, Benavot,

[5]Notably, universities as an organizational form also spread to other parts of the world as a consequence of colonial subjugation. Colonial powers saw the need to train a small local elite to staff the colonial state apparatus.

1996, Acemoglu et al., 2005a]. Related work has also looked at the relationships between mass- and elite-level education and state capacity [Hong and Paik, Green, 1990], nation-building [Bandiera et al., 2017], social trust [Rothstein and Uslaner, 2005], conflict and collective action [Thyne, 2006, Dahlum and Wig, 2017, Dahlum, 2018] or political participation [Croke et al., 2016, Lieberman et al., 2014, Wantchekon et al., 2015, Berinsky and Lenz, 2011, Larreguy and Marshall, 2016]. Specific work on universities, however, is less numerous. More recently, some studies have identified effects of universities on democratization and pro-democracy attitudes [Hollenbach et al., 2018, Sanborn and Thyne, 2014, Valero and Reenen, 2016]. Relatedly, Ansell [2010, 2006] has investigated the political economy of tertiary education in modern welfare states.

Explicit research on the emergence of universities from a political economy perspective, however, is limited. Most historians emphasize a series of jointly causal and interactive macro-historical processes, highlighting the rise of urban centers, the differentiation and competition of secular and ecclesiastical rule or intellectual and social changes in the course of the late Middle Ages and the Renaissance as drivers of university creations (Rüegg 2004, de Ridder-Symoens 1996, 2003 but also see Cantoni and Yuchtman 2014 and Cantoni and Yuchtman 2013). Riddle [1993] develops a more specific political rationale for the emergence and spread of universities. According to Riddle's [1989] argument, universities were more likely to be founded as politically fractionalization increased, i.e., the degree of political fractionalization *within* states is an important predictor of university founding before 1800.

We draw on these existing explanations and related theories of state-building to identify a specific argument about the effects of increased competition between secular and ecclesiastical rule

2.1 Secular and Ecclesiastical Rule and the Creation of Universities

Medieval European rule was characterized by pervasive *fractionalization*. On the one hand, fractionalization took the form of an increasing number of political authorities that competed for the exclusive coercive and extractive control over territory and people and their simultaneous internal weakening [Van Zanden, 2009, Tilly, 1990, Abramson,

2017]. According to Van Zanden [2009, p.33], while Europe featured fewer than 10 states in the year 800, this number increased to more than 200 by 1300. On the other hand, fractionalization also describes the existing *functional* separation between secular and ecclesiastical authority in Medieval Europe, which created parallel authority structures with joint claims over different aspects of people's lives [Mann, 1986].[6] As a consequence of this competition, the Catholic Church, as Grzymala-Busse [2020] notes, had a strong interest in preserving the fractionalization of secular political units. Early types of territorial political authority in Europe did not fully concentrate all forms of state power within well-defined borders and a unified and trained bureaucratic apparatus, nor did they have the ability to develop, refine, and broadcast a coherent legitimizing ideology for their rule, independently of the Catholic Church [Grzymala-Busse, 2020]. Instead, rulers, in large part, relinquished control over two key functions of statecraft to the Catholic Church: the supply of trained personnel to staff emerging state bureaucracies and the production of the necessary legitimizing ideology and governance frameworks for their rule.

The relationship between ecclesiastical and secular rule in Europe, at times, could be characterized as *collaborative* and, at other times, as *competitive* (see, e.g., Van Zanden 2009, Mann 1986, De Mesquita and De Mesquita 2018, and Grzymala-Busse 2020). We argue that the increasing desire of secular authorities to capture aspects of statecraft controlled by the Catholic Church and events that weakened the power of ecclesiastical rule, increasingly created a *competitive* environment that was favorable to the creation of universities.

Traditionally, the church had relied on monasteries and Cathedral schools to train priests and church administrators. The early monastic tradition laid important groundwork for the Church's control over basic literacy and numeracy training, the privileged access to the required books, and expert scholarship to interpret Christian doctrine. Monasteries and Cathedral schools allowed the church to train literate and numerate experts to maintain its own large and specialized bureaucratic apparatus and produce

[6]This separation crystallized in the Investiture Conflict and its resolution in the Concordat of Worms in 1122.

advanced and complex governance ideologies that could be used to navigate and sustain the ever-evolving relationship with secular rulers.[7] The doctrine developed by specialized legal, theological, and philosophical scholars refined governing principles that legitimized the role of the church, sanctioned specific forms of secular rule, and could be used to address novel governance challenges.

The functional division of statecraft between ecclesiastical and secular rulers conferred substantial influence to the Catholic Church. The Church had a near monopoly over the training of literacy, numeracy, and specialized knowledge of Canon law, theological doctrine, and philosophy. As a consequence, the Catholic Church had substantial influence over the staffing of rudimentary secular bureaucratic structures that increasingly required trained legal experts.

The rediscovery of Roman law in the Middle Ages promised substantial benefits for the legal and commercial development of cities. Roman law contained specific legal constructs that were valuable for the articulation of property rights [Berman, 1983, Moore, 2000] and facilitated the organization and regulation of commercial interests and long-distance trade relationships [Cantoni and Yuchtman, 2014]. The incorporation of Roman law required extensive development of legal philosophy by experts trained in the intricacies of Roman *and* Canon law. Similarly, rulers that wanted to develop secular legal texts, like royal or city charters, had to draw on a small pool of experts trained by the church to do so.

As noted above, the retreat of several monastic orders from their role as training grounds in the Middle Ages [Riddle, 1989], led the church to embrace new institutional models for the production of experts in ecclesiastical rule. Universities could be co-opted into the service of the church by offering official Papal sanctioning in exchange for the training of church staff. Since universities became the main organizational locus for expert training, we expect their creation to be tied to the presence and strength of ecclesiastical rule. Consequently, we argue that universities were more likely to be

[7] An ecclesiastical bureaucratic apparatus was also needed to collect taxes, control coercive labor arrangements on church lands, manage lands and church businesses, even engaging in the production of law and order in directly administered territories, all the while tending to the provision of religious services across thousands of small communities.

created in locations that were loci of ecclesiastical power in the form of bishop and archbishop seats:

H1: Cities with bishop or archbishop seats are associated with the creation of universities.

On the side of secular rulers, demands for trained personnel, differentiated legal frameworks and governance approaches, as well as legitimizing ideologies increased over the course of European history. The slow emergence of secular power in the form of centralized states has been chronicled by a plethora of scholarship on European state-building. Tilly [1990] canonically describes the process of violent competition of the many European principalities as a core driver in the creation of modern state institutions. These territorial states were characterized by a complete monopoly over the use of violent means in a well-defined territory, the existence of a centralized bureaucratic apparatus, and the articulation of legitimizing governance ideologies in support of rule. Famously, Tilly [1990] sees war-making as the core propellant of this process, which requires rulers to capture full control over coercive means, modernize their use, and create institutions, in particular for tax collection, to finance war-making. While the *bellicist* approach to state-building has largely focused on the creation of standing armies and the authority to tax, the logic of the argument implies a growing need to assure the supply of a well-trained labor force, steeped in law and modern theories of the administrative state. Growing secular bureaucracies required trained staff conversant in Roman and church law, that could aid rulers in effectively running increasingly complex state institutions and diplomatic efforts. Further, by encouraging the creation of governing ideologies that justified secular rule independent from the church or rival rulers, secular rule created a demand for university education removed from the control of the Catholic Church.

A different demand-side driver on the side of secular rule emerged in parallel to top-down absolutist rule: the self-governance of cities and the emergence of parliaments. The late Middle Ages and Renaissance period was characterized by different types of secular regimes. Boix [2015] and Stasavage [2014] broadly distinguish between larger territorial princely states and city states that stood in competition with each other for long time periods of European history. Moreover, not every territorial state was characterized by

power centralized in the hands of a single ruler. While by 1800 large territorial nation-states had become the dominant political form in Europe, it was the result of long-term competition between different modes of authority. The evolution of princely states to modern, centralized and absolutist states creates one source of demand for university educated experts. A parallel demand was generated by the rise of institutions of self-governance in city-states and cities within princely states. Starting in the early 13^{th} century, urban commercial elites across Europe asserted autonomy from local lords, creating a varying array of local participatory institutions and, importantly, contributed to the development of parliamentary institutions more generally [Van Zanden et al., 2012, De Long and Shleifer, 1993, Abramson and Boix]. This institutionalization of self-governance and constraints on princely rule also required the creation of human capital that could be deployed to articulate the needs of parliamentary or city self-governance and provide administrative capacity.

In sum, we argue that the increasing demands of secular rulers for university education put pressure on the monopoly of the Catholic Church over the training of legal experts and, eventually, generated a competitive relationship between ecclesiastical and secular rule.

H2: Growing secular rule in cities is associated with university creations.

Finally, we argue that new university creations were especially likely where and when socio-political shocks weakened the Catholic Church and allowed secular rulers to take advantage of a shift in the balance of power. We focus on the most important shock that shifted the balance of power away from the Catholic Church: the Protestant Reformation.[8] The reformation represented a fundamental theological and political challenge to Papal authority and generated a deep schism that eventually destroyed the alliance between secular rulers and the Catholic Church in large parts of Europe [Becker et al., 2016, Cantoni et al., 2018]. We argue that this shock upended the pre-existing balance of

[8] An earlier shock, the Papal Schism of 1378, played a similar role [Cantoni and Yuchtman, 2014, Rashdall, 1895]. From 1309 to 1378 the papacy resided in Avignon, rather than Rome, an arrangement that came to an end in 1378 with the election of an Italian pope (Urban VI). The attempt to return the papacy to Rome was met with the institution of a rival pope in Avignon, manifesting a schism in the church that had important political reverberations throughout Europe. This Papal schism of 1378 created competing papal authorities, internally fracturing ecclesiastical authority, and contributed to the issuance of new Papal decrees for university creations in Germany [Cantoni and Yuchtman, 2014, Rashdall, 1895].

power between ecclesiastical and secular rulers and opened the doors for a redefinition of spheres of influence over arenas of statecraft. This allowed secular rulers that had already build up a demand for legal training to embark on university foundings outside of papal control.

H3: The socio-political shock of the reformation weakened the Catholic Church and is associated with university creations especially in cities with high demand.

3 Data and Research Design

In order to empirically investigate the correlates of university creations, we construct a new data set on universities from $800 - 1800$. We begin by defining an appropriate unit of analysis. As universities are generally founded in urban agglomerations, we opt for cities, nested in European states, as our unit of analysis.[9] We use the canonical city data from Bairoch [1988] to define our universe of possible locations in which universities can be founded. These data include all cities that reached a population of over $10,000$ at some point in the covered centuries. We construct a panel of city-centuries from 800 to 1800 to cover the core period of early university creations in Europe. In this paper, we forego an analysis of later university creations in the 19^{th} and 20^{th} century because the role of the university changes in this time period. The Industrial Revolution creates a new economic environment with high returns for applied scientific advancements, augmenting the importance of universities. At the same time, the advent of democratic rule and an expanded franchise is tied to a new class of university-educated elites [Hollenbach et al., 2018] and positions universities in potential opposition to non-democratic rulers. This likely changes the underlying dynamics of university creations throughout the 19^{th} and 20^{th} century in comparison to pre-1800.

We draw on an updated version of the Bairoch [1988] data by Bosker et al. [2012]. Bosker et al. [2012] study city growth in Europe and the Middle East and their data provide detailed information on city size, geographic context conditions, and political and religious institutions. We focus on the set of European cities in the data, which leaves us with 677 unique cities observed over eleven centuries.

We nest these 677 cities in historical European political entities whose territory covered the city location in each respective century. Given to the post-treatment character of modern country shapes, we avoid using modern countries as larger political units in which the cities are nested. Instead, we take political maps of Europe for each century from Nüssli [2011] and assign each city in a given century to the appropriate political unit.

[9] At a minimum this is true for the time period and region we study.

While the Bosker et al. [2012] data contains a binary variable for the presence of a university, this measure does not accurately reflect the creation of multiple universities in the same city, the closure of universities, and the presence of some universities originally not recorded in the data. We construct a time-varying count of the number of universities in each city, based on information from historical secondary literature [Rüegg, 2004, de Ridder-Symoens, 1996, 2003] and an assortment of university-specific sources.[10] We use this time-varying count, as well as a binary dependent variable that measures the opening of the first university in a city. This onset variable takes the value 1 in the first year the university count is positive, 0 prior to a first opening, and is coded missing in years after the opening.[11]

Figure 1 displays the overall count of universities in our sample over time. The plot also marks several important historical moments in Europe: the Papal schism, the Reformation, the signing of the Peace of Westphalia, and the French Revolution. As noted in the historical literature, the first universities in Europe were founded in the 11^{th} and 12^{th} century. This was followed by a steady increase until the final year in our sample: 1800. We observe a dip in the overall number of universities due to the closure of several universities in the wake of the French Revolution.

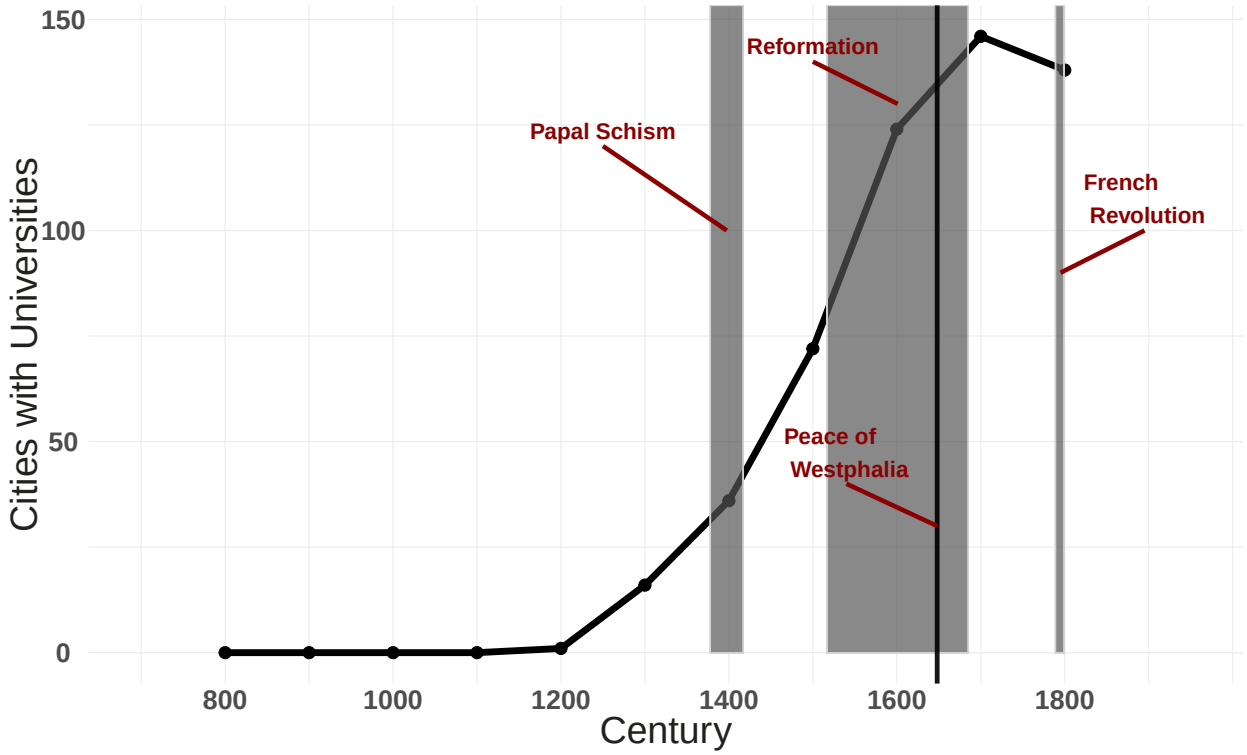
Figure 2 shows the distribution of cities in our sample across Europe as orange dots, while cities with a university by 1500 (left) or 1800 (right) are shown as green triangles. As one can see, in 1500 universities were most concentrated in what is today Italy, followed by France, Spain and Germany. By 1800, the number of universities has increased significantly and these institutions are spread throughout Western Europe.

We primarily use two variables to measure our theoretical concepts of religious and secular rule. First, we operationalize cities with bishop seats as having stronger religious (*Catholic*) bases. We create a binary variable that takes the value 1 if a city is host to an archbishop or bishop seat (*Bishop*), constructed based on Bosker et al. [2012]. Archbishop

[10] Wikipedia generally offers a fairly detailed account of university histories.

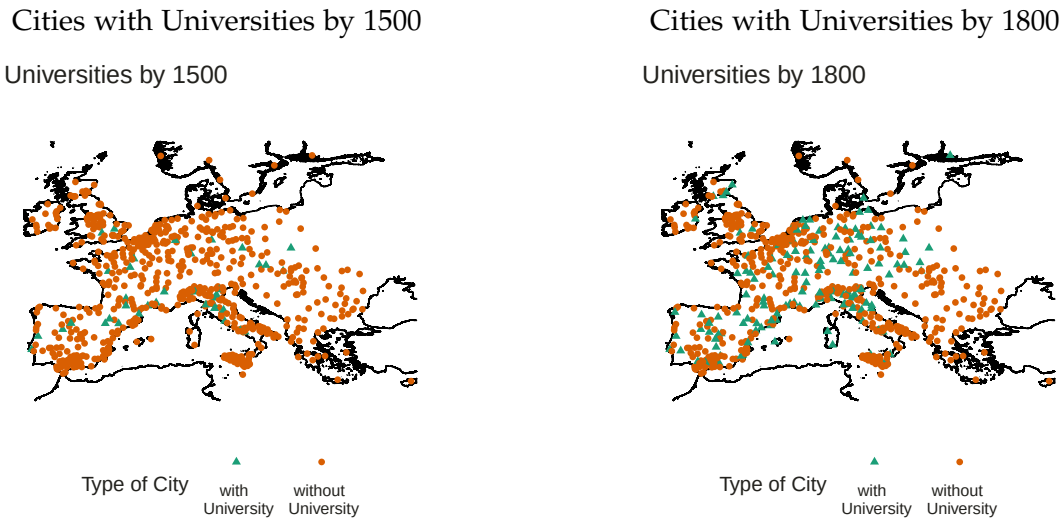
[11] Our time-varying binary variable differs from the variable provided by Bosker and Buringh [2017]. There are 152 city-centuries recorded as having a university in the Bosker and Buringh [2017] data that we code as 0, likely due to unrecorded closures of universities, and there are 93 city-century cases in which we record the presence of a university not contained in their data. Our core results do not depend on this difference.

Figure 1: Establishment of Universities by Century



Note: This figure shows the development of universities over time, as well as several important historical moments in Western Europe. The first medieval universities in Europe were founded around the 11^{th} and 12^{th} century and were followed by a steady increase until the final year in our sample: 1800. We observe a dip in the overall number of universities, likely due to the closure of several universities in the wake of the French Revolution.

Figure 2: Cities with and without universities across Europe by 1500 (left) and by 1800 (right)



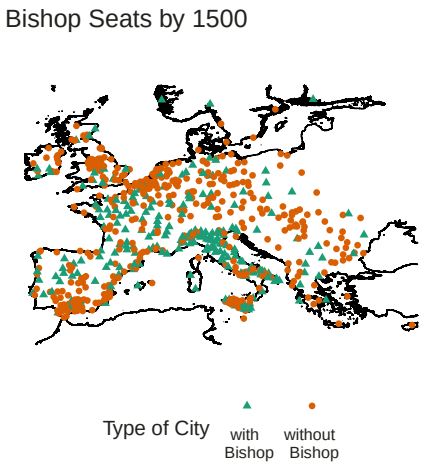
Note: These maps show the distribution of cities in our sample across Europe as orange dots, while those cities with universities by 1500 (left) or 1800 (right) are shown as green triangles. As one can see, in 1500 universities were most concentrated in what is today Italy, followed by France, Spain and Germany. By 1800, the number of universities has increased significantly and these institutions are spread throughout Western Europe.

and bishop seats in a city signify the presence of important church bureaucracy that was needed to actively manage the worldly and spiritual enterprise of the church in a given region. Figure 3 again visualizes the cities in our sample. Here, we mark those cities with the presence of archbishop or bishop seats in 1500. As one can easily see, bishop seats were concentrated especially in what is today Italy, France, and Spain.

In an effort to investigate whether demand from secular rulers was a major driver in the development of universities (*H2*), we identify different potential mechanisms behind the demand for higher education by secular rulers. As the most important potential mechanism we believe that increasing self-governance of cities led to higher demands for bureaucrats, administrators, and thus more local education and research. To operationalize this idea, we create an indicator variable for cities with the presence of any form of communal participatory organizations (*Self-Governance*, see Bosker et al. 2012). Whether a city has self-governance institutions is our primary measure of secular demand.

In Figure 4 we show the distribution of cities and mark those with self-governance institutions by 1500. As one can see, a large number of cities had a form of self-governance

Figure 3: Bishop Seats Across Europe until 1500



Note: The map again visualize the cities in our sample, showing the presence of archbishop or bishop seats in 1500. Bishop seats were concentrated especially in what is today Italy, France, and Spain.

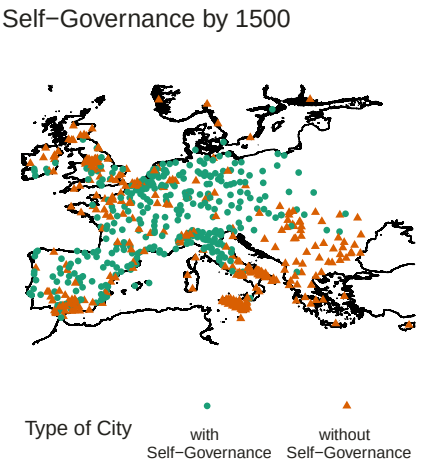
by 1500. Self-governance was especially present in central Europe, less so in what is today Great Britain and southern Italy.

To capture other secular demand-side effects of centralized rule, independent of war-making, we include a dummy variable for each city that signifies whether, at a given point in time, a city had capital city status of a historical political unit (*Capital*) [Nüssli, 2011].

As an additional possible driver of state building, we consider the standard *bellicist* argument, i.e., that war making drives state making. To investigate this particular mechanism, we code two different variables. First, we measure actual conflict events (battles) that occurred around a given city (*Num Battles (50 km)*). To do so, take data on the location of historical battles in a given century from Dincecco and Onorato [2018] and check whether they are located with a city's 50km radius.[12] Additionally, we measure each city's (latent) potential for conflict by counting the number of different historical political units that existed within a 50km radius at a given time (*Num States (50 km)*). To create this variable, we take the historical political units from Nüssli [2011].

[12]We also estimate our models with the same variables based on 100 km and 200 km radii, respectively.)

Figure 4: Self-Governance Across Europe until 1500



Note: The map shows the presence of self-governance institutions by 1500. archbishop or bishop seats in 1500. A vast majority of cities had a form of self-governance by 1500, especially in central Europe, less so in what is today Great Britain and southern Italy.

4 Empirical Analysis

To empirically assess the theoretical argument made above, we estimate a number of regression models at the city level. First, we model the constant (average) effect of the independent variables of interest over the time period studied. Next, we use the political and economic shock created by the reformation in the 16th century to better investigate our theoretical argument. We contend that the emergence of Protestantism significantly weakened the Catholic Church's monopoly on thought and power [Dittmar, 2019] and heightened competition between rule of the Catholic church and secular rulers. To test this implication, we estimate pre- and post-reformation coefficients for our main variables of interest.

As explained above, our data contains observations for each city at 100 year intervals from 800 to 1800. In all statistical models, we regress the number of universities (or our onset variable) at time t (e.g., in 1400) on independent variables in year $t - 100$ (i.e., in 1300). The idea is that processes that are present in a city in, for example 1300, ought to predict whether universities are founded in the subsequent century, i.e., a university would be present in 1400.

In the main text, we present results from standard linear regression models. For both the count of universities and onset variable, we estimate three types of regression models. A first model only includes our main covariates of interest with fixed effects for cities and centuries. In a second model, we add covariates for city population (in thousands) and a dummy for French control after the French Revolution, city and century fixed effects are also included. Lastly, in a third model we include population size, French control after the French revolution, a set of geographic controls (i.e., time constant), as well as century fixed effects. The geographic controls included in the third model are the following: latitude of each city (*Latitude*), a dummy variable for cities close to the sea (*Sea*), a dummy variable for cities on rivers (*River*), a city's elevation (*Elevation*), whether a city was located on a hub of ancient Roman roads (*Roman hub*), and (*Soil Quality*). Additionally, we add a control for the number of cities in a 50km radius (*Num Cities*). Our idea behind this last covariate is to control for potential competition between cities. These geographic variables should capture a city's local economic potential via agricultural productivity, long-distance trade, and general transport infrastructure [Acemoglu et al., 2005b, Nunn and Qian, 2011]. Aside from the number of neighboring cities, the control variables are taken from the Bosker et al. [2012] data.

In our models estimating the differential effects in the pre- and post-reformation era, we add two additional implicit interactions as controls. First, we use data from Rubin [2014] who identified cities as early adopters of Protestantism (*Protestant*), to identify protestant cities after the reformation. For cities coded as early adopters, this variable takes a 1 after the reformation (post 1500) and 0 for years prior. Similarly, we create a variable for cities with printing presses after Gutenberg's important invention. Using Rubin's [2014] data on printing press locations, we code cities with printing presses as 1 after the invention of the print press (post 1400) and 0 otherwise.[13] We include these additional covariates in the *time-shock* models to ensure that the recovered results are not

[13]Constituent terms are absorbed by the city and year fixed effects. If city fixed effects are not included in the models, we add the constituent terms for early adopters Protestantism and whether cities had a printing press. Some cities in our data set do not appear in the Rubin [2014] data. For our main models, we assume Rubin's [2014] data are complete and code those cities as zeros on both the early adopter of Protestantism and printing press measure. In addition, however, we also estimate our models with coding these cities as missing (Table A.5 in the Appendix). Our main results are substantively unaffected.

due to the discovery of the printing press or cities' early adoption of Protestantism.

Our main regression models take the following forms:

$$y_{i,t} = \alpha_i + \gamma_t + \delta \cdot \mathbf{X_{i,t-1}} + \beta \cdot \mathbf{Z_{i,t-1}} + \varepsilon_{i,t},$$

$y_{i,t}$ denotes our dependent variable of interest, a count of open universities in city i at time t or a binary indicator for whether city i has a new university founding at time t. We estimate all models on both codings of the dependent variable. $\mathbf{X}_{i,t}$ is a matrix of the independent variables of interest and δ is a vector of the associated coefficients. $\mathbf{Z}_{i,t}$ denotes any additional covariates and β is a vector of the associated coefficients. α_i and γ_t are intercepts for cities and years, when included. We cluster standard errors at the city level.

Table 1 shows the results from our first regression models with static covariates. In the main table we only report the coefficient estimates of our variables of interest. We present the full model results in Table A.1 in the Appendix. In columns 1-3, we show the results for the models using the count of universities as the dependent variable, whereas columns 4-6 show the models with the onset coding as the dependent variable. The results across all six different model specifications are quite consistent.

Cities with (arch)bishop seats are substantially more likely to experience a university founding. In line with the idea that university development was driven by the (Catholic) church, we find a positive and significant effect of bishop seats on universities in all six models. The estimated effects, somewhat surprisingly, are substantially smaller in models without city fixed effects, where geographic controls are included. Overall, having a bishop seat increases the expected number of universities between 0.05 and 0.15.

We find strong evidence in line with the second argument. Secular demand also led to university creations. First, as Table 1 shows, cities that had self-governance institutions were substantially more likely to also experience university foundings. Cities with self-governance institutions are estimated to have 0.11 to 0.14 more universities. Further, according to the linear probability model, self-governance institutions increase the probability of new university foundings by 0.05. To summarize the results, cities with

Table 1: University Creations

	University Count			Onset Models		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Bishop	**0.15****	**0.14****	**0.05***	**0.04****	**0.04****	**0.01****
	(0.05)	**(0.04)**	**(0.02)**	**(0.01)**	**(0.01)**	**(0.00)**
Self-Governance	**0.14****	**0.10****	**0.11****	**0.06****	**0.06****	**0.05****
	(0.02)	**(0.02)**	**(0.03)**	**(0.01)**	**(0.01)**	**(0.01)**
Capital	0.26**	0.05	0.18	0.10**	0.07*	0.08**
	(0.10)	(0.12)	(0.11)	(0.03)	(0.03)	(0.02)
Num States (50 km)	0.02*	0.02*	0.01	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
Num Battles (50 km)	0.01	0.01	0.00	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
City FE	Yes	Yes	No	Yes	Yes	No
Century FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Minimal	Geographic	No	Minimal	Geographic
N	7447	7447	7447	7035	7035	7035
Adj. R2	0.33	0.42	0.28	0.08	0.09	0.08

Note: Minimal controls are population size and indicator for post-revolution France. Geographic controls are latitude, elevation, located near sea or river, soil quality, location at Roman road hub, and number of cities in 50 km radius. Models estimated with standard errors clustered by city.
* $p < 0.05$, ** $p < 0.01$,

self-governance institutions are significantly more likely to be hosts to universities.

The results also suggest that capital city status leads to new university foundings. In contrast, we only find mixed evidence with respect to the effect of capital city status on the count of universities. In addition, the different operationalizations of the bellicist argument have little association with growth in universities. In the models of the number of open universities with city fixed effects (columns 1, 2), the estimated coefficient of number of states in a 50 km radius is statistically significant. The estimated effect, however, is quite small. The estimated effect of battles in close vicinity is effectively zero and imprecisely estimated.

Some of our covariates are dependent on the specific distance used when calculating number of state borders, battles, or number of cities in a city's vicinity. We therefore estimate the same models as in Table 1 with those distance based variables (*number of states*, *number of conflict battles*, *number of cities*) calculated on the basis of 100 and 200 km radii. Tables A.2 and A.3 in the Appendix show that our main results remain effectively the same. Additionally, some readers may be concerned about the use of OLS fixed effects models. In Table B.10, we present the results when we estimate Bayesian hierarchical models with random intercepts for cities and centuries. We present the results for the count variable estimated with Gaussian errors and as a negative binomial model, as well as the onset variable estimated as a linear probability model or as a logit model. All models in the table include random intercepts for city and century, as well as the all control variables. Overall, results from the hierarchical models are in line with those presented above. We again find positive effects of bishop seats and self-governance institutions across all four models. The 95% credible intervals never include zero. In addition, we recover positive associations of universities with capital city status and number of nearby states.

4.1 The Reformation

Our general theoretical argument is that the creation of universities was driven by an increasing need for administrators, bureaucrats, and generally better educated citizenry. This demand, we contend, was primarily met by the Church early on, but grew as secular

rulers started to invest in state building and came into competition with the Church. In the previous section, we have presented evidence that cities near (arch)bishop seats were more likely to gain universities, a finding in line with the Church being a major driver of university development. Similarly, cities that were engaged in self-governance were also substantially more likely to develop institutions of higher education, a finding we would expect if increased secular rule leads to a demand for more educated civil servants.

In this section, we attempt to further investigate the idea that competition between the ecclesiastical and secular rule was particularly important in the development of universities. In order to do so, we create interactions to estimate differential effects of our main variables of interest before and after the reformation. We identify the reformation as a particularly important socio-political event (shock), in which we believe the Catholic Church was substantially weakened. We expect that the shock of the reformation strengthened secular forces and their political power in cities with existing secular institutions (i.e., self-governance institutions). At the same time, we expect the heightened competition to also lead to more universities in cities with bishop seats, where the Catholic Church attempts to avoid losing its grip on power.

To test our theoretical mechanisms further, we create an indicator variable for the period before and after the reformation (*Reformation*, coded 0 before 1500 and 1 otherwise). We interact this variable with our main variables of interest: 1) bishop; 2) self-governance. We expect that, self-governance and bishops should have stronger effects after the reformation. As mentioned above, we now also include controls for Protestant cities after the reformation and cities with a printing press. As above, we do not include the constituent terms for the time-period indicators, as these are absorbed by the year fixed effects in all models. Similarly, the time-constant terms for early adopters of Protestantism and cities with a printing press are only included in models without city fixed effects.

Table 2 shows our coefficients of interest for the models with time varying effects. We estimate the same set of models with different sets of controls as well as city and year fixed effects for the count of universities (columns 1-3) and onset variable (columns 4-6).

The results are in line with our theoretical expectations, but the two different depen-

Table 2: University Creations – Time Varying

	University Count			**Onset Models**		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Bishop	0.06	0.10*	0.00	0.03*	0.04**	0.01
	(0.05)	(0.04)	(0.01)	(0.01)	(0.01)	(0.00)
Bishop post Reformation	**0.18****	**0.08****	**0.10****	**0.03****	**0.01**	**0.01**
	(0.04)	**(0.03)**	**(0.03)**	**(0.01)**	**(0.01)**	**(0.01)**
Self-Governance	0.03	-0.00	0.02	0.06**	0.05**	0.05**
	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)
Self-Governance post Reformation	**0.20****	**0.13****	**0.11****	**0.01**	**-0.00**	**-0.02**
	(0.03)	**(0.03)**	**(0.03)**	**(0.01)**	**(0.01)**	**(0.01)**
Capital	0.27**	0.05	0.18	0.10**	0.07*	0.08**
	(0.10)	(0.12)	(0.10)	(0.03)	(0.03)	(0.02)
Num States (50 km)	0.01*	0.01	0.00	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
Num Battles (50 km)	0.01	0.00	0.00	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
City FE	Yes	Yes	No	Yes	Yes	No
Century FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Minimal	Geographic	No	Minimal	Geographic
N	7447	7447	7447	7035	7035	7035
Adj. R2	0.35	0.45	0.31	0.08	0.10	0.09

Note: Minimal controls are population size, indicator for post-revolution France, indicator for locations with printing press, and indicator for early adopters of Protestantism. Geographic controls are latitude, elevation, located near sea or river, soil quality, location at Roman road hub, and number of cities in 50 km radius. Models estimated with standard errors clustered by city. * $p < 0.05$, ** $p < 0.01$,

dent variables reveal interesting heterogeneity. For the models with university counts as the dependent variable, we find little evidence for the importance of bishops or self-governance institutions prior to the reformation. The estimated constituent terms of both bishops and self-governance are generally small and insignificant (with the exception of the bishop term in model 2). In contrast, we find strong evidence that both bishops and self-governance institutions have strong positive effects on the number of universities after the reformation. The results suggest that bishop seats after the reformation lead to an expected increase in the number of universities by $0.08 - 0.18$. Similarly, self-governance institutions are estimated to have a marginal effect of 0.11 to 0.2 on the number of universities.

We also find strong positive effects of having a printing press. Cities with printing presses are much more likely to also become homes to universities. Again, there is little evidence in favor of the bellicist argument.[14]

The results for models with the onset coding as the dependent variable add additional nuance. Here our results indicate that both bishops and self-governance institutions had positive and substantively important effects on the likelihood of new university creations. Importantly, however, there is no statistically significant difference in the effects pre-/post-reformation, i.e., the results do not suggest differences in effects over time. We cautiously interpret these results to indicate that bishops and self-governance institutions have important effects along the extensive margin—the likelihood of initial university creations—across the whole time period studied. In contrast, both religious and secular forces matter on the intensive margin—the creation of more universities—especially after the socio-political shock of the reformation.

Our interpretation regarding differences between the count and onset models are strengthened by comparing the results from our regression models with the binary onset indicator to results when we use an indicator variable measuring whether one or more universities exist in a given city at time t. Table A.9 in the Appendix shows the results when the binary indicator is used as the dependent variable. Columns 1-3 show the

[14]Table A.4 in the Appendix shows the full model results, including the coefficients for all control variables.

time-constant models, whereas columns 4-6 show the *time-shock* models. The results are similar to those of the count models. When it comes to the probability of having at least one university, bishop seats and self-governance institutions are especially important after the reformation. This is again in contrast to the probability of the opening of a first university, where we find no evidence of differential pre-/post-reformation effects for bishop seats and self-governance institutions. Given the data and modeling limitations, however, it is impossible to entirely discern the reasons for these differences in pre-/post reformation results.

We again undertake several robustness checks. One possibility is that our differential pre/post-reformation effect of self-governance is capturing a more general trend that also exists for other covariates. We therefore estimate the same set of models but additionally interact the pre/post-reformation indicator with our other covariates of interest: *capital* status, *number of states* in 50 km radius, and *number of battles* in 50 km radius. We present the full results from these models in Table A.8 in the Appendix. The estimated coefficients for our main variables of interests are quite similar substantively and our main conclusions remain. In addition, we find little evidence that the number of battles or bordering states nearby (50 km radius) changes the likelihood of university foundings, either before or after the reformation. The additional results reveal one other important finding, however. While a city's capital status does substantively increase the expected number of universities, it only does so after the reformation. In our view, both these results are consistent with our theoretical argument that as the (Catholic) Church weakened, secular state development became an important driver of additional universities.

Next, we estimate our original time-varying models (as presented in Table 2 above) with the distance based variables calculated at 100 and 200 km radii, respectively (Tables A.6 and A.7 in the Appendix). We also estimate our main models on the limited sample of cities included in the Rubin [2014] data. Our main results remain unchanged to these specifications. Lastly, we estimate the same Bayesian hierarchical models as above but with the *time-shock* interaction. Table B.11 in the Appendix shows the results for the Bayesian hierarchical models when estimated with pre-/post-reformation interactions. In the hierarchical models we generally find evidence of a time-constant effect

of both self-governance and bishop seats. There is little evidence of a difference in effects before and after the reformation.

5 Universities and State Capacity

Our main analysis provides evidence for the origins of universities. We provide evidence that university creation was generally driven by the increasing demands of secular and ecclesiastical rulers and their emergent competition. A secondary implication of our theory is that university locations should be associated with subsequent improvements in state capacity, especially in administrative dimensions and the arena of legal statecraft. Cities that experience the founding of a university should eventually benefit from the access to trained legal experts, legal scholarship, and generally higher human capital in their build-up of state capacity.

To explore this possibility, we turn to unique town-level data from Germany, compiled by Dittmar and Meisenzahl and Cantoni and Yuchtman [2014]. Both Dittmar and Meisenzahl and Cantoni and Yuchtman [2014] painstakingly extracted detailed information on over 2,000 German towns from 1400 to 1600 from the *Deutsche StÃd'dtebuch*, a historical record of town-level events. We combine the data provided by Dittmar and Meisenzahl and Cantoni and Yuchtman [2014] with our own data on university creations for this set of German towns and build a town-year panel from 1400–1600. Our main independent variable of interest is a binary indicator marking the existence of a university at the time. We investigate a number of outcome variables to capture changes to state capacity. First, we utilize several construction variables from Cantoni and Yuchtman [2014]. The *Deutsches Städtebuch* records major construction events in each town, including buildings used by city governments for administrative purposes. We estimate the effect of university creations on the number of completed administrative, military, and welfare building projects, considering those as being associated with increased secular state capacity. We also use the number of clerical building projects as a proxy for ecclesiastical capacity. As a placebo outcome, we estimate the effect of university creations on private building projects. For each outcome variable, we estimate models with year fixed effects and controls for city-status, a dummy for the establishment of markets

by 1470, and the number of religious establishments within 25 km. Alternatively, we include town and year fixed effects. Table C.12 in Appendix C reports our estimates. We find a small positive, but statistically insignificant, effect of university creations on the number of administrative buildings in either model. In contrast, we estimate a positive effect in the town fixed effects models for the number of military buildings and positive and significant effects for either model for the number of welfare buildings. We also find a positive association between university creations and the number of clerical buildings when excluding town-level fixed effects. As expected, we find no clear effect of universities on the number of private building projects. This indicates at least weak evidence for positive downstream consequences of universities on state capacity.

In addition to construction events, we also investigate the effects of university creations on more ephemeral aspects of state capacity. Drawing on data by Dittmar and Meisenzahl, we estimate similar models as before, but use the total number of books published in each town-year, the total number of legal texts published in each town-year, and the total number of upper tail human capital individuals—measured as the individuals recorded in the biographical database *Deutsche Biographie* that were born or moved to a town in the sample. We present the results in Table C.13 in Appendix C. We find robust evidence that university creations are associated with more total books published, more legal texts, and more overall upper tail human capital. When we distinguish upper tail individuals by area of expertise (see C.14), we find a positive effect of universities on the number of church-related individuals, university scholars, artists, and court officials/judges/administrators, but no effect on individuals with a background in medicine, the military, crafts or trade, industry, nobility or other. This is consistent with an effect of universities on human capital development that is of particular value in some arenas of state-building—specifically the more ephemeral realm of administration, legal expertise, and production of new governance frameworks and theories of legitimate rule.

6 Conclusion

Universities emerged in Western Europe in the 11^{th} and 12^{th} century and soon became to dominate the tertiary education sector as well as the production of basic research.

Before the university appeared in its modern (and global) form, it played a narrower, albeit just as important role for the development of European states. From 1200 to 1800 universities were the primary supplier of an administrative workforce that could be used to staff increasingly differentiated local and state bureaucracies. Universities also helped advance governance structures by articulating and developing formal legal codes of governance and commerce and differentiating secular notions of legitimacy.

In this paper, we empirically investigate the origin and spread of European universities from 800–1800. We contend that while at first university creation was primarily driven by the Church, it quickly became important for the development of early secular rule. As such, universities were most likely where Church and state were in strong competition and where secular rulers were expanding their power. We provide original data on the number of universities across Europe and pair them with detailed information on cities that can serve as possible locations for university foundings. This creates a panel dataset of nearly 700 cities, which are nested in historical states. We estimate fixed effects OLS models to ascertain the association between both ecclesiastical and secular demands for universities.

We show that self-governance institutions and bishop seats were important for the creation of first universities across the whole time period. Using the socio-political shock of the Reformation, we also provide some evidence that both factors were especially important in the growth of *additional* universities when secular powers became stronger and the conflict between Church and secular rulers was heightened. We do find evidence that capital city status was an important determinant only after the reformation. Notably, beyond the mechanisms we highlight, we find little evidence that demands of war-making are direct drivers of university creations. Finally, we present auxiliary evidence that university foundings contributed to subsequent improvements in administrative capacity, legal statecraft, administrative human capital.

These patterns add to the existing literature in several ways. First, by focusing on the creation of universities, we broaden the literature on state-building that often centers on the means of coercion and tax capacity, instead of other aspects of governance. Second, our empirical findings suggest that mechanisms that are prominent in the lit-

erature on generic state capacity have little purchase in the domain of 1) the supply of skilled state administrators and 2) the production of governance knowledge. It seems that violent contest between territorial governance units is not the only way by which competition spurs state-building. Instead, the rivalry between religious and secular authorities along functional dimensions generated a fruitful theoretical and ideational arms race that found its institutional engine in the university.

Future research could do better to differentiate and empirically capture the degree of *competition* between secular and ecclesiastical rule, e.g., by considering the spatial topography of the competitive environment, processes of diffusion, and the internal organization of secular states. Moreover, data on the production of specific legal texts and books on governance [Blaydes et al., 2018] as well as the changing composition of university graduates' degrees [Cantoni and Yuchtman, 2014] could be used to further document the role of universities in the development of non-coercive and non-extractive dimensions of statecraft.

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Supplementary Online Appendix: State-Building and the Origin of Universities in Europe, 800-1800

A Fixed Effects Model Results

Table A.1: University Creations - Full Results

	University Count			Onset Models		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Bishop	**0.15****	**0.14****	**0.05***	**0.04****	**0.04****	**0.01****
	(0.05)	**(0.04)**	**(0.02)**	**(0.01)**	**(0.01)**	**(0.00)**
Self-Governance	**0.14****	**0.10****	**0.11****	**0.06****	**0.06****	**0.05****
	(0.02)	**(0.02)**	**(0.03)**	**(0.01)**	**(0.01)**	**(0.01)**
Capital	0.26**	0.05	0.18	0.10**	0.07*	0.08**
	(0.10)	(0.12)	(0.11)	(0.03)	(0.03)	(0.02)
Num States (50 km)	0.02*	0.02*	0.01	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
Num Battles (50 km)	0.01	0.01	0.00	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
Population		0.01*	0.01*		0.00**	0.00**
		(0.00)	(0.00)		(0.00)	(0.00)
France		0.01	-0.01		-0.00	-0.00
		(0.10)	(0.10)		(0.03)	(0.03)
Latitude			0.00			0.00
			(0.00)			(0.00)
Sea			-0.04			-0.00
			(0.02)			(0.00)
River			0.03			0.01
			(0.02)			(0.00)
Elevation			0.00			0.00
			(0.00)			(0.00)
Soil Quality			0.00			-0.00
			(0.03)			(0.01)
Roman Hub			-0.02			-0.00
			(0.02)			(0.01)
Num Cities (50 km)			-0.01**			-0.00*
			(0.00)			(0.00)
City FE	Yes	Yes	No	Yes	Yes	No
Century FE	Yes	Yes	Yes	Yes	Yes	Yes
N	7447	7447	7447	7035	7035	7035
Adj. R2	0.33	0.42	0.28	0.08	0.09	0.08

Note: Models estimated with standard errors clustered by city. * $p < 0.05$, ** $p < 0.01$,

Table A.2: University Creations - Full Results

	University Count			**Onset Models**		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Bishop	**0.15****	**0.15****	**0.04***	**0.04****	**0.04****	**0.01****
	(0.05)	**(0.04)**	**(0.02)**	**(0.01)**	**(0.01)**	**(0.00)**
Self-Governance	**0.13****	**0.09****	**0.11****	**0.06****	**0.06****	**0.05****
	(0.02)	**(0.02)**	**(0.03)**	**(0.01)**	**(0.01)**	**(0.01)**
Capital	0.26*	0.05	0.18	0.10**	0.07*	0.08**
	(0.10)	(0.12)	(0.11)	(0.03)	(0.03)	(0.02)
Num States (100 km)	0.01**	0.01**	0.01	0.00*	0.00*	0.00*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Num Battles (100 km)	0.00	0.00	-0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Population		0.01*	0.01*		0.00**	0.00**
		(0.00)	(0.00)		(0.00)	(0.00)
France		0.01	-0.01		-0.00	-0.00
		(0.10)	(0.10)		(0.03)	(0.03)
Latitude			0.00			0.00
			(0.00)			(0.00)
Sea			-0.04			-0.00
			(0.02)			(0.00)
River			0.03			0.01
			(0.02)			(0.00)
Elevation			0.00			0.00
			(0.00)			(0.00)
Soil Quality			0.01			-0.00
			(0.03)			(0.01)
Roman Hub			-0.02			-0.00
			(0.02)			(0.01)
Num Cities (100 km)			-0.00**			-0.00**
			(0.00)			(0.00)
City FE	Yes	Yes	No	Yes	Yes	No
Century FE	Yes	Yes	Yes	Yes	Yes	Yes
N	7447	7447	7447	7035	7035	7035
Adj. R2	0.33	0.42	0.28	0.08	0.09	0.08

Note: Models estimated with standard errors clustered by city. * $p < 0.05$, ** $p < 0.01$,

Table A.3: University Creations - Full Results

	University Count			Onset Models		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Bishop	**0.15****	**0.15****	**0.05***	**0.04****	**0.04****	**0.01****
	(0.05)	**(0.04)**	**(0.02)**	**(0.01)**	**(0.01)**	**(0.00)**
Self-Governance	**0.13****	**0.09****	**0.11****	**0.06****	**0.05****	**0.04****
	(0.02)	**(0.02)**	**(0.02)**	**(0.01)**	**(0.01)**	**(0.01)**
Capital	0.26*	0.04	0.17	0.10**	0.07*	0.08**
	(0.10)	(0.12)	(0.11)	(0.03)	(0.03)	(0.02)
Num States (200 km)	0.00**	0.00**	0.00*	0.00**	0.00**	0.00*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Num Battles (200 km)	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Population		0.01*	0.01*		0.00**	0.00**
		(0.00)	(0.00)		(0.00)	(0.00)
France		0.01	-0.00		-0.00	0.00
		(0.10)	(0.10)		(0.03)	(0.03)
Latitude			0.00			0.00
			(0.00)			(0.00)
Sea			-0.04			-0.00
			(0.02)			(0.00)
River			0.03			0.01*
			(0.02)			(0.00)
Elevation			0.00			0.00
			(0.00)			(0.00)
Soil Quality			0.02			-0.00
			(0.03)			(0.01)
Roman Hub			-0.02			-0.01
			(0.02)			(0.01)
Num Cities (200 km)			-0.00**			-0.00**
			(0.00)			(0.00)
City FE	Yes	Yes	No	Yes	Yes	No
Century FE	Yes	Yes	Yes	Yes	Yes	Yes
N	7447	7447	7447	7035	7035	7035
Adj. R2	0.33	0.43	0.28	0.08	0.09	0.08

Note: Models estimated with standard errors clustered by city. * $p < 0.05$, ** $p < 0.01$,

Table A.4: University Creations – Time Varying – Full Results

	University Count			**Onset Models**		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Bishop	0.06	0.10*	0.00	0.03*	0.04**	0.01
	(0.05)	(0.04)	(0.01)	(0.01)	(0.01)	(0.00)
Bishop post Reformation	**0.18****	**0.08****	**0.10****	**0.03****	**0.01**	**0.01**
	(0.04)	**(0.03)**	**(0.03)**	**(0.01)**	**(0.01)**	**(0.01)**
Self-Governance	0.03	-0.00	0.02	0.06**	0.05**	0.05**
	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)
Self-Governance post Reformation	**0.20****	**0.13****	**0.11****	**0.01**	**-0.00**	**-0.02**
	(0.03)	**(0.03)**	**(0.03)**	**(0.01)**	**(0.01)**	**(0.01)**
Capital	0.27**	0.05	0.18	0.10**	0.07*	0.08**
	(0.10)	(0.12)	(0.10)	(0.03)	(0.03)	(0.02)
Num States (50 km)	0.01*	0.01	0.00	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
Num Battles (50 km)	0.01	0.00	0.00	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
Protestant			0.00			-0.00
			(0.01)			(0.01)
Protestant post Reformation		0.05	0.06		0.03*	0.03*
		(0.05)	(0.05)		(0.02)	(0.01)
Press			-0.02			0.01
			(0.02)			(0.01)
Press post Invention		0.26**	0.26**		0.09**	0.06**
		(0.05)	(0.04)		(0.02)	(0.02)
Population		0.01	0.01		0.00**	0.00**
		(0.00)	(0.00)		(0.00)	(0.00)
France		-0.02	-0.03		-0.01	-0.00
		(0.10)	(0.10)		(0.03)	(0.03)
Latitude			0.00			0.00
			(0.00)			(0.00)
Sea			-0.04			-0.00
			(0.02)			(0.00)
River			0.01			0.00
			(0.01)			(0.00)
Elevation			0.00			0.00
			(0.00)			(0.00)
Soil Quality			0.01			-0.00
			(0.03)			(0.01)
Roman Hub			-0.02			-0.01
			(0.02)			(0.01)
Num Cities (50 km)			-0.01**			-0.00*
			(0.00)			(0.00)
City FE	Yes	Yes	No	Yes	Yes	No
Century FE	Yes	Yes	Yes	Yes	Yes	Yes
N	7447	7447	7447	7035	7035	7035
Adj. R2	0.35	0.45	0.31	0.08	0.10	0.09

Note: Models estimated with standard errors clustered by city. * $p < 0.05$, ** $p < 0.01$,

Table A.5: University Creations – Time Varying – Missing Press/Protestant

	University Count			**Onset Models**		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Bishop	0.06	0.14**	0.00	0.03*	0.04**	0.01
	(0.05)	(0.05)	(0.02)	(0.01)	(0.02)	(0.01)
Bishop post Reformation	**0.18****	**0.08***	**0.11***	**0.03****	**0.00**	**-0.00**
	(0.04)	**(0.04)**	**(0.04)**	**(0.01)**	**(0.01)**	**(0.01)**
Self-Governance	0.03	-0.00	0.00	0.06**	0.05**	0.05**
	(0.02)	(0.03)	(0.03)	(0.01)	(0.01)	(0.01)
Self-Governance post Reformation	**0.20****	**0.15****	**0.13****	**0.01**	**0.00**	**-0.01**
	(0.03)	**(0.04)**	**(0.04)**	**(0.01)**	**(0.02)**	**(0.02)**
Capital	0.27**	0.07	0.21	0.10**	0.09*	0.10**
	(0.10)	(0.14)	(0.12)	(0.03)	(0.04)	(0.02)
Num States (50 km)	0.01*	0.01	0.00	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
Num Battles (50 km)	0.01	0.00	-0.00	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
Protestant			0.01			-0.00
			(0.02)			(0.01)
Protestant post Reformation		0.03	0.04		0.03	0.03
		(0.06)	(0.06)		(0.02)	(0.02)
Press			-0.04			0.01
			(0.02)			(0.01)
Press post Invention		0.23**	0.23**		0.08**	0.05**
		(0.05)	(0.05)		(0.02)	(0.02)
Population		0.01	0.01		0.00**	0.00**
		(0.00)	(0.00)		(0.00)	(0.00)
France		-0.01	-0.03		0.01	0.02
		(0.15)	(0.15)		(0.04)	(0.04)
Latitude			-0.00			-0.00
			(0.00)			(0.00)
Sea			-0.06*			-0.01
			(0.03)			(0.01)
River			0.02			0.01
			(0.02)			(0.01)
Elevation			0.00			0.00
			(0.00)			(0.00)
Soil Quality			0.02			-0.01
			(0.05)			(0.01)
Roman Hub			-0.03			-0.01
			(0.03)			(0.01)
Num Cities (50 km)			-0.01**			-0.00**
			(0.00)			(0.00)
City FE	Yes	Yes	No	Yes	Yes	No
Century FE	Yes	Yes	Yes	Yes	Yes	Yes
N	7447	4851	4851	7035	4454	4454
Adj. R2	0.35	0.45	0.31	0.08	0.11	0.09

Note: Models estimated with standard errors clustered by city. * $p < 0.05$, ** $p < 0.01$,

Table A.6: University Creations – Time Varying – 100 km Radius

	University Count			Onset Models		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Bishop	0.06	0.10**	-0.00	0.03*	0.04**	0.00
	(0.05)	(0.04)	(0.01)	(0.01)	(0.01)	(0.00)
Bishop post Reformation	**0.18****	**0.08****	**0.10****	**0.03****	**0.01**	**0.01**
	(0.04)	**(0.03)**	**(0.03)**	**(0.01)**	**(0.01)**	**(0.01)**
Self-Governance	0.03	-0.00	0.02	0.06**	0.05**	0.05**
	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)
Self-Governance post Reformation	**0.19****	**0.13****	**0.11****	**0.01**	**-0.01**	**-0.02**
	(0.03)	**(0.03)**	**(0.03)**	**(0.01)**	**(0.01)**	**(0.01)**
Capital	0.27**	0.05	0.18	0.10**	0.07*	0.08**
	(0.10)	(0.12)	(0.11)	(0.03)	(0.03)	(0.02)
Num States (100 km)	0.01*	0.00	0.00	0.00*	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Num Battles (100 km)	0.00	-0.00	-0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Protestant			0.01			0.00
			(0.01)			(0.01)
Protestant post Reformation		0.05	0.06		0.03*	0.03
		(0.05)	(0.05)		(0.02)	(0.01)
Press			-0.02			0.01
			(0.02)			(0.01)
Press post Invention		0.26**	0.26**		0.09**	0.06**
		(0.05)	(0.04)		(0.02)	(0.02)
Population		0.01	0.01		0.00**	0.00**
		(0.00)	(0.00)		(0.00)	(0.00)
France		-0.02	-0.03		-0.01	-0.00
		(0.10)	(0.10)		(0.03)	(0.03)
Latitude			-0.00			-0.00
			(0.00)			(0.00)
Sea			-0.04			-0.00
			(0.02)			(0.00)
River			0.01			0.00
			(0.01)			(0.00)
Elevation			0.00			0.00
			(0.00)			(0.00)
Soil Quality			0.01			-0.00
			(0.03)			(0.01)
Roman Hub			-0.02			-0.00
			(0.02)			(0.01)
Num Cities (100 km)			-0.00**			-0.00**
			(0.00)			(0.00)
City FE	Yes	Yes	No	Yes	Yes	No
Century FE	Yes	Yes	Yes	Yes	Yes	Yes
N	7447	7447	7447	7035	7035	7035
Adj. R2	0.35	0.45	0.31	0.08	0.11	0.09

Note: Models estimated with standard errors clustered by city. * $p < 0.05$, ** $p < 0.01$,

Table A.7: University Creations – Time Varying – 200 km Radius

	University Count			Onset Models		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Bishop	0.06	0.10**	-0.00	0.03*	0.04**	0.00
	(0.05)	(0.04)	(0.01)	(0.01)	(0.01)	(0.00)
Bishop post Reformation	**0.18****	**0.08****	**0.10****	**0.03***	**0.01**	**0.01**
	(0.04)	**(0.03)**	**(0.03)**	**(0.01)**	**(0.01)**	**(0.01)**
Self-Governance	0.03	-0.00	0.02	0.06**	0.05**	0.05**
	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)
Self-Governance post Reformation	**0.19****	**0.13****	**0.11****	**0.01**	**-0.01**	**-0.02**
	(0.03)	**(0.03)**	**(0.03)**	**(0.01)**	**(0.01)**	**(0.01)**
Capital	0.27**	0.05	0.17	0.10**	0.07*	0.08**
	(0.10)	(0.12)	(0.11)	(0.03)	(0.03)	(0.02)
Num States (200 km)	0.00*	0.00	0.00	0.00*	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Num Battles (200 km)	0.00	-0.00	-0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Protestant			0.01			0.00
			(0.01)			(0.01)
Protestant post Reformation		0.05	0.06		0.03	0.03
		(0.05)	(0.05)		(0.02)	(0.01)
Press			-0.02			0.01
			(0.02)			(0.01)
Press post Invention		0.25**	0.26**		0.09**	0.06**
		(0.05)	(0.04)		(0.02)	(0.02)
Population		0.01	0.01		0.00**	0.00**
		(0.00)	(0.00)		(0.00)	(0.00)
France		-0.02	-0.02		-0.01	-0.00
		(0.10)	(0.10)		(0.03)	(0.03)
Latitude			0.00			-0.00
			(0.00)			(0.00)
Sea			-0.04			-0.00
			(0.02)			(0.00)
River			0.01			0.00
			(0.01)			(0.00)
Elevation			0.00			0.00
			(0.00)			(0.00)
Soil Quality			0.02			-0.00
			(0.03)			(0.01)
Roman Hub			-0.02			-0.01
			(0.02)			(0.01)
Num Cities (200 km)			-0.00**			-0.00**
			(0.00)			(0.00)
City FE	Yes	Yes	No	Yes	Yes	No
Century FE	Yes	Yes	Yes	Yes	Yes	Yes
N	7447	7447	7447	7035	7035	7035
Adj. R2	0.35	0.45	0.31	0.08	0.11	0.09

Note: Models estimated with standard errors clustered by city. * $p < 0.05$, ** $p < 0.01$,

Table A.8: University Creations – Time Varying – Addl. Covariate Interactions

	University Count			**Onset Models**		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Bishop	0.07	0.11**	0.01	0.03*	0.04**	0.01
	(0.04)	(0.04)	(0.01)	(0.01)	(0.01)	(0.00)
Bishop post Reformation	**0.13****	**0.05**	**0.08****	**0.02***	**0.01**	**0.01**
	(0.03)	**(0.03)**	**(0.03)**	**(0.01)**	**(0.01)**	**(0.01)**
Self-Governance	0.05**	0.01	0.03	0.06**	0.05**	0.05**
	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)
Self-Governance post Reformation	**0.16****	**0.11****	**0.10****	**0.01**	**-0.00**	**-0.02**
	(0.03)	**(0.03)**	**(0.03)**	**(0.01)**	**(0.01)**	**(0.01)**
Capital	-0.15	-0.15	-0.01	0.04	0.03	0.06*
	(0.10)	(0.11)	(0.09)	(0.04)	(0.04)	(0.02)
Capital post Reformation	0.97**	0.52**	0.47**	0.20**	0.13	0.09
	(0.24)	(0.11)	(0.13)	(0.07)	(0.07)	(0.06)
Num States (50 km)	0.01	0.00	-0.00	0.00	0.00	0.00
	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Num States post Reformation	0.02	0.01	0.02	0.00	-0.00	-0.00
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
Num Battles (50 km)	0.01	0.01	0.01	0.01	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Num Battles post Reformation	-0.01	-0.01	-0.01	-0.01	-0.01	-0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Protestant			0.00			-0.00
			(0.01)			(0.01)
Protestant post Reformation		0.03	0.04		0.03	0.03
		(0.05)	(0.05)		(0.02)	(0.02)
Press			-0.01			0.01*
			(0.02)			(0.01)
Press post Invention		0.24**	0.24**		0.09**	0.06**
		(0.04)	(0.04)		(0.02)	(0.02)
Population		0.01	0.01		0.00**	0.00*
		(0.00)	(0.00)		(0.00)	(0.00)
France		-0.00	-0.01		-0.01	-0.00
		(0.10)	(0.10)		(0.03)	(0.03)
Latitude			-0.00			-0.00
			(0.00)			(0.00)
Sea			-0.04			-0.00
			(0.02)			(0.00)
River			0.01			0.00
			(0.01)			(0.00)
Elevation			0.00			0.00
			(0.00)			(0.00)
Soil Quality			0.00			-0.01
			(0.03)			(0.01)
Roman Hub			-0.02			-0.01
			(0.02)			(0.01)
Num Cities (50 km)			-0.01**			-0.00*
			(0.00)			(0.00)
City FE	Yes	Yes	No	Yes	Yes	No
Century FE	Yes	Yes	Yes	Yes	Yes	Yes
N	7447	7447	7447	7035	7035	7035
Adj. R2	0.39	0.46	0.32	0.09	0.11	0.09

Note: Models estimated with standard errors clustered by city. * p < 0.05, ** p < 0.01,

Table A.9: University Creations – Binary Indicator – Full Results

	University Indicator			**University Indicator**		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Bishop	**0.10****	**0.09****	**0.06****	**0.04**	**0.06***	**0.01**
	(0.03)	**(0.03)**	**(0.01)**	**(0.03)**	**(0.03)**	**(0.01)**
Bishop post Reformation				**0.12****	**0.07****	**0.08****
				(0.02)	**(0.02)**	**(0.02)**
Self-Governance	**0.10****	**0.09****	**0.10****	**0.05****	**0.04***	**0.05****
	(0.02)	**(0.02)**	**(0.02)**	**(0.01)**	**(0.01)**	**(0.02)**
Self-Governance post Reformation				**0.11****	**0.06****	**0.04**
				(0.02)	**(0.02)**	**(0.02)**
Capital	0.12*	0.07	0.17**	0.13*	0.07	0.16**
	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Num States (50 km)	0.01*	0.01*	0.01*	0.01*	0.00	0.00
	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
Num Battles (50 km)	0.00	0.00	0.00	0.00	0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Protestant						0.00
						(0.01)
Protestant post Reformation					0.06*	0.07*
					(0.03)	(0.03)
Press						0.01
						(0.01)
Press post Invention					0.23**	0.23**
					(0.03)	(0.03)
Population		0.00**	0.00**		0.00**	0.00*
		(0.00)	(0.00)		(0.00)	(0.00)
France		-0.05	-0.07		-0.07*	-0.08*
		(0.03)	(0.04)		(0.03)	(0.03)
Latitude			-0.00			-0.00
			(0.00)			(0.00)
Sea			-0.00			-0.00
			(0.01)			(0.01)
River			0.03*			0.01
			(0.01)			(0.01)
Elevation			0.00			0.00
			(0.00)			(0.00)
Soil Quality			0.00			0.00
			(0.03)			(0.02)
Roman Hub			-0.01			-0.01
			(0.02)			(0.02)
Num Cities (50 km)			-0.00*			-0.00*
			(0.00)			(0.00)
City FE	Yes	Yes	No	Yes	Yes	No
Century FE	Yes	Yes	Yes	Yes	Yes	Yes
N	7447	7447	7447	7447	7447	7447
Adj. R2	0.41	0.42	0.22	0.43	0.47	0.28

Note: Models estimated with standard errors clustered by city. * $p < 0.05$, ** $p < 0.01$,

B Bayesian Hierarchical Models

Table B.10: University Creations - Bayesian Hierarchical Model

	University Count		**Onset Models**	
	Gaussian Count	Negative Binomial	Gaussian Binary	Logit
Intercept	0.000	-8.602	-0.005	-6.275
	[-0.144, 0.148]	[-11.927, -5.625]	[-0.044, 0.033]	[-9.006, -3.966]
Bishop	**0.083**	**1.094**	**0.013**	**0.662**
	[0.056, 0.110]	**[0.717, 1.494]**	**[0.005, 0.022]**	**[0.294, 1.056]**
Self-Governance	**0.106**	**1.004**	**0.047**	**1.317**
	[0.082, 0.129]	**[0.693, 1.324]**	**[0.038, 0.057]**	**[0.922, 1.729]**
Capital	0.098	0.783	0.084	1.399
	[0.044, 0.153]	[0.340, 1.222]	[0.060, 0.109]	[0.791, 1.977]
Num States (50 km)	0.020	0.094	0.005	0.121
	[0.011, 0.029]	[0.008, 0.183]	[0.001, 0.008]	[-0.016, 0.255]
Num Battles (50 km)	0.008	0.047	0.003	0.067
	[-0.000, 0.016]	[-0.017, 0.108]	[-0.000, 0.007]	[-0.040, 0.165]
Population	0.172	0.131	0.026	0.373
	[0.162, 0.181]	[0.087, 0.179]	[0.021, 0.032]	[0.190, 0.569]
Latitude	0.001	0.029	0.000	0.006
	[-0.002, 0.004]	[-0.018, 0.079]	[-0.001, 0.001]	[-0.036, 0.050]
Sea	-0.042	-0.025	-0.002	-0.238
	[-0.082, -0.000]	[-0.607, 0.546]	[-0.013, 0.009]	[-0.766, 0.270]
River	0.024	0.842	0.007	0.402
	[-0.009, 0.057]	[0.342, 1.363]	[-0.002, 0.016]	[-0.023, 0.852]
Elevation	0.008	0.097	0.001	-0.042
	[-0.010, 0.026]	[-0.161, 0.345]	[-0.003, 0.006]	[-0.260, 0.174]
Soil Quality	-0.001	0.058	-0.001	-0.033
	[-0.016, 0.015]	[-0.164, 0.278]	[-0.005, 0.003]	[-0.218, 0.154]
Roman Hub	-0.040	0.052	-0.005	-0.072
	[-0.077, -0.002]	[-0.437, 0.554]	[-0.015, 0.005]	[-0.489, 0.342]
Num Cities (50 km	-0.022	-0.399	-0.004	-0.385
	[-0.037, -0.007]	[-0.662, -0.144]	[-0.007, 0.000]	[-0.652, -0.138]
City Intercepts	Yes	Yes	Yes	Yes
Century Intercepts	Yes	Yes	Yes	Yes

Note: Models estimated in rstan using the brms package. All models include random intercepts for city and century. Models were estimated on four chains with 3500 iterations each with 1000 warmup iterations.

Table B.11: University Creations - Time Varying - Bayesian Hierarchical Models

	University Count		**Onset Models**	
	Gaussian Count	Negative Binomial	Gaussian Binary	Logit
Intercept	0.005	-9.822	0.005	-7.916
	[-0.037, 0.048]	[-14.047, -6.685]	[-0.037, 0.048]	[-11.638, -5.036]
Bishop	**0.007**	**0.980**	**0.007**	**0.763**
	[-0.004, 0.017]	**[0.426, 1.574]**	**[-0.004, 0.017]**	**[0.119, 1.446]**
Bishop post Reformation	**0.006**	**-0.125**	**0.006**	**-0.286**
	[-0.010, 0.023]	**[-0.652, 0.383]**	**[-0.010, 0.023]**	**[-1.036, 0.449]**
Self-Governance	**0.047**	**0.890**	**0.047**	**1.558**
	[0.032, 0.062]	**[0.392, 1.417]**	**[0.032, 0.062]**	**[0.865, 2.329]**
Self-Governance post Reformation	**-0.016**	**-0.127**	**-0.016**	**-0.694**
	[-0.035, 0.004]	**[-0.669, 0.379]**	**[-0.035, 0.004]**	**[-1.574, 0.159]**
Capital	0.056	0.559	0.056	1.082
	[0.029, 0.084]	[-0.002, 1.090]	[0.029, 0.084]	[0.231, 1.893]
Capital post Reformation	0.089	0.076	0.089	0.329
	[0.039, 0.140]	[-0.459, 0.617]	[0.039, 0.140]	[-0.776, 1.470]
Num States (50 km)	0.003	-0.005	0.003	0.083
	[-0.003, 0.009]	[-0.159, 0.143]	[-0.003, 0.009]	[-0.152, 0.297]
Num States post Reformation	-0.003	0.067	-0.003	-0.074
	[-0.011, 0.005]	[-0.092, 0.229]	[-0.011, 0.005]	[-0.358, 0.217]
Num Battles (50 km)	0.007	0.256	0.007	0.385
	[-0.005, 0.019]	[-0.095, 0.562]	[-0.005, 0.019]	[-0.151, 0.831]
Num Conflicts post Reformation	-0.005	-0.215	-0.005	-0.326
	[-0.018, 0.007]	[-0.525, 0.133]	[-0.018, 0.007]	[-0.778, 0.209]
Reformation	-0.007	0.763	-0.007	0.489
	[-0.054, 0.039]	[-4.556, 6.194]	[-0.054, 0.039]	[-4.688, 5.037]
Printing Press	0.011	2.496	0.011	1.763
	[-0.001, 0.024]	[1.693, 3.421]	[-0.001, 0.024]	[0.897, 2.750]
Press Invention	0.011	3.925	0.011	3.027
	[-0.034, 0.055]	[-0.579, 10.230]	[-0.034, 0.055]	[-0.862, 8.860]
Press post Invention	0.060	-0.913	0.060	-0.777
	[0.040, 0.080]	[-1.719, -0.219]	[0.040, 0.080]	[-1.809, 0.148]
Protestant	-0.000	0.416	-0.000	0.146
	[-0.013, 0.013]	[-0.358, 1.196]	[-0.013, 0.013]	[-0.602, 0.890]
Protestant post Reformation	0.029	0.248	0.029	0.398
	[0.007, 0.050]	[-0.326, 0.842]	[0.007, 0.050]	[-0.448, 1.253]
Population	0.020	0.119	0.020	0.256
	[0.015, 0.026]	[0.074, 0.167]	[0.015, 0.026]	[0.081, 0.459]
Latitude	-0.000	-0.001	-0.000	-0.007
	[-0.001, 0.001]	[-0.055, 0.054]	[-0.001, 0.001]	[-0.056, 0.041]
Sea	-0.002	-0.044	-0.002	-0.221
	[-0.013, 0.009]	[-0.626, 0.520]	[-0.013, 0.009]	[-0.764, 0.325]
River	0.003	0.511	0.003	0.266
	[-0.006, 0.012]	[0.011, 1.028]	[-0.006, 0.012]	[-0.180, 0.724]
Elevation	0.001	0.069	0.001	-0.054
	[-0.004, 0.005]	[-0.184, 0.324]	[-0.004, 0.005]	[-0.279, 0.168]
Soil Quality	-0.001	-0.016	-0.001	-0.044
	[-0.005, 0.003]	[-0.234, 0.212]	[-0.005, 0.003]	[-0.234, 0.158]
Roman Hub	-0.006	-0.129	-0.006	-0.197
	[-0.015, 0.004]	[-0.621, 0.357]	[-0.015, 0.004]	[-0.633, 0.243]
Num Cities (50 km	-0.004	-0.417	-0.004	-0.403
	[-0.008, 0.000]	[-0.694, -0.157]	[-0.008, 0.000]	[-0.677, -0.151]
City Intercepts	Yes	Yes	Yes	Yes
Century Intercepts	Yes	Yes	Yes	Yes

Note: Models estimated in rstan using the brms package. All models include random intercepts for city and century. Models were estimated on four chains with 3500 iterations each with 1000 warmup iterations.

C University Creation and State Capacity

Table C.12: University Creations and State Capacity

	Admin	Admin	Military	Military	Welfare	Welfare	Clerical	Clerical	Private	Private
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
University Creation	0.00	0.00	0.00	0.00*	0.01***	0.01***	0.02***	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
Controls	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Town FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	450,642	450,642	450,642	450,642	450,642	450,642	450,642	450,642	450,642	450,642
R^2	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.02	0.00	0.01

Models estimated with standard errors clustered by town.
$^{***}p < .01$; $^{**}p < .05$; $^{*}p < .1$

Table C.13: University Creations and State Capacity

	Publications	Publications	Law Publications	Law Publications	Upper Tail	Upper Tail
	(1)	(2)	(3)	(4)	(5)	(6)
University Creation	27.79***	32.31***	0.23***	0.23***	0.46***	0.40***
	(0.37)	(1.01)	(0.01)	(0.04)	(0.04)	(0.06)
Controls	Yes	No	Yes	No	Yes	No
Town FE	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	24,139	24,139	24,139	24,139	5,019	5,019
R^2	0.20	0.66	0.04	0.17	0.05	0.43

Models estimated with standard errors clustered by town.
$^{***}p < .01$; $^{**}p < .05$; $^{*}p < .1$

Table C.14: University Creations and State Capacity

	Church	University	Artist	Medicine	Court/Admin	Military	Crafts/Trade	Industry	Noble	Other
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
University Creation	0.17**	0.17***	0.09**	0.00	0.13***	−0.00	0.01	0.01	−0.01	0.01
	(0.08)	(0.05)	(0.04)	(0.01)	(0.04)	(0.00)	(0.04)	(0.01)	(0.02)	(0.01)
Town FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,019	5,019	5,019	5,019	5,019	5,019	5,019	5,019	5,019	5,019
R^2	0.19	0.14	0.18	0.09	0.14	0.05	0.31	0.06	0.10	0.07

Models estimated with standard errors clustered by town.
***p < .01; **p < .05; *p < .1