

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 use 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 cities with self-governance institutions. Shocks to the balance of power between Church and State further amplified the demand for universities and led to an increase in their numbers.

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, collective action by students, 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. Recent work by Møller (2019, 2021); Møller and Doucette (2022) and Grzymala-Busse (2020) has identified the competitive tension between the Catholic Church and European rulers as a unique engine of state development, contributing to multi-polar competition and many legal and bureaucratic innovations integral to modern states. We join this line of reasoning, arguing that the university as an institution arose out of the intensifying rivalry between ecclesiastical and secular power. 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. In Rubin’s words, the Church was the key “propagating agent’ for European rulers (Rubin, 2016). This provided

¹Universities are by no means the only 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.

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 hampered 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, 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. Conversely, the growing legitimization crisis of the Church, due to the printing press and the reformation (Rubin, 2016), created 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 use data on university creations and closures from 800–1800 collected by historians (Rüegg, 2004; de Ridder-Symoens, 1996, 2003). 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 after the reformation, cities with a printing press were significantly more likely to found a first university (i.e., extensive margin). We interpret this as evidence that a power shift towards secular rule lead to new universities. Additionally, local self-governance, the printing press, and bishop seats are particularly important in explaining the creation of additional universities after the reformation (i.e., intensive margin).

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) or limited in the scope of quantitative analysis (Riddle, 1989). We offer a broad quantitative investigation

²There 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.

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 join Møller (2019, 2021); Møller and Doucette (2022) and Grzymala-Busse (2020) in broadening this debate by considering the competition between Church and state as a driver of state-building. In addition, we see the rise of universities as a neglected aspect of the European state-building process. Universities played a crucial role in the development of modern state machinery, statecraft, and the supply of trained and specialized personnel. 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. 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 univer-

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

sities (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 18th and 19th 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 11th and 12th century (Riddle, 1993).

The first European universities emerged in the 11th and 12th 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 13th 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

⁴Note 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).

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 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 influence and involvement of state authorities in the internal management of universities grew. By the turn of the 18th century, for example, universities in some states were seen as stalwarts of the *ancien régime*, 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, proved adaptable and resilient.

Over the course of the 18th and 19th 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 19th century, which would be imitated around the world.⁵

⁵Notably, 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.

The historical development of the university has been covered fairly well in the literature. Historians 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, 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 *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) and Møller (2019, 2021); Møller and Doucette (2022) note, 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 Catholic Church was the main “propagating agent” (Rubin, 2016) for secular rulers.

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, Grzymala-Busse 2020, and Møller 2019, 2021; Møller and Doucette 2022). 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

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

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 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 organi-

⁷An 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.

zational locus for expert training, we expect their creation to be tied to the presence and strength of ecclesiastical rule—at least early on. Consequently, we argue that universities were more likely to be 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 13th 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 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 consider two shocks. First, the Papal Schism of 1378 played an important role in re-equilibrating the balance of power between secular and ecclesiastical rule (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). Second, we consider the most important shock that shifted the balance of power away from the Catholic Church: the Protestant Reformation. 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 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.⁸

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

⁸The Reformation also spurred a Catholic Counter-Reformation movement with implications for university governance, e.g., the increasing influence of the Jesuit order in some colleges and universities.

3 Data and Research Design

In order to empirically investigate the correlates of university creations, we construct a 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 19th and 20th 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 19th and 20th 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 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.

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

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

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 11th and 12th 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.

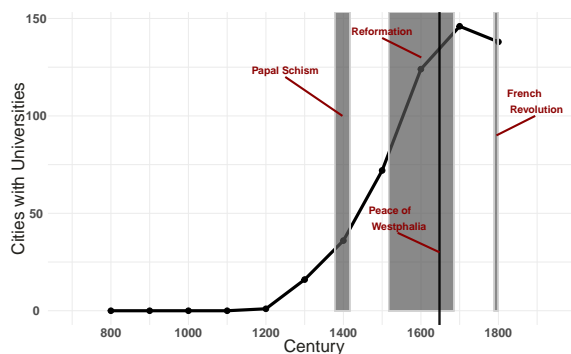


Figure 1. Establishment of Universities by Century

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 11th and 12th 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.

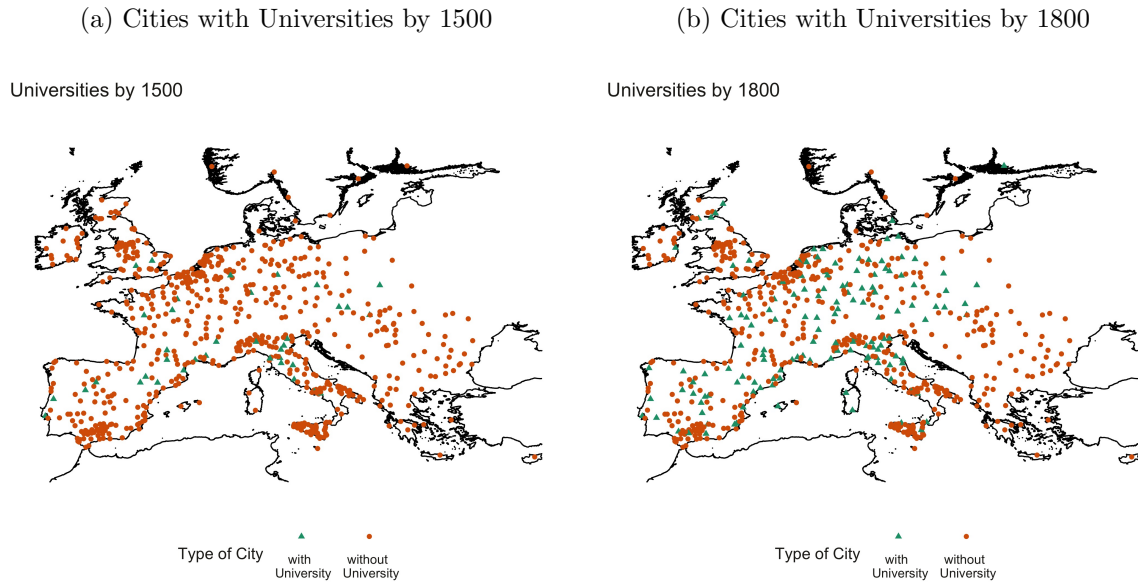
Figure 2 shows the distribution of cities in our sample across Europe as orange dots, while cities with a university by 1500 (left) or 1800 (right) are shown as green triangles. As one can see, in 1500 universities were most concentrated in what is today

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

¹¹Our 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.

Italy, followed by France, Spain and Germany. By 1800, the number of universities has increased significantly and these institutions are spread throughout Western Europe.

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



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.

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*), based on [Bosker et al. \(2012\)](#). Archbishop 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.

Bishop Seats by 1500

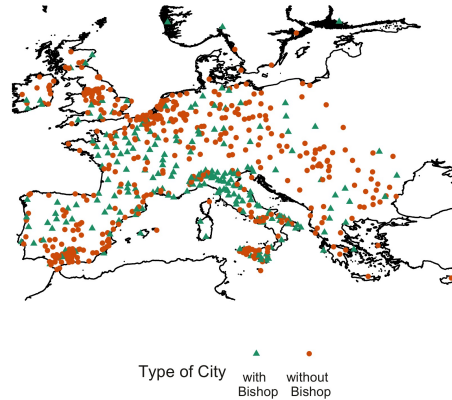


Figure 3. Bishop Seats Across Europe until 1500

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.

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

Self-Governance by 1500

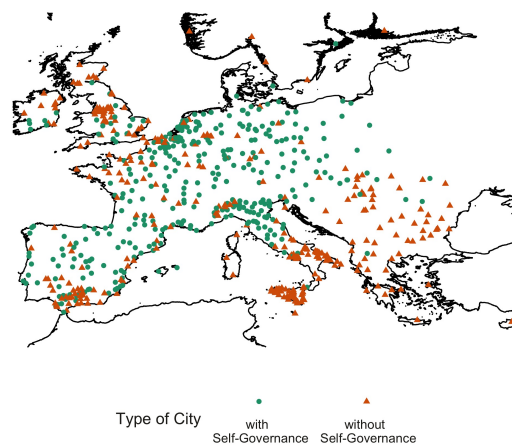


Figure 4. Self-Governance Across Europe until 1500

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.

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, we take data on the location of historical battles in a given century from Dincecco and Onorato (2018) and check whether they are located within 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).

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

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 noted 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 (alternatively the onset variable) at time t (e.g., in 1400) on independent variables measured in period $t - 100$ (i.e., in 1300). The idea is that processes that are present in a city in at t , e.g., 1300, should predict whether universities are founded in the subsequent century, i.e., whether a university would be present in 1400.

For both the count of universities and onset variable, we estimate three types of linear 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, but 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*). 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).¹³

Our main regression models take the following forms:

$$y_{i,t} = \alpha_i + \gamma_t + \delta \cdot \mathbf{X}_{i,t-1} + \beta \cdot \mathbf{Z}_{i,t-1} + \varepsilon_{i,t},$$

¹³Variables are taken from the Bosker et al. (2012) data.

$y_{i,t}$ 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 A1 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. Bishop seats positively predict the founding of first universities (extensive margin) and additional universities (intensive margin). 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 also find strong evidence in line with the second argument. Secular demand 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. Self-governing institutions have a slightly larger positive effect on new university foundings compared to bishop seats.

The results also suggest that capital city status leads to new university foundings. 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

Table 1. University Creation (Static Models)

| | University Count | | | Onset Models | | |
|------------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Bishop | 0.15** (0.05) | 0.14** (0.04) | 0.05* (0.02) | 0.04** (0.01) | 0.04** (0.01) | 0.01** (0.00) |
| Self-Governance | 0.14** (0.02) | 0.10** (0.02) | 0.11** (0.03) | 0.06** (0.01) | 0.06** (0.01) | 0.05** (0.01) |
| Capital | 0.26* (0.10) | 0.05 (0.12) | 0.18 (0.11) | 0.10** (0.03) | 0.07* (0.03) | 0.08** (0.02) |
| Num States (50 km) | 0.02* (0.01) | 0.02* (0.01) | 0.01 (0.01) | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) |
| Num Battles (50 km) | 0.01 (0.01) | 0.01 (0.01) | 0.00 (0.01) | 0.00 (0.00) | 0.00 (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 |

* $p < 0.05$, ** $p < 0.01$

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.

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 A2 and A3 in the Appendix show that our main results remain effectively the same.

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. The secular demand grew particularly when and where secular rulers came into competition with the Church. In the previous section, we 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 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) and/or potential for political conflict. 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. In addition, we consider the adoption of the printing press as another

compounding shock to the equilibrium between the Church and secular rulers. The printing press weakened the monopoly of the Church over knowledge production and empowered various actors, secular legal scholars or critics of the Catholic Church, to challenge the Catholic Church’ dominance in the field of theology, political philosophy, and legal statecraft. To capture this additional shift, we create an interaction of whether cities had a printing press in 1500 (Rubin, 2014), i.e., was an early adopter of the technology, and the post-reformation indicator. We expect that, self-governance, bishops, and the printing press should have stronger effects after the reformation.

In our models estimating the differential effects in the pre- and post-reformation era, we add an additional implicit interaction as control. 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.¹⁴ We include the additional covariate in the *time-shock* models to ensure that the recovered results are not due to cities’ early adoption of Protestantism.¹⁵ 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 dependent variables reveal interesting heterogeneity. For the models with university counts as the dependent variable, we find little evidence for the importance of bishops

¹⁴For 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 A5 in the Appendix). Our main results are substantively unaffected.

¹⁵In fact, the emergence and spread of the Reformation itself was likely affected by universities and students (Kim and Pfaff, 2012). Instead of using Protestantism itself as a variable of interest, we treat the Reformation as a global shock, allowing the effects of ecclesiastical and secular variables to change post-1500, independent of the local adoption of Protestantism. E.g., cities with Bishop seats might become more likely to generate new universities during the Reformation, as a way of countering this reform movement. In fact, The Counter-Reformation featured several examples of the Jesuit order becoming more involved in universities to combat the rising prominence of Protestant universities. In other words, while a variable that measures the local strength of the Reformation movement would be endogenous to the presence of a local university or the exposure of thinkers from regionally proximate universities, our model is meant to capture the effects of ecclesiastical and secular pre- and post-Reformation, not necessarily the effects of Reformation activists themselves.

Table 2. University Creations – Time Varying

| | University Count | | | Onset Models | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Bishop | 0.11 (0.06) | 0.14** (0.05) | 0.00 (0.02) | 0.04* (0.02) | 0.04* (0.02) | 0.01 (0.01) |
| Bishop post Reformation | 0.12** (0.04) | 0.08 (0.04) | 0.11* (0.04) | 0.01 (0.01) | 0.01 (0.01) | 0.00 (0.01) |
| Printing Press in 1500 | | | -0.01 (0.02) | | | 0.02** (0.01) |
| Printing Press post Reformation | 0.29** (0.06) | 0.22** (0.05) | 0.22** (0.05) | 0.06** (0.02) | 0.05** (0.02) | 0.03 (0.02) |
| Self-Governance | 0.04 (0.02) | 0.01 (0.03) | 0.01 (0.03) | 0.06** (0.01) | 0.06** (0.01) | 0.05** (0.01) |
| Self-Governance post Reformation | 0.15** (0.04) | 0.14** (0.04) | 0.12** (0.04) | 0.01 (0.02) | 0.00 (0.02) | -0.01 (0.02) |
| Capital | 0.30** (0.12) | 0.08 (0.14) | 0.22 (0.12) | 0.13** (0.04) | 0.10* (0.04) | 0.10** (0.02) |
| Num States (50 km) | 0.01 (0.01) | 0.01 (0.01) | 0.00 (0.01) | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) |
| Num Battles (50 km) | 0.00 (0.01) | 0.00 (0.01) | -0.00 (0.01) | 0.00 (0.00) | 0.00 (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 | 4851 | 4851 | 4851 | 4454 | 4454 | 4454 |
| Adj. R2 | 0.37 | 0.45 | 0.31 | 0.09 | 0.10 | 0.09 |

* p < 0.05, ** p < 0.01

Note: Minimal controls are population size, indicator for post-revolution France, 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.

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). This means that pre-1500, ecclesiastical and secular demand did not produce universities on the intensive margin. 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. Moreover, we find a strong positive effects of having a printing press on the intensive margin of universities after the Reformation—the technology of the printing press stoked the demand for institutions of higher learning during a time period in which the balance of power between Church and state was being re-negotiated. Again, there is little evidence in favor of the bellicist argument.¹⁶

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 first university creations prior to the Reformation. 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. In contrast, cities with the printing press were more likely to open a first university after the reformation,¹⁷ providing some support for the idea that technology interacted differently with the Reformation compared to measures of secular and ecclesiastical demand.

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

¹⁶Table A4 in the Appendix shows the full model results, including the coefficients for all control variables.

¹⁷We also find a positive and statistically significant coefficient for the printing press in the pre-Reformation period in Model (6), but note that this model excludes city fixed effects and is likely confounded.

or more universities exist in a given city at time t . Table A9 in the Appendix shows the results when the binary indicator is used as the dependent variable. Columns 1-3 show the *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.

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 A8 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 A6 and A7 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.

5 Conclusion

Universities emerged in Western Europe in the 11th and 12th 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. Additionally we show that cities with the printing press were significantly more likely to found a first university after the reformation. We do find some 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.

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 literature 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.

References

- Scott F. Abramson. The Economic Origins of the Territorial State. *International Organization*, 71(1):97–130, January 2017. ISSN 0020-8183, 1531-5088. doi: 10.1017/S0020818316000308.
- Scott F. Abramson and Carles Boix. Endogenous Parliaments: The Domestic and International Roots of Long-Term Economic Growth and Executive Constraints in Europe. *International Organization*.
- Daron Acemoglu and James A. Robinson. *Economic Origins of Dictatorship and Democracy*. Cambridge University Press, New York, NY, 2006.
- Daron Acemoglu, Simon Johnson, James A Robinson, and Pierre Yared. From Education to Democracy? *American Economic Review*, pages 44–49, 2005a.
- Daron Acemoglu, Simon Jonson, and James Robinson. The Rise of Europe: Atlantic Trade, Institutional Change, and Economic Growth. *Quarterly Journal of Economics*, 95(3):546–579, 2005b.
- Avidit Acharya and Alexander Lee. Economic Foundations of the Territorial State System. *American Journal of Political Science*, 0(0). ISSN 1540-5907. doi: 10.1111/ajps.12379.
- Michael Andrews. The Role of Universities in Local Invention: Evidence from the Establishment of U.S. Colleges. 2017.
- Ben Ansell. *University Challenges. The Trilemma of Higher Education Policy in Advanced Industrial States*. April 2006.
- Ben W Ansell. *From the Ballot to the Blackboard: The Redistributive Political Economy of Education*. Cambridge University Press, 2010.
- Paul Bairoch. *Cities and Economic Development. From the Dawn of History to the Present*. The University of Chicago Press, 1988.
- Oriana Bandiera, Myra Mohnen, Imran Rasul, and Martina Viarengo. Nation-Building Through Compulsory Schooling During the Age of Mass Migration. Technical Report 057, Suntory and Toyota International Centres for Economics and Related Disciplines, LSE, 2017.

- Sascha O. Becker, Steven Pfaff, and Jared Rubin. Causes and consequences of the Protestant Reformation. *Explorations in Economic History*, 62(Supplement C): 1–25, October 2016. ISSN 0014-4983. doi: 10.1016/j.eeh.2016.07.007.
- Aaron Benavot. Education and Political Democratization: Cross-National and Longitudinal Findings. *Comparative Education Review*, 40(4):377–403, 1996. ISSN 0010-4086.
- Adam J. Berinsky and Gabriel S. Lenz. Education and Political Participation: Exploring the Causal Link. *Political Behavior*, 33(3):357–373, September 2011. ISSN 0190-9320, 1573-6687. doi: 10.1007/s11109-010-9134-9.
- Harold J. Berman. *Law and Revolution: The Formation of the Western Legal Tradition*. Harvard University Press, Cambridge, MA, 1983.
- Timothy Besley and Torsten Persson. *Pillars of Prosperity: The Political Economics of Development Clusters*. Princeton University Press, Princeton, NJ, 2011.
- Lisa Blaydes, Justin Grimmer, and Alison McQueen. Mirrors for Princes and Sultans: Advice on the Art of Governance in the Medieval Christian and Islamic Worlds. *The Journal of Politics*, 80(4):1150–1167, August 2018. ISSN 0022-3816. doi: 10.1086/699246.
- Carles Boix. *Political Order and Inequality*. Cambridge University Press, 2015.
- Maarten Bosker and Eltjo Buringh. City seeds: Geography and the origins of the European city system. *Journal of Urban Economics*, 98(C):139–157, 2017. ISSN 0094-1190.
- Maarten Bosker, Eltjo Buringh, and Jan Luiten van Zanden. From Baghdad to London: Unraveling Urban Development in Europe, the Middle East, and North Africa, 800–1800. *The Review of Economics and Statistics*, 95(4):1418–1437, May 2012. ISSN 0034-6535. doi: 10.1162/REST_a.00284.
- Davide Cantoni and Noam Yuchtman. The political economy of educational content and development: Lessons from history. *Journal of Development Economics*, 104: 233–244, September 2013. ISSN 0304-3878. doi: 10.1016/j.jdeveco.2013.04.004.
- Davide Cantoni and Noam Yuchtman. Medieval Universities, Legal Institutions, and the Commercial Revolution. *The Quarterly Journal of Economics*, 129(2):823–887, May 2014. ISSN 0033-5533, 1531-4650. doi: 10.1093/qje/qju007.

- Davide Cantoni, Jeremiah Dittmar, and Noam Yuchtman. Religious Competition and Reallocation: The Political Economy of Secularization in the Protestant Reformation. *The Quarterly Journal of Economics*, 133(4):2037–2096, November 2018. ISSN 0033-5533. doi: 10.1093/qje/qjy011.
- Kevin Croke, Guy Grossman, Horacio A. Larreguy, and John Marshall. Deliberate Disengagement: How Education Can Decrease Political Participation in Electoral Authoritarian Regimes. *American Political Science Review*, 110(3):579–600, August 2016. ISSN 0003-0554, 1537-5943. doi: 10.1017/S0003055416000253.
- Sirianne Dahlum. Students in the Streets: Education and Nonviolent Protest. *Comparative Political Studies*, page 0010414018758761, April 2018. ISSN 0010-4140. doi: 10.1177/0010414018758761.
- Sirianne Dahlum. Students in the Streets: Education and Nonviolent Protest. *Comparative Political Studies*, 52(2):277–309, February 2019. ISSN 0010-4140. doi: 10.1177/0010414018758761.
- Sirianne Dahlum and Tore Wig. Educating Demonstrators: Education and Mass Protest in Africa. *Journal of Conflict Resolution*, page 0022002717721394, 2017.
- Sirianne Dahlum and Tore Wig. Chaos on Campus: Universities and Mass Political Protest. 2019.
- J. Bradford De Long and Andrei Shleifer. Princes and Merchants: European City Growth before the Industrial Revolution. *The Journal of Law & Economics*, 36(2): 671–702, 1993. ISSN 0022-2186.
- Bruce Bueno De Mesquita and Ethan Bueno De Mesquita. From Investiture to Worms: A Political Economy of European Development and the Rise of Secular Authority. 2018.
- Hilde de Ridder-Symoens. *A History of the University in Europe: Vol. 2. Universities in Early Modern Europe (1500-1800)*, volume 2. Cambridge, England: Cambridge University Press, 1996.
- Hilde de Ridder-Symoens. *A History of the University in Europe: Volume I, Universities in the Middle Ages*, volume 1. Cambridge University Press, 2003.

- Mark Dincecco. The Rise of Effective States in Europe. *The Journal of Economic History*, 75(03):901–918, September 2015. ISSN 1471-6372. doi: 10.1017/S002205071500114X.
- Mark Dincecco and Massimiliano Gaetano Onorato. *From Warfare to Wealth. The Military Origins of Urban Prosperity in Europe*. Cambridge University Press, New York, NY, 2018.
- Jeremiah Dittmar. *The Economic Origins of Modern Science: Technology, Institutions, and Markets*. 2019.
- John M. Fletcher. Change and Resistance to Change: A Consideration of the Development of English and German Universities During the Sixteenth Century. In Charles Schmitt, editor, *History of Universities, Vol. I, Continuity and Change in Early Modern Universities*, pages 1–36. Avebury, London, UK, 1982.
- Oscar Gelderblom, Abe de Jong, and Joost Jonker. The Formative Years of the Modern Corporation: The Dutch East India Company VOC, 1602–1623. *The Journal of Economic History*, 73(4):1050–1076, December 2013. ISSN 0022-0507, 1471-6372. doi: 10.1017/S0022050713000879.
- Nicola Gennaioli and Hans-Joachim Voth. State Capacity and Military Conflict. *The Review of Economic Studies*, 82(4):1409–1448, October 2015. ISSN 0034-6527. doi: 10.1093/restud/rdv019.
- Andy Green. Education and state formation. In *Education and State Formation*, pages 76–110. Springer, 1990.
- Anna Grzymala-Busse. Beyond War and Contracts: The Medieval and Religious Roots of the European State. *Annual Review of Political Science*, 23(1):null, 2020. doi: 10.1146/annurev-polisci-050718-032628.
- Jeffrey Herbst. *States and Power in Africa: Comparative Lessons in Authority and Control*. Princeton University Press, Princeton, NJ, 2000.
- Florian M. Hollenbach, Janica Magat, and Jan H. Pierskalla. Universities and Democratization. 2018.
- Ji Yeon Hong and Christopher Paik. Colonization and Education: Exploring the Legacy of Local Elites in Korea. *The Economic History Review*, forthcoming.

- Toby Huff. *The Rise of Early Modern Science: Islam, China and the West*. Cambridge University Press, New York, NY, 2010.
- Toby E. Huff. *The Rise of Early Modern Science: Islam, China and the West*. Cambridge University Press, New York, NY, 2003.
- Hyojoung Kim and Steven Pfaff. Structure and Dynamics of Religious Insurgency: Students and the Spread of the Reformation. *American Sociological Review*, 77(2): 188–215, April 2012. ISSN 0003-1224. doi: 10.1177/0003122411435905.
- Ahmet T. Kuru. *Islam, Authoritarianism, and Underdevelopment*. Cambridge University Press, New York, NY, 2019.
- Horacio Larreguy and John Marshall. The Effect of Education on Civic and Political Engagement in Nonconsolidated Democracies: Evidence from Nigeria. *The Review of Economics and Statistics*, 99(3):387–401, August 2016. ISSN 0034-6535. doi: 10.1162/REST_a_00633.
- Margaret Levi. *Of Rule and Revenue*. University of California Press, Berkeley, CA, 1989.
- Evan S. Lieberman, Daniel N. Posner, and Lily L. Tsai. Does Information Lead to More Active Citizenship? Evidence from an Education Intervention in Rural Kenya. *World Development*, 60:69–83, August 2014. ISSN 0305-750X. doi: 10.1016/j.worlddev.2014.03.014.
- Seymour Martin Lipset. *Political Man: The Social Bases of Politics*. The Johns Hopkins University Press, Baltimore, MD, 1981.
- Michael Mann. *The Sources of Social Power. Volume I. A History of Power from the Beginning to A.D. 1760*. Cambridge University Press, New York, NY, 1986.
- Jørgen Møller. Bringing the Church Back In: Ecclesiastical Influences on the Rise of Europe. *Politics and Religion*, 12(2):213–226, June 2019. ISSN 1755-0483, 1755-0491. doi: 10.1017/S1755048318000822.
- Jørgen Møller. Medieval Origins of the European State System: The Catholic Church as Midwife. *International Studies Review*, 23(3):914–932, September 2021. ISSN 1521-9488. doi: 10.1093/isr/viaa091.

- Jørgen Møller and Jonathan Stavnskær Doucette. *The Catholic Church and European State Formation, AD 1000-1500*. Oxford University Press, Oxford, New York, 2022. ISBN 978-0-19-285711-8.
- R.I. Moore. *The First European Revolution, c.970-1215*. Blackwell, Oxford, UK, 2000.
- Douglass C. North and Barry R. Weingast. Constitutions and Commitment: The Evolution of Institutional Governing Public Choice in Seventeenth-Century England. *The Journal of Economic History*, 49(4):803–832, 1989.
- Nathan Nunn and Nancy Qian. The Potato’s Contribution to Population and Urbanization: Evidence From A Historical Experiment. *The Quarterly Journal of Economics*, 126(2):593–650, May 2011. ISSN 0033-5533, 1531-4650. doi: 10.1093/qje/qjr009.
- Christos Nüssli. *Digital Historical Cartography of Europe*. 2011.
- Didac Queralt. From Mercantilism to Free Trade: A History of Fiscal Capacity Building. *Quarterly Journal of Political Science*, 10(2):221–273, June 2015. ISSN 15540634. doi: 10.1561/100.00014065.
- Hastings Rashdall. *The Universities of Europe in the Middle Ages*. Clarendon Press, Oxford, UK, 1895.
- Phyllis Riddle. *University and State: Political Competition and the Rise of Universities, 1200-1985*. PhD thesis, Stanford University, 1989.
- Phyllis Riddle. Political authority and university formation in Europe, 1200–1800. *Sociological Perspectives*, 36(1):45–62, 1993.
- Bo Rothstein and Eric M. Uslaner. All for All: Equality, Corruption, and Social Trust. *World Politics*, 58(01):41–72, October 2005. ISSN 1086-3338. doi: 10.1353/wp.2006.0022.
- Jared Rubin. Printing and Protestants: An Empirical Test of the Role of Printing in the Reformation. *The Review of Economics and Statistics*, 96(2):270–286, 2014. ISSN 0034-6535. doi: 10.1162/REST_a_00368.
- Jared Rubin. *Rulers, Religion, & Riches. Why the West Got Rich and the Middle East Did Not*. Cambridge University Press, Cambridge, Mass, 2016.

- Walter Rüegg. *A History of the University in Europe: Volume III, Universities in the Nineteenth and Early Twentieth Centuries (1800-1945)*. Cambridge University Press, 2004.
- Howard Sanborn and Clayton L. Thyne. Learning Democracy: Education and the Fall of Authoritarian Regimes. *British Journal of Political Science*, 44(4):773–797, 2014.
- Janika Spannagel, Katrin Kinzelbach, and Ilyas Saliba. The Academic Freedom Index and Other New Indicators Relating to Academic Space: An Introduction. 2020.
- Hendrik Spruyt. *The Sovereign State and Its Competitors*. Princeton University Press, New York, NY, 1994.
- David Stasavage. When Distance Mattered: Geographic Scale and the Development of European Representative Assemblies. *American Political Science Review*, 104(04):625–643, November 2010. ISSN 1537-5943. doi: 10.1017/S0003055410000444.
- David Stasavage. Was Weber Right? The Role of Urban Autonomy in Europe’s Rise. *American Political Science Review*, 108(02):337–354, May 2014. ISSN 1537-5943. doi: 10.1017/S0003055414000173.
- Clayton L. Thyne. ABC’s, 123’s, and the Golden Rule: The Pacifying Effect of Education on Civil War, 1980–1999. *International Studies Quarterly*, 50(4):733–754, December 2006. ISSN 1468-2478. doi: 10.1111/j.1468-2478.2006.00423.x.
- Charles Tilly. *Coercion, Capital, and European States, AD 990-1990*. Blackwell, Oxford, UK, 1990.
- Anna Valero and John Van Reenen. The Economic Impact of Universities: Evidence from Across the Globe. Working Paper 22501, National Bureau of Economic Research, August 2016.
- Jan Luiten Van Zanden. *The Long Road to the Industrial Revolution. The European Economy in a Global Perspective, 1000-1800*. Brill, Leiden, 2009.
- Jan Luiten Van Zanden, Eltjo Buringh, and Maarten Bosker. The rise and decline of European parliaments, 1188–17891. *The Economic History Review*, 65(3):835–861, August 2012. ISSN 1468-0289. doi: 10.1111/j.1468-0289.2011.00612.x.

Leonard Wantchekon, Marko Klašnja, and Natalija Novta. Education and Human Capital Externalities: Evidence from Colonial Benin. *The Quarterly Journal of Economics*, 130(2):703–757, May 2015. ISSN 0033-5533, 1531-4650. doi: 10.1093/qje/qjv004.

A Additional Model Results

Appendix Table A1. University Creations (Full Results)

| | University Count | | | Onset Models | | |
|------------------------|------------------|------------------|-------------------|------------------|------------------|------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Bishop | 0.15** (0.05) | 0.14** (0.04) | 0.05* (0.02) | 0.04** (0.01) | 0.04** (0.01) | 0.01** (0.00) |
| Self-Governance | 0.14** (0.02) | 0.10** (0.02) | 0.11** (0.03) | 0.06** (0.01) | 0.06** (0.01) | 0.05** (0.01) |
| Capital | 0.26* (0.10) | 0.05 (0.12) | 0.18 (0.11) | 0.10** (0.03) | 0.07* (0.03) | 0.08** (0.02) |
| Num States (50 km) | 0.02* (0.01) | 0.02* (0.01) | 0.01 (0.01) | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) |
| Num Battles (50 km) | 0.01 (0.01) | 0.01 (0.01) | 0.00 (0.01) | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) |
| Population | | 0.01* (0.00) | 0.01* (0.00) | | 0.00** (0.00) | 0.00** (0.00) |
| France | | 0.01 (0.10) | -0.01 (0.10) | | -0.00 (0.03) | -0.00 (0.03) |
| Latitude | | | 0.00 (0.00) | | | 0.00 (0.00) |
| Sea | | | -0.04 (0.02) | | | -0.00 (0.00) |
| River | | | 0.03 (0.02) | | | 0.01 (0.00) |
| Elevation | | | 0.00 (0.00) | | | 0.00 (0.00) |
| Soil Quality | | | 0.00 (0.03) | | | -0.00 (0.01) |
| Roman Hub | | | -0.02 (0.02) | | | -0.00 (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 |

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

Appendix Table A2. University Creations (100 km Radius)

| | University Count | | | Onset Models | | |
|------------------------|------------------|------------------|-------------------|------------------|------------------|-------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Bishop | 0.15** (0.05) | 0.15** (0.04) | 0.04* (0.02) | 0.04** (0.01) | 0.04** (0.01) | 0.01** (0.00) |
| Self-Governance | 0.13** (0.02) | 0.09** (0.02) | 0.11** (0.03) | 0.06** (0.01) | 0.06** (0.01) | 0.05** (0.01) |
| Capital | 0.26* (0.10) | 0.05 (0.12) | 0.18 (0.11) | 0.10** (0.03) | 0.07* (0.03) | 0.08** (0.02) |
| Num States (100 km) | 0.01** (0.00) | 0.01** (0.00) | 0.01 (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* (0.00) | 0.01* (0.00) | | 0.00** (0.00) | 0.00** (0.00) |
| France | | 0.01 (0.10) | -0.01 (0.10) | | -0.00 (0.03) | -0.00 (0.03) |
| Latitude | | | 0.00 (0.00) | | | 0.00 (0.00) |
| Sea | | | -0.04 (0.02) | | | -0.00 (0.00) |
| River | | | 0.03 (0.02) | | | 0.01 (0.00) |
| Elevation | | | 0.00 (0.00) | | | 0.00 (0.00) |
| Soil Quality | | | 0.01 (0.03) | | | -0.00 (0.01) |
| Roman Hub | | | -0.02 (0.02) | | | -0.00 (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 |

* $p < 0.05$, ** $p < 0.01$

Note: Models estimated with standard errors clustered by city.

Appendix Table A3. University Creations (200 km Radius)

| | University Count | | | Onset Models | | |
|------------------------|------------------|------------------|-------------------|------------------|------------------|-------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Bishop | 0.15** (0.05) | 0.15** (0.04) | 0.05* (0.02) | 0.04** (0.01) | 0.04** (0.01) | 0.01** (0.00) |
| Self-Governance | 0.13** (0.02) | 0.09** (0.02) | 0.11** (0.02) | 0.06** (0.01) | 0.05** (0.01) | 0.04** (0.01) |
| Capital | 0.26* (0.10) | 0.04 (0.12) | 0.17 (0.11) | 0.10** (0.03) | 0.07* (0.03) | 0.08** (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* (0.00) | 0.01* (0.00) | | 0.00** (0.00) | 0.00** (0.00) |
| France | | 0.01 (0.10) | -0.00 (0.10) | | -0.00 (0.03) | 0.00 (0.03) |
| Latitude | | | 0.00 (0.00) | | | 0.00 (0.00) |
| Sea | | | -0.04 (0.02) | | | -0.00 (0.00) |
| River | | | 0.03 (0.02) | | | 0.01* (0.00) |
| Elevation | | | 0.00 (0.00) | | | 0.00 (0.00) |
| Soil Quality | | | 0.02 (0.03) | | | -0.00 (0.01) |
| Roman Hub | | | -0.02 (0.02) | | | -0.01 (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 |

* p < 0.05, ** p < 0.01

Note: Models estimated with standard errors clustered by city.

Appendix Table A4. University Creations – Time Varying (Full Results)

| | University Count | | | Onset Models | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|------------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Bishop | 0.11 (0.06) | 0.14** (0.05) | 0.00 (0.02) | 0.04* (0.02) | 0.04* (0.02) | 0.01 (0.01) |
| Bishop post Reformation | 0.12** (0.04) | 0.08 (0.04) | 0.11* (0.04) | 0.01 (0.01) | 0.01 (0.01) | 0.00 (0.01) |
| Printing Press in 1500 | | | -0.01 (0.02) | | | 0.02** (0.01) |
| Printing Press post Reformation | 0.29** (0.06) | 0.22** (0.05) | 0.22** (0.05) | 0.06** (0.02) | 0.05** (0.02) | 0.03 (0.02) |
| Self-Governance | 0.04 (0.02) | 0.01 (0.03) | 0.01 (0.03) | 0.06** (0.01) | 0.06** (0.01) | 0.05** (0.01) |
| Self-Governance post Reformation | 0.15** (0.04) | 0.14** (0.04) | 0.12** (0.04) | 0.01 (0.02) | 0.00 (0.02) | -0.01 (0.02) |
| Capital | 0.30** (0.12) | 0.08 (0.14) | 0.22 (0.12) | 0.13** (0.04) | 0.10* (0.04) | 0.10** (0.02) |
| Num States (50 km) | 0.01 (0.01) | 0.01 (0.01) | 0.00 (0.01) | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) |
| Num Battles (50 km) | 0.00 (0.01) | 0.00 (0.01) | -0.00 (0.01) | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) |
| Protestant | | | 0.01 (0.02) | | | -0.00 (0.01) |
| Protestant post Reformation | | 0.03 (0.06) | 0.04 (0.06) | | 0.02 (0.02) | 0.02 (0.02) |
| Population | | 0.01 (0.00) | 0.01 (0.00) | | 0.00** (0.00) | 0.00** (0.00) |
| France | | -0.01 (0.15) | -0.03 (0.15) | | 0.01 (0.04) | 0.02 (0.04) |
| Latitude | | | -0.00 (0.00) | | | -0.00 (0.00) |
| Sea | | | -0.06* (0.03) | | | -0.01 (0.01) |
| River | | | 0.02 (0.02) | | | 0.00 (0.01) |
| Elevation | | | 0.00 (0.00) | | | 0.00 (0.00) |
| Soil Quality | | | 0.02 (0.05) | | | -0.01 (0.01) |
| Roman Hub | | | -0.03 (0.03) | | | -0.01 (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 | 4851 | 4851 | 4851 | 4454 | 4454 | 4454 |
| Adj. R2 | 0.37 | 0.45 | 0.31 | 0.09 | 0.10 | 0.09 |

* p < 0.05, ** p < 0.01

Note: Models estimated with standard errors clustered by city.

Appendix Table A5. University Creations – Time Varying (Missing Press/Protestant)

| | University Count | | | Onset Models | | |
|---|--------------------------------|--------------------------------|--------------------------------|------------------------------|------------------------------|-------------------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Bishop | 0.11 (0.06) | 0.14** (0.05) | 0.00 (0.02) | 0.04* (0.02) | 0.04* (0.02) | 0.01 (0.01) |
| Bishop post Reformation | 0.12** (0.04) | 0.08 (0.04) | 0.11* (0.04) | 0.01 (0.01) | 0.01 (0.01) | 0.00 (0.01) |
| Self-Governance | 0.04 (0.02) | 0.01 (0.03) | 0.01 (0.03) | 0.06** (0.01) | 0.06** (0.01) | 0.05** (0.01) |
| Self-Governance post Reformation | 0.15** (0.04) | 0.14** (0.04) | 0.12** (0.04) | 0.01 (0.02) | 0.00 (0.02) | -0.01 (0.02) |
| Capital | 0.30** (0.12) | 0.08 (0.14) | 0.22 (0.12) | 0.13** (0.04) | 0.10* (0.04) | 0.10** (0.02) |
| Num States (50 km) | 0.01 (0.01) | 0.01 (0.01) | 0.00 (0.01) | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) |
| Num Battles (50 km) | 0.00 (0.01) | 0.00 (0.01) | -0.00 (0.01) | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) |
| Protestant | | | 0.01 (0.02) | | | -0.00 (0.01) |
| Protestant post Reformation | | 0.03 (0.06) | 0.04 (0.06) | | 0.02 (0.02) | 0.02 (0.02) |
| Population | | 0.01 (0.00) | 0.01 (0.00) | | 0.00** (0.00) | 0.00** (0.00) |
| France | | -0.01 (0.15) | -0.03 (0.15) | | 0.01 (0.04) | 0.02 (0.04) |
| Latitude | | | -0.00 (0.00) | | | -0.00 (0.00) |
| Sea | | | -0.06* (0.03) | | | -0.01 (0.01) |
| River | | | 0.02 (0.02) | | | 0.00 (0.01) |
| Elevation | | | 0.00 (0.00) | | | 0.00 (0.00) |
| Soil Quality | | | 0.02 (0.05) | | | -0.01 (0.01) |
| Roman Hub | | | -0.03 (0.03) | | | -0.01 (0.01) |
| Num Cities (50 km) | | | -0.01** (0.00) | | | -0.00** (0.00) |
| N | 4851 | 4851 | 4851 | 4454 | 4454 | 4454 |
| City FE | Yes | Yes | No | Yes | Yes | No |
| NA | NA | NA | NA | NA | NA | NA |
| NA | NA | NA | NA | NA | NA | NA |
| NA | NA | NA | NA | NA | NA | NA |
| Century FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Adj. R2 | 0.37 | 0.45 | 0.31 | 0.09 | 0.10 | 0.09 |

* p < 0.05, ** p < 0.01

Note: Models estimated with standard errors clustered by city.

Appendix Table A6. University Creations – Time Varying (100 km Radius)

| | University Count | | | Onset Models | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|------------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Bishop | 0.11 (0.06) | 0.14** (0.05) | -0.01 (0.02) | 0.04* (0.02) | 0.04* (0.02) | 0.00 (0.01) |
| Bishop post Reformation | 0.12** (0.04) | 0.08 (0.04) | 0.11* (0.04) | 0.01 (0.01) | 0.01 (0.01) | 0.00 (0.01) |
| Printing Press in 1500 | | | -0.01 (0.02) | | | 0.02** (0.01) |
| Printing Press post Reformation | 0.29** (0.06) | 0.22** (0.05) | 0.22** (0.05) | 0.06** (0.02) | 0.05* (0.02) | 0.03 (0.02) |
| Self-Governance | 0.04 (0.02) | 0.01 (0.03) | 0.01 (0.03) | 0.06** (0.01) | 0.05** (0.01) | 0.05** (0.01) |
| Self-Governance post Reformation | 0.15** (0.04) | 0.14** (0.04) | 0.12** (0.04) | 0.01 (0.02) | 0.00 (0.02) | -0.01 (0.02) |
| Capital | 0.30** (0.12) | 0.08 (0.14) | 0.22 (0.12) | 0.13** (0.04) | 0.10* (0.04) | 0.10** (0.02) |
| Num States (100 km) | 0.00 (0.00) | 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) |
| Protestant | | | 0.01 (0.02) | | | 0.00 (0.01) |
| Protestant post Reformation | | 0.03 (0.06) | 0.04 (0.06) | | 0.02 (0.02) | 0.02 (0.02) |
| Population | | 0.01 (0.00) | 0.01 (0.00) | | 0.00** (0.00) | 0.00** (0.00) |
| France | | -0.01 (0.15) | -0.03 (0.15) | | 0.01 (0.04) | 0.02 (0.04) |
| Latitude | | | -0.00 (0.00) | | | -0.00 (0.00) |
| Sea | | | -0.07* (0.03) | | | -0.01 (0.01) |
| River | | | 0.02 (0.02) | | | 0.00 (0.01) |
| Elevation | | | 0.00 (0.00) | | | -0.00 (0.00) |
| Soil Quality | | | 0.04 (0.05) | | | -0.01 (0.01) |
| Roman Hub | | | -0.02 (0.03) | | | -0.01 (0.01) |
| Num Cities (100 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 | 4851 | 4851 | 4851 | 4454 | 4454 | 4454 |
| Adj. R2 | 0.37 | 0.45 | 0.31 | 0.09 | 0.10 | 0.09 |

* p < 0.05, ** p < 0.01

Note: Models estimated with standard errors clustered by city.

Appendix Table A7. University Creations – Time Varying (200 km Radius)

| | University Count | | | Onset Models | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|------------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Bishop | 0.11 (0.06) | 0.14** (0.05) | -0.01 (0.02) | 0.04* (0.02) | 0.04** (0.02) | 0.01 (0.01) |
| Bishop post Reformation | 0.12** (0.04) | 0.08* (0.04) | 0.11* (0.04) | 0.01 (0.01) | 0.01 (0.01) | 0.00 (0.01) |
| Printing Press in 1500 | | | -0.01 (0.02) | | | 0.02** (0.01) |
| Printing Press post Reformation | 0.29** (0.06) | 0.21** (0.05) | 0.22** (0.05) | 0.06** (0.02) | 0.05* (0.02) | 0.03 (0.02) |
| Self-Governance | 0.04 (0.02) | 0.01 (0.03) | 0.02 (0.03) | 0.06** (0.01) | 0.05** (0.01) | 0.05** (0.01) |
| Self-Governance post Reformation | 0.15** (0.04) | 0.14** (0.04) | 0.12** (0.04) | 0.01 (0.02) | 0.00 (0.02) | -0.01 (0.02) |
| Capital | 0.30** (0.12) | 0.08 (0.14) | 0.20 (0.12) | 0.13** (0.04) | 0.10* (0.04) | 0.10** (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 (0.02) | | | 0.00 (0.01) |
| Protestant post Reformation | | 0.03 (0.06) | 0.04 (0.06) | | 0.02 (0.02) | 0.02 (0.02) |
| Population | | 0.01 (0.00) | 0.01 (0.00) | | 0.00** (0.00) | 0.00** (0.00) |
| France | | -0.01 (0.15) | -0.03 (0.15) | | 0.01 (0.04) | 0.02 (0.04) |
| Latitude | | | 0.00 (0.00) | | | -0.00 (0.00) |
| Sea | | | -0.07* (0.03) | | | -0.01 (0.01) |
| River | | | 0.02 (0.02) | | | 0.00 (0.01) |
| Elevation | | | -0.00 (0.00) | | | -0.00 (0.00) |
| Soil Quality | | | 0.05 (0.05) | | | -0.01 (0.01) |
| Roman Hub | | | -0.01 (0.03) | | | -0.01 (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 | 4851 | 4851 | 4851 | 4454 | 4454 | 4454 |
| Adj. R2 | 0.37 | 0.45 | 0.32 | 0.09 | 0.10 | 0.09 |

* p < 0.05, ** p < 0.01

Note: Models estimated with standard errors clustered by city.

Appendix Table A8. University Creations – Time Varying (Addl. Covariate Interactions)

| | University Count | | | Onset Models | | |
|--|------------------|---------------|---------------|---------------|--------------|-------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Bishop | 0.12* | 0.14** | 0.01 | 0.04* | 0.04* | 0.01 |
| | (0.05) | (0.05) | (0.01) | (0.02) | (0.02) | (0.01) |
| Bishop post Reformation | 0.09* | 0.05 | 0.09* | 0.02 | 0.01 | 0.00 |
| | (0.04) | (0.04) | (0.04) | (0.01) | (0.01) | (0.01) |
| Printing Press in 1500 | | | 0.00 | | | 0.02** |
| | | | (0.02) | | | (0.01) |
| Printing Press post Reformation | 0.20** | 0.17** | 0.18** | 0.06** | 0.05* | 0.02 |
| | (0.05) | (0.05) | (0.05) | (0.02) | (0.02) | (0.02) |
| Self-Governance | 0.05* | 0.02 | 0.02 | 0.08** | 0.06** | 0.05** |
| | (0.02) | (0.03) | (0.03) | (0.01) | (0.01) | (0.01) |
| Self-Governance post Reformation | 0.13** | 0.13** | 0.11* | 0.00 | 0.00 | -0.01 |
| | (0.04) | (0.04) | (0.04) | (0.02) | (0.02) | (0.02) |
| Capital | -0.16 | -0.16 | 0.01 | 0.04 | 0.04 | 0.06* |
| | (0.12) | (0.13) | (0.11) | (0.05) | (0.05) | (0.03) |
| Capital post Reformation | 1.04** | 0.62** | 0.55** | 0.28** | 0.21* | 0.16* |
| | (0.28) | (0.13) | (0.15) | (0.09) | (0.10) | (0.08) |
| 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 States post Reformation | 0.01 | 0.02 | 0.02 | -0.00 | -0.00 | -0.00 |
| | (0.01) | (0.01) | (0.01) | (0.00) | (0.01) | (0.01) |
| Num Battles (50 km) | 0.02 | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| Num Battles post Reformation | -0.02 | -0.03 | -0.02 | -0.01 | -0.01 | -0.01 |
| | (0.01) | (0.01) | (0.02) | (0.01) | (0.01) | (0.01) |
| Protestant | | | 0.01 | | | 0.00 |
| | | | (0.02) | | | (0.01) |
| Protestant post Reformation | | -0.00 | 0.01 | | 0.02 | 0.02 |
| | | (0.06) | (0.06) | | (0.02) | (0.02) |
| Population | | 0.01 | 0.01 | | 0.00* | 0.00* |
| | | (0.00) | (0.00) | | (0.00) | (0.00) |
| France | | 0.02 | -0.00 | | 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 | | | 0.03 | | | 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 | | | -0.02 | | | -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 | 4851 | 4851 | 4851 | 4454 | 4454 | 4454 |
| Adj. R2 | 0.41 | 0.46 | 0.32 | 0.09 | 0.11 | 0.10 |

* p < 0.05, ** p < 0.01

Note: Models estimated with standard errors clustered by city.

Appendix Table A9. University Creations – Binary Indicator (Full Results)

| | University Indicator | | | | | |
|---|----------------------|------------------|-------------------|------------------|------------------|-------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Bishop | 0.09** (0.02) | 0.09** (0.02) | 0.04** (0.01) | 0.07* (0.03) | 0.07* (0.03) | 0.01 (0.01) |
| Bishop post Reformation | | | | 0.07* (0.03) | 0.07* (0.03) | 0.09** (0.03) |
| Printing Press in 1500 | | | | | | 0.03* (0.01) |
| Printing Press post Reformation | | | | 0.20** (0.03) | 0.19** (0.03) | 0.19** (0.04) |
| Self-Governance | 0.10** (0.01) | 0.09** (0.01) | 0.09** (0.02) | 0.06** (0.02) | 0.05** (0.02) | 0.06** (0.02) |
| Self-Governance post Reformation | | | | 0.06* (0.03) | 0.06 (0.03) | 0.03 (0.03) |
| Capital | 0.11* (0.05) | 0.06 (0.05) | 0.15** (0.04) | 0.13* (0.06) | 0.08 (0.06) | 0.19** (0.05) |
| Num States (50 km) | 0.01 (0.00) | 0.01 (0.00) | 0.00 (0.00) | 0.01 (0.01) | 0.00 (0.01) | 0.00 (0.01) |
| Num Battles (50 km) | -0.00 (0.00) | -0.00 (0.00) | -0.01 (0.00) | -0.00 (0.00) | -0.00 (0.00) | -0.00 (0.01) |
| Protestant | | | | | | 0.01 (0.01) |
| Protestant post Reformation | | | | | 0.04 (0.04) | 0.05 (0.04) |
| Population | | 0.00** (0.00) | 0.00** (0.00) | | 0.00** (0.00) | 0.00* (0.00) |
| France | | 0.02 (0.03) | 0.01 (0.03) | | -0.08 (0.05) | -0.09 (0.05) |
| Latitude | | | 0.00 (0.00) | | | -0.00 (0.00) |
| Sea | | | -0.00 (0.01) | | | -0.01 (0.02) |
| River | | | 0.02* (0.01) | | | 0.02 (0.02) |
| Elevation | | | 0.00 (0.00) | | | 0.00 (0.00) |
| Soil Quality | | | -0.02 (0.02) | | | 0.00 (0.03) |
| Roman Hub | | | -0.01 (0.01) | | | -0.01 (0.02) |
| Num Cities (50 km) | | | -0.01** (0.00) | | | -0.01** (0.00) |
| City FE | Yes | Yes | No | Yes | Yes | No |
| Century FE | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 7447 | 7447 | 7447 | 4851 | 4851 | 4851 |
| Adj. R2 | 0.48 | 0.49 | 0.33 | 0.45 | 0.46 | 0.27 |

* p < 0.05, ** p < 0.01

Note: Models estimated with standard errors clustered by city.