

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

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Abstract

Universities are an important institutional innovation that emerged in Western Europe. Becoming the dominant institutional locus of elite human capital formation and scientific research, they contribute to innovation, economic growth (Cantoni and Yuchtman, 2014; Valero and Reenen, 2016; Andrews, 2017), and play an essential role in social and political progress (Hollenbach, Magat and Pierskalla, 2018; Sanborn and Thyne, 2014). What specific factors led to the initial emergence of universities? We argue that universities emerged as a consequence of the increased competition between secular and ecclesiastical rule. The Catholic Church maintained a near monopoly over the training of legal, theological, and philosophical experts and the supply of legitimizing ideology for political authority, requiring secular rulers to cooperate with ecclesiastical rulers. Increased demands by secular rulers for the independent supply of an administrative workforce and new governance frameworks, paired with socio-political shocks that weakened the Church' control over legal training, led to increased competition between secular and ecclesiastical rule and a flourishing of universities. We collect original data on university creations and closures from 800-1800 and combine these with data on European cities (Bosker, Buringh and van Zanden, 2012) and early-modern state-building (Dincecco and Onorato, 2018; Nüssli, 2011) to test our argument. We find universities were more likely to emerge in cities that were centers of ecclesiastical rule, where ecclesiastical rule was subsequently exposed to more competition, and where demands by secular rulers for legal experts was increasing.

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1 Introduction

European political and economic history has produced many institutional innovations. These institutions—ranging from constitutional rule, parliaments, the rule of law, and representative democracy, to the publicly traded stock company—spread to much of the rest of the world, either by voluntary adoption or coercion (Van Zanden, Buringh and Bosker, 2012; Stasavage, 2010; North and Weingast, 1989; Acemoglu and Robinson, 2006; Gelderblom and Jonker, 2004; Gelderblom, Jong and Jonker, 2013).

Another institution that took shape in Western Europe during the Middle Ages and is now prevalent across the world is the university. Today, universities are the dominant institutional locus of advanced human capital formation and scientific research.¹ They play a crucial role in the political economy of most countries, driving innovation and economic growth (Cantoni and Yuchtman, 2014; Valero and Reenen, 2016; Andrews, 2017). Moreover, universities often play an essential role in social and political progress, e.g., modernization, protest movements, and democratization (Hollenbach, Magat and Pierskalla, 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 of this particular institutional innovation?

We contend that one useful lens to understand the creation of universities is the competition between secular and ecclesiastical rule in Western Europe. In the early Middle Ages, the Catholic Church enjoyed a near monopoly over the supply of literate, numerate, and specialized legal, theological, and philosophical experts. This provided the Church substantial influence over secular rulers' state-building attempts. First, with 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. Second,

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

it hampered the ability of secular rulers to adjust existing theories of governance to address new policy challenges without the Church's input. Third, it enabled ecclesiastical authorities to influence the staffing of rudimentary secular bureaucratic structures, limiting the state's ability to build autonomous capacity over the development of a sufficiently trained and loyal administrative labor force that could support the coercive powers of the state. Given the fractionalized and weak nature of European secular political authorities in the early Middle Ages, rulers were willing to cede these dimensions of state-building to the Catholic Church.

We argue that as the power of secular rulers grew, as they consolidated and differentiated their authority – e.g., due to *bellicist* pressures from external and internal war (Tilly, 1990), the desire to regulate long-distance trade (Cantoni and Yuchtman, 2014), or to manage intra-elite conflict through forms of parliamentary rule—the demand for a differentiated, well-trained, and loyal bureaucracy grew. Moreover, the need for theories of political legitimacy, independent from classic Catholic doctrine, intensified. This generated an incentive to break or re-negotiate the collaborative relationship with the Catholic Church and establish independent control over the training of legal experts as well as the supply of theories of political legitimacy and governance in the form of university creations. This 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 and conflict internal to the Church.

To empirically explore the explanatory power of our argument, we collect original data on university creations and closures from 800-1800. We combine these data on the number and locations of universities with detailed data on European cities that could have served as potential locations for universities (Bosker, Buringh and van Zanden, 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 years 800-1800. We use Bayesian multilevel and classic frequentist fixed effects models to trace the spread of universities over this period.

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, finding that a university creations are more likely in cities where forms of self-governance are present. Third, we document that the creation of universities increased when ecclesiastical rule faced higher competitive pressures, e.g., due to the papal schism of 1378, the Protestant Reformation or the introduction of the printing press. Conversely, we find little evidence that a standard mechanisms of state-building, the demands of engaging in warfare (Tilly, 1990), affects the creation of universities.

Overall, our findings suggest that universities emerged out of a process of competition and played a crucial role in the creation of the modern territorial state, by supporting a qualitative expansion of statecraft. This result was not borne not 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, Buringh and Bosker, 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, we contribute to the growing scholarship on state-building. Work on state-building 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, N.d.; Dincecco, 2015; Karaman and Pamuk, 2013; 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;

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.

Queralt, 2015). We broaden this debate by also considering the rise of universities as a core aspect of the European state-building process. Universities played a crucial role in the development of modern state machinery and statecraft via their role in the training of staff for European rulers' increasingly differentiated bureaucracies as well as suppliers of new governance frameworks and legitimizing ideologies. Our findings force us to consider a broader understanding of state capacity and statecraft 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. Future research will have to determine to which extent the competition secular and ecclesiastical rule had similar affects in other parts of the world.

Finally, whereas the small body of existing work on universities is historical in nature (Rüegg, 2004, 2010; de Ridder-Symoens, 1996, 2003), focused on specific regions in Europe (Cantoni and Yuchtman, 2014), or limited in the scope of quantitative analysis (Riddle, 1993), our paper is the first to offer a broad quantitative investigation of university creations through all of Europe from 800–1800.

2 The Origin of Universities

The university, in its modern form, is an ubiquitous institution across the world. At its core, universities engage in the creation and certification of human capital and the production of scientific research. Complementing its educational and research mission, universities as organizations also enjoy a certain degree of autonomy from government interference. 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 to the extent they grant autonomy and financial security to universities (Grimm and Saliba, 2017; Hollenbach, Magat and Pierskalla, 2018), this basic institutional form is sur-

prisingly common across the world. While universities' institutionalized role in modern scientific research only took shape over the course of the 19th century, in response to the intellectual developments of the Enlightenment and the Industrial Revolution, other core features of universities, notably the training of specialized experts, were present starting in the 12th and 13th century. This combination of roles was potent enough so that universities soon displaced other organizations of higher learning and research, e.g., Royal Academies, and eventually gained a near monopoly over tertiary education. Universities were soon dominant the education of elites in most countries.

The first European universities emerged around the year 1200 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 whilst the Catholic church's governance structure also 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.

At this point, universities engaged in the training of students in the fields of law, theology, and medicine (later adding the arts). This 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 via the entrepreneurial activities of local scholars, making universities initially independent of secular and church influence, this quickly changed. 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. In later centuries, this top-down sanctioning process became the standard procedure for university creation. The power to endow universities was then held by either the pope or a powerful secular lord. Receiving official sanction brought important benefits to universities. It allowed for the conferring of degrees that would be automatically recognized by ecclesiastical and secular authorities, creating a path of employment for university students. It also allowed students to retain income from church benefices while at university (Riddle, 1993, p.50). Consequently, this generated a stable demand for the services offered by universities. A second privilege conferred to medieval universities was a limited form of academic freedom, which allowed subjects from different regions of Europe to travel freely for the purposes of furthering their education. This made early universities pan-European institutions that could sell their services broadly. This form of academic mobility would be restricted later on, as states, and by extension universities, became more nationalized. At one point, educational access to universities would only be granted to citizens.

As the European state-system crystallized and the modern state emerged as the dominant political form, these states established well-defined national borders and differentiated central state bureaucracies. At the same time, universities increasingly institutionalized and became the main suppliers of trained civil servants and producers of secular governance ideologies, which offered legitimizing arguments for political authority independently of the church. As the nation state became stronger, universities developed into narrow national institutions created and maintained at the behest of secular rulers. 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 also grew.

Over the course of the 18th and 19th century, universities across Europe became more rigorous and scientific, fully internalizing the core ideas of the Enlightenment and reflecting the increased importance of the natural and applied sciences. In part, these changes reflected new demands due to the Industrial Revolution. These new demands led to internal reforms and new waves of university creations, culminating in its clearest

form in the shape of the modernized German universities of the late 19th century, which would be imitated around the world.³

The historical development of the university has been covered fairly well in the literature. Several path-breaking volumes have chronicled the different waves of university creations, the institutional evolution of universities, and their role with respect to the state and society (Rüegg, 2004, 2010; de Ridder-Symoens, 1996, 2003; Cobban, 1975; Haskins, 1957). 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).⁴ In political science, research on universities has been part of a larger program on the role of education for politics (Gift and Wibbels, 2014). 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; Gift and Krcmaric, 2017; Benavot, 1996; Acemoglu et al., 2005). Related work has also looked at the relationships between mass- and elite-level education and state capacity (Hong and Paik, N.d.; 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, Posner and Tsai, 2014; Wantchekon, Klašnja and Novta, 2015; Berinsky and Lenz, 2011; Larreguy and Marshall, 2016). Specific work on universities, however, is scarcer. More recently, several studies have identified effects of universities on democratization and pro-democracy attitudes (Hollenbach, Magat and Pierskalla, 2018; Sanborn and Thyne, 2014; Valero and Reenen, 2016). Relatedly, Ansell (2010; 2006) has investigated the political economy of tertiary education in mod-

³Notably, 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.

⁴It is of note though that there exists a much larger literature on the effects of primary and secondary education on growth (Barro, 1997, 2001; Krueger and Lindahl, 2001).

ern 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, 2010; 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 (1993) 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). Van Zanden (2009, p.33) reports that 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 fact that there existed a *functional* separation between secular and ecclesiastical authority in Medieval Europe, generating parallel authority structures with joint claims over different aspects of people's lives (Mann, 1986).⁵ This implied that 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

⁵This separation crystallized in the Investiture Conflict and its resolution in the Concordat of Worms in 1122.

coherent legitimizing ideology for their rule, independently of the Catholic Church. Instead, rulers, in large part, relinquished control over two key functions of statecraft to the Catholic Church: the supply of trained personnel to staff emerging state bureaucracies and the production of the necessary legitimizing ideology and governance frameworks for their rule.

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

Traditionally, the church had relied on monasteries and Cathedral schools to train priests and church administrators. Especially 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.

This allowed the church to train new generations of 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.⁶ 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. Given the Church's near monopoly over the training of literacy, numeracy, and specialized knowledge of Canon law, theological doctrine, and philosophy, the Catholic Church also had substantial influence over

⁶An 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.

the staffing of rudimentary secular bureaucratic structures that increasingly required trained legal experts.

For example, 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). This 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.

Beyond the development of legal theory and new governance frameworks, the Catholic Church's power over the interpretation of church doctrine also granted it supreme influence over the perceived legitimacy of secular rule, due to the widespread adoption of Christianity among Europe's rulers.

Importantly, the retreat of several monastic orders from their role as training grounds in the Middle Ages (Riddle, 1993), led the church to embrace new institutional models for the production of experts in ecclesiastical rule. Universities quickly became a successful model that could be co-opted into the service of the church by offering official Papal sanctioning in exchange for the training of church staff. Since universities became the main organizational locus for expert training, we expect their creation to be tied to the presence and strength of ecclesiastical rule. Consequently, we argue that universities were more likely to be 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 only increased over the course of European history. The slow emergence of secular power in the form of centralized states has been chronicled and charted by a plethora of scholarship on European state-building. Tilly (1990) canonically describes the process of violent com-

petition of the many European principalities as a core driver in the creation of modern state institutions, 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 this *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, which was important for several reasons. First, 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. Second, by encouraging the creation of governing ideologies that justified secular rule independent from the church or rival rulers, it 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 parliamentary rule. 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 some autonomy from local lords, creating a varying array of local participatory institutions and, importantly, con-

tributed to the development of parliamentary institutions more generally (Van Zanden, Buringh and Bosker, 2012; De Long and Shleifer, 1993; Acemoglu, Jonson and Robinson, 2005; Abramson and Boix, N.d.). 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.

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

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

Finally, we argue that new university creations were especially likely where and when exogenous socio-political shocks weakened the Catholic Church. We focus on three specific shocks that shifted the balance of power away from the Catholic Church: the Papal Schism of 1378, the Protestant Reformation, and the introduction of the printing press. Initially, the Catholic church was selective in issuing papal decrees that legitimized universities, wary of losing control over theological teaching, limiting the supply of university education. An unforeseen development weakened the ecclesiastical power, especially with regard to the issuance of Papal decrees for university creations (Cantoni and Yuchtman, 2014). 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. The Protestant Reformation generated an even deeper schism that eventually destroyed the alliance between secular rulers and the Catholic Church in large parts of Europe (Becker, Pfaff and Rubin, 2016; Cantoni, Dittmar and Yuchtman, 2018). Finally, the technological shock of the printing press weakened the monopoly of the Catholic Church over the production of books and increased the ability of new universities to engage in teaching and scholarship. All three types of shocks should be associated with weakened control and power of the Catholic

Church and the emergence of new institutions at the behest of secular rulers.

H3: Socio-political shocks that weakened the Catholic Church are associated with university creations.

3 Data and Research Design

In order to empirically investigate the correlates of university creations, we construct a new data set on universities from 800 – 1800. We begin by defining an appropriate unit of analysis. As universities are generally founded in urban agglomerations, we opt for cities, nested in European states, as our unit of analysis.⁷ 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, Magat and Pierskalla, 2018](#)) and positions universities in potential opposition to autocratic 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, Buringh and van Zanden \(2012\)](#). [Bosker, Buringh and van Zanden \(2012\)](#) study city growth in Europe and the Middle East and their data provide detailed information on city size, geographic context conditions, and political and religious institutions. We focus on the set of European cities in the data, which leaves us with 677 unique cities observed over eleven centuries.

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

⁷At a minimum this is true for the time period and region we study.

unit.

While the [Bosker, Buringh and van Zanden \(2012\)](#) data contains a binary variable for the presence of a university, this measure does not accurately reflect the creation of multiple universities in the same city, the closure of universities, and the presence of some universities originally not recorded in the data. We construct a time-varying count of the number of universities in each city, based on information from historical secondary literature ([Rüegg, 2004, 2010](#); [de Ridder-Symoens, 1996, 2003](#)) and an assortment of university-specific sources.⁸ We use this time-varying count, and a binary dependent variable that takes the value 1 when the count is positive and 0 otherwise, as our outcome variables.⁹

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 were founded around the year 1200. This was followed by a steady increase until the final year in our sample: 1800. We observe a dip in the overall number of universities due to the closure of several universities in the wake of the French Revolution.

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

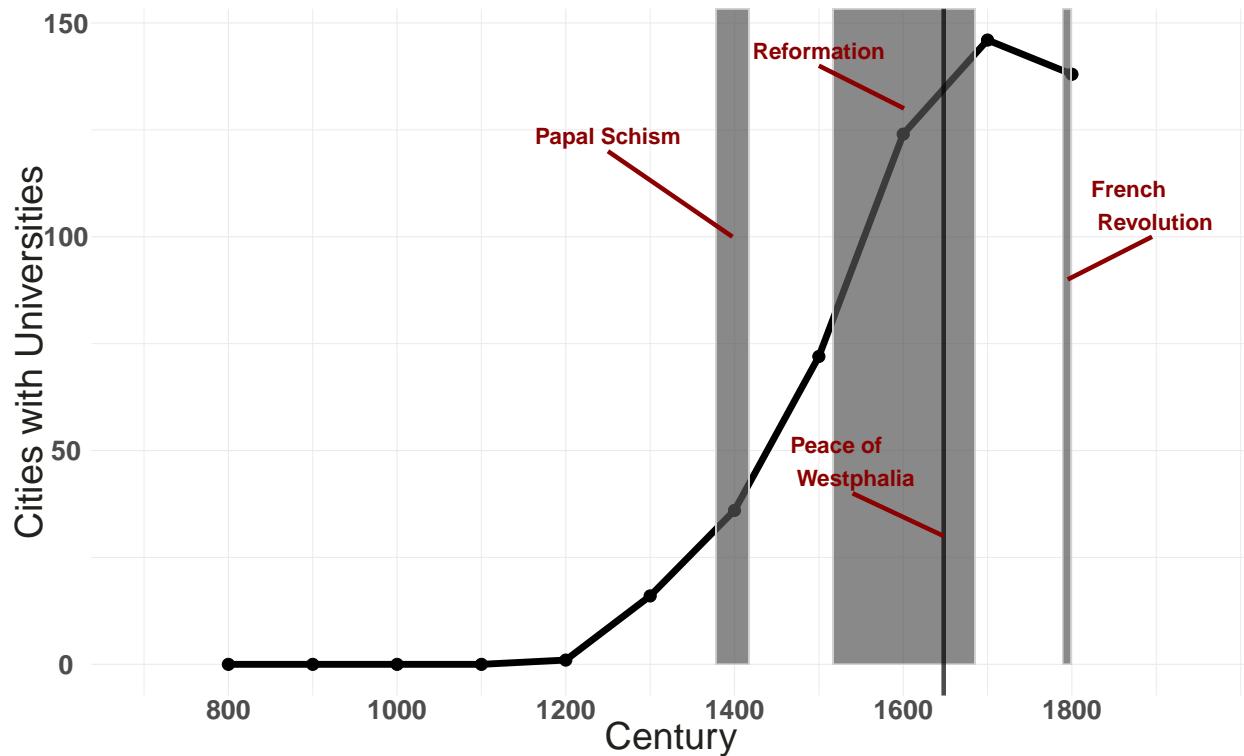
4 Empirical Analysis

To empirically assess the theoretical argument made above, we proceed in three steps. First, we model the relationship between cities with (arch)bishop seats and the likelihood

⁸Wikipedia generally offers a fairly detailed account of university histories.

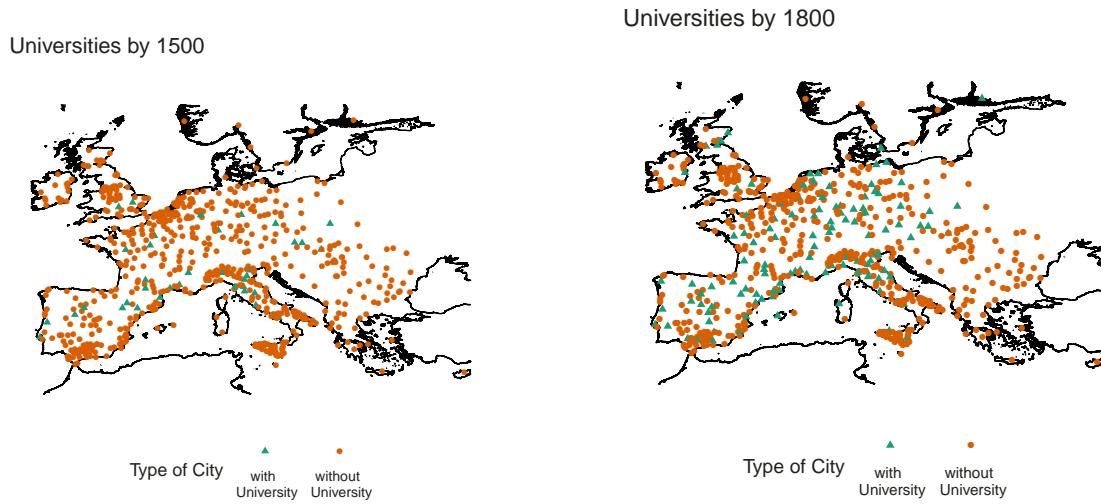
⁹Our time-varying binary variable differs from the variable provided by [Bosker and Buringh \(2017\)](#). There are 152 city-centuries recorded as having a university in the [Bosker and Buringh \(2017\)](#) data that we code as 0, likely due to unrecorded closures of universities, and there are 93 city-century cases in which we record the presence of a university not contained in their data. Our core results do not depend on this difference.

Figure 1: Establishment of Universities by Century



Note: This figure shows the development of universities over time, as well as several important historical moments in Western Europe. The first universities were founded around the year 1200 and were followed by a steady increase until the final year in our sample: 1800. We observe a dip in the overall number of universities, likely due to the closure of several universities in the wake of the French Revolution.

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



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

of building universities. Here we attempt to evaluate the idea the Church was a major driver of university development early on. In a second step, we add our main measures of secular development to the statistical models. We estimate each secular *theme*—governance, war making, and centralization—in separate as well as joint models. Third, we investigate whether the relationships of ecclesiastical/secular variables with university creations changes at time points of socio-political shocks that should weaken/strengthen particular actors. As explained above, our data contains observations for each city at 100 year intervals from 800 to 1800. In all statistical models, we regress the number of universities at time t (e.g., in 1400) on independent variables in year $t - 100$ (i.e., in 1300). The idea is that processes that are present in a city in, for example 1300, ought to predict whether universities are founded in the subsequent century, i.e., these would be present in 1400. Our statistical models generally include either random intercepts or fixed effects for cities and centuries.

In the main text, we present the results from Bayesian hierarchical models, specifically

we estimate models of the following form:

$$y_{i,t} \sim \mathcal{N}(\nu_{i,t}, \sigma), \nu_{i,t} = \alpha_{k=(i,t)} + \beta' \mathbf{x}_{i,t}$$

$$\alpha_k \sim \mathcal{N}(0, \mathbf{V}_k), \mathbf{V}_k = \mathbf{D}(\sigma_k) \boldsymbol{\Omega}_k \mathbf{D}(\sigma_k)$$

$y_{i,t}$ denotes our dependent variable of interest, a count of open universities in city i at time t .¹⁰ $\mathbf{x}_{i,t}$ is the matrix of covariates and β is a vector of population level effects. We specify Gaussian priors with mean zero and a standard deviation of three for the population level parameters. These are relatively conservative priors, reflecting the expectation of a null effect. α_k are random intercepts for cities and years, which are drawn from a normal distribution with mean zero and covariance matrix V_k .¹¹ The prior on the overall variance parameter σ is the default half Cauchy. The model is estimated using the *brms* package in *R* (Bürckner, 2017). *brms* uses the Hamiltonian Monte Carlo and no-U-turn samplers implemented in *Stan* (Carpenter et al., 2017) to estimate the models.¹²

In addition to the Bayesian hierarchical model, we also estimate frequentist ordinary least squares models with fixed effects for cities and centuries. The results from the fixed effects models are presented in the Appendix.

4.1 Ecclesiastical Rule

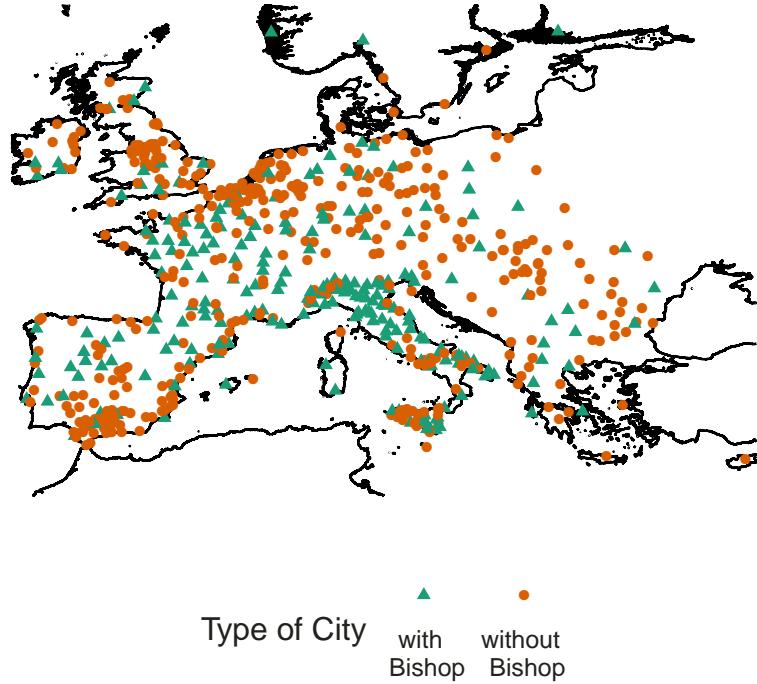
As our first empirical test, we investigate the association between (arch)bishop seats and universities. We create a binary variable that takes the value 1 if a city is host to an archbishop or bishop seat (*Bishop*), constructed based on Bosker, Buringh and van Zanden 2012). Archbishop and bishop seats in a city signify the presence of important church bureaucracy that was needed to actively manage the worldly and spiritual enterprise of

¹⁰Based on our university count, we also create a binary indicator variable for any open university in city i at time t .

¹¹To parameterize the model, the covariance matrix is decomposed into a correlation matrix and a vector of standard deviations. We then specify a default LKJ-prior (Carpenter et al., 2017) on the correlation matrix and a half student-t prior with 3 degrees of freedom on the standard deviations. These are relatively uninformative priors that should allow the data to speak, but are somewhat conservative in that the prior variance on the random intercepts is rather small.

¹²We estimate each of the presented models by sampling five separate chains for 2500 iterations with a warm-up of 1000 iterations. We assess convergence both using rhat statistics, as well as visually. The rhat values for none of parameters presented are above 1.01.

Figure 3: Bishop Seats Across Europe until 1500
 Bishop Seats by 1500



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

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.

Given that the causal ordering of our variables of interest and potential covariates is not always clear, we are concerned about potential omitted variable bias as well as post-treatment bias ([Montgomery, Nyhan and Torres, 2018](#)). We therefore estimate three different models, each with different sets of controls. As a first model, we estimate a bivariate model of the university count and the indicator variable of whether a given city contains a bishop or archbishop seat. In the second model, we add a minimum set of geographic (i.e., plausibly exogenous) controls. Here we control for the latitude of each

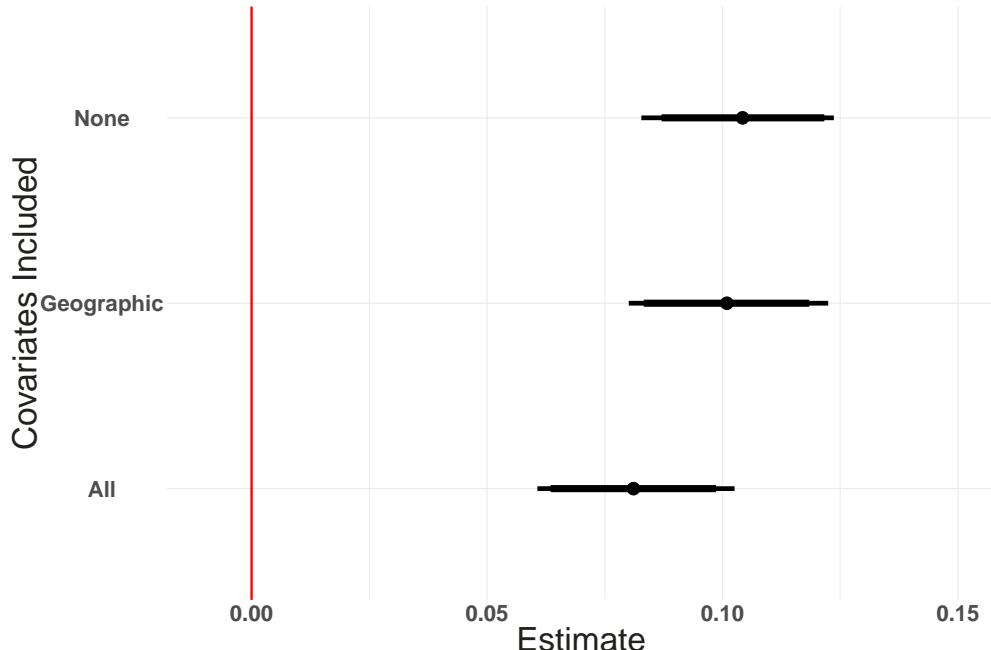
city (*Latitude*), a dummy variable for cities close to the sea (*Sea*), a dummy variable for cities on rivers (*River*), a city's elevation (*Elevation*), and the quality of soil (*Soil Quality*). These geographic variables capture a city's local economic potential via agricultural productivity, long-distance trade, and general transport infrastructure (Acemoglu, Jonson and Robinson, 2005; Findlay and O'Rourke, 2007; Nunn and Qian, 2011). In the third model, we include the full set of potential confounders we identify. In addition to the geographic variables, we add covariates for city population in thousands (*Population*), an indicator for whether a city was located on hubs of ancient Roman roads (*Roman hub*), or connected to Roman roads (*Roman road*). All these variables are provided by Bosker, Burgingh and van Zanden (2012). Lastly, we add a dummy variable for cities under French rule at time of the French revolution.

Figure 4 presents the main results from the three estimated models. The plot shows the median coefficient estimates, as well as the 90% (thick line) and 95% (thin line) highest posterior density intervals for the *Bishop* variable in the three estimated models. The top line is based on the model without controls, whereas the middle line is the estimate when the geographic controls are included. The third model is estimated with the full set of controls discussed above. As we can see, the association between bishop seats and universities is quite strong and none of the uncertainty intervals cover zero. The median estimate ranges from 0.1 in the model with no controls to 0.08 in the model with all controls. The estimate is quite stable across the three different models. Moreover, as Table A.2 in the appendix shows, the results are virtually the same when we estimate OLS with city and century fixed effects.

4.2 Drivers of Secular Rule

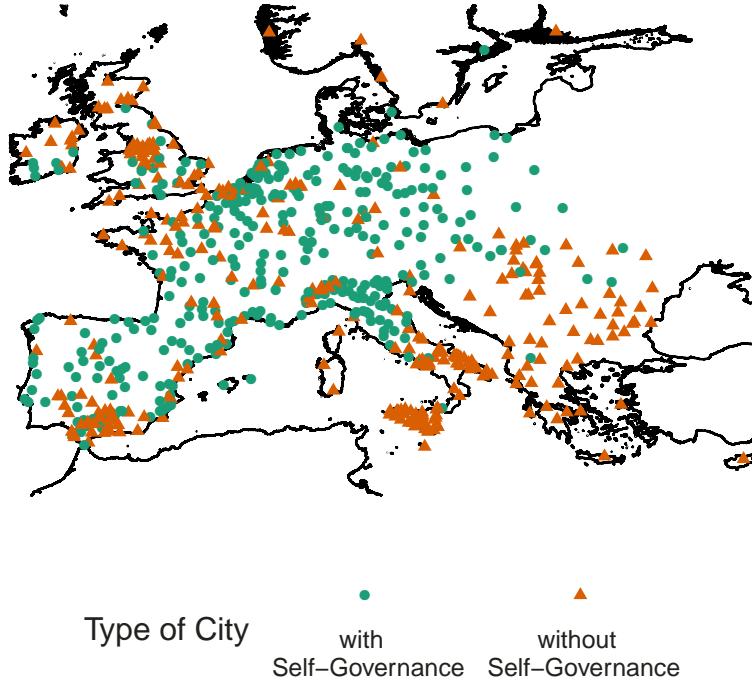
In an effort to investigate whether demand from secular rulers was a major driver in the development of universities (*H2*), we first identify three *themes* that are potential mechanisms behind the demand for higher education by secular rulers. As discussed above, one potential mechanism is that increasing self-governance of cities and parliamentary forms of elite power-sharing led to higher demands for bureaucrats, administrators, and thus more local education and research. We try to account for this possibility by estimat-

Figure 4: (Arch)bishop Seats & Universities



Note: The plot shows the estimated association between bishop seats and universities according to the three estimated models. The points indicate the median estimate, while the thick and thin line mark the 90% and 95% highest posterior density intervals, respectively. All models include random intercepts for city and century. From top to bottom, we plot first the estimate when no controls are included, next the estimate when including only geographic controls, and last the estimate when all covariates are included. In all three models we recover a positive association between bishop seats and universities. None of the 95% intervals are close to zero. Moreover, the estimates are quite stable across the different model specifications.

Figure 5: Self-Governance Across Europe until 1500
Self-Governance by 1500



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

ing statistical models with indicator variables for cities with the presence of any form of communal participatory organizations (*Self-Governance*, see [Bosker, Buringh and van Zanden 2012](#)) and those that took part in parliamentary institutions in national decision-making (*Parliament*, based on [Van Zanden, Buringh and Bosker 2012](#)).

In Figure 5 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.

As a second possible driver of secular state building we consider the standard *bellicist* argument, that war making drives state making. To investigate this particular mechanism, we use a variable on conflict events involving the city's territorial state. We take

data on the location of historical battles from Dincecco and Onorato (2018) and match them to the historical political units from Nüssli (2011). We then count the total number of battles fought on the territory of each political unit in the preceding century as a measure for the overall pressures due to war. This variable is assigned to each city based on our nesting structure (*Conflict*).

Lastly, to capture demand-side effects of centralized rule independent of war-making, we include a dummy variable for each city that signifies capital city status (*Capital*).

We use the three models estimated above to estimate the relationship between bishop seats and universities as our base models. Recall that all models include random intercepts for cities and centuries. We estimate each of the three models (bishop + sets of controls) again, but now do so with the covariates for each of the three secular rule themes added separately. Lastly, estimate the models with the three sets of controls and add all covariates measuring secular rule at the same time. The results for the individual variables do not change depending on whether they are included individually or jointly, we therefore present the results from the joint models.

Figure 6 shows the coefficient estimates (median), the 90%, and 95% posterior intervals for each of our variables of interest. The points and lines in green depict the estimates when no other controls are included, while orange points/lines are from models including the geographic controls. Lastly, the results from the model including all control variables are plotted in purple. Overall, the results are remarkably stable across the three different set of control variables. Bishops remain strongly associated with more universities, even when we include the variables for possible secular drivers. At the same time, cities that are engaged in self-governance have a much higher likelihood of developing universities. The estimated effect is about the same as that of having a bishop seat. On the other hand, participating in active parliaments is estimated to have a quite weak relationship and both uncertainty intervals cover zero. These results suggest that local political development may be more important than participating in higher administrative unit governance.

Across all estimated models, there is little evidence that the conflict events of a city's territorial state are associated with increased likelihood of building universities. In fact,

the coefficient estimate is very close to zero and quite precisely estimated. When including no or only geographic control variables, the estimate for capital cities is quite large and the uncertainty intervals do not cover zero. The positive association completely disappears, however, once we control for population of the city. This seems to suggest that population growth rather than demands of central state governance are the driver here.

In Appendix A.2 we present results from the OLS estimation with city and century fixed effects. The estimates of all independent variables are virtually the same.

Overall, these results suggest that bishop seats, i.e., ecclesiastical rule, and city self-governance were important determinants of university creations in the time period studies. In fact, the estimated impact of both variables is quite strong and similar in magnitude.

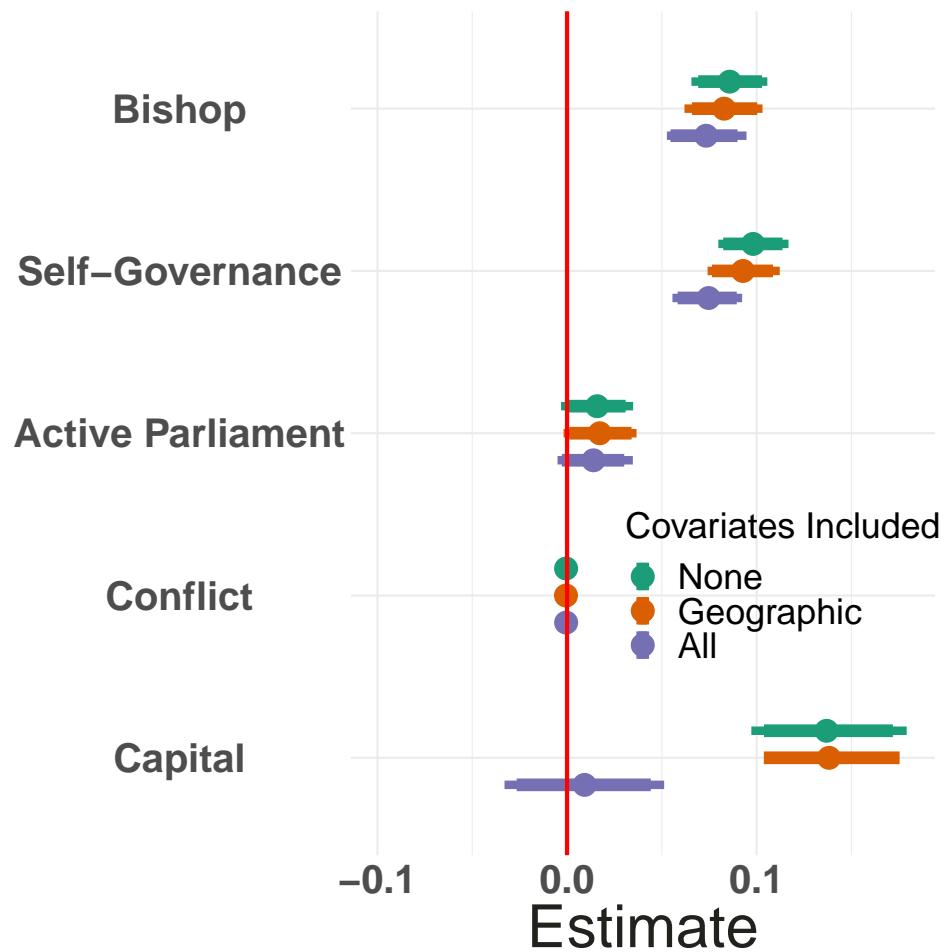
4.3 Changing Times

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

In this section, we attempt to further investigate the idea that competition between the ecclesiastical and secular rule was especially important in the development of universities. In order to do so, we identify three particular socio-political events (shocks) in the time period we study, in which we believe the Church was substantially weakened. We expect that these events should be associated with a growth in university creations.

As outlined above, the first break point we identify is the papal schism, which created an internal conflict within the Catholic church and a leadership vacuum. We create an indicator variable for the time period between 1300 and 1400 (*Papal Schism*). We

Figure 6: Secular Rule & Universities



Note: This plot shows the coefficient estimates as well as 90% and 95% posterior intervals for the main variables of interest in models with three combinations of controls. The relationship of bishop seats and university creation remains virtually the same compared to models without the secular variables. Additionally, we find evidence that cities with self-governance institutions were more likely to invest in building universities. While capitals seems to be associated with more universities, this finding disappears once we control for population.

interact this dummy variable with the measure on (arch)bishop locations. Given the weakness of the Church at this period, we expect that bishops should have less of an effect on university creations during the Papal schism. On the other hand, we expect more universities creations during the Papal schism in general. Second, we create an indicator variable for the period before and after the reformation (*Reformation*, coded 0 before 1500 and 1 otherwise). We interact this time dummy with cities identified by Rubin (2014) as early adopters of Protestantism (*Protestant*). Again, we expect this shock to have weakened the Church overall, but especially in areas where Protestantism was adopted early on.

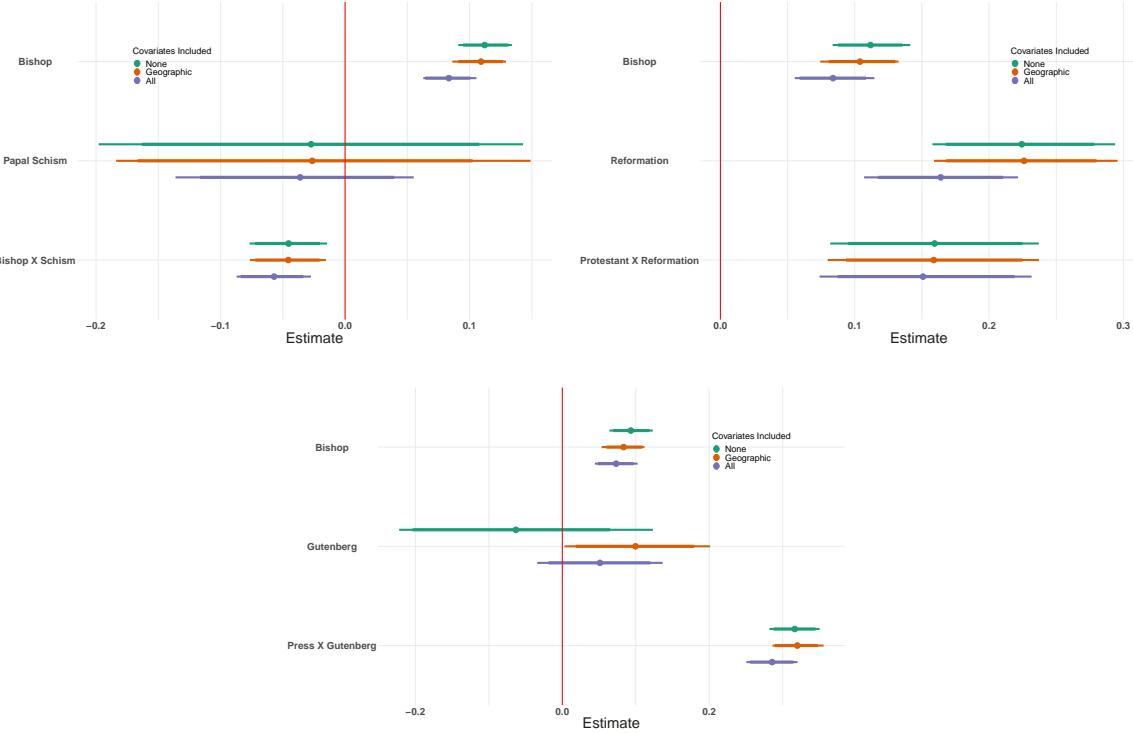
Lastly, we code a time dummy for the period after the invention of the printing press (*Gutenberg*, coded 0 for years prior to 1400 and 1 otherwise) and interact it with an indicator for cities that had a printing press in 1500 (*Press*, taken from Rubin (2014)). As with the other interactions, we believe the printing press weakened the Church's monopoly on thought and power, and this ought to be especially true in cities with a printing press present.

Given the pre/post-*treatment* time indicators and the interaction with the geographic locations of *treatments*, these interactions models are effectively difference-in-differences models.

We first estimate our three canonical models separately for each of the event indicators and the respective interaction. Again, for each event variable we estimate one model without controls, one with the geographic controls, and one with all controls as well as the secular rule variables. Lastly, we estimate the same three models but now jointly include all three event interactions. As above, all models include random intercepts for cities and centuries.

Figure 7 shows the results from estimating each of the interaction effects in separate models with the different sets of controls included. The top left plot shows the results for the Papal schism interaction. In the top right, we plot the results for the reformation/Protestantism interaction. Lastly, the bottom plot shows the estimates for the printing press interaction. Overall, the results are in line with the theoretical argument. Bishop seats are still positively associated with universities, but less so during the Pa-

Figure 7: Socio-Political Shocks - Individual Models

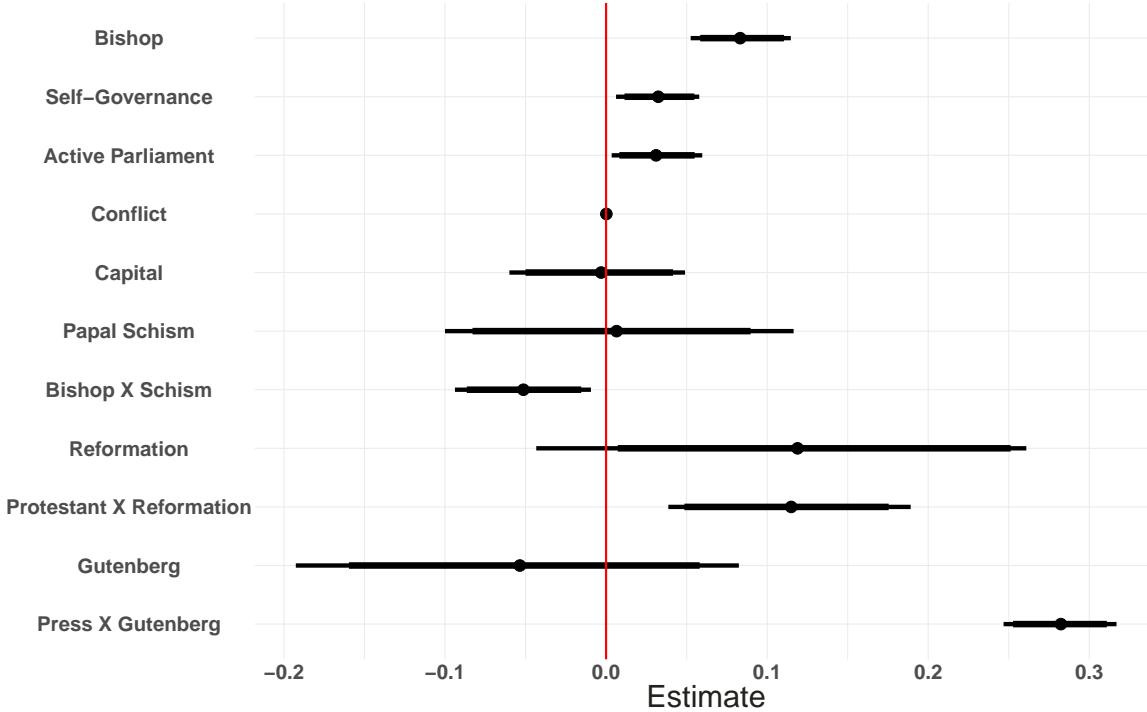


Note: The plots show the results for the variables of interest in the interaction models when each of the interactions are modeled separately. The top left plot shows that while bishops are still positively associated with growth in universities, the relationship is much weaker during the Papal schism. As shown in the top right plot, reformation was positively related to university creations, and especially so in cities that were early adopters of Protestantism. Lastly, as expected, cities with a printing press were substantially more likely to build universities.

pal schism. Both the printing press and early adoption of Protestantism are positively associated with university creations, as we would expect after events that weakened the Catholic church.

Figure 8 provides the coefficient estimates (median) and highest posterior density intervals (90% and 95%) for all variables of interest, including the secular variables and all interactions. As one can see, the results are quite similar to when the variables are included individually. Bishops remain estimated to have a positive effect, but the interaction is negative, i.e., the effect is smaller during the Papal schism. As expected based on our theoretical argument, both cities with the printing press after its invention and early adopters of Protestantism after the Reformation, were significantly more likely to create

Figure 8: Socio-Political Shocks - Joint Model



Note: The figure shows coefficient estimates and highest posterior density intervals (90% and 95%) for all variables of interest based on the model with the full set of controls and the secular variables. In line with the theoretical argument, we find that the positive effect of bishop seats remains but it substantially weaker during the Papal schism. Similarly, early adopters of Protestantism were significantly more likely to create universities after the reformation. Lastly, cities with printing presses saw an increase in universities.

universities. As in the models presented above, cities with self-governing institutions are associated with more universities, though the estimated relationship is substantially weaker.

Table A.5 in the Appendix provides the results from the joint interaction models when estimated via OLS with city and century fixed effects. The constituent terms of the interactions are dropped due to the fixed effects included. In the fixed effects models, we again find a significant negative effect on the bishop/Papal schism interaction and a significant positive effect on the interaction of printing press locations with the dummy of its invention. The interaction between early adopters of Protestantism and the reformation is not significant, however. Similarly, in the fixed effects models with the socio-political shock interactions, the estimate for self-governing cities is no longer

significant.

5 Conclusion

Universities emerged in Western Europe around 1200 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 more narrow, 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 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, to create a panel dataset of nearly 700 cities, nested in historical states. We estimate Bayesian multi-level and fixed effects OLS models to ascertain the association between both ecclesiastical and secular demands for universities. We also show that these mechanisms were especially pronounced during periods at which the Church was weakened: the Papal schism, the invention of the printing press, and reformation. While our empirical exercise is mainly descriptive, it nonetheless reveals some noteworthy patterns. Notably, beyond the mechanisms we highlight, we find little evidence that, e.g., 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 lit-

erature on generic state capacity have little purchase in the domain of 1) the supply of skilled state administrators and 2) the production of governance knowledge. It seems that violent contest between territorial governance units is not the only way by which competition spurs state-building. Instead, the rivalry between religious and secular authorities along functional dimensions generated a fruitful theoretical and ideational arms race that found its institutional engine in the university. Our findings concerning the influences of the printing press can be seen in the same spirit. While innovations in military technology (e.g., the famous longbow or the effective military use of gunpowder) spurred coercive state-building, technological innovations in the form of the printing press spurred the creation of universities and contributed to the build-up of state capacity concerning differentiated governance theories and technologies.

Going forward, we plan to better 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, we hope to use data on the production of legal texts and books on governance (Blaydes, Grimmer and McQueen, 2018) as well as the changing composition of university graduates' degrees (Cantoni and Yuchtman, 2014) to document the role of universities in the development of non-coercive and non-extractive dimensions of statecraft.

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A Appendix

A.1 Bayesian Multilevel Model Results

A.2 Fixed Effects Model Results

Table A.1: Ecclesiastical Rule – University Count

Bishop	0.11*** (0.03)	0.10*** (0.03)
Population		0.00* (0.00)
France		-0.04 (0.08)
City FE	Yes	Yes
Century FE	Yes	Yes
Observations	7,447	7,447
R ²	0.38	0.41

Models estimated with standard errors clustered by city.

***p < .01; **p < .05; *p < .1

Table A.2: Ecclesiastical Rule – University Indicator

Bishop	0.09*** (0.03)	0.08*** (0.03)
Population		0.00* (0.00)
France		-0.11*** (0.03)
City FE	Yes	Yes
Century FE	Yes	Yes
Observations	7,447	7,447
R ²	0.41	0.43

Models estimated with standard errors clustered by city.

***p < .01; **p < .05; *p < .1

Table A.3: Ecclesiastical and Secular Rule – University Count

Bishop	0.10*** (0.03)	0.09*** (0.03)
Self-Governance	0.08*** (0.02)	0.07*** (0.02)
Active Parliament	0.01 (0.02)	0.00 (0.02)
Conflict	-0.00 (0.00)	-0.00 (0.00)
Capital	0.05 (0.08)	-0.05 (0.09)
Population		0.00 (0.00)
France		-0.02 (0.08)
City FE	Yes	Yes
Century FE	Yes	Yes
Observations	7,447	7,447
R ²	0.39	0.42

Models estimated with standard errors clustered by city.

***p < .01; **p < .05; *p < .1

Table A.4: Ecclesiastical and Secular Rule – University Indicator

Bishop	0.08*** (0.03)	0.07*** (0.03)
Self-Governance	0.07*** (0.02)	0.06*** (0.02)
Active Parliament	0.01 (0.01)	-0.00 (0.01)
Conflict	-0.00*** (0.00)	-0.00 (0.00)
Capital	0.06 (0.06)	0.01 (0.06)
Population		0.00* (0.00)
France		-0.07* (0.04)
City FE	Yes	Yes
Century FE	Yes	Yes
Observations	7,447	7,447
R ²	0.42	0.43

Models estimated with standard errors clustered by city.

***p < .01; **p < .05; *p < .1

Table A.5: Socio-Political Shocks – University Count

	0.12*** (0.04)	0.11*** (0.04)	0.11*** (0.04)
Bishop	0.12*** (0.04)	0.11*** (0.04)	0.11*** (0.04)
Self-Governance		0.02 (0.02)	
Active Parliament		0.02 (0.02)	
Conflict		0.00 (0.00)	
Capital		−0.08 (0.10)	
Population		0.00 (0.00)	0.00 (0.00)
France		−0.08 (0.12)	−0.07 (0.13)
Bishop × Schism	−0.04** (0.02)	−0.05** (0.02)	−0.05** (0.02)
Press × Gutenberg	0.32*** (0.05)	0.28*** (0.04)	0.28*** (0.04)
Protestant × Reformation	0.10 (0.11)	0.11 (0.11)	0.12 (0.11)
City FE	Yes	Yes	Yes
Century FE	Yes	Yes	Yes
Observations	4,851	4,851	4,851
R ²	0.44	0.46	0.46

Models estimated with standard errors clustered by city.

***p < .01; **p < .05; *p < .1

Table A.6: Socio-Political Shocks – University Indicator

	0.09*** (0.03)	0.08** (0.03)	0.08** (0.03)
Bishop	0.09*** (0.03)	0.08** (0.03)	0.08** (0.03)
Self-Governance		0.02 (0.02)	
Active Parliament		0.01 (0.02)	
Conflict		−0.00 (0.00)	
Capital		−0.00 (0.06)	
Population	0.00 (0.00)	0.00 (0.00)	
France	−0.17*** (0.04)	−0.14** (0.06)	
Bishop × Schism	−0.02 (0.02)	−0.02 (0.02)	−0.02 (0.02)
Press × Gutenberg	0.26*** (0.03)	0.25*** (0.03)	0.25*** (0.04)
Protestant × Reformation	0.07 (0.08)	0.07 (0.08)	0.06 (0.08)
City FE	Yes	Yes	Yes
Century FE	Yes	Yes	Yes
Observations	4,851	4,851	4,851
R ²	0.48	0.49	0.49

Models estimated with standard errors clustered by city.

***p < .01; **p < .05; *p < .1