

# The Rise of Fiscal Capacity

Davide Cantoni  
Cathrin Mohr  
Matthias Weigand\*

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## Abstract

We study the role of a crucial institutional innovation — the development of fiscal capacity through modern, permanent administrations — in fostering state consolidation in Europe in the Early Modern era. Using a novel dataset, we examine the introduction of fiscal centralization in territories of the Holy Roman Empire from 1400 to 1789. After implementing the reform, territories were more likely to survive, increased in size, and were able to achieve a more compact territorial extension. We show that increased revenues, a reduction of short-term lending, more investments in military infrastructure, improved defensive capability, and a higher ability to marry off daughters to powerful princes, were key mechanisms through which rulers were able to consolidate their territories. The absence of pre-trends, as well as the robustness of our results with regard to selection and endogeneity concerns, suggest that fiscal centralization played a causal role in this context. We argue that the external threat posed by the Ottoman Empire was a key driver of the adoption of fiscal centralization, independently of the rise and decline of deliberative bodies (Estates).

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\*Cantoni: Ludwig-Maximilians-Universität Munich, CEPR, and CESifo. Email: cantoni@lmu.de. Mohr: Universität Bonn. Email: cmohr@uni-bonn.de. Weigand: Harvard University. Email: matthias.weigand@maximilianeum.de. Helpful and much appreciated suggestions, critiques and encouragement were provided by Joachim Voth and Jesse Shapiro as well as seminar and conference participants in Berkeley, Frankfurt (Max Planck Institute), Harvard, Milan (Università Cattolica), Oxford, and Tel Aviv. Refer to data documentations for additional acknowledgments. Financial support from the Munich Graduate School of Economics, the Egon Sohmen Foundation, and from the Deutsche Forschungsgemeinschaft through CRC-TRR 190 is gratefully acknowledged.

# 1 Introduction

Exiting the Middle Ages, Europe was divided into hundreds of territories with limited and uncertain extent of their monopoly of power, overlapping and competing jurisdictions, and complex feudal arrangements. By the end of the Early Modern era, the territorial landscape of Europe had undergone a profound process of institutional innovation and state consolidation: the number of territories was substantially reduced, their competences and sovereignties clearly defined, overlapping claims resolved, and the princes' capacity to rule and tax was mostly uncontested (North and Thomas, 1973; Jones, 1981; Tilly, 1990).

In this paper, we study the role of a crucial institutional innovation in the Holy Roman Empire — the development of fiscal capacity through modern, permanent administrations — in fostering this historical development (Schumpeter, 1991; Hintze, 1975). Between the 16th and the 18th century, several territories introduced permanent offices, staffed by professionally trained individuals, in charge of raising and organizing revenues, and replacing personalized, local, or ad-hoc systems. These offices, mostly called “Chambers” (*Hofkammer* or *Rentkammer*), substantially increased the efficiency of revenue extraction, the ability to raise taxes, and to project military, political, and diplomatic power.

We find that, after the introduction of fiscal chambers, territories embarked on a process of state consolidation: they were more likely to survive, increased in size, and were able to achieve a more compact (cohesive) territorial extension. We show the key mechanisms through which the princes of the Empire were able to consolidate and strengthen their territories following the establishment of fiscal institutions: an increase in revenues, a reduction of short-term lending, as measured by the number of cities pawned to other rulers, more investments in military infrastructure, leading to improved defensive capability, and a higher ability to marry off daughters to powerful princes.

As a loose confederation of hundreds of largely sovereign states of varying size, the rich array of the Holy Roman Empire provides an ideal setting in which to study the genesis and consequences of this institutional innovation for eventually successful and eventually unsuccessful states. In contrast to existing literature that focuses on few, ex-post successful territories such as Prussia or England, we observe all territories and cities of the Empire at the yearly level, thereby overcoming selection (survivorship) bias.<sup>1</sup>

Laying the groundwork for our analysis is a major, novel data collection. First, we construct a dataset providing a complete picture of both cities and territories in the Holy Roman Empire. We link each city in the *Deutsches Städtebuch* (Keyser et al., eds, 1939-2003), a detailed encyclopedia of all 2,390 cities in Germany, to its ruling dynasty for every year between 1400 and 1789. Aggregating

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<sup>1</sup>Tilly (1975) points out this fundamental selection problem: “Most of the European efforts to build states failed. The enormous majority of the political units which were around to bid for autonomy and strength in 1500 disappeared in the next few centuries, smashed or absorbed by other states-in-the-making [...] [O]f the handful which survived or emerged into the nineteenth century as autonomous states, only a few operated effectively—regardless of what criterion of effectiveness we employ. The disproportionate distribution of success and failure puts us in the unpleasant situation of dealing with an experience in which most of the cases are negative, while only the positive cases are well-documented” (p. 38-39).

this information over all cities, we can identify all territories (which ruled over at least one city) extant in the Holy Roman Empire during this time frame and trace their existence, size, and shape. We can describe their mergers, break-ups, expansions or losses as a consequence of wars, treaties, or dynastic changes. We further identify rulers of secular territories in an extensive kinship and marriage network of noble families. The resulting dataset encompasses 833,301 observations at the city×year level, 15,953 rule transitions, 684 distinct territorial entities, and 2,799 rulers of secular territories.

Complementing these data, we document the presence and date of development of centralized fiscal institutions (“fiscal centralization”) for 39 territories of the Holy Roman Empire in the period between the 16th and the 18th century. We also collect information about time periods in which (territory-level) Estates were active, and about the exposure of each territory to Imperial tax levies. Moreover, we collect an extensive set of additional data on the geography (ruggedness, agricultural suitability, distance to rivers and sea), economy (markets and construction activity) and conflict involvement of cities (attacks and military buildings). Information on neighboring territories allows us to measure a city’s or territory’s exposure to military threats.

Our analysis first sheds light on the determinants and circumstances of the adoption of fiscal centralization. In a cross-section of territories, we find that larger, more commercially active territories are more likely to become fiscally centralized, reflecting that these institutions, which necessitated the hiring and training of a professional bureaucracy, represented a substantial fixed investment. We also find evidence for the role of external financial pressures in the eventual adoption of fiscal centralization. Territories were required to contribute to the military expenditures of the Empire, e.g. for the campaigns against the Ottoman troops. In 1521, the Imperial Diet fixed permanently the shares of single territories in the Empire’s military budget. We find that territories with higher relative levels of contributions to the Empire’s budget (even after conditioning on observable factors such as size) are more likely to adopt fiscal centralization. Analyzing the actual *timing* of the adoption of fiscal centralization in a panel, we observe that fiscal institutions are more likely to be installed by the territories in the years immediately following an actual request by the Imperial Diet to fund its military enterprises.<sup>2</sup>

Next, we analyze the consequences of fiscal centralization for the territories of the Empire. We establish that the adoption of fiscal centralization reduced a territory’s likelihood of vanishing (because of military conflict or purchase, but not by extinction of the dynasty) in an immediate, permanent, and substantial way. Following fiscal centralization, territories also increase in size: the effect cumulates over time, and suggests that centralized territories control about 7.7 percent more cities one century after the institutional reform. We observe that such territories especially increase their number of uncontested cities (i.e., cities over which they rule exclusively), suggesting that fiscal centralization leads to a greater ability to project state capacity and resolve existing

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<sup>2</sup>Imperial Diets repeatedly confirmed the principle that princes could pass through the cost of these contributions to their subjects. As a consequence, many princes created permanent institutions to raise and process these taxes.

conflicts of shared control over regions.

This increase in territories' sizes also allowed rulers to achieve a more compact extension, with fewer enclaves and exclaves. We capture this by calculating, for each city, the share of its boundary length that does not border a foreign polity. Cities in fiscally centralized territories (as well as territories as a whole) increase their territorial contiguity over time: one century after centralization, our measure of compactness increases by 5 percentage points, relative to a baseline rate of 42%.

We argue that these results likely represent a positive, causal effect of the introduction of fiscal institutions, addressing concerns about selection, omitted variables, and endogeneity. First, we note that our data do not just comprise a selection of the more powerful or most successful, surviving territories, but they include every territory and every city in the Holy Roman Empire over the period 1400–1789. We show that our results are robust to excluding single territories, and also hold within the intensive margin, i.e. the sample of territories that eventually adopt fiscal centralization (thus excluding a large number of potentially less comparable territories from the control group).

By including city/territory and year fixed effects, our panel data regressions take into account a large class of potentially confounding factors; we can also control explicitly for potentially time-varying, territory-specific confounders. A major historical development at the territory level is the rise and eventual decline of representative assemblies (Estates). We show the existence of Estates is orthogonal to the institutionalization of fiscal capacity: the timing of Estates' activity is uncorrelated to the introduction of Chambers; Estates do not directly affect our outcomes of interest; and, the effect of fiscal centralization is not affected by the inclusion of this variable.

In a series of event-study analyses, we show that territories are not embarking on path of consolidation before the introduction of a Chamber (we do not observe pre-trends for our outcomes of interest). To speak more directly to endogeneity concerns, we consider an alternative estimation approach, in which we exploit the levying of the Imperial war tax as an arguably exogenous shifter of the likelihood of Chamber adoption. We predict the timing of fiscal centralization based on the amounts requested by the Imperial Diets, conditional on a large number of baseline territory characteristics and time effects. We then exploit these predicted treatment dates in a 2SLS analogue, and confirm the main results of our analysis for all outcomes.

Finally, we turn to the mechanisms which allow fiscally centralized territories to become more likely to survive, larger, and more compact over time. Using two case studies for which the development of state finances is well documented — Hesse and Albertine Saxony — we show that revenues increase immediately following fiscal centralization. In the broader sample of our dataset, we demonstrate that territories with a Chamber are less likely to resort to inefficient, short-term sources of revenue: in the decades immediately following fiscal centralization, cities are less likely to be given in pawn to other rulers.

After the adoption of a Chamber, territories also invest considerably more in military infrastructure: the rate of construction of new military buildings in cities increases by two thirds. These investments pay off: the likelihood that a city is lost to another ruler following a military attack

is reduced by over 80% (relative to the baseline probability) if a city belongs to a fiscally centralized territory. Moreover, territories with a Chamber were able to improve the outcomes of their strategic diplomacy. Rulers presiding over centralized territories married off their daughters more effectively: as a result of these marriages, more (and more powerful) rulers were in their immediate network.

Early contributions to the literature on fiscal capacity — starting with the groundbreaking works by North and Thomas (1973), Hintze (1975), Tilly (1975), Brewer (1990), or Bonney (1999) — have studied single countries and their efforts to set up an effective fiscal infrastructure. More recent, quantitative analyses have focused on advanced levels of fiscal innovations such as the introduction of personal income taxes in the 18th and 19th century (Dincecco, 2009; Dincecco and Katz, 2014; Dincecco, 2015). Our work provides a longer-term view, based on data with unprecedented frequency and detail, of the development of fiscal capacity; it also provides a rich and complete array of cases, from small to large territories, covering a core region of Europe. Moreover, our analysis focuses on the *early* buildup of fiscal institutions — the crucial first transition from informal, personalized arrangements to a structured, institutionalized system.

In analyzing the effects of fiscal capacity, our work speaks to the growing literature on the formation of the European state system in the Early Modern era; recent contributions have analyzed the role of economic factors (Abramson, 2017), of state quality and competition (Schönholzer and Weese, 2019), of appropriability of agricultural output (Huning and Wahl, 2020), and of ruler ability (Ottinger and Voigtländer, 2021). A core theme of this literature is the role of wars in shaping state formation, the survival of states, and institutional change: from the pathbreaking contribution by Tilly (1990), to the more recent work by Gennaioli and Voth (2015), Dincecco and Onorato (2016, 2017), and Queralt (2018, 2019). Our setting showcases, too, the importance of external military threats in fostering the development of fiscal capacity (as studied theoretically by Besley and Persson, 2008, 2009) — in this case, the threat posed by Ottoman troops.<sup>3</sup> Similarly to Benzell and Cooke (forthcoming), who study the role of dynastic connections in warfare, and Marcassa et al. (2020), who compare German and British nobles, this paper also considers the role of kinship and marriage networks of the European nobility.

The rich literature on fiscal capacity and the making of the modern state has frequently emphasized the tradeoff between levying taxes and the desire to participate in political affairs. In this vein, scholars have analyzed the bargaining between sovereigns and their subjects that eventually led to the establishment of representative assemblies with control over imposition: from the historical work by Schumpeter (1991), Tilly (1975), and North and Weingast (1989), to more recent field experimental evidence by Weigel (2020). Our findings show that, in the Holy Roman Empire, the taxation-representation nexus was largely orthogonal to the development of early fiscal institutions; the introduction of Chambers was mostly fostered by external military threats, which led

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<sup>3</sup>The role of the Ottoman threat in fostering the spread of another major cultural and institutional innovation — Protestantism — has been studied by Iyigun (2008).

to the imposition of (Imperial) taxes that did not require the assent of Estates. As such, our study further enriches our understanding of the institutional “bifurcation” (Cox et al., 2021) between full parliamentarism and absolutism — between the well-known cases of institutional development in England, where full parliamentary control over taxes developed, and France or Spain, where the Estates General or Cortes were sidelined (North and Thomas, 1973).

Finally, our research also allows us to speak to the development of the crucial, dominant polity of the Early Modern period: the territorial state. A large part of the existing literature has concentrated on the historical experience of city-states (Stasavage, 2007, 2011; Wahl, 2019), which, while dominant in the late Middle Ages, declined in economic and political power in the period considered here. Similarly, the work by Becker et al. (2020) studies the taxation-representation nexus in German cities and thus complements our work, which focuses on territories. Cities, while often endowed with a certain degree of political and fiscal autonomy, mostly belonged to one of the larger territories of the Empire.

The remainder of the paper is organized as follows. In Section 2, we give an introduction to the Holy Roman Empire and explain the political and historical context to the development of fiscal capacity (Chambers) in this region. In Section 3, we introduce our novel datasets. In Section 4, we analyze the origins of fiscal centralization; in Section 5, its main effects; in Section 6, mechanisms. Section 7 concludes.

## 2 Historical Background

### 2.1 The Holy Roman Empire, Territories, and Territorial Competition

The Holy Roman Empire existed from the 9th until the beginning of the 19th century in Central Europe. We focus on the period between the Late Middle Ages and the Napoleonic era, 1400–1789, a time that saw large shifts in both fiscal institutionalization and state consolidation. The Empire consisted of a large number of territories, both secular (such as kingdoms, dukedoms, and free imperial cities) and ecclesiastical (such as prince-bishoprics), and was headed by an elected emperor (Whaley, 2012a,b; Wilson, 2016). Rather than with the Emperor, territorial sovereignty increasingly lay with the rulers of these constituent territories, who decided on the administrative and fiscal organization of their lands (Klein, 1974, p. 3). At the heart of territorial politics were familial connections between and within noble dynasties: Sons of secular rulers inherited their fathers’ territories,<sup>4</sup> and marriages strengthened or fractured alliances.

All territories foremost aimed to survive in this institutional setting: they faced the threat of annexations or financial dependence. Secular rulers additionally needed to secure succession, while ecclesiastical territories faced the threat of secularization after the advent of Protestantism. To

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<sup>4</sup>Following Salic law, the territories of the Holy Roman Empire in our data established male succession. From the 15th century, most territories practiced Primogeniture.

ensure survival, territories aimed to acquire new land holdings to extend demesne areas, and to achieve a more compact shape for ease of administration and defense. Acquisitions were driven by peaceful means of inheritance claims through strategic marriages, and outright purchases of land, as well as by means of warfare.

The transition from the Middle Ages to the early modern era marked the slow move from states based on feudal relationships of dependence between individuals (*Personenverbandsstaat*) to the concept of a state as a geographic area defined by spatial, not personal boundaries (*Flächenstaat*) in adaptation to changing economic and societal needs (Mayer, 1956; Power, 1999; Schubert, 2006; Rutz, 2018). This change was driven by an increasing institutionalization, in which rulers handed off power to bureaucratic office holders to ease the administrative and judicial burden placed on the sovereign. This process slowly decoupled state structures from the ruling dynasty (Möckl, 1990, p. 97)

## 2.2 Early Territorial Finances: Dues, Estates, Pawns

In the early Middle Ages, fiscal capacity in the territories of the Empire was low. Local offices (so-called *Ämter*) were in charge of revenue collection and spending of princes. Revenues came from sources that were tied to geographic and geological features of territories, and which were accessible without sophisticated levels of fiscal capacity: demesnes, forests, metal, salt and coin monopolies, tolls, as well as tariffs.

Beyond these sources of revenues, some forms of taxes were introduced in the late Middle Ages (Klein, 1974, p. 12). These payments were extracted locally to provide for the prince and his court, and were mostly paid in-kind because of the lack of monetarization of the medieval economy. The immediate, local consumption of surplus implied little need for bookkeeping. A so-called *Landrentmeister* was entrusted with fiscal matters: he was in charge of collecting local surpluses and auditing local offices. However, this did not represent a central financial administration: there was no formal institution the *Landrentmeister* presided over (Isenmann, 1999, p. 247).

Over the course of the 15th century, several concurring developments required princes to increase their sources of revenues: an increasing number of feuds between territories, the growing costs of holding court, commercialization and marketization, and a rise in the costs of war technology. Estates representing towns, clergy, and nobility/knights formed (Finer, 1997, p. 1027) and established their right to approve and deny taxes at irregular assemblies (diets).<sup>5</sup> Taxation requests were decided upon on a once-off basis, and the Estates opposed regular taxation, which would have curtailed their rights.

Thus, rulers could all but rely on territorial diets to secure a steady stream of revenues. To free up short-term revenue, rulers pawned parts of their land holdings to local nobles, who would be granted limited privileges over the pawned lands in exchange for money.<sup>6</sup> This proved a risky

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<sup>5</sup>Peasants did occasionally form Estates but these were considerably less powerful.

<sup>6</sup>The legal structure of a "land pawn" was not different from any other form of pawn (Landwehr, 1967).

endeavor for sovereigns: pawning away a large part of the land also removed potential income sources to redeem these pawns; and failure to redeem over long stretches of time effectively implied the permanent loss of this pawn.

### 2.3 The Introduction of Chambers

With this very limited scope to raise revenues by taxation or pawning, the largest potential gains could be made in exploiting existing revenue sources better, and in handling revenue more efficiently. This required a modernization and centralization of territories' fiscal administration, which gave rise to specialized, central institutions, so-called Chambers (usually *Hofkammern* or *Rentkammern*) (Klein, 1974, p. 16). By removing discretionary powers from single individuals, such as the *Landrentmeister*, and transferring it to abstract, rule-bound institutions, Chambers were a central step in the transition to modern state administration (Jeserich et al., 1983, p. 331).

The Chamber was in charge of all domains and their revenues, as well as revenues from dues, tariffs, and taxes. It used these revenues to make payments in the name of the prince. Mostly, its financial endowment and proceedings were separate from the financial means that needed consent of the Estates (Weiß, 2010).<sup>7</sup> The Chamber took on the role of an economic institution mandated to secure and exploit old sources of revenue, to handle revenues more efficiently, and more generally supervise departments and officials.

The evident advantage of this central, collegial fiscal administration was its financial efficiency.<sup>8</sup> Against these gains of efficiency stood a loss of discretionary power on the side of the sovereign: turning his private demesnes into Chamber assets, and ceding parts of his powers of fiscal administration to Chamber officials (Bütterlin, 1977, p. 14). Also, government officials previously personally entrusted with fiscal matters had to transfer parts of their privileges to this novel institution.

Thus, the exact form and time of introducing a Chamber varied across territories. The concept of centralizing fiscal administration in a Chamber had first been introduced to the Holy Roman Empire in areas of the Habsburg Empire at the turn of the 16th century. The first territory to fiscally centralize in our data is Württemberg in 1521, which received a Chamber under Habsburg occupation, and maintained it after the end of the war. Over the course of the following centuries, a substantial number of territories of the Empire introduced similar institutional arrangements (cf. Table 1).

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<sup>7</sup>We treat as "Chamber" only institutions that are separate from a specific person, i.e. an institution that is collegially organized (Zimmermann, 1933, p. 69).

<sup>8</sup>Rulers and government officials recognized this advantage early on. For example, Philipp I. of Hesse required his sons to take part in the activities of the Chamber starting with 16 years of age (Zimmermann, 1933, p. 99). In 1556, Melchior von Ossa, a lawyer closely associated with the Albertine Saxon court, recommended the institution of a Chamber in a Cameralist handbook (Klein, 1974, p. 21).



## 2.4 Imperial Finances

While territories and their financial organization became more institutionalized during this transition, the Empire was also undergoing substantial changes, influencing and influenced by the processes in subsidiary territories. Over the course of the Middle Ages, territorial rulers in the Holy Roman Empire progressively consolidated their power, substantially diminishing the capacity of the Emperor. There were no financial institutions for the Empire itself.<sup>9</sup> For the purposes of Imperial defense, the Emperor had to rely on troops provided by territorial rulers.

A series of military defeats in the early 15th century demonstrated the inadequacy of these arrangements. Additionally, after the conquest of Constantinople in 1453, an increased threat from the Ottoman Empire affected the Eastern Habsburg lands. In response, the Holy Roman Emperor attempted to levy taxes for Imperial defense purposes, but the territories of the Empire were reluctant to comply.<sup>10</sup>

A breakthrough for Imperial finances came with the creation of an Imperial Register, the *Reichsmatrikel*, at the Diet of Worms in 1521, which assigned each territory a fixed share of the imperial tax burden. Its initial purpose was the supply of troops for the Italian campaign of Emperor Charles V., but it continued to be used for future Imperial tax purposes. Two factors affected compliance of the Imperial Estates considerably: The increasing threat of the Ottoman Empire following a series of defeats at the Eastern borders of the Holy Roman Empire in the 1520s, and the fact that territories, not the Empire, were responsible for levying the required sums. Imperial cohesion was thus achieved at the expense of acknowledging the sovereignty of territorial rulers.

What determined a territory's share of Imperial taxes, as set in the *Reichsmatrikel*? The shares were broadly correlated with a territory's size and its political and economic power in 1521. In addition, some part of the variation in contribution shares was correlated to (past) prestige of territories rather than their actual power. Once established, this share remained fixed in the years to follow, even as territories shrank or grew.<sup>11</sup>

While contribution shares remained fixed, the overall sum of Imperial taxes raised differed over time. The Imperial Diet, meeting irregularly every few years, determined the amount of taxes to be raised (as a multiple of the "Roman Month", a fictitious unit of calculation equivalent to 128,000 guilders). For example, the Diets of 1566/67 approved an imposition of 48 Roman Months, the following Diet of 1570 approved 12 Roman Months, then, after a hiatus of six years, the Diet of Regensburg in 1576 approved 60 Months (Schulze, 1978, p. 80). Thus, while the relative shares of each

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<sup>9</sup>One source of revenue for Emperors was to pawn away Imperial land holdings. This further eroded the Imperial position to a degree where redeeming the pawns became impossible. In 1519, Emperor Charles V, following his election, fully transferred all Imperial pawns to the territorial rulers that held them.

<sup>10</sup>The first Imperial tax, the Common Penny (*Gemeiner Pfennig*) of 1495, was suspended in 1505 and eventually abandoned in 1551 due to lack of compliance: the Empire itself had to collect these taxes, but because state capacity largely lay with the territorial rulers, this proved nearly impossible.

<sup>11</sup>Since the fixed contribution shares had become misaligned with territories' ability to raise taxes following the border changes of the 16th century and especially the Thirty Years' War, the Imperial register was repartitioned in 1648 and largely remained fixed thereafter.

territory were pre-determined, the actual, required contributions changed in irregular intervals.

This intervention proved highly successful: Between 1500 and 1650, the amount of Imperial taxes raised is estimated to have increased tenfold (Whaley, 2012a, p. 512). Importantly, it was the princes' responsibility to raise these taxes from their subjects. This increasing pressure to raise revenue meant that the incentive to establish efficient fiscal institutions grew with every new imposition of the Imperial taxes.

## 3 Data

### 3.1 Territories, Cities, Lineages

Our setting requires a complete picture of both cities and territories in the Holy Roman Empire. To do so, we construct the first dataset linking each of the 2,390 cities in the *Deutsches Städtebuch* (Keyser et al., eds, 1939-2003), an encyclopedic compendium on cities in the Empire,<sup>12</sup> to one or multiple rulers, for each year between 1400 and 1789. We note the kind of rule, the rule hierarchy (if there were multiple rulers), and the reasons for any rule changes. To construct these data, we draw on an encyclopedia on German territories (Köbler, 2007), lineage trees of the majority of German and European noble families, numerous historical maps, as well as sources on individual cities, dynasties, and territories, and match this information with the city histories described in the *Deutsches Städtebuch*.<sup>13</sup>

The resulting dataset eventually features 833,301 observations at the city  $\times$  year level, including 15,953 changes of rulers, and belonging to 684 distinct territorial entities.

Building on this dataset, we construct a series of variables that serve as primary outcomes in Section 5, or as measures of the mechanisms of interest in Section 6. Aggregating the information at the territory  $\times$  year level, we can measure the size of a territory (measured by the number of cities it rules over) at any given point in time. We can also code whether and when a territory ceases to exist, and the reasons for its disappearance (dynastic extinction, conquest, or purchase). Next, from the perspective of single cities, we can observe whether and when a city changes ruler, the reasons for this change, and whether the city is put in pawn to a secondary ruler.

Beyond its temporal evolution, territorial rule also had a spatial dimension. To approximate the spatial dimension of territorial holdings over the period considered (lacking detailed, year-to-year maps which reflect the complex layerings of sovereignty), we draw Thiessen polygons (Voronoi partitions) around city centerpoints.<sup>14</sup> Aggregating city polygons belonging to the same ruler, we

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<sup>12</sup>The data contains all cities that were within German borders of 1937.

<sup>13</sup>For more information on the coding of the territories, refer to the documentation files available with Cantoni et al. (2019). We exclude all territories that are directly under Danish, Polish or Bohemian rule and do not belong to the Holy Roman Empire. In Bohemia, for example, the data only captures Upper and Lower Silesia, but the full territory reached far into the East. We also omit the scattered Further Austrian territories of the House of Habsburg as we do not observe Austria, Hungary, and Spain.

<sup>14</sup>Appendix Figure A.1 shows the location of these city centerpoints. See the documentation files available with

obtain a graphical depiction of the extent of every territory, from the large ones such as Prussia to the smallest principalities, in a given year.<sup>15</sup> Appendix Figure A.2 shows the resulting evolution of territorial borders for every century. Based on the shape of each territory’s extent, we calculate several measures of compactness, or roundedness.

Finally, our dataset also considers the dynastic (network) dimension of the territorial history of the Empire. We identify 2,799 rulers of secular territories in an extensive kinship and marriage network of over 132,000 members of noble families from Marek (2018). For each member of these dynasties, we know birth and death years, dates of marriage, and a full set of offspring and marriage links between individuals. We assign rulers to their land holdings from (Cantoni et al., 2019), and we note the start and end years of their reign. Building on this information, we calculate network-based measures of dynastic connectedness for territorial rulers across time.

### 3.2 Territory-level Institutions

Complementing this detailed information on the rulers, rule changes, and territorial holdings, we collect several measures relating to the fiscal-institutional development of these territories.

Most importantly, we measure fiscal centralization, our key variable of interest. We construct a novel dataset on the timing of the introduction of a Chamber in the territories of the Holy Roman Empire by supplementing and rigorously verifying information from a comprehensive handbook on the administrative history of Germany (Jeserich et al., 1983) with a large number of publications on fiscal and regional histories. We find evidence for fiscal centralization in 39 territories, which are listed in Table 1 along with the corresponding dates and the exact type of institution that was introduced for each territory. There is considerable variation in the timing of the introduction of a Chamber: Württemberg and Albertine Saxony are the first territories to fiscally centralize at the beginning of the 16th century, whereas Schaumburg-Lippe, Paderborn and Reuß-Greiz first have a Chamber in the 18th century.<sup>16</sup>

Another major institutional development in early modern Europe was the formation of Estates and territorial diets. For all territories which eventually adopted a Chamber, we collect information about time periods in which Estates were active, for example because they were consulted for taxation purposes (see Appendix Table A.1).

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Bogucka et al. (2019) for details on the construction of polygons and point locations. Alternatively, we can draw modified polygons that take terrain ruggedness and river velocity into account (Bogucka et al., 2019); our results are robust to the use of either definition.

<sup>15</sup>This allows us to move beyond existing, coarse digital maps that have been used in the literature so far (e.g., Nüssli’s EurAtlas), and beyond maps that have been drawn by historians for single territories at selected points in time. We do acknowledge that exact borders of territories were ambiguous in the Middle Ages (Mayer, 1956; Power, 1999; Schubert, 2006; Rutz, 2018), but the assignment of cities to territories is clear during the entire time period of interest.

<sup>16</sup>We are confident that territories did not fiscally centralize if there is no evidence of the existence of a Chamber. The historical literature agrees that fiscal centralization in the Empire set out in Württemberg in 1521, so we do not miss events before 1521. Also, there is broad variation in the size of territories with a Chamber, ranging from very large (such as Prussia) to comprising only a few cities (for example Münster or Trier). Similarly, we observe that some territories with a Chamber cease to exist in our coverage period, so that “survivorship bias” is unlikely.

Finally, we map the territories in our data to the Imperial Register of 1521 (Zeumer, 1913, pp. 313-317).<sup>17</sup> We also note the timing and size of the Imperial tax levy, to which territories had to contribute according to their share in the Imperial Register (Steglich, 1972, pp. 54-55; Schulze, 1978, pp. 79-80; Rauscher, 2012, p. 345). Appendix Figure A.3 shows the distribution of contribution shares as well as the level and timing of the required Imperial tax contributions, which were raised 27 times between 1522 and 1740.<sup>18</sup>

### 3.3 Other Variables

We collect an extensive set of additional information on the geography, economy and conflict involvement of cities. We calculate distance to the closest sea coast or navigable river (Map 2 in Kunz, 1991). Measures of agricultural suitability are taken from the FAO's Global Agro-Ecological Zones (GAEZ) 2002 database<sup>19</sup>, matched to the Thiessen polygons of city borders. Similarly, we also calculate terrain ruggedness for the area surrounding each city. To assess mining suitability of a city's surrounding area, we identify town charters which contained provisions on mining.<sup>20</sup>

From the *Deutsches Städtebuch*, we extract information on construction events associated with military spending such as castles, arsenals, or fortifications, and pooled construction events as an economic indicator (Cantoni, 2020). As another proxy for economic activity, we collect the number, type and timing of markets in the covered cities (Cantoni et al., 2020b). The *Städtebuch* moreover records attacks to cities, which we take as indicators of (defensive) conflict involvement and military threat to a territory.<sup>21</sup> Finally, we know, due to the spatial nature of our data, the neighbors for each city. Combining this with information on territories, we know military construction events taking place in foreign neighboring cities, or whether a city has neighboring cities that belong to a fiscally centralized territory.

## 4 Origins of Fiscal Centralization

Figure 1, which combines information on territories' land holdings with their fiscal history, shows that not all territories introduced a Chamber until 1789, and the timing of adoption differed widely among those that did. In this section we explore what drove whether territories adopted fiscal centralization, and when they did so.

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<sup>17</sup>Similar data has been used in Cantoni (2012). We also assign Imperial Register shares from the repartition of 1648 from Universitäts- und Landesbibliothek Sachsen-Anhalt (2008 [1663]) to our territorial entities.

<sup>18</sup>We omit the extraordinary, low-compliance contributions levied during the Thirty Years' War.

<sup>19</sup>This data was kindly shared by Nathan Nunn due to the download center at <http://fao.org/Ag/AGL/agll/gaez/index.htm> being defunct during the time of writing this paper.

<sup>20</sup>We extract data on the town charter status of cities from Cantoni et al. (2020a).

<sup>21</sup>Note that information on these attacks is not dyadic, so that we are agnostic about offensive consequences of these attacks to cities throughout our analysis.

The historical account of Section 2 suggests that benefits, such as gains from bureaucratic efficiency, and costs, such as the loss of direct control over revenues, determined a ruler’s decision to adopt a Chamber. We take this framework to our data. We do so first in a cross-section, examining baseline differences between territories in the early 16th century, and next in a panel data set, considering decade-to-decade changes.

#### 4.1 Which Territories Centralize?

We first look at the entire set of territories extant in 1500, i.e. two decades before Württemberg implemented the first Chamber.<sup>22</sup> We estimate the following linear probability model:

$$\begin{aligned} EverTreated_j = & \beta_1 Geography_j + \beta_2 Economy_j + \beta_3 SecondaryPower_j \\ & + \beta_4 PressureNeighbors_j + \beta_5 ImperialTax_j + \varepsilon_j, \end{aligned} \quad (1)$$

where *EverTreated<sub>j</sub>* is a binary variable that captures if a territory introduces a Chamber until 1789 (to ease interpretation of the coefficients, we multiply the dependent variable by 100). We look at several potential predictors for centralization, all measured in 1500.<sup>23</sup>

First, we consider *Geography<sub>j</sub>*. Geographic circumstances in a territory influence its early economic development, and thereby its need for revenue processing and collection. For example, in Cleves more than half of the territory’s revenues in 1481 were represented by river tolls from the Rhine, while in Hesse demesne income accounted for roughly 90 percent of all revenue until as late as 1529 (Klein, 1974, p. 13; Whaley, 2012a, p. 513). *Geography<sub>j</sub>* is thus a vector encompassing (standardized) terrain ruggedness, distance to water, agricultural suitability, and the presence of any mining activity in 1500 in territory *j*.

An increase in commercialization over the late 14th and 15th century drove early forms of fiscal bureaucracy; moreover, the sheer size of a territory (and thus of its market) directly affected the returns to investing in fiscal capacity. We consider these factors in *Economy<sub>j</sub>*, a vector comprising the overall size of a territory (measured through the number of cities controlled), construction activity between 1400 and 1499, and the number of existing market grants in this territory in 1500. With the vector *SecondaryPower<sub>j</sub>*, we proxy for the internal state capacity of territorial lords in *j* in 1500. We include the the share of cities with secondary rulers, which proxies for the relative power of territorial lords vis-à-vis the local nobility, as well as the share of cities that are members of the Hanse, which indicates the presence of more powerful urban centers.

We also turn to potential determinants of fiscal capacity that stem from conflicts with other territories (Gennaioli and Voth, 2015). A hostile environment will increase the pressure to handle

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<sup>22</sup>Note that our approach, by conditioning on the universe of territories in 1500, overcomes the selection problem inherent to most analyses that typically rely on the set of ex-post successful territories.

<sup>23</sup>In the regressions, we use the natural logarithm for count variables such as the number of cities or markets, as marked in Table 2.

revenue more efficiently for military purposes. We capture this aspect in  $PressureNeighbors_j$ , a vector comprising militarization of neighboring territories, measured through the presence of military buildings, and any past exposure to warfare (over the last 100 years), measured through attacks on a territory's cities. Finally, in  $ImperialTax_j$ , we look at a territory's standardized contribution to the 1521 Imperial Register: the higher this contribution, the larger the benefit of introducing a Chamber to levy and process necessary funds.

Results are presented in Table 2. In columns 1 to 5 we look at the potential determinants of fiscal centralization separately, and in column 6 we pool all determinants.

Differences in early economic development stemming from differing geography at the beginning of the 16th century predict fiscal centralization: Territories that are closer to water, have lands that are suitable for agriculture, and mining activity, are more likely to introduce a Chamber (column 1). Also, territories with a more commercialized economy (more cities and markets) are more likely to fiscally centralize (column 2). The internal power structure of territories in 1500 does not predict which territories will fiscally centralize (column 3). There is evidence that territories that eventually centralize experience more conflict in the 15th century; the threat of war in 1500, captured by the militarization of neighbors, is also positively associated with fiscal centralization (column 4). Column 5 shows that territories exposed to a greater financial burden in the 1521 Imperial Register, as measured by their standardized contribution, are substantially more likely to fiscally centralize (column 5). In column 6 we regard all potential determinants jointly. The number of markets, territory size, and Register contributions remain good predictors of eventual centralization. The reduction of the coefficient on Imperial tax (Register) contributions indicates that some of its variation is captured by observable characteristics of territories, but it retains significant explanatory power of Chamber adoption.

## 4.2 When Do Territories Centralize?

The results in Table 2 point to why some territories adopt fiscal centralization, but not when they do so. We modify equation 1 to analyze the timing of fiscal centralization in a decadal panel setting. Our panel contains one observation for each territory existing in a given decade; the dependent variable (fiscal centralization) is a binary indicator reflecting the decade of introduction of the Chamber in a territory. We omit the territory from our sample thereafter, reflecting the absorbing state of this treatment.

Our regression equation is as follows:

$$Treated_{jt} = \beta X_{jt} + \beta^{1500} X_{j,1500} + \alpha_t + \varepsilon_{jt} \quad (2)$$

It predicts the eventual adoption of the Chamber ( $Treated_{jt}$ ) using a vector of covariates  $X$ , which correspond to the variables used in regression equation (1) above.<sup>24</sup> We also control for the initial

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<sup>24</sup>We observe all covariates on a yearly basis. Note that even characteristics such as agricultural suitability are con-

level of the variables contained in  $X$  ( $X_{j,1500}$ ), measured in 1500 or at the earliest available time period (for territories that start to exist after 1500).  $\beta$  can thus be interpreted as the effect of relative changes in the variables contained in  $X$ . Finally, the regression includes a full set of decade fixed effects.<sup>25</sup> Standard errors are clustered at the territory level.

Table 3 presents results from the OLS estimation as described in equation (2) above; as such, the findings are comparable to the other linear estimations in this paper. Appendix Table A.2 shows different empirical approaches, including Cox hazard rates regressions and estimations of first-differenced models, in the context of the specification of Table 3, column 6. We obtain very similar results throughout.

The findings of Table 3 are broadly comparable to the cross-sectional analysis of Table 2. Factors relating to the geography, economy, or internal power structure of territories (viz., changes thereof) are, for the most part, weakly related to the actual timing of fiscal centralization (columns 1–3). Territories that are exposed to increasing military threat and conflict are more likely to fiscally centralize, and neighbors introducing a Chamber increase the likelihood of fiscal centralization by 0.6 percentage points (column 4). This is consistent with external pressure leading to the need to collect more revenue, and handle revenues more efficiently.

Fiscal centralization occurs in decades with higher requests of contributions to the Imperial budget, as measured by the natural logarithm of Roman Months levied, multiplied by the fixed (standardized) contribution share (column 5). Conditional on a given share of contributions being assigned to a territory by the Imperial Register, being required to raise 10% more Roman Months (monetary equivalents) in a given decade increases the likelihood of fiscally centralizing in that decade by 4.4 percentage points. This suggests that territories adopted a Chamber to better collect and process the revenues required to meet the Empire’s fiscal needs. This finding also holds when considering all potential determinants jointly in column 6: requests of Imperial tax contributions are the most consistent predictor of the timing of fiscal centralization.<sup>26</sup>

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tained in the vector  $X_{jt}$ , as their value might change with a territory’s extension. In  $Economy_{jt}$ , we include all construction events in the past decade instead of the past century. Similarly, we include a dummy whether an attack took place in the past decade, and a binary indicator of neighboring military building activity in the past decade, and an indicator of any fiscally centralized neighbors to  $PressureNeighbors_{jt}$ .

<sup>25</sup>Our regression does *not* contain territory fixed effects. This is analogous to similar settings in which a hazard is estimated through a linear probability model, in a panel data set with absorbing outcomes (see, e.g., Currie and Neidell, 2005; Corno et al., 2020).

<sup>26</sup>In Appendix Table A.3, we turn to a specific obstacle in introducing a Chamber: stakeholders in territorial administration. Usually, a change of administrative staff would follow as new rulers took office, following the death of their predecessor. We thus test whether territories are more likely to adopt a Chamber in a “window of opportunity” of the first five years of a ruler’s reign, using both OLS and Cox Hazard models. We find suggestive evidence that fiscal centralization is more likely to take place early into a ruler’s reign.

## 5 Effects of Fiscal Centralization

### 5.1 Survival of Centralized Territories

In the eyes of contemporaries, as the will of Frederick the Great attests, “the first concern of a ruler has to be to survive, only then comes the question of enlargement” (Friedrich II. von Preußen, 1769). We thus consider survival and two aspects of territorial “enlargement” — size and compactness — to depict the major aspects of consolidation. We first turn to these ultimate outcomes of state consolidation, before considering mechanisms in Section 6.

The most striking feature of state consolidation in the Holy Roman Empire was the survival of some territorial entities at a time when others vanished. To understand the role of fiscal centralization and test whether territories that became centralized were more likely to survive than those that did not, we estimate a linear probability model of the following form:

$$Vanish_{jt} = \beta_1 Treated_{jt} + \beta_2 Treated_{jt} \times DecadesTreated_{jt} + \alpha_t + \varepsilon_{jt} \quad (3)$$

where *Vanish* is a binary variable that reflects whether a territory *j* vanishes in year *t*. The specification is thus a hazard estimation in a linear probability setting, analogous to regression equation (2). *Treated<sub>jt</sub>* is a dummy that takes value 1 if territory *j* is fiscally centralized at time *t*, and *DecadesTreated<sub>jt</sub>* measures for how many decades territory *j* is already treated in year *t*. This allows the effect of fiscal centralization to change in magnitude over time.  $\alpha_t$  are year fixed effects. Standard errors are clustered at the territory level.

The detailed nature of our data allows us to consider three major reasons for territorial vanishing: extinction of the ruling lineage, conflicts, and purchase. Vanishing by dynastic extinction, when a ruling family does not produce a potential heir, is the most common impediment to territorial survival; nearly half of all vanishing territories fall in this group. We consider dynastic extinction to constitute a largely uncontrollable part of territorial survival, whereas the remaining reasons are endogenous to a territory’s actions.<sup>27</sup>

Annexation was a constant threat for territories which were unsuccessful in building foreign relations and military strength: An early example is the Burgravate of Dohna, which in 1402 vanished in a conflict with the Margravate of Meißen over territory in the middle Elbe region. Similarly, rulers who resorted to selling lands risked ending up in a self-reinforcing circle of ever-growing land pawns, and risked vanishing by purchase: In 1548, Count Berthold of Henneberg-Aschach sold off his last substantial land holdings to the Mansfeld family, thus dissolving the territory, which ended up with Albertine Saxony shortly thereafter.

Table 4 shows results.<sup>28</sup> Columns 1 and 2 show there to be no differences between fiscally

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<sup>27</sup>As late as 1799, and in a territory as significant as the Electorate of Bavaria, the ruling family died out, even though they hired major specialists and underwent fertility treatments multiple times (Stein, 2011).

<sup>28</sup>Similar to Section 4.2, refer to Appendix Table A.4 for results of estimating a Cox proportional hazard model. Appendix Table A.5 includes only territories extant in 1500, and Appendix Table A.6 shows results including both year and



centralized and non-centralized territories when it comes to extinction; coefficients are small and insignificant. This is consistent with the view that dynastic extinction due to the lack of (male) heirs was an outcome that could not be affected by the actual fiscal capacity of a territory. Columns 3 and 4 instead indicate a sizeable, significantly negative relationship between centralization and vanishing because of conflict. The last two columns then consider whether territories cease to exist because they are sold. There is a large, significant reduction of this probability following fiscal centralization at around 91% of the baseline probability. As opposed to the birth of male offspring, thus, fiscal capacity increases the probability to survive thanks to military success and financial strength. We further examine these mechanisms in Section 6.

To examine these vanishing dynamics over time, we estimate an event study framework as follows:

$$\begin{aligned}
 Vanish_{jt} = & \sum_{\tau=1}^{10} \beta_{\tau} Treated_{jt} \times RelativeDecade_{\tau(j,t)} \\
 & + \alpha_t + \varepsilon_{jt} ,
 \end{aligned} \tag{4}$$

where  $Treated_{jt}$  and  $\alpha_t$  are defined as above. We interact the treatment indicator with a set of relative decade dummies for the decades after treatment; the dummy for  $\tau = 10$  is defined to include all time periods ten decades or later relative to the year of treatment. Thus, for each decade after the introduction of Chambers, we estimate the probability of vanishing for treated territories relative to all non-centralized territories, and territories before centralization. Note that we cannot estimate  $\beta_{\tau}$  for  $\tau < 0$ , since our sample is conditional on a territory having survived up to time  $\tau$ , i.e. the introduction of the Chamber.

Figure 3, Panel A, shows the probability of vanishing due to purchase or conflict (i.e. not considering dynastic extinction) over time. Following fiscal centralization, there is an immediate, clear, and sustained decrease in this probability (by about 20%), compared to territories without a Chamber.

## 5.2 Size of Centralized Territories

A second important aspect of state consolidation is the size of territories. From 1400 to 1789 the size of the average territory increased substantially: In 1400 the average territory consisted of around 6 cities, in 1789 this had doubled to 12 cities. While the largest territory in 1400 held 185 cities, the largest territory in 1789 consisted of 598 cities.

The financial situation of territories and their ability to grow in size were closely linked, and rulers spent large parts of their revenues to enlarge their territories (Jeserich et al., 1983, p. 71). The case of Albertine Saxony shows how acquisitions were directly influenced by state revenue: after the introduction of a Chamber in 1524, the electoral prince spent 700,000 fl. until 1567 to buy up

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territory fixed effects. Again, we obtain very similar results throughout.

rural estates, villages, and entire lordships.

Financial means were not only necessary to purchase additional land holdings directly, but also to acquire land by other, seemingly non-financial means (such as inheritance and warfare). The case of Brandenburg — which installed a Chamber in 1577 — in the first decades of the 17th century illustrates the manifold linkages between financial means and size. In 1614 and 1618, the Electorate incorporated Ducal Prussia and the Duchy of Cleves-Mark. The top panel of Figure 2 shows the large territorial gains between 1600 and 1625. Brandenburg’s expansion hinged on its financial capacity in three ways: The foundation for the territorial expansion was laid by building inheritance claims through strategic marriages. In 1591, Joachim Friedrich had married his son Johann Sigismund to Anna of Prussia, which served as the basis for the claims to both the gain of Cleves-Mark and Ducal Prussia. In the case of Cleves-Mark, where the ruling dynasty died out in 1609, the inheritance claims were contested: Philipp Ludwig of Palatinate-Neuburg also laid claim to the entire territory, giving rise to military disputes. The strength of Brandenburg’s military forces ensured a division of the lands in which the larger part of Cleves-Mark went to the Electorate. Finally, disposable income played a direct role to complete the acquisitions, which necessitated large monetary sums — 300,000 fl. to the King of Poland for Ducal Prussia, and 600,000 fl. for Cleves-Mark (Jeserich et al., 1983, p. 874).

In Section 6, we demonstrate how the above factors — disposable income, and foreign relations through strategic marriages and warfare — were substantially influenced by fiscal centralization.<sup>29</sup> First, we test directly the relation between fiscal centralization and territory size. We estimate the following equation:

$$Size_{jt} = \beta_1 Treated_{jt} + \beta_2 Treated_{jt} \times DecadesTreated_{jt} + \alpha_t + \alpha_j + \varepsilon_{jt} \quad (5)$$

The outcome  $Size_{jt}$  is the natural logarithm of cities in territory  $j$  in year  $t$ . In addition to time fixed effects  $\alpha_t$ , this equation also contains a full set of territory fixed effects  $\alpha_j$ . Ownership of cities in the Holy Roman Empire was commonly disputed between several rulers; in addition, cities frequently had a hierarchy of rulers, for example as part of a pawn or a fief. To capture these aspects of state capacity, we consider for each territory, in separate regressions, (i) cities it rules alone, (ii) uncontested cities, and (iii) all cities, as the dependent variable.<sup>30</sup>

Table 5 shows that there is an immediate effect of fiscal centralization on territories’ size ( $\beta_1$ ), measured through the number of directly ruled cities.<sup>31</sup> Fiscally centralized territories also grow

<sup>29</sup>An additional minor, albeit important mechanism through which fiscal centralization influenced land holdings was through the introduction and improvement of bookkeeping. In Hesse, administrative statistics of the Chamber first documented the exact extent of the ruler’s lands, powers and privileges; changes were to be reported and discussed on an annual basis; by the late 16th century, there was no scope for the alienation of land pawns and fiefs from the sovereign’s belongings (Zimmermann, 1933, p. 75).

<sup>30</sup>For more information refer to Section 2 and the data description of Cantoni et al. (2019).

<sup>31</sup>These results on territory size also hold if we exclude city states, which arguably have different means of organizing their finances (Stasavage, 2007), from the analysis.

larger over time, which points to territorial expansion taking hold gradually (columns 1 and 2). A territory that has been fiscally centralized for 100 years controls around 7.7 percent more cities than before the introduction of a Chamber. Similarly, the number of uncontested cities and the number of all cities — contested, given away, or ruled alone — do not increase immediately upon fiscal centralization of a territory, but grow over time (columns 3 and 4 and columns 5 and 6, respectively). Centralized territories hold 19.1 percent more uncontested cities and 17.6 percent more cities overall after having been fiscally centralized for 100 years. These results suggest that fiscally centralized territories are not only able to grow in size, but also that this growth is neither disputed by rivaling territories, nor shared with other stakeholders.

Our regression results in Table 5 show that territorial growth takes hold over time in the decades following fiscal centralization. We now estimate the analogue of the even-study setup in equation (4). Additionally, we include a full set of territory fixed effects,  $\alpha_j$ , as well as a series of interaction terms for the decades prior to the treatment (thus with  $\tau = \{-5, \dots, 10\}$ ), where  $\tau = -5$  encompasses all periods five decades or more prior to the year of fiscal centralization. This setup allows us to examine the timing of the increase in size following fiscal centralization and any potential pre-trends in more detail.

Figure 3, Panel B, shows the relationship between fiscal centralization and territory size over time. There is no trend in territory growth before the adoption of a Chamber. After fiscal centralization, the event study graph shows a clear increase in size over time, consistent with the positive estimates of  $\beta_2$  in Table 5.

### 5.3 Compactness of Centralized Territories

Compared to today, the territorial fragmentation of medieval and early modern polities is visually striking. Often territories consisted of disconnected areas and there were many gaps in their land holdings. State consolidation led to more compact territories. Consider again the example of Brandenburg in Figure 2. Following the increases between 1600–1625 (top panel), which had fragmented the belongings, territorial growth in the following century rounded off the territory, even connecting previously separate parts of the Brandenburg lands. Just as with overall size increases, achieving a more rounded territory hinged on the acquisition of lands, so that the factors discussed in the context of size growth — from financial solvency to functioning bookkeeping — all apply.

Measuring compactness is not straightforward in a context in which territories sought, at the same time, both to expand and to round off the shape of their holdings. Standard measures of compactness will, in general, not be invariant to overall size, and decline in value as territories grow: in the extreme, a territory that consists of only one city will have a large overall compactness.

We thus approach compactness as a measure that penalizes an acquisition of scattered land holdings. We first operationalize this at the level of territories. If a territory is completely spread out, it consists of a set of disconnected cities; the length of its border is then equal to the sum of

all city borders.<sup>32</sup> In a more compact territory, cities will lie adjacent to each other. An increase in compactness thus implies longer “internal” (shared) borders between individual cities. Our territory-level measure of compactness is thus defined as the length of all “internal borders” (between ruled cities), relative to the sum of all city borders in that territory. This measure is 0 for disconnected territories. As more cities from the same territory share borders, the measure gets larger. For example, our measure of territorial compactness for Brandenburg increases from 0.78 to 0.81 between 1625 and 1725.

We also consider compactness from the perspective of individual cities. Analogously to the previous definition, we define a city’s compactness as the length of its border shared with cities from the same territory, relative to the length of the entire city border. This allows us to account, through the use of city fixed effects, for the fact that cities might differ in their innate potential for compactness, for example because they are situated at the sea.

To test whether fiscally centralized territories become more compact, we estimate the analogue of equation (5) with the above compactness measure as the outcome of interest (defined either at the level of territories  $j$  or of cities  $i$ , in each year  $t$ ). We multiply the dependent variable by 100. The specification with city-level compactness as the outcome of interest includes both city fixed effects  $\alpha_i$  and territory fixed effects  $\alpha_j$ .

Table 6 shows results. Positive coefficients indicate that a larger share of borders are internal borders, i.e. within cities of the same territory, and thus a more compact shape. We find that fiscally centralized territories become substantially more compact after centralization (columns 1 and 3), and that this process occurs gradually over time (columns 2 and 4). Our measure of territory-level compactness increases by around 4.6 percentage points in the first century after fiscal centralization (4.5 percentage points in the case of city-level compactness), compared to a baseline level of 12 percent (42 percent, respectively) on average for the control group.

Panels C and D in Figure 3 present the effect of fiscal centralization on compactness over time, estimated following the approach in equation 4. There are no changes to compactness in the decades prior to fiscal centralization. After the introduction of a Chamber, there is a continued and sustained increase in compactness in all following decades.

## 5.4 Robustness: Selection and Confounding Factors

The results of the previous analyses strongly suggest a positive association between the introduction of fiscal institutions and a range of outcomes relating to territorial consolidation and survival. However, this naturally raises the question about the causal nature of these correlations. Can these positive developments be interpreted as the causal effect of the introduction of fiscal chambers?

Clearly, there are several reasons to be skeptical about claims of causality in this context. More powerful, richer, better organized territories can both stem the burden of reforming their fiscal

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<sup>32</sup>As explained in Section 3, we partition the territory of the Empire into a set of mutually exclusive polygons around the 2390 cities. A city’s border is thus defined as the border of the polygon surrounding this city.

institutions and are more likely to achieve positive long-term outcomes. Talented or especially far-sighted rulers, such as Frederick II of Prussia, can almost single-handedly change the destiny of their territories (Ottinger and Voigtländer, 2021). Another concern, intrinsic to many major historical “experiments”, is the fact that reforms often come in bundles, changing several aspects of the state administration and institutions at once.

While we acknowledge these concerns, in this section we offer a cautiously optimistic take, suggesting that the results shown so far likely represent in fact a positive, causal effect of the introduction of fiscal institutions.

First, our data’s unique breadth and coverage allows us to observe every territory and every city in the Holy Roman Empire over the entire period 1400–1789, not just a selection of the more powerful or (eventually) most successful territories. We are also confident that our results are not driven by single outliers, such as the remarkable trajectory of Prussia. In Appendix Figures A.4 and A.5, we present plots showing that our results (both the differences-in-differences estimates and the event-study analyses) are robust to leaving out single territories from the treatment group.

A related concern is the comparability of territories, within the broad gamut of institutional settings in the Holy Roman Empire. The territories which (eventually) adopted Chambers may be a selected subset, differing from the control group in multiple dimensions. While our baseline regressions utilize all observations, relating to all territories in the dataset, we can conduct our analyses also within the sample of territories that eventually fiscally centralize. In Appendix Section B, we show that all our results are very comparable (both qualitatively and quantitatively) when using this selected sample of territories, amounting to the “intensive margin” of fiscal centralization.

Second, the baseline research design, with panel data regressions and two-way fixed effects, takes into account two major groups of potential omitted variables relevant in this context. These could be time-invariant characteristics of states, which affect both their propensity to invest in fiscal capacity and to consolidate their territory, such as their ecclesiastical nature or their core geographic features; or, they could be historical shocks affecting all territories in equal measure, such as pandemics or technological paradigm shifts from the military revolution.

Moreover, our regressions can also control explicitly for potentially time-varying, territory-specific confounders. We show these regressions in Appendix Section B. To avoid controlling for potentially endogenous developments, we limit the set of control variables to those that are arguably determined outside a territory, such as past military attacks or military construction activity among neighbors.<sup>33</sup>

The introduction of Chambers could have coincided with a series of other reforms that modernized the state administration; in this case, our estimates would reflect the effect of the entire

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<sup>33</sup>We acknowledge however the potential reflection problem, in a setting in which military investments and institutional innovations may be mutually interdependent. This is why these regressions are best seen as suggestive; reassuringly, our results are not particularly sensitive to the inclusion of these controls.

bundle of changes occurring at the same time. The historical accounts suggest that this was rarely the case.<sup>34</sup> When a Chamber was introduced together with additional institutional changes, it was generally the single most important reform. Other concurrent developments, such as the improvement of financial bookkeeping or the introduction of regular audits, were complementary or ancillary effects of the Chamber.

A large literature (Schumpeter, 1991; Tilly, 1975; North and Weingast, 1989) suggests a link between the increase in fiscal capacity and the development of representative assemblies, approving the imposition of taxes and controlling revenue streams. In this respect, however, the development in the Holy Roman Empire differs from many other parts of Europe. Estates in the territories of the Empire gained in importance over the course of the 15th century; when they exerted some control over taxation, this was limited to a small set of taxes, in comparison to the much broader revenue streams ultimately controlled directly by the Chambers. As we discuss in Section 2, Chambers thus did not form part of the coordination between local nobility, clergy, and towns, but instead were closely tied to the sovereign's finances and enabled their unprecedented expansion.

Appendix Figure A.6 shows the timing of the introduction of a Chamber relative to the time periods during which Estates were in existence. There is no correlation between these events, confirming our reading of the historical literature. Moreover, in the regressions in Appendix Tables B.6 and B.7, we directly control for the presence of Estates.<sup>35</sup> While the main coefficient for fiscal centralization remains largely unaffected, we find no direct effects of the presence of Estates on our outcomes of interest.

## 5.5 Robustness: Endogeneity

One could be worried about the potential endogeneity of the timing and the location of fiscal reforms. The event-study analyses of Figure 3 show that the effects of the introduction of a Chamber represent a distinct break from the periods preceding it. This absence of pre-trends speaks against territories embarking on paths of successful expansion and consolidation *before* reforming their fiscal institutions.

To speak more directly to these endogeneity concerns, we consider an alternative estimation approach, in which we exploit an arguably exogenous shifter of the likelihood of Chamber adoption: the incidence of Imperial tax levies. As explained in Section 2, starting in the 16th century the increasing financial needs of the Holy Roman Empire were rolled over to the single territories.<sup>36</sup> Raising those sums represented a major burden for territories; at the same time, Imperial levies of-

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<sup>34</sup>In particular, the introduction of Privy Councils (*Geheime Räte*), a modernized branch of executive power, typically occurred in later eras.

<sup>35</sup>Building on a large set of sources, we determine the presence and period of activity of Estates for all territories that eventually adopt fiscal centralization. Refer to Appendix Table A.1 for details.

<sup>36</sup>Importantly, these increasing expenditures were caused by external political threats, especially the rise of the Ottoman Empire. These threats affected most directly the eastern Habsburg lands. Note that the Habsburg territories are largely outside the area of our analysis (we also exclude scattered minor Habsburg land holdings from the data).

ferred an opportunity to tax citizens directly (without the need for consent from the Estates, where they existed). To this purpose, territorial lords often invested in fiscal capacity, creating the first Chambers. Once established, Chambers could be used not only to raise the money needed for the Imperial war taxes, but also to collect revenue more broadly.

The actual burden borne by the single territories varied widely both across time and space. The allocation followed a complex system: actual sums to be paid to the Empire were determined by the product of a fixed share (the *Reichsmatrikel* contribution) and a multiplier (the number of “Roman months”). The interaction of these two factors is a strong and powerful predictor of the hazard of fiscal centralization, as shown in Table 3, columns 5 and 6. Note that the predictive power of the Imperial tax levies holds even after taking into account baseline territory characteristics and all other predictors. Conditioning on these factors, the interaction term thus represents an idiosyncratic, time-varying driver of the likelihood of adopting a fiscal Chamber.

We exploit this relationship in a setup equivalent to a 2SLS regression. Rather than predicting the endogenous variable (fiscal centralization) through a standard first-stage, linear regression, we take into account its binary nature and the fact that the eventual adoption of a Chamber is an absorbing state. We proceed as follows. We first use the regression in Table 3, column 6, to predict, decade-by-decade, the linear probability of adopting a Chamber for each territory.<sup>37</sup> We then set a threshold of 3.85%, and impute a “predicted” adoption of the Chamber for all decades after a territory passes this threshold for the first time. The threshold is chosen such as to match, in the prediction, the actual number of territories eventually centralizing in our dataset (39).

In the analogue of a second-stage regression, we then use these predicted treatments to estimate the effects of fiscal centralization on the outcomes of the previous sections (likelihood of vanishing, size, and territory-level compactness). Results are presented in Table 7, comparing the OLS baseline estimates (Panel A) to our 2SLS-analogue regressions (Panel B). The estimates using the imputed fiscal centralization events are close to the baseline results, throughout all specifications.

## 6 Mechanisms

In the previous section, we have shown that fiscally centralized territories are more likely to survive, grow in size, and achieve a more compact extension. We next discuss the mechanisms through which this territorial consolidation takes place: increased revenues and reduction of land pawns led to internal consolidation, which eventually benefitted the projection of power through military pursuits and marriage diplomacy.

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<sup>37</sup>The corresponding F-statistic associated with the coefficient (analogous to the excluded instrument in a standard 2SLS setup) is equal to 10.59 .

## 6.1 Revenues

Levying funds or tapping into new income sources proved difficult for most rulers at the dawn of the early modern era. Chambers were thus charged with a twofold objective: An improved exploitation of existing sources of revenue, and a more efficient handling of levied funds at court. Hesse's Chamber ordinance of 1568, for example, states the overarching goal of the institution: it needs to increase steady revenues.<sup>38</sup>

Documenting comprehensively the increases in revenues resulting from the introduction of a Chamber is challenging, as systematic record-keeping was directly linked with the institution of the Chamber. Data about revenues in the periods prior to fiscal centralization are thus scarce. For two territories — Hesse and Albertine Saxony — revenue estimates spanning the periods before and after the reform exist.<sup>39</sup> Figure 4 depicts the evolution of revenues for these territories over time, with the vertical line indicating the year of the introduction of a Chamber. In both cases, funds increase following fiscal centralization. In Hesse, the substantial and sustained revenue jump of over 30,000 fl. in the decade between 1540 and 1550 stands out, even against the moderate pre-trend in the period 1520–1540. In Albertine Saxony, drink excise tax revenues average 20,000 fl. yearly before the replacement of the *Landrentmeister* with a collegial Chamber in 1524; after the reform, revenues are stably at a higher level of approximately 24,000 fl. per year.

## 6.2 Alternative Methods of Raising Revenue

While revenues are observed directly only for a minority of territories, we propose an indirect test of increases in disposable funds generated by fiscal centralization. We expect additional revenue to crowd out the conventional method of raising funds at a ruler's disposal: pawning of land holdings to local nobility and wealthy burghers.

For an large number of territories, pawns were the predominant means of raising funds for rulers, especially in the short term and in a context with low fiscal capacity (moreover, pawns did not require consent from the Estates).<sup>40</sup> Rulers under financial pressure exhausted these means until very little of their territory remained under direct control, setting off a vicious circle of further financial pressure due to insufficient land holdings. These lands could even be lost permanently if sovereign rights were not exercised for a sufficiently long time period. Pawns were thus an inefficient way of raising revenue, and there were large incentives to redeem pawned settlements, forests and acres.

For example, in 1561 the Chamber clerk in Hesse filed a complaint that he still found it im-

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<sup>38</sup>The Chamber ordinance of 1568 states: "the returns under 'permanent revenues' shall be increased" (*Die unter dem Titel "Ständige Einnahmen" verzeichneten Gefälle müssen gesteigert werden.*, Zimmermann, 1933, p. 102).

<sup>39</sup>For Hesse, Chamber revenue estimates are drawn from North (1999). Albertine Saxony recorded revenues from a drinks excise tax, which was one of the ruler's primary sources of disposable income during the time period depicted here Schirmer (2006, pp. 235, 252-253, 605).

<sup>40</sup>See Klein (1974, p. 19), Jeserich et al. (1983, p. 712), Bütterlin (1977, p. 123).



possible to cover expenditures from revenues of the local offices, since the majority of them had been put in pawn before. However, by 1569 the Chamber had redeemed 28 local offices, and it spent another 100,000 fl. in the following decade on redeeming pawns. A similar development can be traced for Albertine Saxony, where the largest ducal expenditures in the years following fiscal centralization (46,190 fl.) were spent on redeeming pawns.<sup>41</sup>

Our data records pawnings of cities to secondary rulers at the yearly level. To estimate whether the introduction of a Chamber reduces the likelihood of a city being pawned, we estimate the analogue of equation (5) at the city level, where the dependent variable,  $PawnedCity_{ijt}$ , is an indicator whether city  $i$  in territory  $j$  is pawned to a territory  $j' \neq j$  in year  $t$ . We again include a full set of city, territory, and year fixed effects.

Table 8 shows results. Cities in fiscally centralized territories are slightly less likely to be put in pawn (column 1). The decrease in pawning probability is immediate, and attenuates over time (column 2). Results are similar when taking into account whether a city is located at the border to a foreign territory, which might make it more attractive for other rulers to pawn it (column 4).

A more informative picture emerges when considering changes in pawning probability over time, in the event-study graph of Figure 5, Panel A. In the decade immediately after fiscal centralization, cities in centralized territories experience a sharp drop in their probability of being pawned. This effect slowly attenuates over the following decades, leading to the weakly insignificant overall effect estimated in the differences-in-differences regressions of Table 8. The timing of effects suggests that the additional stream of revenues guaranteed by the new fiscal administration was immediately used by princes and Chamber officials to reduce the number of cities temporarily pawned away to other rulers — a step towards internal territorial consolidation, and an indicator of increased overall disposable revenue.

### 6.3 Military Investments and Success

How exactly did rulers profit from this internal consolidation to expand the size of their territories and increase their probability of survival? Beyond direct purchases of lands, acquisitions through military interventions and marriage diplomacy also share as a common denominator their reliance on financial means. In the context of warfare, Chambers usually were put in charge of handling relevant expenditures, especially for military buildings (Jeserich et al., 1983, pp. 331, 640, 723, 752, 816).<sup>42</sup>

We test for an increase in the number of military buildings in cities following fiscal centralization by estimating equation (5) at the city level, including relevant fixed effects. The dependent variable is an indicator variable for new military construction in a city  $\times$  year.<sup>43</sup> Results are shown

<sup>41</sup>These expenditures exceed the cost of Albertine participation in the four-year war of the *Hildesheimer Stiftsfehde* (1519–1523) by a factor of well over two.

<sup>42</sup>Albertine Saxony is exemplary in that following the 1530s, expenditures for armories, fortresses, and defense increased substantially (Schirmer, 2006, p. 569).

<sup>43</sup>Since we multiply the dependent variable by 100, one can interpret coefficients as the increase in construction

in Table 9. For cities in treated territories, military construction increases by around 0.03 buildings per century (column 1). This is a significant and sizable effect, considering that average military construction in our sample amounts to 0.051 buildings per city and century. There is no clear time trend in this increase in construction (columns 2 to 5).

One potential confounder is a change in the threat environment: military construction could increase more in centralized territories because these are attacked more. In column 3 we thus control for whether a city has been attacked in the current decade. This does not affect military construction at conventional significance levels, and the treatment coefficient remains unaffected. We also add measures for the threat of war, such as military construction by neighboring foreign territories and the number of foreign cities in the vicinity. Again, the coefficient of interest remains unchanged (column 4). The same holds when considering the length of the foreign border as another measure for the threat of war (column 5).

To examine the trajectory of building activity for military purposes over time, and to rule out the presence of pre-trends, we turn to an event-study framework. Figure 5, Panel B, shows the resulting coefficients. Military construction is constant before fiscal centralization and increases steadily after the introduction of a Chamber. After three decades, military construction largely remains on an increased level compared to the decade prior to fiscal centralization.

Increased revenues lead to more military investments in territories with a Chamber. Stronger territories can defend their existing set of cities better, and they can conquer new cities, thus resulting in higher survival probabilities and the consolidation of territories as described in Section 5. Our dataset — in which we observe attacks to cities, but not the identity of the aggressors — allows to examine the defensive channel.

To do so, we consider the relationship between rule changes for cities as a result of attacks in treated and untreated territories by estimating

$$\begin{aligned}
 \text{ChangeRuler}_{ij(t+1)} &= \beta_1 \text{Treated}_{ijt} + \beta_2 \text{Treated}_{ijt} \times \text{DecadesTreated}_{ijt} \\
 &\quad + \gamma_1 \text{Attack}_{ijt} + \gamma_2 \text{Treated}_{ijt} \times \text{Attack}_{ijt} \\
 &\quad + \delta M_{ijt} + \alpha_i + \alpha_j + \alpha_t + \varepsilon_{ijt}
 \end{aligned} \tag{6}$$

where *ChangeRuler* is an indicator whether city *i* changed from territory  $j' \neq j$  to territory *j* in a given year. *Attack* is a dummy whether a city is attacked in year *t*, and *M* is a vector of military covariates.

The results in Table 10, column 1, show that cities that are attacked have a 1.1 percentage points higher probability of changing ruler, relative to a baseline probability of year-to-year rule change of 0.92. However, if a city belongs to a fiscally centralized territory, the conditional probability of changing hands if attacked is essentially reduced to zero ( $0.203 = 1.135 - 0.932$ ).

As a plausibility check, we compare the effect of attacks on three different types of rule changes.

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activity per century.

The relevant interaction term ( $\text{Attack} \times \text{Treated}$ ) is sizable and significant only if the outcome considered is rule changes due to violence (column 2). In contrast, attacks are not associated with subsequent rule changes due to sales of cities or dynastic extinction (columns 3 and 4). This confirms that military investments following fiscal centralization have a meaningful effect in increasing the defensive capabilities of a territory.

## 6.4 Marriages

While warfare and its expenditures constituted an important feature of early modern polities, the predominant forms of rule expansion were peaceful. A central role played marriage alliances, both for sons — potential successors — and daughters of rulers.

Chambers were closely bound to the private finances of territorial rulers. This is especially true for marriage arrangements, which were prestigious and hence costly endeavours. The case of Albertine Saxony in the years of the introduction of a Chamber illustrates this point. To successfully marry off Georg of Saxony's daughter Magdalene to Joachim II. of Brandenburg, a prince who had been previously offered the hand of the French king's daughter, the Albertine Chamber handed out 20,952 fl. of dowry to the Hohenzollern prince. Extravagant wedding ceremonies also burdened a ruler's treasury: for the marriage of Magdalene and Joachim, 3,000 guests had to be entertained, including 24 princes of the Empire (Schirmer, 2006, pp. 275-76). While these marriage arrangements served to signal status and secure prestige, they foremost had very tangible territorial consequences: In the case of the extinction of a lineage, inheritance claims were made on the basis of marriage ties.

We formalize these notions of the strength of inheritance claims and ties to powerful dynasties in a graph of kinship and marriage connections. On a yearly basis, we observe this network between members of noble families. We calculate the marriage success for all daughters of territorial rulers. It is important that our measure reflect the consequences of fiscal centralization: we thus focus on the marriage success of daughters and not of the rulers themselves (which might have been determined before the institutional reforms). Also, in contrast to sons, marriages of noble daughters were most directly linked to the abundance of revenues, which could be used for the payment of dowries or monetary compensations.

Marriage success is defined as the change in dynasty connectedness resulting from the union. To measure dynasty connectedness, we count the number of territorial rulers within three degrees of family separation (kinship or marriage) in a daughter's network, as well as the number of cities that rulers within this immediate network preside over.<sup>44</sup>

Specifically, we calculate connectedness once in the full network, and once in a network that does not have the daughter's marriage link. The difference between married and unmarried connectedness will be weakly positive, since a daughter cannot be less connected by adding a link to

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<sup>44</sup>We do not consider members of the same dynasty to be relevant rulers.

her network. This allows us to assess the quality of a marriage link.

We estimate the effect of fiscal centralization on marriage outcomes through an analogue of equation (5), where  $MarriageGain_{jt}$  is the logarithm of the marriage success for territory  $j$  in year  $t$ .<sup>45</sup> Table 11 presents results. The outcomes of marriage politics improve after the adoption of a Chamber: a daughter’s immediate network comprises 28% more other rulers as a consequence of their marriage (column 1), and the number of ruled cities in their network increases by more than 70% (column 3).

Panels C and D in Figure 5 shows marriage gain coefficients from an event-study framework: for both the number of rulers and the number of ruled cities within the immediate network there are no pre-trends. Following fiscal centralization, there is a large jump in the gains from marriage on inheritance claims, which does not attenuate over time: ruler daughters have more successful marriages after the introduction of a Chamber.<sup>46</sup>

## 7 Conclusion

In this paper we trace the early stages of the development of fiscal capacity. We study the Holy Roman Empire from 1400 to 1789, a time and setting that was marked by profound state consolidation that reorganized the political landscape of Europe. The introduction of a modern fiscal administration played a large role in this. Using a novel and extensive dataset, we show that the introduction of Chambers, the first step towards a modern fiscal administration, increased the probability of survival, size and compactness of territories — three key elements of state consolidation. The absence of evident pre-trends, as well as the robustness of our results with regard to selection and endogeneity concerns, suggest that fiscal centralization played a causal role in this context. Territories were able to increase their revenues through fiscal centralization and had to revert less to other means of raising short-term funds. This allowed rulers to increase military investments, making them more successful in conflicts with other territories, and to be more successful in tying linkages with other, powerful families through strategic marriages.

The results of this paper speak to the broader literature on fiscal capacity and state consolidation. One implication of our findings is that fiscal institutions staffed with a professional bureaucracy — alongside the solution of the well-studied commitment problem in sovereign borrowing (North and Weingast, 1989; Drelichman and Voth, 2014) — are of fundamental importance in explaining the rise of modern state finances. In the context of the Holy Roman Empire, this institutional development occurred independently of the rise (or decline) of deliberative bodies such

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<sup>45</sup>To account for limited coverage of the dynasty data, we restrict the sample to (secular) territories that eventually fiscally centralize. We furthermore exclude all rulers who never had marriage-age daughters from the analysis.

<sup>46</sup>As an alternative definition of dynasty connectedness, we consider the mean “closeness” to the three closest rulers. This is the inverse of the number of degrees of separation from rulers, such that no connected rulers implies a closeness of 0, and being married to a ruler implies a closeness of 1. To account for ruler land holdings, we weight these closeness values with the number of cities the closest (second-closest, third-closest) ruler commands over. Appendix Table A.7 and Appendix Figure A.7 presents results, which are comparable.

as Parliaments or Estates: the external military threat of the Ottoman Empire, instead, provided a major impetus to the introduction of permanent fiscal structures. Our findings suggest that investments in building fiscal capacity play a crucial role in the development process (Besley and Persson, 2011, 2013); empirical studies of other historical trajectories will shed further light on the nexus between bureaucracy, taxation, and state consolidation.

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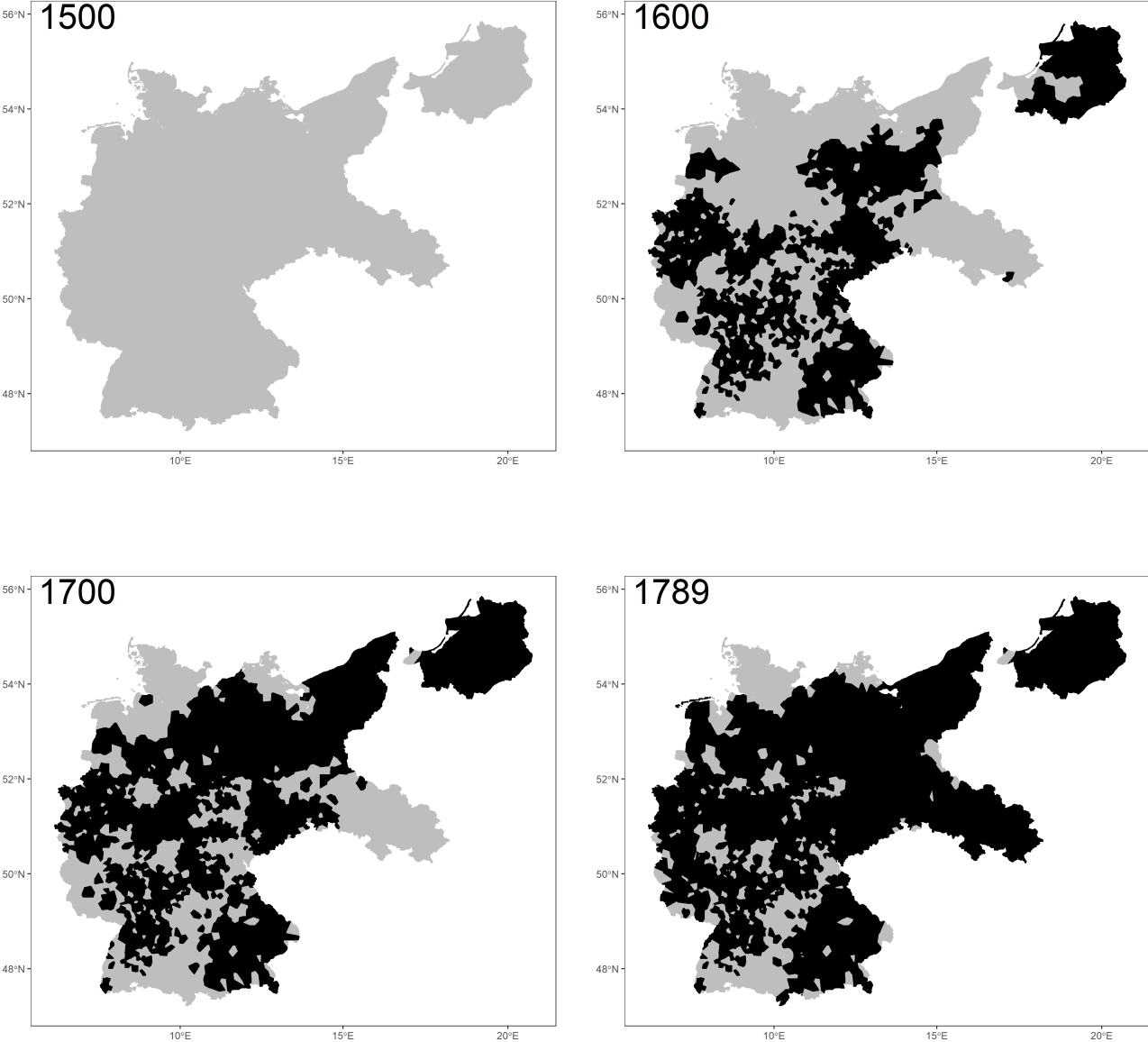
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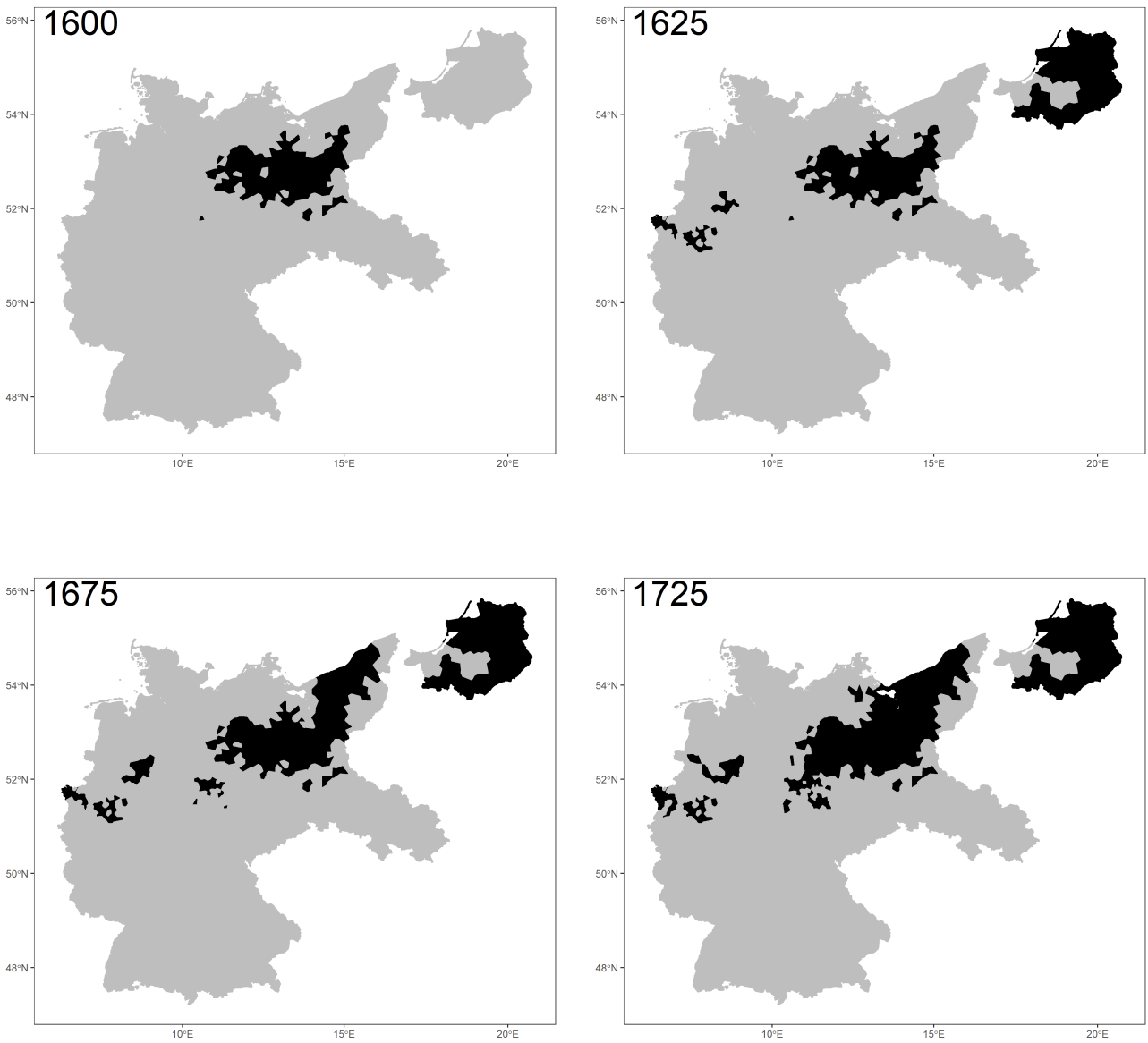
# Figures

Figure 1: Fiscally Centralized Territories



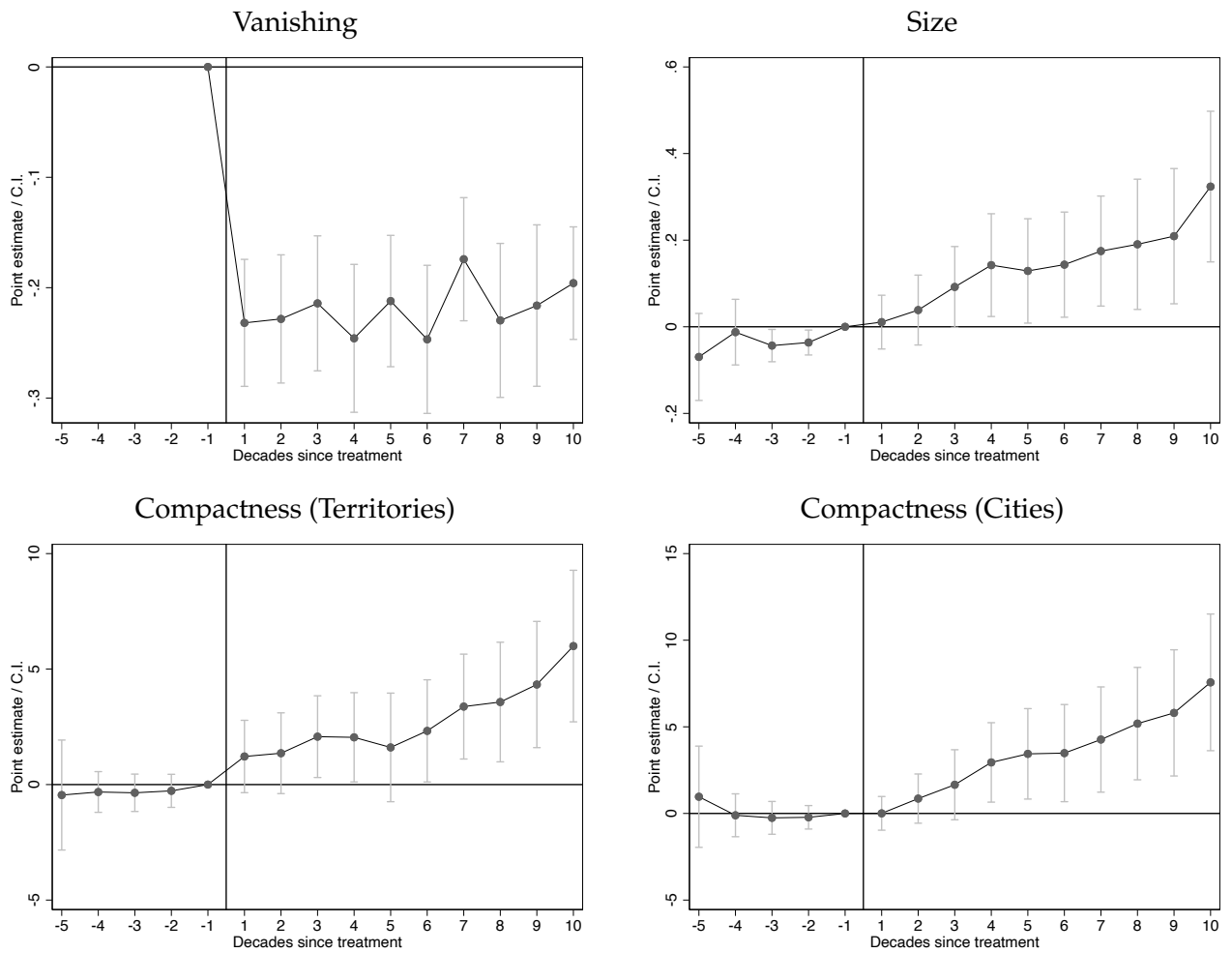
**Note** The maps show the area covered by fiscally centralized territories in the years 1500, 1600, 1700, and 1789. Data sources: see text

Figure 2: Brandenburg, 1600-1725



**Note** The maps show the area governed by the dynasty ruling Brandenburg(-Prussia) between the years 1600 and 1725. Data sources: see text

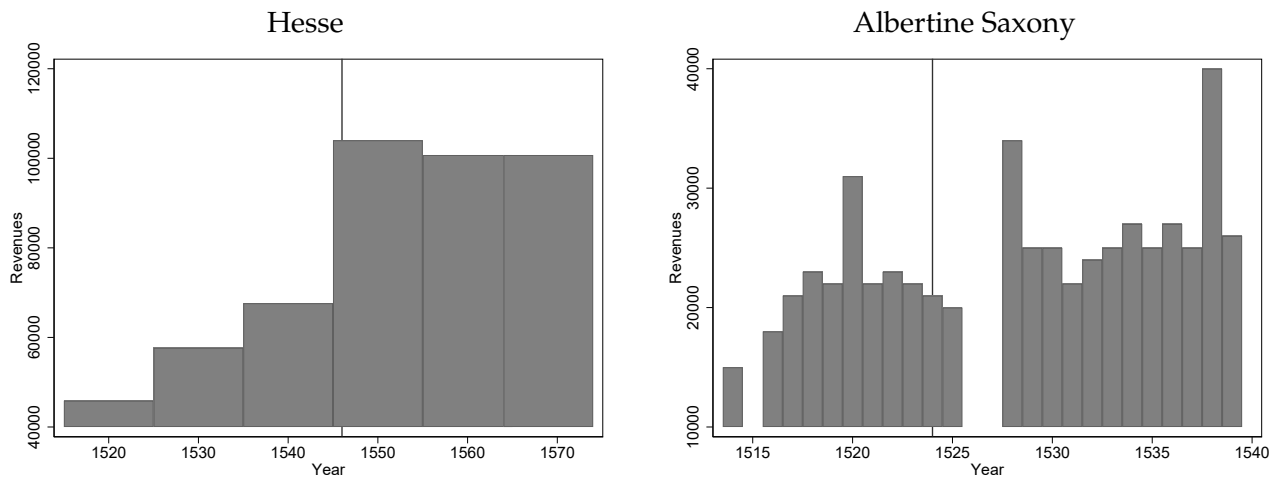
Figure 3: Territorial Consolidation Event Studies



**Note** The plot shows results of an event study regression of the effect of fiscal centralization on territorial survival, size, and compactness over time, with 95 percent confidence intervals. Observations are at the territory-year level for all panels but "Compactness (Cities)", which is at the city-year level. Standard errors are clustered at territory level. Data sources: see text

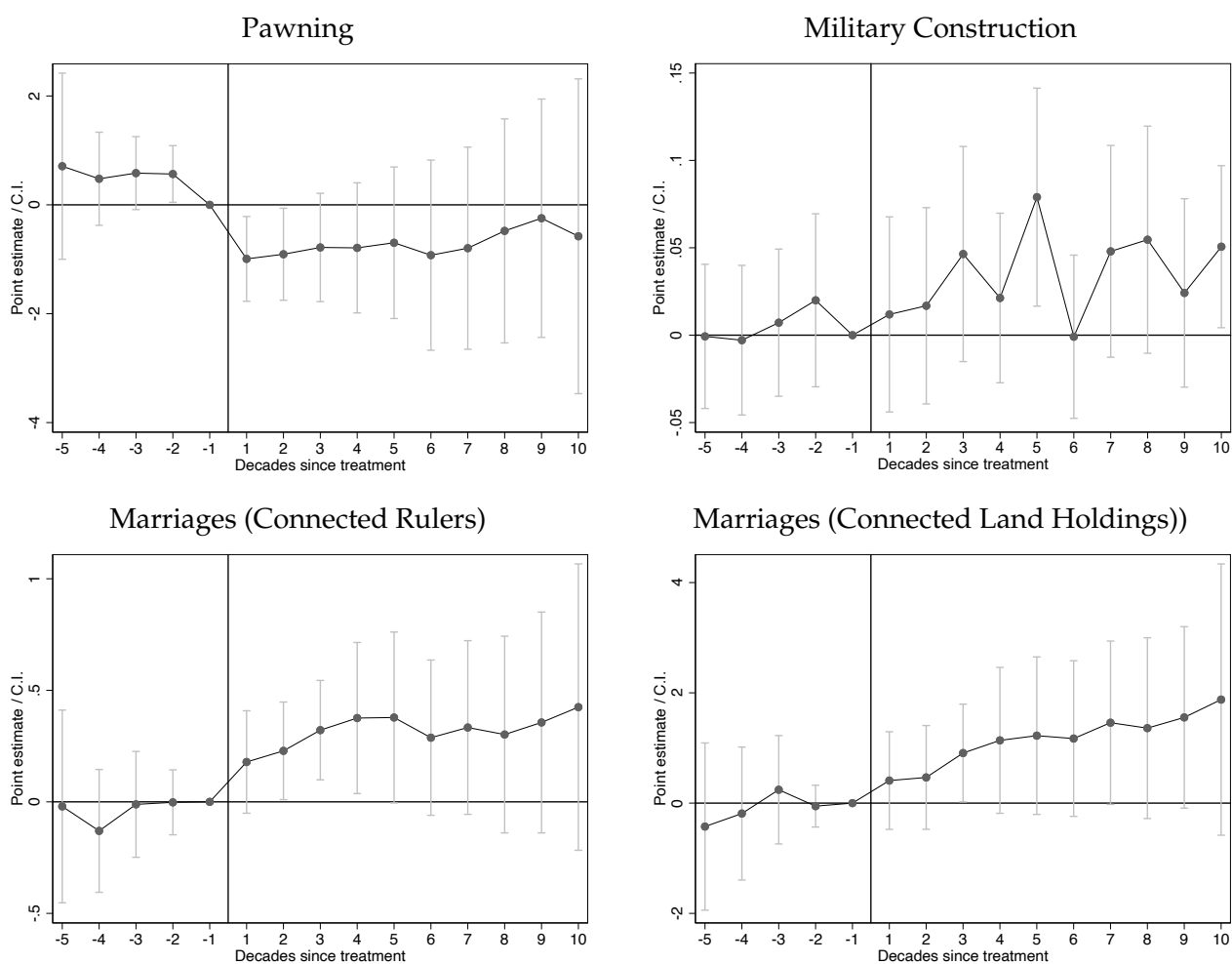


Figure 4: Revenues



**Note** The plot shows revenues in Hesse and Albertine Saxony before and after the introduction of a Chamber. Data sources: see text

Figure 5: Mechanisms Event Studies



**Note** The plot shows results of an event study regression of the effect of fiscal centralization on pawning of cities, military construction, and ruler daughters' marriage gains, with 95 percent confidence intervals. Observations are at the city-year level for the top panels, and at the territory-year level for the bottom panels. Standard errors are clustered at territory level. Data sources: see text

## Tables

Table 1: Dates of Fiscal Centralization

Territory	Year	Name	Selected Sources
Margraviate of Baden-Baden	1588	Rentkammer	Carlebach (1906, p. 43)
Margraviate of Baden-Durlach	1578	Rentkammer	Taddey (2000, p. 168)
Prince-Bishopric of Bamberg	1638	Hofkammer	Caspary (1976, pp. 47-53)
Duchy of Bavaria	1550	Hofkammer	Spindler (1988, p. 378)
Principality of Bayreuth	1576	Hofkammer	Schaupp (2004, p. 171)
Margraviate of Brandenburg	1577	Amtskammer	Schultze (2004, pp. 142-3)
Duchy of Brunswick-Calenberg	1680	Kammer	Jeserich et al. (1983, p. 754)
Duchy of Brunswick-Lüneburg	1616	Kammer	Jeserich et al. (1983, p. 753)
Duchy of Brunswick-Wolfenbüttel	1636	Kammer	Jeserich et al. (1983, p. 752)
Duchy of Cleves-Mark	1557	Rechenkammer	Schottmüller (1896, p. 66)
Electorate of Cologne	1587	Hofkammer	Wüst (1987, p. 37)
Bishopric of Eichstätt	1681	Hofkammer	Braun (1991, p. 94)
Landgraviate of Hesse	1546	Rentkammer	Krüger (1980, p. 53)
Landgraviate of Hesse-Darmstadt	1590	Rentkammer	Jeserich et al. (1983, p. 648)
Landgraviate of Hesse-Marburg	1567	Rentkammer	Jeserich et al. (1983, p. 642)
Duchy of Jülich-Berg	1547	Rechenkammer	Sallmann (1902, p. 8)
Electorate of Mainz	1532	Hofkammer	Wüst (1987, p.37)
Duchy of Mecklenburg-Güstrow	1659	Kammer	Hamann (1965, p. 83)
Duchy of Mecklenburg-Schwerin	1660	Kammer	Hamann (1965, p. 83)
Duchy of Mecklenburg-Strelitz	1701	Kammer	Hamann (1965, p. 99)
Prince-Bishopric of Münster	1573	Rechenkammer	Sallmann (1965)
County of Oldenburg	1623	Rentkammer	Ahrens (2003, p. 87)
Prince-Bishopric of Paderborn	1723	Hofkammer	Jeserich et al. (1983, p. 735)
Electoral Palatinate	1557	Rechenkammer	Press (1970, p. 99-100)
Principality of Palatinate-Sulzbach	1615	Hofkammer	Jeserich et al. (1983, p. 573)
County of Reuß-Greiz	1770	Kammer	Heß (1993, p. 51)
Duchy of Saxe-Eisenach	1672	Rentkammer	Heß (1993, p. 33)
Duchy of Saxe-Gotha	1640	Kammer	Heß (1993, p. 35)
Duchy of Saxe-Hildburghausen	1680	Kammer	Jeserich et al. (1983, p. 857)
Duchy of Saxe-Meiningen	1680	Kammer	Heß (1993, p. 42)
Albertine Saxony	1524	Rentkammer	Schirmer (2006, p. 597)
Duchy of Saxe-Weimar	1633	Kammer	Heß (1993, pp. 30-31)
County of Schaumburg-Lippe	1728	Rentkammer	Schneider (1983, p. 24)
County of Schwarzburg-Rudolstadt	1707	Kammer	Müller (2012)
Electorate of Trier	1719	Hofkammer	Flach (2021)
County of Waldeck	1696	Rentkammer	Martin and Wetekam (1971, p. 229)
Duchy of Württemberg	1521	Rentkammer	Bernhardt (1971, pp. 32-33)
Bishopric of Würzburg	1553	Kammer	Reuschling (1984, pp. 232-234)

**Note** Table shows fiscally centralized territories and dates of fiscal centralization.

Table 2: Predicting Fiscal Centralization, Cross Section

	Ever Fiscally Centralized					
	(1)	(2)	(3)	(4)	(5)	(6)
Terrain Ruggedness (std.)	-1.560 (1.099)					-0.0215 (0.903)
Distance to Water (std.)	-2.282** (1.125)					-0.0144 (0.883)
Agricultural Suitability (std.)	2.618** (1.249)					0.750 (0.976)
Any Mining Activity	40.36*** (12.22)					3.026 (8.350)
In Number of Cities/Towns		9.866*** (2.245)				6.669** (2.619)
In Construction (1400–1499)		-0.458 (1.394)				-3.538*** (1.314)
In Number Markets		6.875*** (1.704)				4.430*** (1.703)
Share of Cities with Secondary Ruler			2.420 (2.592)			3.247* (1.768)
Share of Hanse Cities			5.246 (5.908)			-4.678 (4.335)
Any Attacks (1400–1499)				18.90*** (4.221)		3.832 (2.856)
Any Neighboring Military Buildings				6.420*** (1.818)		-1.910 (1.743)
Imperial Tax Contribution (std.)					16.62*** (2.168)	11.44*** (2.295)
Observations	313	313	313	313	313	313
$R^2$	0.15	0.44	0.00	0.16	0.45	0.56

**Note** Table presents results of estimating equation (1). Observations are at the territory level, for territories extant in 1500. Standard errors are robust. \*, \*\*, and \*\*\* denote significance on the 10 percent, 5 per cent, and 1 percent level, respectively. Data sources: see text

Table 3: Predicting Fiscal Centralization, Panel

	Fiscal Centralization					
	(1)	(2)	(3)	(4)	(5)	(6)
Terrain Ruggedness (std.)	-0.125 (0.201)					-0.373 (0.297)
Distance to Water (std.)	0.326** (0.162)					0.305 (0.224)
Agricultural Suitability (std.)	0.0601 (0.116)					0.213 (0.203)
Any Mining Activity	1.813 (1.507)					1.321 (1.334)
ln Number of Cities/Towns		0.460* (0.234)				0.342 (0.222)
ln Number Markets		0.174 (0.153)				0.0883 (0.157)
ln Construction, prior decade		0.477** (0.222)				0.357* (0.217)
Share of Cities with Secondary Ruler			0.152 (0.127)			0.0225 (0.133)
Share of Hanse Cities			0.158 (0.586)			-0.326 (0.741)
Any Attacks, past decade				1.261*** (0.443)		0.533 (0.416)
Any Neighb. Mil. Constr., past decade				1.095** (0.493)		0.536 (0.480)
Any Centralized Neighbors				0.627*** (0.164)		0.350** (0.150)
Contribution (std.) $\times$ ln Roman Months					0.441*** (0.118)	0.347*** (0.108)
Observations	10,555	9,794	10,555	9,794	10,555	9,794
$R^2$	0.01	0.03	0.01	0.02	0.03	0.04
baseline	✓	✓	✓	✓	✓	✓
Decade FEs	✓	✓	✓	✓	✓	✓

**Note** Table presents results of estimating equation (2). Observations are at the territory-decade level. Standard errors are clustered at the territory level. \*, \*\*, and \*\*\* denote significance on the 10 percent, 5 per cent, and 1 percent level, respectively. Data sources: see text

Table 4: Territorial Survival: Probability of Vanishing

	Extinction		Vanishing Conflict and Conquest		Purchase	
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	-0.0186 (0.0683)	-0.00378 (0.123)	-0.157*** (0.0188)	-0.184*** (0.0219)	-0.0546*** (0.0112)	-0.0500*** (0.0105)
Treated × Decades Since		-0.00171 (0.0102)		0.00307** (0.00132)		-0.000522 (0.00105)
Observations	106,446	106,446	106,446	106,446	106,446	106,446
$R^2$	0.00	0.00	0.01	0.01	0.00	0.00
Mean dep. var	0.2	0.2	0.16	0.16	0.06	0.06
Year FEs	✓	✓	✓	✓	✓	✓

**Note** Table presents results of estimating equation 3. Observations are at the territory-year level. Standard errors are clustered at the territory level. \*, \*\*, and \*\*\* denote significance on the 10 percent, 5 per cent, and 1 percent level, respectively. Data sources: see text

Table 5: Territory Size

	Single Ruler		Uncontested		All	
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	0.234*** (0.0641)	0.0823 (0.0545)	0.191*** (0.0557)	0.0489 (0.0481)	0.176*** (0.0543)	0.0541 (0.0456)
Treated × Decades Since		0.0198*** (0.00475)		0.0186*** (0.00499)		0.0160*** (0.00452)
Observations	106,946	106,946	106,946	106,946	106,946	106,946
$R^2$	0.94	0.94	0.94	0.94	0.95	0.95
Territory FEs	✓	✓	✓	✓	✓	✓
Year FEs	✓	✓	✓	✓	✓	✓

**Note** Table presents results of estimating equation (5). Observations are at the territory-year level. Standard errors are clustered at the territory level. \*, \*\*, and \*\*\* denote significance on the 10 percent, 5 per cent, and 1 percent level, respectively. Data sources: see text

Table 6: Territorial Compactness

	Domestic Border			
	Territories		Cities	
	(1)	(2)	(3)	(4)
Treated	3.821*** (1.202)	1.312 (1.035)	2.555** (1.053)	0.559 (1.016)
Treated $\times$ Decades Since		0.329*** (0.105)		0.397*** (0.139)
Observations	106,946	106,946	833,301	833,301
$R^2$	0.93	0.93	0.87	0.87
City FEs			✓	✓
Territory FEs	✓	✓	✓	✓
Year FEs	✓	✓	✓	✓

**Note** Table presents results of estimating the analogue of equation (5), considering the compactness of territory  $j$  in year  $t$  as an outcome. Observations are at the territory-year level for the first two columns, and at the city-year level for the last two columns. Standard errors are clustered at the territory level. \*, \*\*, and \*\*\* denote significance on the 10 percent, 5 per cent, and 1 percent level, respectively. Data sources: see text



Table 7: Predicted Fiscal Centralization

	Vanishing		Size		Compactness	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A: Fiscal Centralization</i>						
Treated	-0.213*** (0.0218)	-0.235*** (0.0245)	0.234*** (0.0641)	0.0823 (0.0545)	3.821*** (1.202)	1.312 (1.035)
Treated $\times$ Decades Since		0.00252 (0.00168)		0.0198*** (0.00475)		0.329*** (0.105)
<i>Panel B: Predicted Fiscal Centralization</i>						
Treated (Pred.)	-0.159*** (0.0223)	-0.188*** (0.0443)	0.315*** (0.0852)	0.191** (0.0945)	4.926** (1.924)	2.453 (2.499)
Treated (Pred.) $\times$ Decades Since		0.00375 (0.00496)		0.0164* (0.00908)		0.327* (0.192)
Observations	106,946	106,946	106,946	106,946	106,946	106,946
Territory FEs			✓	✓	✓	✓
Year FEs	✓	✓	✓	✓	✓	✓

**Note** Table presents results of estimating vanishing probability, size, and territorial compactness. Panel A presents results for actual fiscal centralization treatment. Panel B shows results for predicted values of fiscal centralization. Observations are at the territory-year level. Standard errors are clustered at the territory level. \*, \*\*, and \*\*\* denote significance on the 10 percent, 5 per cent, and 1 percent level, respectively. Data sources: see text

Table 8: Pawning

	City Put in Pawn		
	(1)	(2)	(3)
Treated	-1.316 (0.909)	-1.344* (0.768)	-1.350* (0.777)
Treated $\times$ Decades Since		0.00559 (0.0971)	0.0139 (0.0989)
At Foreign Border			1.135 (1.435)
Observations	833,299	833,299	833,299
$R^2$	0.50	0.50	0.50
City FEs	✓	✓	✓
Territory FEs	✓	✓	✓
Year FEs	✓	✓	✓

**Note** Table presents results of estimating the analogue to equation (5), considering whether city  $i$  was pawned in year  $t$  as an outcome. Observations are at the city-year level. Standard errors are clustered at the territory level. \*, \*\*, and \*\*\* denote significance on the 10 percent, 5 per cent, and 1 percent level, respectively. Data sources: see text

Table 9: Military Construction

	Military Construction				
	(1)	(2)	(3)	(4)	(5)
Treated	0.0319** (0.0140)	0.0290* (0.0154)	0.0280* (0.0154)	0.0282* (0.0154)	0.0280* (0.0154)
Treated $\times$ Decades Since		0.000586 (0.00102)	0.000604 (0.00104)	0.000666 (0.00104)	0.000609 (0.00105)
Attack, past decade			0.0281 (0.0197)	0.0280 (0.0197)	0.0281 (0.0197)
Any Neighb. Mil. Constr., past decade				-0.0149 (0.0228)	
Near Foreign Cities				0.00233 (0.00168)	
At Foreign Border					0.000757 (0.0101)
Observations	833,301	833,301	810,350	810,350	810,350
$R^2$	0.01	0.01	0.01	0.01	0.01
City FEs	✓	✓	✓	✓	✓
Territory FEs	✓	✓	✓	✓	✓
Year FEs	✓	✓	✓	✓	✓

**Note** Table presents results of the analogue to equation (5), considering military construction events in city  $i$  in territory  $j$  in year  $t$  as an outcome. Observations are at the city-year level. Standard errors are clustered at the territory level. \*, \*\*, and \*\*\* denote significance on the 10 percent, 5 per cent, and 1 percent level, respectively. Data sources: see text

Table 10: Retaining

	Change Ruler Due To			
	All (1)	Violence (2)	Purchase (3)	Extinction (4)
Treated (t-1)	-1.697 (1.275)	-0.786 (0.602)	-0.0901* (0.0510)	-0.495 (0.454)
Treated $\times$ Decades Since (t-1)	0.00859 (0.0263)	0.00203 (0.00720)	0.000792 (0.00107)	-0.0139 (0.0205)
Attack	1.135*** (0.349)	0.792*** (0.254)	-0.00189 (0.0241)	0.153 (0.177)
Attack $\times$ Treated (t-1)	-0.932** (0.416)	-0.720** (0.290)	0.00704 (0.0246)	-0.162 (0.180)
Observations	831,334	831,334	831,334	831,334
$R^2$	0.04	0.04	0.02	0.04
Mean dep. var	0.92	0.1	0.06	0.29
Military Covariates	✓	✓	✓	✓
City FEs	✓	✓	✓	✓
Territory FEs	✓	✓	✓	✓
Year FEs	✓	✓	✓	✓

**Note** Table presents results of equation (6). Observations are at the city-year level. Standard errors are clustered at the territory level. Military covariates are the natural logarithm of military buildings in a city and an indicator whether a city is located at a foreign border. \*, \*\*, and \*\*\* denote significance on the 10 percent, 5 per cent, and 1 percent level, respectively. Data sources: see text

Table 11: Marriage Gains

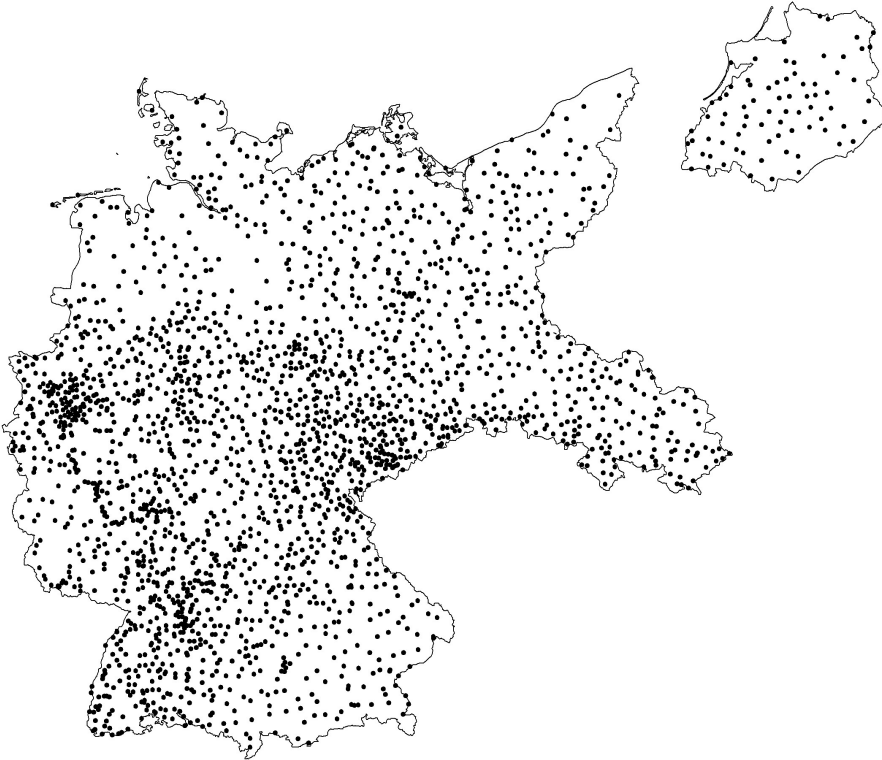
	Connectedness Gains			
	Rulers		Land Holdings	
	(1)	(2)	(3)	(4)
Treated	0.281* (0.137)	0.279* (0.157)	0.706 (0.512)	0.797 (0.582)
Treated $\times$ Decades Since		-0.000786 (0.0278)		0.0503 (0.120)
Observations	4,465	4,465	4,465	4,465
$R^2$	0.29	0.29	0.35	0.35
Territory FEs	✓	✓	✓	✓
Year FEs	✓	✓	✓	✓

**Note** Table presents results of estimating the analogue to equation (5), considering connectedness gains due to marriages for ruler daughters in territory  $j$  in year  $t$  as an outcome. The sample only includes secular territories that eventually fiscally centralize. Observations are at the territory-year level. Standard errors are clustered at the territory level. \*, \*\*, and \*\*\* denote significance on the 10 percent, 5 per cent, and 1 percent level, respectively. Data sources: see text

# A Supplementary Appendix: For Online Publication

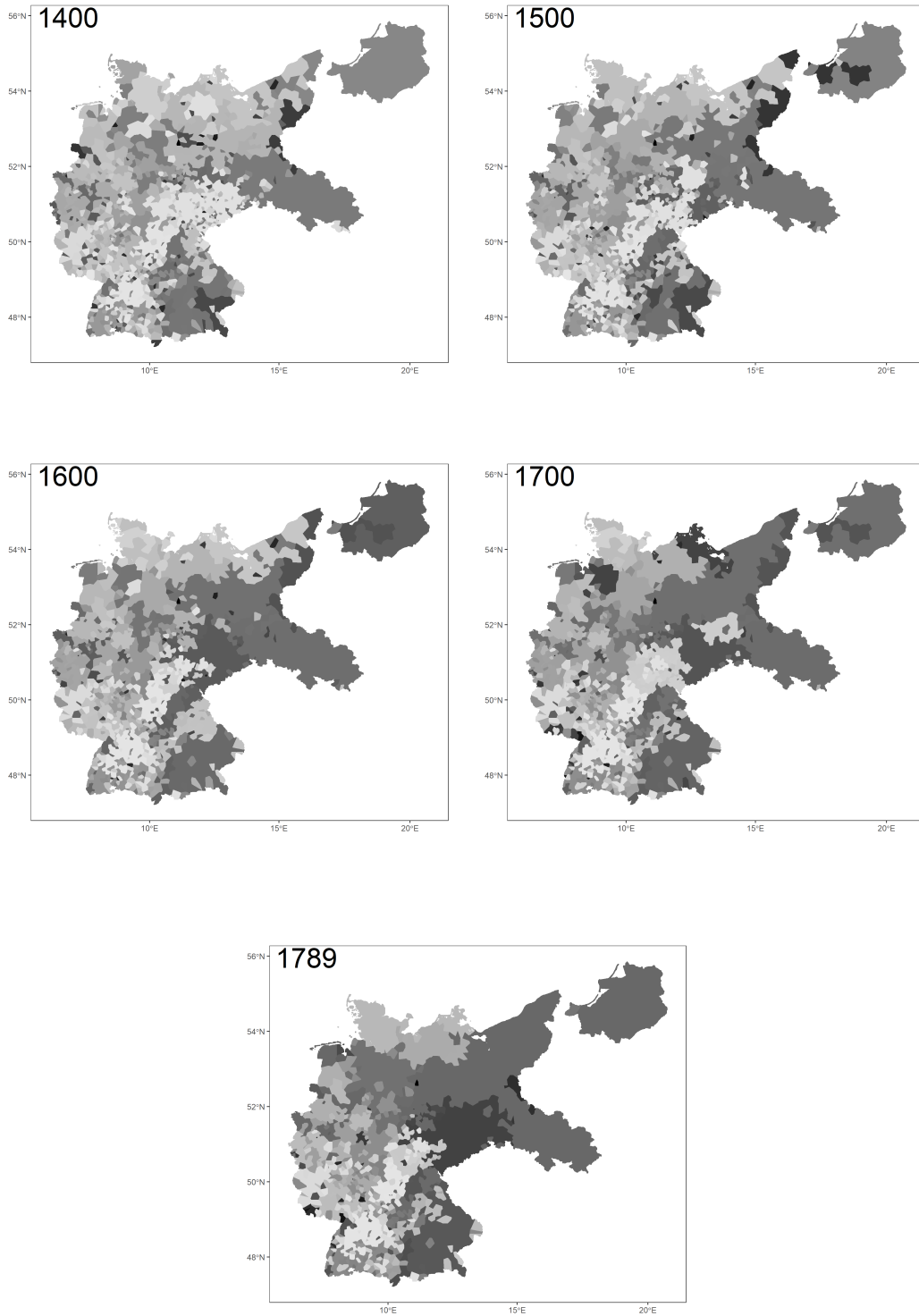
## A.1 Supplementary Graphs

Figure A.1: Locations of Cities



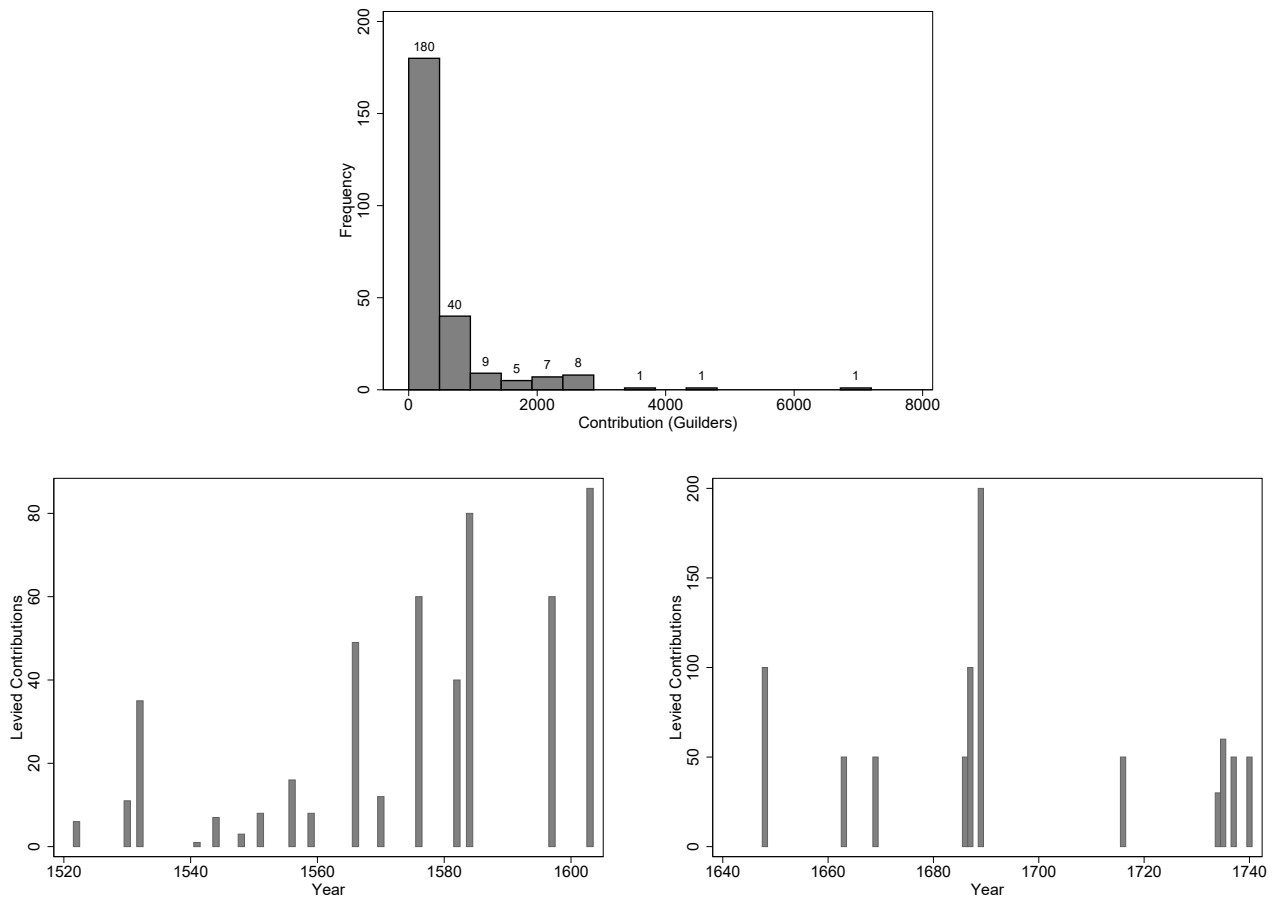
**Note** The map illustrates the location of each city in our data. Data sources: see text

Figure A.2: Territories Over Time



**Note** The maps show territorial borders for the years 1400, 1500, 1600, 1700, and 1789. To map territories, we aggregate all cities' Thiessen polygons that belong to the same territory in a given year. Data sources: see text

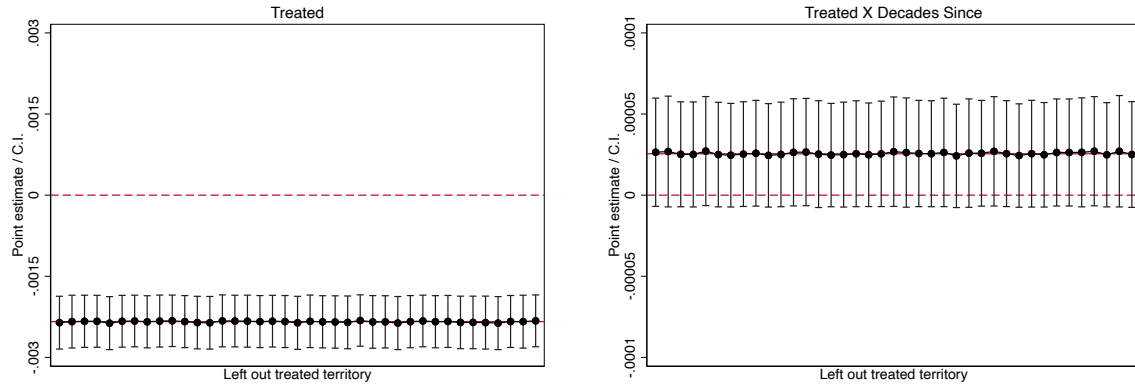
Figure A.3: Imperial Tax Contributions



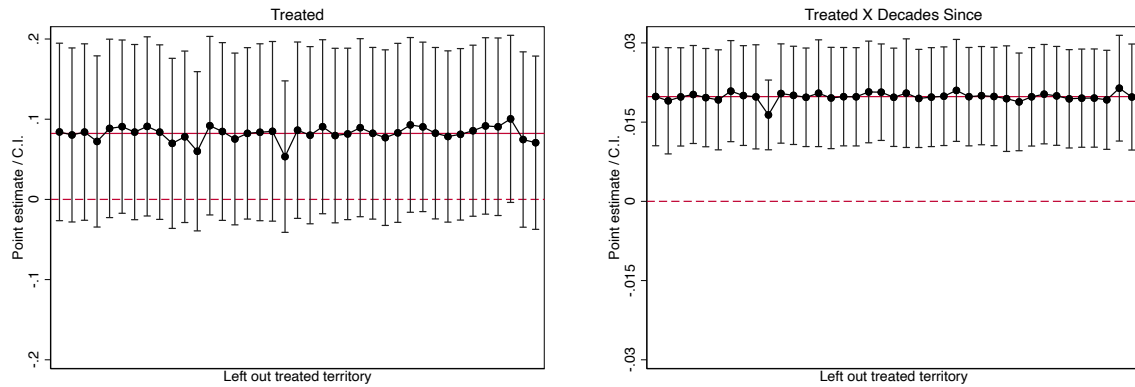
**Note** Top row shows the distribution of territories' contributions to one "Roman Month" (128,000 guilders) of Imperial Taxes in the Imperial Register of 1521. The horizontal axis denotes binned contributions. Vertical axis shows the number of territories in the respective contribution bin. Bottom row shows the size of contributions (in terms of multiples of "Roman Months") levied over time between 1521 and 1618, and between 1648 and 1789. Data sources: see text

Figure A.4: Leave-Out Coefficient Plots

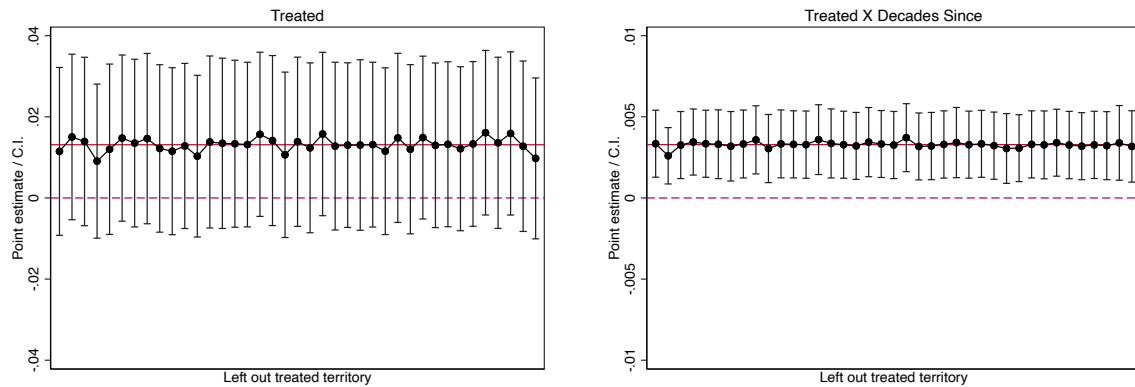
Vanishing



Size



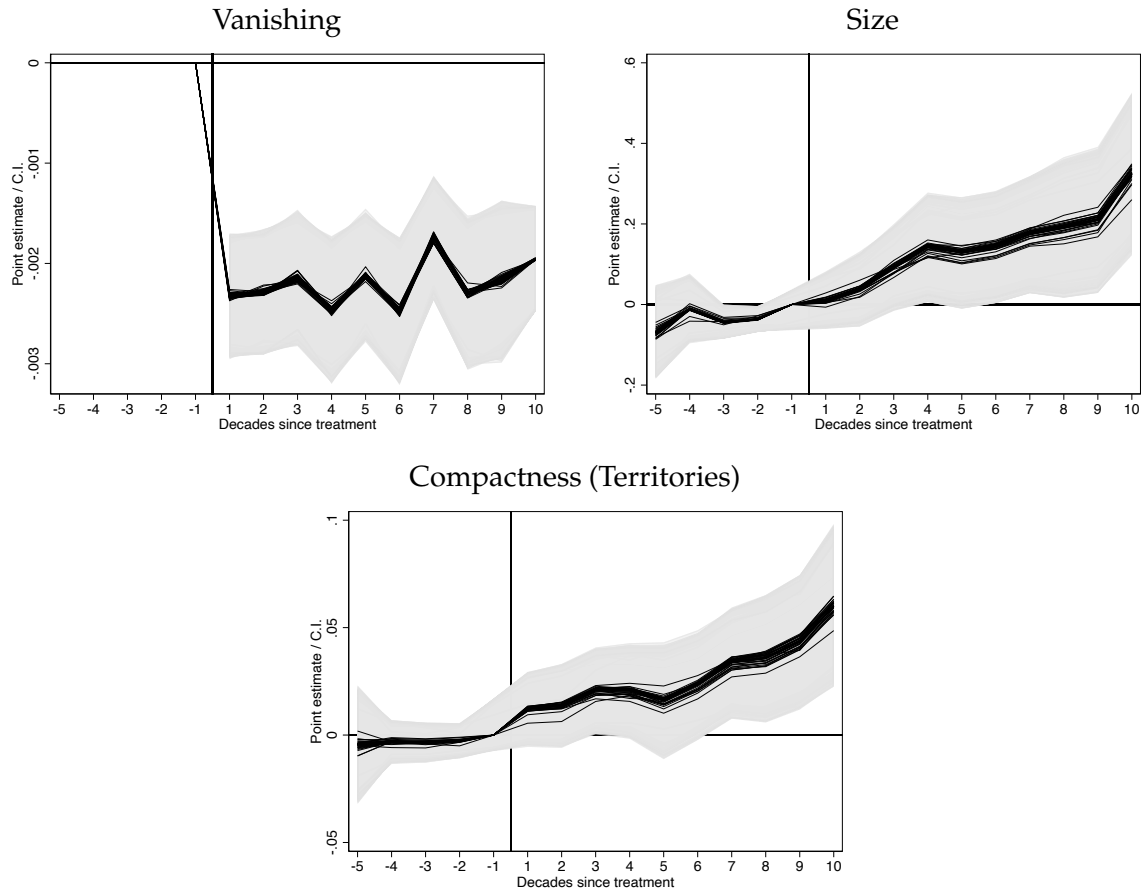
Compactness (Territories)



**Note** The plots shows results for omitting one (eventually) fiscally centralized territory at a time from the sample, with 95 percent confidence intervals. Top panel shows the probability of vanishing as in Table 4. Middle panel shows territory size as in Table 5, column 2. Bottom panel shows territorial compactness as in Table 6. Left column shows  $\beta_1$ , and right column shows  $\beta_2$ . Data sources: see text

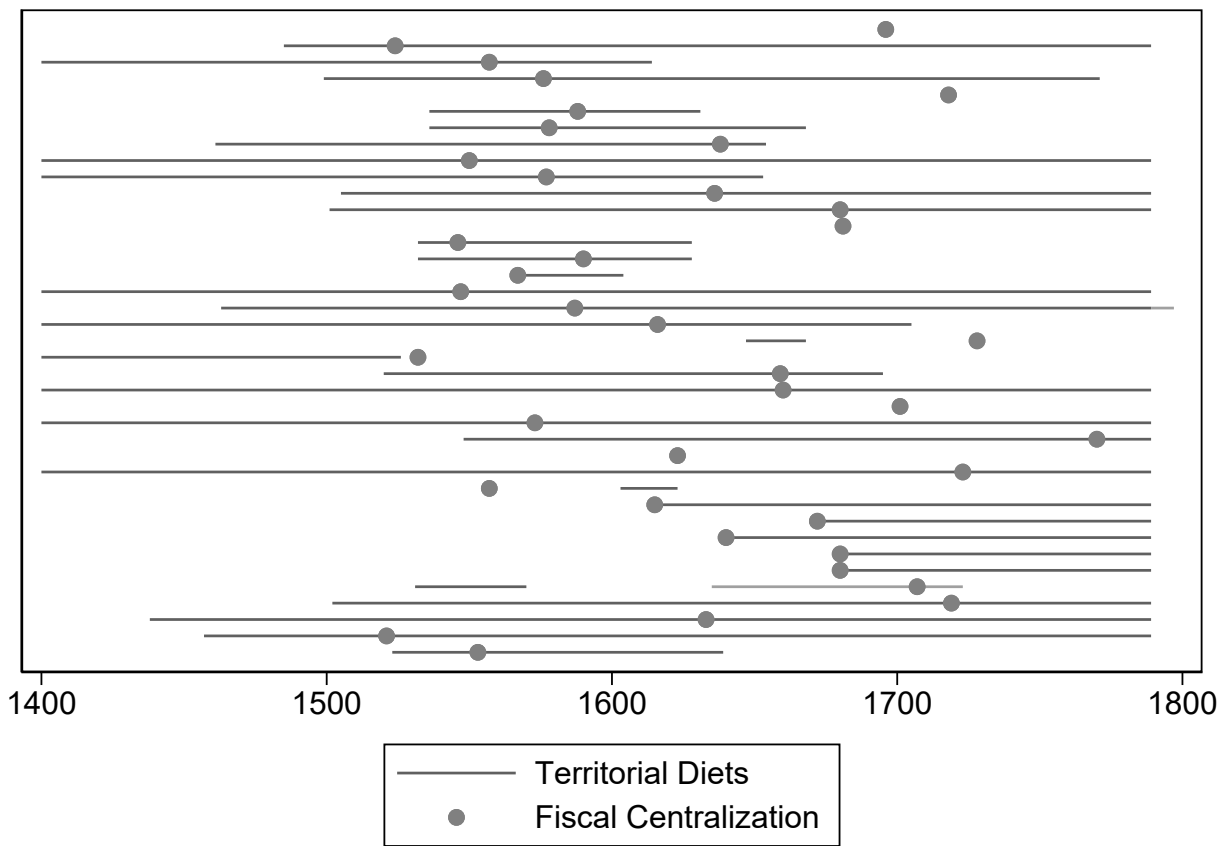


Figure A.5: Leave-Out Event Study Plots



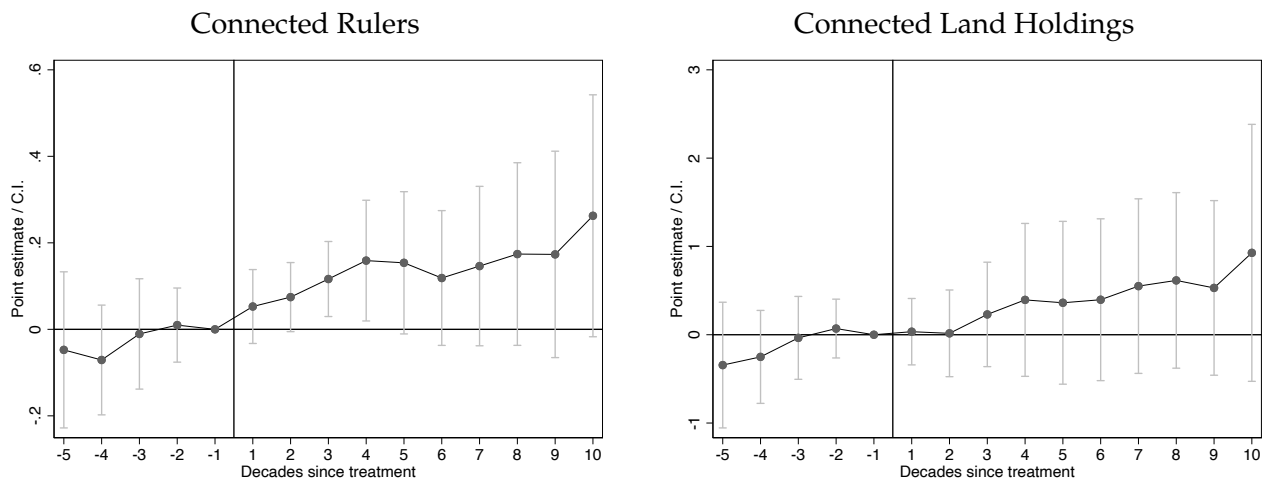
**Note** The plots shows results for omitting one (eventually) fiscally centralized territory at a time from the sample, with 95 percent confidence intervals. Panels A, B, and C correspond to their respective panels in Figure 3. Data sources: see text

Figure A.6: Activity of Estates and Fiscal Centralization



**Note** The figure shows the time period during which Estates were active, for all territories that ever fiscally centralize. Dots indicate the timing of the introduction of a Chamber. Data sources: see text

Figure A.7: Marriage Gains (Alternative Definition), Event Study



**Note** Figure presents the analogue to Panels C and D in Figure 5, considering gains in closeness to rulers instead of gains in immediate network connectedness.

## A.2 Supplementary Tables

Table A.1: Presence of Estates

Territory	Years	Selected Sources
Prince-Bishopric of Augsburg		Lanzinner (2011)
Margraviate of Baden-Baden	1536-1631	Gut (1970, p. 355)
Margraviate of Baden-Durlach	1536-1668	Gut (1970, p. 379)
Prince-Bishopric of Bamberg	1461-1654	Staudenmaier (2014)
Duchy of Bavaria	1302-1789	Folz (1974, p. 197)
Principality of Bayreuth	1499-1771	Schaupp and Schnupp (2017)
Margraviate of Brandenburg	1345-1653	Sieg (2003, p. 128)
Duchy of Brunswick-Lüneburg	1392-1789	bei der Wieden, ed (2004, p. 359)
Duchy of Brunswick-Wolfenbüttel	1505-1789	bei der Wieden, ed (2004, p. 414)
Duchy of Cleves-Mark	1347-1614	Schulze (1907, p. 18-20)
Bishopric of Eichstätt		Lanzinner (2011)
Landgraviate of Hesse	1532-1628	Siebeck (1914, p. 1)
Landgraviate of Hesse-Darmstadt	1532-1628	Siebeck (1914, p. 1)
Landgraviate of Hesse-Marburg	1567-1604	Siebeck (1914, p. 53-54)
Electorate of Mainz	1346-1526	Fischer (2010)
Duchy of Mecklenburg-Güstrow	1520-1695	Folz (1974)
Duchy of Mecklenburg-Schwerin	1279-1789	Folz (1974, p. 197)
Duchy of Mecklenburg-Strelitz	1701-1789	Folz (1974, p. 197)
Prince-Bishopric of Münster	1278-1789	Schmitz-Kallenberg (1936, p. 34-35)
County of Oldenburg		Oldenburgische Landschaft (2014, p. 80)
Electoral Palatinate	1603-1623	(Gothein, 1888, p. 39-41)
Principality of Palatinate-Sulzbach	1615-1789	Rösel (2010)
County of Reuß-Greiz	1548-1789	Espig (2008, p. 265)
Duchy of Saxe-Eisenach	1674-1789	Schirmer (2008, p. 61-64)
Duchy of Saxe-Gotha	1640-1789	Stievermann (2008)
Duchy of Saxe-Hildburghausen	1680-1789	Witter (2008, p. 253-258)
Duchy of Saxe-Meiningen	1680-1789	Witter (2008, p. 239-241)
Albertine Saxony	1485-1789	Sächsischer Landtag (2021)
Duchy of Saxe-Weimar	1438-1789	Sächsischer Landtag (2021)
County of Schaumburg-Lippe	1647-1668	von Stieglitz (2004, p. 391-404)
Electorate of Trier	1502-1789	Dillinger (2009)
County of Waldeck	1607-1789	Hufnagel (1924, p. 125)
Duchy of Württemberg	1457-1789	Baden-Württemberg (2008)
Bishopric of Würzburg	1523-1639	Neumaier (2010)

**Note** Table shows fiscally centralized territories and years of Estate activity. If 1789 is given as the end date, this means that Estates existed until at least the year 1789.

Table A.2: Predicting Fiscal Centralization, Alternative Specifications

	Fiscal Centralization						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Terrain Ruggedness (std.)	-0.373 (0.297)	-0.373 (0.297)	-0.257 (0.411)	-0.278 (0.474)	-0.192 (0.838)	0.0216 (0.471)	-0.938 (1.182)
Distance to Water (std.)	0.305 (0.224)	0.305 (0.224)	0.385 (0.275)	0.811** (0.366)	1.649*** (0.419)	0.316 (0.253)	2.787*** (0.978)
Agricultural Suitability (std.)	0.213 (0.203)	0.213 (0.203)	0.148 (0.287)	0.230 (0.358)	0.269 (0.717)	0.240 (0.380)	0.944 (1.147)
Any Mining Activity	1.321 (1.334)	1.321 (1.334)	2.388 (1.988)	2.156 (1.984)	2.449*** (0.794)	-0.616 (0.504)	-0.630 (1.021)
In Number of Cities/Towns	0.342 (0.222)	0.342 (0.222)	0.358 (0.219)	-0.0377 (0.279)	0.809 (0.633)	1.069 (0.908)	1.283 (0.934)
In Number Markets	0.0883 (0.157)	0.0883 (0.157)	0.142 (0.203)	0.403* (0.239)	0.170 (0.907)	0.453 (0.390)	1.249** (0.544)
In Construction, prior decade	0.357* (0.217)	0.357* (0.217)	0.549** (0.224)	0.504** (0.243)	0.291 (0.380)	0.228 (0.194)	0.577 (0.496)
Share of Cities with Secondary Ruler	0.0225 (0.133)	0.0225 (0.133)	-0.0958 (0.157)	-0.122 (0.206)	-0.0340 (1.487)	-0.366 (0.304)	-0.864 (0.742)
Share of Hanse Cities	-0.326 (0.741)	-0.326 (0.741)	-0.324 (0.602)	-0.945 (0.936)	0.636 (3.590)	1.366 (2.603)	2.791 (3.656)
Any Attacks, past decade	0.533 (0.416)	0.533 (0.416)	0.499 (0.464)	0.683* (0.405)	0.224 (0.528)	0.450* (0.256)	0.929* (0.500)
Any Neighb. Mil. Constr., past decade	0.536 (0.480)	0.536 (0.480)	0.502 (0.529)	0.521 (0.489)	-0.0282 (0.408)	-0.0780 (0.362)	-0.213 (0.761)
Any Centralized Neighbors	0.350** (0.150)	0.350** (0.150)	0.247 (0.178)	0.463* (0.269)	1.486 (1.033)	0.126 (0.557)	0.128 (0.715)
Contribution (std.) × In Roman Months	0.347*** (0.108)	0.347*** (0.108)	0.361*** (0.113)	0.470*** (0.131)	0.132*** (0.0397)	0.233** (0.100)	0.212*** (0.0493)
Observations	9,794	9,794	7,560	9,851	9,794	9,191	9,191
Model	OLS	OLS	OLS	OLS	Cox	OLS	Cox
Territories	all	all	1500	all	all	all	all
R <sup>2</sup>	0.0417	0.0417	0.0620	0.167		0.0129	
Baseline	✓	✓	✓		✓		
Territory FEs				✓			
Decade FEs	✓	✓	✓	✓		✓	
First Differences						✓	✓

**Note** Table presents results of estimating equation (2) in different specifications. Observations are at the territory-decade level. Standard errors are clustered at the territory level. \*, \*\*, and \*\*\* denote significance on the 10 percent, 5 per cent, and 1 percent level, respectively. Data sources: see text

Table A.3: Predicting Fiscal Centralization, First Years in Office

	Fiscal Centralization			
	(1)	(2)	(3)	(4)
First Five Years in Office	0.899** (0.445)	0.473 (0.435)	1.547*** (0.333)	0.320 (0.368)
Observations	2,936	2,675	2,944	2,675
Model	OLS	OLS	Cox	Cox
$R^2$	0.02	0.12		
Predictors		✓		✓
Baseline		✓		✓
Decade FEs	✓	✓		

**Note** Table presents results of estimating equation (2) with an additional vector  $FirstYearsInOffice_{jt}$ . Observations are at the territory-decade level. The sample is composed of all territory-decades which are also in the nobility network; thus, the sample size is considerably reduced compared to all territory-decades. We include all predictors from Table 3 and their baseline values where indicated. Standard errors are clustered at the territory level. \*, \*\*, and \*\*\* denote significance on the 10 percent, 5 per cent, and 1 percent level, respectively. Data sources: see text

Table A.4: Territorial Survival: Probability of Vanishing, Cox Model

	Vanishing					
	Extinction		Conflict and Conquest		Purchase	
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	-0.0782 (0.338)	-0.170 (0.509)	-34.13*** (0.218)	-34.08*** (0.261)	-34.14*** (0.263)	-34.08*** (0.288)
Treated $\times$ Decades Since		0.0129 (0.0477)		-0.00690 (0.0247)		-0.00797 (0.0246)
Observations	106,446	106,446	106,446	106,446	106,446	106,446

**Note** Table presents results of estimating equation (3) in a Cox model without year fixed effects. Observations are at the territory-year level. Standard errors are clustered at the territory level. \*, \*\*, and \*\*\* denote significance on the 10 percent, 5 per cent, and 1 percent level, respectively. Data sources: see text

Table A.5: Territorial Survival: Probability of Vanishing, 1500 Territories

	Extinction		Vanishing Conflict and Conquest		Purchase	
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	0.0879 (0.0880)	0.0894 (0.175)	-0.111*** (0.0180)	-0.154*** (0.0270)	-0.0398*** (0.0115)	-0.0280** (0.0112)
Treated × Decades Since		-0.000153 (0.0135)		0.00448*** (0.00154)		-0.00120 (0.00134)
Observations	80,853	80,853	80,853	80,853	80,853	80,853
$R^2$	0.01	0.01	0.01	0.01	0.01	0.01
Mean dep. var	0.1	0.1	0.07	0.07	0.03	0.03
Year FEs	✓	✓	✓	✓	✓	✓

**Note** Table presents results of estimating equation (3) for the subset of territories that exist in 1500. Observations are at the territory-year level. Standard errors are clustered at the territory level. \*, \*\*, and \*\*\* denote significance on the 10 percent, 5 per cent, and 1 percent level, respectively. Data sources: see text

Table A.6: Territorial Survival: Probability of Vanishing, Territory FEs

	Extinction		Vanishing Conflict and Conquest		Purchase	
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	0.114 (0.126)	0.148 (0.162)	-0.160*** (0.0262)	-0.120*** (0.0221)	-0.0613*** (0.0148)	-0.0295*** (0.0101)
Treated × Decades Since		-0.00453 (0.0106)		-0.00530*** (0.00180)		-0.00417** (0.00167)
Observations	106,446	106,446	106,446	106,446	106,446	106,446
$R^2$	0.03	0.03	0.07	0.07	0.06	0.06
Mean dep. var	0.2	0.2	0.16	0.16	0.06	0.06
Territory FEs	✓	✓	✓	✓	✓	✓
Year FEs	✓	✓	✓	✓	✓	✓

**Note** Table presents results of estimating equation (3) for the subset of territories that exist in 1500. Observations are at the territory-year level. Standard errors are clustered at the territory level. \*, \*\*, and \*\*\* denote significance on the 10 percent, 5 per cent, and 1 percent level, respectively. Data sources: see text



Table A.7: Marriage Gains (Alternative Connectedness Measure)

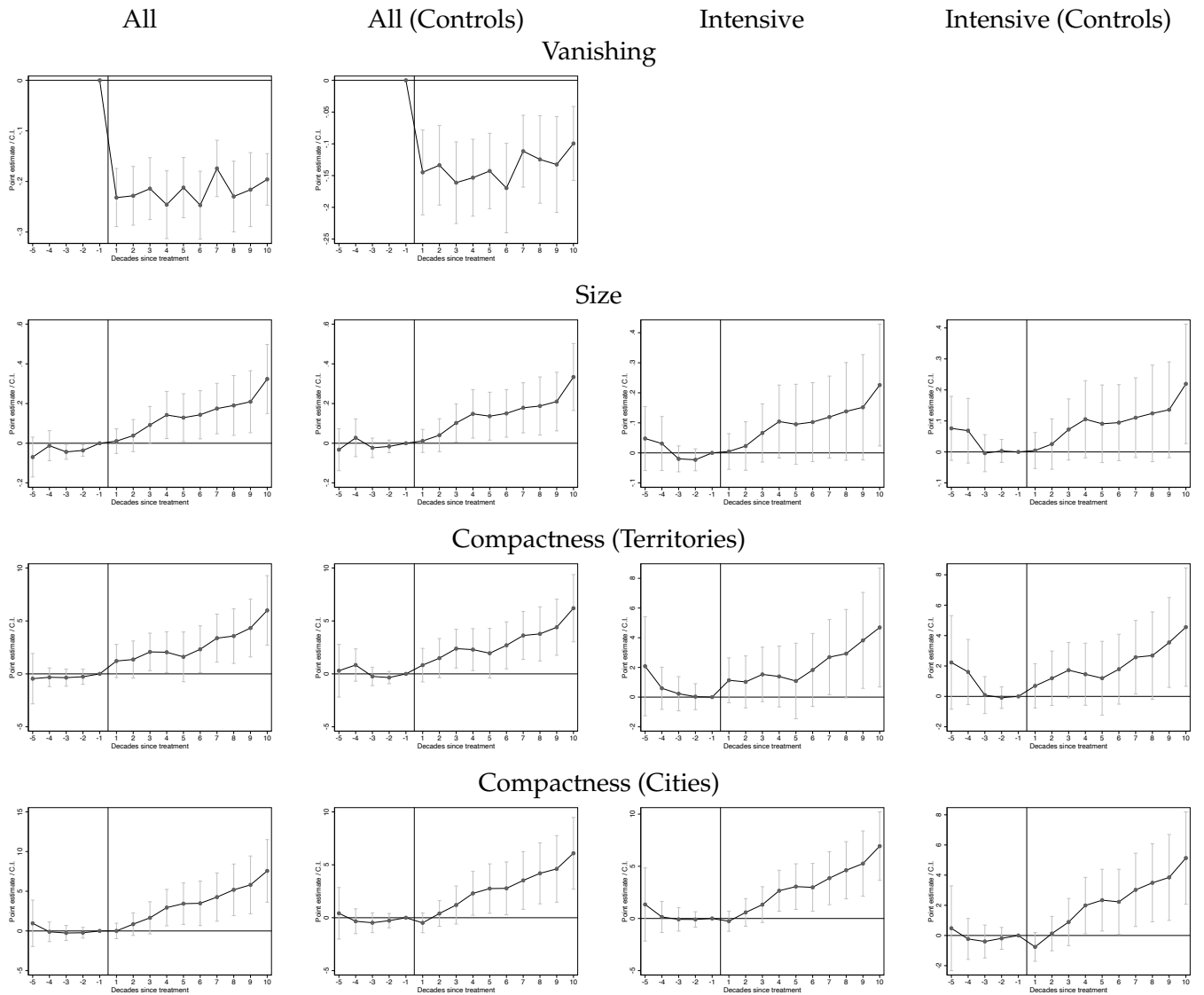
	Connectedness Gains			
	Rulers		Land Holdings	
	(1)	(2)	(3)	(4)
Treated	0.0920*	0.108*	0.162	0.355
	(0.0520)	(0.0599)	(0.281)	(0.293)
Treated $\times$ Decades Since		0.00858		0.107
		(0.0123)		(0.0763)
Observations	4,465	4,465	4,465	4,465
$R^2$	0.34	0.34	0.56	0.58
Territory FEs	✓	✓	✓	✓
Year FEs	✓	✓	✓	✓

**Note** Table presents the analogue to Table 11, considering gains in closeness to rulers instead of gains in immediate network connectedness.

# B Intensive Margin and Controls

## B.1 Figures

Figure B.1: Territorial Consolidation, Intensive Margin and Controls



**Note** Figure shows the equivalent of Figure 3 in the first row. Second row shows results from including controls in the estimation. Third row shows results from only considering territories that ever fiscally centralize. Fourth row shows results for the intensive margin, including controls.

## B.2 Intensive Margin Tables

Table B.1: Territory Size, Intensive Margin

	Single Ruler		Uncontested		All	
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	0.0307 (0.0574)	0.0294 (0.0577)	0.0159 (0.0568)	0.0148 (0.0567)	0.0194 (0.0555)	0.0184 (0.0559)
Treated $\times$ Decades Since		0.0204*** (0.00700)		0.0183*** (0.00663)		0.0151** (0.00627)
Observations	9,534	9,534	9,534	9,534	9,534	9,534
$R^2$	0.94	0.94	0.95	0.95	0.95	0.95
Territory FEs	✓	✓	✓	✓	✓	✓
Year FEs	✓	✓	✓	✓	✓	✓

**Note** Table shows the equivalent of Table 5, including only intensive-margin territories into the analysis.

Table B.2: Territorial Compactness, Intensive Margin

	Domestic Border			
	Territories		Cities	
	(1)	(2)	(3)	(4)
Treated	0.282 (1.164)	0.259 (1.127)	0.719 (0.975)	-0.150 (0.999)
Treated $\times$ Decades Since		0.383* (0.199)		0.405** (0.174)
Observations	9,534	9,534	670,375	670,375
$R^2$	0.92	0.92	0.85	0.85
City FEs			✓	✓
Territory FEs	✓	✓	✓	✓
Year FEs	✓	✓	✓	✓

**Note** Table shows the equivalent of Table 6, including only intensive-margin territories into the analysis.

### B.3 Controls

Table B.3: Territorial Survival: Probability of Vanishing, OLS Model (Controls)

	Extinction		Vanishing Conflict and Conquest		Purchase	
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	-0.105 (0.0793)	-0.0627 (0.129)	-0.0920*** (0.0212)	-0.121*** (0.0216)	-0.0332*** (0.0110)	-0.0351*** (0.0118)
Treated × Decades Since		-0.00493 (0.0108)		0.00336** (0.00138)		0.000221 (0.00119)
Observations	98,997	98,997	98,997	98,997	98,997	98,997
R <sup>2</sup>	0.00	0.00	0.01	0.01	0.00	0.00
Mean dep. var	0.2	0.2	0.16	0.16	0.06	0.06
Controls	✓	✓	✓	✓	✓	✓
Year FEs	✓	✓	✓	✓	✓	✓

**Note** Table shows the equivalent of Table 4, including controls into the analysis.

Table B.4: Territory Size (Controls)

	Single Ruler		Uncontested		All	
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	0.207*** (0.0595)	0.0543 (0.0484)	0.163*** (0.0495)	0.0229 (0.0396)	0.149*** (0.0486)	0.0285 (0.0382)
Treated × Decades Since		0.0203*** (0.00444)		0.0185*** (0.00458)		0.0160*** (0.00417)
Observations	99,443	99,443	99,443	99,443	99,443	99,443
R <sup>2</sup>	0.95	0.95	0.95	0.95	0.96	0.96
Controls	✓	✓	✓	✓	✓	✓
Territory FEs	✓	✓	✓	✓	✓	✓
Year FEs	✓	✓	✓	✓	✓	✓

**Note** Table shows the equivalent of Table 5, including controls into the analysis.

Table B.5: Territorial Compactness (Controls)

	Domestic Border			
	Territories		Cities	
	(1)	(2)	(3)	(4)
Treated	3.390*** (1.167)	0.846 (1.019)	1.907** (0.937)	0.422 (0.943)
Treated × Decades Since		0.337*** (0.101)		0.304*** (0.118)
Observations	99,443	99,443	810,350	810,350
$R^2$	0.93	0.93	0.88	0.88
Controls	✓	✓	✓	✓
City FEs			✓	✓
Territory FEs	✓	✓	✓	✓
Year FEs	✓	✓	✓	✓

**Note** Table shows the equivalent of Table 6, including controls into the analysis.

Table B.6: Territory Size, Intensive Margin (Controls)

	Single Ruler		Uncontested		All	
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	0.00889 (0.0474)	0.00864 (0.0468)	-0.00735 (0.0424)	-0.00758 (0.0414)	-0.00186 (0.0426)	-0.00204 (0.0424)
Estates	-0.153* (0.0871)	-0.118 (0.0842)	-0.122 (0.0828)	-0.0903 (0.0794)	-0.105 (0.0782)	-0.0791 (0.0759)
Treated $\times$ Decades Since		0.0180*** (0.00565)		0.0163*** (0.00525)		0.0131** (0.00503)
Observations	9,099	9,099	9,099	9,099	9,099	9,099
$R^2$	0.95	0.95	0.96	0.96	0.96	0.96
Controls	✓	✓	✓	✓	✓	✓
Territory FEs	✓	✓	✓	✓	✓	✓
Year FEs	✓	✓	✓	✓	✓	✓

**Note** Table shows the equivalent of Table 5, including only intensive-margin territories into the analysis, and including controls.

Table B.7: Territorial Compactness, Intensive Margin (Controls)

	Domestic Border			
	Territories		Cities	
	(1)	(2)	(3)	(4)
Treated	0.132 (1.079)	0.127 (1.045)	0.219 (0.889)	-0.222 (0.938)
Estates	-1.318 (1.249)	-0.622 (1.225)	-2.084 (1.533)	-1.820 (1.549)
Treated $\times$ Decades Since		0.357* (0.199)		0.224 (0.149)
Observations	9,099	9,099	651,839	651,839
$R^2$	0.93	0.93	0.86	0.86
Controls	✓	✓	✓	✓
City FEs			✓	✓
Territory FEs	✓	✓	✓	✓
Year FEs	✓	✓	✓	✓

**Note** Table shows the equivalent of Table 6, including only intensive-margin territories into the analysis, and including controls.