Rulers on the Road: Itinerant Rule in the Holy Roman Empire, AD 919–1519

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Abstract

Itinerant rule, rule exercised through traveling, was a common, yet insufficiently researched pre-modern form of governance. Studying the determinants of ruler itineraries in the Holy Roman Empire AD 919–1519, we argue that rulers focused on monitoring "marginal" elites. Powerful rulers could count on family members and thus targeted unrelated local elites. Weak emperors had to monitor their less loyal relatives and left unrelated nobles unvisited. We reconstruct emperors' itineraries from 72'665 dated and geolocated documents and measure territorial control by their relatives. Exploiting the weakening of imperial power through the Great Interregnum (1250–1273), we find that strong, pre-1250 emperors frequented areas controlled by their relatives relatively less. In contrast, family control increased visits post-1273. Causal identification rests on the discontinuous reduction of emperors' power through the Great Interregnum and differences in family relations between subsequent emperors. The results show strategic itinerant rule as an important but understudied form of governance.

The data and materials required to verify the computational reproducibility of the results, procedures and analyses in this article we be available on the American Journal of Political Science Dataverse within the Harvard Dataverse Network upon publication of the article.

Keywords: State formation; itinerant rule; Europe; Holy Roman Empire; Great Interregnum

Word count: 9'937

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Medieval European monarchs faced the same problem as authoritarian rulers today: how to monitor and keep in line the powerful individuals who prop up their rule, their "winning coalition" (Bueno de Mesquita 2005; Svolik 2012). But they did so under vastly different circumstances. Medieval monarchies were "dynastic" and "composite" states. Their vast array of local laws, rights, and institutions (Gustafsson 1998, Te Brake 1998, 14-21; Nexon 2009) was held together by the monarch and his family (Sharma 2015, 2017; Kokkonen et al. 2021). Medieval monarchs could not rely on a centralized administration but constantly moved around to maintain and execute their rule, bringing along their courts as the rudiments of the state and acting as roving judges (Boucoyannis 2021). It was an age of "lordship on the march" (Bartlett 2000, 143) where travel was slow and costly and distance "public enemy number one" (Braudel 1993, xx).

The proliferating research on European state formation clearly recognizes that medieval administrations were rudimentary by modern standards. Across Europe, power depended on negotiated relationships between rulers and their elite groups while geography constrained political development (Ertman 1997; Blaydes and Chaney 2013; Boix 2015; Boucoyannis 2021; Abramson 2017; Acemoglu and Robinson 2019; Stasavage 2020; Grzymała-Busse 2023*b*,*a*). Representative institutions for example first arose in small polities where elites could congregate easily (Blockmans 1978; Stasavage 2010; Møller 2017). Yet, most recent quantitative historical analyses brush over the non-territorial character of states where governance required rulers' presence, using, for example, state-level indicators of state capacity or borders as states' demarcations (Blaydes and Chaney 2013; Boix 2015; Abramson 2017; Bueno de Mesquita and Bueno de Mesquita 2023; Abramson and Rivera 2016; Kokkonen, Møller and Sundell 2022). We address this issue by studying medieval itinerant rule and ask how rulers allocated their presence across their realm.

The lack of attention to itinerant rule in previous studies is unfortunate for several reasons. First, almost all larger European monarchies were itinerant in the period studied in this paper (SI A, p. 1). Second, ignoring itinerant rule comes with an implicit projection of the modern concept of territorial, bounded, and impersonal statehood onto a past where rulers' presence often carried political authority. Third, studying itinerant rule can shed light on how rulers controlled local elites more directly than is often possible even in modern states. Although historical and contemporary authoritarian regimes differ in many regards, both need to maintain power coalitions and navigate principal-agent relations (Kokkonen et al. 2021).

The neglect of itinerant rule is also troubling elsewhere, as a large part of non-European monarchies practiced itinerant rule (SI A, p. 4). Historically, itinerant rule was practiced by Achaemenid kings of ancient Persia as well as Genghis Khan's Mongolian Empire and its successor states (Durand-Guédy 2013; Atwood 2015). 14$^{\text{th}}$-century Javanese emperors, 18$^{\text{th}}$-century Moroccan Sultans, and British colonial officers all governed traveling (Geertz 1977; Peyer 1964; Lugard 1926). In fact, political leaders still travel extensively – in 2023, US President Joseph Biden traveled on 30% of all days.[1] Subject of IR literature, international trips often pursue security and economic interests (Lebovic and Saunders 2016), increase leaders' public approval abroad (Goldsmith, Horiuchi and Matush 2021), and shore up visited governments (Malis and Smith 2021). Within states, presidential travels have been studied in electoral contexts as often targeting swing constituencies (Hoddie and Routh 2004; Sellers and Denton 2006; Mellen Jr and Searles 2013). Internal travels are thus important even for modern governance which can rely on relatively centralized bureaucracies.[2] Rulers' travels were all the more important in medieval Europe where centralized institutions were lacking entirely.

So where did itinerant rulers travel in medieval Europe? How did monarchs decide which localities to visit, given that they could not cover their entire realm, that they and their courts often traveled at a snail's pace, and knowing that visiting the wrong place at the wrong time was not only folly but potentially dangerous?

While mundane considerations like the need for the courts' upkeep affected travel patterns, we seek to understand underlying political considerations. We propose a theory of itinerant rule that conceives of monarchs and local elites as principals and their agents (e.g., Huning and Wahl 2017, 13). We argue that rulers maximized the payoff of traveling by visiting "marginal" local elites who could be induced to comply through in-person visits. Visits yielded lower payoffs for two types of non-marginal local elites: Elites whose interests were strongly aligned with the ruler's, and elites whose interests diverged so much that only permanent supervision or removal would produce compliance – actions with costs outweighing their benefits.

In an age when power was based on dynastic relations, elites' loyalty depended on family relations. Rulers' closest relatives would often make for the most trustworthy agents (Kokkonen et al. 2021), as rulers could reward them and promise them dynastic prosperity. However, their ability to do so depended on their power: Close relatives of strong rulers had comparatively few incentives to shirk and turn against them. We therefore expect strong rulers to spend less time in territories controlled by their relatives and orient their governance towards regions controlled by more "marginal," unrelated elites who could be made compliant through rulers' presence. In turn, weaker rulers faced less loyal relatives, incentivizing them to spend more time monitoring them.

We test this argument by reconstructing the itineraries of the kings and emperors of the Holy Roman Empire (HRE) between AD 919 and 1519. At the time, the HRE's center was not fixed but "simply the court of the individual who happened to be emperor at the time" (Whaley 2018, 4-5), with centralized institutions developing only slowly after the death of Maximilian I in 1519 (Johanek 2000, 296; Whaley 2018, 2). Our data includes 25 German kings and emperors, short 'rulers', of the HRE. We reconstruct their

[1] Excluding trips to Camp David and family homes, listed here.

[2] Assouad (2020), for example, analyzes how Kemal Attatürk's travels affected nation-building in Turkey.

itineraries from 72'665 historical documents or an average of 143 documents per year. The full data will be accessible via an interactive online platform vailable at https://carlmc.shinyapps.io/hre-itineraries/.

Our empirical analysis maps ruler' yearly itineraries as well as newly constructed data on the territories controlled by their relatives onto grid cells. To differentiate between strong and weak emperors, we turn to the collapse of imperial power through the Great Interregnum (1250–1273). The interregnum left the throne vacant for a quarter century, broke the power of Holy Roman emperors, and left their imperial infrastructure dilapidated (see Møller and Doucette 2022, ch. 6; Doucette 2023; Grzymała-Busse 2023*b*).

We find a negative effect of relatives' dominions on the frequency of imperial visits before 1250. However, after this juncture, emperors spent significantly more time in their relatives' territories than elsewhere. This change in travel patterns materialized immediately and discontinuously after the Great Interregnum. Our findings hold using fixed effects counterfactual estimators (Liu, Wang and Xu 2024) and in a difference-in-differences design, which accounts for potential endogeneity in relatives' territorial control. Highlighting the politico-economic logic of itinerant rule, we find that the effects of family control are largest in affluent areas and driven by close, male, and direct relatives, who were important agents of strong rulers and fierce competitors of weaker ones (Kokkonen et al. 2021).

Historical background

Itinerant rule was a method of government that characterized European monarchies throughout the Middle Ages. Whoever exercised lordship – be it kings, nobles, or bishops – had to travel their lands to govern effectively. The Salian emperors of the HRE could spend more than half their tenure on the road (Bernhardt 1993, 48), and English King John Lackland traveled about thirteen times a month (Bartlett 2000, 133). Their entourages were considerable; 300 to 1'000 people typically followed German emperors (Bernhardt 1993, 58).

Historians argue that itinerant rule was driven by the demise of central government structures of the Western Roman Empire in the 5th century, making it necessary for rulers to physically broadcast their power themselves (Wickham 2005, 2009, 2016).[3] In addition, the HRE featured a "structural dualism" that set the ruler and his agents alongside powerful local nobles and high clergy (Rady 2017, 15). Rulers exercised power through physical interactions with elites across the empire (Strayer 1987 [1965]; Poggi 1978; Finer 1997; Bisson 2009; Oakley 2010; Sharma 2017). Indeed, the localized nature of politics often forced future monarchs to visit and seek recognition across their realm

[3] As we discuss in more detail in SI A (p. 1), centralized bureaucracies are likely a necessary though not sufficient condition for *sedentary* rule. For example, governance was sedentary in the centralized Roman and Chinese empires with permanent administrations broadcasting power, with the important exception of Nomad dynasties who practiced itinerant rule (Halfmann 2022; Chang 2007).

even before acceding the throne (Bernhardt 1993, 46). If there ever was an age when "all politics is local," the High Middle Ages was it.

Despite this localized nature and the fact that it saw several border changes between AD 900 and 1500, the HRE remained a fixed unit in a political and judicial sense. Political elites recognized the idea of the HRE, attended realm-wide meetings, and paid respect to the elected emperor/king. Indeed, the number of institutions and rules regulating governance in the HRE expanded over time, and the HRE retained substantive legitimacy well into the 17th and 18th centuries, its political and judicial institutions respected and used by elites and wider populations (see Osiander 2001; Whaley 2018; Rady 2017; Hardy 2018).

Traveling was made relatively safe and easy by royal roads maintained and safeguarded by monasteries, churches, episcopal cities, and royal vassals (Bernhardt 1993, 57; Bernhardt 2013, 316). Royal palaces (*Pfalzen*) offered accommodation and upkeep on royal domains (Bernhardt 2013, 310). Normally, rulers' trips were planned, and itineraries announced in advance. This facilitated preparations and allowed local elites to travel towards the emperor.

Throughout their travels, rulers carried out a wide range of activities. First and foremost was judicial and political governance: they would showcase and assert their authority, renew and receive pledges of loyalty, and sanction the peace to protect the common people (Whaley 2018, 28). Long before medieval monarchs were taxmen, they were judges who certified property rights, presided over courts, corrected power abuses by local elites, and mitigated disputes, all according to local and/or imperial law (Boucoyannis 2021). What we would today see as the judicial functions of kingship were thus themselves deeply political. Rulers often addressed such matters of local justice and politics at assemblies of notables they frequented. These ritualized proceedings also allowed notables to offer their counsel, facilitating rulers' efforts to make decisions and resolve conflicts (Althoff 2004, 139-152).

Second, rulers' attendance of public rituals was crucial in fostering the mutually dependent legitimacy of the ruler and local elites (Nelson 2008; Haldén 2020).[4] Assemblies and feasts, and the handout of lavish gifts helped monarchs maintain personal bonds with friends and followers, which were necessary to retain power (Althoff 2004; Bernhardt 1993). Traveling rulers would bestow vacant fiefs and offices on supporters or opponents that they had to placate. Likewise, they would remove fiefs from their enemies with reference to breaches of local and/or imperial law. But these rulings had most legitimacy if they were done in situ: investing a new bishop, resolving a local dispute, or regulating a local lay succession was best done in person.

Third and lastly, rulers traveled to administrate and supervise their estates, which were usually scattered around the Empire. This was an era when public taxation was

[4]Note parallel effects of US presidents' travels (Goldsmith, Horiuchi and Matush 2021; Malis and Smith 2021).

not existing or unsystematic, and monarchs often depended on their own estates and crown lands for income and provisions. They would also strategically try to enlarge the royal demesne by reclaiming formerly imperial fiefdoms, building royal castles or founding imperial cities, which could become strongholds against recalcitrant local magnates (see Whaley 2018, Chapter 2).

As a result of this range of activities, greater physical presence by a ruler in a locality can be equated with more direct governance. Historians argue that the intensity of imperial government was higher in regions visited regularly by the emperor and lower in regions instead ruled indirectly through his dukes and counts. If a ruler was absent for protracted periods and unable to exercise the royal prerogative, "the local nobility would often be quick to usurp it" (Bernhardt 1993, 53). Indeed, the mere threat of a visit by the king's court is likely to have made nobles more obedient (Geertz 1977). Creating the impression of constant travel was therefore important.

Yet, the HRE was too big for even the most enthusiastically traveling ruler to make his presence felt everywhere at all times. In addition to modern-day Germany, it encompassed northern Italy, most of the Benelux region, parts of Eastern France, Austria and Bohemia. HRE rulers had to choose their itineraries wisely. Beyond offering deep insights into the itineraries of selected emperors (e.g. Müller-Mertens 1980), historical research highlights that economic considerations affected rulers' travels. Not all regions were able to feed the emperor and his court who imposed a heavy burden on their host communities (Gillingham 2000, 72). Affluent regions were thus easier to visit than poor ones. More developed regions were also more attractive to control politically, extort in-kind resources from and offered better opportunities for monetary revenue collection (Kanter 2011; Whaley 2018). This is especially true for affluent royal or personal estates.[5] Yet, beyond these economic arguments, prior research offers few systematic insights into the political strategies that shaped rulers' journeys. The next section therefore develops a political theory of itinerant rule.

The argument: Itineraries as optimization problems

We argue that emperors travel where they foresee the highest payoff from visiting and monitoring local elites, given the (opportunity) costs of travel. They therefore focus on "marginal" agents without well-aligned preferences who may shift their behavior in response. In turn, they frequent agents with fully aligned or misaligned preferences less, as (short) visits would not change their behavior. We argue that family relations and rulers' power shape preference alignment between rulers and local elites. Monarchs' relatives are comparatively loyal. Yet, their loyalty depends on rulers' ability to secure the material benefits of dynastic rule. Once these falter, family members become more likely to shirk or even challenge the ruler. We therefore argue that weak emperors should visit their

[5] These areas were likely also home to elites with more power and weight in rulers' winning coalition.

family's territories more often than strong emperors, who travel more broadly to territory controlled by unrelated local elites.

In the following, we expand on the underlying principal-agent problem and the importance of rulers' relatives as imperial agents. We lastly discuss the Great Interregnum 1250–1273 as an exogenous shock that weakened imperial power in the HRE.

Agents, their preferences, monitoring, and rewarding

Across the HRE, the emperor had to rely on the nobility and high clergy as his agents. The local elites controlled the "[l]anded wealth was the foundation of the political, administrative, and social influence of the aristocracy" in the Middle Ages (Gillingham and Griffiths 2000, 86). This was more true in the HRE than most other European polities, as the HRE lacked a central taxation system. Those who controlled the land thus controlled the bulk of the economic and military resources of the HRE that rulers needed to stay in power. As the set of local elites was given upon coronation, the ruler had little ex-ante control over their preferences. Furthermore, his ability to remove and appoint new local elites was limited by constrained central power and the increasingly hereditary nature of noble "offices," particularly among weak emperors.

The relation between rulers and local elites was therefore fraught with principal-agent problems. Rulers could increase compliance among agents through monitoring and (threats of) punishment upon detection of disloyalty or by rewarding loyalty. Yet, ensuring compliance through such oversight became more costly as local elites' preferences diverged more from those of rulers. Monitoring, punishing, and rewarding under itinerant rule had both direct costs and, importantly, high opportunity costs since rulers could only be at one place at a time and travel was slow.

Given these trade-offs, we propose that the alignment between the preferences of local elites and rulers affected their itineraries. Agents whose preferences aligned neatly with those of the ruler did not require close supervision. Such relationships constituted the ideal grounds for indirect rule as they substituted for the direct presence of the principal.

Other, "marginal" agents with moderately diverging preferences could be induced to comply through monitoring, punishing, and rewarding, without which they would shirk some of their responsibilities, undermine governance, and decrease rulers' payoffs. The ruler could not fully rely on them as a proxy for his presence, but could increase compliance through (prospects of) monitoring visits, punishment of non-compliance, and rewarding loyalty. Agents reacted to the costs and rewards of such temporary direct rule by aligning their behavior with the ruler's preferences.

Finally, local elites with substantively misaligned preferences could hardly be considered productive agents of the regime. Inducing their compliance would have required significant or even constant monitoring, punishing, and rewarding, which was too costly when rulers could only be in one place at a time. In addition, attempting to impose direct rule on a comparatively hostile region might spark rebellion and armed confrontation, which could endanger the overall power of the ruler.

As a result, we expect that rulers spent most time visiting "marginal" agents with moderately but not starkly diverging preferences whose compliance could be induced with comparatively little effort.[6] Visiting such places had the highest expected payoff. Agents whose preferences either aligned well or diverged substantively received much less attention. Given the importance of local economic development for determining the value of land, as well as resources available for extraction by and upkeep of rulers, we expect this pattern to be most pronounced in richer areas.

Family ties and preference alignment

How did emperors assess whether agents' preferences aligned with their own interests and where to direct monitoring and direct rule? Of course, prior personal experience was a guideline, but agents with differing preferences were hard to detect in the HRE with its large size, low state capacity, and slow communication channels. Rulers therefore had to rely on shortcuts to gauge agents' preference alignment.

We argue that family ties proxied for agents' preference alignment since rulers' relatives tended to profit most from the dynastic system. The logic of dynastic politics as well as relatives' real and perceived affinity (e.g. Kokkonen et al. 2021) bound the material prospects of family members directly to the success of a ruler. As natural "allies" (Bendor, Glazer and Hammond 2001; Huber and Shipan 2006), rulers' relatives had the greatest interest in maintaining the dynasty's reign, and their preferences consequently aligned with those of the emperor. Family members could therefore best substitute direct rule and monitoring through physical presence.

Another reason for the trustworthiness of family agents is that solidarity within a dynasty was self-reinforcing (Kokkonen, Møller and Sundell 2022, 198). The closer one's connection to the monarch, the more one had to lose when the reign faltered and a new line of succession was established. When challengers deposed an emperor, they often went after the emperor's relatives to eliminate rival claims to the throne. Consequently, relatives relied on the preservation of power in the short and long term, thus bringing them in line with the emperor.

Yet, this dynamic could potentially reverse if the emperor could not deliver the benefits of family rule and a high probability of its continuation: Once the benefits and stability of dynastic rule subsided, family members were tempted to abandon or even backstab the ruler. In particular close, male relatives – uncles, brothers, and sons – had direct access to the emperor and could use their position in the line of succession to legitimize challenges to the throne or family possessions (Kokkonen et al. 2021). Therefore, weak rulers had good reasons to visit "competing" relatives more than other relatives, simply

[6]Relatedly, Hassan (2017) argues that autocrats post trusted bureaucrats to electoral swing districts.

to keep them on a short leash. In an age where dynastic relations mattered in a way that is difficult to comprehend today (see Kokkonen, Møller and Sundell 2022, Chapter 8), rulers would be keenly aware of these considerations, even though they might not have thought about them in this analytical framework.

The Great Interregnum and the strength of royal power

We argue above that weak rulers visit and monitor their family members more than powerful ones do. Applying this logic to the HRE, we identify temporal variation in the strength of its kings and emperors through the collapse of their power over the Great Interregnum AD 1250–1273.

Around AD 1000, the HRE was the most powerful polity in Western and Central Europe (Southern 1956, 19-20; Wickham 2009, 430, 523; Wickham 2016, 64, 77). Its ascendancy was prominent under the Ottonians (r. 919–1024) and the Salians (r. 1024–1125) up to the Investiture Controversy (1075–1122), which weakened emperors' power over the appointment of bishops, in particular in northern Italy (Wickham 2016; Wilson 2016; Møller and Doucette 2022, ch. 5-6; Grzymała-Busse 2023*b*). However, north of the Alps, imperial power remained vigorous and resurged under the Hohenstaufen dynasty (r. 1138–1250). Emperors Frederick Barbarossa (r. 1152/1155–1190) and Frederick II (r. 1212/1220–1250) even attempted, but ultimately failed, to revive imperial power in northern Italy (Grzymała-Busse 2023*b*, 26). Illustrating their power before 1250, all rulers with living sons were able to have them elected and crowned as German co-kings during their own tenure (Bartlett 2020, 95; Whaley 2018, 55) thus preparing safe dynastic successions. Their strength allowed rulers to rely on loyal family members and focus on monitoring unrelated, "marginal" agents.

A genuine juncture came with the Great Interregnum 1250–1273, which tore apart imperial power structures, never to re-consolidate in earnest.[7] The Great Interregnum began after the natural death of Frederick II in 1250. The throne remained vacant for almost a quarter century as there was no commonly accepted German king.

In 1273, Rudolf of Habsburg was elected king of Germany but never crowned emperor by the pope. The politics of succession reflect the weakness of kings and emperors after 1273. From 1273 to 1438, seven different dynasties held the German throne which only once passed directly from father to son (Bartlett 2020, 398). The imperial title *de facto* became hereditary again only with the Habsburgs from 1440 onwards. However, even they never exerted as widespread imperial authority as the Ottonians, Salians, or Hohenstaufen had done.

With their power weakened and planned successions uncertain, HRE rulers faced major challenges and struggled to monitor and control even close relatives. In practice,

[7]The cause of this weakening is likely exogenous to our argument, as recent research emphasizes the competition between popes and emperors (Møller and Doucette 2022; Grzymała-Busse 2023*a*,*b*; Doucette 2023).

they did not control much of "their" realm outside their private lands and were less able to reward their relatives than pre-interregnum rulers were. This was still true for 15th-century Habsburgs such as Frederick III (r. 1440/1452–1493). The "Arch-Sleepyhead" of the empire (*Reichserzschlafmütze*, Whaley 2018, 74) famously did not leave the Austrian lands for a quarter century while he mostly "occupied himself with Habsburg family affairs" (Rady 2017, 21).

The Empire thus increasingly resembled a patchwork of small polities – governed by kings, princes, dukes, margraves, counts, and other nobles – and free and imperial cities (Johanek 2000; Wilson 2016). The territories enjoyed territorial supremacy (*Landeshoheit*) and differed in levels of centralization. This does not mean that the HRE ceased to exist, *au contraire*. Elites continued to recognize the idea of the HRE and the king as the center of its order and source of legitimacy for "all other political actors" (Hardy 2018, 12). De jure, the German kings still confirmed fiefs, granted privileges, and received homage, even if their de facto power waned.

As a result, we expect that rulers' incentives to monitor and control their relatives through physical visits increased as they lost power during the Great Interregnum. Rulers before 1250 were relatively free from such pressures to monitor close relatives, thus frequenting areas controlled by distant or unrelated elites. In contrast, the comparatively weak rulers after 1250 had to police their close relatives, spending more time in areas under their control.

Itinerant rule: Measurement and descriptive statistics

To test our argument, we reconstruct the itineraries of rulers of the HRE in the most comprehensive manner achieved to date. We here describe the construction of and patterns in the dataset.

Reconstruction of rulers' itineraries

We track rulers' travel itineraries through temporal and geographical data on legal documents they signed and other information on their activities compiled by historians in the *Regesta Imperii*.[8] The *Regesta* consist of short summaries of activities – deeds signed, orders issued, or reports of meetings and religious festivities attended[9] – which are in most cases associated with a date and geographic location. The corpus contains ca. 200'000 documents of which 105'721 relate to ruling German kings and Holy Roman emperors AD 919–1519. Of these, we construct itineraries from 72'665 geographically located and

[8]Accessed on 14.01.2022 at `http://www.regesta-imperii.de/en/home.html`. We add documents for Henry III and Henry V from the *Monumenta Germaniae Historica* (Bresslau and Kehr 1931; Thiel 2010).

[9]Documents most frequently refer to confirmations of rights and authoritative acts of commanding (SI B.3, p. 9).

dated entries, with 68'066 located inside our main geographic area of analysis.

The number of documents varies over time (Figure 1) because of increasing document production and survival. In the 10th and 11th centuries, there are an average of 10 to 100 documents per ruler-year, a number that grows towards 1'000 in the 15th century. Importantly, a similar number of documents is available just before and after the Great Interregnum. On average, we reconstruct itineraries from 143 documents per ruler-year or approximately 0.4 documents per ruler-day. Robustness checks address potential biases from the varying availability of documents (SI E.5, p. 30).

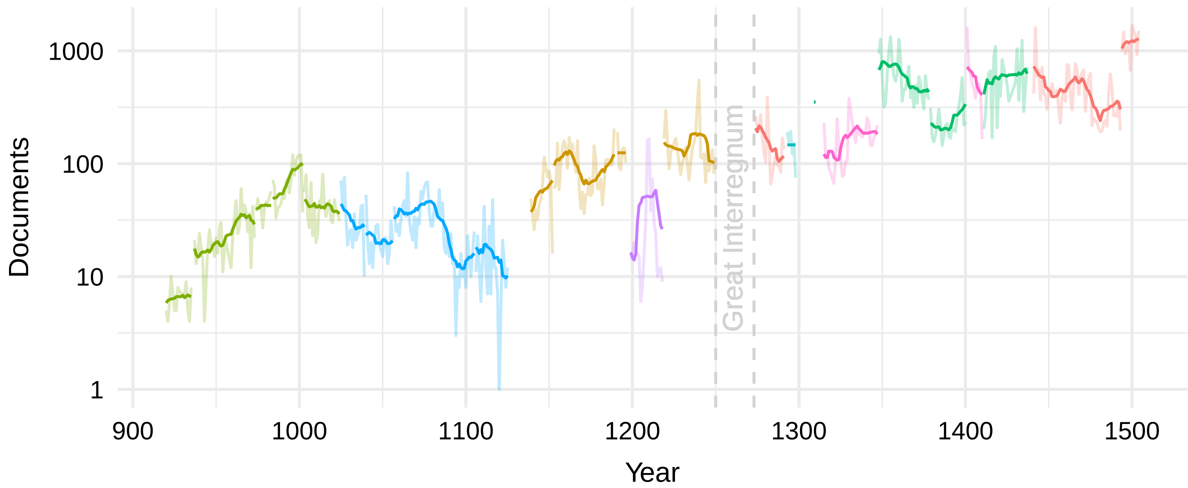

Figure 1: Documents over time

Note: Count of *Regesta Imperii* entries by ruler and year. Running mean in bold.

We transform the documents in the *Regesta* into itineraries. An itinerary is a path through a set of date-location pairs. Our algorithm (see SI B.1, p. 6) solves a series of problems that hamper deriving paths from the *Regesta* directly. We first georeference all document locations, including translation of Latin place names and historically informed spelling-corrections and disambiguations. Second, we remove documents without temporal information or georeferenceable locations, and those with acting subjects other than the relevant ruler. Third, we address imprecise dating above the daily level by searching for the shortest itinerary that is consistent with all (imprecise) date-location pairs for a ruler. Fourth, we automatically correct obvious errors indicated by unlikely travel speeds due to faulty georeferencing or dating. Lastly, we manually inspect and correct unlikely travel episodes with high travel speeds and long distances without intermediate stops.

Our approach is efficient and replicable but comes with a few caveats. First, georeferencing, date-imputation, and ruler-attribution might introduce errors. Yet, we see little reason to expect these errors to occur systematically enough to explain our results and we show that results hold with untransformed data on document locations (SI E.5, p. 30). Second, we have no information on rulers' whereabouts between stops on their itineraries. While such information could be proxied through auxiliary data (e.g., roads), such details would be lost in aggregation in our analysis. Furthermore, auxiliary data would likely not be consistently available, inviting selection biases.

Description of rulers' itineraries, 919-1519

Our data trace rulers' location with unprecedented spatio-temporal detail. Figure 2 visualizes the paths of all ruling kings and emperors between 919 and 1519. The map highlights the concentration of imperial rule in centers such as Aachen, Nuremberg, Prague, and Vienna. Other areas, such as the realm's peripheral North-East or South-West, were hardly ever visited.

The itineraries of individual rulers show substantial spatial variation. The Hohenstaufen Frederick Barbarossa (r. 1152/1155-1190), for example, traveled widely (Figure 2b). While his ancestral power base was in Swabia west of Munich, he spent long periods on campaigns across the Alps in Italy. He died in 1190 during the Third Crusade, trying to cross the Saleph River in today's Turkey.

Post-interregnum emperor Louis IV "the Bavarian" (r. 1314/1328-1347) had a much smaller spatial reach while traveling slightly more than Barbarossa.[10] He concentrated his presence on his Bavarian homelands around Munich and Nuremberg (Figure 2c) and crossed the Alps only once, marching to Milan to be crowned King of Italy in 1327 and continuing to Rome, where he was crowned emperor in 1328. Compared to Barbarossa, his limited presence beyond Bavaria put in doubt his control over the HRE's south and north.

Figure 3 shows how the extent of travel differed within and between rulers. Throughout the period 919–1519, our data indicates that rulers traveled on average approximately 1'652km per year, peaking during years of long-distance travel and campaigns, for example, the crusade in 1228/1229 led by Frederick II. Rulers traveled slightly less before than after the Great Interregnum (1'560km vs. 1'785km per year). Yet, before 1250 rulers visited more far-flung peripheries and covered more ground (29'707km^2 vs. 21'275km^2 per year).[11] We also note seasonal travel patterns with increasing mobility in the spring and summer when life on the road was less harsh. Travel activity also tended to decline with rulers' age (SI B.2, p. 8).

Consistent with the historical literature, we find descriptive evidence of economic motives affecting rulers' itineraries. A cross-sectional analysis of rulers' presence shows more visits to areas with greater agricultural suitability and urban populations (SI B.2, p. 7). In substantive terms, doubling an area's urban population increased the chance of rulers' presence in a year by about 2 percentage points, or 70% of their average presence. Being relatively affluent, visiting cities and their agriculturally productive surroundings paid off most for rulers seeking resources for extraction and sustenance of their courts (Bernhardt 1993). We return to these patterns when assessing the heterogeneous effects of family-controlled territory.

[10] An average 2'175 vs. 2'069km/year.

[11] Computed as a 10km buffer around their yearly path, thus discounting overlapping paths.

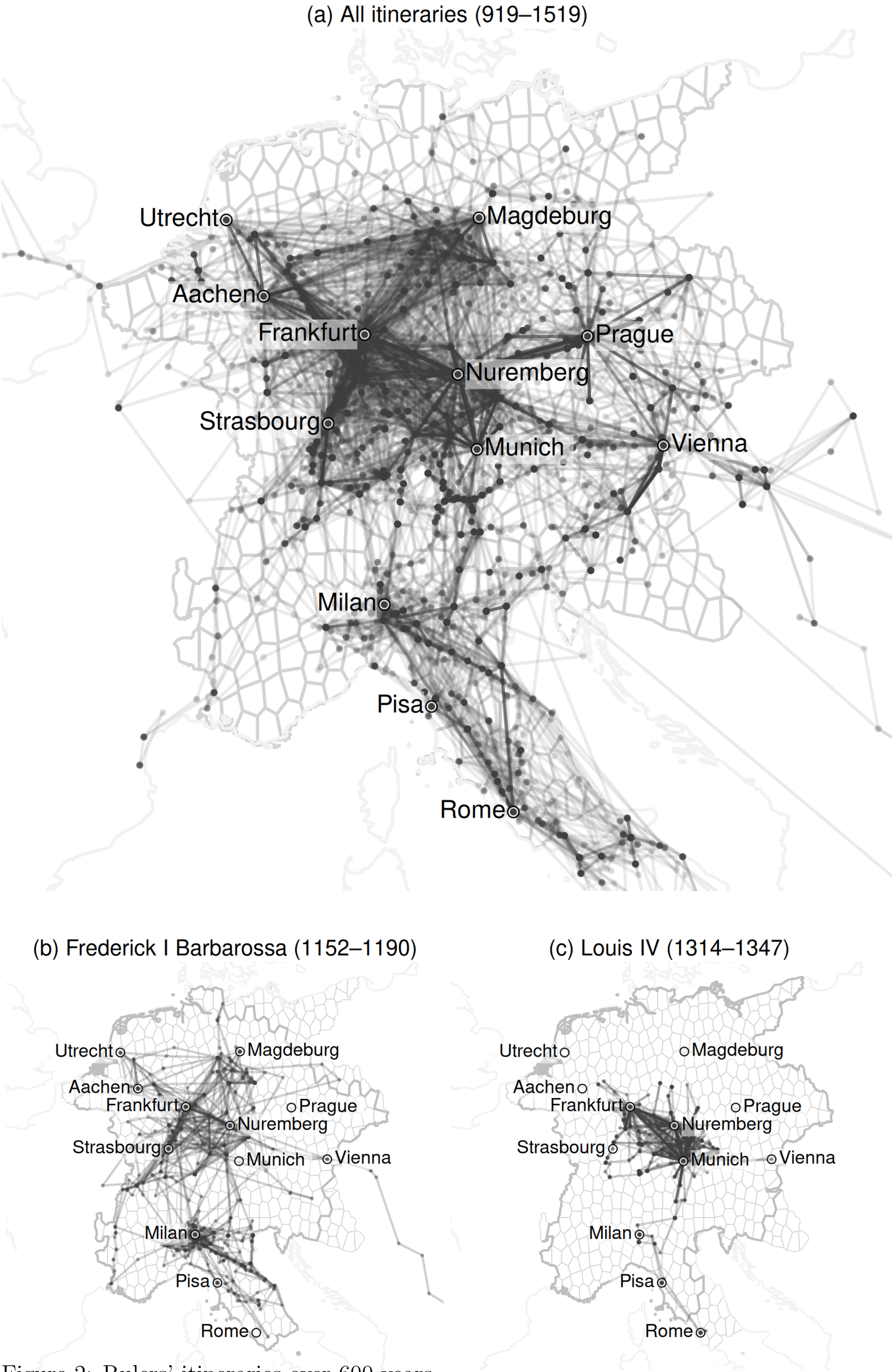

Figure 2: Rulers' itineraries over 600 years

Note: For a map of cell-level share of ruler presence, see SI Figure A1, p. 8.

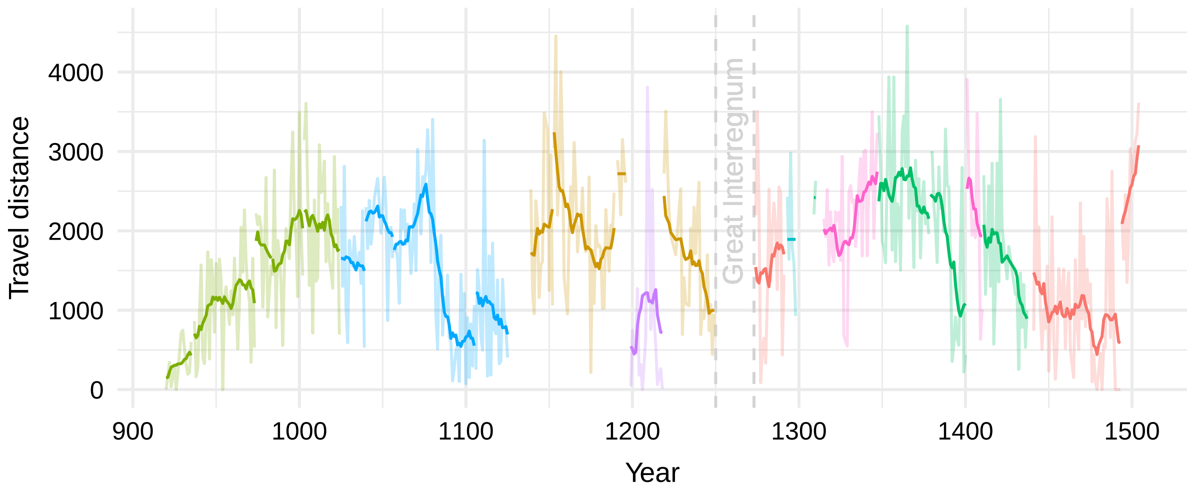

Figure 3: Length of travel path by year, in km

Research design

Unit of analysis

Our empirical inquiry focuses on the itineraries of the rulers of the HRE between AD 919 and 1519. Our dataset starts with Henry the Fowler, the first non-Carolingian king of East Francia which turned into the HRE. His son, Otto I, the Great, was the first Holy Roman emperor[12] from 962. Our data end with Maximilian I. His reign ended in 1519, on the eve of the Reformation when the development of permanent administrative centers gradually substituted for itinerant rule.

Our units of analysis are geographic cells observed for each emperor and year. To substitute for the lack of a fixed set of possible destinations, we take the geographic union of all extents of the HRE and Kingdom of the Franks between 900 and 1500 from the Euratlas (Nüssli and Nüssli 2010) and divide it into roughly hexagonally shaped Voronoi cells.[13] Each covers approximately 2,500km^2 (Figure 4a). For each cell-year, we code our main (in)dependent variables. The main analysis drops cells that are fully outside the territory of the HRE in a given century.[14]

Ruler presence

Our main outcome is yearly ruler presence, measured by projecting royal itineraries onto grid cells and coding for each cell whether it was visited by a ruler in a given year. We

[12] Henceforth, rulers of the HRE would be known as kings of Germany upon ascension and as emperors once crowned by the pope.

[13] In comparison to other arbitrary units such as square grid cells, Voronoi cells can be best adapted to HRE's borders, exhibit least variation in size, and are most compact (see also Müller-Crepon 2023, p. 667).

[14] SI E.2 (p. 22) shows stable results with alternative cell sizes as well as spatial scopes with a narrower and more extensive, stable definition of the HRE.

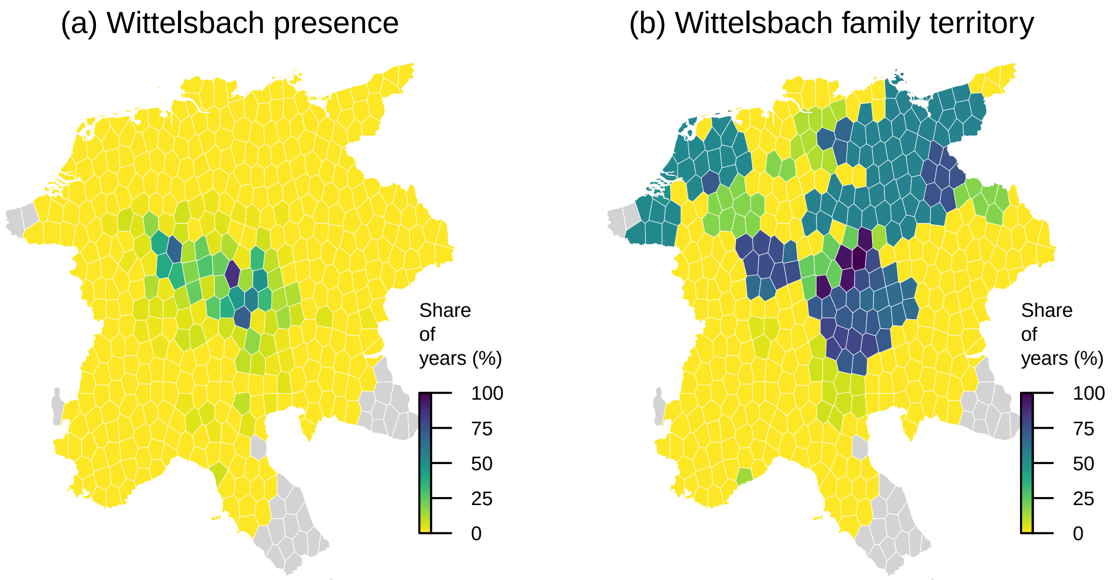

Figure 4: Average (a) ruler presence and (b) family territory over the reign of Wittelsbach rulers (1315-1410)

Note: Cells outside the territory of the HRE in 1300 in in gray.

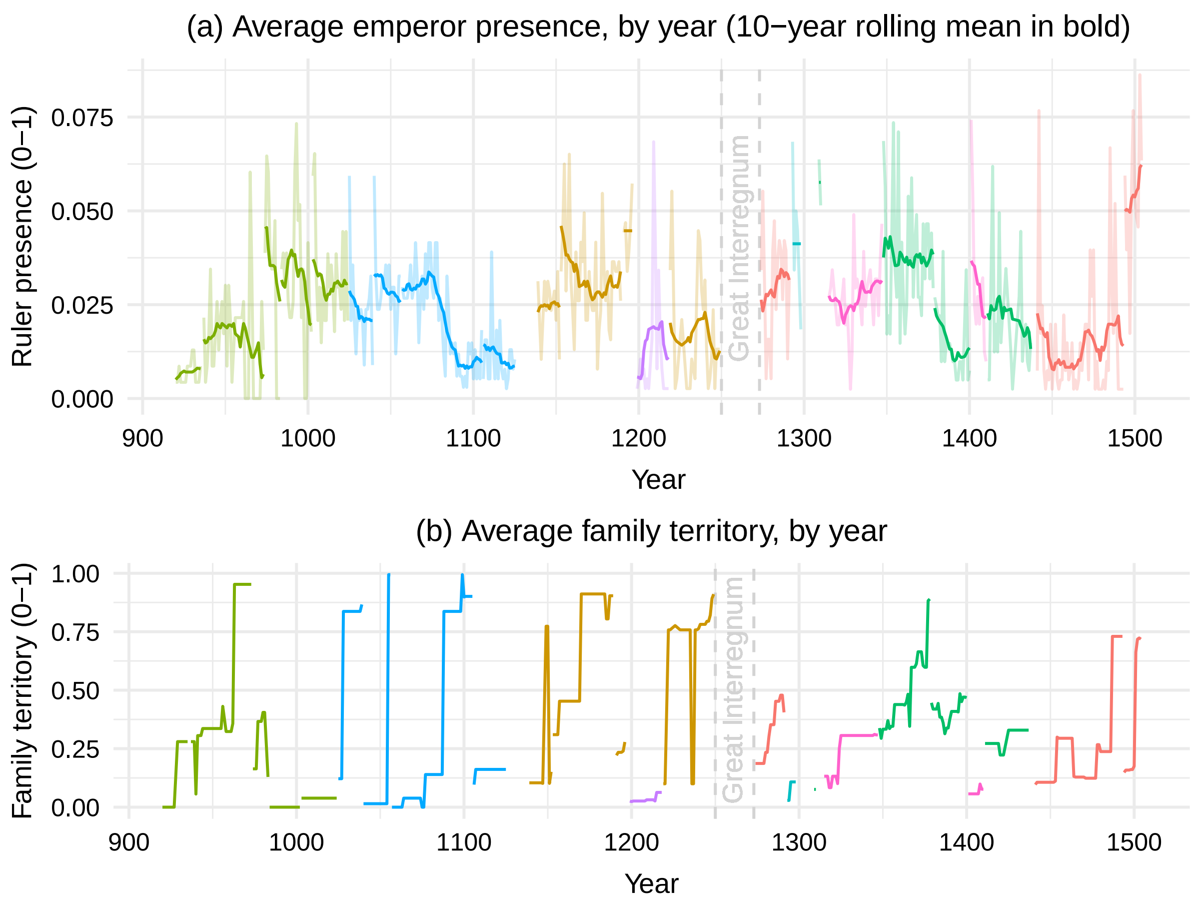

Figure 5: Average yearly (a) ruler presence and (b) family territory across cells in the main sample

Note: Colors denote rulers dynasties.

use four extensive and intensive measures of ruler visits. Our main, conservative present dummy is based on the stops on an itinerary. Rulers were very likely present in cell-year if indicated in at least one document (points in Figure 2). A more approximate measure is based on rulers' path (lines in Figure 2), recording whether it crossed a cell in a given year. On the intensive margin, we furthermore count the number of documents per cell-year as well as the unique number of days on which they have been issued. Both variables are log-transformed after adding a constant of 1 to account for their right skew.

Figure 4a shows a map of average emperor presence over the Wittelsbach dynasty (1315–1410), and Figure 5a tracks rulers' average presence over time. The data show significant spatio-temporal variation in itinerant rule within and between dynasties.

Trusted family agents and their dominions

We furthermore develop a measure of family-controlled territory to test our argument that strong and weak rulers differ in their visits of local elites who are their relatives. Family territory is a simple dummy variable that captures whether a grid cell, in a given year, overlaps with territory controlled by one of the ruler's close relatives. We rely on Marek's (2018) genealogy of European nobility to construct the family trees of Holy Roman Emperors after imputing missing dates to complete the network data (SI B.4, p. 9). On these, we locate, for each year, rulers' living, up to third-degree family members (Figure 6).[15] This follows from our argument that closer family relations increased relatives' baseline compliance as agents of an emperor. In the baseline specification, we include all close family members including the maternal line as well as relatives by marriage. Additional analyses investigate treatment effect heterogeneity by relatives' relationship degree, gender, and type.

We use information on the (time-variant) titles of rulers' relatives recorded by Marek (2018) to encode family-controlled territories. We geocode the territories and places associated with titles by matching the title-territories in the genealogical data to geographic data on states and political entities from Abramson (2017) and Euratlas (Nüssli and Nüssli 2010).[16] Both include states and other sovereign entities that were part of the HRE. For missing territories, we proxy their territory with a 20km buffer around their major city.[17] In addition to the main binary measure, our results are robust to using a continuous measure of family territory and including rulers' personal domains (SI E.4, p. 28).

From these data we derive the dummy variable `Family Territory`, which encodes for each cell and year whether a cell contains territory controlled by a close relative of the German king or emperor. Figure 5b shows a map of average family territory during the

[15] Links by marriage add +1 to all relation degrees.

[16] SI E.4 (p. 28) shows robustness to exclusively using data from Abramson or Euratlas. Results are stable when we account for rulers' relatives in the clergy (SI E.8, p. 33).

[17] Cities are geocoded using the GeoNames data from http://www.geonames.org.

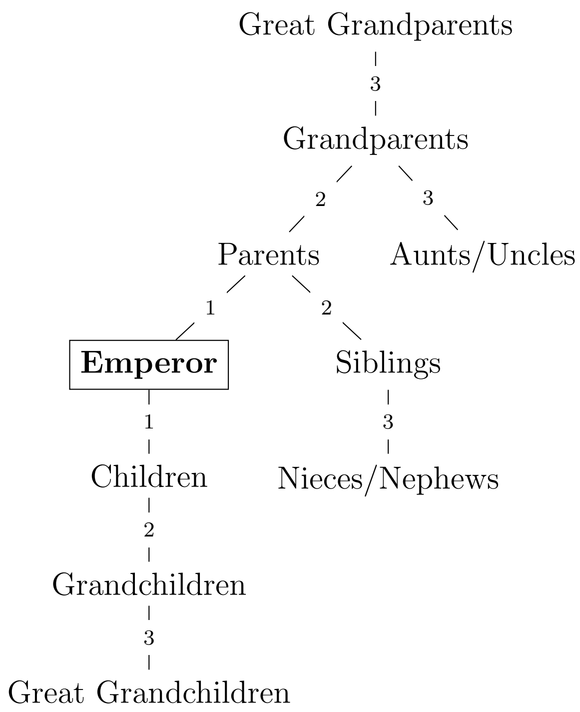

Figure 6: Family relations in our data
Note: Marriage links add +1 to relationship degrees.

Wittelsbach dynasty (1315-1410), and Figure 4d shows the measure's average over time. Across all years, 33 percent of all cells are coded as family territory. This aggregate masks substantive increases in family control during emperors' reign, with 14 percent of cells coded as family control directly prior to rulers' accession to the throne.[18] Years when family-controlled territory spikes beyond 75 percent occur when emperors made their sons German (co-)king. Dropping the German kingdom from the set of family-controlled territories reduces average family control to 23 percent but does not substantively change our results (SI E.4, p. 28). We note that changes in family territory between rulers and dynasties is likely less endogenous to factors driving rulers' travel than variation within rulers. We return to this point in our analyses.

Empirical strategy

We test our argument using several strategies to estimate the difference in the effect of family control of ruler visits before and after the Great Interregnum 1250–1273, which weakened the emperors of the HRE.[19] As our baseline strategy, we use a two-way fixed effects (TWFE) model that leverages the full set of observations:

$$\mathsf{present}_{e,c,t} = \alpha_c + \gamma_t + \beta_1 \mathsf{Family\ Territory}_{e,c,t} + \beta_2 \mathsf{Family\ Territory}_{e,c,t} \times \mathsf{post\text{-}1250} + \epsilon_{e,c,t}, \quad (1)$$

[18]Using this arguably less endogenous measure as independent variable does not change our results (SI E.4, p. 28). It drops emperor-to-be's fathers and uncles who rule the HRE at that time.

[19]Using rulers' centrality in the network of nobles as an alternative measure of rulers' strength yields similar results (SI E.7, p. 33).

where cells c are observed in years t during the reign of emperor e, associated with his presence or our alternative outcomes. Fixed effects γ_t account for temporal variation in emperors' propensity to travel, and α_c capture confounders at the levels of grid cells that make some of them more prevalent destinations of emperors and more likely locations ruled by their relatives.[20] We cluster standard errors at the level of cells ($N = 436$) and years ($N = 509$).[21]

The estimate of the main coefficients of interest, β_1 and β_2, is then driven by *changes* in the location of family-controlled territories over time. These changes happen as a (cumulative) result of (1) changes between emperors with different relatives, and (2) within emperors as family relations change and relatives obtain new titles. Since emperors might strategically expand their family network and territories over time through marriage and title-granting, potential time-varying confounders likely affect variation within emperors more than that between emperors.

To identify β_1, changes in family territory have to be exogenous to rulers' travels. In particular, we rely on the common trends assumption that treated cells would have seen parallel changes in ruler presence as untreated ones and vice versa. This assumption is violated if the assignment and reversal of family territories is endogenous to unobserved time-varying causes of ruler visits. To identify β_2, we require that no temporal development beyond the Great Interregnum led to a difference between the pre- and post-1250 effects of family territory.

We improve causal identification with two additional designs. The first estimates the moderating effect of the weakening of emperors' power in 1250 by assessing the discontinuous change in the effect of family-controlled territories on rulers' visits at the time of the Great Interregnum. The second design estimates the effect of family territory on rulers' visits before and after the Great Interregnum through a stacked difference-in-difference design. This exploits changes in family-controlled territories that come with the successions of emperors. These two strategies increase the internal validity of our results by zooming in on temporally well-defined changes.

In addition to endogeneity concerns, our TWFE estimator could be biased if observations with heterogeneous treatment effects (HTE) receive varying or even negative weights (De Chaisemartin and D'Haultfœuile 2020, 2023). As the main remedy, we employ an HTE-robust fixed effects counterfactual estimator (Athey et al. 2021; Liu, Wang and Xu 2024). The estimator uses matrix completion methods to impute unobserved counterfactual outcomes for cells with territory under the control of rulers' relatives, thus computing average treatment effects on the treated that weigh all observations equally. The coun-

[20]We show robustness to dropping the fixed effects and adding yearly effects of geographical confounders (SI E.8, p. 33).

[21]SI E.3 (p. 25) reports largely equivalent standard errors clustered at the level of emperors and cells. Conley clustering at intermediate distances (200km) leads to slightly larger but statistically significant confidence intervals ($p < .05$), clustering at small or large distances leads to smaller standard errors. Driscoll-Kraay clustering, which accounts for temporal and arbitrary spatial correlation, yields standard errors very similar to the main results.

terfactual estimator also allows for proximate tests of the common trends assumption, thus further bolstering the credibility of our results.

Results

We find strong evidence that the Great Interregnum and its weakening of imperial power substantively shifted rulers' travel itineraries towards areas controlled by closer relatives. Consistent with historical accounts and our theoretical argument, pre-1250 rulers of the HRE spent comparatively less time in family-controlled regions than the post-1273 rulers who found themselves in a much weaker position. These results are mostly driven by variation in family control exerted by rulers' 1st- and 2nd-degree male and direct relatives.

Baseline results

Table 1 presents the baseline results from estimating the TWFE specification in Equation 1. Model 1 shows that the effect of local family control aligns well with the weakening of imperial power over the Great Interregnum. The model shows a negative effect of family control on emperors' presence before 1250, which amounts to -1.5 percentage points or 63 percent of average ruler presence. Yet, after the interregnum, rulers were more present in family-controlled territories: the estimated effect of family control increases by 4.2 percentage points, switching sign to a large effect of 2.7 percentage points after 1250. Both estimates and their difference are substantive in size[22] and precisely estimated.

Model 2 shows the results for our path-based outcome measure, which yields effect estimates that are more than twice as large, corresponding to the higher outcome mean. Models 3 and 4 finally show that the difference between the pre- and post-1250 periods extends beyond the mere presence of rulers to the (logged) count of days of presence and recorded documents.

We address potential bias from HTEs in the TWFE models through the HTE-robust counterfactual estimator based on matrix completion methods applied Athey et al. (2021); Liu, Wang and Xu (2024).[23] Splitting the sample into the pre- and post-1250 periods, Figure 7a shows that the estimator yields substantively very similar effect estimates on ruler presence and related outcome measures to those presented in Table 1. Family territory is estimated to decrease ruler presence by -0.9 [-1.4; -0.4] percentage points before 1250 and increase it by 1.8 [1.2; 2.4] thereafter. The statistically significant effect

[22]They are substantively similar to the cross-sectional effect of moving from none to perfect agricultural suitability (+1.8ppt) or doubling an area's urban population (+2.0ppt), see SI Table A3 (p. 7).

[23]SI E.1 (p. 19) also presents equivalent results from alternative imputation methods. Methods from De Chaisemartin and D'Haultfœuile (2020, 2023) show that negative weights have only a small influence on our main estimates which are also not affected by potential contamination across the two (pre/post-1250) treatment periods. We also use the alternative TWFE estimator developed by De Chaisemartin and D'Haultfœuile (2020), which relies on a set of narrower comparisons and is therefore less precise than imputation-based methods. See Chiu et al. (2023) for a comparison.

Table 1: Ruler presence and family territory: Baseline results

Dependent variables:	Present	On path	Days (log)	Docs (log)
Model:	(1)	(2)	(3)	(4)
Family territory	-0.015**	-0.032**	-0.020**	-0.026**
	(0.004)	(0.008)	(0.005)	(0.006)
Family territory × Post-1250	0.042**	0.087**	0.064**	0.079**
	(0.006)	(0.011)	(0.010)	(0.013)
Cell FE (436)	yes	yes	yes	yes
Year FE (509)	yes	yes	yes	yes
Outcome mean	0.024	0.068	0.032	0.041
Observations	183,090	183,090	183,090	183,090
R^2	0.094	0.141	0.091	0.090
Within R^2	0.003	0.005	0.003	0.003

Clustered (cell & year) standard-errors in parentheses
Significance codes: **: 0.01, *: 0.05, +: 0.1

difference of 2.7 percentage points is substantive but slightly smaller than that in Table 1. The event study in Figure 7b shows that this result is unlikely to be explained by differential pretrends – pre-treatment estimates are close to zero and do not trend. SI E.1 (p. 19) presents formal equivalence and placebo tests that support the parallel trends assumption. After the onset of family control in a cell, estimates from the pre-1250 (gray) and post-1250 (black) periods quickly diverge and only decrease in magnitude and precision after 25 years, where fewer observations decrease statistical power.

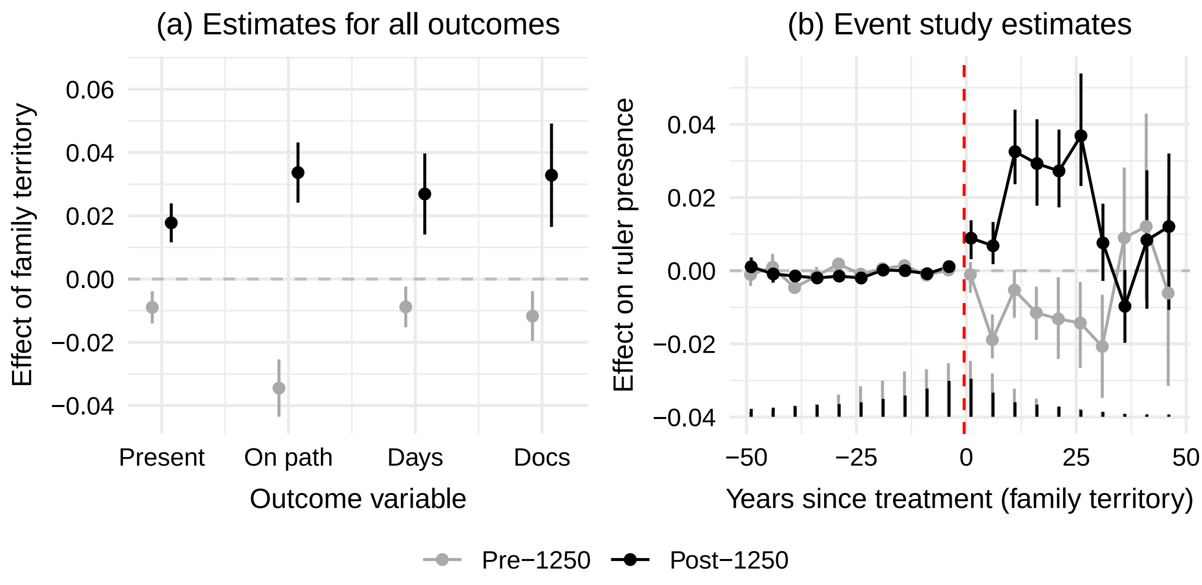

Figure 7: Results from fixed effects counterfactual estimation using the matrix completion method for the pre- and post-1250 sub-samples

Note: In (b), bars denote counts of treated observations. For readability, we bin estimates into 5-year periods and censor them at -50 and 49 years, dropping 1.7% of treated observations.

Sharp change in the effect of family territory in 1250

Simply splitting our 600-year study into pre- and post-Interregnum periods risks masking important heterogeneity in the effect of family territory over time, some of which may have little to do with the Great Interregnum and its weakening of HRE rulers. We investigate such temporal effect variation by disaggregating the effect of family control (β_1 and β_2 in Equation 1) by 25-year period $p \in P$, running from 925 to 1500:[24]

$$\text{present}_{e,c,t} = \alpha_c + \gamma_t + \sum_{p \in P} \beta_p \left(\text{Family Territory}_{e,c,t} \times \text{Period}_p\right) + \epsilon_{e,c,t}, \tag{2}$$

The gray coefficients in Figure 8 show that period-wise effects of family territory sharply increase from around −4 percentage points immediately before 1250 to +5 percentage points immediately after. While this jump stands out in magnitude, the more fine-grained variation in Figure 7 also parallels historical narratives. The Ottonians (r. 919-1024) governed from a position of strength after Henry I and Otto I had built their power and frequented family territory less. The Salians (r. 1024-1125) were weaker, also due to the Investiture Controversy (1075-1122). It was followed by the Hohenstaufen imperial resurgence (r. 1138-1250), a deliberate projection of itinerant rule to parts of the realm where imperial power had collapsed. Finally, HRE rulers are weakest, and hence closely controlling family territory, in the centuries after the Great Interregnum. The Habsburgs partially reasserted their authority and traveled more broadly, but only

[24]To avoid periods with little data, the first period extends back to 919, the first post-interregnum starts in 1273, and the last period extends to 1519.

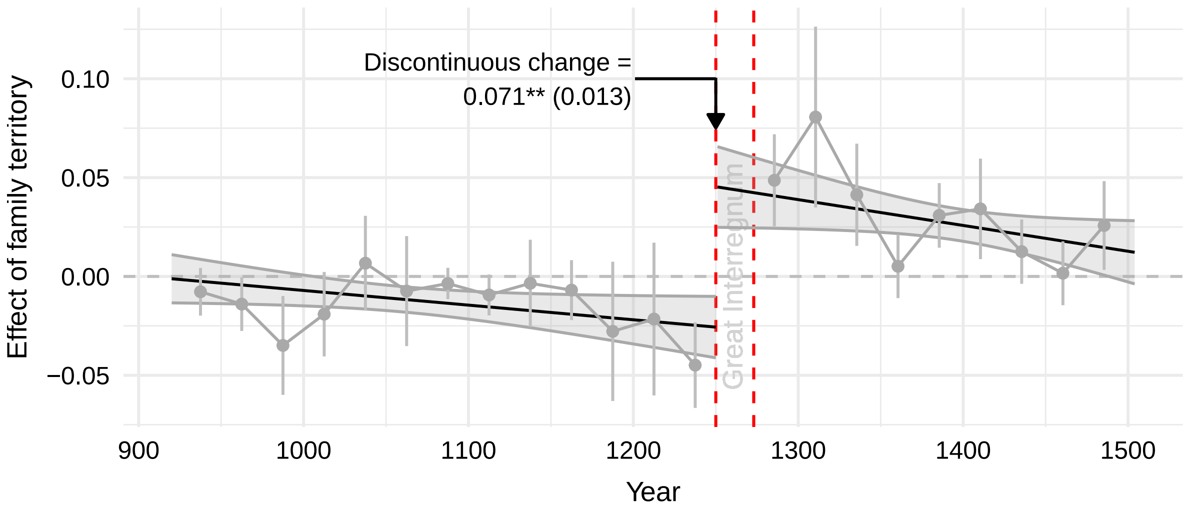

Figure 8: Effect estimates of family territory on ruler presence by 25-year period with 1250-discontinuity and linear trends.

Note: Period-wise estimates in gray from Equation 2, model specification in SI C (p. 10).

came close to matching the travel patterns of the weakest times of pre-1250 rule.

We use a specification akin to a regression discontinuity-in-time design (Hausman and Rapson 2018) to formally analyze the effect increase in 1250. This improves the identification of the moderating effect of the Great Interregnum and the concurrent weakening of Holy Roman Emperors on their itineraries' orientation towards family territories. To do so, we estimate the change in the effect of family control in 1250, including controls for temporal effect trend before and after the break (see SI C, p. 10). The design extrapolates the post-interregnum effect of family territory across the Great Interregnum, which lasted for 23 years, thus preventing continuous data coverage. Importantly, the effect discontinuity in 1250 is unaffected by biases in the estimated effect of family territory as long as these do not change across the interregnum.

Figure 8 overlays the period-wise estimates with linear effect trends before and after 1250. The effect of family-controlled territories on rulers' visits increases by an estimated 7 percentage points with the Great Interregnum. This is almost twice as large as the baseline result for the effect change after 1250 in Model (1), Table 1. SI C (p. 10) presents additional analyses, showing that these results hold across outcomes. A more flexible trend specification or shorter temporal bandwidths increase the size of the estimated change.

Using the HTE-robust counterfactual estimates yields very similar results shown in Figure 9. In particular, we use observation-level effect estimates from the counterfactual models shown in Figure 6 to estimate the change in the effect of family control in 1250. This yields a 5 percentage point increase in the effect in 1250. This estimate increases with more flexible trends and shorter bandwidths (SI C, p. 12).

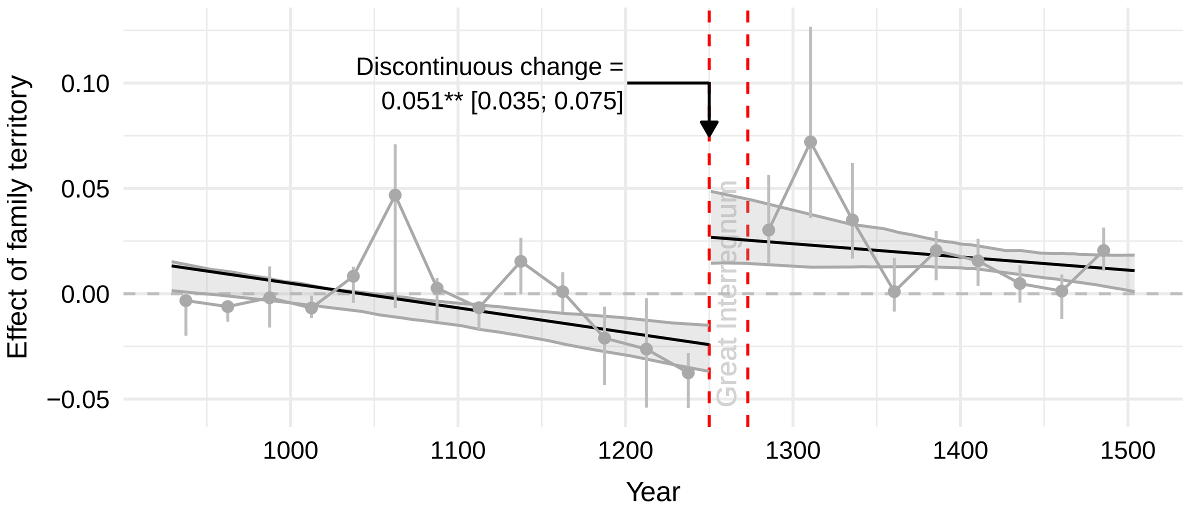

Figure 9: Counterfactual effect estimates of family territory on ruler presence by 25-year period with 1250-discontinuity and linear trends.

Accounting for potentially endogenous family control

The baseline TWFE estimator of the effect of family territory on ruler visits assumes the absence of time-varying confounders. This assumption is violated if, for example, shifts in an area's strategic value motivate rulers' visits and shape imperial politics of granting titles to rulers' relatives. Note, however, that the sharp pre- vs. post-1250 difference in the effect of family control cannot be explained by such bias as long as the bias does not exhibit a contemporaneous shift as well.

We address this potential endogeneity problem using a difference-in-differences (DiD) design that focuses on the change of territories controlled by rulers' relatives resulting from ruler succession.[25] "Stacking" temporal spells s of 10 years before and after all successions of kings and emperors e,[26] we estimate the effect of the change in territory controlled by the relatives of successive rulers on rulers' visits to cell c in year t, as well as the post-1250 difference in that effect. To avoid endogenous assignment of family territories, family control is coded solely in areas controlled by rulers' relatives prior to their accession to the throne. Before the succession in a spell, family territories are thus defined as those ruled by the relatives of the first ruler in the year before he took power. Post-succession, family territory is based on areas controlled by the relatives of the second ruler in the last year before the succession.[27] Family control in each cell thus changes only in the succession year or remains stable for never- and always-treated cells. Estimating a TWFE model as the baseline DiD-specification, we control for spell-specific year and

[25]SI E.4 (p. 28) reports an alternative extension of the baseline TWFE analysis which fixes family territories to the year before rulers' accession to the throne, thereby avoiding potentially endogenous changes through strategic promotion of their relatives.

[26]The uniform, short spell length weights rulers equally, avoiding overweighting successful, long-ruling emperors.

[27]We drop the domains of father- and uncle-emperors, since they are the ones being succeeded.

cell fixed effects and cluster standard errors across spells on the cell and year levels:[28]

$$\mathsf{Present}_{s,e,c,t} = \alpha_{c,s} + \gamma_{t,s} + \beta_1 \mathsf{Family\ Territory}^{\mathsf{pre\text{-}acc}}_{s,e,c} + \beta_2 \mathsf{Family\ Territory}^{\mathsf{pre\text{-}acc}}_{s,e,c} \times \mathsf{post\text{-}1250} + \epsilon_{s,e,c,t}, \tag{3}$$

The main identifying exogeneity assumption again requires that the absence of time-varying confounders and that the potential outcomes of cells that change treatment status trend in parallel to those of the control units, cells that are never or always treated during a spell. The TWFE estimator might be additionally inconsistent if heterogeneous treatment effects receive varying or even negative weights (e.g. De Chaisemartin and D'Haultfœuile 2020). We assess both potential caveats.

Model 1 of Table 2 reports a negative but noisily estimated aggregate pre-1250 effect of -.9 percentage points ($p < .1$) of family control on ruler presence. Yet, after 1250, the effect of family increases significantly by 3.9 percentage points to 3.0 percentage points, which is close to the overall average presence of rulers. The difference between the pre- and post-1250 treatment effects coincides in magnitude with the main results. These effects are consistently estimated across all four outcomes, with some variation in the precision of the pre-1250 effect of family territory. It turns statistically insignificant for the (less precise) `on path` outcome and becomes more precise for the (less noisy) measures of the intensity of rulers' presence. We test the common trends assumption using event study estimates and a placebo test. While the former come with relatively large confidence intervals, both analyses fail to reject the parallel trends assumption (SI D.1, p. 15).

Table 2: Ruler presence and pre-accession family territory: Difference-in-differences

Dependent variables: Model:	Present (1)	On path (2)	Days (log) (3)	Docs (log) (4)
Family territory$^{\text{pre-acc}}$	-0.009^{+}	-0.014	-0.010^{+}	-0.013*
	(0.005)	(0.015)	(0.006)	(0.007)
Family territory$^{\text{pre-acc}}$ × Post-1250	0.039**	0.059**	0.073**	0.087**
	(0.009)	(0.019)	(0.016)	(0.021)
Spell-cell & -year FE	yes	yes	yes	yes
Outcome mean	0.028	0.074	0.036	0.045
Observations	128,100	128,100	128,100	128,100
R^2	0.261	0.317	0.330	0.319
Within R^2	0.001	0.001	0.002	0.002

Clustered (cell & year) standard-errors in parentheses
Significance codes: **: 0.01, *: 0.05, $^{+}$: 0.1

As in the baseline analysis, we assess the robustness of the TWFE estimator to using

[28] See SI D (p. 13) for further details.

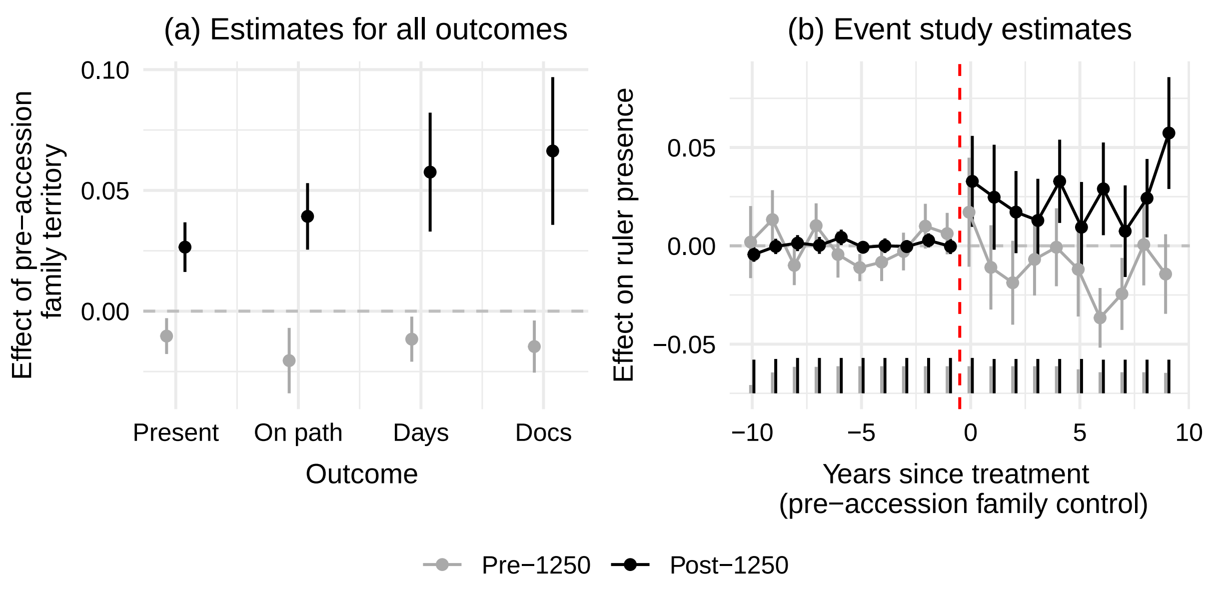

Figure 10: DiD results from fixed effects counterfactual estimation using the matrix completion method for the pre- and post-1250 sub-samples

Note: In (b), bars denote yearly count of treated observations.

the HTE-robust counterfactual estimator.[29] Based again on imputation through matrix completion (Athey et al. 2021; Liu, Wang and Xu 2024),[30] Figure 9a shows similarly sized but more precisely estimated effects for all measures of itinerant rule than in Table 2. The estimated effect of changes in family territory around successions on rulers' presence amounts to -1.1 [-1.8; -0.4] percentage points before 1250 and 2.6 [1.6; 3.7] percentage points after the Great Interregnum. The effect difference of 3.7 percentage points is close to that estimated in Table 2.

The event study estimates in Figure 10b for the pre-1250 period in gray show small but partially statistically significant fluctuations around 0, which do, however not amount to a (negative) trend that would account for the results. Yearly post-succession effects before 1250 are again noisily estimated but negative with the exception of the first treatment year. Post-1250, pre-treatment estimates are precise and narrowly centered around 0, with an immediate and sustained effect after treatment onset. There is a clear effect divergence between both periods. Equivalence, placebo, and carryover tests further support the parallel trends assumption for both periods (SI D.2, p. 18).

Overall then, the DiD results support the baseline TWFE results. Strong rulers of the HRE roamed areas controlled by their relatives less than other regions of their realm. This pattern shifts after the Great Interregnum, which weakened HRE rulers. With less power to draw on, post-1250 rulers frequented areas controlled by their relatives more than areas controlled by elites they could trust even less.

[29]Note that we do not find negative weights in the models in Table 2.
[30]SI D.2 (p. 18) shows robustness to alternative imputation methods.

Effect heterogeneity

The following presents analyses of effect heterogeneity using the baseline TWFE specification. We corroborate expectations of stronger effects of family control on rulers' itineraries in (1) more affluent regions and (2) for close, male, and direct relatives and discuss (3) results from an analysis of rulers' activities.

Local economic development: If rulers maximize the payoffs from itinerant rule through extraction of material resources and sustenance of their courts, the effects of family control should be concentrated in more affluent areas. Splitting the sample at median values of agricultural suitability (from Ramankutty et al. 2002) and urban population size (from Buringh 2021) in Figure 11a shows that pre-1250, family control has a larger negative effect in richer regions, as rulers spend most effort on rich areas controlled by unrelated elites. This relation switches after 1250 as rulers spend most time in affluent areas controlled by their relatives, thus suggesting material incentives driving the monitoring of "marginal" elites.

Family relations: Results by relationship degree and type in Figure 11b support the conjecture that close relatives should be visited least by strong emperors but most by weak ones. Pre-1250, the effect of family control slightly decreases with relationship degree, while it strongly increases after the Great Interregnum. We similarly find that the results are driven by direct family relationships through the "bloodline" rather than marriage-based links from which no succession claims resulted. Mirroring patriarchal power structures, our results are also solely due to rulers' male rather than female relatives.[31] These findings suggest a decreasing importance and risk associated with more removed and female relatives of weak rulers.

Governance activities: We finally assess whether our results are driven by particular types of governance. We use the first verb in each document to categorize acts of (1) authoritative commanding, (2) empowering and (3) informing (see SI B.3, p. 9). Our main estimates are driven by all three act types (SI E.6, p. 32). Our results also suggest that, conditional on rulers' presence, commanding and informing but not empowering acts were more frequent in family territory after 1250 but not before. This is consistent with weak rulers dealing more authoritatively with their relatives than strong rulers.

[31] We observe much lower average female (2 percent) than male family control (34 percent).

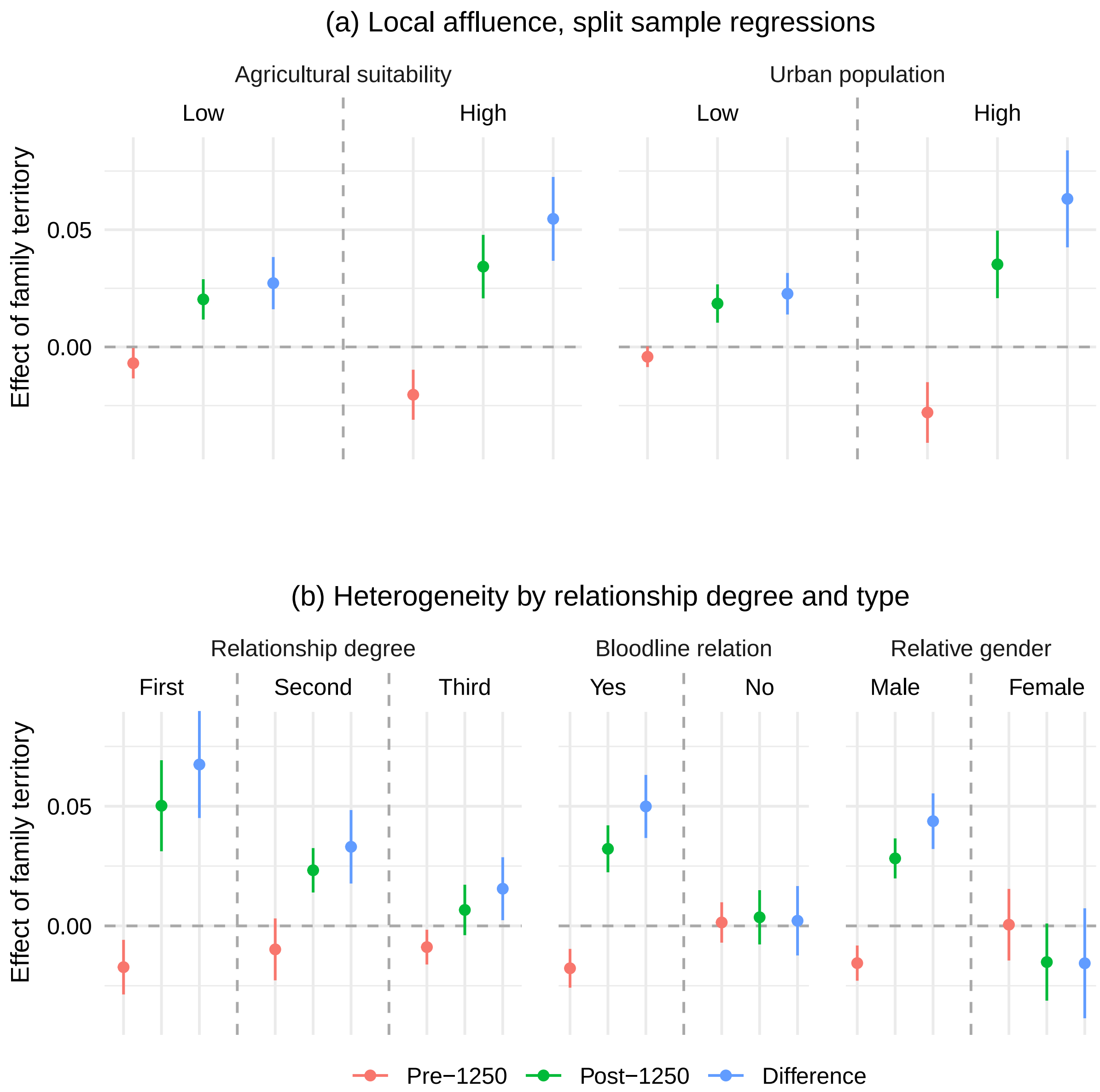

Figure 11: Heterogeneous effects of family control on ruler presence

Note: Based on TWFE regressions based on Model 1 in Table 1. Panel (a) based on split sample regressions, panel (b) disaggregates the family territory variable beyond the simple dummy.

Conclusion

European medieval rulers such as the kings and emperors of the HRE did not govern from a capital city through a centralized administration. Just as in other parts of the premodern world, save centralized empires such as the Roman and Chinese, they governed in person, traveling their lands with their retinue (see SI A, p. 1). Yet, in an age of slow travel and communication, monarchs could not hope to cover their realms entirely, particularly not in large political units such as the HRE. They therefore went where the payoff from personal application of justice, fostering of legitimacy, and revenue collection was highest compared to the high direct and opportunity costs of travel.

We have argued that rulers focused on "marginal" agents who could be induced to comply through occasional visits. In turn, loyal agents and local elites whose preferences were too divergent from the ruler would be targeted at lower rates. Importantly, who exactly constitutes a "marginal" agent depended, among other factors, on rulers' power. The close relatives of strong rulers had incentives to uphold dynastic rule, remain loyal, and allow the ruler to monitor more distantly or entirely unrelated agents. In contrast, the relatives of weak rulers did not enjoy material benefits or the prospects of a continuing line of succession. This induced them to shirk or even turn against the ruler, thus motivating frequent monitoring and control.

To test this argument, we have collected comprehensive data on the itineraries of HRE rulers from 919 to 1519 and constructed a spatial measure of their relatives' territorial control. Empirically, we have examined the Great Interregnum 1250–1273 as an exogenous shift from strong to weak rule in the HRE. Our results corroborate our theoretical argument in that rulers frequented their relatives' domains comparatively less before 1250 but discontinuously shifted their attention towards them after the Great Interregnum. This change is mainly driven by visits to close, male, and direct relatives, i.e., crucial dynastic competitors. Underlining important material underpinnings, the effects of family control are strongest in more affluent regions.

Our data and findings improve our understanding of itinerant rule, which characterized European monarchies throughout the Middle Ages. Royal itineraries reflect state presence in a period with little or no data on local state capacity. Taking advantage of the time and place of signatures on legal documents and rulers' activities to reconstruct royal itineraries, we have added substance and breadth to a subject that has hitherto mainly been studied by historians. The descriptives alone are striking. Traveling more than 1'600km a year, rulers would frequent some areas but never set foot elsewhere.

Our findings also contribute to a better understanding of the secular development of the HRE, which is often described as a weak and fissiparous unit. However, around AD 1000, the HRE was the strongest political entity in the Latin West. It was only with the Great Interregnum that the imperial infrastructure collapsed. This change from strong to weak rule is imprinted in the royal itineraries we have analyzed. In contrast to their predecessors, who could rely on their family members, post-interregnum kings did not travel the empire much beyond areas controlled by their relatives and were hence reduced to local rulers with an imperial title. Overall, our results parallel the development of the HRE from a strong and ruler-centered unit to the weak, composite patchwork unit that we know from so many historical descriptions (see also see Møller and Doucette 2022, ch. 6; Grzymała-Busse 2023*a*,*b*; Doucette 2023).

Beyond its insights on the HRE, our findings raise new questions on rulers' travels more generally. Are patterns of itinerant rule in the HRE similar to dynamics elsewhere in historical Europe (see, e.g., Hall 2025) and beyond? Did local economic resources mainly matter for logistical or political reasons? How did rulers' physical presence shift as centralized state institutions started to substitute for their life on the road? And how does leaders' presence complement local state institutions? After all, leaders' occasional visit might crucially improve the functioning of the state and its legitimacy even today.

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Supplementary Information

Rulers on the Road: Itinerant Rule in the Holy Roman Empire, AD 919-1519

American Journal of Political Science, forthcoming

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Table of Contents

A Comparing historical itinerant and sedentary rule

Below we present two tables that list historical polities and dynasties that have engaged in itinerant and sedentary rule, with the first focusing on Europe and the second on Asia and Africa. The selection of polities is guided by the available research on itinerant and sedentary rule and is likely skewed in favor of polities practicing itinerant rule outside of Europe (given that sedentary rule is not a research field to the same extent as itinerant rule). Nonetheless, the selection covers several important historical polities that practiced sedentary rule, such as Rome and Han Chinese dynasties. It also covers most larger European medieval and early modern polities and illustrates developments in Europe over time quite well. However, it covers few smaller European polities, and it sometimes lacks information for certain time periods also for larger polities. The list of Asian and African polities is more impressionistic, but it covers most important Chinese dynasties, as well as many larger Turco-Mongol and Persian Empires. However, it covers few Arab polities.

There is no universally adopted definition or operationalization of "itinerant rule" in the historical literature. The definitions used in scholarship on the Holy Roman Empire are usually very demanding. For example, John Bernhardt defines it as a "form of government in which a king carries out all the administrative functions and symbolic representations of governing by periodically or constantly travelling throughout the areas of his dominion" (Bernhardt 1993, 45). This definition seemingly excludes rulers who, in addition to traveling their realms, also governed extensively by sending out written orders to state agents through established communication networks (e.g., McKitterick 2011). Others use more permissive definitions, which also include rulers of the latter kind even when they stay for most of the year in one or two cities and govern mainly through written orders to agents (e.g., Muelder 2022). Usually, classical definitions of itinerant rule also distinguish the concept from campaigning and other war related activities. The distinction between government activities and campaigning is, however, often difficult to make in practice, especially when rulers are constantly on campaign (see for example Strootman's (2012) analysis of the Seleucids).

Regardless of the definition used, the operationalization of itinerant (or peripatetic) rule tend to come down to three dimensions. The first is how frequently the ruler and his court traveled. The second is what the ruler did when he was traveling (i.e., if he governed or traveled primarily for pleasure). The third is whether there existed a stationary bureaucracy (for example a chancellery or high court). "Capitals" frequently also appear in discussions on itinerant and sedentary rule but the concepts are mostly defined based on the three other dimensions.

Based on the dimensions above, we have chosen to group polities into three categories to measure the degree of itinerant rule. We thus treat the concept as a continuous measurement rather than a dichotomy: i) Itinerant rule, meaning polities in which rulers traveled extensively to govern, ii) Mixed rule, meaning polities in which rulers traveled periodically to govern their realm but also governed extensively through written communication from one or more stationary "capitals", and iii) Sedentary rule, in which rulers governed primarily by written communication from one or a few stationary "capitals", even though they occasionally traveled for pleasure or other non-governmental activities.

Our category of "itinerant rule" is somewhat broader than the definitions used for the Holy Roman Empire, as we also categorize some polities that had rudimentary stationary bureaucracies that were governed by written means of communication in this category, as for example Charlemagne's Frankish realm and the Kingdom of England after the establishment of a permanent chancellery at Westminster. The reason is that the monarchs in these polities still traveled constantly to carry out governmental tasks.

In the category of "mixed rule" we find most of the Nomadic dynasties that ruled China. These dynasties usually had many capitals, which the rulers traveled between. They also spent much time traveling areas where their military important nomadic subjects were settled (Rawski

1998, 18, 34-35) and embarked on "inspections tours" of other parts of their realms (Chang 2007). At the same time, they had large stationary bureaucracies at their disposal, which governed much of their realms from their capitals by written correspondence.

In the category of "sedentary rule" we find the Roman Empire, the later Ottoman Empire, most Han Chinese dynasties, and many European states, such as France, in the 17th and 18th centuries. These polities were primarily governed from stationary capitals with the help of relatively advanced bureaucracies acting on written orders from the ruler. Although their rulers often embarked on pleasure trips (for hunting and summer vacations) or military campaigns, domestic governance usually did not demand that the ruler traveled.

Our categorization is based on a qualitative interpretation of the literature - a literature that is often plagued by a lack of reliable sources. Transitions between categories were likely often gradual affairs, rather than dramatic changes pinpointed to exact dates. Hence, the tables should be interpreted as a general (and tentative) description of broader trends and distinctions.

The tables show some notable patterns. As historians have argued, the main reason for itinerant rule in Europe was the breakdown of written administration after the fall of the West Roman Empire. A bureaucracy could hence partly substitute for traveling. The Roman Empire is, as noted, a case in point. Roman emperors had a bureaucracy governed by written orders from the capital. Despite being modest by modern standards, this bureaucracy made it possible for emperors to rule without traveling, and most emperors also ruled from Rome and its vicinity (Halfmann 2022). A unique factor enabling Roman sedentary rule may have been the Empire's origin as a city republic, which kept the key institution of the senate after the republic's demise.

Another example of sedentary rule, highlighting how a permanent bureaucracy could substitute for itinerant rule, is China. As Table A2 shows, indigenous Chinese dynasties ruled the Empire from a fixed capital (Chang 2007). This required an advanced bureaucracy governed by written orders. However, many Nomad dynasties that conquered China, like the Khitan Liao, Jin, Yuan, and Qing, remained highly itinerant, despite having similar bureaucracies (Chang 2007). Other polities with advanced bureaucracies, such as the Achaemenides, Parthians, Sasanians, and Mughals, also remained highly itinerant. Thus, a bureaucracy was a necessary but not sufficient condition for sedentary rule.

The fact that a bureaucracy could substitute for itinerant rule likely explains why most European monarchs (except Byzantine Emperors) were itinerant in the medieval era, but became less itinerant in the 16th and 17th centuries when the state apparatus expanded, as is shown in Table A1. Size made a difference though. The only early European examples of sedentary rule, such as the bishopric of Würzburg, can be found in polities that were so small that it was hardly possible to travel them.

Although some polities switched between itinerant and sedentary rule they did so rarely. Hence, most general explanations of itinerant and sedentary rule (except economic and logistical ones) are likely more suitable to test at the polity level, rather than the sub-national level we focus on in the paper.

Table A1: European Polities and Dynasties

Polity/Dynasty	**Mode of Rule**	**Source**
Antigonids c. 306-168 BC	Itinerant rule	Strootman (2013)
Aragon until c. 1556	Itinerant rule	Redworth and Checa (1999)
Aragon after c. 1556	Sedentary rule	Redworth and Checa (1999)
Argeads c. 700-310 BC	Itinerant rule	Strootman (2013)
Avars 6th -8th centuries	Probably itinerant rule	Golden (2013)
Bohemia c. 1000-1300	Itinerant rule with regular stops in Prague	Berend, Urbańczyk and Wiszewski (2013, 266, 304-5); Mertel, Kalhouš and Stachoň (2022)

Bulgarian Empire (second) 1185-1396	Sedentary rule	Peyer (1964)
Burgundian Low Countries in the 14th and 15th centuries	Itinerant rule	Muelder (2022)
Burgundian Low Countries from the 16th century	Mixed rule: Court mainly staying in Brussels and Mechelen but also itinerant	Muelder (2022)
Byzantium 330-1453	Sedentary rule	Peyer (1964); Magdalino (2011)
Carolingians 751-987	Itinerant rule	Peyer (1964); McKitterick (2011)
Castile until c. 1556	Itinerant rule	Redworth and Checa (1999); Guillén (2013)
Castile after c. 1556	Sedentary rule	Redworth and Checa (1999)
Denmark until 1660	Itinerant rule with more regular stops in Copenhagen over time	Porsmose (2023)
Denmark after 1660	Sedentary rule	Porsmose (2023)
England - 1066 (Anglo-Saxon)	Itinerant rule	Roach (2011)
England 1066 - 15th century	Itinerant rule with more regular stops in London over time (where parts of the administration also settled permanently)	Peyer (1964); Christelow (1996); Kanter (2011)
England 16th and 17th centuries	Mixed rule: Court mainly staying in London but itinerant at times	Adamson (1999*b*); Kisby (1999); Cooper and Hayes-Davies (2022)
France until c. 1574	Itinerant rule with regular stops in Paris	Knecht (2008); Faisant (2022)
France c. 1574 – c. 1682	Mixed rule: The court mostly sedentary in Paris but at times itinerant	Chaline (1999); Duindam (2011)
France c. 1682 -	Sedentary rule	Chaline (1999); Duindam (2011)
Golden Horde 1242- 1502	Itinerant rule with regular stops in Sarai	Favereau (2021)
Habsburgs (Austria, Bohemia, Hungary, and the Holy Roman Empire) 16th – 18th centuries	Mixed rule: Court mainly staying in Vienna but remained highly itinerant	Duindam (1999), Duindam (2011)
Hohenzollern until c. 1450s	Itinerant rule	Völkel (1999)
Hohenzollern c. 1450 - c 1605	Sedentary rule	Völkel (1999)
Hohenzollern c 1605-	Itinerant rule	Völkel (1999)
Holy Roman Empire until c. 1500	Itinerant rule	See paper
Hungary c. 1000-1300	Itinerant rule with regular stops at "capitals"	Berend, Urbańczyk and Wiszewski (2013, 278-279); Hudacek (2022)

Huns 5^{th} century	Probably itinerant rule	Golden (2013)
Iberian Muslim kingdoms	Sedentary rule	Peyer (1964)
Irish kingdoms 11^{th} century (and likely much earlier)	Itinerant rule	Peyer (1964)
Khazars 7th-10^{th} centuries	Probably sedentary rule	Golden (2013)
Medici/Grand Duchy of Tuscany 1531-	Sedentary rule	Fantoni (1999)
Merovingians c. 481–751	Itinerant rule	Peyer (1964)
Muscovy/Russia from 1547-	Sedentary rule	Hughes (1999)
Ottomans c. 1300 - c. 1453	Itinerant rule	Gommans (2002, 102); Murphey (2008, 207-222); Kaplan (2023, 11-12)
Ottomans c. 1453 -	Sedentary rule (in Istanbul and Edirne)	Gommans (2002, 102); Murphey (2008, 207-222); Kaplan (2023, 1-12, 28)
Poland at least until 1200	Itinerant rule	Peyer (1964)
Roman Empire c. 30 BC – 300 AD	Sedentary rule	Halfmann (2022)
Rus 9^{th} – 13^{th} centuries	Itinerant rule - at least early in the period and for later Galician and Novgorodian princes	Peyer (1964); Ignatov (2012)
Savoy/Sardinia 1563-	Sedentary rule	Oresko (1999)
Scotland 12^{th} century	Itinerant rule	Peyer (1964)
Serbia 11^{th} - 14^{th} centuries	Itinerant rule	Peyer (1964)
Sweden until at least 1599 (but probably later)	Itinerant rule with more regular stops in Stockholm over time	Strömberg (2013)
Norway until 1388 (see Denmark after that)	Itinerant rule with regular stops at “capitals”	Peyer (1964); Orning (2008)
United Provinces 1590s-	Sedentary rule	Israel (1999)
Volga Bulghars 8^{th}—10^{th} centuries	Probably sedentary rule	Golden (2013)
Welsh principalities 8^{th} – 12^{th} centuries	Itinerant rule	Peyer (1964); Gleeson (2021)
Würzburg 8^{th} century-	Sedentary rule	Adamson (1999*a*)

Table A2: Asian and African Polities and Dynasties

Polity/Dynasty	**Mode of Rule**	**Source**
Achaemenids 550 BC – 330 BC	Itinerant rule with regular stops in “capitals”	Bahadori and Miri (2024)
Algier 16^{th} and 17^{th} centuries	Itinerant rule	Peyer (1964)
Arsacids 247 BC–224 AD	Itinerant rule with regular stops in “capitals”	Bahadori and Miri (2024)
Chagadaids 1266-1347	Itinerant rule with regular stops in Almaliq	Biran (2013)
(China) Qin dynasty 221-206 BC	Mixed rule: Extensive inspection tours	Sanft (2014, 77-89); Chang (2007, 48-50)

(China) Han dynasty 202 BC - 220 AD	Sedentary rule (notwithstanding some inspection tours)	Lewis (2007); Chang (2007, 48-50)
(China) Tang dynasty 618-907	Sedentary rule (notwithstanding some inspection tours)	Chang (2007, 48-50)
(China) Khitan Liao 907-1115	Mixed rule: Seasonal migrations of the court between capitals	Rawski (1998, 18,34-35);Atwood (2015)
(China) Song dynasty 960–1279	Sedentary rule	Chang (2007, 34-71); Rawski (1998, 18,34-35)
(China) Jurchen Jin 1115-1234	Mixed rule: Seasonal migrations of the court between capitals	Chang (2007, 34-71); Rawski (1998, 18,34-35)
(China) Yuan dynasty 1273-1368	Mixed rule: Seasonal migrations of the court between capitals	Chang (2007, 34-71); Rawski (1998, 18,34-35); Masuya (2013)
(China) Ming dynasty 1368-1644	Sedentary rule	Chang (2007, 48-50)
(China) Qing dynasty 1644-1800	Mixed rule: Regular inspection tours	Chang (2007)
Egyptian sultanate 13th and 14th centuries	Sedentary rule	Franz (2013)
Ethiopian Empire c. 1412-1636	Itinerant rule	Horvath (1969)
Ethiopian Empire 1636- c. 1755	Sedentary rule	Horvath (1969)
Ghaznavids 977–1186	Mixed rule: alternated between itinerance and sedentary court life	Inaba (2013)
Hepthalites 5th-7th centuries	Probably itinerant rule	Golden (2013)
Ilkhanids 1256–1335	Itinerant rule with regular stops in “capitals”	Melville (1990); Masuya (2013)
Karakhanids	Mixed rule: itinerant rule early, but settled in their later periods	Karev (2013)
Kereyids 12th –13th centuries	Itinerant rule	Atwood (2015)
Kimeks 9th – 11th centuries	Probably itinerant rule with seasonal “capitals”	Golden (2013)
Kingdom of Ankole (in Uganda)	Itinerant rule	Peyer (1964)
Kingdom of Jerusalem 12th-13th centuries	Itinerant rule	Peyer (1964)
Mamluks 1250-1517	Sedentary rule	Franz (2013)
Mongol Empire 1206 – 1260	Itinerant rule with regular stops in the “capital” Karakorum	Golden (2013)
Morocco until early 20th century	Itinerant rule	Peyer (1964)
Mughal Empire 16th - 17th centuries	Mixed rule: Seasonal migrations of the court between capitals	Gommans (2002)
Northern Yuan 1473-1517	Itinerant rule	Atwood (2015)
Parthians 247 BC- 224 AD	Mixed rule	Bahadori and Miri (2024)
Ptolemies 305 – 30 BC	Sedentary rule	Strootman (2013)

Qajars 18th - 19th centuries	Sedentary rule	Kondo (2013)
Rum Seljuks 1077-1328	Itinerant	Peacock (2013)
Safavids 16th – 17th centuries	Mixed rule: Seasonal migrations of the court with long stops in the capital Herat	Melville (1993)
Sasanians 224-651	Itinerant rule with regular stops at "capitals"	Bahadori and Miri (2024)
Seleukids 312 - 63 BC	Itinerant rule	Strootman (2013)
Timurid dynasty 1405 -1447	Mixed rule	Melville (2013)
Tunis 16th - 17th centuries	Itinerant rule	Peyer (1964)
Türks 6th – 8th centuries	Probably itinerant rule	Golden (2013)
Uighurs 8th – 9th centuries	Probably mixed rule with a capital, and a court that was itinerant for parts of the year	Golden (2013)
Xiongnu 3rd century BC – 2nd century AD	Itinerant rule with regular stops at ceremonial places	Golden (2013)

B Data construction

B.1 Construction of ruler itineraries

We develop a semi-automated procedure to construct ruler itineraries from the documents contained in the *Regesta Imperii*.[32] Our procedure takes the following steps:

1. **Automatic cleaning**:

- Deletion of undated documents
- Deletion of documents without a location attribute
- Deletion of likely forgeries as indicated by comments in the regesta imperii.
- Deletion of documents that do not refer to ruler as acting subject. These are identified via the first word of the documents' text, following the German grammatical structure of sentences. These are extracted and flagged for deletion if they signal an acting subject other than the emperor or king in question.

2. **Georeferencing of locations**: This is based on a combination of existing open-source geocodes available from collaborators of the Regesta Imperii[33] and a fuzzy string match of all place names in the Regesta data with the Geonames data base.[34] All matches are manually assessed. Cases of spelling mistakes are corrected, Latin place names are researched and translated into the (likely) contemporaneous correspondent, and ambiguous matches resolved such that matches reflect the most likely target of rulers' travels.

3. **Temporal sorting of documents:** Many documents in the Regesta Imperii are only approximately dates, e.g., indicating March 1200 as their date. This creates ambiguitiy in the sequence in which rulers traveled through locations as there can be multiple – potentially

[32]Our procedure is similar to Opitz et al. (2019) who present a first automatic approach. It does, however, lack a disambiguation of rulers and document issuers and misses a disambiguation of roughly defined or erroneous time periods, which leads to "jumps" in the resulting itineraries.
[33]Downloaded from `https://github.com/flipz357/regesta-imperii-to-semgis`.
[34]`https://www.geonames.org/`.

many – temporal sequences of the documents that are consistent with their dates. Our algorithm enlists all possible temporal sequences, computes the length of the travel path they entail and selects the shortest travel path that is consistent with the dates of all documents as the most likely path taken.

4. **Automatic correction of obvious errors**: Our algorithm automatically detects and corrects highly likely errors in the dating and georeferencing of documents.

- A document from a place is redated by up to 30 days if (1) its place of origin is visited 30 days before or after its data, (2) it is a "solitaire" document in the path, i.e., if the preceding and following documents originate from a different place, (3) and if travel to/from its location is inexplicably fast (above 60km/day). This avoids frequent errors where one document is dated slightly after a visit to the respective location.
- Similarly, a document's location is relocated closer to the path if travel to/from its location is inexplicably fast (above 60km/day) and the location name yields and ambiguous geocode. This happens in cases of frequent place names such as "Mühlbach" (mill's creek).

After the correction, step 3 is repeated.

5. **Manual inspection and correction:** We automatically flag instances of travel of above 60km/day for manual inspection and correction. In addition, we plot the yearly path for each ruler-year to detect anomalies, in particular far travel and clear deviations from an otherwise smooth path. Equipped with both, we identify unlikely location-date sequences. Once detected, we assess whether the text of the document indeed signals the ruler as the acting subject and delete the document if not. If rulers are acting yet a visit to the location is implausible or even impossible at the given time, we follow the logic of step 4 and attempt to correct either its date or geographic coordinate. If neither is possible, we delete the document from the path – such documents might, for example, be forgeries unidentified in the Regesta data. After cleaning the data manually, step 3 is repeated.

B.2 Descriptive evidence on ruler itineraries

Table A3: Ruler presence: Cross-sectional results

Dependent Variable:			Present	
Model:	(1)	(2)	(3)	(4)
Agr. suitability	0.025**		0.003	0.018*
	(0.006)		(0.007)	(0.008)
Urban pop. (1000s; log)		0.017**	0.016**	0.020**
		(0.003)	(0.003)	(0.003)
Controls	no	no	no	yes
Year FE	yes	yes	yes	yes
Outcome mean	0.025	0.024	0.025	0.025
Observations	182,072	183,090	182,072	182,072
R^2	0.014	0.025	0.025	0.028
Within R^2	0.002	0.013	0.013	0.016

Controls in Model 4 refer to altitude, slope, precipitation, and temperature.
Clustered (cell & year) standard-errors in parentheses
Significance codes: **: 0.01, *: 0.05, +: 0.1

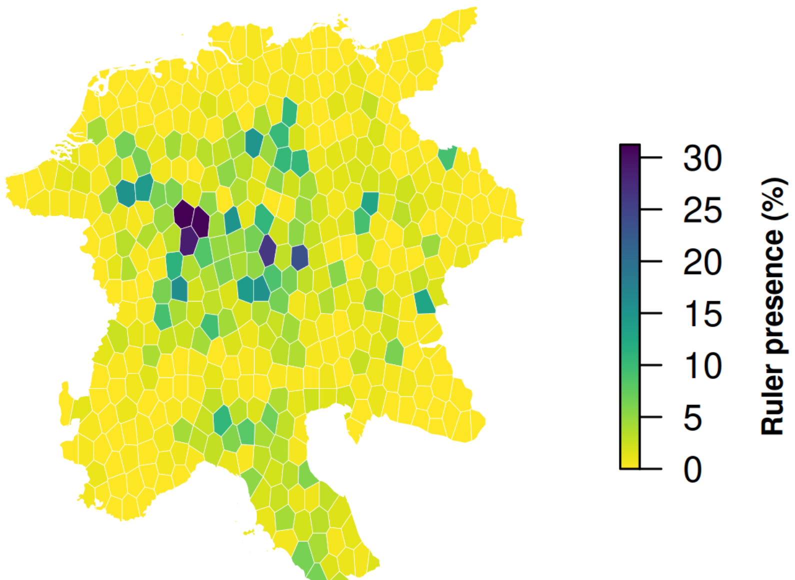
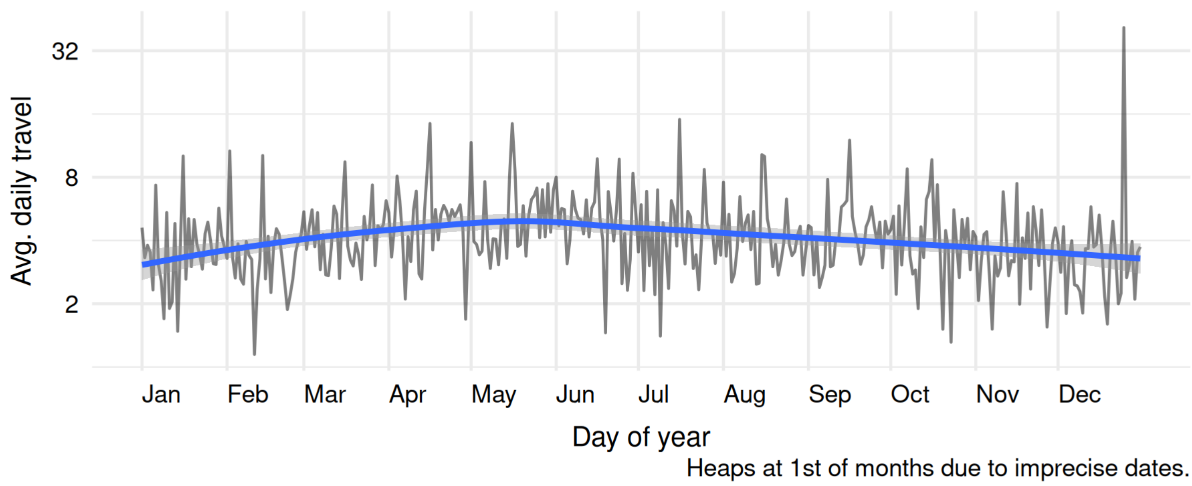
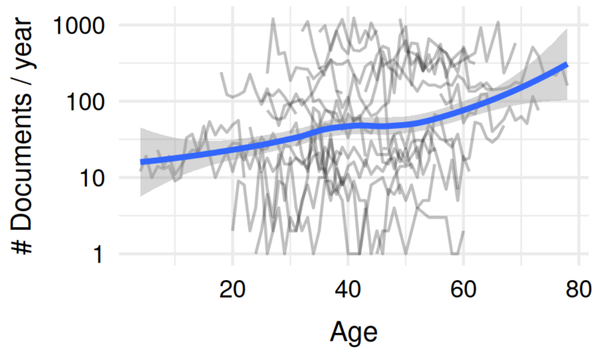


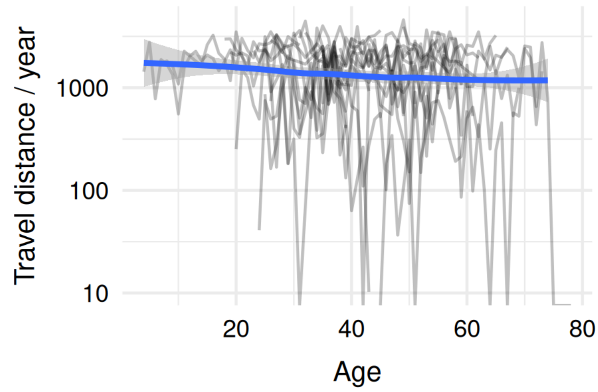
Figure A1: Share of years with ruler presence, by Voronoi cell (in percent)



(a) Ruler travel by time of year



(b) Documents by ruler age



(c) Travel by ruler age

Figure A2: Data description

B.3 Characterization of ruler activities in the *Regesta Imperii*

The *Regesta* documents allow for an approximate characterization of ruler activities. We make particular use of the fact that the historical summaries of which the documents are short and systematically use the respective ruler as the subject of the first sentence. We can therefore use the first verb in each document to characterize the type of activity summarized in the document. Figure A3 shows the frequency-cloud of the 100 most common verbs describing rulers' actions in the first sentence of each document.

Reflecting rulers' role in adjudication and affirmation of rights (Boucoyannis 2021), "confirm" (13.7%) is the most frequent verb. It is directly followed by the executive "command" (11.2%). Similarly important are instances of conferring, certification, and granting but also acts of giving, taking, and sharing or synonyms of commanding (e.g., instructing, demanding, prescribing).

To systematize the list of verbs, we use the German original to encode the first 100 verbs into three categories of (1) authoritative commanding, (2) empowering and (3) informing. These are colored in Figure A3 in red, green, and blue respectively. These codings are used in our auxiliary analysis in Appendix E.6.

Figure A3: Word cloud of main verbs describing rulers' activities

Note: (1) authoritative commanding, (2) empowering and (3) informing in red, green, and blue, respectively. Verbs' size corresponds to their frequency.

B.4 Imputing missing dates in genealogical family trees

A major hindrance in the construction of family networks and derivation of rulers' relatives are missing values in the life-event dates in Marek's (2018) genealogical data. We derive estimates for missing birth and death dates in the family tree from the existing dates in the data based on a series of simple, approximate heuristics. The following procedure is repeated twice in order to use as much information as possible and iterate it through the network:

- **Birth years:** If a birth date is missing, we take the first of the following dates if available as an indication of the likely lower birth year bound:

  1. Earliest year of birth of sibling
  2. Marriage year of parents
  3. Birth year of youngest parent + 14 years
  4. Earliest year of noble title associated with person
  5. Year of death - 100

  Similarly, we use as indicators of the upper birth year bound:

  1. Latest year of birth of sibling
  2. Year of birth of first child - 14

3. Death year of parent who died first
4. Earliest year of noble title associated with person
5. Year of death - 1

The estimated birth year is the mean of the lower and upper bound.

- **Death years:** If a death date is missing, we take the first of the following dates if available as an indication of the likely lower death year bound:

1. Year of marriage
2. Year of birth of last child
3. Last year of noble title associated with person
4. Year of birth + 1

Similarly, we use as indicators of the upper birth year bound:

1. Last year of noble title associated with person
2. Year of birth + 100

The estimated death year is the mean of the lower and upper bound.

Missing marriage dates – which are less consequential for the family networks – are allocated based on the (imputed) date of birth +16 years for female and +20 years for male nobles.

C Discontinuity in the effect of family-controlled territory in 1250

Table A5 presents the results of a formal analysis of the discontinuity in the effect of family territory on ruler presence displayed in Figure 7 in the main text. The models estimate the following relation:

$$\begin{aligned} \mathsf{Y}_{e,c,t} =& \alpha_c + \gamma_t + \beta_1 \mathsf{Family\ Terr.}_{e,c,t} + \beta_2 \mathsf{Family\ Terr.}_{e,c,t} \times \mathsf{post\text{-}1250} + \\ & \gamma_1 \, f(year - 1250) \times \mathsf{Family\ Terr.}_{e,c,t} \times \mathsf{pre\text{-}1250} + \\ & \gamma_2 \, f(year - 1250) \times \mathsf{Family\ Terr.}_{e,c,t} \times \mathsf{post\text{-}1250} + \epsilon_{e,c,t}, \end{aligned} \tag{A1}$$

where γ_1 and γ_2 capture the effect of time trends $f(year - 1250)$ in the effect of family territory before and after the Great Interregnum. This setup parallels more standard regression discontinuity in time designs (e.g. Hausman and Rapson 2018), the difference being that the running variable forces a discontinuity in the moderator such that we are assessing a discontinuity in the effect of family territory in 1250 rather than examining the direct effect of the Great Interregnum on ruler presence.[35] The identifying assumptions are again parallel to the standard RDiT setup, namely that we assume that the effect of family territory would have developed smoothly immediately after 1250 absent the Great Interregnum and concurrent weakening of emperors. This implies in particular that there is no common unobserved cause of the Great Interregnum and contemporaneous changes in the (estimated) effect of family control.

Trend specification: Table A4 implements 3 versions of the pre- and post-1250 time trend functions $f(year - 1250)$ taking on a linear, quadratic, and cubic specification. This yields larger estimates of the discontinuity in specifications with a more flexible time-trend before and after 1250.

[35] The direct effect of the running variable is captured by the year fixed effects in Eq. A1.

Table A4: Discontinuity in effect of family territory in 1250: Trend specification

Dependent Variable:		Present	
Trend pre/post-1250:	Linear	Quadratic	Cubic
Model:	(1)	(2)	(3)
Family territory	-0.026**	-0.043**	-0.052**
	(0.008)	(0.012)	(0.013)
Family territory × Post-1250	0.071**	0.116**	0.084*
	(0.013)	(0.020)	(0.034)
Cell & Year FE	yes	yes	yes
Outcome mean	0.024	0.024	0.024
Observations	183,090	183,090	183,090
R^2	0.094	0.095	0.095
Within R^2	0.003	0.004	0.004

Clustered (cell & year) standard-errors in parentheses
Significance codes: **: 0.01, *: 0.05, +: 0.1

Table A5: Discontinuity in effect of family territory in 1250, linear pre/post-1250 trend

Dependent variables:	Present	On path	Days (log)	Docs (log)
Model:	(1)	(2)	(3)	(4)
Family territory	-0.026**	-0.029+	-0.036**	-0.049**
	(0.008)	(0.016)	(0.011)	(0.015)
Family territory × Post-1250	0.071**	0.131**	0.090**	0.109**
	(0.013)	(0.023)	(0.026)	(0.032)
Cell & Year FE	yes	yes	yes	yes
Outcome mean	0.024	0.068	0.032	0.041
Observations	183,090	183,090	183,090	183,090
R^2	0.094	0.142	0.091	0.090
Within R^2	0.003	0.006	0.003	0.003

Clustered (cell & year) standard-errors in parentheses
Significance codes: **: 0.01, *: 0.05, +: 0.1

Results across outcomes: Using the most conservative, linear specification, Table A5 shows all four measures of itinerant rule as outcomes Y. Parameter β_2 captures the discontinuous jump in the effect of family territory after 1250 of between 7 and 13 percentage points. The results in Table A5 closely mirror Figure 7 in the main text, showing that the effect of family territory discontinuously increases across all outcomes with the Great Interregnum. This difference is larger than in the main TWFE or DiD specifications for all outcomes.

Bandwidth variation: To assess whether results are stable across varying bandwidth, we vary the temporal window in exponential steps to between 10, 20, ..., 320 years before and after the Great Interregnum. Figure A4 shows larger (yet less precise) estimates of the discontinuity in 1250 for shorter windows, all of which are significantly larger than 0. Results are robust when observations are weighted using a triangular kernel which gives most weight to observations close to the Great Interregnum and decreases linearly with temporal distance. Overall, these results coincides closely with estimates based on more flexible temporal effect trends in Table A4.

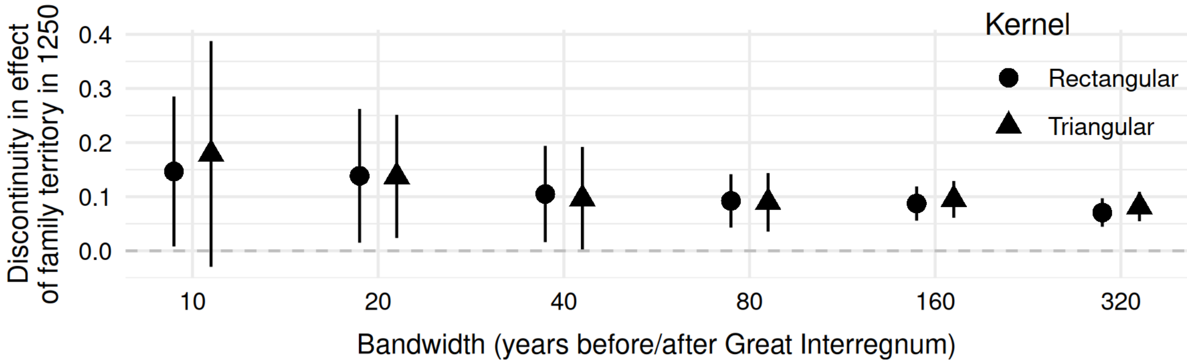


Figure A4: Discontinuity in effect of family territory in 1250, linear pre/post-1250 trend, varying bandwidths

Note: Bandwidth range: Symmetric expansion in exponential increments from the Great Interregnum

Automatic bandwidth selection: Standard RDD and RDiT designs allow for the application of standard methods for optimal bandwidth selection. Yet, the method developed by Calonico, Cattaneo and Farrell (2020) assumes that the running variable forces a change in the value of the main treatment at the threshold. This is not the case in our setup the running variable forces the moderator (strong vs. weak emperors) to change value in 1250.

Notwithstanding these problems, we here compute optimal bandwidths *as if* the main treatment was sharply applied in 1250. In addition, we compute optimal bandwidths for the raw data as well as data demeaned by cell and year fixed effects which account for the panel nature of our data. Both approaches yield a consistent estimate of 64 years when relying on Calonico, Cattaneo and Farrell (2020). Reestimating the RDiT (Eq. A1) for this bandwidth in Table A6 yields results that are consistent with estimates presented in Figure A4 and Table A5, again showing that baseline estimates are conservative and more precise if compared to results from shorter bandwidths.

Table A6: Discontinuity in effect of family territory in 1250 using Calonico, Cattaneo & Farrell bandwidth (64 years)

Dependent variables:	Present	On path	Days (log)	Docs (log)
Model:	(1)	(2)	(3)	(4)
Family territory	-0.048**	-0.104**	-0.064**	-0.089**
	(0.016)	(0.025)	(0.022)	(0.031)
Post-1250 × Family territory	0.093+	0.229*	0.151	0.188+
	(0.047)	(0.087)	(0.091)	(0.101)
Spell-Cell & -Year FE	yes	yes	yes	yes
Observations	28,176	28,176	28,176	28,176
R^2	0.144	0.176	0.153	0.145
Within R^2	0.011	0.017	0.011	0.011

Clustered (cell & year) standard-errors in parentheses
Significance codes: **: 0.01, *: 0.05, +: 0.1

Using fixed effects counterfactual estimates: To assuage concerns about potential bias due to heterogeneous treatment effects in the RDiT-TWFE specification (Eq. A1), we also use the fixed effects counterfactual estimates based on imputation of counterfactuals through matrix completion (see Appendix E.1; Liu, Wang and Xu 2024) to estimate whether an by how much the effect of family territory on ruler presence discontinuously increases across the Great Interregnum. In particular, we take as the outcome the yearly, cell-level effect estimate $\widehat{\delta}_{c,t} = Y_{c,t}(1) - \widehat{Y}_{c,t}(0)$ for all treated observations before and after 1250, i.e. the difference in (estimated counterfactual) outcomes under treatment and control among treated cell-years. These are visualized by 25-year bins in Figure 8 in the main text. We then estimate the effects' temporal trend and discontinuous change in 1250 using a standard RDiT design:

$$\begin{aligned}\widehat{\delta}_{c,t} =& \beta_0 + \beta_1 \times \textsf{post-1250} + \gamma_1 f(year - 1250) \times \textsf{pre-1250} + \\ & \gamma_2 f(year - 1250) \times \textsf{post-1250} + \epsilon_{c,t},\end{aligned} \tag{A2}$$

In order to capture the uncertainty associated with the estimates of $\widehat{\delta}_{c,t}$ and its effect on the estimate of the coefficient of interest β_1, we conduct a joint, cell-level bootstrap of the counterfactual estimation of $\delta_{c,t}$ and Eq. A2 with 200 iterations.

The results coincide with the main results and the discontinuous increase of the effect of family territory across the Great Interregnum visible in main Figure 8. Figure A5 shows β_1 estimates from estimating Eq. A2 with linear, quadratic, and cubic trend $f(year - 1250)$ specifications, as well as under variation of the temporal bandwidth. Estimated effect magnitudes are precisely estimated and range between 5 and 10 percentage points, thus being very close in magnitude to the baseline results discussed above. The one exception consists in the smaller and statistically insignificant estimate for the very small 10-year bandwidth which amounts to a noisy 3.2 percentage points. These results show that the RDiT-TWFE estimates based on Eq. A1 are generally robust to accounting for potentially heterogeneous treatment effects.

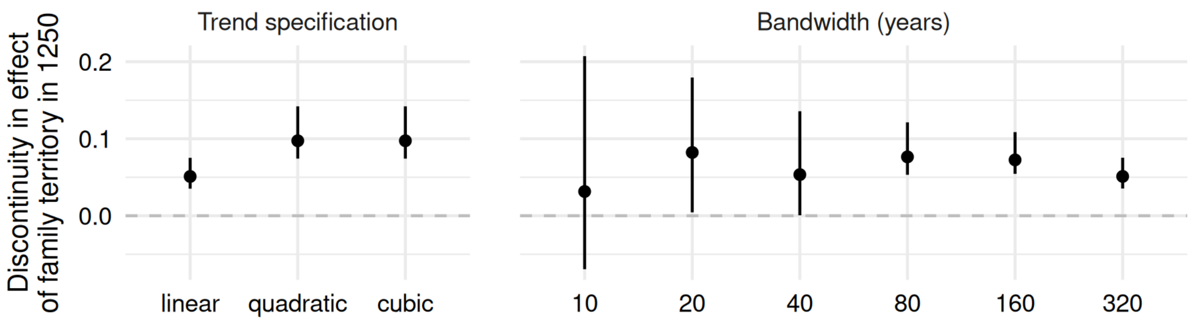


Figure A5: Results from the RDiT based on counterfactual effect estimates using the matrix completion method.

Note: 95% Confidence Intervals result from a cell-level non-parametric bootstrap with 200 iterations.

D Difference-in-Differences

D.1 Two-way fixed effects specification

Our main difference-in-differences estimator identifies the effect of family-territories from *changes* between successive emperors only, thus dropping potentially endogenous variation in family-territories within an emperor's reign. To that intent, we first crop our sample to a bandwidth of ten years before and after the accession to power of a new emperor. Comparing cells only across these 20-year long spells s of the reigns of old and new emperors e, we redefine the main treatment variable $\textsf{family}_{s,e,c}$ to take the cell-level values of family-control in the year prior to each emperors' accession. I.e., looking at the succession from Otto I to Otto II in 973, the spell ranges from 964 to 983. $\text{family pre-acc.}_{s,e,c}$ up to 973 is defined according to the territories controlled by Otto I's relatives in the year prior to his accession in 936. Cells' family control after 973 is coded using the territories controlled by Otto II's relatives in 972, the year before he acceded the throne. This coding avoids any contamination by potentially endogenous changes of family control through marriage or titling policies during an emperor's reign.[36] Thus, some cells become family-controlled under a new emperor (taker), while in others family-control stops with the succession (leavers). Other cells are either always or never under family control. These constitute the control group. The estimator amounts to:

$$\text{Present}_{s,e,c,t} = \alpha_{c,s} + \gamma_{t,s} + \beta_1 \text{family pre-acc.}_{s,e,c} + \beta_2 \text{family pre-acc.}_{s,e,c} \times \text{post-1250} + \epsilon_{s,e,c,t}, \quad \text{(A3)}$$

where the main difference to the main specification Eq. 1 in the main text consists in the addition of cell-spell and spell-year fixed effects $\alpha_{c,s}$ and $\gamma_{t,s}$ which account for the stacked nature of the DiD setup. β_1 then captures the average effect of moving in *and* out of being part of emperors' family territory taking into account the contemporaneous change in the presence of emperors in cells that are either never *or* always family territory during a spell. We decompose these aggregates to account for these four treatment and control groups in a robustness check in Table A9 below. As in the main specification, β_2 shows the change in the effect of family territory observed over the Great Interregnum 1250-1273. The TWFE specification in Eq. A3 might yield biased estimates in the presence of heterogeneous treatment effects (HTE). We present results from HTE robust estimators below which closely coincide with the TWFE results.

The effect of family control in the DiD design is causally identified under the exogeneity assumption which assumes parallel trends in potential outcomes of the treated and control groups. Our event study estimates for "taker" cells that enter treatment with a succession are presented in Figure A6 and show no significant differential pretreatment trends before or after 1250. Figure A7 presents the event study for the (sign-reversed) effect of leaving treatment at the time of succession, which is relevant for all "leaver" cells. For both, pre-succession point estimates are for the most part close to 0, lie within a equivalence range set by default to .36 the standard deviation of the residualized outcome ($\approx \pm$.5ppts; see Hartman and Hidalgo 2018), and show no substantive trend in the direction of the treatment effect. Yet, standard errors are relatively large and exceed the equivalence range in some instances suggesting that the test might suffer from low statistical power.

Table A7 conducts an alternative placebo test inspired by Liu, Wang and Xu (2024) to test whether travel patterns observed after a succession are already visible in the three years prior to it happening – this would be a clear violation of the parallel trends assumption. We thus "redate" for each spell the year of succession to 3 years prior, adjust values of family control of takers and leavers accordingly, drop all data after the true observed succession, and reestimate the DiD specification. Effect estimates for all outcomes are close to 0 before and after 1250, precisely estimated and thus fall well inside the equivalence range. While this last result supports the parallel trends assumption, the uncertainties coming with the previous tests do not allow for a strong and confident rejection of the null of non-parallel trends. Note, however, that the HTE-robust counterfactual estimator below comes with greater statistical power and yields much stronger results supporting parallel trends.

The aggregate main effects discussed in the main text and shown in Table 2 are driven by "taker" cells that become family controlled with a succession and "leaver" cells that move out of that treatment with a succession. A disaggregation of treatment effects along this difference in Table A8 shows that the effects in "taker" cells amounts to roughly the same magnitude

[36] Note that we exclude the emperor-fathers and uncles of emperors-to-be from the coding, since these are the rulers that they succeed.

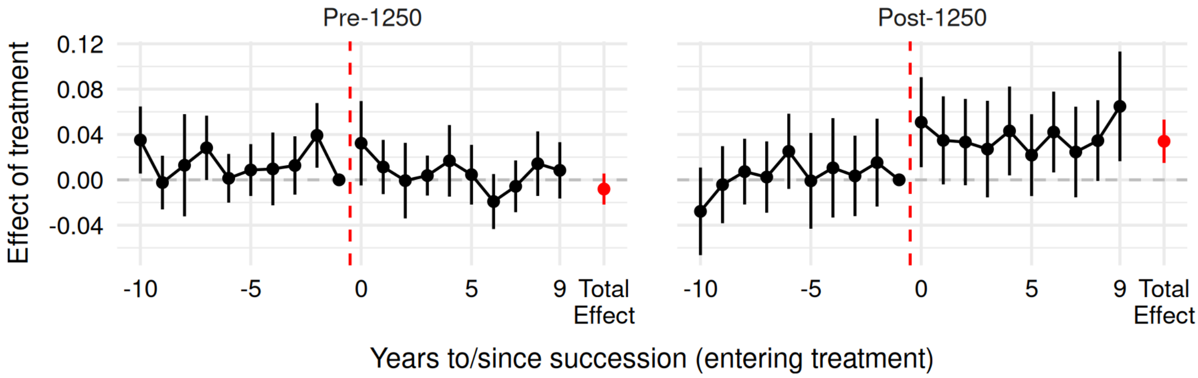


Figure A6: Event study plot of the effect of becoming a family territory around successions

Note: Red estimates correspond to results for "takers" in Table A8, Model 1.

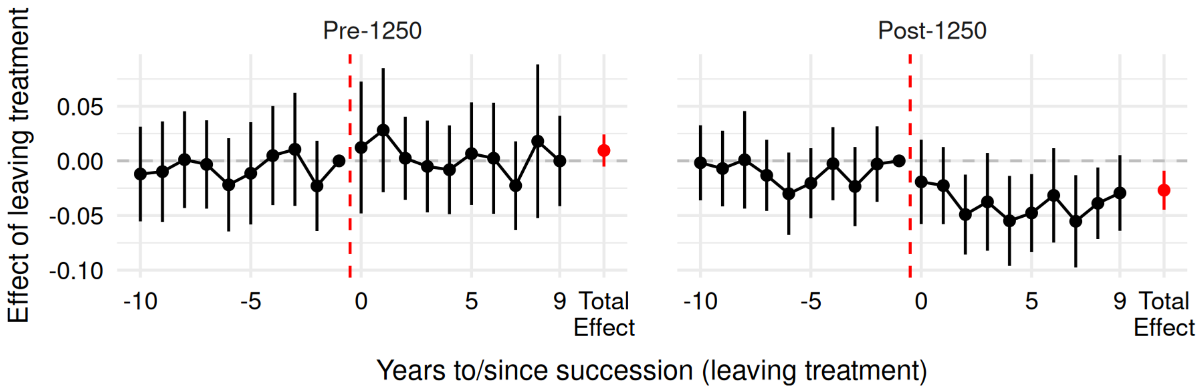


Figure A7: Exit event study plot of the effect of becoming non-family territory around successions

Note: Red estimates correspond to results for "leavers" in Table A8, Model 1.

as the effect among "leaver" cells which is sign-reversed in this disaggregation.[37] Their effects cannot be well separated before 1250, since estimates are overall noisy. In addition, the analysis in Table A8 shows in Models 2 and 3 that the results are not solely due to the inclusion of cells that are either always or never controlled by rulers' family members during a given spell s, even though dropping never treated units limits the sample to a quarter of its size.

In Table A9, we assess whether results are due to successions within or across dynasties. Any remaining endogeneity concerns are likely less pressing for variation between than within dynasties. We find results to be very similar in both samples. The main difference consists in the small and statistically insignificant between-dynasty effect before 1250, which might be due to low power (since there are only five pre-1250 successions between dynasties in our data).

[37]This is because "leavers" move out of the treatment after the succession.

Table A7: Ruler presence and family territory: DiD Placebo Test

Dependent variables:	Present	On path	Days (log)	Docs (log)
Model:	(1)	(2)	(3)	(4)
Family territory (placebo)	0.002	-0.006	0.002	0.001
	(0.008)	(0.021)	(0.007)	(0.009)
Family territory (placebo) × Post-1250	-0.001	-0.003	-0.003	0.001
	(0.010)	(0.024)	(0.012)	(0.016)
Spell-Cell & -Year FE	yes	yes	yes	yes
Outcome mean	0.025	0.068	0.032	0.040
Observations	62,928	62,928	62,928	62,928
R^2	0.353	0.395	0.475	0.459
Within R^2	0.000	0.000	0.000	0.000

Clustered (cell & year) standard-errors in parentheses
Significance codes: **: 0.01, *: 0.05, $^{+}$: 0.1

Table A8: Difference-in-differences: Disaggregation of treatment and control groups

Dependent Variable:		Present	
Sample	Full	≠Always	≠Never
Model:	(1)	(2)	(3)
Taker × Post-succession	-0.008	-0.008	-0.039
	(0.007)	(0.007)	(0.030)
Leaver × Post-succession	0.009	0.010	0.003
	(0.008)	(0.007)	(0.032)
Taker × Post-succession × Post-1250	0.042**	0.040**	0.078*
	(0.011)	(0.011)	(0.034)
Leaver × Post-succession × Post-1250	-0.036**	-0.036**	-0.048
	(0.012)	(0.012)	(0.037)
Spell-cell & -year FE	yes	yes	yes
Outcome mean	0.028	0.027	0.037
Observations	128,100	124,877	31,651
R^2	0.261	0.259	0.290
Within R^2	0.001	0.001	0.006

Clustered (cell & year) standard-errors in parentheses
Significance codes: **: 0.01, *: 0.05, $^{+}$: 0.1

Table A9: Difference-in-differences: Within and across dynasties

Dependent Variable:	Present		
Sample	Full sample	B/w dynasties	W/in dynasties
Model:	(1)	(2)	(3)
Family territory$^{\text{pre-acc}}$	-0.009^{+}	-0.001	-0.011*
	(0.005)	(0.013)	(0.005)
Family territory$^{\text{pre-acc}}$ × Post-1250	0.039**	0.035*	0.036**
	(0.009)	(0.017)	(0.012)
Spell-cell & -year FE	yes	yes	yes
Outcome mean	0.028	0.027	0.028
Observations	128,100	56,508	71,592
R^2	0.261	0.268	0.256
Within R^2	0.001	0.002	0.001

Clustered (cell & year) standard-errors in parentheses
Significance codes: **: 0.01, *: 0.05, $^{+}$: 0.1

D.2 Fixed Effects Counterfactual Estimators

Noting potential biases in the baseline TWFE estimator arising due to heterogeneous treatment effects (HTE) across units or over time, we use a set of diagnostics and alternative, fixed effect counterfactual estimators to probe the robustness of our DiD results.

Prevalence of negative weights: The occurrence of negative weights in TWFE estimation can possibly lead to a reversal of estimated treatment effects. Using methods proposed by De Chaisemartin and D'Haultfœuile (2020), we find that no treated observations are weighted negatively in the analyses reported in Table 2 in the main paper. This does, however, not rule out lesser bias from differential weighting of observations.

Results from fixed effect counterfactual estimators: In order to test the robustness of results to HTE-robust estimators, we apply the imputation methods through matrix completion (the main model below Athey et al. 2021) and (interactive) fixed effects (Gobillon and Magnac 2016; Xu 2017) to our stacked DiD setup. Figure A8 shows that results across all three imputation estimators yield estimates of the effect of family territory on ruler presence that are consistent with but slightly more precise than the TWFE results presented in the main Table 2. As reported in Figure A9, we find that the results equivalently hold for the other outcomes analyzed in the main paper.

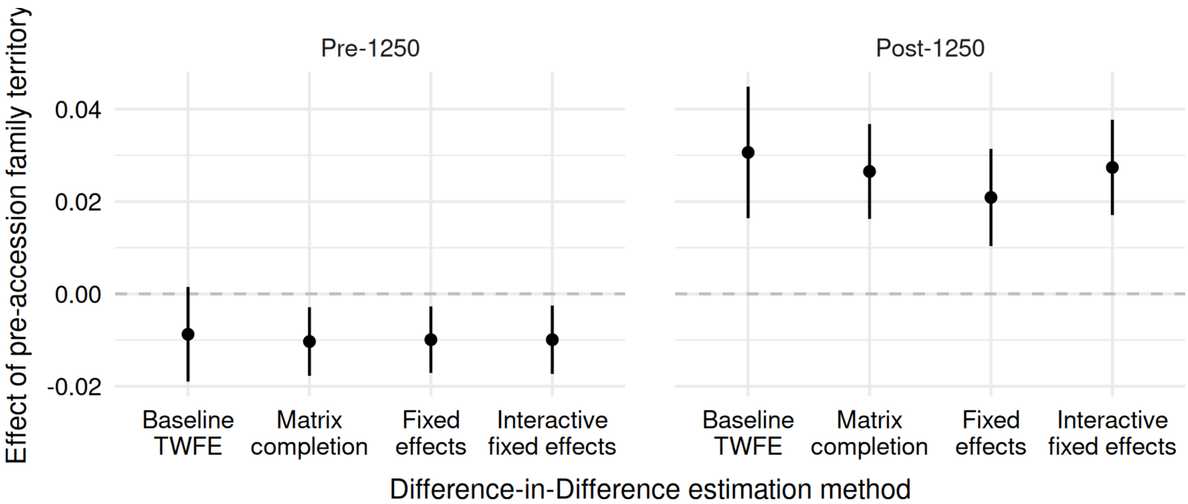


Figure A8: Comparing different counterfactual estimators

We analyze the potential significance of pretrends in Figure A10. While pre-treatment estimates are more varied and noisy for the pre- than for the post-1250 period, the results suggest that the parallel trends assumption holds for both periods. In particular, we conduct equivalence tests (Liu, Wang and Xu 2024) in Figure A10. While some pre-treatment coefficients differ from 0 (p-value of joint F-Test $< .01$ and $< .1$ for pre- and post-1250 respectively), they vary within a range that is significantly smaller than the equivalence range[38] and show no discernible trend. We also find statistically insignificant placebo (pre-1250: 0.008 [-0.004; 0.020]; post-1250: -0.000 [-0.011; 0.011]) and carry-over effects (pre-1250: 0.008 [-0.010; 0.026]; post-1250: 0.015 [0.000; 0.030])[39] for the three periods just before and after treatment onset.

[38] Following standard practice, we set this range to .36 times the standard deviation of the outcome variable demeaned by unit and year fixed effects (see Hartman and Hidalgo 2018; Liu, Wang and Xu 2024, for details).

[39] The noisily estimated carry-over effect in the post-1250 would, if at all, bias treatment effect estimates downwards.

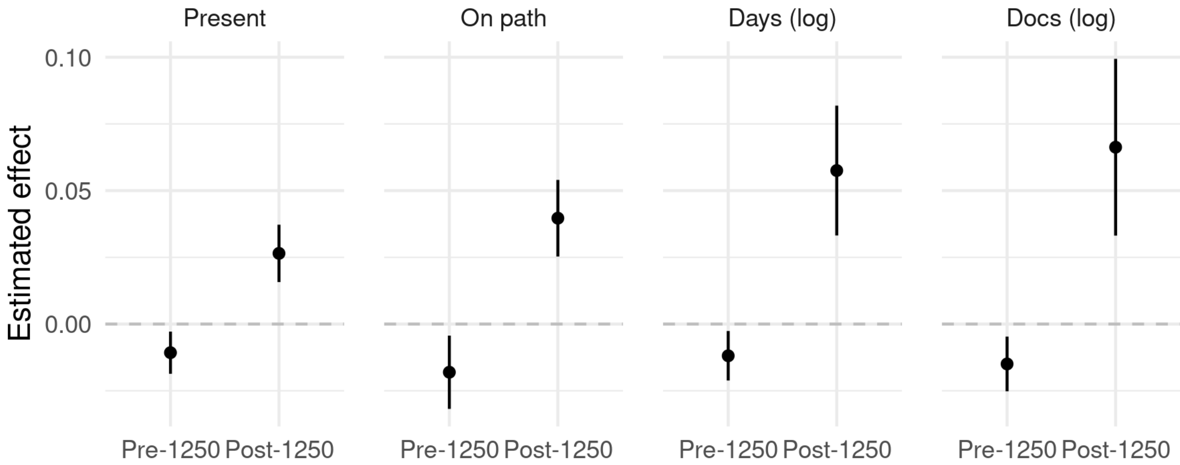


Figure A9: DiD-effect of family territory on main outcomes

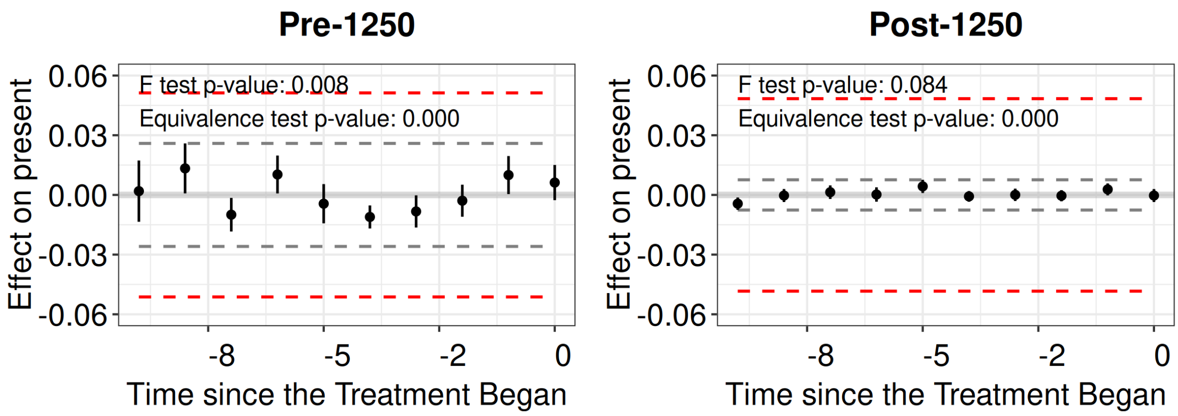


Figure A10: Equivalence tests for pretrends à la Liu, Wang and Xu (2024)

E Main analysis: Robustness checks

E.1 Accounting for heterogeneous treatment effects

Recent studies have highlighted that the TWFE estimator used in the baseline results can yield biased results under the presence of heterogeneous treatment effects (HTE) over time and across units. This problem can lead to a negative weighting of treated observations, in particular when treatments are applied and reversed in a staggered manner as is the case in our setting. We refer to Chiu et al. (2023) for a recent overview over the methodological discussion and possible remedies. We first discuss results from a set of diagnostic analyses that show that our baseline results are only weakly affected by negative weights. We then apply fixed effects counterfactual estimators (Liu, Wang and Xu 2024) and the Multiple DiD estimator by De Chaisemartin and D'Haultfœuile (2020), both of which are robust to HTE and yield substantively similar results as the main TWFE specification.

Negative weights and effect direction under heterogeneous treatment effects: We first estimate the weights attached to treated observations in our main specification in Table 1 in the main text. Using the method developed by De Chaisemartin and D'Haultfœuile (2020, 2023), we find few negative weights. When estimating the main effects of family control pre-1250, 4.65 percent of treated observations receive negative weights which sum to -0.0067. The post-1250 effect is estimated with negative weights on 0.34 percent of treated observations, with a cumulative weight of -0.0003.

Contamination by multiple treatments? A second issue highlighted by De Chaisemartin and D'Haultfœuile (2023) is that in the TWFE the average treatment effect estimate for one treatment (e.g., pre-1250 family control) can be "contaminated" by heterogeneous effects of a second treatment (e.g., post-1250 family control) in particular when the latter receive large weights.[40] Yet, we find very small weights for the second treatment.[41] When estimating pre-1250 effects, positive and negative weights of the post-1250 effects each sum to ±0.0518. For the post-1250 effects, these contamination weights sum to ±0.0838. Reassuringly, estimating the effect of pre- and post-1250 family control in two "short" regressions as recommended by De Chaisemartin and D'Haultfœuile (2023) does not affect the results or the proportion of negative weights on treated observations.

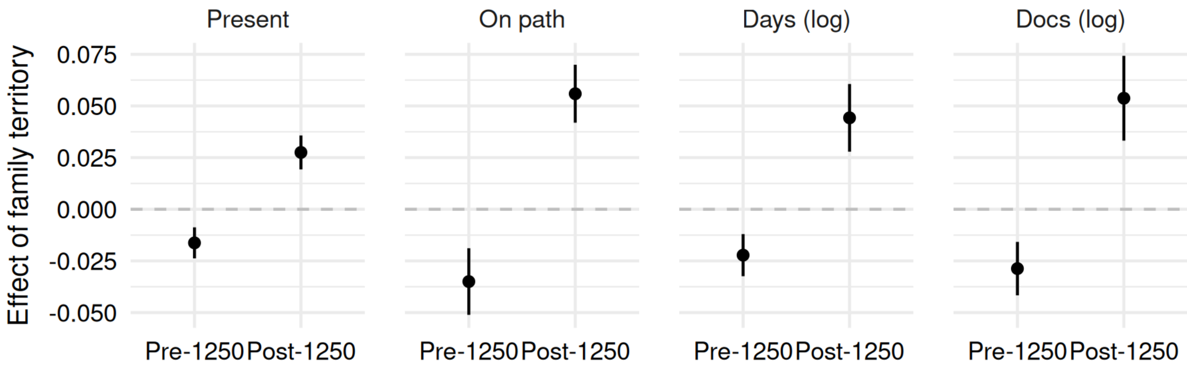


Figure A11: Results from "short" regressions as proposed by De Chaisemartin and D'Haultfœuile (2023)

Note: Each coefficient plots the results of a separate regression with cell and year FEs of the effect of Family Terr. in the pre- or post-1250 period as indicated on the x-axis.

Fixed Effect Counterfactual Estimators: An efficient set of estimators consists in fixed effect counterfactual estimators which impute the unobserved counterfactual outcomes of treated observations through the matrix completion methods (Athey et al. 2021) or the use of (interactive) fixed effects ((Gobillon and Magnac 2016; Xu 2017), for an overview, see Liu, Wang and Xu 2024). By construction, these are robust to treatment effects that vary over time and across observation and allow for staggered treatment adoption and reversal. We choose the matrix completion method as the main approach but show consistent results with the other two estimators (Figure A12). Separately estimating the effect of family control for the pre- and post-1250 eras, we find that our baseline estimates are generally robust. Figure A12 shows stable results across the three imputation methods, with the matrix completion method yielding the most conservative estimate of -0.9 [-1.4; -0.4] and 1.8 [1.2; 2.4] for the pre- and post-1250 periods, respectively. While sizeable and significantly different from each other, the effect magnitude is ca. 50% smaller than those of the baseline results, but very close to that reported for the DiD analysis.

The matrix completion estimator also yields no discernible pretrends (see panel b). Figure A13 plots the results of systematic tests for the absence of pretrends in the 10 years prior to the onset of family control of an area. While some coefficients differ significantly from 0 (p-values of joint F-tests $< .01$), these are all contained in a narrow range (dotted grey lines) which is significantly smaller than the equivalence range which is set by default to .36 times the

[40] These weights sum to 0 but can contain large positive and negative weights.

[41] This is mostly because the two treatments are implemented in separate time periods.

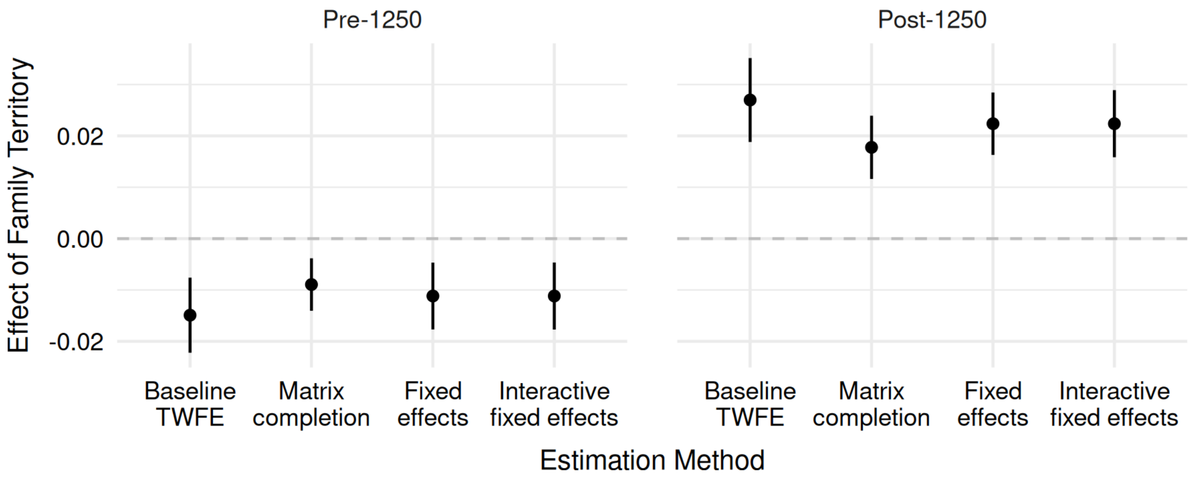


Figure A12: Results from fixed effects counterfactual estimators

Note: Each coefficient plots the results of a separate models with the imputation method noted on the x-axis, using the `fect` package by Liu, Wang and Xu (2024).

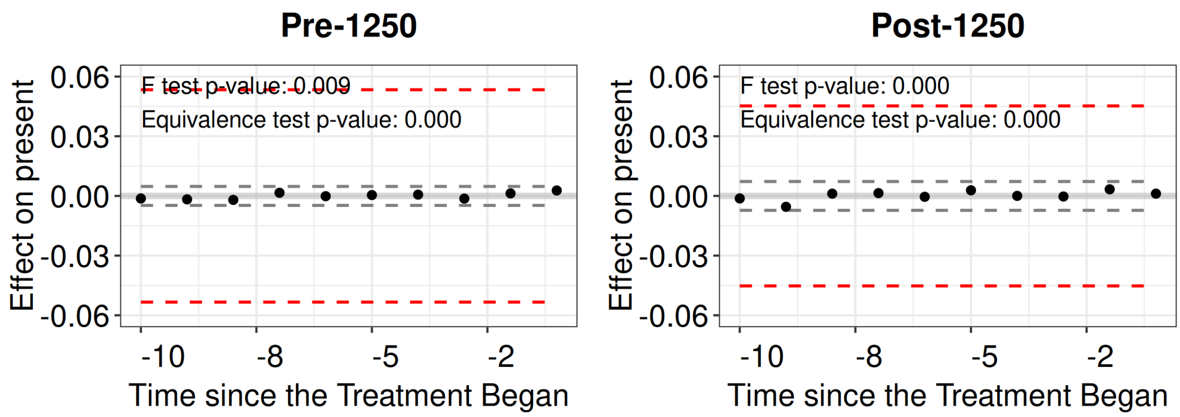


Figure A13: Pre-trend equivalence tests based on the matrix completion method in the 10 years prior to treatment onset

standard deviation of the residualized outcome variable (see Liu, Wang and Xu 2024; Hartman and Hidalgo 2018, for details). Lastly, testing for placebo and carryover effects further supports the credibility of the common trends assumption. Conducting a placebo test for the last 10 pre-treatment years[42] yields small placebo effects on ruler presence of -0.004 [-0.011; 0.002] ppts before and 0.004 [-0.000; 0.009] ppts after 1250. Both placebo effects fall squarely within the equivalence range ($p = 0$ for both tests). Carry-over effects after treatment termination are relatively small,[43], again fall inside the equivalence range, and point in the same direction as the main estimate thus biasing it, if at all, downwards.

Figure A14 lastly shows that the method yields estimates close to the baseline results for all outcome measures.

Multiple DiD estimator: We also use the alternative TWFE estimator developed by De Chaisemartin and D'Haultfœuile (2020). It estimates the treatment effect only for the (comparatively narrow) set of observations that switch their treatment status for the years in which they do so. Because it takes the simple average treatment effect across these observations, it does not rely

[42]These account for 33 percent of the control observations, thus yielding a well-powered test.
[43]Estimated to be -0.014 [-0.029; 0.001] ppts before and 0.006 [0.000; 0.011] ppts after 1250.

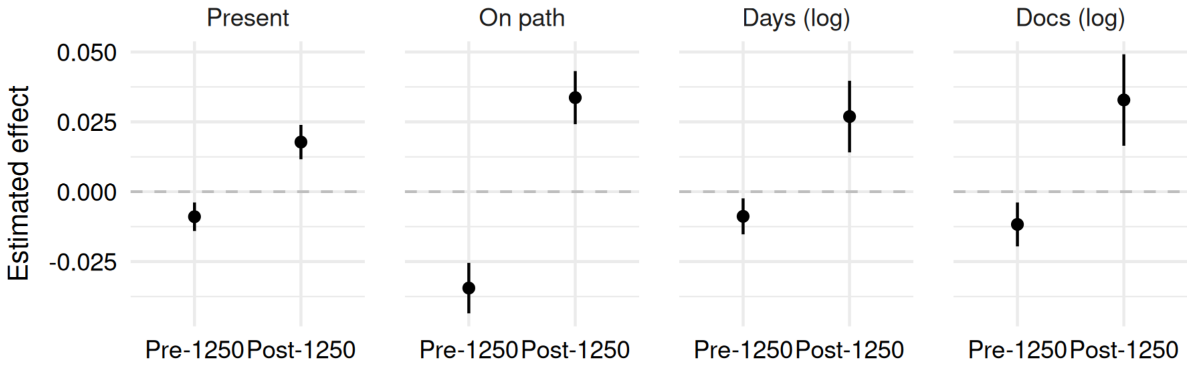


Figure A14: Effect of family territory on all outcomes, fixed effects counterfactual estimation

on the assumption of treatment homogeneity. It has, though, lower efficiency and power than the counterfactual methods discussed above, and offers less flexibility to test for the absence of pretrends which is why the latter are preferred here (see also Chiu et al. 2023). The estimator yields effects of family territory that are negative but statistically insignificant before 1250 (-0.010 [-0.033, 0.013]) and positive and precisely estimated thereafter (0.035 [0.016, 0.054]). These effects are statistically indistinguishable from those of the higher-powered counterfactual estimator used above. The significant effect difference is similar to that reported in Table 1.

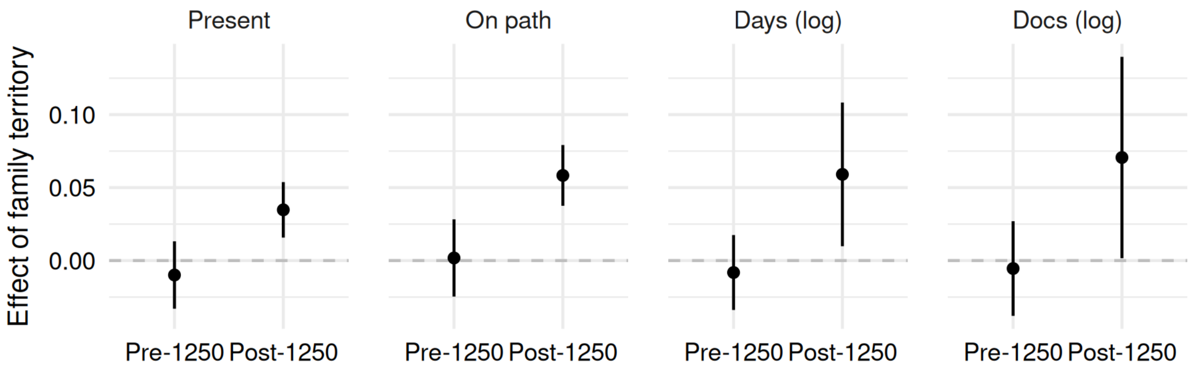
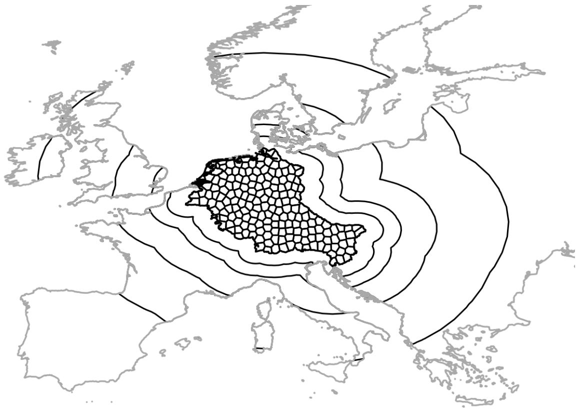


Figure A15: Results from the Multiple DiD estimator (De Chaisemartin and D'Haultfœuile 2020)

Note: Each coefficient plots the results of a separate regression with cell and year FEs of the effect of Family Terr. in the pre- and post-1250 periods.

E.2 Sample definition

Narrow vs. extensive definition of HRE: The baseline analysis is based on a definition of the territory of the HRE that tracks changes over century as captured in the Euratlas data. Yet, some of those changes might be endogenous to rulers' (lack of) power or itinerant rule. We thus create two versions of the HRE territory. The first narrowly defines the HRE as the intersection of all territories between 900 and 1500 (Figure A16a), yielding a much smaller territory without any areas south of the Alps. The other defines the HRE expansively as the union of all territories over the six centuries (Figure A16b). For each, we generate Voronoi cells of approx. 2'500km^2 size and measure rulers' presence and family territory. Reestimating the main specification yields results that are very close to those reported in the main paper (Figure A17). These results are furthermore robust if we expand the narrow and extensive definitions of the HRE using buffers of 100, 200, 400, and 800km width (Figure A18 and A19). This increases the number of cells and includes many more "peripheral" cells with fewer family control and ruler visits, suggesting that the results are robust to including them.



(a) Intersection of all extents with buffers. 183 cells à 2'500km^2.

(b) Union of all spatial extents (main sample) with buffers. 436 cells à 2'500km^2.

Figure A16: Spatial extent of sample

Note: Buffers drawn at 100, 200, 400, and 800km distance

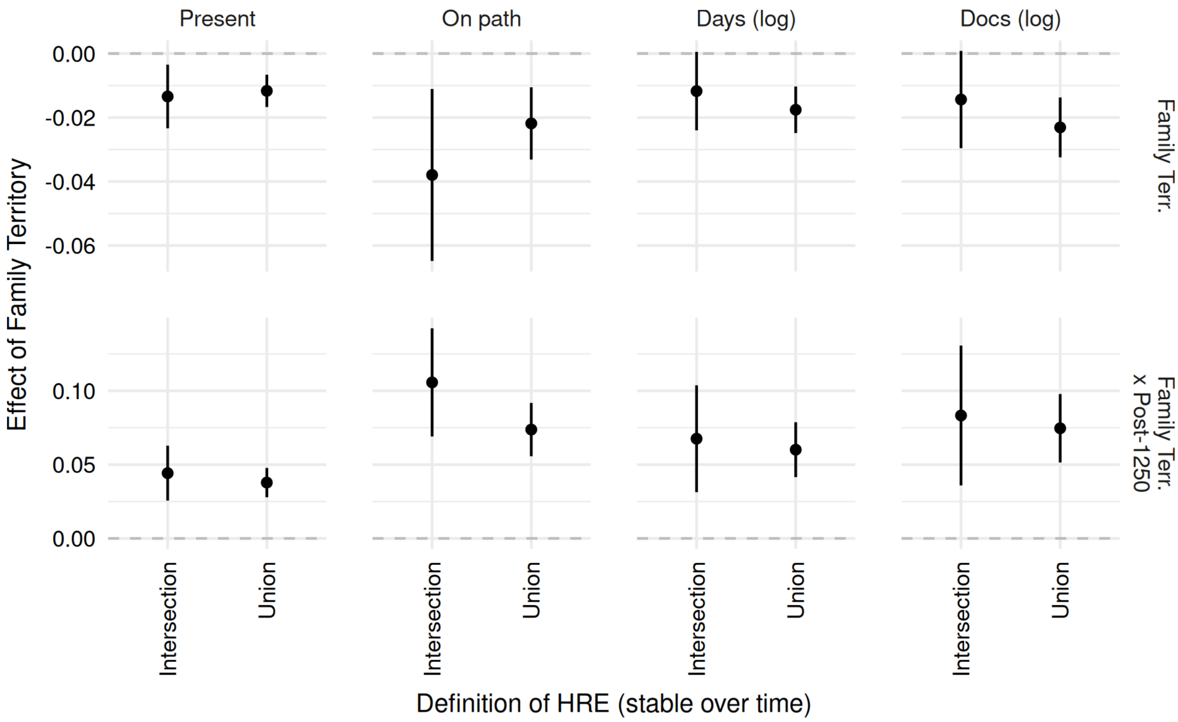


Figure A17: Stable sample of Voronoi cells covering the (1) intersection and (2) union of extents of the HRE from 900 to 1500.

Note: Specifications as in Table 1.

Unit size: One more potential caveat of the baseline results may stem from the size of our units of analysis, the Voronoi cells. Results plotted in Figure A20 are fairly stable – estimates

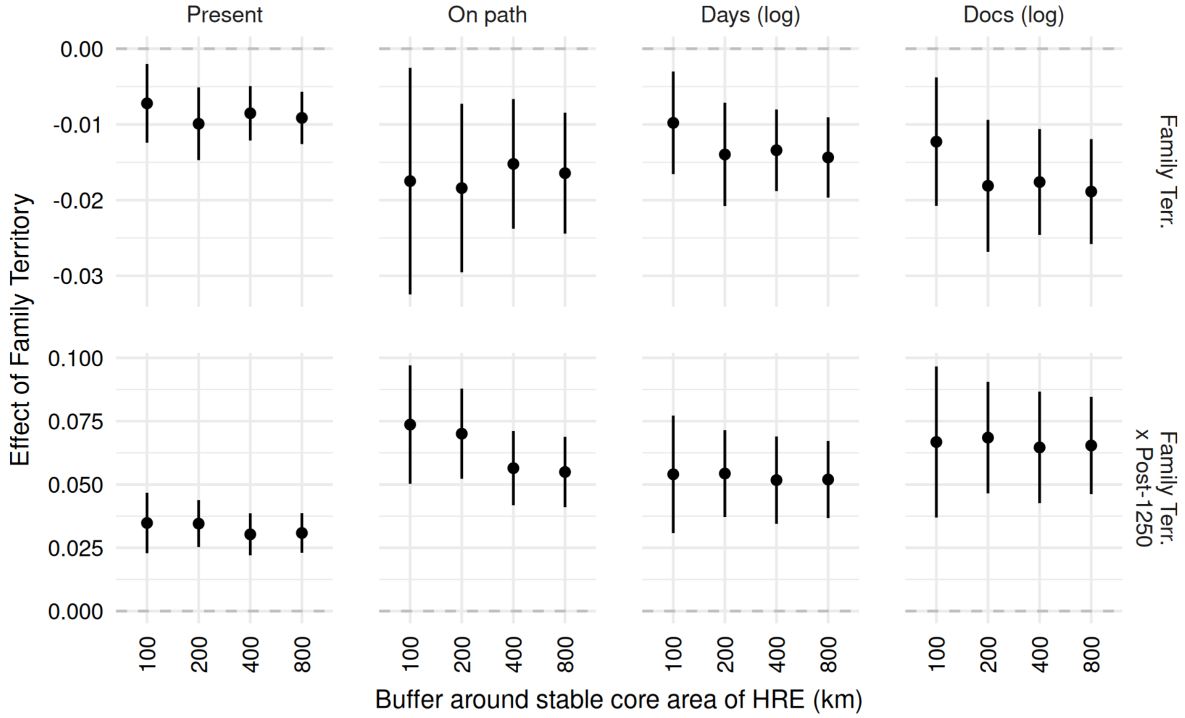


Figure A18: Stable sample of Voronoi cells (2'500km^2) covering the intersection of all HRE extents with additional buffer (in km)

Note: Specifications as in Table 1.

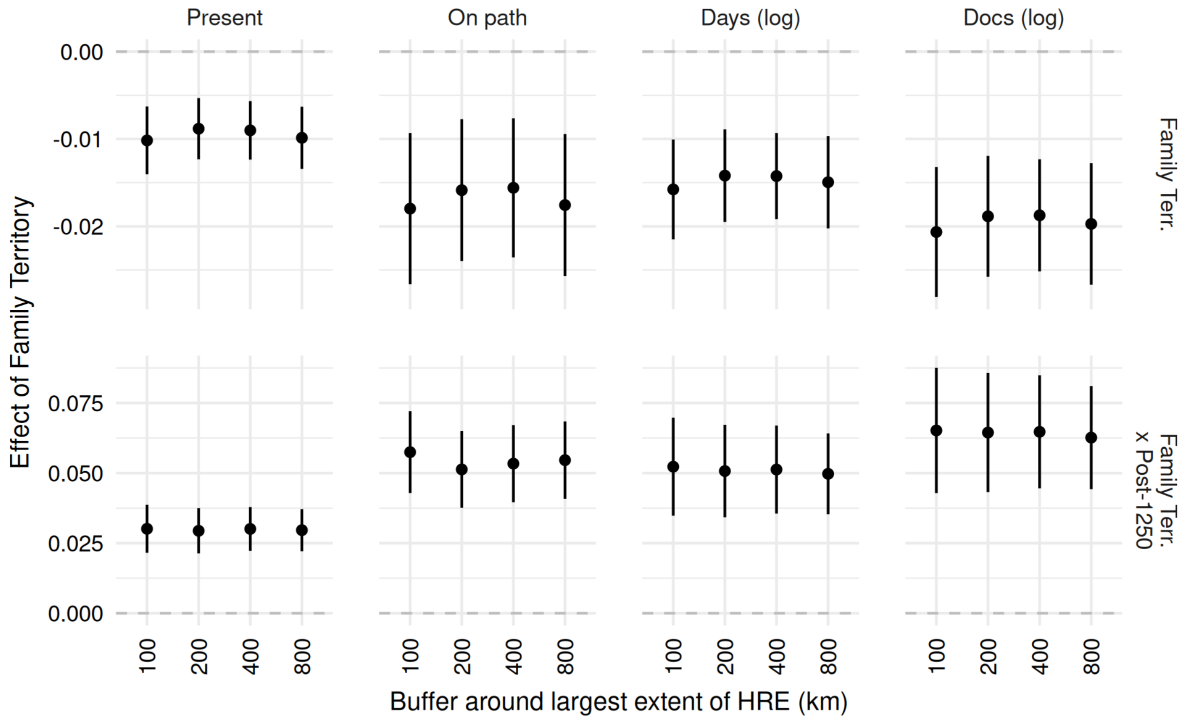


Figure A19: Stable sample of Voronoi cells (2'500km^2) covering the union of all HRE extents with additional buffer (in km)

Note: Specifications as in Table 1.

become slightly smaller and less precise as we add more errors from ecological inference with large (i.e., 10'000km^2) cells.

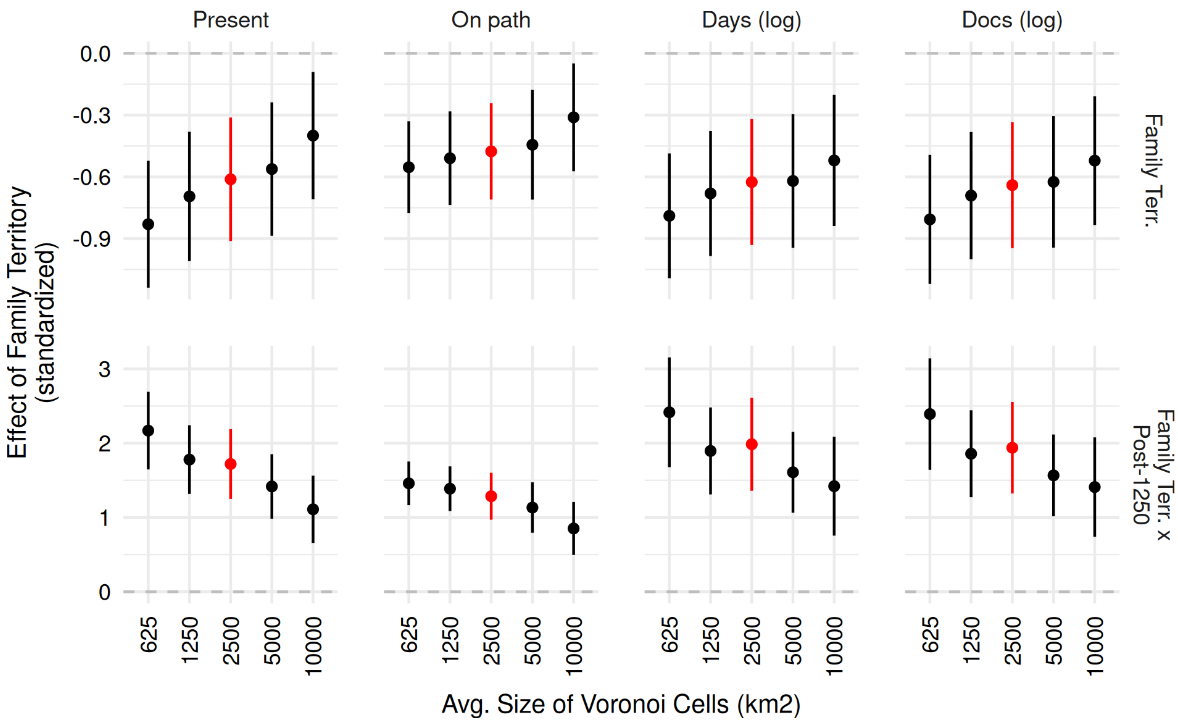


Figure A20: Effect by size of Voronoi cells. Coefficients are standardized by the mean of the dependent variables to compare results across models.

Note: Based on Table 1 using Voronoi cells of differing sizes as units of analysis.

E.3 Alternative Standard Error Adjustments

We employ a variety of alternative standard error specifications. We first show that our results are robust to clustering on the level of emperors (Table A10). Similar results are achieved with a ruler-jackknife in Figure A21. They show that the main estimates are not significantly affected by any single ruler in the data, not even those with a long reign.

We also assess robustness of uncertainty estimates to spatial and spatio-temporal error clustering. Results in Figure A22 employ Conley clustering (Conley 1999) to account for spatial dependencies, using a distance cutoff of between 50 and 500km. The results show statistically significant estimates throughout ($p < .05$), with slightly increased uncertainty at intermediate (≈200km) and smaller standard errors for small or large distance cutoffs.

To account for both spatial and temporal dependencies in the data, we use Driscoll-Kraay standard errors (Driscoll and Kraay 1998). Driscoll-Kraay standard errors account for spatial dependence by allowing for arbitrary cross-sectional correlation across units, averaging over all pairwise dependencies rather than imposing a distance-based cutoff. This feature is particularly useful in our context where changes in family territories can affect distinct areas at the same time and rulers paths form lines that might entail non-uniform dependencies between units. We set the temporal lag length to 20 years which is close to the average length of rulers reign (20.36 years). As shown in Table A11), our results remain robust to Driscoll-Kraay clustering.

Table A10: Ruler presence and family territory: SEs clustered at emperor and cell level

Dependent variables:	Present	On path	Days (log)	Docs (log)
Model:	(1)	(2)	(3)	(4)
Family territory	-0.015**	-0.032*	-0.020**	-0.026**
	(0.004)	(0.012)	(0.006)	(0.009)
Family territory × Post-1250	0.042**	0.087**	0.064**	0.079**
	(0.011)	(0.022)	(0.019)	(0.024)
Cell & Year FE	yes	yes	yes	yes
Outcome mean	0.024	0.068	0.032	0.041
Observations	183,090	183,090	183,090	183,090
R^2	0.094	0.141	0.091	0.090
Within R^2	0.003	0.005	0.003	0.003

Clustered (Emperor & Cell FE) standard-errors in parentheses
Significance codes: **: 0.01, *: 0.05, +: 0.1

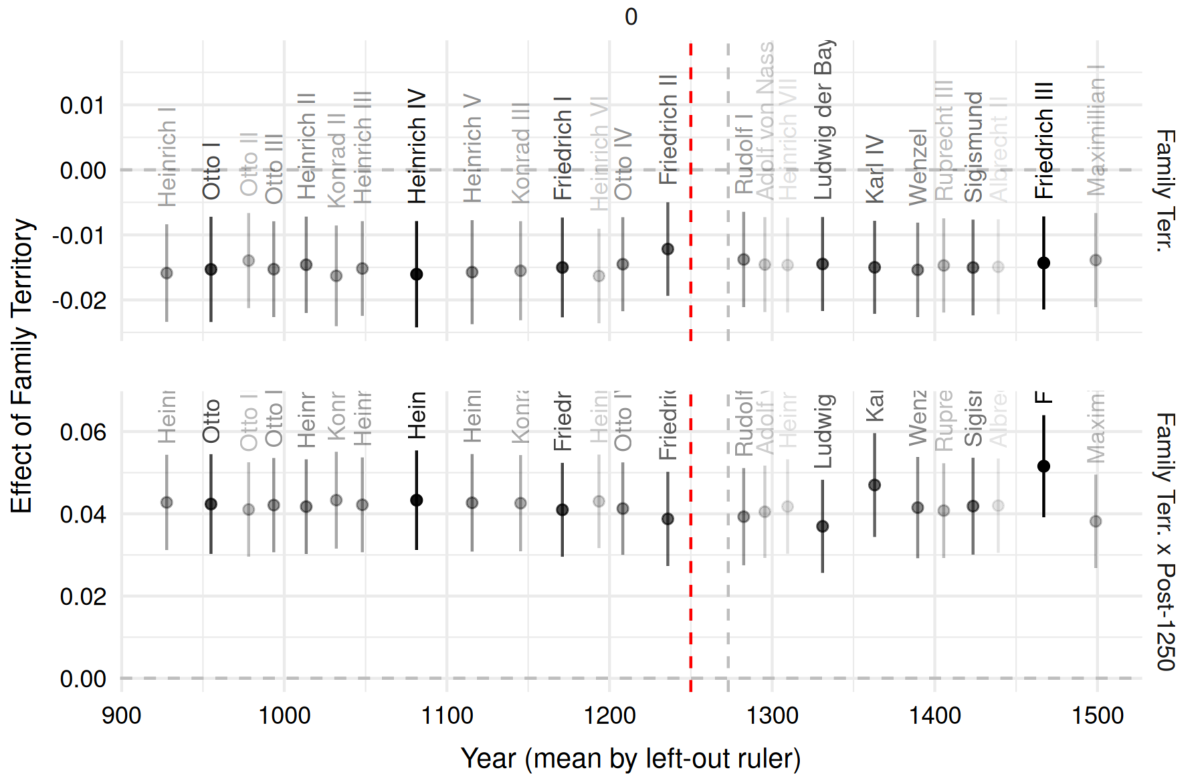


Figure A21: Ruler Jackknife: Leaving each ruler out of the sample.

Note: Based on specification from Model 1 in Table 1. Darker coefficients result from dropping emperors with a longer reign.

Table A11: Ruler presence and family territory: Driscoll Kraay-SEs

Dependent variables:	Present	On path	Days (log)	Docs (log)
Model:	(1)	(2)	(3)	(4)
Family territory	-0.015**	-0.032**	-0.020**	-0.026**
	(0.004)	(0.011)	(0.006)	(0.008)
Family territory × Post-1250	0.042**	0.087**	0.064**	0.079**
	(0.008)	(0.016)	(0.014)	(0.017)
Cell & Year FE	yes	yes	yes	yes
Outcome mean	0.024	0.068	0.032	0.041
Observations	183,090	183,090	183,090	183,090
R^2	0.094	0.141	0.091	0.090
Within R^2	0.003	0.005	0.003	0.003

Driscoll-Kraay (L=20) standard-errors in parentheses
Significance codes: **: 0.01, *: 0.05, +: 0.1

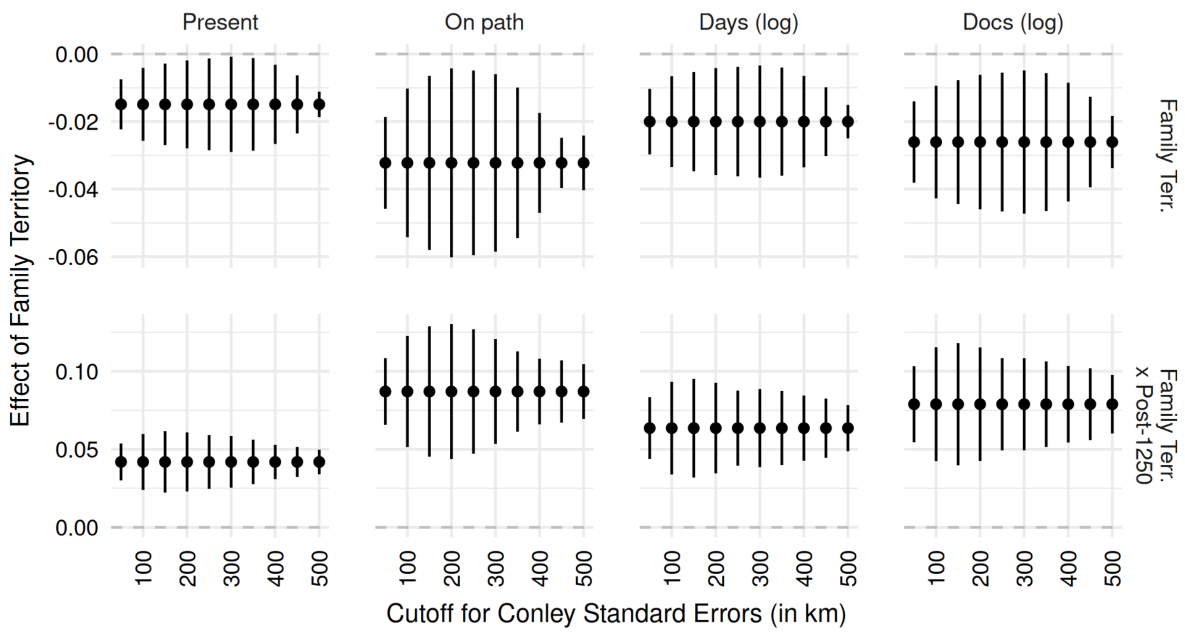


Figure A22: Conley standard errors with varying distance cutoffs (in km)

Note: Based on specifications from Table 1.

E.4 Family territory measurement

Pre-accession family control Some changes in family control might be due to emperors' strategic deployment of kin to become rulers in certain areas, a dynamic which might bias the main estimates as the underlying political reasons might well affect their travel patterns too. In order to prevent such biases from affecting the results, Table A12 uses a measure of family control which only relies on the territories under control of relatives in the year prior to emperors' accession to the throne and is held fixed throughout the reign of each emperor.[44] Thus removing the most pressing endogeneity concerns from the measure, the results show small negative but insignificant effects of family control before the Great Interregnum, but large, positive and statistically significant ones thereafter, with the difference being positive and significant as well. This findings aligns in particular with results from the Difference-in-Difference design which also focuses on variation around successions of the throne.

Table A12: Ruler presence and pre-accession family territory

Dependent variables:	Present	On path	Days (log)	Docs (log)
Model:	(1)	(2)	(3)	(4)
Family territory$^{\text{pre-acc}}$	-0.004	-0.002	-0.005	-0.007
	(0.004)	(0.009)	(0.005)	(0.007)
Family territory$^{\text{pre-acc}}$ × Post-1250	0.031**	0.047**	0.053**	0.063**
	(0.007)	(0.013)	(0.013)	(0.016)
Cell & Year FE	yes	yes	yes	yes
Outcome mean	0.024	0.068	0.032	0.041
Observations	183,090	183,090	183,090	183,090
R^2	0.093	0.139	0.090	0.090
Within R^2	0.002	0.002	0.003	0.002

Clustered (cell & year) standard-errors in parentheses
Significance codes: **: 0.01, *: 0.05, $^+$: 0.1

Excluding co-kings from the analysis A related potential problem of using family controlled territories is the pre-1250 praxis of handing of the Kingdom of Germany to emperors' sons. While the praxis is itself a signal of rulers' power, it might unduly bias the results and may indeed wholly cause them. We therefore construct a version of the family control indicator which excludes all titles of German (co-)kingship and reestimate our main model. The estimates show only slightly reduced effect estimates which is consistent with our argument that son's co-kingship is important, yet by far not the sole driver of our results.

Adding rulers' personal domains Another potential caveat of our measure of family territory is that it strongly, but of course not entirely overlaps with rulers' own personal domain, i.e. the titles they hold irrespective of their position as German and Italian kings and Holy Roman Emperors. The results could be particularly driven by visits to personal domains that do not overlap with our measure of family territory. We thus add rulers' personal territory to the other family territories. Rerunning the main analyses does produces barely different results as Table A14 shows. We continue to see a negative pre-1250 effect and a strong post-Interregnum shift towards rulers spending substantially more time in their own and their relatives' domains.

[44]Note that we drop the territory controlled by any ruling emperor or German King in that year, since these are the rulers that are being succeeded by an emperor-to-be in question.

Table A13: Ruler presence and family territory without German co-kings

Dependent variables:	Present	On path	Days (log)	Docs (log)
Model:	(1)	(2)	(3)	(4)
Family territory (no German Kings)	-0.009**	-0.016*	-0.011**	-0.014*
	(0.003)	(0.007)	(0.004)	(0.005)
Family territory (no German Kings) × Post-1250	0.036**	0.073**	0.056**	0.068**
	(0.005)	(0.011)	(0.010)	(0.012)
Cell & Year FE	yes	yes	yes	yes
Outcome mean	0.024	0.068	0.032	0.041
Observations	183,090	183,090	183,090	183,090
R^2	0.094	0.141	0.091	0.090
Within R^2	0.003	0.005	0.003	0.003

Clustered (cell & year) standard-errors in parentheses
Significance codes: **: 0.01, *: 0.05, +: 0.1

Table A14: Ruler presence and family territory: Incluiding rulers' personal domains

Dependent variables:	Present	On path	Days (log)	Docs (log)
Model:	(1)	(2)	(3)	(4)
Family territory (w/ pers. dom.)	-0.011**	-0.014+	-0.014**	-0.019**
	(0.004)	(0.008)	(0.005)	(0.006)
Family territory (w/ pers. dom.) × Post-1250	0.049**	0.094**	0.082**	0.100**
	(0.006)	(0.011)	(0.013)	(0.015)
Cell & Year FE	yes	yes	yes	yes
Outcome mean	0.024	0.068	0.032	0.041
Observations	183,090	183,090	183,090	183,090
R^2	0.096	0.145	0.094	0.093
Within R^2	0.006	0.010	0.007	0.006

Clustered (cell & year) standard-errors in parentheses
Significance codes: **: 0.01, *: 0.05, +: 0.1

Varying spatial coding of family territory Table A15 tests whether our main results are due to measuring family territory as a dummy variable instead of continuously (as the share of a cell covered by family control), or due to combining the Euratlas and Abramson data. The results show slightly stronger results with a continuous measure of territorial family control. They also hold when using either only the Euratlas data or only the Abramson data. Yet, since neither fully covers all titles of all family members, coefficient sizes and estimates' precision decreases slightly.

Table A15: Ruler presence and family territory: Alternative treatment indicators

Dependent Variable:	Present					
Territory data:	Combined		Euratlas		Abramson	
Family Terr. values:	0/1	0–1	0/1	0–1	0/1	0–1
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Family territory	-0.015**	-0.018**	-0.018**	-0.019**	-0.012*	-0.013*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.006)
Family territory × Post-1250	0.042**	0.060**	0.037**	0.051**	0.040**	0.059**
	(0.006)	(0.008)	(0.006)	(0.008)	(0.008)	(0.011)
Cell & Year FE	yes	yes	yes	yes	yes	yes
Outcome mean	0.024	0.024	0.024	0.024	0.024	0.024
Observations	183,090	183,090	183,090	183,090	183,090	183,090
R^2	0.094	0.095	0.093	0.093	0.093	0.094
Within R^2	0.003	0.004	0.002	0.002	0.002	0.003

Clustered (cell & year) standard-errors in parentheses
Significance codes: **: 0.01, *: 0.05, +: 0.1

E.5 Potential bias in Regesta documents

The regesta imperii feature a growing number of documents per year. This pattern in the availability of data may drive the results. We here present three additional analysis: We (1) use all geocoded regests (without any potentially biased cleaning incurred in the path-making exercise) in Table A16, (3) mimick the loss of documents over time by resampling the data, keeping only 12, 25, .. 200, 400 documents in each year as an input to the path-making algorithm in Figure A23, and finally (3) control for the yearly number of documents and unique locations visited in Table A17. If low vs. high coverage differences over time explain our results, these additional analysis should yield results that differ starkly from the baseline analysis. Yet, the results of these additional analysis are well in line with the baseline results, suggesting that biased survival or quality of the Regesta data does not drive them. This adds to the evidence of the discontinuity in the effect of family territory in 1250 which is unlikely caused by such biases in the data.

Table A16: Ruler presence and family territory: All georeferenced regesta imperii entries

Dependent variables:	Present (all RI)	Days (all RI, log)	Docs (all RI, log)
Model:	(1)	(2)	(3)
Family territory	-0.022**	-0.029**	-0.036**
	(0.005)	(0.007)	(0.008)
Family territory × Post-1250	0.048**	0.074**	0.090**
	(0.007)	(0.012)	(0.014)
Cell & Year FE	yes	yes	yes
Outcome mean	0.035	0.043	0.053
Observations	183,090	183,090	183,090
R^2	0.107	0.107	0.104
Within R^2	0.003	0.003	0.003

Clustered (cell & year) standard-errors in parentheses
Significance codes: **: 0.01, *: 0.05, +: 0.1

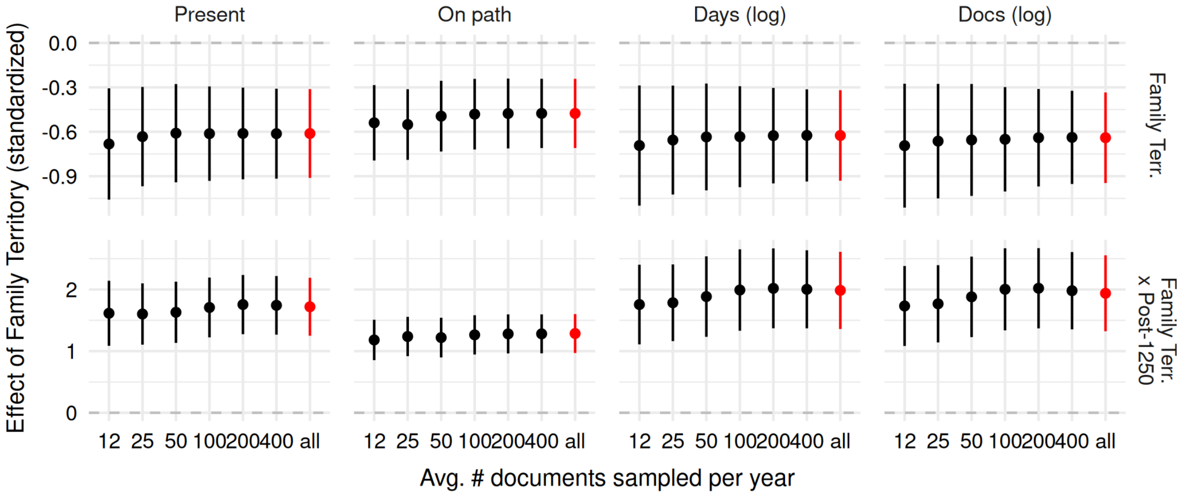


Figure A23: Effect by sampled # of yearly documents. Coefficients are standardized by the mean of the dependent variables to compare results across models.

Note: Resampling N documents (x-axis) from the regesta imperii as input to the path-making algorithm, then reestimating our main specification from Model 2 in Table 1.

Table A17: Ruler presence and family territory: Control for yearly data coverage

Dependent Variable:		Present	
Model:	(1)	(2)	(3)
Family territory	-0.014**	-0.018**	-0.021**
	(0.004)	(0.004)	(0.004)
Family territory × Post-1250	0.044**	0.041**	0.046**
	(0.008)	(0.006)	(0.008)
Family territory × I(docs/1000)	-0.007		-0.020
	(0.014)		(0.015)
Family territory × I(locs/1000)		0.226	0.447^{+}
		(0.238)	(0.261)
Cell & Year FE	yes	yes	yes
Outcome mean	0.024	0.024	0.024
Observations	183,090	183,090	183,090
R^2	0.094	0.094	0.094
Within R^2	0.003	0.003	0.003

Clustered (cell & year) standard-errors in parentheses
Significance codes: **: 0.01, *: 0.05, $^{+}$: 0.1

E.6 Governance activities

We use the categories of first verbs (commanding, empowering, informing; see Appendix B.3) in each *Regesta* document to differentiate between different types of governance activities. In parallel to our main `present` dummy, we encode (overlapping) activity binary variables which take the value of 1 if any one document with a first-sentence verb from the respective category is issued in a cell-year and 0 otherwise. We then perform two analyses. The first re-estimates the baseline model (Model 1, Table 1) with the governance activity dummy as the outcome. The second analysis conditions on rulers' presence and a linear and quadratic term of the number of documents issued in a cell-year to assess differences in governance activities *conditional* on ruler presence. We standardize coefficients by the mean of the respective outcome variable to ensure comparability.

Supporting the notion that governance activities come as "bundles" with rulers' presence, the first row of unconditional estimates in Figure A24 show that all three types governance activity follow similar patterns. Once conditioning on rulers' presence and the number of documents recorded, we find that weak *command* and *inform* become relatively more frequently in family territory after the Great Interregnum but not before. No such pattern is visible among verbs associated with empowering an object. This result is suggestive evidence in support of our argument that weak rulers had to keep their relatives at a shorter leash than stronger ones.

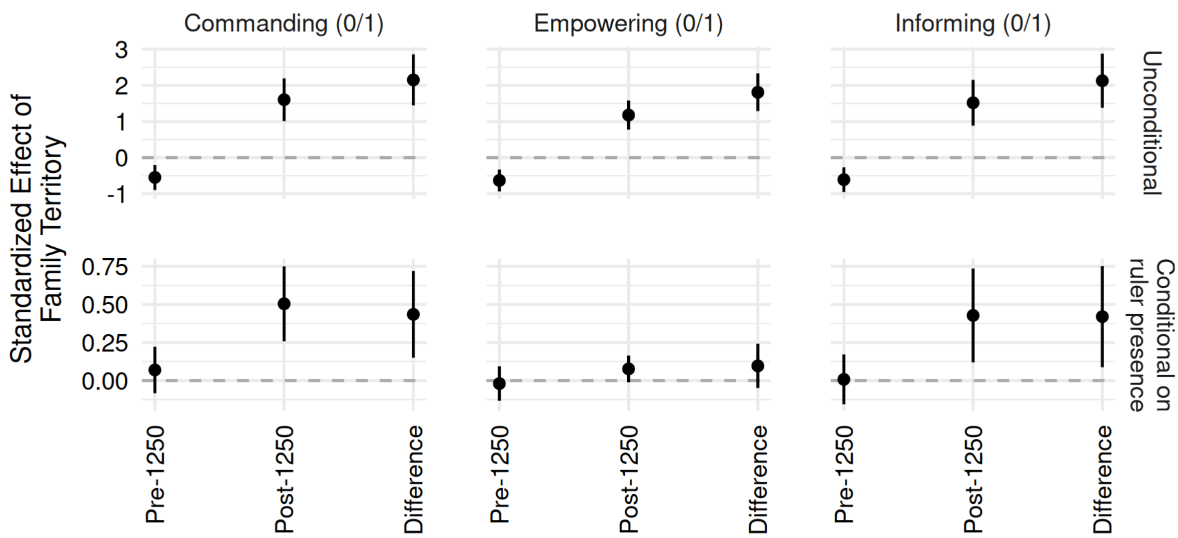


Figure A24: Effect by family territory on binary indicators of rulers' governance activities.

Note: Based on the main TWFE specification from Model 1, Table 1. Conditional models add a dummy variable for rulers' presence and a count of documents recorded (linear and squared).

While these results align closely with tour argument, analyzing the content of the *Regesta* documents comes with at least three risks of bias. First is potential recording bias as some activities such as the conferring of rights may have been more amenable to leaving a trace in written records than others. Second, some acts may refer to areas other than where they were issued as rulers also interact with elites from elsewhere who have traveled to meet him. Third and most importantly, where acts refer to objects in rulers' current location, they are conditional on rulers' presence adding a crucial layer of selection bias. While our conditional estimates account for this fact, adding controls for rulers' presence and the number of documents issued causes potential post-treatment bias. As a result, we regard the above results as only suggestive.

E.7 Alternative measures of rulers' power

Our argument that the Great Interregnum disrupted imperial power is well grounded in the historical literature. Yet, our interpretation of results is based on the argument that the post-1250 shift in rulers' itineraries to family-controlled territories occurred because their power weakened rather than other factors that might have changed simultaneously during the Great Interregnum. As a remedy, we present an auxiliary analysis that focuses on family ties between nobles as an important source of political power (cf. Padgett and Ansell 1993) and loyalty that held polities and political alliances together (Benzell and Cooke 2021).

We capture this logic by recurring on rulers' centrality in the network of European nobility as an alternative measure of imperial power. In particular, we measure rulers' average distance to all living members of the network constructed from Marek's (2018) data[45] as well as their eigenvector centrality. Both are commonly used measures of centrality, which we normalize for every year by dividing them by the mean of the respective measure among all living members in the network. This accounts for changes in the network topology over time. Since the centrality measures might be affected by the network size and rulers' age – both might also correlate with their travels, we control for both.

Table A18: Ruler presence and family territory: Alternative strength indicators

Dependent Variable:	Present			
Model:	(1)	(2)	(3)	(4)
Family territory	-0.500**	-0.567**	0.197**	0.001
	(0.127)	(0.130)	(0.061)	(0.068)
Family territory × NW distance (norm)	0.552**	0.477**		
	(0.138)	(0.133)		
Family territory × EV centrality (norm)			-0.163**	-0.109*
			(0.052)	(0.054)
Controls	no	yes	no	yes
Cell & Year FE	yes	yes	yes	yes
Outcome mean	0.024	0.024	0.024	0.024
Observations	183,090	183,090	183,090	183,090
R^2	0.092	0.093	0.092	0.093
Within R^2	0.001	0.002	0.001	0.002

Clustered (cell & year) standard-errors in parentheses
Significance codes: **: 0.01, *: 0.05, +: 0.1

The results in Table A18 show that rulers centrality (i.e., distance) in the network of European nobility reduces the effect of family territory on the likelyhood that an area receives a visit in a given year or not. This effect is only slightly reduced by the addition of the above mentioned covariates and precisely estimated with the slight exception of the eigenvector centrality model with controls (Model 4; $p < .1$).

E.8 Accounting for potential time-varying confounders:

Varying Fixed Effects: We first test whether our results are stable to removing cell and year fixed effects from the analysis. Table A19 shows very similar effect estimates of family territory on ruler presence with and without these.

[45] For unconnected members, we set the distance to 10 and truncate all other connections to that (very high) value.

Table A19: Ruler presence and family territory: Dropping fixed effects

Dependent Variable:	Present			
Model:	(1)	(2)	(3)	(4)
Constant	0.026**			
	(0.003)			
Post-1250	-0.008*		-0.004	
	(0.003)		(0.003)	
Family territory	-0.009**	-0.009*	-0.010**	-0.015**
	(0.002)	(0.004)	(0.002)	(0.004)
Post-1250 × Family territory	0.034**	0.037**	0.034**	0.042**
	(0.005)	(0.006)	(0.005)	(0.006)
Year FE (509)		yes		yes
Cell FE (436)			yes	yes
Outcome mean	0.024	0.024	0.024	0.024
Observations	183,090	183,090	183,090	183,090
R^2	0.003	0.015	0.082	0.094
Within R^2		0.003	0.004	0.003

Clustered (cell & year) standard-errors in parentheses
Significance codes: **: 0.01, *: 0.05, +: 0.1

Our main analyses only assess the effects of territories controlled by secular family members as a treatment. Yet, the Church – and family members of rulers that wield power over its institutions and lands – might similarly shape rulers' travels. In addition, after the Investiture Crisis, the relationship between the Church and Holy Roman Empire changed drastically, adding to the risk that our results are driven by unmodelled dynamics in rulers' responses to family members in the clergy. We geolocate the towns of positions of power in the clergy that rulers' family members occupy, aggregate this data to the cell level, and interact it with our post-1250 dummy. Adding this interaction to our main specification does not affect our main results – after all, only very few cells are affected by this coding. Yet, we see that cells with church-family members tend to be visited less often after 1250 than before.

Time-varying controls: We lastly address potential issues of omitted variable bias that are hard to observe given the lack of time-varying and geographically disaggregated socio-economic data for the period. We do so by adding various geographic control variables with yearly varying effects to the data. In particular, Table A21 adds (1) linear and interactive terms for cells' latitude and longitude; (2) measures of cells' altitude and slope (from FAO 2015); (3) climate-related variables on cells' average temperature, precipitation, evaporation, and the ratio of the latter two (from FAO 2015); (4) as well measures of cells' average agricultural suitability (from Ramankutty et al. 2002). Model (5) finally adds all yearly varying covariates. Even though adding these yearly covariate terms is demanding on the data and adds significantly to the explanatory power of the model, the resulting interaction term indicates stable, negative (positive) effects of family-controlled territory on emperors' presence for the pre-1250 (post-1250) period.

Table A20: Controlling for family members in the Church

Dependent variables:	Present	On path	Days (log)	Docs (log)
Model:	(1)	(2)	(3)	(4)
Family territory	-0.015**	-0.032**	-0.020**	-0.026**
	(0.004)	(0.008)	(0.005)	(0.006)
Family territory × Post-1250	0.042**	0.087**	0.063**	0.079**
	(0.006)	(0.011)	(0.010)	(0.013)
Family in church	0.011	0.083**	-0.004	-0.013
	(0.016)	(0.030)	(0.020)	(0.024)
Post-1250 × Family in church	-0.004	-0.109*	0.013	0.029
	(0.027)	(0.042)	(0.041)	(0.051)
Cell & Year FE	yes	yes	yes	yes
Outcome mean	0.024	0.068	0.032	0.041
Observations	183,090	183,090	183,090	183,090
R^2	0.094	0.142	0.091	0.090
Within R^2	0.003	0.006	0.003	0.003

Clustered (cell & year) standard-errors in parentheses
Significance codes: **: 0.01, *: 0.05, $^+$: 0.1

Table A21: Ruler presence and family territory: Fixed slopes

Dependent Variable:	Present				
Model:	(1)	(2)	(3)	(4)	(5)
Family territory	-0.016**	-0.015**	-0.012**	-0.015**	-0.008*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Family territory × Post-1250	0.043**	0.044**	0.038**	0.042**	0.033**
	(0.007)	(0.006)	(0.006)	(0.006)	(0.007)
Yearly fixed slopes	Lon/lat	Terrain	Climate	Agr. suit.	All
Cell & Year FE	yes	yes	yes	yes	yes
Outcome mean	0.024	0.024	0.024	0.025	0.025
Observations	183,090	183,090	183,090	182,072	182,072
R^2	0.115	0.098	0.119	0.098	0.153
Within R^2	0.003	0.003	0.003	0.003	0.002

Clustered (cell & year) standard-errors in parentheses
Significance codes: **: 0.01, *: 0.05, $^+$: 0.1

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