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

Carl Müller-Crepon* Clara Neupert-Wentz† Andrej Kokkonen‡
Jørgen Møller§

April 24, 2024

Abstract

Itinerant rule, rule exercised through traveling, was a common, yet barely studied 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 yet understudied form of governance.

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

Word count: 9'997

*Department of Government, London School of Economics and Political Science. Corresponding author: c.a.muller-crepon@lse.ac.uk. We thank Anne Degrave, Andrew Goodhart, Trellace Lawrimore, Roberto Valli, and participants of seminars in Aarhus and Zurich, and audiences at EPSA 2022 and APSA 2022 for their constructive and very helpful feedback. We thank Ali Karcic for his invaluable research assistance.

†Department of Political Science, Aarhus University
‡Department of Political Science, University of Gothenburg
§Department of Political Science, Aarhus University

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 clearly recognizes that medieval administrations were rudimentary by modern standards. Across Europe, power depended on negotiated relationships between rulers and their elite groups and 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, it comes with the at least implicit projection of the modern concept of territorial, strictly bounded, and impersonal statehood onto a past where political authority was significantly carried by rulers' presence. Second, the very physical character of itinerant rule sheds light on how rulers monitored and controlled local elites more directly than is often possible even in modern states. Although historical and contemporary authoritarian regimes differ in many regards, they share the need to maintain power coalitions and navigate principal-agent relations (Kokkonen et al. 2021).

The neglect of itinerant rule is also troubling as it affects governance beyond the European Middle Ages. 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). 14th-century Javanese emperors, 18th-century Moroccan Sultans, 19th-century Ethiopian kings, and British colonial officers all governed traveling (Geertz 1977; Peyer 1964; Lugard 1926). In fact, political leaders travel extensively still today – in 2023, US President Joseph Biden traveled on 30% of all days.[1]

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

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 likely important tools for modern governance too even where rulers can draw (but only imperfectly rely) on 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 snail's pace, and knowing that visiting the wrong place at the wrong time was not only folly but potentially dangerous?

We propose a theory of itinerant rule that conceives of the relation between the monarch and local elites as a principal-agent relationship (e.g., Huning and Wahl 2017, 13). We argue that rulers maximized the payoff of slow and costly traveling by visiting "marginal" local elites who could be induced to comply through in-person visits. Visits yielded less payoff 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 succession. However, their ability to do so depended on their power: Close relatives of weak rulers had more incentives to shirk and turn against them, increasing the payoff of more frequent monitoring. We therefore expect rulers' itineraries to reflect their own strength and the geography of their family-relations. We expect strong rulers to spend less time in territories controlled by their relatives and orient their governance towards regions controlled by more "marginal" elites who could be made compliant through rulers' presence. In comparison, weaker rulers face less loyal relatives, incentivising them to spend more time monitoring them.

We test this argument by comprehensively 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 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

[2] Assouad (2020), for example, analyzes the effects of Kemal Attatürk's travels on nation-building in Turkey.

their travel itineraries from 72'665 historical documents recording dated and geolocated activities they engaged in. On average, we reconstruct itineraries from 143 documents per year. We make the full data accessible via the interactive platform on www.xxx.com.

Our empirical analysis maps emperors' 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 their relatives' territories than elsewhere. This change in travel patterns materialized immediately and discontinuously after the Great Interregnum. Our finding holds in a difference-in-differences design that 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 most pronounced in economically more affluent areas and mainly driven by relatively close, male, and direct relatives, who were important agents of strong rulers and the fiercest 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, local lords, or bishops – had to travel their lands to govern effectively. The Salian kings and emperors of the HRE could spend more than half their royal lifetime on the road (Bernhardt 1993, 48), and the English King John Lackland traveled with his court an average of thirteen to fourteen times a month (Bartlett 2000, 133). The accompanying entourages were considerable: German emperors were typically followed by 300 to 1'000 people (Bernhardt 1993, 58).

According to historians, the most important driver of itinerant rule in Europe was the breakdown of central government structures of the Western Roman Empire in the 5th century (Wickham 2005, 2009, 2016). The emerging HRE was politically fragmented and characterized by a "structural dualism" setting the ruler and his agents alongside powerful local nobles and high clergy (Rady 2017, 15). Rulers executed their power through physical interactions with elites across the large 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 the recognition across their realm 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.

Royal roads maintained and safeguarded by monasteries, churches, episcopal cities, and royal vassals made traveling relatively safe and easy (Bernhardt 1993, 57; Bernhardt 2013, 316). Royal palaces (*Pfalzen*) offered accommodation and upkeep on royal domains (Bernhardt 2013, 310). This infrastructure gave the emperor an advantage over local nobles, who only had the right to utilize the roads in the regions they ruled. Normally, rulers' trips were planned, and itineraries announced long in advance. This facilitated preparations and allowed local elites to plan their own (shorter) travels to meet the emperor, sometimes at formal "court days" (German *Hoftage*).

Throughout their travels, rulers carried out a wide range of activities. First and foremost were acts that constituted the judicial and political functions of governance: they would showcase and assert their royal authority, renew and receive pledges of loyalty from the elites, 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 at court cases, corrected power-abuses by local elites, and mitigated disputes, all according to local and/or imperial law (Boucoyannis 2021). Rulers addressed these matters of local justice and politics at the assemblies of notables they frequented. These public and highly ritualized proceedings also allowed notables to offer their counsel, facilitating rulers' efforts to take decisions and resolve conflicts (Althoff 2004, 139-152).

Second, rulers' travels and related public rituals were crucial to foster the mutually dependent legitimacy of the ruler and local elites (Nelson 2008; Haldén 2020).[3] Assemblies and meetings for feasts, and the handout of lavish gifts also 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 – including duchies and count-ships – on supporters or enemies that they had to placate, and they would appoint others to offices such as bishops and abbots. 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 Holy Roman Empire. This was an era when public taxation was non-existing or low, 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 fiefdoms that had once been imperial, 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 traditionally argue that "the intensity" of imperial government was higher in regions visited regularly by the emperor

[3]For parallel effects of US presidents' travels, see Goldsmith, Horiuchi and Matush (2021) and Malis and Smith (2021).

and lower in regions the emperor did not inspect personally but rather ruled through his dukes, margraves, and counts. If a ruler was absent for protracted periods and was unable to exercise the royal prerogative, "the local nobility would often be quick to usurp it" (Bernhardt 1993, 53). Indeed, the mere threat that the king and his armed followers might appear outside their castles at any time is likely to have made nobles more obedient (Geertz 1977). It was, therefore, important for him to keep up the impression that he was constantly traveling.

The main problem was that the HRE was too big for even the most enthusiastically traveling emperor to make his presence felt everywhere at all times. In addition to modern-day Germany, it encompassed northern Italy, large parts of the Benelux countries, Austria and Bohemia. Throughout the period we analyze, HRE rulers therefore had to choose their itineraries wisely.

Economic considerations certainly affected rulers' itineraries. Not all regions were able to feed the emperor and his court who imposed heavy burdens on communities, making itinerant rule effective at burden-sharing (Gillingham 2000, 72). Affluent regions were thus easier to visit than poor ones. More developed regions were also more attractive to extort in-kind resources from, especially if the monarch held personal or royal estates in the region. They also proved easier to collect monetary revenues from which was at times an important factor in shaping royal itineraries (Kanter 2011; Whaley 2018).[4]

Historical research provides further insights into particular, dynastic drivers of itineraries of selected emperors. Müller-Mertens (1980), for example, shows that Otto I (r. 936-973) spent much time in his ancestral Saxony and the old Carolingian heartland along the Rhine. During the Salian dynasty, the center of imperial power shifted further toward the Rhine with and further south towards Swabia with the Hohenstaufens. While providing thick descriptions of emperors' travels, prior historical research on itinerant rule offers little systematic insights into the political strategies that determined rulers' journeys. The next section therefore develops a 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 a visit. Specifically, emperors will focus on locations controlled by "marginal" agents whose preferences are not well aligned with those of the emperor but may shift with (the possibility of) a visit. Loyal agents should be visited less frequently, as their preference alignment mutes delegation problems of indirect rule. Reversely, inducing compliance among agents whose preferences diverge significantly from those of the ruler requires too much oversight to be profitable, which is why they are seldom visited.

We expect that the degree of preference alignment between central rulers and local

[4]They were likely also home to elites with more power and weight in rulers' winning coalition.

elites crucially depends on family relations and rulers' power. Due to the dynastic politics of succession, we expect that monarchs' relatives are comparatively loyal. Yet, this loyalty depends on rulers' ability to secure the material benefits of family rule and uphold the prospect of dynastic succession. Once these falter, family members become more likely to shirk or even challenge the ruler. We therefore argue that weak emperors should visit their 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, and monitoring

Across the HRE, the emperor had to rely on the nobility and high clergy as his agents. As the set of local nobles was given upon coronation, he had little ex-ante control over their (varying) preferences. Furthermore, his ability to remove and appoint new local elites was limited due to 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. They could increase compliance among agents through monitoring and (threats of) punishment upon detection of disloyalty. Yet, ensuring compliance through such oversight became more costly as local elites' preferences diverged more from those of rulers. Monitoring and punishment under itinerant rule had both direct costs and, importantly, high opportunity costs since rulers could only be at one place at once 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 monitoring and 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 and policing without which they would shirk their responsibilities, undermine governance, and decrease rulers' payoffs. The emperor could not fully rely on them as a proxy for his presence but could increase compliance through (prospects of) monitoring visits and punishment of non-compliance. Agents reacted to the costs 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 a high, even constant level of monitoring and policing, which was too costly when rulers could only be at one place at a time. In addition, attempting to impose direct rule on a comparatively hostile part 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.[5] 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 providing upkeep and resources to rulers, we expect these patterns to be most pronounced in more developed areas. Rulers should frequent less affluent areas generally less, irrespective of their local elites.

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. Emperor therefore had to rely on shortcuts to gauge agents' preference alignment.

We argue that family ties proxied for agents' preference alignment since rulers' relatives tend to profit most from the ruling dynasty, system, and hierarchy. The logic of dynastic politics and succession as well 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 important 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 (Kokkonen et al. 2021). Therefore, weak rulers had good reasons to visit "competing" relatives more than other relatives, simply to keep them on a short

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

leash.

The Great Interregnum and the strength of royal power

We argue above that rulers' propensity to visit and monitor their family members is lower among powerful than among weak rulers. To apply this logic to the HRE, we identify temporal variation in the strength of its kings and emperors, in particular its collapse with the Great Interregnum AD 1250–1273.

Around AD 1000, the HRE was by far the most powerful polity in Western and Central Europe (Southern 1956, 19-20; Wickham 2009, 430, 523; Wickham 2016, 64, 77). Its ascendancy was particularly prominent with the Ottonians (r. 919–1024) and the Salians (r. 1024–1125) up until the Investiture Controversy 1075–1122, which weakened emperors' power over the appointment of bishops and starkly reduced imperial authority south of the Alps (Wickham 2016; Wilson 2016; Møller and Doucette 2022, ch. 5-6; Grzymała-Busse 2023*b*). However, in the Empire's largest part north of the Alps, imperial power remained vigorous long after, and generally resurged under the Hohenstaufen dynasty (r. 1138/55–1254). Emperor Frederick Barbarossa (r. 1152–1190) and his grandson Frederick II (r. 1212–1250) even attempted, but ultimately failed, to revive imperial power in northern Italy (Grzymała-Busse 2023*b*, 26). In general, rulers of the HRE thus governed from a position of strength from the rise of the Ottonians in 919 and until the death of Frederick II in 1250. A good illustration of their power is that in all instances where they had living sons, they were able to have them elected and crowned as German co-kings during their own tenure (Bartlett 2020, 95; Whaley 2018, 55).

A genuine juncture in the HRE's path towards fragmentation came with the Great Interregnum 1250–1273, which tore the imperial power structure to pieces, never to re-consolidate in earnest.[6] The Great Interregnum began after the death of Emperor Frederick II in 1250. In the period 1250-1273, the throne was basically vacant as there was no commonly accepted German king. Different competitors, including the English king's younger brother Richard of Cornwall and the king of Castile, Alfonso X, cast around for support but failed.

In 1273, Rudolf of Habsburg was elected king of Germany, but he governed from a position of weakness and was never crowned emperor by the pope. This only happened again in 1312, with Henry VII of the Luxembourg dynasty. But Henry, too, was a comparatively weak ruler, being a former vassal of the Capetian kings of France with limited personal economic resources. The post-Interregnum weakness of kings and emperors is reflected in the politics of succession. From 1254 to 1438, seven different dynasties held the German throne. It passed directly from father to son only once (Bartlett 2020, 398), thus reducing the incentives of rulers' relatives to support the dynasty. Later, the impe-

[6]The cause of this weakening of the HRE is exogenous to our argument with recent research emphasizing strategic competition between popes and emperors since the Investiture Controversy (Møller and Doucette 2022; Grzymała-Busse 2023*a*,*b*; Doucette 2023).

rial title *de facto* became hereditary again in the Habsburg line, reflecting a strengthening of rulers. However, even the Habsburgs never exerted the kind of widespread imperial authority that the Ottonians, Salians, and Hohenstaufen had done; in reality, they were Austrian dukes and Bohemian and Hungarian kings with an imperial title. The dynasty developed more centralized judicial and political institutions that could substitute for itinerant rule mostly after the death of Maximilian I in 1519 which falls outside our empirical scope.

The Great Interregnum thus broke the imperial infrastructure north of the Alps. After 1250, the Empire increasingly resembled a checkerboard structure of authority, 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 further strengthened centripetal dynamics in the HRE.

The fact that kings before the Great Interregnum were both *de jure* and *de facto* kings of Germany whereas their successors were primarily *de jure* kings means that pre-interregnum kings could rely on comparatively loyal family members. Emperors could thus focus on monitoring "marginal" agents that were not or only distantly related to them. A case in point is the Salian king Henry IV (r. 1056–1106) who was crowned at only six years of age, weakening imperial power until he came of age (Cowdrey 1998, 80-2; see also Jordan 2001, 87–8; Whaley 2018, 15). He then traveled aggressively, established fortifications, and placed loyal agents where his rule had been undermined during his minority rule (Cowdrey 1998, 84-5) and bolstered his presence and power in the affluent realm south of the Alps. Indeed, Henry's aggressive rule sparked a Saxon rebellion and culminated in the Investiture Controversy, illustrating what was at stake when strong rulers exerted their presence widely.

In contrast, post-interregnum kings faced major challenges to their rule and struggled to monitor and control even many close relatives. In practice, they did not control large tracts of "their" realm outside their private lands and were unable to reward their relatives to the same extent as pre-interregnum rulers. Without the prospect of dynastic succession, their family members' loyalty was limited and had to be upheld through monitoring, lest the rulers lost their hold on imperial power and control over their remaining private lands. This was still the case for early Habsburg rulers of the HRE, who were occupied ruling their own inherited territories, which were governed by cadet members of the family. For example, Frederick III (r. 1452–1493), the "Arch-Sleepyhead" (*Reichserzschlafmütze*, Whaley 2018, 74), famously did not leave the Austrian lands for a quarter century where he "occupied himself with Habsburg family affairs" (Rady 2017, 21). Due to the need to monitor family members, the weak post-interregnum rulers could not afford expending much monitoring efforts on other elites across the realm.

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. The

comparatively strong rulers before 1250 should have been relatively free from pressures to monitor close relatives, thus frequenting areas controlled by distantly or non-related elites. In contrast, the comparatively weak post-1250 rulers were under pressure to police their close relatives given their incentives to shirk or even challenge their rule. We therefore expect that they spent more time in areas controlled by their relatives.

Itinerant rule: Measurement and descriptive statistics

To test our argument, we reconstruct the travel itineraries of rulers of the HRE in the most comprehensive manner achieved to date. The following section details the construction of the dataset and describes important patterns in rulers' travels.

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*.[7] The *Regesta* consist of short summaries of activities – deeds signed, orders issued, or reports of meetings and religious festivities attended[8] – 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, 72'665 are geographically located and dated, with 68'077 located inside our geographic area of analysis.[9]

The number of documents varies substantively over time (Figure 1), a likely result of varying document production and survival. In the 10$^{\text{th}}$ and 11$^{\text{th}}$ centuries, on average 10 to 100 documents are available per ruler-year. This number grows significantly towards 1'000 in the 15$^{\text{th}}$ 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 addresse potential biases from the varying availability of documents.

We transform the documents in the *Regesta* into travel itineraries. An itinerary is a path through a set of date-location pairs. Our algorithm (see Appendix A.1) solves a series of problems that make it impossible to directly derive travel paths from the *Regesta* data. We first georeference all locations associated with the documents. This includes translations of Latin place names and historically informed corrections of spelling mistakes and ambiguous names. Second, we remove documents without temporal information or georeferenceable locations, and documents with an acting subject other than the relevant

[7] Accessible online at http://www.regesta-imperii.de/en/home.html. We add documents for Henry III and Henry V from the *Monumenta Germaniae Historica*.

[8] Appendix A.3 shows that documents most frequently refer to confirmations of rights and authoritative acts of commanding.

[9] Some documents originate from, for example, the crusades.

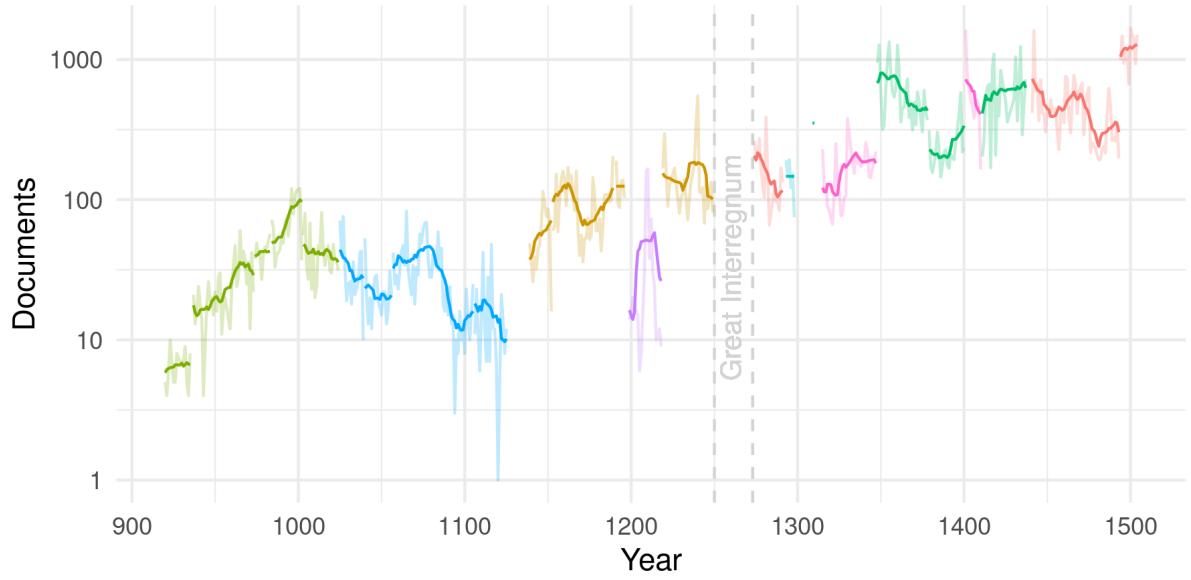


Figure 1: Documents over time

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

ruler. Third, we address imprecise document dates, for example when only a month is recorded for an entry. We do so by searching for the shortest geographical path that is consistent with all documents for a ruler. Fourth, we automatically correct obvious errors indicated by unlikely travel speeds due to ambiguous location names or faulty dating information. Lastly, we manually inspect and correct unlikely travel episodes characterized by high travel speed and long distances without intermediate stops.

Our approach constructs imperial itineraries in an efficient and replicable manner 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. Second, we have no information on rulers' whereabouts between the stops in our data. Such information could be proxied by drawing on additional sources and data on roads and the physical environment. Doing so could increase precision, yet these details would be lost in aggregation in our analysis. Furthermore, roads data are not consistently available, inviting selection biases.

Description of rulers' itineraries, 919-1519

Our itineraries allow us to trace rulers' location at an unprecedented level of spatial and temporal detail. Figure 2a visualizes the paths of all ruling kings and emperors in our data. The map highlights the concentration of imperial rule in centers such as Aachen, Nuremberg, Prague, and Vienna. Other areas, such as the realm's peripheries in the North-East or South-West, were hardly visited.

Zooming in on the itineraries of single rulers shows how they varied in space. Frederick Barbarossa (r. 1152-1190) of the Hohenstaufen dynasty, for example, traversed the realm

extensively (Figure 2a). While his ancestral power base was mainly concentrated in Swabia west of Munich, he spent long periods on campaigns across the Alps in Italy. He died in 1190 during the Third Crusade while crossing the Saleph River in today's Turkey.

Post-interregnum emperor Louis IV "the Bavarian" (r. 1314-1347) had a much smaller spatial reach while traveling slightly more than Barbarossa.[10] He concentrated his presence in the Wittelsbach homelands in Bavaria and its main cities Munich and Nuremberg (Figure 2c). Travels elsewhere were limited. He crossed the alps once, marching to Milan where he was crowned King of Italy in 1327 and continuing to Rome. Compared to Barbarossa, his limited presence in the south and north of the realm put in doubt his control over the areas.

Figure 3 shows how the extent of travel differed within and between rulers. We see that average travel activity drops below 1'000 km in relatively few years, for example during the reign of the adolescent Otto III (r. 996–1002), his successor Henry II (r. 1002–1024), and Frederick III of Habsburg (r. 1452–1493). Throughout the period 919-1519, our data indicates that rulers traveled on average approximately 1'652km per year, peaking during years of far-distance travel, for example the crusade in 1228/1229 led by Frederick II. We also note that travel followed a slight seasonal pattern with average travel activity increasing in the spring and summer when life on the road was less harsh. Travel activity also tended to decline with rulers' age (Appendix A.2).

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 higher levels of agricultural suitability and greater urban populations (Appendix A.2). In substantive terms, doubling an area's urban population increases the chance of rulers' presence in a year by about 2 percentage points, or 70% of their average presence. Because of their affluence, visiting cities and their agriculturally productive surroundings paid off most for rulers seeking resources for extraction and upkeep (Bernhardt 1993). We return to these patterns when assessing the heterogeneous effects of family-controlled territory.

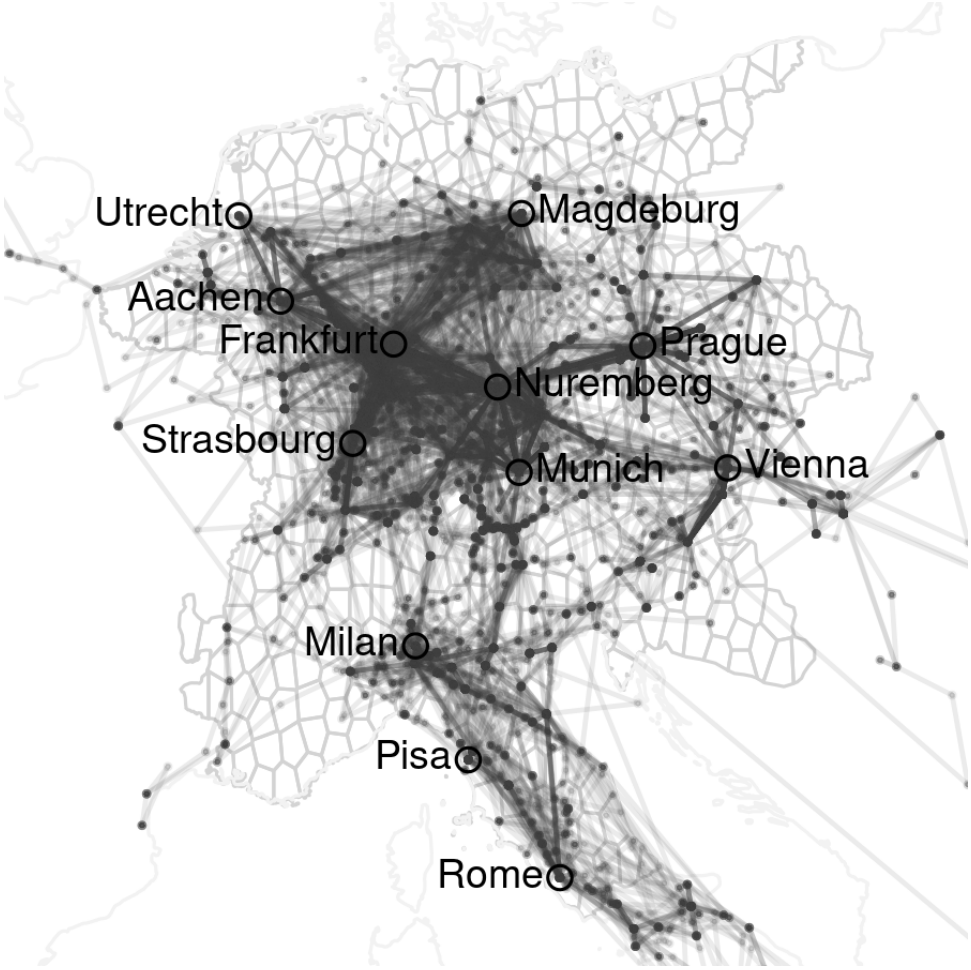
Research design

Unit of analysis

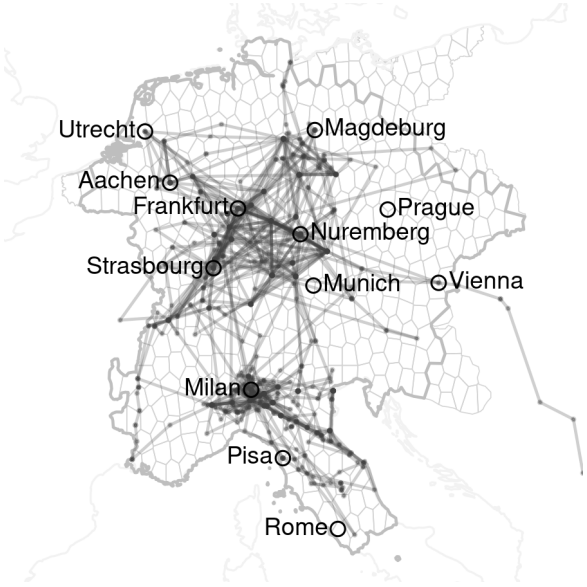
Our empirical inquiry focuses on the travel itineraries of the rulers of the HRE AD 919–1519. Our dataset starts with Henry the Fowler, the first non-Carolingian king of East Francia which turned into the HRE. His son, Otto I, the Great, was the first Holy Roman emperor[11] from AD 962. Our data end with Maximilian I. His reign ended in AD 1519,

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

[11] Henceforth, rulers of the HRE would be known as the king of Germany (*König der Römer, Rex Romanorum*) upon ascension and as emperors once crowned by the pope.



(a) All itineraries, AD 919–1519



(b) Itinerary of Frederick I Barbarossa, AD 1152–1190

(c) Itinerary of Louis IV, AD 1314–1347

Figure 2: Rulers' itineraries over 600 years: data description

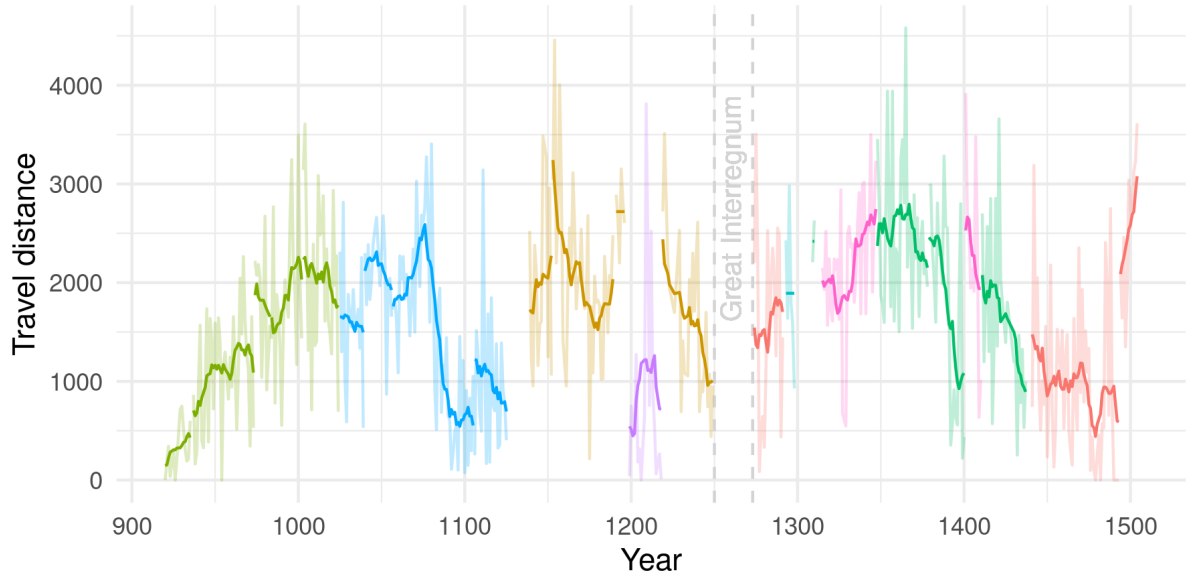


Figure 3: Length of travel path by year

on the eve of the Reformation when the development of permanent administrative centers substituted for itinerant strategies of rule.

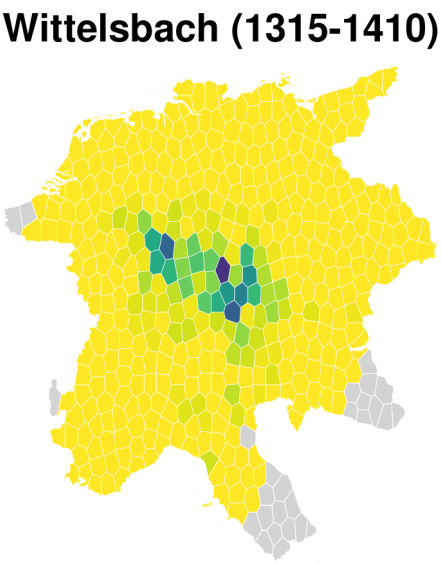
Our units of analysis are geographic cells observed for each emperor and year. Since we have no fixed set of possible destinations, we choose Voronoi cells of roughly equal size as spatial units. In particular, we take the geographic union of all extents of the HRE and Kingdom of the Franks between 900 and 1500 from the Euratlas (Nüssli and Nüssli 2010) and divide it into roughly hexagonally shaped cells, each covering approximately 2500km^2 (Figure 4a). For each cell, we code our main (in)dependent variables for each year and emperor. We drop cells that are fully outside the territory of the HRE in a given century in the analysis.

Ruler presence

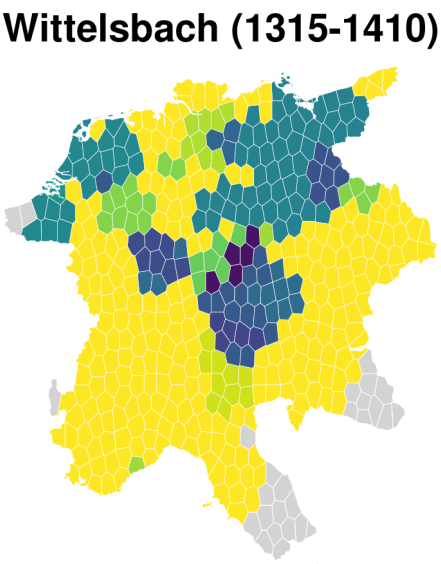
We first measure our main outcome, yearly ruler presence, by projecting their itineraries onto grid cells, coding for each cell whether it was visited by a ruler in a given year. We use two measures to capture such visits. The first, conservative `present` dummy, is based on the geolocation of *Regesta* documents. With a high likelihood, rulers were present in cells in which at least one document is located in a given year (points in Figure 2). The second, more approximate measure is based on rulers' travel *path* (lines in Figure 2). Each cell that is crossed by the travel path in a given year is coded as being `on path`.

We also construct measures of the extent of visits. We count the number of `documents` per cell-year as well as the unique number of `days` on which they have been issued. The two variables are log-transformed after adding a constant of 1 to account for their right skew.

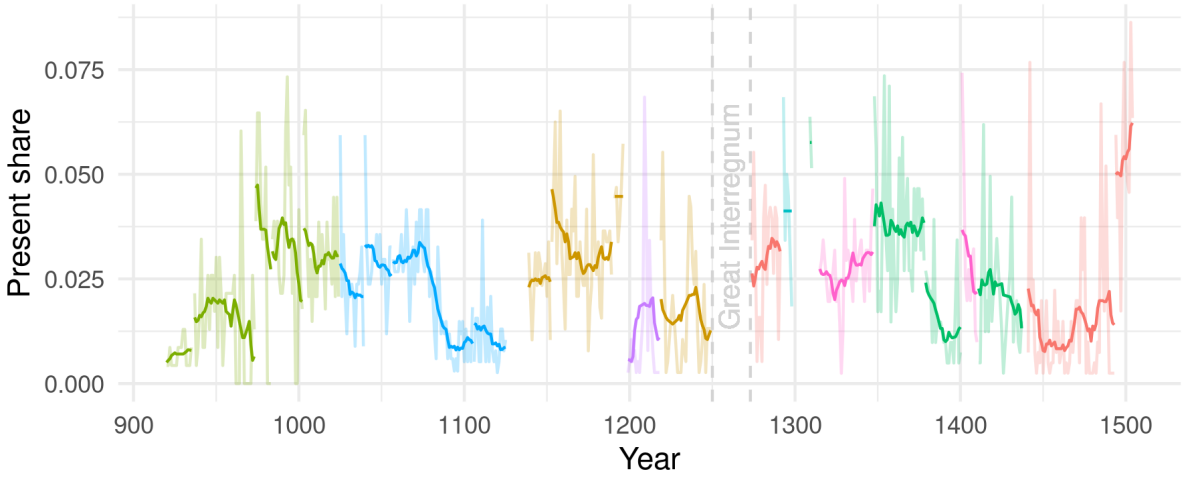
Figure 4a shows a map of average emperor presence in a year during the Wittelsbach



(a) Emperor presence

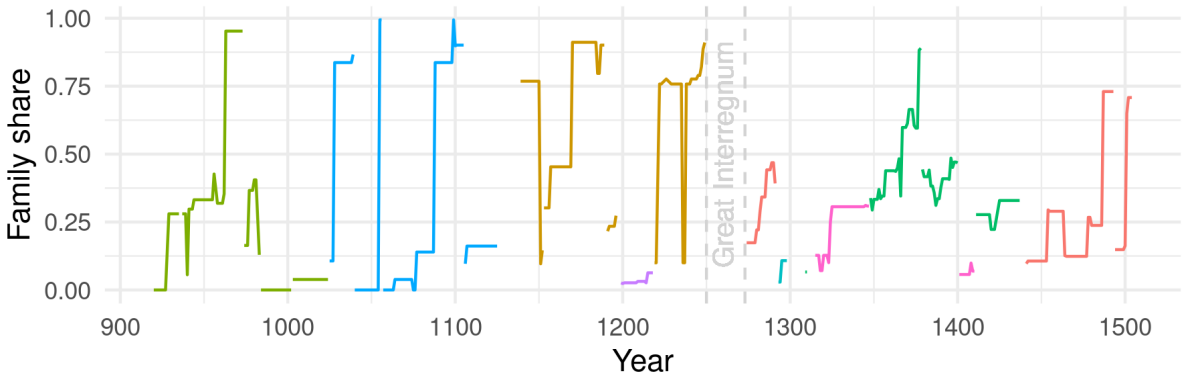


(b) Family territories



(c) Average emperor presence, by year.

Note: 10-year rolling mean as colored line, raw data as transparent line.



(d) Average family territory, by year

Figure 4: Data

Note: Cells outside the territory of the HRE in 1300 in (a) and (b) in grey. Colors in (c) and (d) denote dynasties.

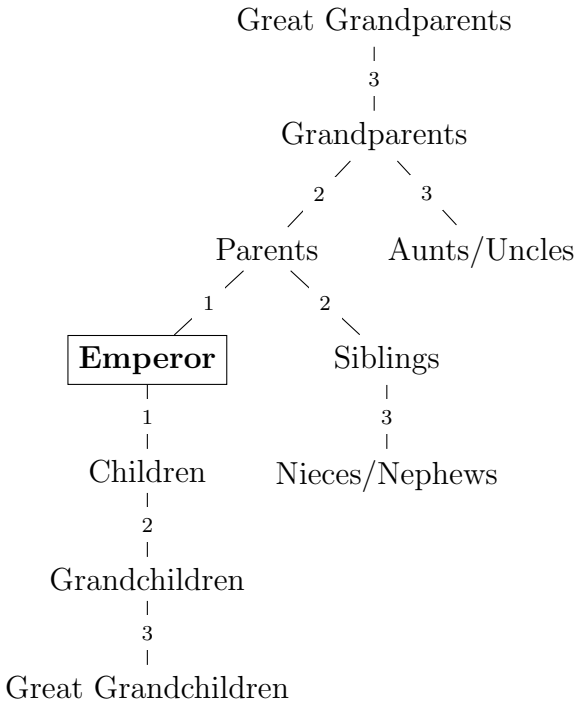


Figure 5: Family relations in our data

Note: Marriage links add +1 to relationship degrees.

dynasty, and 4c tracks the average of our main `present` dummy over time.[12] Our raw data shows significant variation in overall travel activities over time as well as large geographic shifts in their geography 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 emperor'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 (see Appendix A.4). On these, we locate, for each year, rulers' living, up to third-degree family members (Figure 5).[13] 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 third-degree family members including the maternal line as well as relatives by marriage. Additional analyses investigate treatment 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. To geocode the territories and places as-

[12] See Appendix A.1 for descriptive maps of all other dynasties.

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

sociated with titles, we match the title-territories in the genealogical data to geographic data on states in Abramson (2017) and political entities in the Euratlas (Nüssli and Nüssli 2010). Both include independent states and other sovereign entities that were part of the HRE. For territories missing in both databases, we identify their major city[14] and use a 20km buffer around it as a territorial proxy. A robustness check in Appendix D.2 shows stable results if we draw only on the data from either Abramson or Euratlas.

The resulting spatio-temporal data allows us to 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.[15] Figure 4b shows the resulting measure averaged over time for the Wittelsbach dynasty, and Figure 4d shows the average over time. Years in which the share of family-controlled territory spikes beyond 75% correspond to times during which emperors entrusted their sons with the title of German (co-)king. We show in Appendix D.1 that dropping the German kingdom from the set of family-controlled territories in these instances does not substantively change our results.

While there is substantive spatial and temporal variation in the measure, we note that the spatial variation is much greater between rulers than within rulers. This is because each governed for comparatively few years on average with a relatively stable network of relatives with mostly inherited titles. We exploit the variation between emperors using a difference-in-difference design below.

Empirical strategy

We test our argument using a two-way fixed effects (TWFE) strategy of 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. As our main specification, we estimate a standard two-way fixed effects model that leverages the full set of observations:

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

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.

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 emper-

[14] Geocoded using the GeoNames API http://www.geonames.org.

[15] Including rulers' (only partially overlapping) personal domains in the measure does not change the results substantively (Appendix A7).

ors strategically expanded their control through the family network over time through marriage and the granting of titles, omitted time-varying confounders are more likely to affect variation within emperors than variation between emperors.

The TWFE estimation strategy relies on the full data, a feature that might come with potential problems as our treatments are staggered, often reversed, and may have heterogeneous effects over time (e.g. Imai and Kim 2021; Goodman-Bacon 2021; Callaway and Sant'Anna 2021). We therefore employ two additional designs to improve causal identification. The first estimates the discontinuous change in the effect of family-controlled territories on rulers' visits directly at the time of the Great Interregnum using a variant of the regression discontinuity design. 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 that exploits the change in family-controlled territories that comes with the successions of emperors of the HRE. These two strategies increase the internal validity of our results by zooming in on temporally well-defined changes and thereby address potential weaknesses of the TWFE approach.

Results

We find strong evidence that the Great Interregnum and the weakening of imperial power it created substantively shifted rulers' travel itineraries towards areas controlled by closer relatives. Consistent with historical accounts and our theoretical argument, rulers of the HRE spent comparatively less time in family-controlled regions of the realm in times of imperial strength before 1250 but spent more time in them after the end of the interregnum in 1273. In line with our theoretical account, these results are mostly driven by variation in family control exerted by emperors' 1^{st}- and 2^{nd}-degree male and direct relatives. The results are robust under a broad set of alternative specifications.

Table 1 presents the main results from estimating the TWFE specification in Eq. 1. Model 1 shows that the effect of local family control aligns well with the weakening of imperial power over the Great Interregnum starting in 1250. The model shows a negative effect of family control on emperors' presence before 1250, which amounts to -1.5 percentage points or 60 percent of the average presence probability. Yet, after the interregnum, rulers are more present in family-controlled territories: the estimated effect of family control switches sign and amounts to a positive and substantively large effect of 2.6 percentage points after 1250. Both estimates and their difference are substantive in size,[16] precisely estimated, and statistically significant.

Model 2 shows the results for our `path`-based outcome measure, which supports the first set of results in substance and magnitude. Effects are more than twice as large, which

[16]They are substantively similar to the cross-sectional effect of moving from none to perfect agricultural suitability (+1.8ppt) or doubling an areas' urban population (+2.0ppt), see Appendix Table A1.

corresponds to the fact that about 2.8 as many cells lie on rulers' paths than indicated by the mere location of documents. Models 3 and 4 furthermore 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.

Table 1: Emperor presence and family territory: Baseline results

Dependent Variables:	Present	On path	Days (log)	Docs (log)
Model:	(1)	(2)	(3)	(4)
Variables				
Family Terr.	-0.014**	-0.031**	-0.019**	-0.025**
	(0.004)	(0.008)	(0.005)	(0.006)
Post-1250 × Family Terr.	0.041**	0.086**	0.063**	0.078**
	(0.006)	(0.011)	(0.010)	(0.013)
Fixed-effects				
Cell (436)	Yes	Yes	Yes	Yes
Year (509)	Yes	Yes	Yes	Yes
Fit statistics				
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
*Signif. Codes: **: 0.01, *: 0.05, +: 0.1*

Simply splitting our 600-year study into pre- and post-Interregnum periods risks masking important effect heterogeneity over time, some of which may have little to do with the weakening of the rulers brought along by the Great Interregnum. Figure 6 investigates this heterogeneity, showing the jointly estimated effect of family control for each 25-year period. While there is some effect heterogeneity before and after 1250, there is a clear and sharp increase in the effect of family control from −5 percentage points immediately before 1250 to +5 percentage points immediately after.

We formally analyze the sharp increase in Figure 6 to improve the identification of the effect of the Great Interregnum – and the concurrent weakening of Holy Roman Emperors – on their itineraries' orientation towards territories controlled by their relatives. To do so, we formally estimate the discontinuity in the effect of family control at the time of the interregnum in Appendix B, including controls for time trends in the effect on either side of the break. This analysis yields estimates of a discontinuous jump of the effect of family-controlled territories on rulers' visits over the Great Interregnum of about 7 to 13 percentage points. This is two to three times the estimate of the interaction effect of `family territory` × `post-1250` in the baseline analysis in Model (1), Table 1. This

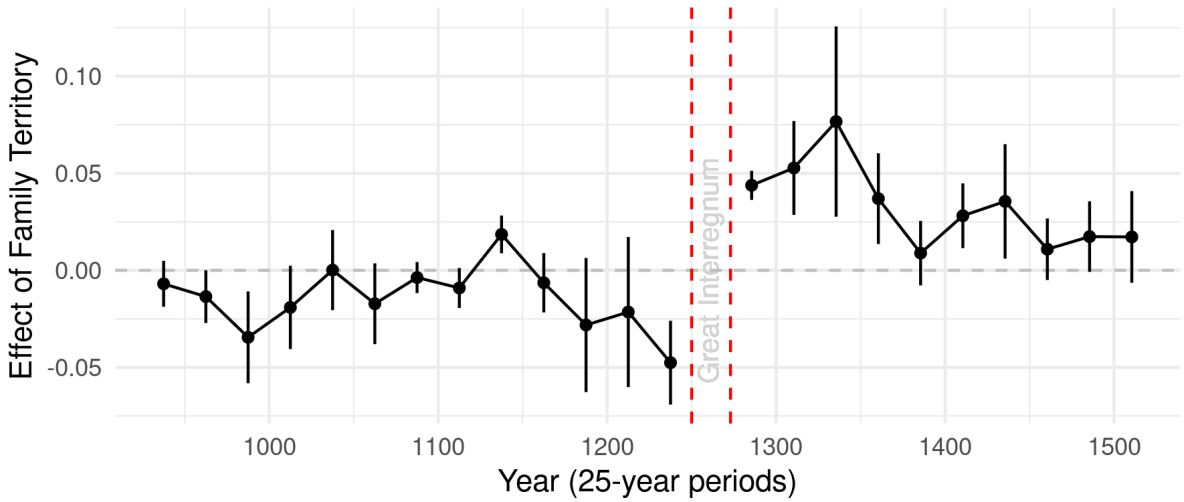


Figure 6: Effect of family territory on ruler presence, by 25-year period

Note: Effects from joint model with year and cell fixed effects.

suggests that the TWFE model, if anything, underestimates the effect of the weakening of rulers in 1250 on their propensity to travel towards family territories.

While the discontinuous jump across the Great Interregnum stands out in magnitude, the more fine-grained variation in Figure 6 also generally fits our expectations. The Ottonians (r. 919-1024), who governed from a position of strength after Henry I and Otto I had built their power, hardly needed to visit relatives. The Salian position (r. 1028-1125) was weaker, especially after the Investiture Controversy (1075-1122). Indeed, the only pre-1250 period when kings/emperors spent relatively more time with their family is in the 25-year period immediately after the end of the Investiture Controversy, a period of crisis before the Hohenstaufen imperial resurgence (r. 1138-1250). This resurgence – a deliberate projection of imperial power to parts of the realm where it had collapsed – began in earnest with the accession of Frederick Barbarossa in 1152 and is clearly reflected in travel patterns. Finally, HRE rulers are weakest, and hence most dependent on family, in the centuries after the Great Interregnum, before we find a partial reassertion of authority under the Habsburg dynastic rule, which began with Frederick III in 1440 and his son Maximilian I, who was crowned German King in 1486. But even Habsburg rule only matches the very weakest period of pre-1250 rule with respect to travel patterns.

Accounting for potentially endogeneous family control

The baseline TWFE estimates of the effect of family territory on ruler visits relies on the assumption that no time-varying factors simultaneously affect who controls local areas as well as rulers' presence there. This assumption is violated if, for example, shifts in the strategic value of an area motivate rulers' visits and shape imperial politics of local

control, which often included granting titles to rulers' relatives.[17] We address the problem of potentially endogenous family control with a difference-in-differences (DiD) design that focuses on the shift in family control that occurred around ruler successions.

Table 2: Emperor presence and family territory: Difference-in-differences

Dependent Variables:	Present	On path	Days (log)	Docs (log)
Model:	(1)	(2)	(3)	(4)
Variables				
Family Terr.$_{DiD}$	-0.008^{+}	-0.010	-0.009^{+}	-0.012*
	(0.004)	(0.012)	(0.005)	(0.006)
Family Terr.$_{DiD}$ × Post-1250	0.034**	0.052**	0.061**	0.073**
	(0.008)	(0.015)	(0.014)	(0.018)
Fixed-effects				
Cell × spell (7,584)	Yes	Yes	Yes	Yes
Year × spell (366)	Yes	Yes	Yes	Yes
Fit statistics				
Outcome mean	0.027	0.074	0.036	0.045
Observations	129,899	129,899	129,899	129,899
R^2	0.260	0.314	0.329	0.318
Within R^2	0.001	0.001	0.002	0.002

Clustered (Cell & Year) standard-errors in parentheses
*Signif. Codes: **: 0.01, *: 0.05, +: 0.1*

Our DiD design leverages solely variation in family-controlled territories around the succession of subsequent emperors and yields strong support for the above findings. The empirical strategy here exploits the fact that family-controlled territories change as rulers of the HRE succeed each other. "Stacking" temporal windows of 10 years before and after all ruler successions, we estimate the effect of the change in territory controlled by the relatives of successive rulers on their propensity to visit a given area, as well as the difference in that effect before and after the Great Interregnum.[18]

Summarized in Model 1 of Table 2, we first find that there is a negative but noisily estimated aggregate effect of -.8 percentage points of family control on ruler presence in a cell before 1250. Yet, after 1250, the effect of family increases significantly by 3.4 percentage points to a substantive 2.6 percentage points, which is close to the overall average presence of rulers. The difference between the pre- and post-1250 treatment effect is again precisely estimated and coincides in magnitude with the estimate from the TWFE specification. 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

[17]Note that it is unlikely that the pre- and post-1250 difference in the effect of family control is caused by such omitted variables.

[18]See Appendix C for all details.

statistically insignificant for the (less precise) `on path` outcome and becomes more precise for the (less noisy) measures of the intensity of rulers' presence. An event-study shows the absence of differential pretrends (Appendix C), suggesting that we can causally interpret these results.

Overall then, the DiD results support the baseline TWFE results. Strong rulers of the HRE roam areas controlled by their relatives less than other regions of their realm. This pattern shifts with the Great Interregnum which weakened the Empire's 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.

Robustness checks

We implement a series of additional analyses that probe the robustness of our main results. Appendix D provides details on these analyses and results in Table 1.

***Regesta* documents:** Our path data might be biased by temporally differential survival of documents, with more documents available for later years. We therefore randomly sample a constant number of between 12 and 400 *Regesta* entries for every year and recompute paths on their basis. Furthermore, we account for potentially biased dropping of *Regesta* entries in the generation of paths by computing our outcomes from all georeferenced entries. Lastly, we directly control for yearly varying characteristics of our path data, such as the number of *Regesta* entries and their locations. Results from these exercises closely coincide with our baseline results.

Governance activities: To assess whether our results are driven by a particular set of governance acts, we use the first verb in each *Regesta* entry to categorize rulers' activities into (1) authoritative commanding, (2) empowering and (3) informing (see Appendix A.3). Additional results show that our main estimates are driven by all three types of activity (Appendix D.4). We furthermore find suggestive evidence that, conditional on rulers' presence, commanding activities are more common in family territory than empowering ones after the Great Interregnum but not before. This is consistent with the argument that weak rulers have to control family members more closely than strong rulers do.

Alternative weakness measures: 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 dynamic by recurring to rulers' centrality in the family network of European nobles (Marek 2018), measuring rulers' average distance to all network members living each year, as well as their eigenvector centrality. We then replace the post-1250 indicator with these measures of power. The results show that the effect of family control on ruler presence decreases significantly with rulers' network centrality, a result that holds when we account for potential confounders of the latter.

Potential confounders: We account for a series of potential confounders of areas' control by rulers' relatives. We first add geographic controls for the type of terrain, climate, or agricultural suitability interacted with year-dummies. These substitute for the lack of alternative time-varying geographic data on, for example, socio-economic development at the time. Furthermore, we add a measure of local presence of rulers' relatives who are part of the church, e.g., bishops or abbots,[19] which could bias our results due to conflicts between the rulers of the HRE and the church (Grzymała-Busse 2023*a*,*b*). Results remain substantively unchanged in both analyses.

Sample characteristics: To account for potential problems arising from the modifiable areal unit problem (Fotheringham and Wong 1991), we vary the size of Voronoi cells to between 625-10'000km^2. Due to increasing measurement precision, effect estimates increase with smaller cells but remain substantive and precise even in the small sample of 103 large cells. Finally, a jackknife analysis confirms that no single ruler drives our results.

Effect heterogeneity

The historical literature suggests stronger effects of family control on rulers' itineraries in (1) more developed and affluent regions and (2) for close, male, and direct relatives. Our analyses of heterogeneous effects corroborate these expectations.

Local economic development: Following our argument that rulers maximize the payoffs from itinerant rule, we expect that the effects of family control are concentrated in economically affluent areas. Areas with significant urban populations and agricultural resources promise the most significant material returns from itinerant rule and are therefore generally visited more frequently by all rulers than less affluent areas (see Appendix A.2). The same affluent areas also drive the main effects of family control on ruler visits. Figure 7 shows results from models that split the sample at median values of agricultural suitability (from Ramankutty et al. 2002) and urban population size (from Buringh 2021) as proxies for local economic development. Pre-Interregnum, family control has a larger

[19]The data is constructed in parallel to our secular family control measure and based on the enumeration of clerical titles by Marek (2018)

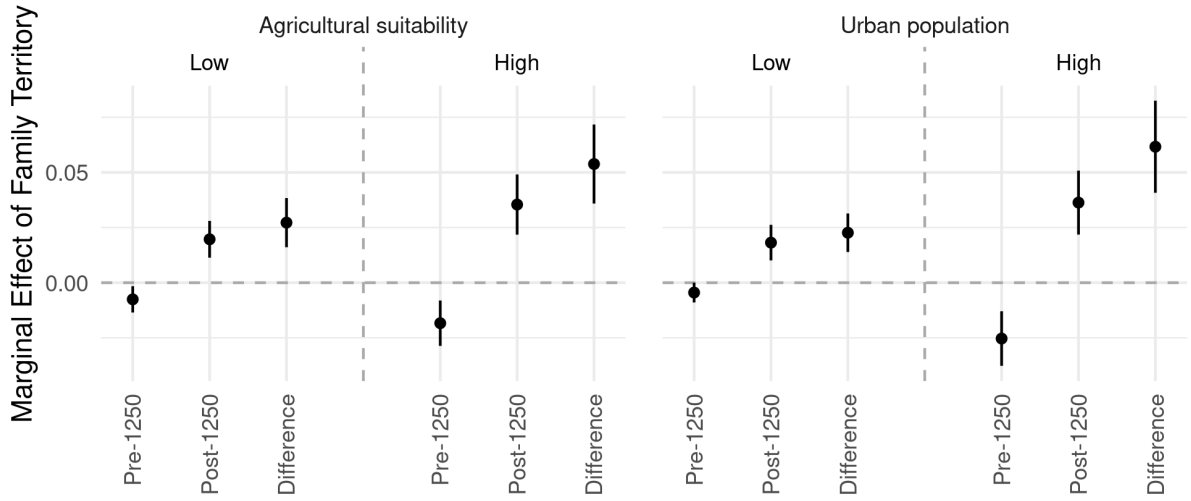


Figure 7: Heterogeneous effects of family control on ruler presence by local affluence.
Note: From split-sample TWFE regressions based on Model 1 in Table 1.

negative effect in regions with higher agricultural suitability and larger urban populations, as rulers spend most effort on affluent areas not controlled by their relatives. This relation switches after 1250 as rulers spend most time in affluent areas controlled by their relatives. These patterns support our argument that rulers' monitoring of "marginal" agents is shaped by material incentives.

Family relations: Above, we theorize that relatively close relatives should have the largest effects on emperors' travels: Strong emperors should visit them least, while weak emperors should keep the closest eye on them due to their potential claims to the throne. Results by relationship degree plotted in Figure 7 supports this conjecture. Pre-1250, family control has a negative effect that slightly decreases with relationship degree. In the post-1250 period, areas controlled by first-degree relatives see emperors' presence increased by a substantive 6.4 percentage points. The post-1250 effect associated with second-degree relatives is roughly half that size, and that of third-degree relatives approaches zero with the difference with the pre-Interregnum period being noisily estimated ($p < .1$). These finding suggest a decreasing importance and risk associated with more removed relatives of weak rulers.

Due to the strong patriarchal structure of political power and succession, we expect male and direct relatives to affect rulers' itineraries most, with little effect of female relatives and those linked only through marriage. Indeed, Figure 8 shows that male relatives exclusively drive our findings.[20] We also find that our results are exclusively driven by direct family relationships through the "bloodline". Relationships based on

[20]This finding comes with the caveat that women in our data are not associated with their husband's territories, although they may have had some power over them. We therefore observe a much lower female (2 percent) than male family control (34 percent).

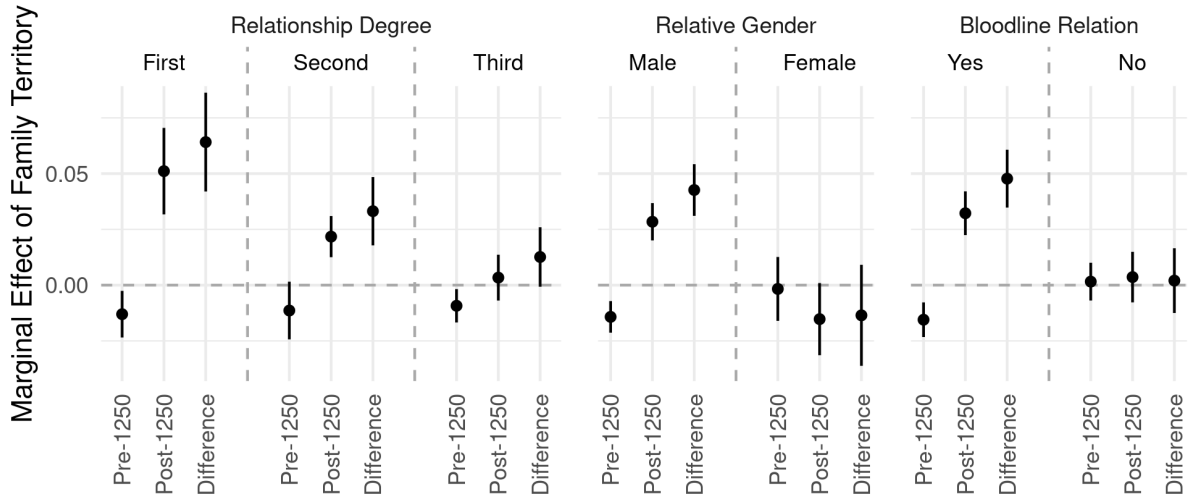


Figure 8: Heterogeneous effects of family control on ruler presence by relationship degree and type

Note: From TWFE regressions with a disaggregated `Family Terr.` indicator based on Model 1 in Table 1.

marriage links on which no claims to the throne could be based having no discernible effects. In sum, these results underscore the centrality of the politics of succession for rulers' strategies of itinerant rule.

Conclusion

To better understand dynamics of rule in premodern societies where the state was still non-territorial, we need to unpack the spatial dimension of governance. Adding to recent historical work in social science that tends to project a modern image of territorial statehood back in time, we have peeked under the hood of premodern states, using the case of the Holy Roman Empire 919-1519.

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 world, they governed in person, traveling their lands with a large retinue to project power. Yet, in an age of slow travel and communication, monarchs could not hope to cover all of their realms, particularly not in large and composite political units such as the HRE. They therefore went where the payoff 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, in turn motivating frequent monitoring and control.

To test this argument, we have collected a comprehensive dataset 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 1250-73 as the 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.

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. The descriptives alone are striking. Traveling more than 1'600km a year, rulers would visit certain areas frequently and never set foot elsewhere. Taking advantage of the time and place of signatures on legal documents and activities, we have added substance and breadth to a subject that has hitherto mainly been studied by historians.

Our findings also contribute to a better understanding of the secular development of the HRE. Many social scientists have described it 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 (1250-1273) 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 relatives, 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. These varying effects of rulers' relatives are most pronounced in economically affluent areas and among close, male, and direct relatives. Overall, our results parallel the development of the HRE from a strong and relatively centralized 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 and beyond? How does rulers' physical presence shift as centralized state institutions substitute for their life on the road? And how does leader presence complement local state institutions? After all, leaders' occasional presence might crucially improve the functioning of the state and its legitimacy even until today.

References

Abramson, Scott and Carlos Velasco Rivera. 2016. "Time is power: The noninstitutional sources of stability in autocracies." *The Journal of Politics* 78(4):1279–1295.

Abramson, Scott F. 2017. "The economic origins of the territorial state." *International Organization* 71(1):97–130.

Acemoglu, Daron and James Robinson. 2019. *The Narrow Corridor: States, Societies, and the Fate of Liberty*. Princeton: Princeton University Press.

Althoff, Gerd. 2004. *Family, Friends and Followers: political and social bonds in Early Medieval Europe*. Cambridge University Press.

Assouad, Lydia. 2020. "Charismatic leaders and nation building." *PSE Working Paper* .

Atwood, Christopher P. 2015. "Imperial Itinerance and Mobile Pastoralism: The state and mobility in medieval inner Asia." *Inner Asia* 17(2):293–349.

Bartlett, Robert. 2000. *England under the Norman and Angevin Kings, 1075–1225*. Oxford University Press.

Bartlett, Robert. 2020. *Blood Royal: Dynastic Politics in Medieval Europe*. Cambridge University Press.

Bendor, Jonathan, Amihai Glazer and Thomas Hammond. 2001. "Theories of Delegation." *Annual Review of Political Science* 4(1):235–269.

Benzell, Seth G and Kevin Cooke. 2021. "A network of thrones: Kinship and conflict in europe, 1495–1918." *American Economic Journal: Applied Economics* 13(3):102–33.

Bernhardt, John W. 1993. *Itinerant Kingship and Royal Monasteries in Early Medieval Germany, c936-1075*. Cambridge: Cambridge University Press.

Bernhardt, John W. 2013. On the Road Again: Kings, Roads and Accommodation in High Medieval Germany. In *Every Inch a King*, ed. Lynette Mitchell and Charles Melville. Leiden: Brill.

Bisson, Thomas N. 2009. *The Crisis of the Twelfth Century: Power, Lordship, and the Origins of European government*. Princeton: Princeton University Press.

Blaydes, Lisa and Eric Chaney. 2013. "The Feudal Revolution and Europe's rise: Political divergence of the Christian West and the Muslim World before 1500 CE." *American Political Science Review* 107(1):16–34.

Blockmans, Wim P. 1978. "A typology of representative institutions in late medieval Europe." *Journal of Medieval History* 4(2):189–215.

Boix, Carles. 2015. *Political order and inequality.* Cambridge: Cambridge University Press.

Boucoyannis, Deborah. 2021. *Kings as judges: Power, justice, and the origins of parliaments.* Cambridge University Press.

Braudel, Fernand. 1993. "A history of civilizations (R. Mayne, Trans.)." *London: Peng [Originally published 1987.]* .

Bueno de Mesquita, Bruce. 2005. *The Logic of Political Survival.* Cambridge: MIT Press.

Bueno de Mesquita, Bruce and Ethan Bueno de Mesquita. 2023. "From Investiture to Worms: European Development and the Rise of Political Authority." *The Journal of Politics* 85(3).

Buringh, Eltjo. 2021. "The population of European cities from 700 to 2000: Social and economic history." *Research Data Journal for the Humanities and Social Sciences* 6(1):1–18.

Callaway, Brantly and Pedro H. C. Sant'Anna. 2021. "Difference-in-Differences with multiple time periods." *Journal of Econometrics* 225(2):200–230. Themed Issue: Treatment Effect 1.
URL: *https://www.sciencedirect.com/science/article/pii/S0304407620303948*

Cowdrey, Herbert Edward John. 1998. *Pope Gregory VII, 1073-1085.* Clarendon Press.

Doucette, Jonathan Stavnskær. 2023. "Why Was Central Europe Characterized by Political Fragmentation?" *Journal of Historical Political Economy* . forthcoming.

Durand-Guédy, David. 2013. Introduction: Location of rule in a context of Turko-Mongol domination. In *Turko-Mongol Rulers, Cities and City Life.* Leiden and Boston: Brill pp. 1–20.

Ertman, Thomas. 1997. *Birth of the Leviathan: Building States and Regimes in Medieval and Early Modern Europe.* Cambridge: Cambridge University Press.

Finer, Samuel E. 1997. *The History of Government from the Earliest Times, Vol II: The Intermediate Ages.* New York: Oxford University Press.

Fotheringham, A Stewart and David WS Wong. 1991. "The modifiable areal unit problem in multivariate statistical analysis." *Environment and planning A* 23(7):1025–1044.

Geertz, Clifford. 1977. Centers, kings and charisma: reflections on the symbolics of power. In *Culture and its creators: essays in honor of Edward Shils*, ed. Joseph Ben-David and Terry Nichols Clarke. Chicago: University of Chicago Press pp. 150–171.

Gillingham, John. 2000. *The Angevin Empire.* Bloomsbury.

Goldsmith, Benjamin E, Yusaku Horiuchi and Kelly Matush. 2021. "Does public diplomacy sway foreign public opinion? Identifying the effect of high-level visits." *American Political Science Review* 115(4):1342–1357.

Goodman-Bacon, Andrew. 2021. "Difference-in-differences with variation in treatment timing." *Journal of Econometrics* 225(2):254–277. Themed Issue: Treatment Effect 1.

Grzymała-Busse, Anna. 2023*a*. "Tilly Goes to Church: The Religious and Medieval Roots of European State Fragmentation." *American Political Science Review* pp. 1–20.

Grzymała-Busse, Anna M. 2023*b*. *Sacred Foundations: The Religious and Medieval Roots of the European State*. Princeton University Press.

Gustafsson, Harald. 1998. "The Conglomerate State: A Perspective on State Formation in Early Modern Europe." *Scandinavian Journal of History* 23(34):189–213.

Haldén, Peter. 2020. "Family Power: Kinship." *War and Political Orders in Eurasia* pp. 500–2018.

Hassan, Mai. 2017. "The strategic shuffle: Ethnic geography, the internal security apparatus, and elections in Kenya." *American Journal of Political Science* 61(2):382–395.

Hoddie, Matthew and Stephen R Routh. 2004. "Predicting the presidential presence: Explaining presidential midterm elections campaign behavior." *Political Research Quarterly* 57(2):257–265.

Huber, John D. and Charles R. Shipan. 2006. Politics, Delegation, and Bureaucracy. In *The Oxford Handbook of Political Economy*, ed. Donald A. Wittman and R. Barry R. Weingast Barry. New York: Oxford University Press pp. 256–272.

Huning, Thilo R and Fabian Wahl. 2017. Lord of the lemons: Origin and dynamics of state capacity. Technical report Hohenheim Discussion Papers in Business, Economics and Social Sciences.

Imai, Kosuke and In Song Kim. 2021. "On the use of two-way fixed effects regression models for causal inference with panel data." *Political Analysis* 29(3):405–415.

Johanek, Peter. 2000. "Imperial and free towns of the Holy Roman Empire. City-states in pre-modern Germany?" *A Comparative Study of Thirty City-State Cultures, Copenhagen, Reitzel* pp. 295–319.

Jordan, William Chester. 2001. *Europe in the High Middle Ages*. London: Pen guin.

Kanter, Julie Elizabeth. 2011. *Peripatetic and Sedentary Kingship: The Itineraries of the Thirteenth-Century English Kings*. PhD Dissertation. London: King's College.

Kokkonen, Andrej, Jørgen Møller and Anders Sundell. 2022. *The Politics of Succession: Forging Stable Monarchies in Europe, AD 1000-1800*. Oxford University Press.

Kokkonen, Andrej, Suthan Krishnarajan, Jørgen Møller and Anders Sundell. 2021. "Blood Is Thicker than Water: Family Size and Leader Deposition in Medieval and Early Modern Europe." *The Journal of Politics* 83(4):1246–1259.

Lebovic, James H and Elizabeth N Saunders. 2016. "The diplomatic core: The determinants of high-level US diplomatic visits, 1946–2010." *International Studies Quarterly* 60(1):107–123.

Lugard, Frederick Dealtry. 1926. *The dual mandate in British tropical Africa*. W. Blackwood and Sons.

Malis, Matt and Alastair Smith. 2021. "State visits and leader survival." *American Journal of Political Science* 65(1):241–256.

Marek, Miroslav. 2018. "Genealogy Index." http://genealogy.euweb.cz/. Accessed: May 6, 2022.

Mellen Jr, Rob and Kathleen Searles. 2013. "Predicting Presidential Appearances During Midterm Elections: The President and House Candidates, 1982-2010." *American Politics Research* 41(2):328–347.

Møller, Jørgen. 2017. "The birth of representative institutions: the case of the crown of Aragon." *Social Science History* 41(2):175–200.

Møller, Jørgen and Jonathan Stavnskær Doucette. 2022. *The Catholic Church and European State Formation, AD 1000-1500*. Oxford University Press.

Müller-Mertens, Eckhard. 1980. *Die Reichsstruktur im Spiegel der Herrschaftspraxis Ottos des Grossen*. Berlin: de Gruyter.

Nelson, Janet. 2008. The Frankish Kingdoms, 814-898: The West. In *The New Cambridge Medieval History Part I: Political Development*, ed. Rosamond McKitterick. Cambridge University Press pp. 110–141.

Nexon, Daniel H. 2009. *The Struggle for Power in Early Modern Europe: Religious Conflict, Dynastic Empires, and International Change*. Princeton: Princeton University Press.

Nüssli, Christos and Marc-Antoine Nüssli. 2010. "Euratlas." *URL: http://www. euratlas. com/about. html* .

Oakley, Francis. 2010. *Empty Bottles of Gentilism: Kingship and the Divine in Late Antiquity and the Early Middle Ages (to 1050)*. New Haven and London: Yale University Press.

Padgett, John F and Christopher K Ansell. 1993. "Robust Action and the Rise of the Medici, 1400-1434." *American journal of sociology* 98(6):1259–1319.

Peyer, Hans Conrad. 1964. "Das Reisekönigtum des Mittelalters." *Vierteljahrschrift für Sozial-und Wirtschaftsgeschichte* 51(1):1–21.

Poggi, Gianfranco. 1978. *The Development of the Modern State: A Sociological Introduction*. Stanford: Stanford University Press.

Rady, Martyn C. 2017. *The Habsburg Empire: A very short introduction*. Vol. 515 Oxford University Press.

Ramankutty, Navin, Jonathan A Foley, John Norman and Kevin McSweeney. 2002. "The Global Distribution of Cultivable Lands: Current Patterns and Sensitivity to Possible Climate Change." *Global Ecology and Biogeography* 11(5):377–392.

Sellers, Patrick J and Laura M Denton. 2006. "Presidential visits and midterm senate elections." *Presidential Studies Quarterly* 36(3):410–432.

Sharma, Vivek Swaroop. 2015. "Kinship, Property, and Authority: European Territorial Consolidation Reconsidered." *Politics Society* 43(2):151–180.

Sharma, Vivek Swaroop. 2017. War, Conflict and the State Reconsidered. In *Does War Make State? Investigations of Charles Tilly's Historical Sociology*, ed. Lars Bo Kaspersen and Jeppe Strandsbjerg (eds. Cambridge University Press pp. 181–217.

Southern, Richard. 1956. *The Making of the Middle Ages*. London: Hutchinson & Co.

Stasavage, David. 2010. "When Distance Mattered: Geographic Scale and the Development of European Representative Assemblies." *American Political Science Review* 104(4):625–643.

Stasavage, David. 2020. *The Decline and Rise of Democracy*. Princeton: Princeton University Press.

Strayer, Joseph. 1987 [1965]. *Feudalism*. Malabar: Krieger Publishing Company.

Svolik, Milan W. 2012. *The politics of authoritarian rule*. Cambridge University Press.

Te Brake, Wayne. 1998. *Shaping history: Ordinary people in European politics, 1500-1700*. Univ of California Press.

Whaley, Joachim. 2018. *The Holy Roman Empire: A Very Short Introduction*. Oxford University Press.

Wickham, Chris. 2005. *Framing the Early Middle Ages: Europe and the Mediterranean, 400–800*. Oxford: Oxford University Press.

Wickham, Chris. 2009. *The Inheritance of Rome: A History of Europe from 400 to 1000*. London: Penguin.

Wickham, Chris. 2016. *Medieval Europe*. New Haven: Yale University Press.

Wilson, Peter. 2016. *Heart of Europe: A History of the Holy Roman Empire*. Cambridge: Harvard University Press.

Supplementary Material

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

Table of Contents

A Data construction

A.1 Construction of ruler itineraries

We develop a semi-automated procedure to construct ruler itineraries from the documents contained in the *Regesta Imperii*.[21] 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[22] and a fuzzy string match of all place names in the Regesta data with the Geonames data base.[23] 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 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.

[21] Our procedure is inspired by (Opitz et al. 2019) who present a first automatic approach, which does, however, lack a disambiguation of rulers and document issuers and misses a comprehensive disambiguation of only roughly defined or erroneous time periods, which leads to impossible "jumps" in the resulting itineraries.

[22] Downloaded from https://github.com/flipz357/regesta-imperii-to-semgis.

[23] https://www.geonames.org/.

- 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.

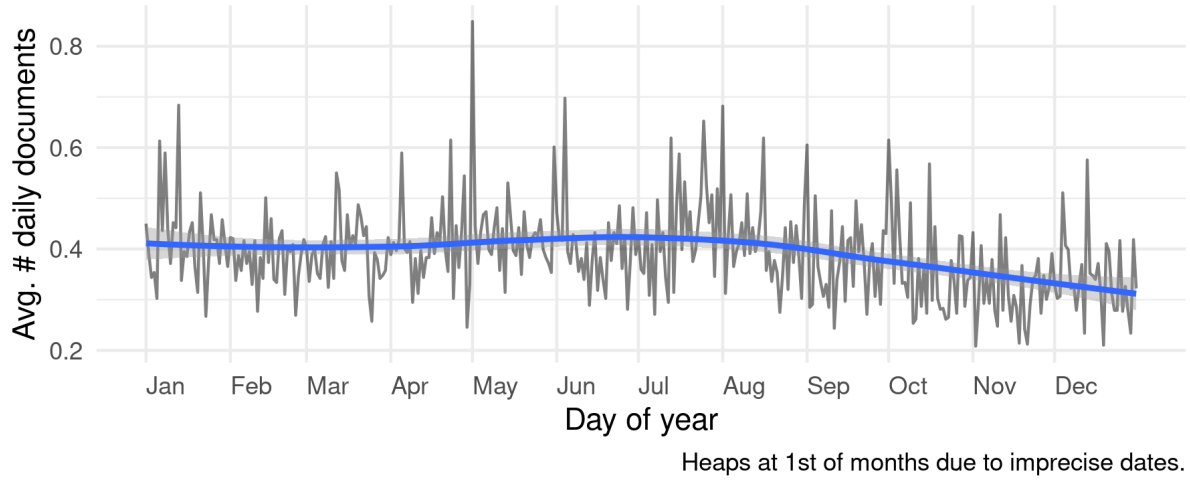
5. **Manual inspection and correction:** We automatically flag instances of travel of above 60km/day for manual inspection and correction. In addition, we plot the yearly path for each ruler-year to detect anomalies, in particular far travel and clear deviations from an otherwise smooth path. Equipped 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.

A.2 Descriptive evidence on ruler itineraries

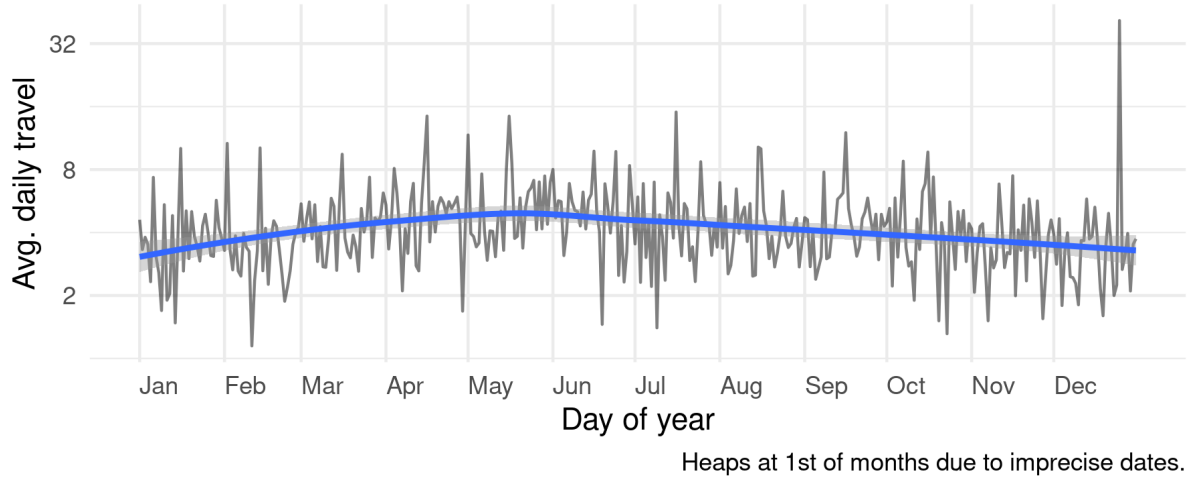
Table A1: Ruler presence: Cross-sectional results

Dependent Variable:	Present			
Model:	(1)	(2)	(3)	(4)
Variables				
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
Fixed-effects				
Year (509)	Yes	Yes	Yes	Yes
Fit statistics				
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

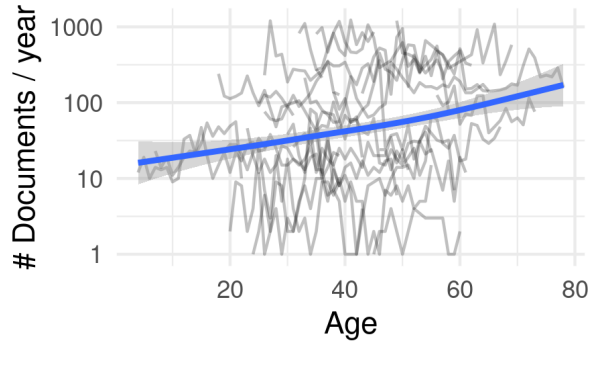
Clustered (Cell & Year) standard-errors in parentheses
*Signif. Codes: **: 0.01, *: 0.05, +: 0.1*



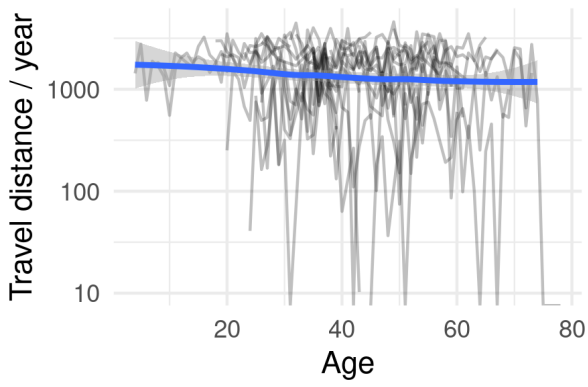
(a) Documents by time of year



(b) Ruler travel by time of year



(c) Documents by ruler age



(d) Travel by ruler age

Figure A1: Data description

A.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 A2 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 A2 in red, green, and blue respectively. These codings are used in our auxiliary analysis in Appendix D.4.

Figure A2: 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.

A.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.

Marriage dates – which are less consequential for the family networks – are allocated based on the (imputed) birth (+16 for female and +20 years for male nobles) and death dates where missing as are missing start and end dates of noble titles.

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

Table A2 presents the results of a formal analysis of the discontinuity in the effect of family territory on ruler presence displayed in Figure 6 in the main text. The models estimate the following relation:

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

where γ_1 and γ_2 capture the time trends in the effect of family territory before and after the Great Interregnum. Table A2 shows all four measures of itinerant rule as outcomes Y and Table A3 implements 3 versions of the time trend functions $f(year)$, taking on a linear, quadratic, and cubic specification. Parameter β_2 captures the discontinuous jump in the effect of family territory after 1250. This is parallel to more standard regression discontinuity designs with the difference that we are here assessing a discontinuity in an effect rather than using a discontinuity in a treatment.

The results in Table A2 closely mirror Figure 6, 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 specification for all outcomes. Table A3 shows stronger results for ruler `presence` yielded by specifications with a more flexible time-trend before and after 1250.

Table A2: 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)
Variables				
Family Terr.	-0.024**	-0.024	-0.034**	-0.047**
	(0.008)	(0.016)	(0.011)	(0.014)
Post-1250 × Family Terr.	0.070**	0.126**	0.089**	0.108**
	(0.014)	(0.023)	(0.026)	(0.032)
Fixed-effects				
Cell (436)	Yes	Yes	Yes	Yes
Year (509)	Yes	Yes	Yes	Yes
Fit statistics				
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
*Signif. Codes: **: 0.01, *: 0.05, +: 0.1*

Table A3: Discontinuity in effect of family territory in 1250: Trend specification

Dependent Variable:		Present	
Trend pre/post-1250:	Linear	Quadratic	Cubic
Model:	(1)	(2)	(3)
Variables			
Family Terr.	-0.024**	-0.044**	-0.059**
	(0.008)	(0.012)	(0.013)
Family Terr. × Post-1250	0.070**	0.123**	0.100**
	(0.014)	(0.021)	(0.034)
Fixed-effects			
Cell (436)	Yes	Yes	Yes
Year (509)	Yes	Yes	Yes
Fit statistics			
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
*Signif. Codes: **: 0.01, *: 0.05, +: 0.1*

C Difference-in-Differences

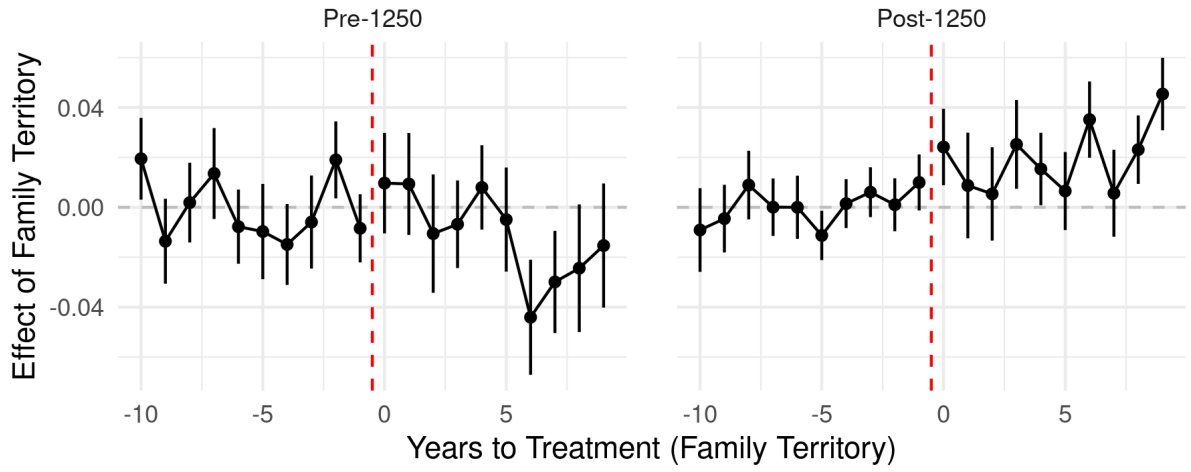


Figure A3: Event study plot of the effect of territory around successions

Our main difference-in-differences estimator identifies the effect of family-territories off *changes* between successive emperors only, 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 $\mathsf{family}_{s,e,c}$ to take the cell-level values of the first year of an emperor in a spell. I.e., looking at the succession from Otto I to Otto II in 973, the spell ranges from 964 to 983. $\mathsf{family}_{s,e,c}$ up to (after) 973 is set to cells values observed in 964 (974). The estimator amounts to:

$$\mathsf{Present}_{s,e,c,t} = \alpha_{c,s} + \gamma_{t,s} + \beta_1 \mathsf{family}_{s,e,c} + \beta_2 \mathsf{family}_{s,e,c} \times \mathsf{post\text{-}1250} + \epsilon_{s,e,c,t}, \tag{A1}$$

where the main difference to Equation 1 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 difference-in-differences 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 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 A5 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 effect of family control in the DiD design is causally identified under the parallel trends assumption. Our event study estimates presented below in Figure A3 show no signs of differential pretreatment trends before or after 1250.

As discussed above, the aggregate main effects discussed in the main text and shown in Table 2 on page 21 are driven by "taker" cell that move into ruler-connected family control through relatives of the new ruler and "leaver" cells that move of family control as relatives of the old ruler loose access to imperial power. A disaggregation of treatment effects along this difference in Table A4 shows that "taker" cells saw a contribute ca. two times more to the overall effect post-1250 than leaver cells. Their effects cannot be well seperated before 1250, since estimates are overall noisy. In addition, the analysis in Table

A4 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 half its size.

Table A4: Difference-in-differences: Disaggregation of treatment and control groups

Dependent Variable:		Present	
Sample	Full	≠Always	≠Never
Model:	(1)	(2)	(3)
Variables			
Taker × Treated	-0.016	-0.016	-0.014
	(0.010)	(0.010)	(0.013)
Leaver × Treated	0.004	0.001	0.015^{+}
	(0.005)	(0.006)	(0.008)
Taker × Treated × Post-1250	0.044**	0.046**	0.046*
	(0.015)	(0.015)	(0.022)
Leaver × Treated × Post-1250	-0.029**	-0.022*	-0.058**
	(0.009)	(0.010)	(0.016)
Fixed-effects			
Cell × spell	Yes	Yes	Yes
Year × spell (366)	Yes	Yes	Yes
Fit statistics			
Outcome mean	0.027	0.026	0.030
# Cell × spell	7,584	7,092	3,729
Observations	129,899	120,579	67,680
R^2	0.260	0.253	0.270
Within R^2	0.001	0.001	0.003

Clustered (Cell & Year) standard-errors in parentheses
*Signif. Codes: **: 0.01, *: 0.05, +: 0.1*

In Table A5, assess whether results are due to successions within or across dynasties. We find results to be more driven by (the more extensive) variation across dynasties (i.e., where successive rulers hail from different ruling family) than by (more marginal) variation within dynasties. Yet, the latter yields dynamics that point in the same direction but are more noisily estimated ($p < .1$), which might be due to their infrequency, in particular after the Great Interregnum.

Table A5: Difference-in-differences: Within and across dynasties

Dependent Variable:	Present		
Sample	Full sample	B/w dynasties	W/in dynasties
Model:	(1)	(2)	(3)
Variables			
Family Terr.$_{DiD}$	-0.008^{+}	-0.006	-0.009^{+}
	(0.004)	(0.011)	(0.005)
Family Terr.$_{DiD}$ × Post-1250	0.034**	0.039**	0.016^{+}
	(0.008)	(0.014)	(0.009)
Fixed-effects			
Cell × spell	Yes	Yes	Yes
Year × spell	Yes	Yes	Yes
Fit statistics			
Outcome mean	0.027	0.027	0.028
# Cell × spell	7,584	3,509	4,075
# Year × spell	366	145	221
Observations	129,899	56,315	73,584
R^2	0.260	0.268	0.254
Within R^2	0.001	0.003	0.000

Clustered (Cell & Year) standard-errors in parentheses
*Signif. Codes: **: 0.01, *: 0.05, +: 0.1*

D Main analysis: Robustness checks

D.1 Family territory measurement

Excluding co-kings from the analysis One 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 A7 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.

Table A6: Emperor presence and family territory without German co-kings

Dependent Variables:	Present	On path	Days (log)	Docs (log)
Model:	(1)	(2)	(3)	(4)
Variables				
Fam. Terr. (no German Kings)	-0.009**	-0.016*	-0.011**	-0.014*
	(0.003)	(0.007)	(0.004)	(0.005)
Post-1250 × Fam. Terr. (no German Kings)	0.036**	0.074**	0.056**	0.068**
	(0.005)	(0.011)	(0.010)	(0.012)
Fixed-effects				
Cell (436)	Yes	Yes	Yes	Yes
Year (509)	Yes	Yes	Yes	Yes
Fit statistics				
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
*Signif. Codes: **: 0.01, *: 0.05, +: 0.1*

Table A7: Emperor presence and family territory: Incluiding rulers' personal domains

Dependent Variables:	Present	On path	Days (log)	Docs (log)
Model:	(1)	(2)	(3)	(4)
Variables				
Family Terr. (w/ pers. dom.)	-0.010**	-0.012	-0.014**	-0.018**
	(0.003)	(0.008)	(0.004)	(0.006)
Post-1250 × Family Terr. (w/ pers. dom.)	0.049**	0.093**	0.081**	0.100**
	(0.006)	(0.011)	(0.013)	(0.016)
Fixed-effects				
Cell (436)	Yes	Yes	Yes	Yes
Year (509)	Yes	Yes	Yes	Yes
Fit statistics				
Outcome mean	0.024	0.068	0.032	0.041
Observations	183,090	183,090	183,090	183,090
R^2	0.096	0.146	0.094	0.093
Within R^2	0.006	0.010	0.007	0.006

Clustered (Cell & Year) standard-errors in parentheses
*Signif. Codes: **: 0.01, *: 0.05, +: 0.1*

D.2 Alternative family territory indicators

Table A8 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 A8: Emperor 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)
Variables						
Family Terr.	-0.014**	-0.015**	-0.016**	-0.016**	-0.012*	-0.013*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.006)
Family Terr. × Post-1250	0.041**	0.057**	0.034**	0.047**	0.040**	0.059**
	(0.006)	(0.008)	(0.006)	(0.008)	(0.008)	(0.011)
Fixed-effects						
Cell (436)	Yes	Yes	Yes	Yes	Yes	Yes
Year (509)	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics						
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	0.094	0.092	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
*Signif. Codes: **: 0.01, *: 0.05, +: 0.1*

D.3 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 A9, (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 A4, and finally (3) control for the yearly number of documents and unique locations visited in Table A10. 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 A9: Emperor 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)
Variables			
Family Terr.	-0.021**	-0.028**	-0.034**
	(0.005)	(0.006)	(0.008)
Post-1250 × Family Terr.	0.047**	0.073**	0.088**
	(0.007)	(0.012)	(0.014)
Fixed-effects			
Cell (436)	Yes	Yes	Yes
Year (509)	Yes	Yes	Yes
Fit statistics			
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
*Signif. Codes: **: 0.01, *: 0.05, +: 0.1*

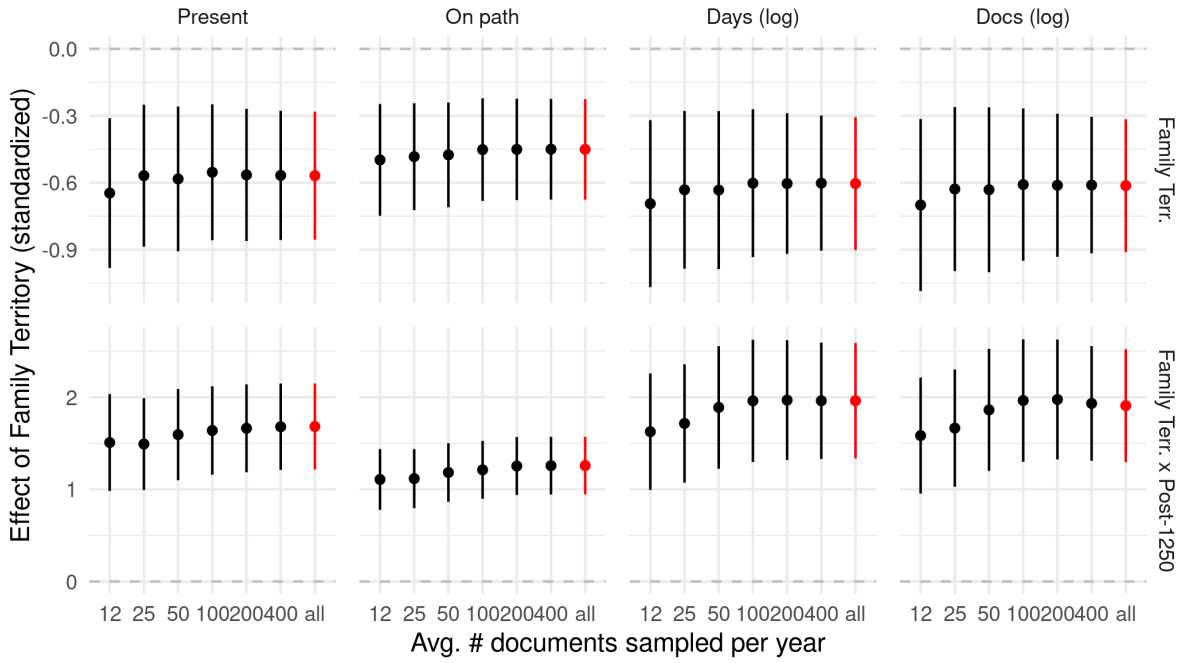


Figure A4: Effect by sampled # of yearly documents. Coefficients are standardized by the mean of the dependent variables to compare results across models.

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 A10: Emperor presence and family territory: Control for yearly data coverage

Dependent Variable:	Present		
Model:	(1)	(2)	(3)
Variables			
Family Terr.	-0.013**	-0.018**	-0.020**
	(0.004)	(0.004)	(0.004)
Post-1250 × Family Terr.	0.043**	0.040**	0.045**
	(0.008)	(0.006)	(0.008)
Family Terr. × I(docs/1000)	-0.006		-0.020
	(0.014)		(0.016)
Family Terr. × I(locs/1000)		0.248	0.470+
		(0.240)	(0.266)
Fixed-effects			
Cell (436)	Yes	Yes	Yes
Year (509)	Yes	Yes	Yes
Fit statistics			
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
*Signif. Codes: **: 0.01, *: 0.05, +: 0.1*

D.4 Governance activities

We use the categories of first verbs (commanding, empowering, informing; see Appendix A.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 A5 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.

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.

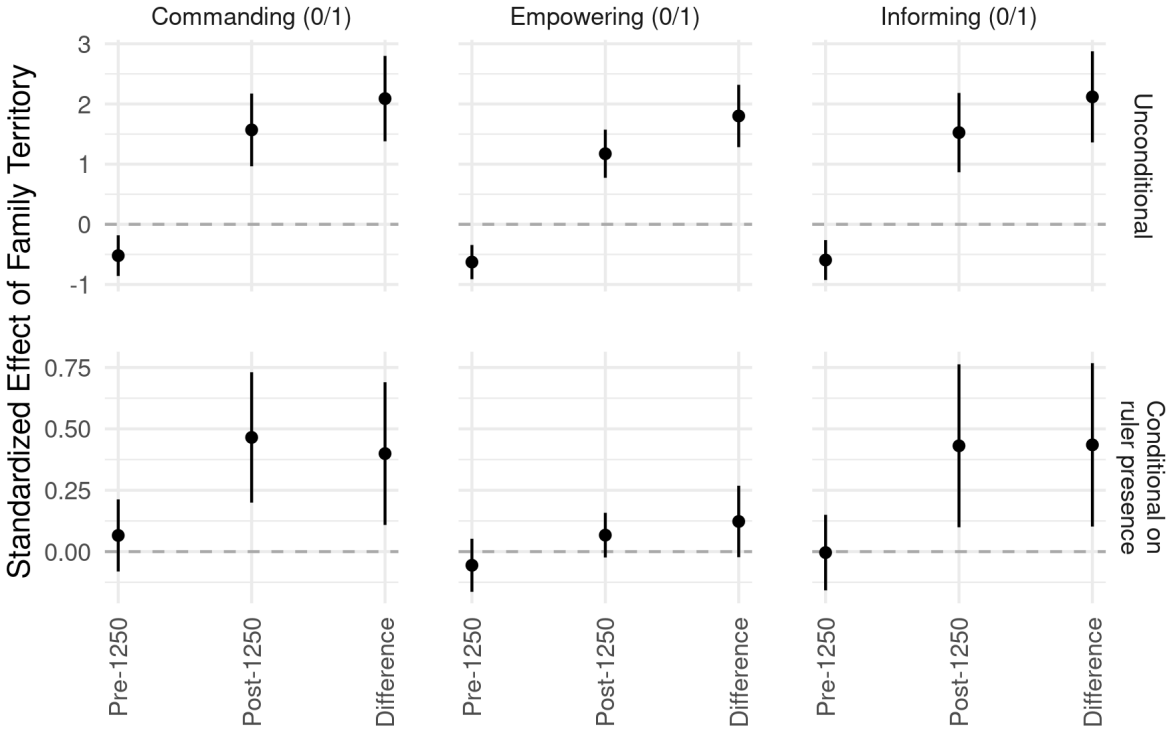


Figure A5: Effect by family territory on binary indicators of rulers' governance activities.

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).

D.5 Alternative measures of rulers' power

We assess 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[24] 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

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

centrality measures might be affected by the network size and rulers' age – both might also correlate with their travels, we control for both.

Table A11: Emperor presence and family territory: Alternative strength indicators

Dependent Variable:	Present			
Model:	(1)	(2)	(3)	(4)
Variables				
Family Terr.	-0.427**	-0.494**	0.172**	-0.023
	(0.122)	(0.125)	(0.059)	(0.066)
Family Terr. × NW Dist. (norm)	0.473**	0.397**		
	(0.132)	(0.128)		
Family Terr. × EV Centr. (norm)			-0.140**	-0.089+
			(0.051)	(0.053)
Controls	no	yes	no	yes
Fixed-effects				
Cell (436)	Yes	Yes	Yes	Yes
Year (509)	Yes	Yes	Yes	Yes
Fit statistics				
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
*Signif. Codes: **: 0.01, *: 0.05, +: 0.1*

The results in Table A11 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; $p < .1$).

D.6 Accounting for potential confounders:

Secular vs. Church territories: Our main analysis 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 it's institutions and lands – might similarly shape rulers' travels. In addition, after the Investiture Crisis, the relation between 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.

Table A12: Controlling for family members in the Church

Dependent Variables:	Present	On path	Days (log)	Docs (log)
Model:	(1)	(2)	(3)	(4)
Variables				
Family Terr.	-0.014**	-0.030**	-0.019**	-0.025**
	(0.004)	(0.008)	(0.005)	(0.006)
Post-1250 × Family Terr.	0.041**	0.085**	0.063**	0.078**
	(0.006)	(0.011)	(0.010)	(0.013)
Family in Church	0.011	0.084**	-0.004	-0.013
	(0.016)	(0.029)	(0.020)	(0.024)
Post-1250 × Family in Church	-0.004	-0.109**	0.013	0.030
	(0.027)	(0.042)	(0.041)	(0.051)
Fixed-effects				
Cell (436)	Yes	Yes	Yes	Yes
Year (509)	Yes	Yes	Yes	Yes
Fit statistics				
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
*Signif. Codes: **: 0.01, *: 0.05, +: 0.1*

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 A13 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 A13: Emperor presence and family territory: Fixed slopes

Dependent Variable:	Present				
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
Family Terr.	-0.016**	-0.014**	-0.013**	-0.014**	-0.009*
	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)
Family Terr. × Post-1250	0.044**	0.043**	0.039**	0.042**	0.034**
	(0.007)	(0.006)	(0.006)	(0.006)	(0.007)
Fixed-effects					
Cell & Year	Yes	Yes	Yes	Yes	Yes
Fixed slopes					
Lon/lat (Year)	yes				yes
Terrain (Year)		yes			yes
Climate (Year)			yes		yes
Agr. suit. (Year)				yes	yes
Fit statistics					
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
*Signif. Codes: **: 0.01, *: 0.05, +: 0.1*

D.7 Additional analyses of effects of sample characteristics

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 A6 are fairly stable – estimates become slightly smaller and less precise as we add more errors from ecological inference with large (i.e., 10'000km^2) cells.

Ruler jackknife: In addition, it might be that the travels of any one ruler exert undue influence over our baseline results, maybe causing them entirely. The ruler-jackknife in Figure A7 shows that our results are not significantly affected by any single ruler in the data, not even those with a long reign.

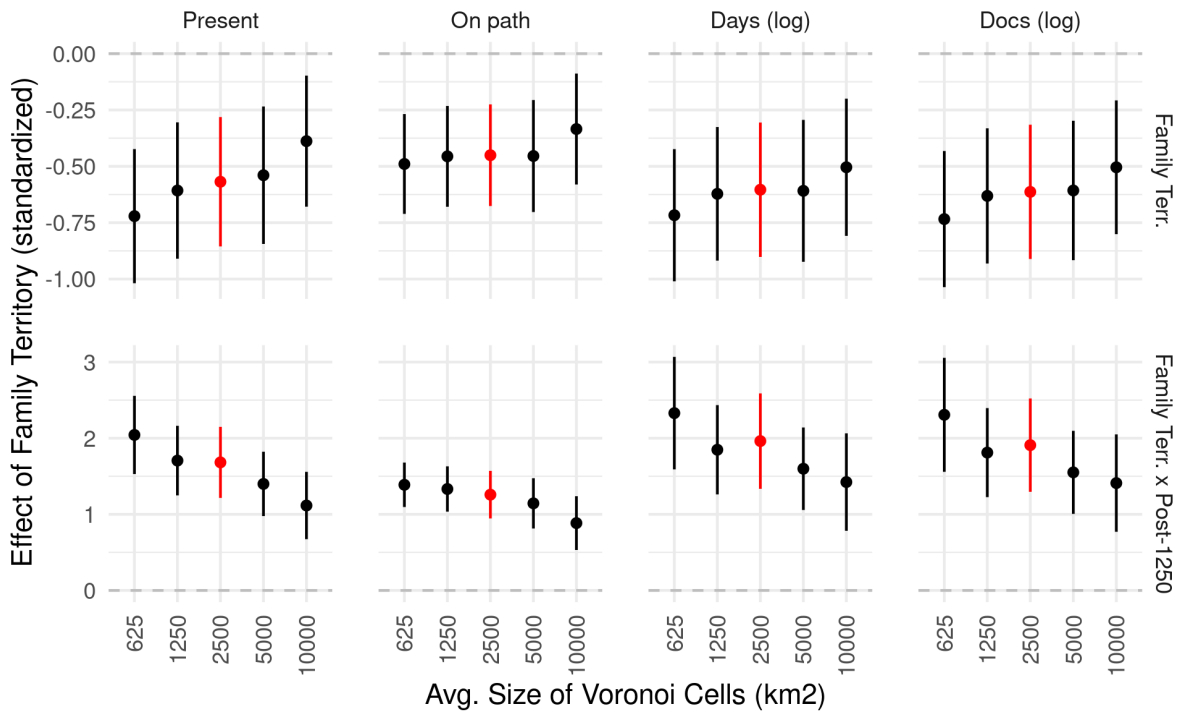


Figure A6: Effect by size of Voronoi cells. Coefficients are standardized by the mean of the dependent variables to compare results across models.

Note: Based on specification from Model 2 in Table 1 using Voronoi cells of differing sizes as units of analysis.

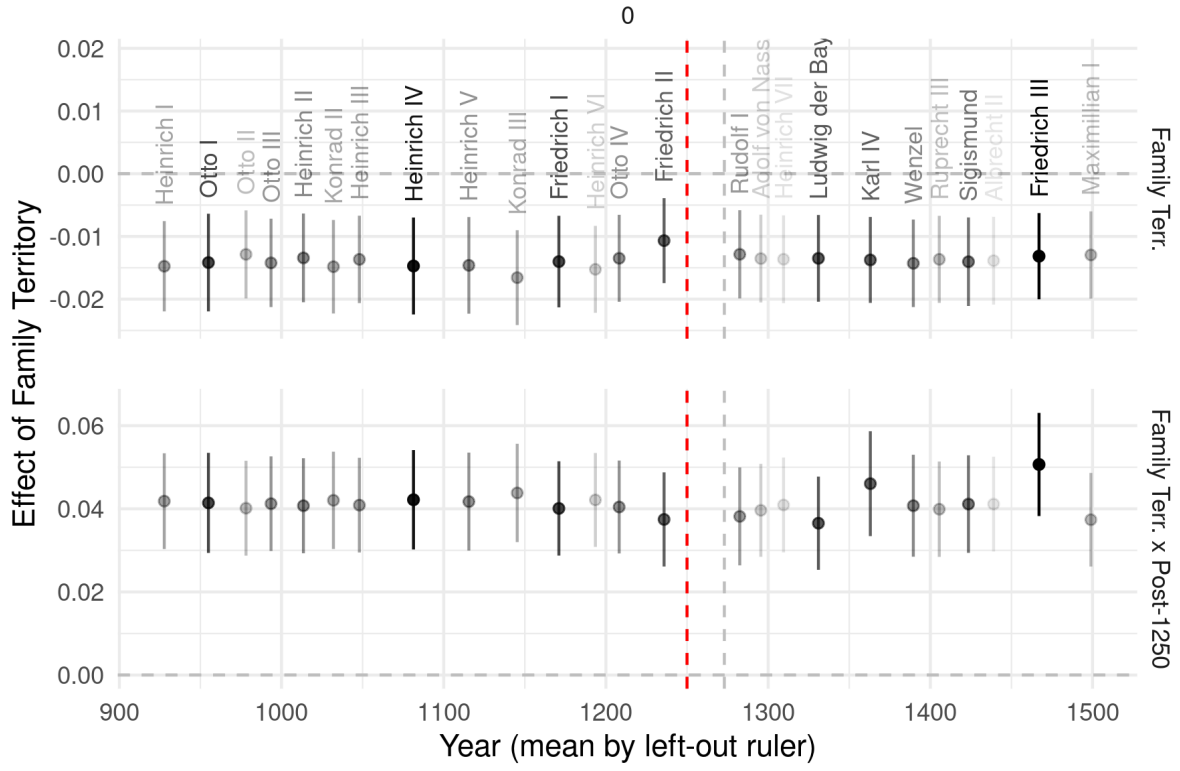


Figure A7: Ruler Jackknife: Leaving each ruler out of the sample.

Note: Based on specification from Model 2 in Table 1.

E References (Appendix)

Boucoyannis, Deborah. 2021. *Kings as judges: Power, justice, and the origins of parliaments*. Cambridge University Press.

FAO. 2015. "Global Agro-Ecological Zones: Crop Suitability Index." *Dataset, available online at: http://gaez.fao.org* .

Marek, Miroslav. 2018. "Genealogy Index." http://genealogy.euweb.cz/. Accessed: May 6, 2022.

Opitz, Juri, Leo Born, Vivi Nastase and Yannick Pultar. 2019. Automatic Reconstruction of Emperor Itineraries from the Regesta Imperii. In *Proceedings of the 3rd International Conference on Digital Access to Textual Cultural Heritage*. pp. 39–44.

Ramankutty, Navin, Jonathan A Foley, John Norman and Kevin McSweeney. 2002. "The Global Distribution of Cultivable Lands: Current Patterns and Sensitivity to Possible Climate Change." *Global Ecology and Biogeography* 11(5):377–392.