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

Working Paper

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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

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

The proliferating research on medieval and early modern Europe clearly recognizes that medieval administrations were rudimentary by modern standards. Power depended on negotiated relationships between rulers and their elite groups, and polities' geographical size mattered (Ertman 1997; Blaydes and Chaney 2013; Boix 2015; Boucoyannis 2021; Abramson 2017; Acemoglu and Robinson 2019; Stasavage 2020; Grzymała-Busse 2023*b*,*a*). For instance, representative institutions first arose where small polities made it possible for elites to congregate for regular as well as emergency meetings (Blockmans 1978; Stasavage 2010; Møller 2017). Yet, most quantitative historical analyses published in recent years overlook the non-territorial character of states in pre-modern Europe, for example by using state-level indicators of state capacity or borders as demarcations of political units (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).

While previous literature has produced many important insights, it does not geographically unpack historical rule and investigate how monarchs prioritized in a situation where governance required personal attendance, but traveling was slow and costly (Stasavage 2010). This is unfortunate for two reasons. First, it means that much research has projected the modern concept of territorial statehood onto a radically different past. This presentism ignores itinerant rule as an important characteristic of pre-modern governance. Second, studying rulers' itineraries shed light on how they monitored and controlled local elites in a more direct way than is often possible even in states with modern administrations. In short, the very physical character of itinerant rule offers a unique insight into the sinews of autocratic government.

The fact that political scientists have largely ignored itinerant rule is equally troubling beyond the study of the European Middle Ages. Itinerant rule was practiced by Achaemenid kings of ancient Persia as well as the Mongolian Empire created by Genghis Khan and its successor states (Durand-Guédy 2013; Atwood 2015). Itinerant rule was similarly practiced by rulers as diverse as 18$^{\text{th}}$-century Moroccan Sultans, 14$^{\text{th}}$-century Ja-

vanese emperors, 19th-century Ethiopian kings, as well as British colonial officers (Geertz 1977; Peyer 1964; Lugard 1926). In fact, rulers travel extensively still today – so far in 2023, US President Biden traveled on 32% of all days.[1]

So what were the determinants of rulers' itineraries in medieval Europe? How did monarchs decide which localities to visit, given that they could not cover their entire territory, that they and their courts often traveled at snail's pace, and knowing that visiting the wrong persons at the wrong time was not only folly but potentially dangerous?[2] And what do these dynamics tell us about the ability of medieval rulers to project public power?

We build a theory of itinerant rule that conceives of the relationship between the monarch and local elites as a principal-agent relationship (e.g., Huning and Wahl 2017, 13). Considering that itinerant rule was a costly and potentially dangerous form of projecting power, we argue that rulers maximized the payoff of traveling by visiting "marginal" local elites who could be induced to comply through in-person visits. Monitoring visits yielded less payoff for two types of non-marginal local elites: Elites whose interests were strongly aligned with those of the ruler, and elites whose interests were so misaligned that only a permanent presence or even their removal would produce compliance – actions too costly to outweigh their benefits.[3]

In an age when power was based on dynastic relations, elites' degrees of loyalty depended on family relations. Rulers' closest relatives would often make for the most trustworthy agents (Kokkonen et al. 2021), as rulers were able to reward relatives and maintain the prospects of 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, which increased the payoff of monitoring them frequently. We therefore expect rulers' itineraries to reflect their own strength and the geographical position of their relatives. We expect rulers who are strong and capable of rewarding their relatives to spend less time in territories controlled by their relatives and orient their governance towards regions controlled by more marginal members of their winning coalition. If the ruler's ability to reward his relatives diminishes, their loyalty decreases, and rulers spend more time monitoring them. We thus expect weak rulers to visit regions ruled by their family members more often than strong rulers.

We test this argument by comprehensively reconstructing the itineraries of the kings and emperors of the Holy Roman Empire between AD 919 and 1519. Our data includes 25 German kings and emperors, short 'rulers', of the Holy Roman Empire (HRE). We reconstruct their itineraries based on information from more than 72'665 documented,

[1] Excluding trips to Camp David and his family homes in Delaware. All trips can be found here.

[2] Many early medieval kings were attacked and some killed when they visited hostile parts of their realms.

[3] This argument has parallels in the literature on electoral campaign efforts and candidate visits to closely contested constituencies (e.g. James and Lawson 1999; Shachar and Nalebuff 1999; Strömberg 2008).

dated, and geolocated activities they engaged in. On average, we reconstruct itineraries from 143 documents per year. Upon publication of this article, we will make the data available on an accessible and interactive web platform that allows for spatiotemporal mapping, browsing, and downloading of rulers' itineraries and the underlying documents.

Our empirical analysis maps emperors' yearly itineraries as well as newly constructed data on the territories controlled by their immediate family members onto grid cells. To differentiate between strong and weak emperors, we turn to the weakening of imperial power through the Great Interregnum (1250–1273). The interregnum left the throne vacant for almost 25 years and broke the power of Holy Roman emperors as imperial infrastructure collapsed (see Møller and Doucette 2022, ch. 6; Doucette 2023; Grzymała-Busse 2023*b*).

Our analysis finds a negative effect of relatives' dominions on the frequency of imperial visits before 1250. However, after this juncture, emperors spent significantly more time in the dominions of their relatives than elsewhere, a change in travel patterns that materialized immediately after the Great Interregnum. This finding holds when we estimate the discontinuity of the effect of family-controlled territory in 1250 and when we apply a robust difference-in-differences design. These analyses account for potential endogeneity in the territorial control exerted by rulers' relatives. We furthermore find that the effects of family control are mostly 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, both on the regnal and the more local level. Whoever exercised lordship – be it kings, local lords, or bishops – had to travel their lands to govern them 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 personally led his court to travel an average of thirteen to fourteen times a month throughout his sixteen-year reign (Bartlett 2000, 133). The accompanying entourages were considerable; German emperors were, for instance, normally followed by 300-1'000 people (Bernhardt 1993, 58).

According to historians, the most important reason for the emergence of itinerant rule in Europe is the breakdown of central government structures after the fall of the Western Roman Empire in the 5th century (Wickham 2005, 2009, 2016). In the period analyzed here, power was therefore executed through physical interactions between rulers and elites across the realm (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 of the constituent parts of their realm even before they

could accede to the throne (Bernhardt 1993, 46). If there ever was an age characterized by the saying that "all politics is local," the High Middle Ages was it.

In the HRE, the need for itinerant rule not only reflected the importance of physical interactions between monarchs and local elites but also the Empire's size and political fragmentation.[4] A network of 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), and numerous royal palaces (*Pfalzen*) offered accommodation and upkeep on royal domains (Bernhardt 2013, 310). This network of roads and palaces gave the emperor an advantage over his nobles, who only had the right to utilize the roads in the regions they ruled. Normally, royal trips were planned and announced long in advance. This facilitated preparations and allowed local elites to plan their own (shorter) travels to places to meet the emperor, sometimes at formal "court days" (German *Hoftage*).

Throughout their travels, rulers carried out the full range of activities that constituted their governance. Long before medieval monarchs were taxmen, they were judges who visited localities to certify property rights, preside at court cases, and mitigate disputes (Boucoyannis 2021). Many cases concerned notables who infringed on the rights of each other or on peasants and cities and gave monarchs important power to oversee and rein in notables who exceeded their authority. Rulers addressed these matters of local justice and politics at assemblies of notables, which they frequented throughout their reigns. These assemblies were public and highly ritualized affairs in which the notables offered their counsel to the monarch, who then decided on matters (Althoff 2004, 139-146). Such assemblies were also often used for conflict resolution between the monarch and insubordinate notables (Althoff 2004, 147-152).

Visits were furthermore crucial to maintain and strengthen the legitimacy of the ruler and local elites whose status was mutually dependent on these public displays of politics (Nelson 2008; Haldén 2020), especially as literacy was low. Assemblies and more intimate meetings, such as feasts, also helped monarchs maintain personal bonds of loyalty to friends and followers, which were necessary to retain power (cf. Althoff 2004). It was difficult to preserve such bonds without regular personal interactions and lavish gifts, not only to the lay elite but also to monasteries, bishoprics, and towns, which often received rights and land grants in the wake of visits (Bernhardt 1993, 51).

Lastly, rulers also 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.

As a result, more direct oversight through the ruler's physical presence in a locality can be equated with more direct governance. Historians have traditionally argued that

[4]Early on, the Empire consisted of the kingdoms of Germany, Burgundy, Italy, and Bohemia; later, of a legion of kingdoms, archbishoprics, and principalities.

"the intensity" of royal government was higher in regions that were visited regularly by the emperor and lower in regions the emperor could not inspect personally but where he had to rely on 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 Empire was too big for even the most enthusiastically travelling emperor to make his presence felt in all important localities 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 destinations wisely and travel to destinations where they could expect the highest potential gain from a visit.

Historical research provides important insights into the geography of imperial itineraries. Müller-Mertens (1980), in particular, shows how emperors' presence varied across space under under Otto I (r. 936-973) who spend much time in his ancestral Saxony and the old Carolingian heartland in the Rhineland, where he owned personal lands and controlled royal estates. Following the ascent of the Salians in 1024, the center of imperial power shifted toward the Rhineland, and Saxony now became a remote zone. Later, the Hohenstaufen dynasty would move the center further south towards Swabia. While providing thick descriptions of the details of emperors' travels, prior historical research on itinerant rule offers less systematic insights into the political strategies that determined rulers' journeys. We devote the next section to developing a theory of itinerant rule.

The argument: Itineraries as optimization problems

Our theory of itinerant rule expects emperors to travel where they foresee the highest payoff from visiting and monitoring local elites given the (opportunity) costs of a visit. Holding the destination constant and focusing on the variation in the local elites who control it, the payoff of a visit is decided by the benefits of projecting power (i.e., monitoring and controlling agents). Specifically, emperors will focus on critical locations controlled by "marginal" agents whose preferences are not well aligned with those of the emperor but may shift as a result of (the possibility of) a visit. Loyal agents should be visited less frequently, as the problems of delegation and indirect rule are less pronounced. Reversely, inducing compliance among agents whose preferences diverge significantly from those of the ruler can necessitate too much oversight to be profitable, which is why they are seldom visited.

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

rulers crucially depends on family relations and rulers' power. Due to the dynastic politics of succession, monarchs' family members can be expected to be comparatively loyal. Yet, this loyalty depends on the rulers' ability to secure material benefits of the family's 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 rulers' relatives as an important class of imperial agents and provide historical details of 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 agents of the regime. As the set of local nobles was given upon coronation, he had little to no ex-ante control over their (varying) preferences. At the same time, the ability to remove and appoint new local elites in the sub-units within the imperial territory was limited due to constrained central power and the increasingly hereditary nature of noble "offices," even though strong emperors could replace at least some nobles if they wanted to.

The relation between emperors and local elites was therefore fraught with principal-agent problems. Compliance among agents could be increased through monitoring and (threats of) punishment upon detection of disloyalty and shirking. Yet, the price at which monitoring and punishment could induce compliance increased with the extent to which local elites' preferences diverged from those of the emperor. Monitoring and punishment under itinerant rule had both direct costs and, importantly, high opportunity costs since rulers could only be at one place at a time and travel was slow. Visiting the right elites at the right time was thus crucial. We propose that the degree of preference alignment between rulers and local elites affected rulers' optimal itineraries.

Agents whose preferences aligned 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 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 his itinerant style of rule 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 more closely to the ruler's preferences.

Finally, local elites with substantively misaligned preferences could not 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 of their time visiting "marginal" agents with slightly but not starkly diverging preferences whose compliance could be effectively induced with comparatively low monitoring effort. Visiting such places had the highest expected payoff from imperial visits. Agents whose preferences either aligned well or diverged starkly received only minimal attention, in the latter case to avoid direct threats to the center.

Family ties can proxy preference alignment

How does the emperor assess whether agents' preferences align with his own interests and where to direct monitoring and direct rule? Of course, prior personal experience is a guideline, but agents with differing preferences are hard to detect without continuous direct monitoring, which was a particular obstacle in the HRE due to the size of the polity, low state capacity, and slow communication channels. Given the limited monitoring resources and the high cost of direct agent supervision, the emperor had to use shortcuts to proxy how agents' preferences aligned with his own.

We argue that family ties can proxy for the degree of preference alignment since rulers' family members tend to profit most from the existing dynasty, system, and hierarchy. The logic of dynastic politics and succession as well the real and perceived affinity between family members (e.g. Kokkonen et al. 2021) bind the material prospects of rulers' relatives directly to the success of a ruler. As natural "allies" (Bendor, Glazer and Hammond 2001; Huber and Shipan 2006), they therefore have the highest interest in maintaining the dynasty's reign over the empire, and therefore, their incentives align with those of the emperor. Family members can therefore best substitute direct rule and monitoring through physical presence.

Another important reason for the trustworthiness of family agents beyond the material logic above is that solidarity within the dynasty is self-reinforcing (Kokkonen, Møller and Sundell 2022, 198).[5] The closer your connection to the monarch, the more you have to lose if the reign falters, and a new line of succession is established. If a challenger deposes an emperor, he is likely to go after the emperor's family members to eliminate their rival claims to the throne. Consequently, the preferences for power preservation in the short and long term align, and, on the operational level, the family agent truthfully adheres to the monarchs' preferences.

Yet, this dynamic subsides and potentially reverses if the emperor cannot deliver

[5]In-married relatives (i.e., wives and husbands and their relatives) are also likely to be more trustworthy agents, especially when their marriages produce children, whom both they and the royal family have an interest in protecting (cf. Burton-Chellew and Dunbar 2011).

the benefits of family rule and a high probability of its continuation: Once the benefits and stability of dynastic rule subside, family members are tempted to abandon or even backstab the ruler. It has been demonstrated that male relatives – especially uncles, brothers, and to a lesser extent sons – at times presented the gravest threat to medieval monarchs. They had direct access to the emperor and could draw on their position in the line of succession to legitimize their rule upon successfully acceding the throne (Kokkonen et al. 2021). Therefore, weak rulers had good reasons to visit "competitor" relatives more than other relatives, simply to keep them on a short 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. In order to apply our argument to the Holy Roman Empire, we therefore need to identify temporal variation in the strength of its kings and emperors. 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 up until the Investiture Controversy 1075-1122, which weakened emperors' power over the appointment of bishops and marked a genuine collapse in imperial authority south of the Alps (Wickham 2016; Wilson 2016; Møller and Doucette 2022, ch. 5-6; Grzymała-Busse 2023*b*).

Imperial power might thus be said to have climaxed with the Ottonians (r. 919-1024) and then to have weakened somewhat under the Salians (r. 1024-1125), especially after the onset of the Investiture Controversy. However, in the Empire's largest part north of the Alps, it remained vigorous long after that, 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 in this period is that in all eleven instances where German kings had living sons, they were able to have them elected and crowned as co-kings during their own tenure (Bartlett 2020, 95).

As we know, the HRE would ultimately become much more fragmented. While this happened in phases, the genuine juncture 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

[6]The reasons for this weakening of the HRE is exogenous to our theoretical argument. Recent research has emphasized the strategic competition between popes and emperors that began with the Investiture Controversy as the main cause (see Møller and Doucette 2022, ch. 6; Grzymała-Busse 2023*b*,*a*; Doucette 2023).

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 (the first imperial crowning since that of Frederick II in 1220), with Henry VII of the Luxembourg dynasty. But Henry, too, was a weak ruler compared to what we find before 1250, a former vassal of the Capetian kings of France with limited personal economic resources. This new weakness is reflected in the politics of succession. In the period 1254-1438, seven different dynasties held the German throne, and we only find one example where it passed directly from father to son (Bartlett 2020, 398). Later, the imperial title *de facto* became hereditary again in the Habsburg line, reflecting a return to somewhat stronger rulers. However, 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 Great Interregnum thus broke the imperial infrastructure north of the Alps, just as the Investiture Controversy had broken it south of the Alps one-and-a-half centuries earlier (see Møller and Doucette 2022, ch. 5-6). After 1250, the Empire thus 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 were characterized by various levels of centralization. This further strengthened centripetal dynamics in the HRE, and it is likely to have affected royal itineraries.

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. This meant that the "marginal" agents to be particularly monitored were not or only distantly related to them.

In contrast, post-interregnum kings faced major challenges to their rule and struggled to retain and monitor even many closely related agents in their (smaller) coalition. In practice, post-interregnum rulers did not have meaningful control over large tracts of "their" realm outside their private lands and were unable to reward their relatives to the same extent as pre-interregnum rulers. In addition, they were generally unable to pass their royal power to their sons (Bartlett 2020, 398), thus reducing the prospects of long-term profits for family members and their incentives to contribute to its survival. Consequently, 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. 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 police 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 and could therefore frequent parts of the realm 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 draw on a unique collection of documents to reconstruct the spatial and temporal details of 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 royal itineraries

We track rulers' travel itineraries through temporal and geographical information on the legal documents they signed and other information on their activities compiled by historians since 1839 in the *Regesta Imperii*.[7] The *Regesta* consist of short summaries of imperial activities – deeds signed, reports of meetings and other events such as religious festivities attended by the German kings and emperors – which are in most cases associated with a date and geographic location. We add documents for emperors Henry III and Henry V, who are missing from the *Regesta*, from the *Monumenta Germaniae Historica*,[8] the original collection of documents which the *Regesta* incorporate and expand upon. The full *Regesta* contain ca. 200'000 documents of which 105'721 relate to ruling German kings and Holy Roman emperors after AD 919. Of these, 72'665 are geographically located and dated, with 68'077 located inside our geographic area of analysis.[9]

As Figure 1 shows, the number of documents varies substantively over time, a likely result of differential document production and survival. In the 10th and 11th centuries at the beginning of our period of study, relatively few (on average 10 to 100) documents are available per ruler-year. This number grows significantly towards 1'000 in the late 15th century. Importantly for our purposes here, 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. Our analysis below addresses potential biases from the varying availability of documents in a series of robustness checks.

[7] Accessible online at http://www.regesta-imperii.de/en/home.html.

[8] Accessible online at https://www.mgh.de/en

[9] Documents outside our spatial focus originated from, for example, the crusades. Some documents cover rulers' pre-coronation activities.

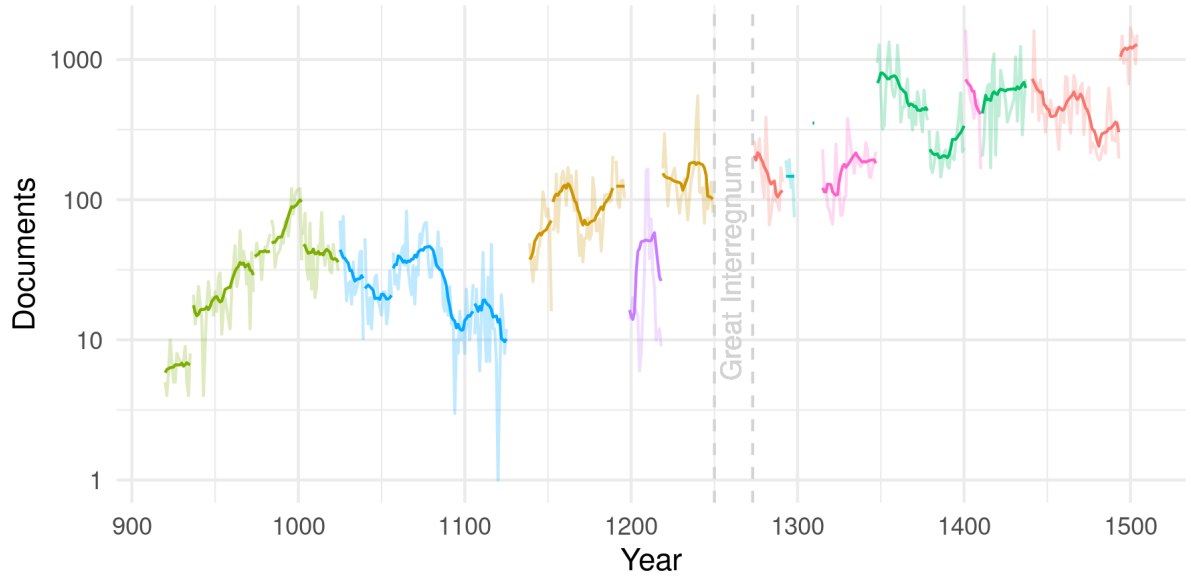


Figure 1: Documents over time

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

We develop an algorithm to transform the set of documents in the *Regesta* into data on rulers' itineraries. An itinerary consists of date-location pairs, which, once strung together, form a path. Our algorithm (see Appendix A.1) solves a series of problems that complicate directly deriving paths from the raw *Regesta* data. We first georeference all locations associated with the documents. This includes translations of Latin place names, and making historically informed choices about most-likely-visited places where names are misspelled or ambiguous. Second, we remove documents without temporal information or georeferenceable locations, and documents that likely refer to an acting subject other than the relevant 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.

Although our semi-automated construction of imperial itineraries handles the large number of documents in an efficient and replicable manner, it does have a few shortcomings. First, it is likely that automatic georeferencing and date-imputation introduces errors, and that some documents are misattributed to rulers where their agents were acting instead. Yet, we see little reason to expect these errors to systematically occur at a scale to explain our results below. Second, we have no information on rulers' whereabouts between the stops indicated by the *Regesta* entries and only know their approximate times of arrival and departure at each location. Such information could be derived or proxied in future work by drawing on additional sources as well as data on roads and the physical

environment. While drawing on such data could increase spatial and temporal precision, these details would be lost in aggregation in our analysis, which is based on yearly grid cells of a size of 2'500km^2. Such an extension is furthermore difficult as roads data is not consistently available, which may therefore lead to selection biases, in particular where roads were built strategically (e.g. Bernhardt 1993, 2013).

Description of rulers' itineraries, 919-1519

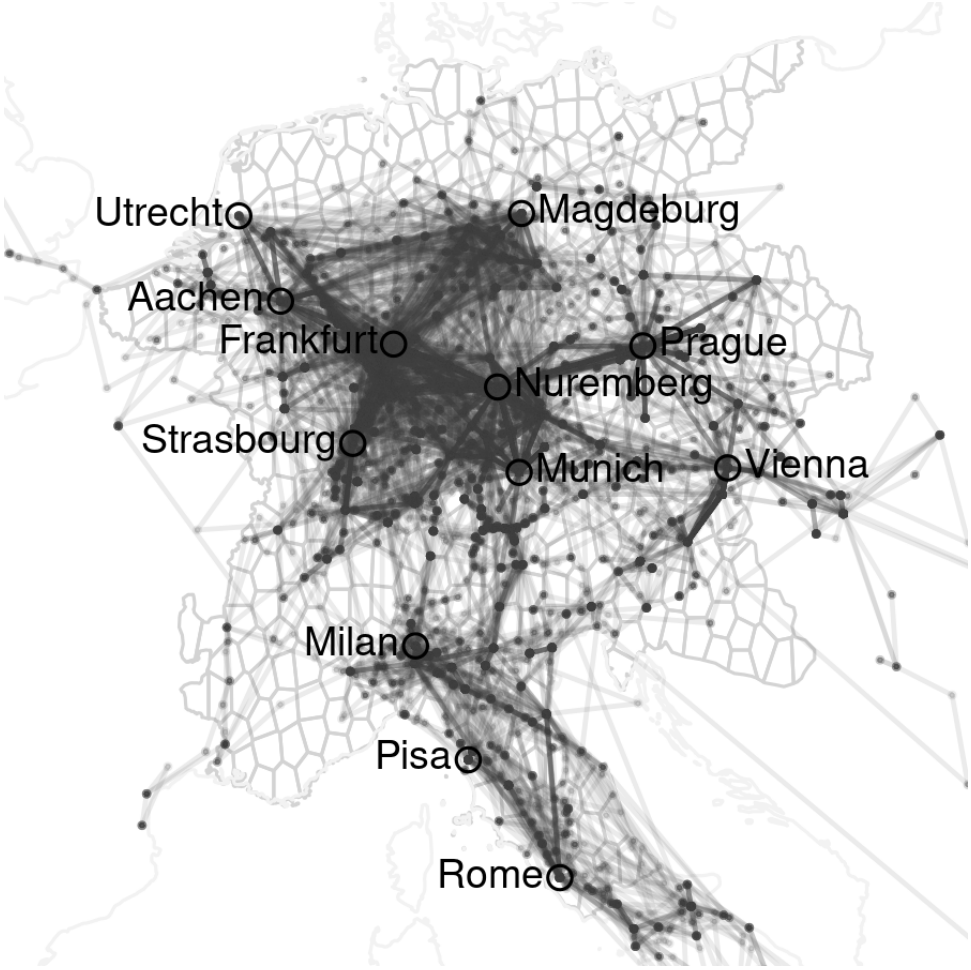
Our data on ruler itineraries allows us to reconstruct rulers' location at an unprecedented level of spatial and temporal detail. Figure 2a visualizes the paths of all ruling kings and emperors in our data. The map highlights the concentration of imperial rule in centers such as Aachen, Nuremberg, Prague,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

Unsurprisingly, zooming in on the itineraries of single rulers shows substantive variation in the presence of rulers across space. Frederick Barbarossa (r. 1152-1190) of the Hohenstaufen dynasty, for example, traversed the realm extensively (see 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 to strengthen imperial power. He died in 1190 during the Third Crusade while crossing the Saleph River in what is today Turkey.

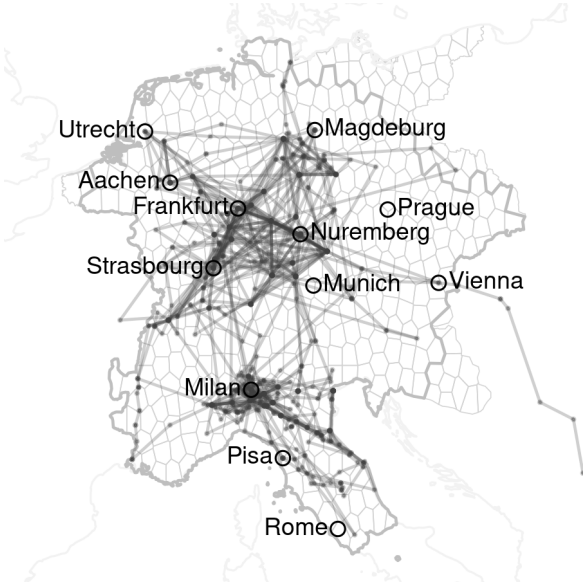
A different picture emerges from the travels of the post-interregnum emperor Louis IV "the Bavarian" (r. 1314-1347). As a member of the Wittelbach dynasty, whose ancestral power was based in Bavaria, a region in the South of today's Germany around Munich and Nuremberg, he concentrated his presence there (see Figure 2c). Travels elsewhere were limited. The map shows his march to Milan where he was crowned King of Italy in 1327, continuing to Rome. Louis did not visit much of the Empire's territories south of the Alps, putting in doubt his control over the area, nor the northern German areas in the way Barbarossa had done.

As the example of Louis IV suggests, the extent of travel differed within rulers' reigns and might differ between them as well. Figure 3 shows this variation. 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. 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, who otherwise spent most of his time traveling his Italian lands.

At a more disaggregate level, we 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 declined with rulers' age. Consistent with the historical literature, we find descriptive evidence of economic motives affecting rulers' itineraries.



(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

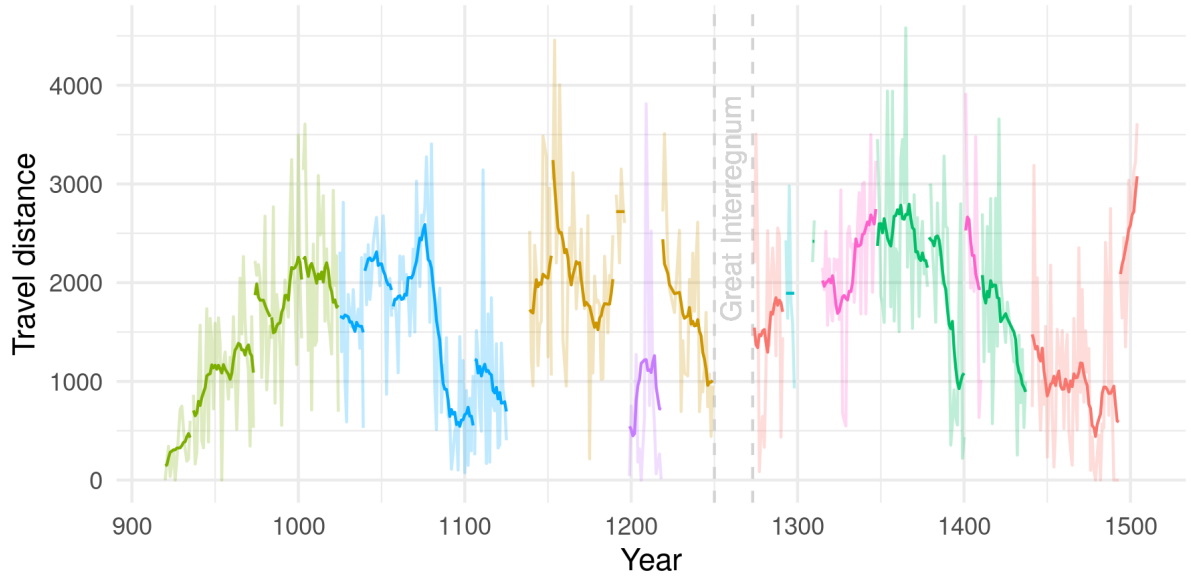


Figure 3: Length of travel path by year

A cross-sectional analysis of spatial correlates of ruler presence shows more visits to areas with higher levels of agricultural suitability and greater urban populations. These are the areas where direct governance paid off most for rulers and with the capacity to host their emperor and his entourage (Bernhardt 1993). These results are described in Appendix A.2.

Research design

Unit of analysis

Our empirical inquiry focuses on the travel itineraries of the rulers of the Holy Roman Empire from AD 919 to 1519. The first ruler in our dataset is Henry the Fowler, the first non-Carolingian king of East Francia, or what turned into the HRE. His son, Otto I, the Great, was the first Holy Roman emperor[10] from AD 962. The final emperor in our data is Maximilian I, whose reign ended in AD 1519, on the eve of the Reformation and the period known as early modern Europe when itinerant rule started to fade, as permanent administrative centers and more genuine royal administrations were created.

Our main 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 our main spatial unit of analysis. 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,[11]

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

[11]Hexagons cause minimal geographic distortions as they allow for a continuous, non-overlapping

each covering approximately 2500km^2 (50×50km; see 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.[12]

Ruler presence

We first measure our main outcome variable, yearly ruler presence, by projecting our travel itineraries introduced above onto our grid cells and 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 the documents. We are fairly confident that rulers were present in cells in which a document from a given year is located (the points in Figure 2). The second, more approximate measure is based on the travel *path* of rulers, which linearly connects all documents from a given year (the lines in Figure 2) – each cell that is crossed by the line is coded as being `on path`.

We also construct measures of the extent of visits. We count the number of `documents` per cell-year on which the travel paths are based as well as the unique number of `days` on which they have been issued. The latter two variables are log-transformed after adding a constant of 1 to account for their right skew.[13]

Figure 4a shows a map of average emperor presence in a year during the Wittelsbach dynasty, and 4c tracks the average of our main `present` dummy over time.[14] 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

The main independent variable used to test our argument that strong and weak rulers visit local elites who are their relatives to varying degrees is a measure of family-controlled territory. This 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.[15] On these, we locate, for each year, rulers' living, up to third-degree[16] family members (Figure 5). This follows from our argument that closer family relations increase relatives' baseline

tesselation that is closest to a circle.

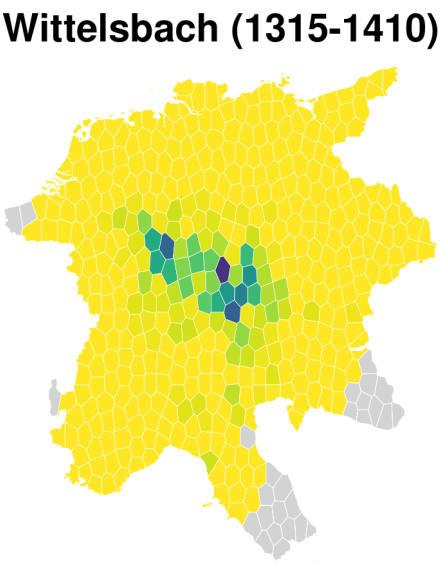
[12] Again using data from (Nüssli and Nüssli 2010) at the beginning of each century.

[13] We obtain consistent results in a robustness check based on parallel outcomes constructed from the raw *Regesta* data, which shows that our path-construction algorithm does not cause selection bias. See Appendix D.

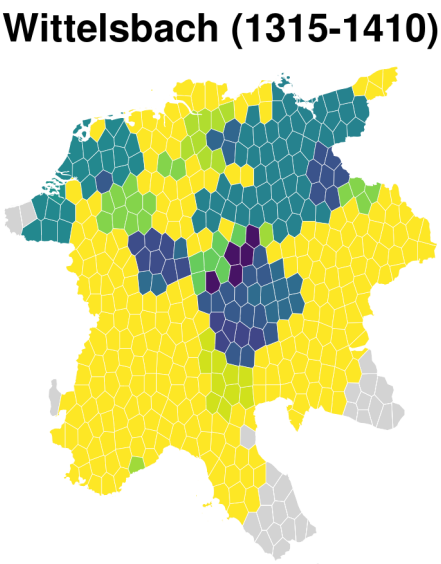
[14] See Appendix A.1 for descriptive maps of all other dynasties.

[15] We impute dates using simple rules based on family relationships, e.g., that parents typically marry before their first child is born. See Appendix A.3 for details.

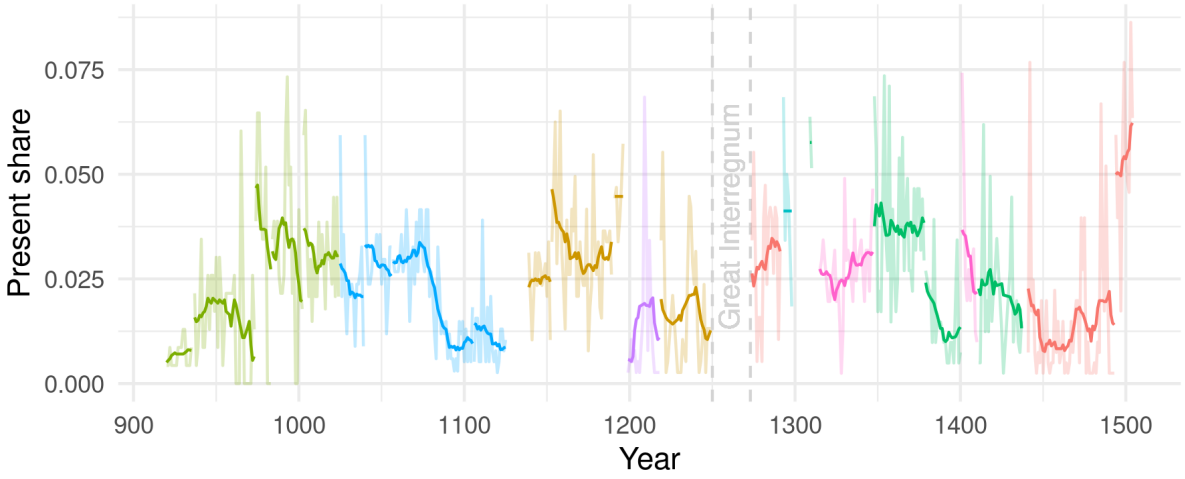
[16] In the same bloodline: 1st degree: parents, children; 2nd degree: grandchildren, grandparents, siblings; 3rd degree: aunts, uncles, great-grandparents, and -children. Links by marriage add +1 to all relation degrees.



(a) Emperor presence

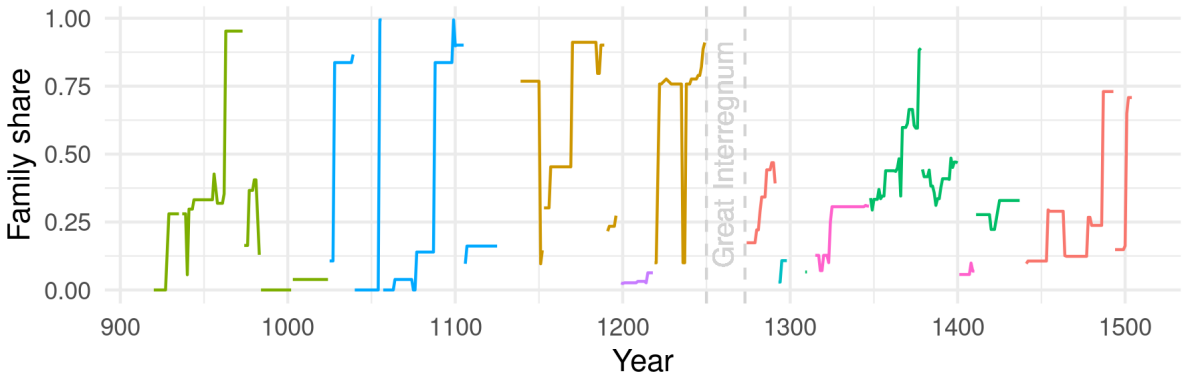


(b) Family territories



(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.

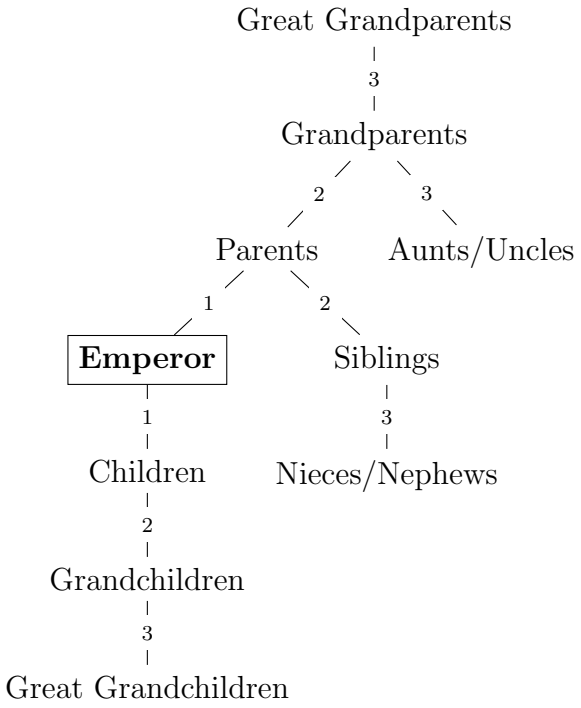


Figure 5: Model of family relations in our data

Note: The model represents both maternal and paternal family relations, i.e., the emperor's maternal grandparents and aunts and uncles are included. In-laws not included, marriage links add +1 to the relationship degree.

compliance as agents of an emperor. In the baseline specification, we include all third-degree family members of the emperor including the maternal line as well as relatives by marriage. In a set of robustness checks discussed below, we investigate treatment heterogeneity by relatives' relationship degree, gender, and type.

We use information on the (time-variant) titles held by each relative of a ruler recorded in Marek's (2018) data to encode family-ruled territories. To geocode the territories and places associated with titles, we match the title-territories in our data to boundary data of states in Abramson (2017) and political entities in the Euratlas (Nüssli and Nüssli 2010), which includes independent states and other sovereign entities that were part of the HRE. For territories missing in both databases, we identify their major city[17] 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 spatiotemporal data allows us to derive the dummy variable `Family Terr.`, which encodes for each cell and year whether a cell contains territory controlled by a close relative of the emperor. 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 king. We show in Appendix D.1 that dropping the German kingdom from the set of family-controlled

[17]Geocoded using the GeoNames API `http://www.geonames.org/about.html`.

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 emperors than within emperors. This is because emperors rule 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. 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 emperors strategically expanded their control through the family network over time through marriage and the granting of titles, we regard the variation within emperors as more likely than variation between emperors to be affected by omitted time-varying confounders.

The TWFE estimation strategy relies on the full set of information in the data, a feature that might come with potential problems as our treatments are staggered, often reversed, and may have heterogeneous effects over time (Imai and Kim 2021; Goodman-Bacon 2021; Callaway and Sant'Anna 2021, e.g.). We therefore employ two additional designs for causal identification below. 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 additional empirical strategies increase the internal validity of our results by zooming in on temporally well-defined changes and thereby address potential caveats 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 as well as their difference are substantive in size, 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 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.

Simply splitting our 600-year study period into two parts and comparing simple averages risks masking important effect heterogeneity of family control of ruler presence over time, some of which may have little to do with the weakening of the rulers of the HRE 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 showing some effect heterogeneity before and after 1250, the results clearly show a sharp increase in the effect of family control from $-.04$ percentage points immediately before 1250 to $+.05$ percentage points immediately after.

We formally analyze the sharp increase in Figure 6 to improve the inference of the causal 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

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*

of 7-13 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 suggests that, if anything, we are underestimating the effect of the weakening of rulers in 1250 on their propensity to travel towards territories controlled by their relatives.

While the discontinuous jump across the Great Interregnum stands out in magnitude, the more specific variation before and after 1250 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, Figure 6 shows that 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 attempt to increase the 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 began in 1250, before we find a partial reassertion 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 (the quarter century after the Investiture Controversy) with respect to travel patterns.

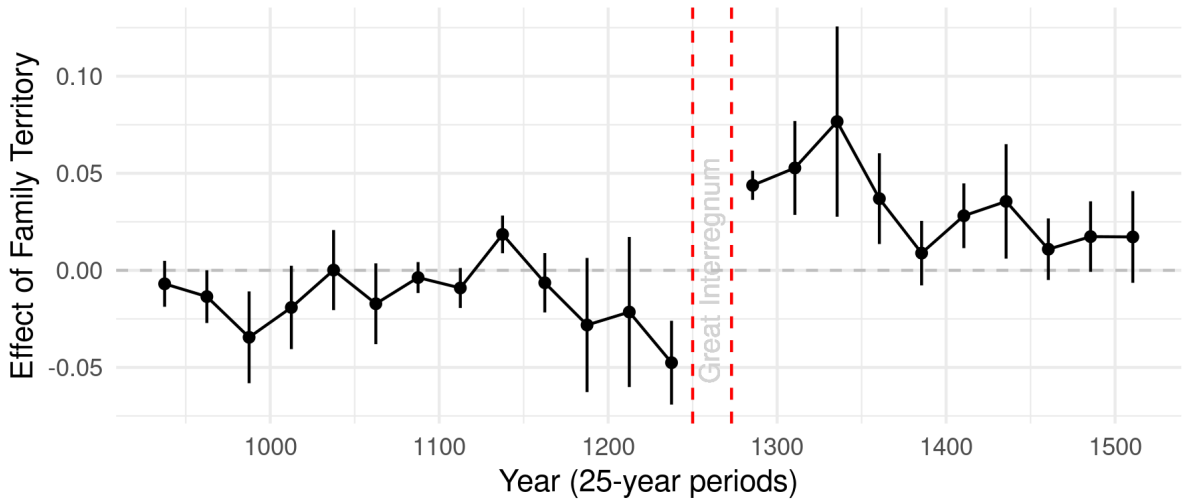


Figure 6: Effect of family territory, by 25-year period

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

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.[18] Our difference-in-differences design addresses this problem of potentially endogenous family control by focusing on the shift in family control that occurred around ruler successions.

Our difference-in-differences 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 average causal 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.[19]

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,

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

[19]See Appendix C for all details.

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*

with some variation in the precision of the pre-1250 effect of family territory. It turns statistically insignificant for the (less precisely measured) `on path` outcome and becomes more precise for the (likely less noisy) measures of the intensity of rulers' presence. Event-study plots in Appendix C show the absence of differential pretrends, suggesting that we can causally interpret these results.

Overall then, the DiD results, which leverage solely variation in family control around times of succession, support the baseline TWFE results, which are based on all variation in the data. In times of imperial strength, the itinerant rulers of the HRE roam areas controlled by their relatives less than other regions of their realm. This pattern shifts abruptly with the Great Interregnum between 1250 and 1273, 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 than their own family.

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.

***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 outcome measured from the locations of all georeferenced entries. Lastly, we directly control for a number of 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.

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 in a given 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,[20] 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 at the level of rulers confirms that no single ruler drives our results.

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

Effect heterogeneity

The historical literature on which we built our theoretical arguments suggests clear differences in the effects produced by different types of family relations. Corroborating these expectations, the following analysis of heterogeneous effects of relatives' local control on rulers' travel itineraries finds strongest effects and post-1250 differences for close, male, and direct relatives.

Table 3: Emperor presence and family territory, by relationship degree D

Dependent Variable:	Present			
Model:	(1)	(2)	(3)	(4)
Variables				
Family Terr. (D=1)	-0.014**			-0.013*
	(0.005)			(0.005)
Post-1250 × Family Terr. (D=1)	0.067**			0.064**
	(0.011)			(0.011)
Family Terr. (D=2)		-0.012^{+}		-0.011^{+}
		(0.007)		(0.007)
Post-1250 × Family Terr. (D=2)		0.036**		0.033**
		(0.008)		(0.008)
Family Terr. (D=3)			-0.010*	-0.009*
			(0.004)	(0.004)
Post-1250 × Family Terr. (D=3)			0.020**	0.013^{+}
			(0.007)	(0.007)
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	0.094	0.092	0.091	0.095
Within R^2	0.003	0.001	0.000	0.005

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

Above, we theorize that close relatives should have larger effects on emperors' travels than distantly related ones: Strong emperors should visit them least, while weak emperors should keep the closest eye on them due to their potential claims to the throne. Table 3 supports this conjecture. Pre-1250, family control has consistently negative effects that slightly decreases with relationship degree. In the post-1250 period, areas controlled by first-degree relatives ($D = 1$; children and parents) see emperors' presence increased by

6.4 percentage points, which is a large and highly significant difference compared to the pre-1250 period. The post-1250 effect associated with second-degree relatives ($D = 2$) is roughly half that size, and that of third-degree relatives ($D = 3$) is again smaller ($p < .1$). This finding relates directly to the decreasing importance and risk associated with more removed relatives of weak rulers.

Due to the strong patriarchal structure of political power and succession in the dynasties ruling the HRE at the time, we expect male relatives to affect rulers' itineraries most, with little effect of female relatives. When we separate out territorial control as indicated by the titles of male versus female relatives in Appendix Table A12, we find that male relatives exclusively drive our findings. This finding comes with the caveat that women in our data are not associated with the territories controlled by their husbands, who remain one degree removed even though they may have had some power over them. As a result, we observe a much lower average female (2 percent) than male control (34 percent).

Lastly, we expect that direct "bloodline" relationships have larger effects than family links created through marriage, on which no claims to a place in the line of succession could be based. We find that our results are exclusively driven by direct family relationships through the "bloodline". Relationships based on marriage links having no discernible effects (see Appendix Table A13). This results underscores 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 their realms from a capital city or use a centralized administration with local branches. They governed in person, traveling their lands with a large retinue to project power, the same reason itinerant rule was practiced in other parts of the world. Mughal emperor Aurangzeb (r. 1658-1707), for example, advised his successor to: "Always be moving about, as much as possible: It is bad for both emperors and water to remain at the same place; the water grows putrid and the king's power slips out of his control." (quoted in Gommans 2002, 100).

However, 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, not to speak of the Mongol and Mughal Empires. They would therefore go where the benefits were biggest compared to the high direct and opportunity costs of

travel.

We have argued that rulers focus 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 taken advantage of 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 lordship, a method of government that 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 in other corners of their realm. Taking advantage of temporal and geographical information on the legal documents they signed and other information on their activities, we have thus 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 with an inherently fragmented and decentralized form of rule. However, around AD 1000, the HRE was the strongest political unit in the Latin West. Weakened by the Investiture Controversy (1075-1122), in particular south of the Alps, 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 difference to their predecessors, post-interregnum kings were unable to make their presence felt across the empire and hence reduced to local rulers with an imperial title, much as the early Capetians had been local rulers of the *Île-de-France* with a royal title. Our results thus show how the HRE developed 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).

Finally, our findings inform about the use of family members as trusted agents in

medieval Europe. We show that powerful rulers relied on relatives as trusted agents. When rulers were weak, they started to monitor their relatives in fear of losing what lands they still controlled. The fact that we only see such a change for male relatives strengthens our confidence in this interpretation of the data, as female relatives were not eligible to inherit and rule family territories as long as there were male relatives around and thus did not constitute the same threat to kings. In this way, family was, somewhat counterintuitively, a greater asset for strong kings.

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Supplementary Material

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

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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

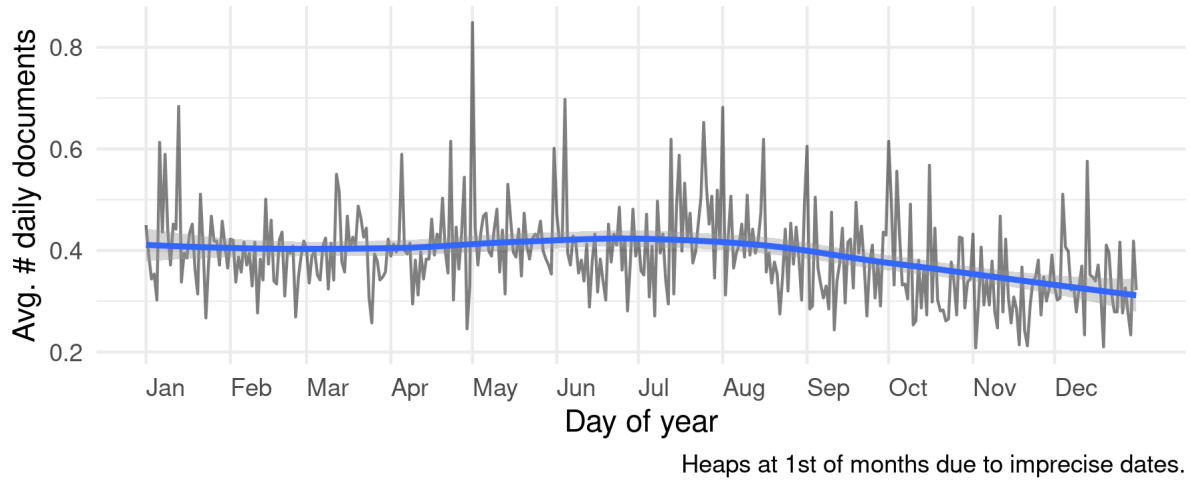


Figure A1: Documents by time of year

Note: Based on path-data.

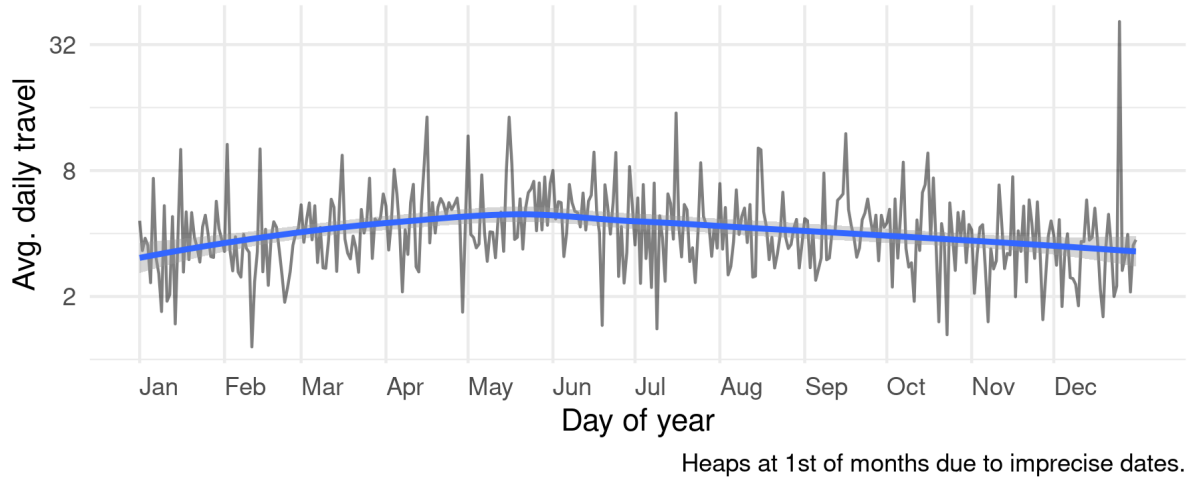
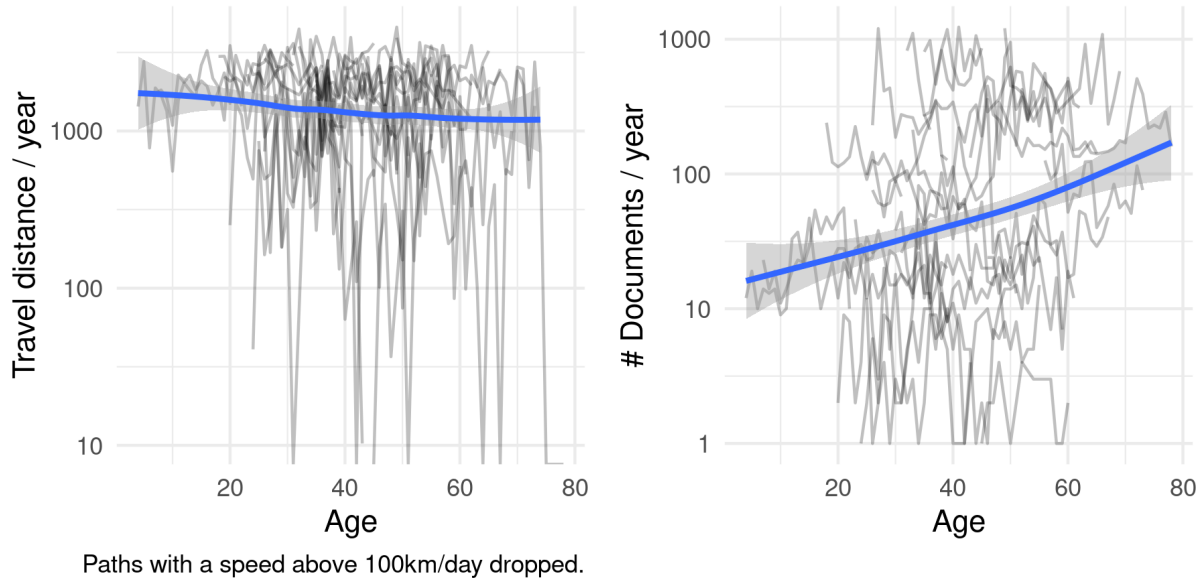


Figure A2: Ruler travel by time of year

Note: Based on path-data.



(a) Travel by ruler age

(b) Documents by ruler age

Figure A3: Data by age of ruler

Note: Based on path-data.

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)
log(1+city.inh)		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*

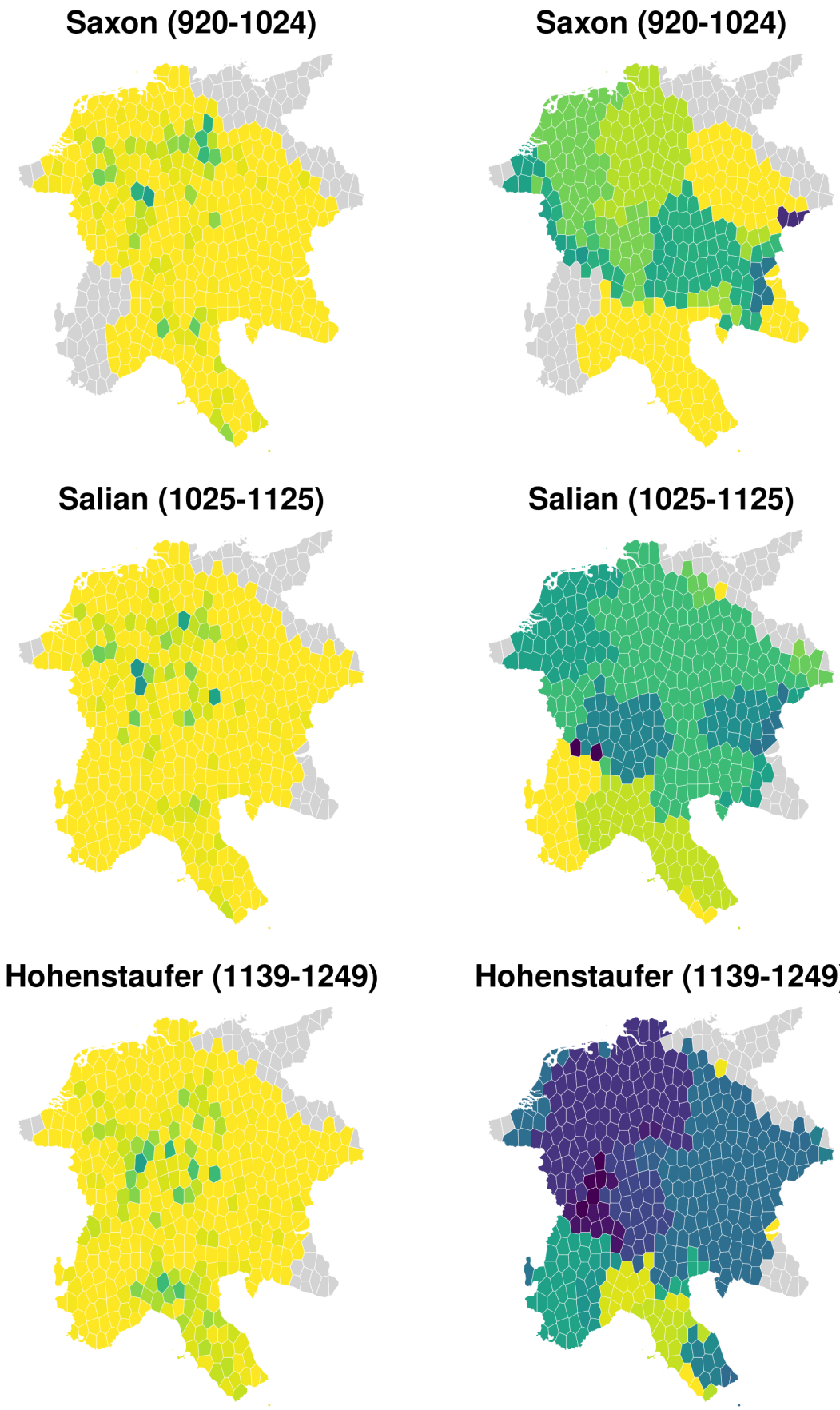


Figure A4: Data

Note: Cells outside the territory of the HRE in grey.

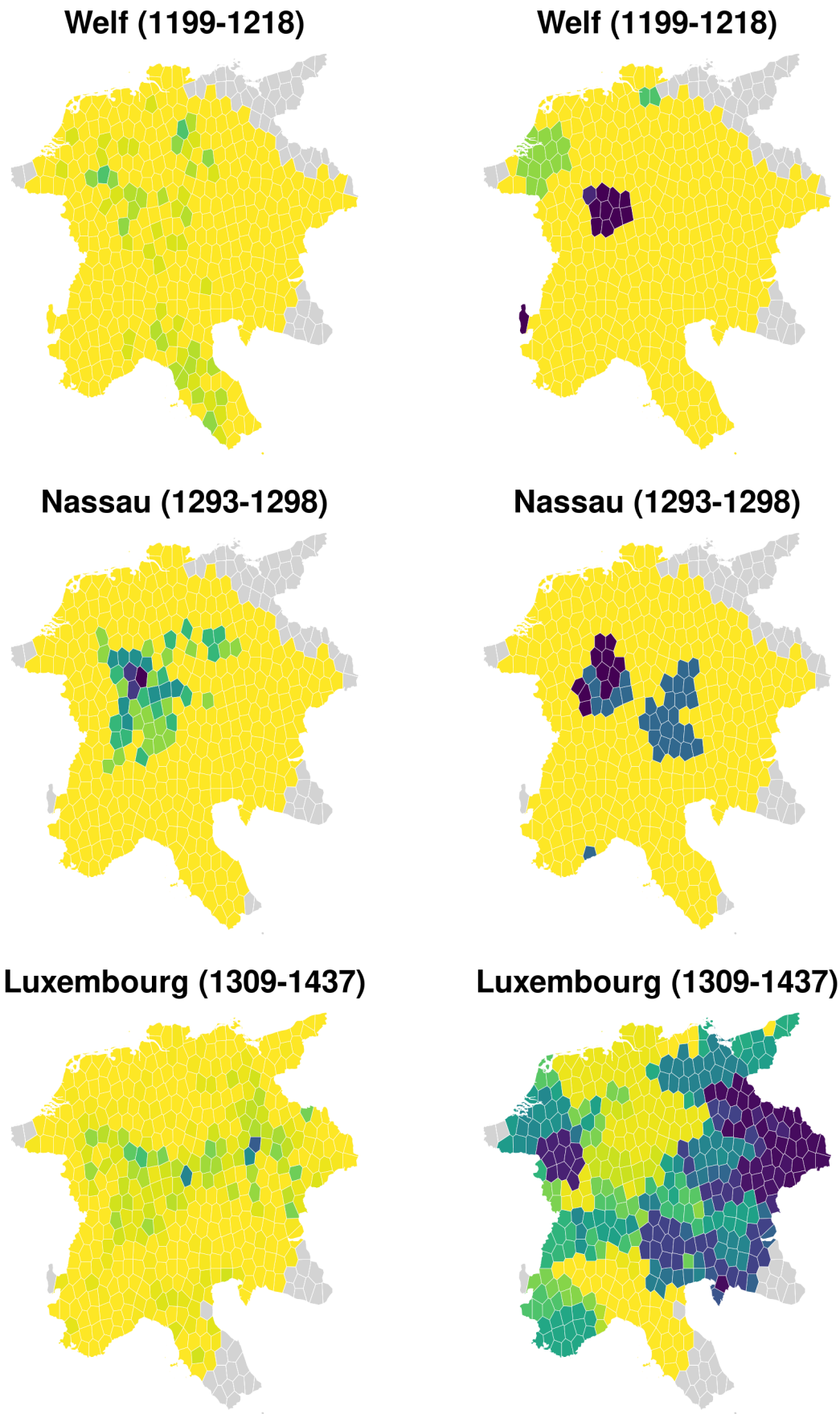


Figure A5: Data

Note: Cells outside the territory of the HRE in grey.

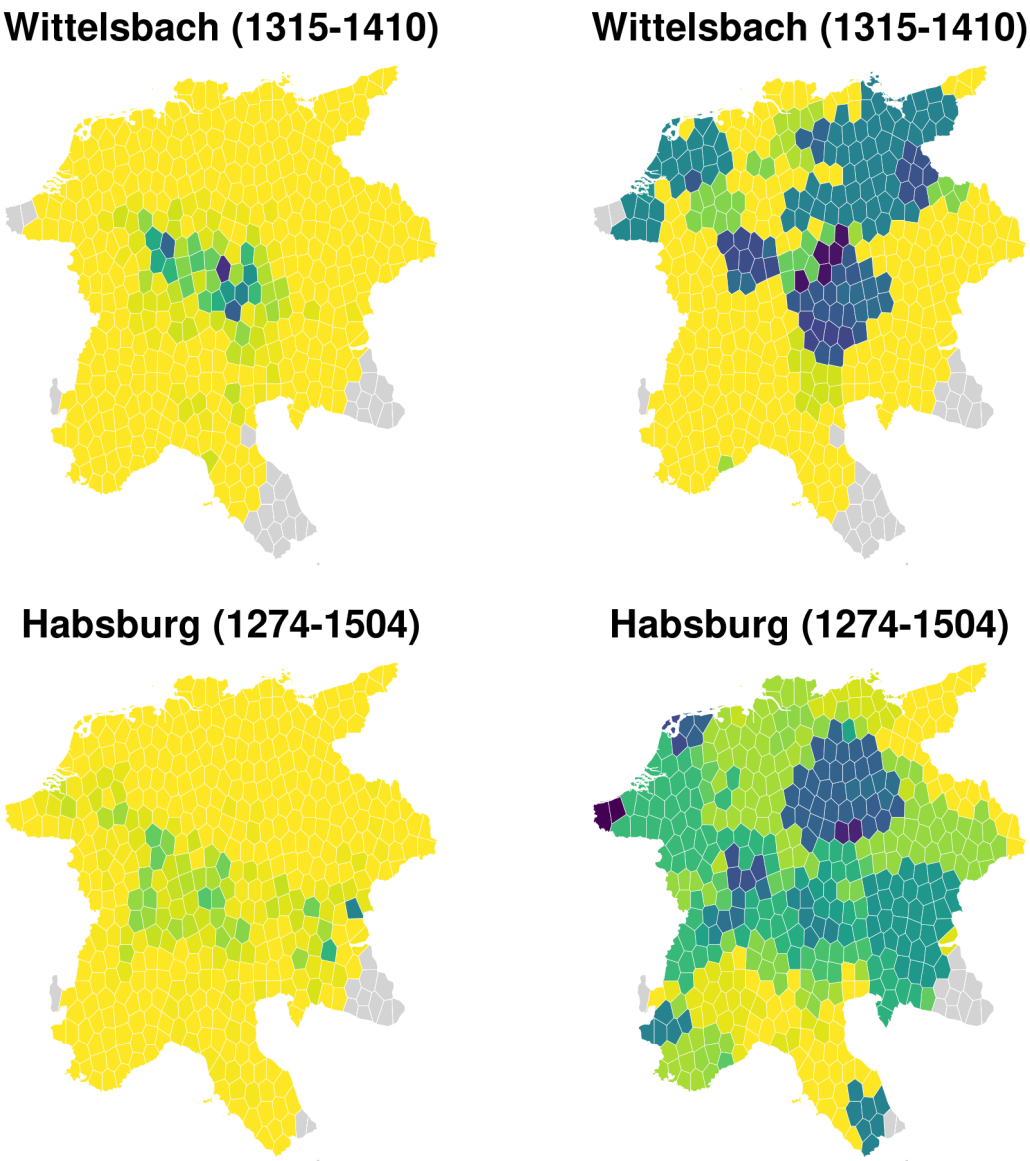


Figure A6: Data

Note: Cells outside the territory of the HRE in grey.

A.3 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:

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

where γ_1 and γ_2 capture the time trends in the effect of family territory before and after the Great Interregnum. We implement 3 versions of the time trend functions $f(year)$, taking on a linear, quadratic, and cubic specification. With that, 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.

Table A2: Discontinuity in effect of family territory in 1250

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*

The results in Table A2 closely mirror Figure 6, showing that the effect of family territory discontinuously increases by between 7 percentage points in the linear trend specification in Model 1 and 12 percentage points in the quadratic specification in Model

2. The cubic specification yields an intermediate estiamte of 10 percentage points. All estimates are precisely estimated.

C Difference-in-Differences

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 A4 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 A7 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 22 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 A3 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 A3 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.

In Table A4, 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.

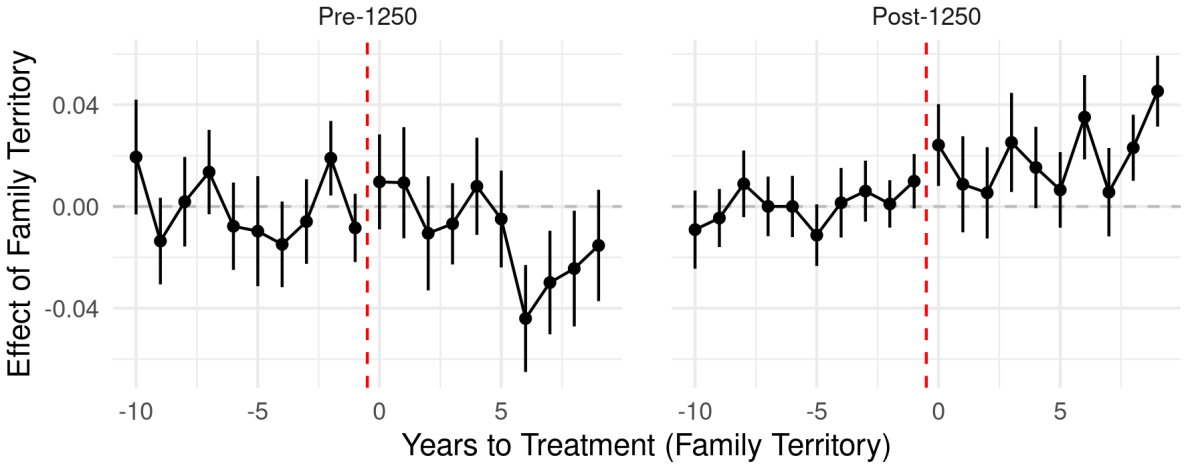


Figure A7: Event study plot of the effect of territory around successions

Table A3: 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*

Table A4: 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 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.

Table A5: 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*

D.2 Alternative family territory indicators

Table A6 presents analyses that test whether our main results are due to measuring the family territory indicator 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 somewhat stronger results when using a continuous measure of territorial family control. The also hold when using either only the Euratlas or only the Abramson data. Yet, since neither fully covers all titles of all family members, coefficient sizes and estimates' precision decreases slightly.

Table A6: 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

Our description of the regesta imperii data clearly shows a growing number of documents used for the construction of paths 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 A7, (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 A8, and finally (3) control for the yearly number of documents and unique locations visited in Table A8. 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 A7: 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*

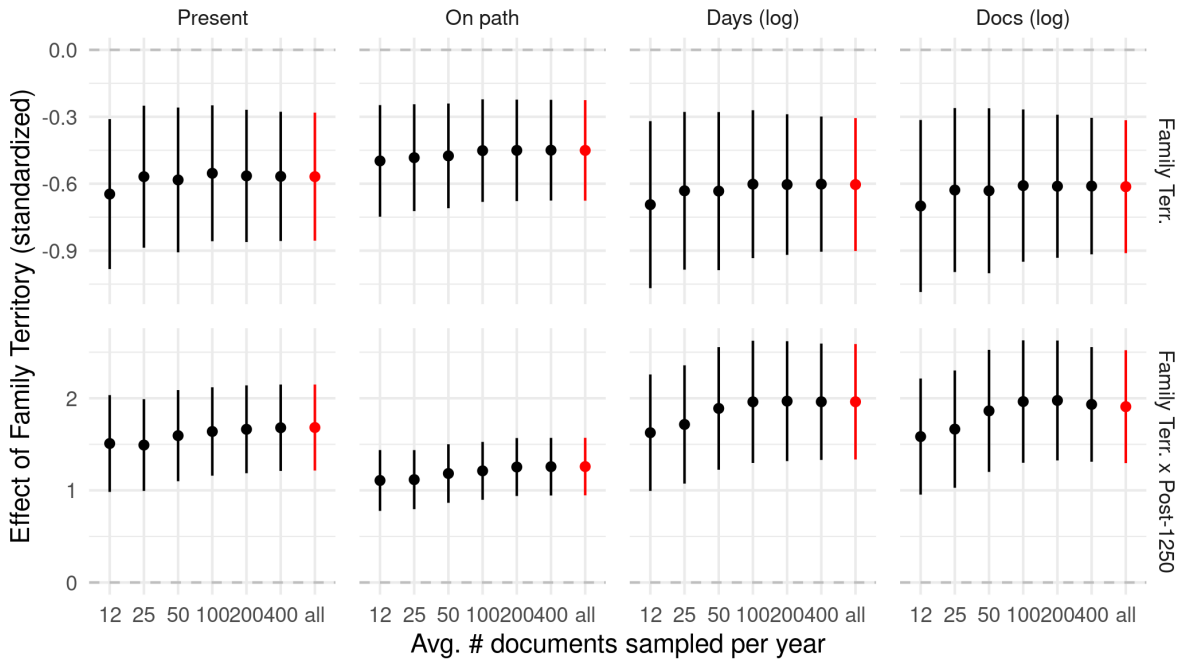


Figure A8: Effect by sampled # of yearly documents. Coefficients are standardized by the mean of the dependent variables to compare results across models.

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 A8: 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 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 centrality measures might be affected by the network size and rulers' age – both might also correlate with their travels, we control for both.

Table A9: 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 A9 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; $p < .1$).

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

D.5 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 A10: 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 A11 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 A11: 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.6 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 A9 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 A10 shows that our results are not significantly affected by any single ruler in the data, not even those with a long reign.

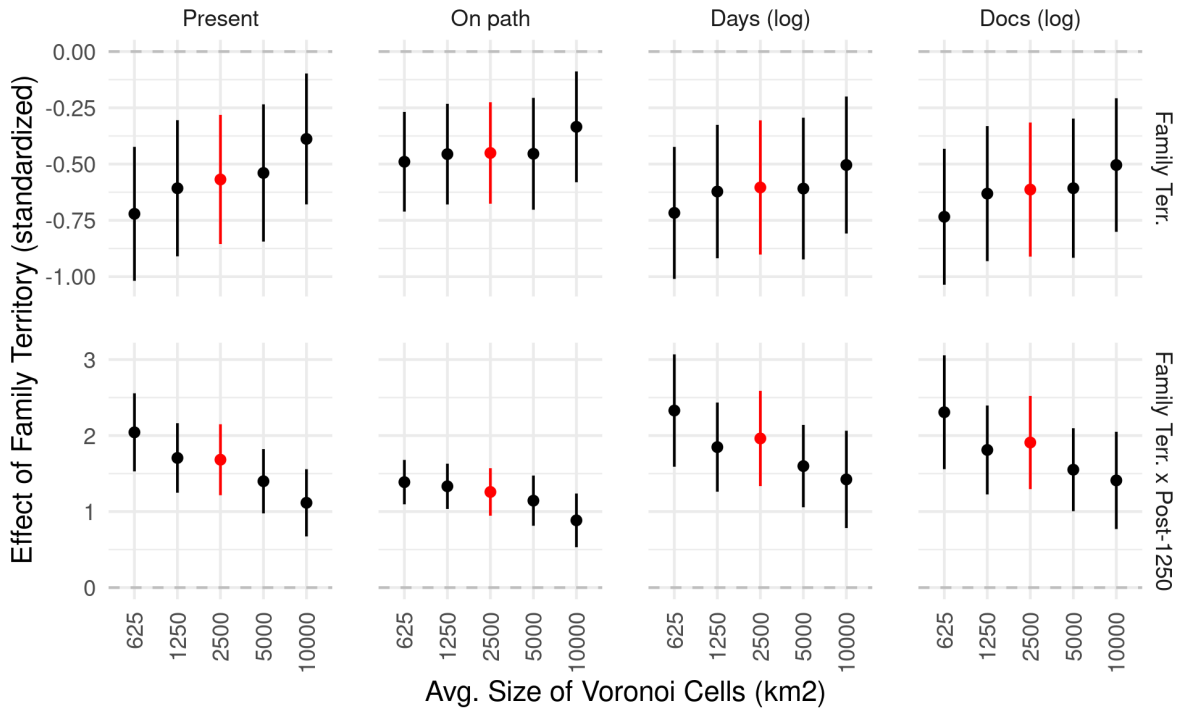


Figure A9: Effect by size of Voronoi cells. Coefficients are standardized by the mean of the dependent variables to compare results across models.

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

E Effect heterogeneity

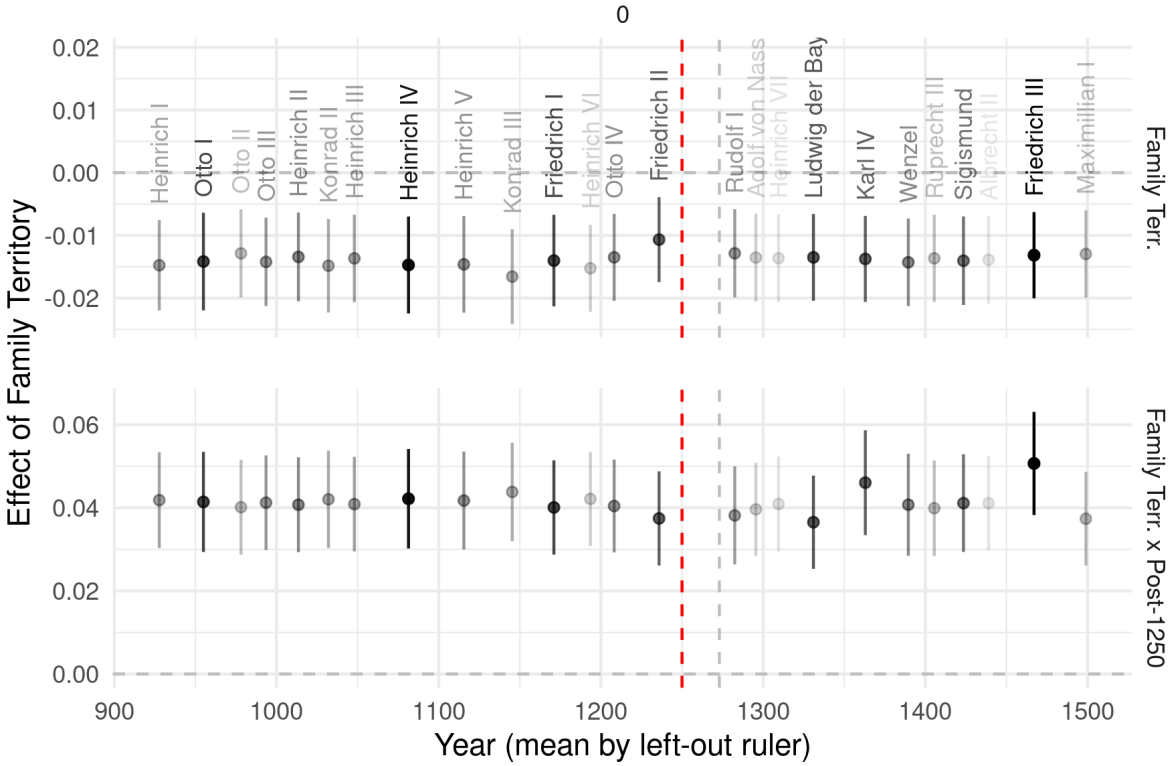


Figure A10: Ruler Jackknife: Leaving each ruler out of the sample.

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

Table A12: Emperor presence and family territory, by relative sex

Dependent Variable:	Present		
Model:	(1)	(2)	(3)
Variables			
Family Terr. (M)	-0.014**		-0.014**
	(0.004)		(0.004)
Post-1250 × Family Terr. (M)	0.042**		0.043**
	(0.006)		(0.006)
Family Terr. (F)		0.006	-0.002
		(0.007)	(0.007)
Post-1250 × Family Terr. (F)		-0.008	-0.014
		(0.011)	(0.012)
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	0.091	0.094
Within R^2	0.003	0.000	0.003

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

Table A13: Emperor presence and family territory, bloodline vs. marriage links

Dependent Variables:	Present	On path	Days (log)	Docs (log)
Model:	(1)	(2)	(3)	(4)
Variables				
Fam. Terr. (bloodline)	-0.016**	-0.029**	-0.023**	-0.031**
	(0.004)	(0.009)	(0.005)	(0.007)
Fam. Terr. (marriage)	0.002	-0.001	0.004	0.006
	(0.004)	(0.010)	(0.006)	(0.008)
Post-1250 × Fam. Terr. (bloodline)	0.048**	0.097**	0.074**	0.093**
	(0.007)	(0.012)	(0.012)	(0.014)
Post-1250 × Fam. Terr. (marriage)	0.002	-0.001	0.006	0.005
	(0.007)	(0.014)	(0.014)	(0.018)
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	0.143	0.091	0.091
Within R^2	0.004	0.006	0.004	0.003

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

F References (Appendix)

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