Kin Networks and Institutional Development*

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Abstract – *The origins and global variation of democratic political institutions are not well understood. This study tests the hypothesis that the Catholic Church's medieval prohibition on kin marriages fostered participatory institutions by dissolving strong extended kin networks. First, I show that weak pre-industrial kin networks are positively associated with countries' democracy scores. At the same time, medieval Church exposure robustly predicts weak kin networks across countries, European regions and ethnic societies. In a difference-in-difference analysis, I then provide historical evidence that exposure to the Church fostered the formation of medieval communes – self-governed cities with participatory institutions that many scholars have identified as critical precursors for national parliaments. Moreover, within medieval Christian Europe, stricter regional and temporal cousin-marriage prohibitions are associated with increased formation of commune cities. Lastly, I shed light on one mechanism, civicness, and show that weak kin networks are associated with higher political participation.*

Keywords: Democracy, Family, Kin networks, Religion, Cousin Marriage, Institutions
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1. Introduction

Political institutions, ranging from autocratic regimes to participatory democracies, are widely acknowledged as a critical determinant of economic prosperity (e.g. Acemoglu and Robinson 2012, North, Wallis, and Weingast 2009). They create incentives that foster or inhibit economic growth. Yet, the emergence and global variation of participatory institutions is not well understood. Initially, democratic institutions were largely confined to the West; and many researchers attribute Europe's growth miracle to its unique institutional setting (e.g. Greif 2006a, Acemoglu, Johnson and Robinson 2005). How and why did those institutions emerge in Europe?

This article contributes to the debate on the formation of participatory institutions and European exceptionalism by testing two long-standing hypotheses. The first hypothesize states that strong extended kin networks are detrimental to social cohesion and affect institutional outcomes (Weber, 1958a; Todd, 1987; Augustine, 413-426/1998, Fukuyama, 2011). Historically, and in many regions of the world still today, strong kin-based institutions such as clans, tribes and norms governing kin marriages form the central institutions organizing society. In some countries first- and second-cousin marriages account for more than 50 percent of all marriages (Bittles and Black 2010). These tight kin networks lead to social closure. Yet, cooperation across the kin group is essential for functioning participatory institutions. Already in the 5th century Theologian Augustine of Hippo (354–430CE) pointed out that marrying outside the kin group enlarges the range of social relations and "should thereby bind social life more effectively" (Augustine of Hippo, 413-426 / 1998, p. 665).

The second hypothesize is due to anthropologist Jack Goody (1983). He hypothesized that, motivated by financial gains, the medieval Catholic Church implemented marriage policies—most prominently, prohibitions on cousin marriage—that destroyed the existing European clan-based kin networks. This created an almost unique European family system where, still today, the nuclear family dominates and marriage among blood relatives is virtually absent.

More recently, Greif (2006a, 2006b), Greif and Tabellini (2010), historian Michael Mitterauer (2010), and anthropologist Joe Henrich (forthcoming) combined these two hypotheses and emphasized the critical role of the Church's marriage prohibitions for Europe's development. They stress that the dissolution of strong kin-networks allowed for new social arrangements such as communes, autonomous cities with participatory institutions in which inhabitants specified rules across the boundaries of the kin-group. Many scholars have emphasized that those communes were important precursors to Europe's economic rise (e.g. Mokyr, 1990; Greif, 2006a, 2006b; Weber, 1958b). Thus, long before modernization Europe experienced local participatory institutions, the rule of law and individual rights, which created a social and cultural setting that was conducive to the development of large-scale growth-enhancing institutions.

Empirical approach. I approach the hypothesis that the Catholic Church's medieval marriage regulations dissolved extended kin networks and thereby fostered inclusive institutions in three steps.

The first step provides global evidence that strong kin networks are detrimental to democracy. Across countries, low democracy scores are not only predicted by high 20th-century cousin-marriage rates. The roots of this association stretch out far deeper than Enlightenment-linked ideas of modernization. The analysis holds for a novel language-based ethnographic measure, cousin-term differentiation, which reflects the strength of historically distant kin networks (Morgan 1870, Murdock 1949). An ethnicity-level analysis based on the ethnographic records strengthens these findings: across the globe weak kin networks are associated with pre-industrial ethnicities' democratic traditions, which predict modern-day countries' democracy scores (Giuliano and Nunn, 2013). This relation between kin-networks and participatory institutions holds globally, i.e., also among societies with entirely different histories than European ones.

This global pattern raises the question why most European societies had such weak kin networks that it placed them at the extreme of the global distribution and created favorable conditions for the emergence of participatory institutions. Consistent with the marriage-prohibition hypothesis, I establish a robust link between medieval Church exposure and weak kin-networks across countries, European regions and ethnicities.

The second step consists of a historical analysis. It provides evidence that the medieval Church's marriage regulations fostered medieval participatory institutions in the form of communes, which – as many scholars argue – fostered the emergence of national parliaments. The analysis rests on a panel data set that captures Church exposure and commune organization of 339 European, Middle Eastern and North African cities in 100-year intervals from 800 to 1500CE. A difference-in-difference specification establishes that cities that experienced longer Church exposure were more likely to become communes. The analysis rules out key sources of omitted variable bias: bias due to time-invariant city characteristics or general time trends. In addition, the absence of pre-trends and a host of control variables mitigate concerns of estimation bias due to time-varying factors. Robustness checks exploit two instances where Church exposure was determined by the idiosyncrasies of medieval warfare (Reconquista of the Hispanic Peninsula and Christianization of Northeastern Germany). All results hold, mitigating concerns that targeted missionary activity bias the estimates.

The global analysis suggests that the dissolution of kin networks is a crucial factor linking Church exposure to participatory institutions. While regionally fine-grained data on medieval kin networks is not available, the historical analysis is nevertheless able to also provide evidence on the role of kin networks by exploiting regional and temporal variation in the Church's marriage regulations within Christian Europe. First, a policy change – the tightening of the Church's prohibitions in the 11th century – is associated with commune formation. Second, regional variation in 6th to 8th-century incest legislation exposure predicts commune formation within the area that comprised the Carolingian Empire. In these centuries, incest legislation was decentrally established by regional synods and synodal records allow me to trace the resulting regional variation. Third, I show that both Orthodox and Catholic Church exposure predict an increase in countries' medieval urban population. Consistent with the marriage hypothesis this association is stronger for the Catholic Church with its stricter marriage prohibition.

In the third step, I focus on contemporary civicness – a factor that many thinkers have emphasized as essential for democracy (Tocqueville, 1838; Putnam, 1993; and Fukuyama, 1995, Acemoglu and Robinson, 2016). I show that regions *within* European countries that have had lower 20th-century cousin-marriage rates have higher contemporary civicness as proxied by voter turnout and trust in others. The association also holds following an epidemiological approach, which exploits variation in the cultural background of adult children of immigrants who grew up in the same country (see Fernández 2007 and Giuliano 2007). This approach thus addresses many potentially confounding factors and aims to identify the effect of intergenerationally transmitted cultural values.

None of these analyses is decisive when considered in isolation and it is possible to think of ad hoc alternative explanations for each. Yet, all analyses coherently support the hypothesis that the Church's marriage prohibitions fostered participatory institutions. This makes it difficult to find a consistent alternative interpretation. For example, the historical difference-in-difference analysis provides robust evidence that the Church fostered the formation of communes. While several Church factors may have plausibly contributed to this relation, the other analyses suggest that the marriage prohibitions are one decisive element: First, regional and temporal variation in incest legislation predicts medieval commune formation within Christian areas. Second, the link between kin networks and participatory institutions holds globally and hence does not depend on (potentially omitted) European or Church factors per se. At the same time, medieval Church exposure is a major predictor of weak kin networks. Lastly, weak kin networks consistently predict a crucial determinant of democracy: civicness. This relation holds controlling for a host of individual characteristics such as religious affiliation and following the epidemiological approach. It also holds within European countries that for many centuries were dominated by the Catholic Church but exhibit regional variation in Church exposure prior to 1500CE – during the height of the marriage prohibitions.

Related literature. To the best of my knowledge, this is the first study that empirically investigates the role of the Church on the dissolution of kin networks, civicness and institutional development. In line with Acemoglu et al.'s (2005b, 2008) notion of critical junctures, this paper provides evidence that the Church's marriage prohibitions changed Europe's developmental trajectory. The prohibitions pushed Europe away from a kin-based society and paved the way for the development of participatory institutions such as communes (Greif, 2006a; Greif and Tabellini, 2017). This suggests that the seeds of the Great Divergence (Pomeranz, 2000) between Europe and other regions of the world were already planted by the Church's incest prohibitions in late antiquity. Even today, medieval Church exposure and the absence of strong kin networks are associated with higher civicness and, ultimately, with more participatory national institutions.

This study relates to the literature on deep roots of political institutions. Giuliano and Nunn (2013) show that local-level pre-industrial democratic traditions are associated with more democratic nations today. Galor and Klemp (2015) present evidence that human genetic diversity fostered autocratic institutions. Bentzen, Kaarsen and Wingender (2017) show that historic irrigation practices, which made it possible to monopolize water and thereby fostered a powerful elite, are associated with autocratic rule today. Tabellini (2008a) and Gorodnichenko and Roland (2017, forthcoming) emphasize the effect of cultural values, which emphasize the in-group, as detrimental for the functioning of institutions. Here, I show that these cultural values and hence the institutional outcomes are linked to kin networks. Furthermore, I emphasize one factor – marriage prohibitions – which gave rise to cultural and institutional change. More broadly, this study contributes to the emerging field examining the historical, geographical and cultural origins of development (for an overview see Spolaore and Wacziarg 2013 as well as Guiso et al., 2006; for work on cultural transmission see Bisin and Verdier 2001; and Boyd and Richerson, 2005).

Influential work by Alesina and Giuliano (2010, 2011, 2014) shows that stronger ties among the nuclear family are associated with less political participation and lower institutional quality. Closely related is also Woodley and Bell (2012), who show that low contemporary cousin-marriage rates are associated with democracy. I extend this line of research by highlighting the role of the medieval Church in dissolving kin networks, fostering medieval communes, and modern-day democracies. More recently, literature is investigating the role of kin networks for several economically relevant outcomes. Edlund (2018) and Hoff and Sen (2016) argue that kin networks are detrimental to economic prosperity. Akbari, Bahrami-Rad and Kimbrough (2016) find a positive association between cousin-marriage rates and corruption.[4] Moscona, Nunn

[4] Relatedly, Buonanno and Vanin (2017) present evidence that social closure leads to reduced tax compliance at the national level.

and Robinson (forthcoming) present evidence on how societies organized along segmentary lineages foster violent conflict in Africa. De Moor et al. (2009) and Carmichael and Rijpma (2017) investigate the effect of family systems on women's agency and labor market participation and Lowes (2017) shows that matrilineal kinship systems decrease intra-household spousal cooperation. Subsequently, Enke (2019) and Schulz et al. (2019) have focused on cooperation and human psychology more generally.

The paper is structured as follows: Section 2 gives a background on kin-networks and the medieval Church's marriage policies. Section 3 links kin networks to countries' and ethnic societies' political institutions. Section 4 presents the historical analysis relating the Church exposure to commune formation. Section 5 focuses on civicness. Section 6 concludes the paper.

2. Background

2.1. Kin-Networks and Institutional Development: Conceptual Framework

In many parts of the world, people live within dense kin networks that are characterized by co-residence of extended families, communal organization based on descent such as clans and lineages, and cousin-marriage practices (Schulz et al. 2019). Dense kin networks most likely became increasingly important during the Neolithic transition as people began to invest in land and animal breeding (Henrich, forthcoming). In contrast to hunter-gatherer groups in which out-reaching kin networks allow for risk hedging, dense kin networks facilitate the defense and succession of property (Johnson and Earle, 2000; Walker and Bailey, 2014; Bahrami-Rad, 2019).

Strong economic and social interdependencies make the kin group essential for survival and create intense loyalty demands. These can manifest as protecting family members from prosecution, facilitating nepotism, voting according to group identity as opposed to individual preferences and other activity that weakens cooperation across the boundary of the kin group (Banfield, 1958; Yamagishi, Cook and Watabe, 1998; Fukuyama, 1995; Tabellini, 2008b; Alesina and Giuliano, 2014; Hillman et al. 2015).[5]

[5] In addition, the biological theory of kin selection predicts that cousin marriage increases genetic relatedness and thereby altruistic behavior among kin (Hamilton, 1964). The inbreeding coefficient of

As such, societies may find themselves stuck in an equilibrium where it is individually optimal to support the kin group, while at the same time such support hinders the development of more efficient large-scale, participatory institutions that promote individual rights.[6] To prevent an elite from seizing government, a broad coalition in society must actively take part in the political process across the boundaries of kin groups by making politicians accountable for their actions and by impartially following rules such as those set out by a constitution. Thus, as Weber (1958a) argues, the dissolution of strong kin networks is likely an essential precondition for the formation of liberal democracy.

According to Goody (1983) the Church's incest prohibitions transformed the European clan-based societies. This severed the ties between subsistence practices and kin networks, fostered social cohesion and allowed for new social arrangements such as communes (Greif, 2006a; Greif and Tabellini, 2017 and Henrich, forthcoming). Many scholars have stressed the role of communes for Europe's growth, civicness and the formation of parliaments (Weber, 1958b; Mokyr, 1990; Greif 2006a, 2006b; González de Lara et al., 2008; Van Zanden, Buringh and Bosker; 2012; Stasavage, 2014; Guiso, Sapienza and Zingales, 2016; Angelucci et al., 2017; Cox, 2017; Cox et al. 2020). Other regions of the world such as China, where kin networks in the form of clans existed, did not experience the formation of communes and – consistent with the marriage hypothesis – communes also only emerged later within the realm of the Eastern Orthodox Church. There the marriage regulations never reached the same significance as in the West.

Communes exemplify the rise of early European non-kin-based participatory institutions. This is not to say that dissolved kin networks only impacted commune formation. They likely impacted other factors that explain Europe's development such

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first-cousin offspring is small though (1/16 compared to ¼ in sibling offspring). Yet, after a long prior history of inbreeding, the relatedness coefficient in the local (kinship) group can increase further. At the boundary of the local group there is a drop in genetic relatedness (Hamilton 1975).

[6] Consistent with the idea that dense kin networks hamper network fluidity and cooperation, eevolutionary game theory models and lab experiments provide evidence that increased network fluidity promotes cooperation (Perc and Szolnoki, 2010; Rand, Arbesman and Christakis, 2011). Consistently, Henrich et al. (2001), Herrmann et al. (2008) and Gächter and Schulz (2016) find that cooperation and honesty is higher in individualistic societies.

as a culture of growth (Mokyr, 2016), the diffusion of new technologies (De la Croix et al. 2018), feudalism (Blaydes and Cheney, 2013) or the European Marriage Pattern (De Moor, van Zanden, 2010; Voigtlaender and Voth, 2006, 2013).[7]

Similarly, I do not argue that dissolved kin networks are the only factor affecting commune formation. For example, Cox et al. (2020) provide evidence that political fragmentation and war, which increased rulers' willingness to cease government rights to merchants in exchange for payments, fostered commune formation. Guiso et al. (2016) show that the presence of bishoprics was conducive for commune formation in Northern Italy. Clearly, the paper does not argue that the dissolution of kin-networks is the sole factor contributing to the Great Divergence. For example, religious restrictions hampered the formation of growth-enhancing institutions in the Middle East (Kuran, 2004, 2011; Rubin, 2017), while political fragmentation and war was conducive for representative institutions in Europe (see e.g. Stasavage, 2010). Yet, the paper does provide consistent empirical evidence that the Western Church in general and its marriage prohibitions in particular profoundly shaped Europe's development.

2.2. The Churches' Marriage Regulations: Historical Background

Paleogenomic evidence, historic writings, Germanic legal codes, Nordic sagas, and historic kinship terminology all highlight the historical importance of extended kin networks among Celtic, Slavic and Germanic tribes.[8] Marriage practices and rules of descent that strengthen kin networks are also found among Roman and other populations around the Mediterranean Sea (Ubl, 2008). In late antiquity, the Church started to impose marriage regulations (far beyond what is proscribed in the Bible) that weakened kin networks.[9] This was a gradual process and different strands of Christianity followed different paths.[10] Here I sketch the regulations in the Western

[7] Mitterauer (2010), Fukuyaman (2011), and Henrich (forthcoming) stress the role of weak kin networks for the emergence of feudalism.
[8] See e.g. Goody (1983), Ubl (2008), Ausenda (1999), Mitterauer (2010), Amorim et al. (2018).
[9] Marriage prohibitions entailed biological (cousins), affinal (in-laws) and spiritual (e.g. god children) relatedness, as well as people related to one's sexual partners. Furthermore, Church regulations demanded free consent of groom and bride and prohibited polygamy, divorce, and remarriage and discouraged adoption.
[10] The Celtic and Coptic Church allowed cousin marriage. The Syric-Orthodox Church only started prohibiting cousin marriage in the late medieval ages, while it was implemented early on in the Armenian Church (Ubl 2008).

(Roman Catholic) and Eastern (Orthodox) Church and discuss the enforcement of this church policy. A detailed table of historical sources is given in the appendix A.1.

Chronological overview. In the 4th century, the Church started to implement marriage prohibitions on in-laws and kin. The collapse of the Western Roman empire in the beginning of the 5th century could have made these prohibitions only a short episode in Europe. It was in the Frankish successor kingdoms of Northwestern Europe where individual bishops spearheaded and most stringently enforced the marriage prohibitions to a degree that historians have talked about an obsession (Ubl, 2008; Gaudemet, 1996). Between 511 to 627CE, 13 out of 17 synods dealt with incest in the Merovingian kingdoms. In close alignment with the Popes, incest legislation gained renewed interest and tightened under the reign of Carolingian rulers Pepin (reign 751−768) and Charlemagne (reign 774–814). They put the fight against incest at the forefront of their political agendas (Ubl, 2008).

Marriage prohibitions in the Catholic Church were radicalized, i.e., extended to sixth cousins, in the 11th century (Ubl, 2008). This implied that marriage was forbidden between two people sharing one of their 128 great-great-great-great-great-grandparents. Since tracing ancestors this far would have been impossible, this likely implied marriage restrictions to anyone whose common ancestry was known. Around the same time, the Gregorian reforms turned the decentralized Western Church into a strong institution with centralized papal authority. Based on a legate system, popes could now more stringently enforce the marriage prohibitions far beyond Rome. Historical sources attest to the enforcement of the extended prohibitions (see appendix A.1). As a consequence, it became harder for the nobility to find permissible marriage partners. At the same time, the extended prohibitions were increasingly used to annul marriages. In 1215, Pope Innocent therefore weakend the prohibitions to include up to third cousins only. Later it was decreased to second (1917) and first cousins (1983).

In the Eastern Orthodox Church, incest legislation never reached the same significance (I exploit this difference in the empirical analysis). Prohibitions were imposed later (in 692 for first cousins and in 741 for second cousins), third cousins were always allowed to marry (Addis 1961), and enforcement was comparably weaker (Mitterauer, 2010).[11]

Enforcement. These prohibitions were enforced from early on. Sixth-century records attest that bishops did not shy away from conflict with secular rulers in enforcing their incest legislation (Ubl, 2008). Transgressors were threatened with increasingly severe punishment: consanguineous marriages were annulled (and consequently offspring were rendered illicit and stripped of inheritance rights), and willful transgressors were faced with (stigmatic) penance, confiscation of property, corporal punishment, slavery or excommunication.[12] The Church's role as a legitimating agent (Rubin, 2017) may have aided and strengthened its position vis-à-vis the nobility and often Church rules were given legal sanctions by secular rulers.

As a consequence, even those in power, the nobility, hardly ever married relatives (Bouchard 1981). Cousin marriage was difficult if not impossible for ordinary peasants as well: Frankish kings—particularly Pippin and Charlemagne—created a parish system, gave an inquisitory mandate to bishops, and mandated prenuptial inquiries by priests and elders, interrogation of the bridal pair, public marriages and oaths to denounce incestuous marriages. The property of couples that were found guilty of incest was redistributed to relatives. This created incentives for relatives to denounce incestuous unions. Moreover, the clergy emphasized God's anger, the danger of "pollution of the blood" and punishment in the afterlife (Rolker 2012). Disasters, such as the plague or advances by the Islamic Umayyad, were interpreted as God's worldly punishment for disobeying the marriage prohibitions (Ubl, 2008; see Purzycki et al. 2016 on the behavioral effects of beliefs in a punishing god).

Altogether, the era was preoccupied with fear of incest and avoidance of kin marriage became one of the defining criteria of Christianity (de Jong 1998, Mitterauer

[11] For example, the Eastern Church's Patriarch Alexius Studites (1025–43) ruled that consanguineous marriages are valid if there was genuine ignorance of the relationship. It became practice to claim ignorance until 1166 when the Synod of Constantinople ruled that this was not a sufficient excuse (Angold 1995).

[12] Excommunication was not only a severe penalty due to perceived punishment in the afterlife. Christians were not allowed to support, employ or enter into contracts with an excommunicated person. Existing contracts were considered void, meaning debts could be ignored, property could be seized and attacks on and murder of an excommunicated person carried far less consequences.

2010). Consequently, historical sources such as legal codes and property registries of abbeys document a shift towards the nuclear family as early as the 9th century (Mitterauer, 2010). Only around 1215, when the prohibitions were reduced to third-cousin marriages, did enforcement become less strict and the granting of dispensation particularly among the nobility became more common (Donahue 2008).

Reasons. Historians have discussed several reasons why the Church implemented these extensive incest prohibitions that go far beyond biblical provisions. Initially, fitting with their vision of a Christian community, influential ecclesiastical figures such as Ambrose (340–397) and Augustine (354–430) endorsed the prohibitions. However, this does not explain why these ideas were successfully implemented. Most likely, bishops and secular rulers had a good understanding that weak kin networks would aid them in consolidating their power over other noble families, clans, and pagan traditions (Ausenda 1999, Ubl 2008). This may have been particularly important in the Frankish kingdom in which bishops had a high degree of autonomy. Finally, the Church had a financial motive (Goody, 1983). Eradicating lineages increased the likelihood that no heirs exist and that bequests would fall to the Church.

3. Global Analysis: Extended Kin networks and Participatory Institutions

The global analysis establishes a robust association between weak kin-networks and participatory institutions, both across country (section 3.2) and ethnicities (section 3.3). It provides evidence on the deep roots of democracy by relying on measures for kin-networks that pre-date modern developments. This relation between kin networks and participatory institutions holds globally, that is, also among societies with very different histories than European ones. The relation thus cannot be explained by an omitted European or Christian factor per se. Asking what gave rise to Europe's almost uniquely weak kin structure, I provide evidence that the medieval Church dissolved strong extended kin-networks (appendix B.3-5).

3.1. Data: Measures of kin networks and medieval Church exposure

I created measures of medieval Church exposure and kin networks. Several feature of kin-based institutions such as co-residence of extended families, the presence of lineages, or kin-marriage practices determine kin networks (Schulz et al., 2019). To proxy the strength of kin networks I rely on measures of cousin marriages and cousin-term differentiation. While they do not capture all aspect of the strength of kin networks, cousin-marriage practices and cousin-term differentiation correlate highly with other features of kin-based institutions.[13]

Cousin-term differentiation. Since language changes only slowly, kin terms offer a window into the strength of historically distant kin-networks. The association between kin terminology and kin-based institutions is foundational to the field of anthropology (Morgan 1870, Murdock 1949). Differentiated cousin terms are prescriptive of people one may, should or is forbidden to marry and indicate the presence of lineages. For example, in Iroquois terminology, parallel cousins (offspring of one's parent's same-sex sibling who usually belong to the same lineage) are likewise called brother and sister—an indication of an incest taboo against parallel cousin marriage. Cross-cousins (offspring of one's parent's opposite-sex sibling who usually belong to a different lineage) are termed differently and are often preferred marriage partners. The Inuit terminology[14] (all cousins are called the same but different from siblings) is associated with the independent nuclear family, bilateral descent and the absence of cousin marriages. Today, the Inuit terminology dominates in countries that experienced medieval Church exposure. This is no coincidence. According to Mitterauer (2010), the Church's prohibitions were the decisive factor in the transformation of kin terminology for the Germanic and Slavic languages. Prior to Church exposure these languages differentiated cousin terms which indicates the presence of strong kin networks.[15]

The indicator *cousin-term differentiation* is based on the Ethnographic Atlas (EA), a worldwide database on ethnicities intended to reflect their characteristics before European contact or the onset of the Industrial Revolution.[16] At the ethnicity level, I

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[13] Schulz et al. (2019) constructed a kinship intensity index (KII) based on the Ethnographic Atlas that incorporates these different elements of kin-based institutions. The results hold using the KII as explanatory variable.

[14] Throughout the text I have replaced "Eskimo,", the term Murdock originally used, with "Inuit."

[15] The transformation follows Christianization chronologically. The first Germanic language to transform was English (11th century), followed by German and Swedish. Among Slavic languages, the change occurred first in Czech and Polish and relatively late in Russian. Slavic languages in the Balkans have retained some differentiating terminology. This is also the case in Celtic languages, where Catholic Church exposure occurred relatively late.

[16] Originally compiled by Murdock, I used the data from the extended version provided by D-PLACE. I excluded eight ethnicities whose characteristics refer to a date prior to 1500CE. The EA classifies cousin

coded a binary variable denoting whether ethnicities differentiate cousin terms. At the country level, the variable captures the proportion of people speaking a language which differentiates cousin-terms (the aggregation follows the methodology of Giuliano and Nunn, 2018, as extended by Schulz et al., 2019).

Cousin-marriage preference is likewise based on the EA. It is an ordinal variable that takes four values: 0 if an ethnicity has no preference for cousin marriage, 1/3 if only second cousins are preferred, 2/3 if cross-cousins are preferred and 1 if parallel cousins are preferred. Parallel-cousin marriage implies lineage endogamy, i.e., marriage within the same lineage, which creates stronger kin networks. The country-level indicator is aggregated following Schulz et al. (2019).

Cousin-marriage rates. This indicator gives a quantifiable measure on countries' 20th century rates of second-cousin marriages or closer. It is based on a literature survey of Bittles (2001) and I amended three countries. The sampling year and the underlying methodology of the data collection varies. Evidence from countries that have data based on different sources suggests consistency over time and sampling method. Studies comparing Bittles' data to genetic correlates of inbreeding find that both methods paint a consistent picture (Pemberton and Rosenberg 2014).

Countries' Eastern and Western Church exposure. The two indicators capture exposure of a present-day country to either the Eastern or the Western Church up to the year 1500. Church exposure only captures the years for which the Church's marriage prohibitions were in place and secular rulers were Christian. In the realm of the Western Church, the starting year is 506 when the Synod of Agde took place. This was the first synod which prohibited cousin marriage. In the Eastern Church's sphere, the starting year is 692 when the Synod of Trullo banned cousin marriage. For areas Christianized after those dates, Church exposure starts with the incorporation of the area of a today's country into the Church's administration. This is proxied by the foundation of bishoprics. For countries that became Christian gradually (notably Spain, Portugal and Germany), I employ the year that most of the area of the present-day country was

terms into six categories (Descriptive/Sudanese, Iroquois, Omaha, Crow, Hawaiian, Inuit). The Inuit and Hawaiian kin terminologies do not distinguish cousins, while the others do.

incorporated into the Church's administration. Table A.2 in the appendix details each country.

The discovery of the New World led to large migration flows. I adjusted the two indicators for migration using the migration matrix from Putterman and Weil (2010). The adjusted measures capture the average duration a person's ancestors experienced Western and Eastern Church exposure up to the year 1500.

3.2. Kin networks and modern-day democracies

Here, I show that countries' democracy scores as captured by the polity IV democracy index (ranging from -10 (hereditary monarchy) to 10 (consolidated democracy)) are robustly associated with the strength of kin-networks. The two pre-industrial measures, cousin-term differentiation and cousin-marriage preference, rule out reverse causality or estimation bias due to omitted factors that only emerged subsequently. In addition, I report the reduced-form relation between Church exposure and democracy.

The regression analysis (Table 1) controls for a host of geographic factors. This aims to mitigate estimation bias that may arise through subsistence practice, remoteness, or other factors that potentially affect both kin networks and institutional outcomes. A geographic baseline contains caloric suitability, ruggedness, distance to waterways and absolute latitude (columns 2-8). Further covariates are tropical climate, mean temperature, mean elevation, mean precipitation, caloric suitability for oats and for rye (columns 3-5). The latter two covariates are included since these grains have been associated with a medieval European agricultural revolution (Mitterauer, 2010). Column 4 adds ancestor-adjusted timing of the Neolithic Transformation and ancestor-adjusted genetic heterogeneity. Galor and Klemp (2015) show that genetic heterogeneity is related to autocratic rule. Further biogeographic controls are pathogen stress and irrigation potential (column 5). Hoben et al. (2010) and Enke (2019) show a positive association between pathogen stress and the strength of kin networks, while irrigation is related to collectivism (Buggle, 2018) and autocracy (Bentzen et al., 2017).

Further specifications investigate whether the association holds globally, i.e., independent of European heritage or religion per se. Column 6 controls for continent fixed effects, column 7 for the fraction of adherence to four major religions (Christians, Muslims, Hindus and Buddhists), and column 8 for the fraction of people with European descent. Clearly, though, precision of the estimates in this small sample will decrease since these covariates are highly correlated with medieval Church exposure and cousin marriage. The ethnicity-level analysis of the next section overcomes this limitation.

The regression results paint a consistent picture. Countries, which differentiate cousin-terms, have on average a 7.5 units lower democracy index compared to non-differentiating countries (column 1, rows 2). Similarly, countries preferring parallel-cousin marriage have a 9 units lower index compared to countries that don't have a cousin-marriage preference (column 1, rows 1). Doubling cousin marriages decreases the democracy score by about 2 units ($\approx 2.65 \cdot ln(2)$) (rows 3). Moreover, the regressions reveal high R^2. In the case of the non-ordinal measure of 20th-century

Table 1: Cousin Marriage and Democracy: Cross-country Evidence

	Democracy							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cousin-marriage preference	-9.38^{***}	-8.32^{***}	-5.84^{***}	-5.36^{***}	-5.03^{***}	-4.81^{***}	-4.38^{**}	-5.10^{***}
N: 148	(1.14)	(1.33)	(1.59)	(1.75)	(1.82)	(1.52)	(1.78)	(1.52)
R^2	0.268	0.369	0.413	0.416	0.436	0.486	0.484	0.463
Cousin-term differentiation	-7.66^{***}	-5.98^{***}	-4.64^{***}	-4.68^{***}	-4.22^{***}	-2.83^{**}	-3.59^{***}	-2.97^{**}
N: 148	(1.00)	(1.07)	(1.18)	(1.31)	(1.33)	(1.36)	(1.22)	(1.26)
R^2	0.299	0.356	0.419	0.428	0.444	0.464	0.494	0.442
Log % cousin marriage	-2.65^{***}	-2.24^{***}	-1.36^{***}	-1.11^{*}	-1.26^{**}	-1.29^{**}	-0.15	-1.26^{**}
N: 69	(0.29)	(0.35)	(0.51)	(0.59)	(0.57)	(0.54)	(0.63)	(0.48)
R^2	0.517	0.616	0.717	0.727	0.767	0.647	0.732	0.652
W. Church exp. (aa. in 100 y.)	1.31^{***}	1.30^{***}	1.06^{***}	1.12^{***}	1.10^{***}	0.52^{***}	0.74^{***}	0.39^{*}
	(0.12)	(0.21)	(0.24)	(0.24)	(0.23)	(0.19)	(0.21)	(0.23)
E. Church exp. (aa. in 100 y.)	1.23^{***}	1.13^{***}	1.35^{***}	1.54^{***}	1.46^{***}	0.05	0.82^{***}	-0.18
N: 145	(0.20)	(0.29)	(0.39)	(0.43)	(0.42)	(0.27)	(0.28)	(0.34)
R^2	0.329	0.386	0.465	0.493	0.500	0.473	0.498	0.442
Geographic baseline	-	yes	yes	yes	yes	yes	yes	yes
Further geographic cont.	-	-	yes	yes	yes	-	-	-
Neolithic trans./gen. heterogen.	-	-	-	yes	yes	-	-	-
Irrigation/pathogen stress	-	-	-	-	yes	-	-	-
Continent FE	-	-	-	-	-	yes	-	-
Fraction major religions	-	-	-	-	-	-	yes	-
Fraction European descent	-	-	-	-	-	-	-	yes

Notes: Cross-country OLS regressions. Dependent variable is the Polity IV democracy index. Each column reports the results of four regressions; the only differences being that each time a different explanatory variable is used. Explanatory variables are cousin-marriage preference (first rows), cousin-term differentiation (second rows), log % cousin marriages (third rows), and ancestor-adjusted Western and Eastern Church exposure (in 100 years, fourth rows). In columns 2-8 the geographic baseline is added (ruggedness, mean distance to waterways, absolute latitude, caloric suitability). Additional biogeographic covariates are added in columns 3-5 (caloric oats suitability, caloric rye suitability, temperature, precipitation, elevation, tropical area), columns 4-5 add ancestor-adjusted timing of the Neolithic transformation, and ancestor-adjusted predicted genetic heterogeneity, and column 5 adds irrigation potential and pathogen stress. Column 6 contain continent fixed effects, column 7 controls for the fraction of adherence to major religions (Christians, Muslim, Hindus, Buddhists), and columns 8 adds fraction of European descent. Robust standard errors are reported in parentheses. * *p≤0.1,* ** *p≤0.05,* *** *p≤0.01.*

cousin-marriage rates it explains more than 50 percent of the variation in the democracy index.

Controlling for biogeographic conditions decreases the coefficients, but they remain significant. This decrease is not surprising since agricultural innovations associated with the Neolithic transformation are tied to geography (Diamond, 1997) and may have fostered kin marriages to protect property. Kin marriages may thus be one mechanism through which agricultural practices affect political institutions. The Church's marriage prohibition in Europe can be seen as a set of cultural rules that cut the ties between agricultural practices and kin networks. Correspondingly, the inclusion of biogeographic covariates does not lead to a similar decrease in the coefficients of the reduced-form relation between Church exposure and democracy (rows 4). Columns 6 to 8 show that the results largely hold when controlling for continent fixed effects, fraction of adherence to major religions and the fraction of European descent. The results thus do not simply capture a European effect or one driven by contemporary religious adherence.

The appendix confirms that the results are robust to controlling for log GDP per capita (table B.1); even though GDP per capita is most likely likewise an outcome of kin networks and therefore a bad control. The results are also robust to Conley standard errors, which account for non-independence due to spatial and – going beyond the standard approach – genetic or cultural similarities (table B.2). Furthermore, appendix B.3-5 shows a robust positive association between Church exposure and weak kin-networks providing evidence that the Church dissolved strong kin networks in Europe – a transformation that is also reflected by a kin terminology in European languages, which changed chronologically following the introduction of Christianity.

3.3. Pre-industrial ethnicities' kin networks and local democratic traditions

This ethnicity-level analysis strengthens the evidence on a global link between weak kin networks and participatory institutions. It shows that local democratic traditions, which are robustly predicted by weak kin networks and which are associated with modern-day democratic institutions (Giuliano and Nunn, 2013), existed around the world before industrialization or European contact. The analysis rests on the

Ethnographic Atlas, which contains characteristics of about 1600 pre-industrial, predominantly non-European ethnicities. This makes the data set uniquely suited to show a universal relation between kin-networks and participatory institutions, i.e., a relation that holds among ethnicities that were not exposed to the medieval Church. Furthermore, compared to the cross-country analysis this relatively large data set increases the precision of estimates and allows controlling for a host of historical characteristics of ethnicities.

Following Giuliano and Nunn (2013), I use the binary dependent variable, *local democratic tradition*, which captures whether the local leader is chosen by consensus rather than by other means such as hereditary rights. The two explanatory variables are ethnicity-level cousin-term differentiation and cousin-marriage preference (for details see section 3.1 above).

The regression analysis (Table 2) controls for a host of geographic conditions, including the previous geographic baseline (caloric suitability, absolute latitude, terrain ruggedness and distance to waterways; columns 2-8), mean temperature, mean precipitation, elevation and slope (columns 3-8) and indicator variables for ten climate zones (columns 7&8). In addition, it controls for characteristics of historical ethnicities: subsistence (percentage of caloric intake depending on fishing, animal husbandry and agriculture; dependence on hunting and gathering is the omitted variable, columns 4-8), existence of property rights for movable objects (e.g. livestock) and land (columns 5-8), settlement complexity, judicial hierarchies, the use of irrigation (columns 5-8). Settlement complexity is a widely used proxy for development (Michalopoulos and Papaioannou, 2013) and together with the other variables mitigate concerns that the coefficients are biased due to factors related to development. Column 8 controls for deep Christianization. The coding follows Korotayev (2003) and denotes ethnicities following a Christian religion at least since 1500CE.[17]

[17] Deep Christianization is a binary indicator and does not distinguish between strands of Christianity. It has the advantage that it rests on the expertise of Korotayev (2003). Coding the duration – particularly for Eastern European ethnicities—is hardly feasible. The regression analysis only contains 23 ethnicities that are coded as "deep Christianization." Excluding those hardly changes the results.

The results of the linear probability model in Table 2 paint a consistent picture: ethnicities that prefer cousin marriage or differentiate cousin terms are less likely to follow democratic traditions. Going from a society that does not prefer cousin marriage to one that prefers parallel cousin marriage reduces the likelihood of local democratic traditions by 14 percentage points (rows 1). The coefficients are remarkably robust to the inclusion of the covariates. Following Oster (2017), unobserved omitted variables would need to be twice as important compared to the 26 included covariates in column 7 to fully account for this finding (assuming that unobservables would increase the R^2 by about the same amount than the included covariates). Given that this large number of covariates was specifically selected to address endogeneity, it provides evidence that the relation is unlikely due to an unobserved factor.

The results hold when controlling for 'deep Christianization' (column 7). This is evidence that the link between kin-networks and democracy is not driven by an omitted factor associated with medieval Christianization. Appendix B.5 reveals a robust negative relation of deep Christianization with ethnicities' cousin-marriage practices and the Inuit kin terminology, which is associated with the independent nuclear family.

Table 2: Ethnicity-level Cousin marriage and Local Democratic Traditions

	Local pre-industrial democratic tradition							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cousin-marriage preference	-0.14**	-0.12**	-0.12***	-0.11**	-0.10**	-0.11**	-0.11**	-0.10**
N: 622	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
R^2	0.011	0.056	0.074	0.095	0.108	0.122	0.143	0.145
Cousin-term differentiation	-0.12***	-0.08**	-0.07**	-0.08**	-0.07**	-0.06**	-0.06**	-0.05*
N: 551	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
R^2	0.018	0.067	0.088	0.115	0.124	0.139	0.162	0.165
Geographic baselines	-	yes	Yes	yes	yes	yes	yes	yes
Further geographic controls	-	-	Yes	yes	yes	yes	yes	yes
Subsistence	-	-	-	yes	yes	yes	yes	yes
Existence of prop. rights	-	-	-	-	yes	yes	yes	yes
Settlement comp., irrigation, jud. hierarchy	-	-	-	-	-	yes	yes	yes
Climate zones	-	-	-	-	-	-	yes	yes
Deep Christianization	-	-	-	-	-	-	-	yes

Notes: Ethnicity-level linear probability regressions of local pre-industrial democratic traditions on cousin-marriage preference (first rows) and cousin-term differentiation (second rows). Each row reports the results of two regressions. Column 2 adds the biogeographic baseline (ruggedness, absolute latitude, distance to the coast, agricultural suitability); column 3 adds further geographic variables (mean temperature, mean precipitation, elevation and slope), column 4 adds subsistence (percent reliance on fishing, animal husbandry, agriculture); column 5 adds the existence of property rights (both for movable property and land); column 6 adds settlement complexity, irrigation practices and judicial hierarchy; column 7 adds indicator variables for ten climate zones; and column 8 adds deep Christianization. Robust standard errors clustered on language families are reported in parentheses. * *p≤0.1, *** *p≤0.05, **** *p≤0.01.*

This is further evidence that the medieval Church dissolved strong kin networks among European societies.

4. Historical Analysis: Church Exposure and Communes

The global analyses of the previous section provide robust evidence that strong extended kin-networks have deep roots and are detrimental to participatory institutions. Furthermore, it suggests that the medieval Church dissolved strong kin-networks in European societies paving the way for the development of participatory institutions in Europe. This section traces the historical development of participatory institutions in Europe. It focuses on communes—cities with constraints on the executive and governed by people across the boundaries of the kin group, e.g. through city councils. It exploits a novel fine-grained pane-data set on the gradual extension of the Western Church across Europe. Consistent with the global analysis, a difference-in-difference analysis shows a robust reduced-form relation between medieval Church exposure and commune formation (section 4.2).

The global analyses suggest that kin networks are one crucial factor relating Church exposure to communes. Even though fine-grained data on medieval kin-networks is not available, the historical analysis is likewise able to provide evidence that the incest prohibitions are likely a decisive Church factor. To this end, I exploit regional and temporal variation in the incest prohibitions. First, a policy change—the temporal tightening of the Church's marriage prohibitions between the 11^{th} to 13^{th} century – is predictive of commune formation. Second, in a cross-section analysis (section 4.3) I exploit regional variation in 6^{th} to 8^{th} century incest legislation exposure *within* the area that comprised the Christian Carolingian Empire. Stronger regional anti-incest legislation exposure is associated with commune formation centuries later. Third, in appendix C.5 I show that consistent with the marriage hypothesis countries' urban population is positively associated with Western Church exposure and significantly less though with Eastern Church exposure.

4.1. Historical data: Communes and Church exposure

The historical analysis rests on a panel data set that captures cities' Western Church exposure and the presence of communes. It contains 339 cities in Europe, the Middle East and North Africa that at least once had a population of 10,000 inhabitants between the year 800 and 1500CE (in 100-year intervals) and is based on Bairoch et al. (1988) as used and amended by Bosker et al. (2013). I capped the analysis at 1500CE to rule out confounding due to subsequent events such as the Protestant Reformation or the discovery of the New World.

The dependent variable *Commune* is taken from Bosker et al. (2013). It takes the value of one if a city had a local participative government in a given century, and zero otherwise. Bosker et al. (2013) rely on the Lexikon des Mittelalters amended by other sources to attach a date to the creation of a local administration in which (at least part of) the citizens participated. A city is coded as a commune when the Lexikon des Mittelalters mentioned the occurrence of a commune, consuls or a town council (*Rat, raad, vroedschap, conseil, consejo, conselho*). This information is supplemented with other sources including the mentioning of building dates of cities' town halls (see appendix E.4 for details). In robustness checks, I rely on an indicator that is based on a different underlying source (Wahl, 2016). It captures cities' participatory institutions within a geographically smaller area (Holy Roman Empire of Germanic Nations) but includes already cities with at least 5,000 inhabitants.

City-level Western Church exposure. To capture cities' Church exposure, I created a dataset that contains the geo-coded Western Church's bishoprics that existed between the year 0 and 1500CE (see appendix A.3 for details). Based on cities' proximity to these bishoprics I defined an indicator that captures for each century the length of time a city was exposed to the Church:

$$Exp_i^y = 0.5 \sum_{t=550}^{t=y} C_{i,t}, \ where \ C_{i,t} \begin{cases} 0 \ if \ distB_{i,t} > 100 \ km \\ 1 \ if \ distB_{i,t} \leq 100 \ km. \end{cases}$$

Church exposure Exp_i^y is the sum of all instances (in 50-year intervals) that city *i* was within a 100-km (62-mile) radius of the nearest bishopric up to century *y* (multiplying by 0.5 rescales to centuries). The year 550CE is the first instance, because the first synods prohibiting cousin marriage occurred between 500 and 550CE. The indicator thus only captures Church exposure once the cousin-marriage prohibitions were in place.

The 100-km radius is informed by three observations. First, in the year 1500CE when all of Europe was Christianized, a 100-km radius around bishoprics covers 65% of the area of today's countries that were fully within the sphere of the Western Church (and 88% when excluding the sparsely populated countries of Sweden, Norway and Finland). Second, 100 km was well within the reach of bishoprics, which relied on a parish system. Reyerson (1999) estimates that 14th-century horseback travel in Italy could cover 50 to 60 km a day. Lastly, while many bishoprics governed smaller areas (e.g. in Italy), the 100-km radius traces the extension of Christendom according to the historical areas newly founded bishoprics covered.[18] All results are qualitatively similar based on smaller (80 km) or larger radii (120 km; analysis available upon request). Table C.1 in the appendix gives a descriptive overview of the whole panel data set.

4.2 Diff-in-diff analysis: Church exposure, extended marriage prohibitions and Communes

This section reports on two panel-data specifications. The first links commune formation to Western Church exposure (specification 1). The second links commune formation to the temporal extension of the incest prohibitions that occurred between the 11th and 13th century (specification 2).

Specification 1: Church exposure and communes. This analysis is based on difference-in-difference specification with staggered entry:

$$S_{yc} = c + \beta \; CE_{yc} + \theta P_{yc} + \lambda_c + \gamma_y + \vartheta_c \times \gamma_y + \epsilon_{yc} \quad (1)$$

where subscript y denotes the year and c the city. The binary outcome measure for commune is S_{yc}. CE_{yc} denotes the duration of Church exposure in centuries up to year y in city c. P_{yc} denotes other time-varying city-level characteristics, λ_c are city fixed effects, and γ_y are time-period fixed effects. Several specifications interact time-

[18] Some bishoprics covered larger areas; for instance, the archdiocese of Salzburg reached as far as Vienna (250km as the crow flies), while Regensburg incorporated parts of Bohemia before Prague got its own diocese.

invariant characteristics with year-fixed effects denoted by $\vartheta_c \times \gamma_y$. The error term ϵ_{yc} is clustered at the city level.

Unobservable, time-invariant city characteristics such as geography, the legacies of pre-existing political entities or culture are a key source of omitted variable bias. Here, city fixed effects rule out that those time-invariant factors bias the estimates, while time-period fixed effects do so for temporal shocks affecting all regions. Yet, unobserved time-varying factors which potentially co-determine Christianization and commune formation may bias the results.

Empirically, I undertake several steps to address this concern. First, I directly control for time-varying city characteristics (P_{yc}) and time-invariant ones each interacted with the full set of time period indicators ($\vartheta_c \times \gamma_y$). Second, I show that there are no pre-trends in the formation of communes (section 4.3 below). Third, I exploit two instances where Christianization was determined by outcomes of wars, which in the medieval ages carried a large idiosyncratic component, and where due to war-related strategic considerations the Church could not directly target specific areas. The two instances are the Reconquista in Spain, where over the course of almost seven centuries Christian secular rulers gradually re-conquered the Hispanic Peninsula, and the Eastward expansion in Northern Germany over the course of several centuries. The results also hold within the area that constituted the Carolingian empire and Roman Britain, which provides further evidence that non-religious institutional factors are unlikely able to explain the results (appendix C.2-3).

Specification 2: Extended marriage prohibitions and communes. Specification 2 exploits a temporal extension of the marriage prohibitions and investigate its association with communes. In 1003 Emperor Henry II extended the marriage prohibitions in the Holy Roman Empire of Germanic nations to include up to sixth cousins. In 1057 the Pope Nicholas II followed suit. While these new prohibitions could not have been enforced to this degree, historical sources document stricter enforcement and an extension to more distant relatives until in 1215 these extensions were weakened.

Specification (2) parallels specification (1) except that EP_{yc} is added, which captures the duration and timing of the extended marriage prohibitions:

$$S_{yc} = c + \beta \;\; CE_{yc} + \beta^{EP} EP_{yc} + \theta P_{yc} + \lambda_c + \gamma_y + \vartheta_c \times \gamma_y + \epsilon_{yc} \text{ (2)}$$

Historical sources strongly suggest that the extended prohibitions were unanticipated (Ubl, 2008). It is thus unlikely that this extension reflects unobserved changes in societal attitudes toward incest. Consistently, the event-study in the next section finds no pre-trend in the extended prohibitions. Furthermore, the extended prohibitions affected Catholic Europe across different political boundaries, mitigating concerns that non-Church related institutional features bias the estimates. Yet, caveats remain. The new policy only affected cities exposed to the Western Church. Other co-occurring trends or Church policies confined to Catholic Europe such as the enforcement of celibacy and the fight against simony (the selling of Church offices) may bias the estimate. The analysis is not able to disentangle these effects. However, in contrast to rules on simony and celibacy, incest regulations impact not just the clergy but the population at large.

Results. Table 3 reports the regression results. Each column reports on two regressions: panel 1 on *specification 1* (i.e. Church exposure), panel 2 on *specification 2* (adding extended prohibitions). Apart from city and time-period fixed effects, all columns control how often (in each century) the city was plundered since war may impact both institutional development and Church infrastructure. Agricultural innovations (Andersen, Jensen, and Skovsgaard, 2016; White, 1962; Mitterauer 2010), shifting trade routes (Acemoglu, Johnson, Robinson, 2005), or Roman roads (Daalgard et al. 2018) have been associated with Europe's growth and could potentially confound the analysis. Column 2 therefore controls for access to the sea and navigable rivers, column 3 for caloric suitability, and column 4 for access to Roman roads; all these variables are interacted with time periods. Column 5 controls for separate European developments (time-periods interacted with Europe).

Historians have suggested that bishoprics facilitated the formation of communes and Guiso et al. (2016) provide evidence that this was the case in northern Italy. To show that there is an association between Church exposure and communes independent of the presence of bishoprics, column 6 controls whether a city had a bishopric in a given century as well as whether the city was ever the see of a bishopric (interacted with time-period). Further controls are current and previous century city population (column 7). This addresses concerns that the estimates are confounded by the Church targeting growing or large cities that were also more likely to become communes. In column 8 all controls are included simultaneously.

Panel 1 of Table 3 reveals that an additional century of Church exposure increases the probability of a city being a commune by about 12 percentage points. This association is robust to the inclusion of all covariates. The regressions do not simply capture a European effect. The point estimate is still sizeable and significant when controlling for overall European development (column 5). The somewhat smaller coefficient is not surprising given that European development is non-negligibly driven by Church exposure. The estimate is robust to controlling for population and lagged

Table 3: Western Church Exposure and Communes: Panel Data Estimates

	Commune City							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Panel 1				
W. Church exposure	0.122***	0.119***	0.105***	0.123***	0.097***	0.123***	0.133***	0.107***
(in 100 years)	(0.007)	(0.007)	(0.010)	(0.007)	(0.011)	(0.007)	(0.008)	(0.014)
R^2	0.627	0.632	0.639	0.642	0.640	0.645	0.638	0.681
				Panel 2				
W. Church exposure	0.060***	0.058***	0.070***	0.061***	0.066***	0.066***	0.064***	0.075***
(in 100 years)	(0.015)	(0.015)	(0.017)	(0.015)	(0.019)	(0.015)	(0.020)	(0.026)
Extended prohibitions	0.155***	0.153***	0.089*	0.154***	0.078*	0.143***	0.156***	0.063
(in 100 years)	(0.038)	(0.038)	(0.046)	(0.038)	(0.046)	(0.037)	(0.043)	(0.054)
R^2	0.632	0.637	0.641	0.647	0.641	0.649	0.642	0.681
City & period FE	yes	yes	yes	yes	yes	yes	yes	yes
Plundered	yes	yes	yes	yes	yes	yes	yes	yes
Period FE X sea & river		yes						yes
Period FE X caloric suit.			yes					yes
Period FE X Roman roads				yes				yes
Period FE X Europe					yes			yes
Period FE X ever bishopric						yes		yes
Bishopric						yes		yes
Population & Pop. lagged							yes	yes
N	2712	2712	2712	2712	2712	2712	2373	2373
Cities	339	339	339	339	339	339	339	339

Notes: Linear probability regressions of Commune on Western Church exposure (row 1), and on Church exposure and extended marriage prohibitions (row 2). Each column thus reports on two regressions. An observation is a city in each century between 800 to 1500CE. All regressions control for how often a city was plundered within a century, city and time-period fixed-effects. Time-period fixed effects are interacted with access to the sea or navigable river (column 2), pre-Columbian caloric suitability (column 3) access to Roman roads (column 4), located in Europe (column 5), and whether the city was ever the see of bishopric (column 6). In addition, column 6 controls for being the see of a bishopric in a given century, while column 7 controls for city population and population lagged. Column 9 controls for all covariates simultaneously. Robust standard errors clustered on 339 cities are reported in parentheses. * *p≤0.1,* ** *p≤0.05,* *** *p≤0.01*.

population (column 7) which mitigates concerns that the Church endogenously targeted growing cities.

Robustness checks show that the results hold using an alternative measure of cities' participatory institutions in a sample, which comprises the area of the Holy Roman Empire of Germanic Nations and which includes less populace cities, i.e., cities with at least 5,000 inhabitants (Wahl 2016, appendix C.3). The results also hold in two instances in which Christianization was determined by the idiosyncrasies of medieval warfare (Reconquista and Eastward expansion of Northern Germany)[19] as well as within other historical political entities such as the Carolingian empire or Roman Britain (appendix C.2-3). This is evidence against the notion that other institutional factors or endogenous Christianization drive the results. Yet, it is consistent with the historical account of an indiscriminate, medieval Christianization by Sword which was determined by geographic proximity to already Christianized areas and the idiosyncrasies of medieval warfare.

Panel 2 of Table 3 reports the regression results of specifications 2. Across political entities within the realm of the Western Church, the extended marriage prohibitions are associated with a higher probability of being a commune. Only in column 8 when all 41 control variables are used simultaneously does the coefficient become insignificant. Consistent with the marriage hypothesis the coefficients for 'Church exposure' in panel 2 remain significant across specifications. The coefficients capture all Church factors including the marriage prohibition, which were in place before and after the extended prohibitions.

In the appendix, I report on urban population as the outcome variable. The hypothesis is that dissolved kin networks, which allowed people across kin networks to live and work together, fostered the formation and growth of cities. Table C.4 in the appendix mirrors specification 1 and reveals that church exposure is significantly associated with cities' population. An additional century of exposure is associated with about 1,900 additional individuals living in the city. Church exposure is also positively

[19] A frontier-effect is unlikely able to account for this finding. Communes first emerged in the non-frontier areas of those regions and they did not emerge in non-Christian (i.e. Islamic or pagan) frontier regions.

associated with countries' urban population (appendix C.5). Consistent with the marriage hypothesis, it is less pronounced for the Eastern compared to the Western Church with its stricter prohibitions and enforcement.

4.3. Event study with staggered entry.

To investigate pre-trends, specification 3 estimates event-study regression with staggered entry of the form

$$S_{yc} = c + \sum_{a=-p}^{a=p} \beta_w^a CExW_{y,c}^a + \theta P_{yc} + \lambda_c + \gamma_y + \vartheta_c \times \gamma_y + \epsilon_{yc} \qquad (3)$$

where $CExW_{yc}^a$ is an indicator variable that takes the value 1 if in a given year y and city c Church exposure started a centuries prior or later. For example, $CExW_{y,c}^1 = 1$ denotes that city c in century y already experienced one century (a=1) of Church exposure. β_w^a therefore captures the association between Church exposure and communes for each period a prior, at or after the start of Church exposure. This event-study specification allows me to investigate pre-trends (a <0) and the impact of Church exposure over time ($a \geq 0$). I estimate pre-trends for three centuries prior to the start of Church exposure. Again, the regression contains time-period fixed effects γ_y and city fixed effects λ_c. The regression outputs are reported in table C.6 (column 1) in the appendix.

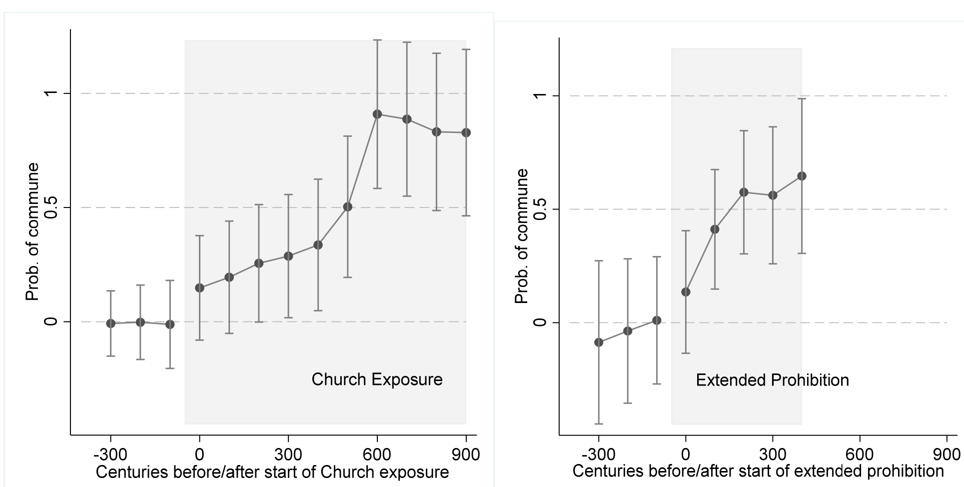

Figure 1: Event-study estimates of relationship between Church exposure and probability of being a commune (left panel, estimates based on Table B.6, following specification 3); and event-study estimates of relationship between extended prohibitions and probability of being a commune (right panel, estimates based on Table B.7 following specification 4). Displayed are 95% confidence intervals.

The left-hand side of Figure 1 plots the beta-coefficients β_w^a from event-study regression of commune on Church exposure (left panel, specification 3). The figure shows no evidence for a pre-trend. The hypothesis that $\beta_w^{-3} = \beta_w^{-2} = \beta_w^{-1} = 0$ is not rejected (F(3,388)=0.13, p=0.94). The probability of being a commune increases at the start of Church exposure (t=0) and then steadily increases. These results are robust to the inclusion of the same covariates as used in Table 1 (appendix C.6).

Specification 4 investigate pre-trends for the extended marriage prohibitions:

$$S_{yc} = c + \sum_{a=-p}^{a=p} \beta_w^a CExW_{yc}^a + \sum_{a=-p}^{a=p} \beta_{Ebw}^a ExtBanW_{yc}^a + \lambda_c + \gamma_y \vartheta_c \times \gamma_y + \epsilon_{yc} \quad (4)$$

The right-hand side of Figure 1 shows the coefficients of extended marriage prohibitions (reported in appendix C.7, column 1). Following the introduction of the extended prohibitions, the presence of communes increases. Again, there is no evidence of a pre-trend. The hypothesis that $\beta_{Ebw}^{-3} = \beta_{Ebw}^{-2} = \beta_{Ebw}^{-1} = 0$ is not rejected (F(3,338)=0.97, p=0.41). This demonstrates a close temporal alignment between the extended prohibitions and communes which makes a spurious alignment less likely.

4.4. Incest Legislation Exposure within the area of the Carolingian Empire

This section adds historical evidence that the marriage prohibitions was one Church factor conducive to commune formation by exploiting regional variation in 6th- to 8th-century incest legislation. In cross-sectional regressions, I establish that anti-incest legislation exposure predicts the occurrence of communes within the area that comprised the Carolingian Empire. Clearly, this analysis is not suited to establish an unassailable causal link. Yet, it can address specific concerns, namely, that other institutional or Church features can fully account for the previous-section reduced-form association between Church exposure and communes. Moreover, the indicator reflects variation in incest legislation prior to the mid-8th century; it therefore rules out that factors that emerged only later such as feudalism can fully explain the results. Thus, this section addresses specific alternative hypothesis and provides a piece of evidence consistent with the marriage hypothesis. Yet, given the short-comings common to cross-sectional analyses this section has to be seen in conjunction with the diff-in-diff approach of the previous section, as well as the global and the individual level analysis linking kin networks to institutional outcomes.

Incest legislation exposure. The indicator of cities' incest legislation exposure is based on pre-Carolingian synodal activity of bishops. In early medieval times the Church was not a centralized power. 6th- to 8th-century incest legislations were spearheaded by bishops' decentralized activity in the Frankish kingdoms. Bishop's differing opinion on incest created regional variation in incest legislation exposure (Ubl, 2008). Well-preserved participation lists of 6th- to 8th-century synods create a unique opportunity to trace this variation by linking bishops, who participated in synods that passed incest legislation, to cities near their sees. The underlying rational is that synodal incest legislation reflects bishops' attitudes towards incest and its enforcement.

The data sources are Pontal (1986), who lists all known Merovingian synods, and Hartmann (1989) for pre-Carolingian (before 750CE) Roman synods. Except for one (Synod of Auxerre in 585), all other 12 of the 13 Merovingian and the two pre-Carolingian Roman synods that passed incest legislation contain subscription lists of the participating bishops.[20] These lists allow me to link synodal incest legislation to the participating bishops' sees.

The indicator is constructed in three steps. First, for each synod I created weights that reflect the severity of the incest legislation: synods prohibiting sororate and levirate but allowing cousin marriages got a weight of one; synods that prohibited at least first cousin marriage got a weight of two; synods that favored a stronger punishment of cousin marriage got a weight of three.[21] Second, I linked each synod to cities through the participating bishops. A city is coded as exposed to a synod's incest legislation if the bishop of the city's closest bishopric (within 100 km) participated in a synod with incest legislation. Third, I took the weighted sum over all synods a city was exposed to and standardized the indicator. A high incest legislation exposure of a city thus reflects

[20] Subscription lists for synods, which took place after 750CE, are missing. The indicator thus captures only pre-Carolingian synodal incest legislation based on Merovingian and Roman synodal activity.
[21] This information is contained in synodal canons and coded along Ubl (2008). All results are qualitatively similar when no weights are used, when the indicator is based only on synods that prohibited cousin marriage, or when the indicator is based on smaller or larger radii around the bishoprics.

that the nearby bishopric was headed by bishops who on average were more active in shaping increasingly stricter incest legislation.

Following the same procedure, I created a *synodal activity* indicator that simply captures exposure to all synodal activity by linking participating bishops' sees to cities in their vicinity. This indicator is based on all synods that occurred in the same time span entering with the same weights—those that did and did not contain incest legislation. This indicator allows me to addresses concerns that incest legislation exposure simply captures that less remote or better endowed bishoprics, whose bishops are more likely to travel to synods, are also located in regions where the emergence of communes is more likely.[22]

Results. The dependent variable is whether a city was a commune in the year 1200. This is the first year there is meaningful variation in commune cities within the Carolingian Empire.[23] Included in the regression are 75 cities that fall within the Carolingian Empire and had non-zero population in the year 1200.

Table 4 reports the regression results. Each column reports on two regressions—panel 1 on incest legislation exposure, while panel 2 adds the control for synodal activity per se. All columns control for Church exposure and for whether a city is located in the Italian part of the Carolingian empire (including the Vatican). The other covariates parallel those of section 4.2: access to waterways (column 2), caloric suitability (column 3), access to Roman roads (column 4), whether the city is the see of a bishop (column 5), and all covariates simultaneously (column 6). City population, even though it is likely endogenous to the Church's marriage prohibitions, is added in column 7 (separately) and in column 8 together with all other covariates.

[22] *Synodal activity* captures 29 out of 47 synods in Merovingian Gaul between 511 and 626. For the other 18 synods no subscription lists are available. For Roman synods, only two that passed incest legislation contain subscription lists, while two synods that focused on other topics could not be included. The indicator is thus noisy.

[23] Communes in Northern Italy emerged earlier. Bosker et al. (2013) code them starting in the year 1100. However, 1100 is not suitable for the analysis since there is no variation in the non-Italian part of the Carolingian Empire. The earlier emergence of communes in the North vs South of Italy is consistent with the idea that the dissolution of kin networks is a precondition for the formation of communes—the North was part of the Carolingian empire while the South did not see the same incest prohibitions. While the dissolution of kin networks is an important precondition, once dissolved, weak central power may have accelerated the formation of communes in Northern Italy. Note that I control for the Italian part.

The results reveal a quantitatively large association. An increase of one standard deviation in incest legislation exposure is associated with 14 to 17 higher percentage points of being a commune several centuries later (top row). Controlling for synodal activity (lower row) leads to similar point estimates, while they are estimated with less precision. Importantly, the results hold controlling for synodal activity or Church exposure.

Altogether, this analysis supports the hypothesis that the Church's incest legislation fostered the formation of communes. Areas in which bishops were active in incest legislation are associated with a higher probability of cities being communes. The analysis is not able to alleviate all endogenous concerns. Yet, by relying on a pre-800 measure, controlling for Church exposure, and Carolingian Northern Italy, it addresses concerns that other Church components, political institutions, or factors emerging only after the mid-8th century fully explain the previous section's reduced-form link between Church exposure and communes.

Table 4: Incest Legislation Exposure and Communes in the Carolingian Empire

	Commune City (1200CE)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Incest legislation exp. (std)	0.17***	0.16***	0.17***	0.17***	0.15***	0.14**	0.17***	0.13**
(N: 75 cities)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)	(0.05)	(0.06)
Church exposure	-0.03	-0.02	-0.03	-0.03	-0.03	-0.03	-0.03	-0.03
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
R^2	0.239	0.251	0.240	0.244	0.254	0.280	0.242	0.283
Incest legislation exp. (std)	0.17*	0.14	0.16*	0.18*	0.16*	0.13	0.16*	0.12
(N: 75 cities)	(0.09)	(0.10)	(0.09)	(0.09)	(0.09)	(0.10)	(0.09)	(0.10)
Synodal activity Index (std)	-0.03	-0.02	-0.03	-0.03	-0.03	-0.03	-0.03	-0.03
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Church exposure	0.00	0.02	0.01	-0.00	-0.00	0.01	0.01	0.01
	(0.08)	(0.09)	(0.08)	(0.08)	(0.08)	(0.09)	(0.08)	(0.09)
R^2	0.240	0.252	0.241	0.244	0.254	0.280	0.242	0.283
Lombard (North) Italy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Waterway access		Yes				Yes		Yes
Caloric suitability			Yes			Yes		Yes
Roman road access				Yes		Yes		Yes
Bishopric (1200CE)					Yes	Yes		Yes
City population (1200CE)							Yes	Yes

Notes: Linear probability OLS cross-section regressions of commune on incest legislation exposure. Each column reports on two regressions one with (top panel) and one without synodal activity index as additional control (second panel). An observation is a city within the boundaries of the Carolingian empire that had a non-zero population in 1200CE. All regressions control for Church exposure and Lombard (North) Italy (including Rome). Access to the sea or navigable river (column 2), pre-Columbian caloric suitability (column 3), access to Roman roads (column 4), whether the city was the seat of a bishopric (column 5) and all previously listed covariates simultaneously (column 6) are added. Column 7 adds the cities' population, while column 8 controls for all covariates simultaneously. Robust standard errors are reported in parentheses. * *p≤0.1,* ** *p≤0.05,* *** *p≤0.01.*

A drawback of the analysis is that it rests on a noisy measure of incest legislation exposure and contains only 75 cities, which reduces the power of the analysis. To strengthen the findings, Table B.8 in the appendix reports regressions with cities' population as dependent variable. Data availability allows to go as far back in time as 800CE when the Carolingian Empire was forming. The analysis shows that already in 800CE, higher anti-incest legislation exposure is associated with larger cities. This is further evidence for a link between incest legislation exposure and city development, which later led to the formation of communes.

5 EXTENDED KIN NETWORKS AND CIVICNESS

Many thinkers have argued that a civic society is a cornerstone of functioning democracies (e.g. Putnam, 1993 or Fukuyama 1995). In particular, people need to actively take part in the political process to express their preferences and hold those in power accountable.

Here, I establish that strong kin networks are negatively associated with political participation as proxied by whether people voted in national election. This holds comparing regions within European countries (section 5.1). To get closer at causality, I take an epidemiological approach and focus on political participation of second-generation immigrants, who experienced the same societal environment when growing up, yet differ in their cultural background (section 5.2). Subsequent work by Schulz et al. (2019) shows that strong kin networks are also positively associated with psychological traits such as obedience and conformity. These traits are favorable to autocratic rule as they can reduce the likelihood of voicing opinions, launching campaigns or protesting ruling elites.

5.1. Regional variation of cousin-marriage within European countries and civicness

This section exploits regional variation in 20th-century cousin-marriage rates in four European countries (Italy, Spain, France and Turkey) and shows a robust association with whether individuals reported to have voted in the last national election. The sample consists of respondents to the European Social Survey (ESS; waves 1-8, conducted between the years 2002 and 2016). I matched respondents to the cousin-marriage rates of their region of residence.

The cousin-marriage rates are based on dispensation records of the Vatican's archive. The data was compiled by geneticists for Spain (average of years 1911 to 1943, Pinto-Cisternas, Zei and Moroni, 1979), Italy (average of years 1910 to 1964, Cavalli-Sforza, Moroni and Zei 2004), and France (average of years 1926 to 1958, Sutter and Goux, 1964). I augmented this data by Turkish cousin-marriages rates based on the second wave of the Demographic and Health Survey (year 1998). This regional within-country variation in cousin-marriage rates is most likely the result of differential exposure to the medieval Church's marriage prohibitions. Appendix B.4 shows that Church exposure predicts cousin-marriage rates in those regions.

Table 5 reports the regression results of whether people voted on the log % first-cousin marriages. All specifications control for wave and country fixed effects and basic individual characteristics (age, age^2, gender). The geographic baseline (ruggedness, absolute latitude, distance to the sea, caloric suitability) is included in columns 2 to 8. Column 3 controls for further geographic characteristics of the regions (precipitation, temperature, elevation, presence of rivers or lakes, caloric suitability for oats and caloric suitability for rye). Column 4 controls for the density of Roman roads (while all regions in the sample were part of the Roman Empire, some might have been

Table 5: Cousin Marriage and Political Participation in Regions of Europe

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Panel 2: Voted				
Log % cousin marriage	-0.135***	-0.106***	-0.119***	-0.108***	-0.095**	-0.096**	-0.094**	-0.103**
(N: 16,650, Regions: 68)	(0.041)	(0.038)	(0.042)	(0.038)	(0.037)	(0.038)	(0.037)	(0.045)
R^2	0.153	0.155	0.157	0.155	0.160	0.170	0.157	0.176
Wave & country FE	yes	yes	yes	yes	Yes	yes	Yes	yes
Basic individual cont.	yes	yes	yes	yes	Yes	yes	Yes	yes
Geographic baseline	-	yes	yes	yes	Yes	yes	Yes	yes
Further geographic cont.	-	-	yes	-	-	-	-	yes
Roman roads / Carolingian	-	-	-	yes	-	-	-	yes
Monastic presence religiousness / denom.	-	-	-	-	yes	-	-	yes
Educational attainment	-	-	-	-	-	yes	-	yes
City size / pop density 500CE	-	-	-	-	-	-	Yes	yes

Notes: Individual-level OLS repressions of generalized trust (Panel 1) and whether people voted (Panel 2) on log % cousin marriage. All regressions contain country fixed effects for the four countries included in this analysis (Spain, Italy, France, Turkey), survey-wave fixed effects and basic individual-level controls (gender, age, age^2). Column 2 adds the regional geographic baseline (terrain ruggedness, distance to the coast, caloric suitability, and absolute latitude); column 3 controls for further geographic variables (precipitation, temperature, elevation, river & lakes, caloric suitability for oats and caloric suitability for rye); column 4 for Roman roads; column 5 for monastic presence, individuals' religious denomination (Catholic, Protestant, Eastern Orthodox, other Christians, Jewish, Muslim, other non-Christian religions) and religiousness; column 6 for individuals' educational attainment (secondary education, tertiary education); and column 7 for population density estimates for the year 500CE and (contemporary) city size. Column 8 controls for all variables simultaneously. Robust standard errors clustered on the 68 regions are reported in parentheses. * p≤0.1, ** p≤0.05, *** p≤0.01.

more firmly integrated into its infrastructure) and exposure to the Carolingian Empire, addressing concerns that legacies of these empires bias the estimates.

Column 5 controls for a bundle of religious variables: monastic presence, which captures the medieval exposure of a region to Cluniac, Cistercian, Franciscan, Dominican or Premonstratensian monastic houses (see appendix E.2 for details), as well as religiousness (self-reported scale between 1 and 7) and religious denomination. While these variables are closely related to medieval Church exposure and hence cousin marriage, they address concerns that other religious factors that don't work through the marriage prohibitions bias the estimates. A nice feature of this sample is that all regions within Italy, Spain and France have been firmly within the sphere of the Catholic Church for at least half of a millennium but regions within countries differ in their previous experience of the Church's medieval marriage regulations. This further mitigates concerns that the analysis is confounded by another Catholic factor. Column 6 controls for educational attainment (indicator variables for secondary and tertiary education). These controls are likely endogenous since in societies with high rates of cousin marriage, less weight may be placed on individual achievements. Column 7 controls for self-reported city size and estimates of population density in 500CE. In column 8 all controls are used simultaneously.

The estimates are quantitatively large: doubling cousin marriage decreases the probability to vote by about 9 percentage points. The relation is robust to the introduction of covariates. Even when all covariates are added simultaneously (column 8), the coefficient remains large and significant. In appendix D.1, I show that the relation between kin networks and voter turnout also holds in sub-regional provinces within Italian regions based on non-self-reported, official voting records.

VI.C Children of immigrants, kin networks and civicness

This section follows the epidemiological approach and investigates the role of kin networks on political participation of second-generation immigrants who live in European countries. The analysis therefore links kin networks of immigrant parents' originating country to their children's political participation. The key idea of this approach is that second-generation immigrants in any given European country by and large experienced the same formal institutions, infrastructure, and social security systems when growing up; yet, they vary in their cultural background. Exploiting this variation aims to isolate the effect of the intergenerationally transmitted norms and values. Controlling for resident country fixed effects rules out that factors such as national infrastructure and institutions bias the results.

The analyses rests on respondents to the European Social Survey (ESS, wave 2-8) who were born in the surveyed country, but who had a mother born abroad. Again, the dependent variable is whether people reported to have voted in the last national election. The sample is restricted to citizens since only they are eligible to vote. This might bias estimates downward since second-generation immigrants opting for citizenship are likely politically more active. The analysis in appendix D.2 includes also non-citizens and reports on a political activity index, which is based on activities that do not require citizenship such as signing a petition, or boycotting products.

One shortcoming of this approach is that it is not a random sample of the originating country; parents self-select to migrate. The results should therefore be interpreted with this caveat in mind. Another concern is that based on their cultural background, immigrants are differentially discriminated against. To account for this possibility, the regression analysis controls for a wide range of individual characteristics such as labor market participation, education and whether a person feels discriminated against. Lastly, the estimates may pick up other culturally transmitted characteristics of the originating country than those which are directly related to extended kin networks. To mitigate this possibility, I control for the baseline set of originating country controls. Equation (5) details the econometric specification:

$$y_{i,r,c} = \beta CM_c + \alpha_r + \gamma X_c + \delta X_i + \varepsilon_{i,r,o} \qquad (5)$$

where *i* denotes the offspring of an immigrant parent, who resides in an ESS country *r* with ancestry in country *c*. $y_{i,r,c}$ is generalized trust. The explanatory variable CM_c is a proxy for cousin-marriage practice in country of ancestry *c*. α_r are resident country fixed effects (FE), and X_c is the geographic baseline of father's originating country (absolute latitude, ruggedness, mean distance to waterways, caloric suitability). X_i denotes a vector of individual-level controls: age, age^2, gender, educational

Table 6: Kin Networks in Mothers' Originating Countries and Voting

	Vote					
	(1)	(2)	(3)	(4)	(5)	(6)
Cousin-marriage preferred, o. country	-0.013***	-0.016***	-0.013***	-0.009*	-0.008*	-0.012*
N: 13,029	(0.004)	(0.005)	(0.004)	(0.005)	(0.004)	(0.007)
R^2	0.107	0.108	0.114	0.131	0.136	0.108
Cousin-term differentiation, o. country	-0.031*	-0.027	-0.009	-0.013	-0.000	-0.008
N: 13,029	(0.016)	(0.020)	(0.020)	(0.017)	(0.015)	(0.023)
R^2	0.107	0.108	0.113	0.131	0.136	0.108
Log % cousin marriage, o. country	-0.013**	-0.020***	-0.013**	-0.013**	-0.009**	-0.012
N: 7,861	(0.006)	(0.006)	(0.005)	(0.006)	(0.004)	(0.009)
R^2	0.108	0.109	0.115	0.132	0.137	0.109
Wave FE, Resident country FE, basic individual controls	yes	yes	yes	yes	yes	yes
Geographic baseline of mother's originating country	-	yes	yes	yes	yes	yes
Religious denomination FE & Religiousness	-	-	yes	-	yes	-
Individual controls	-	-	-	yes	yes	-
Fraction European descent of mother's origination country	-	-	-	-	-	yes

Individual-level linear probability regression of whether respondent voted on mother's country of origin strength of kin networks. An observation is an individual born in the resident country with an immigrant mother. Each column reports the outcome of three regressions. In the first rows the explanatory variable is cousin-marriage preferred, in the second rows it is cousin-term differentiation in the third rows it is the log % cousin marriage. All regressions control for survey-wave fixed-effects, resident country fixed-effects, basic individual controls (age, age^2 and gender). Columns 2-6 add the geographic baseline of mother's originating country (ruggedness, mean distance to waterways, absolute latitude, caloric suitability). Columns 3&5 control for religiousness and religious denomination (Atheist, Catholic, Protestant, Orthodox, other Christian, Jewish, Islamic, other non-Christian religion). Columns 4&5 add further individual controls (feeling discriminated against, unemployed seeking a job, unemployed not seeking a job, educational attainment). Column 6 controls for the fraction of European descent. Robust standard errors clustered at the resident country are reported in parentheses. * *p≤0.1,* ** *p≤0.05,* *** *p≤0.01*.

attainment (primary, secondary or tertiary), labor market participation (unemployed actively searching for a job, unemployed not searching for a job), a variable capturing whether the individual feels discriminated against, wave of survey FE, and religious denomination (no denomination, Roman Catholic, Protestant, Eastern Orthodox, other Christian, Jewish, Islamic, other non-Christian religion), and religiousness.

Table 6 reports the regression results. Each column contains results from three regressions, each with a different explanatory variable reflecting kin networks in mother's originating country. The results show that stronger kin networks are negatively associated with voting (column 1). In case of the two indicators, cousin-marriage preferences and log % cousin marriage, the results are robust to controlling for geographic and individual characteristics. In addition, for cousin-marriage preferences the results hold when controlling for the fraction of European descent of the mother's originating country (column 6). This shows that the relation between kin networks and political participation holds more generally and is not restricted to the European experience. For cousin-term differentiation – a noiser measure since it captures temporally more distant strenght of kin networks emodoied in langauge – all coeficients show the expected signs, while they are mostly not significant. Appendix D.2 shows that the results hold very similarly for a political activity indicator based on factors such as signing a petition or wearing a badge.[24]

6. Discussion and Conclusion

This study empirically tests the hypothesis that the Church's marriage regulations dissolved extended kin networks in Europe and thereby fostered the emergence of participatory institutions. The Church's prohibitions on cousin marriages in the early medieval ages—at times extending up to sixth cousins—forced people to enter relationships with others beyond the confines of the extended kin group. This facilitated the formation of communes—self-governed cities with participatory institutions, a more cohesive civic society and ultimately paved the way for democratic nation-states.

The empirical strategy of this paper is three-fold. First, I provide global evidence that strong kin networks are detrimental to participatory institutions and that this association has roots that stretch out far deeper than modernization. Furthermore, this link between kin networks and institutions is not unique to Europe. It also holds among societies with very different histories than European ones. What made Europe stand out then? I provide evidence that the medieval Church's dissolved strong extended kin networks among many European societies.

Second, I conduct a historical analysis which links medieval Church exposure to the formation of communes—medieval participatory institution that many scholars have associated with the formation of national democracies. This analysis strengthens the global analysis. The difference-in-difference analysis rules out that time-invariant factors such as geography biases the estimates. The results reveal no pre-trend and hold within historical European political entities or in instances in which Church exposure

[24] The results for this alternative indicator also hold when the regressions control for originating-country fixed effects and *ethnicity-level* characteristics, ruling out the possibility that omitted variables at the originating country level may bias the estimates and mitigating this possibility at the ethnicity level. This is analysis is achieved by matching to ancestral ethnicity via language rather than the originating country. The analysis does not hold with the dependent variable 'voting'; possibly due to the reduced sample, which only contains citizens.

was determined by idiosyncrasies of medieval warfare. This mitigates concerns that endogenous Christianization biases the results. Furthermore, the analysis – capped at the year 1500CE – cannot be biased by factors that only emerged subsequently such as the discovery of the Americas or Protestantism. Congruent with the global analysis the historical analysis provides evidence that kin networks are one important factor. Regional and temporal tighter marriage prohibitions within Christendom predict the formation of communes. This also demonstrates that the relation between kin-networks and participatory institutions not only holds globally but also within European political entities.

Third, I show that weak kin networks are positively associated with civicness as proxied by political participation. This holds among regions within European countries, controlling for a large set of individual characteristics such as religiousness or religious denomination, and—getting closer to causality—among second-generation immigrants, who grew up in the same country but vary in their vertically transmitted preference for cousin marriage.

More generally, dissolved kin networks is a building block not only for participatory institutions but also for economic development more generally. For example, transmission of knowledge across kin networks and the shift away from a collectivistic culture toward an individualistic one, a culture of growth, may have further contributed to Europe's economic development (Mokyr, 2016; de la Croix et al., 2018).

The findings in this article have important policy implications. To build strong, functional institutions and to foster democracy, the potentially deleterious effect of dense kin networks must be considered. Simply exporting established formal institutions to other societies without considering existing kin-based institutions will likely fail. Policies that foster cooperation beyond the boundaries of one's kin group, however, have a strong potential to successfully diminish the fractionalization of societies.

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APPENDIX – FOR ONLINE PUBLICATION –

APPENDIX A: CHURCH INCEST PROHIBITIONS AND MEDIEVAL CHURCH EXPOSURE

A.1 HISTORICAL OVERVIEW ON MEDIEVAL CHURCHES' MARRIAGE REGULATIONS

Table A.1: Chronological Overview over the Eastern and Western Churches' Marriage Regulations

Year CE	Church's Prohibition
305/6	Synod of Elvira (Spain) decrees that any man who takes the sister of his dead wife as his new wife (sororate marriage) should abstain from communion for five years. Those marrying their step-daughter should abstain from communion until near death.
314/5	Synod of Neocaesarea (Turkey) forbids marrying the wife of one's brother (levirate marriage) and possibly sororate marriage.
325	The Synod of Nicaea (Turkey) prohibits sororate marriage.
355	Levirate marriage is prohibited by Emperor Constantius II.
374	Basilius of Caesarea argues against sororate marriage in a letter to Diodor von Tarsus.
387	The Christian Roman Emperor Theodosius reaffirms prohibitions against sororate and levirate marriages. In addition, he prohibits first cousin marriage. This law was reversed in 400 or 404 in the Eastern Empire, while in 409 Western Emperor Honorius softened it by allowing dispensation. It is not clear whether and how long it persisted in the West. The dissolving Western Empire (Rome was plundered in 410) makes continued enforcement unlikely.
around 400	In letters to the Gallic bishops, the Pope argues that the sororate marriage is forbidden for Christians and calls for penalties and the annulment of such marriages.
402	Roman Synod (Italy) under Pope Innocent I forbids sororate marriage.
506	Synod of Agde (France, Visigoth kingdom) prohibits marriage to one's brother's widow, wife's sister, stepmother, uncle's widow, uncle's daughter, stepdaughter, cousin or any kinswomen.
511	Synod of Orleans (France, Merovingian kingdom) forbids sororate and levirate marriage
517	Synod of Epaone (France, Burgundian kingdom) decrees that unions up to and including second cousins are incestuous, and henceforth forbidden (although existing unions were not dissolved). It also forbids marriage to stepmothers, widows of brothers, sisters-in-laws, and aunts by marriage. Many subsequent Synods in the area of what would become the Carolingian Empire refer to this Synod for incest regulations.
530	Prohibition of marriage between godfather and godchild (and restriction of marriage between a man and his adopted child) by Byzantine Emperor Justinian.
527/31	Second Synod of Toledo (Spain) prescribes excommunication for marrying blood relatives (the number of years of excommunication should equal the number of years of the marriage).
533	Synod of Orleans (France) forbids marriage with the step mother
535	The Synod of Clermont (France) repeats the legislation of the Synod of Epaone and Agde.
535	Byzantine Emperor Justinian increases punishment for levirate and sororate marriage to confiscation of property, a prohibition on holding administrative positions, exile and, for lower status people, whipping.
538	The third Synod of Orleans (France) prohibits marriage to one's stepmother, stepdaughter, brother's widow, wife's sister, first and second cousin and uncle's widow.
538	First documented letter between a Frankish king and the Pope is about incest (marriage to the wife of one's deceased brother). While the Pope disapproves, he leaves the decision about the extent of the penance to bishops.
541	The Fourth Synod of Orleans (France) renews the canon of the Third Synod of Orleans.
546	Synod of Lerida (Spain). Re-enforces proscriptions of the Synod of Toledo but decreases punishments.
567	Second Synod of Tours (France) forbids marriage to one's niece, cousin, or wife's sister and confirms the canons of Orleans, Epaone, and Auvergne.
567/73	Synod of Paris (France) prohibits marriage to one's brother's widow, stepmother, uncle's widow, wife's sister, daughter-in-law, aunt, stepdaughter, and step-daughter's daughter.
583	The third Synod of Lyons (France) renews canons against incest.
585	Second Synod of Macon (France) renews canons against incest. Stronger condemnation in comparison to earlier Synods.
585/92	The Synod of Auxerre (France) forbids marriage with stepmother, stepdaughter, brother's widow, wife's sister, cousin, uncle's widow.
589	Reccared, the Visigothic King (Spain), decrees the dissolution of incestuous marriages, punishing offenders with exile and the transfer of their property to their children.
596	Frankish King Childbert II decrees death penalty for marriage to one's step-mother. Other forms of violations shall be penalized according to bishops. If the convicted shows resistance to ecclesial punishment, his property is seized and redistributed to relatives.
600	In a letter to his missionary Augustine of Canterbury in England, Pope Gregory I prohibits marriage to first cousins, as well as sororate and levirate marriages. This letter (libellus responsium) is widely distributed.

615	The Fifth Synod of Paris (France) renews the legislation of the Synods of Orleans, Epaone, Auvergne, and Auxerre.
627	Synod of Clichy (France) implements the same punishment and enforcement procedures that were decreed by the Frankish King Childbert II in 596. A systematic collection of incest legislation is part of the *Collectio vetus Gallica,* the oldest systematic collection of canons from Gaul (compiled around this time).
643	Lombard laws of Rothari forbid marriage to one's stepmother, step-daughter, or sister-in-law.
673	Synod of Hertford (England) forbids incest (without specifying the extent) and decrees that one man can only marry one woman and no man shall leave his wife except because of infidelity. If he does leave her, he cannot remarry.
690	Bishop Theodore of Canterbury's (England) widely distributed penitentials forbid first cousin marriages but do not demand that these marriages must be dissolved. Affinal relatedness are likewise included in the prohibitions.
692	At the Synod of Trullo (Turkey), the Eastern Church forbids marriage to one's first cousin and also affinal kin: a father and a son marrying a mother and a daughter or two sisters, and two brothers marrying a mother and a daughter or two sisters. It also forbids marriage of a godfather to his godchild's mother.
716	In a legation to Bavaria, Pope Gregory II prohibits marriage up to first cousins. The penalty is excommunication.
721	Roman Synod (Italy) under Pope Gregory II prohibits marriage to one's brother's wife, niece or grandchild, stepmother and stepdaughter, cousins, all kinsmen, and anyone married to kinsmen. It also prohibits marriage to one's godmother. In the year 726, Gregory II specifies that for practical missionary purposes the prohibitions are up to first cousins, but for others the prohibitions include all known relatives. His successor Gregory III specifies this prohibition such that marriages of third cousins are allowed. Prohibitions include affinal kin. The decisions of the council are widely disseminated.
723/4	Lombard king Liutprand (Italy) prohibits marriage with one's step mother, step daughter, sister-in-law and widows of cousins. .
725	Roman Synod (Italy) threatens anathema against those who marry their godmothers.
741	Pope Zacharias forbids the marriage of a godfather with his godchild or the godchild's mother.
741	Under the Byzantine Emperor Leo III (the Isaurian), the prohibition in the Eastern Church is increased to include marriage of second cousins (and not much later to marriage between second cousins once removed). The penalty for of cousin marriage is whipping.
743	Roman Synod (Italy) under Pope Zacharias orders all to refrain from marrying cousins, nieces and other kin. Such incest was punishable by anathema and excommunication.
753	The Synod of Metz (France) prohibits marriage to one's step-mother, stepdaughter, wife's sister, niece, granddaughter, cousin, and aunt, decreeing that any offender will be fined. If unable to pay the fine, the offender will be sent to prison if he is a freeman, and if not, will to be beaten with many stripes. It also prohibits the marriage of a father with the godmother of his child, and the marriage of a child with his godmother, and the marriage of a confirmed person with the person who presented him or her for confirmation.
755	The Synod of Verneuil (France), convened under Carolingian King Pepin, commands marriages to be performed publicly.
756	Synod of Verbiere (France) prohibits marriage of third cousins and closer. It pronounces that those married to second cousins are to be separated, while those married to third cousins are only to do penance.
756/7	Synod of Aschheim (Germany) forbids incestuous marriages.
757	Synod of Compiegne (France) rules that existing marriages of a man with a second cousin once removed (the child of a second cousin) or closer should be nullified. This is also the case for affinal kin. The Frankish King, Pepin, threatens secular punishment for any who disagree with the decisions of the Synod.
786	Papal legates in England forbid incestuous marriages with relatives and kin (without specifying the extent).
796	Synod of Friuli (Italy) directs attention to pre-nuptial investigations into potentially consanguineous marriages and prohibits clandestine unions. It prescribes a certain waiting time before marriage to find out from neighbours and elders whether there exist any blood relations that would prohibit marriage.
802	Charlemagne's capitulary of 802 insists that nobody should attempt to marry until the bishops and priests, together with the elders of the people, have investigated the blood relations of the prospective spouses. (Saxon capitularies enacted in 785 in Paderborn included fines for contracting unlawful marriages).
813	Synod of Arles (France) reaffirms the prohibitions of previous Synods.
813	Synod of Mainz (Germany) forbids marriage between third cousins or closer as well as marriage with one's godchild or godchild's mother, or the mother of the child that one offered for confirmation. The latter restrictions are also confirmed by Pope Nicholas I in 860 in his reply to the Bulgarians.
874	Synod of Douci (France) urges restraint from marriage to third cousins. To strengthen the ruling, the Synod made the children of such incestuous marriages ineligible for succession to an estate.
909	Synod of Trosle (France) clarifies and affirms the Synod of Douci, deeming that children born in an incestuous marriage are ineligible to inherit property or titles.
922	Synod of Koblenz (Germany) reaffirms the provisions of the Synod of Mainz in 813.
927	Synod of Trier (Germany) decrees penance of 9 years for marriage between in-laws and blood relatives.

948	Synod of Ingelheim (Germany) prohibits marriage with all kin as far back as memory goes.
997	Tomos of Sisinnios (Patriarch of Constantinople) forbids affinal marriages (of two brothers with two (female) cousins, two (male) cousins with two sisters, an uncle and his nephew with two sisters, or two brothers with an aunt and her niece).
1003	Synod of Diedenhofen (Germany). Emperor Heinrich II increases the prohibitions to include sixth cousins, forbidding marriage between people who share one of their 128 great-great-great-great-great-grand-parents.
1023	Synod of Seligenstadt (Germany) forbids cousin marriage to sixth cousins. Bishop Burchard of Worms' Decretum, which extends incestuous marriages to sixth cousins, is popular and spreads.
1032	Synod of Bourges (France) forbids cousin marriage (either up to second or sixth cousins)
1046	Peter Damian, an influential Benedictine monk and cardinal, argues in favour of prohibitions up to and including sixth cousins.
1047	Synod of Tulujas (France) forbids cousin marriage
1049	Synod of Rheims (France) forbids cousin marriage
1059	Synod of Rome (Italy). Pope Nicholas II forbids marriage to sixth cousins or as far back as relatives can be traced. His successor, Pope Alexander II, likewise decrees that marriage to sixth cousins are forbidden. The kingdom of Dalmatia gets a temporary dispensation, forbidding marriages only to fourth cousins.
1060	Synod of Tours (France) reiterates the provisions of the 1059 Synod of Rome
1063	Synod of Rome (Italy) forbids marriage up to sixth cousins or closer. Laymen who have a concubine are suspended from communion.
1072	Synod of Rouen (France) forbids 'occult' (non-Christian) marriages and decrees that the priest must inquire about the relationship of those about to get married.
1075	Synod of London (England) forbids marriages of sixth cousins or closer, including affinal kin.
1094	Decretum of Ivo of Chartres: marriages of up to sixth cousins are forbidden
1102	Synod of London (England) nullifies existing marriages between sixth cousins. Third parties who knew that the marriage was among relatives are were also implicated in the crime of incest.
1123	The First Lateran Council (Italy) condemns unions between blood relatives (without specifying the degree). It declares that anyone who contracted an incestuous marriage will be deprived of hereditary rights.
1125	Synod of London (England) repeats the provisions of the 1075 Synod of London.
1139	The Second Lateran Council (Italy) condemns unions between blood relatives (without specifying the degree).
1140	Decretum of Gratian: marriages of up to sixth cousins are forbidden
1142	In Peter Lombard's Books of Sentences marriage is forbidden up to and including sixth cousins
1166	Synod in Constantinople (Turkey) re-enforces the earlier Eastern Church's prohibition on cousin marriages and enforcement becomes stricter.
1174	Synod of London (England) forbids clandestine marriages.
1176	Odo, Bishop of Paris (France), is associated with the introduction of "the banns of marriage". That is, the public notice of impending marriages in front of the congregation.
1200	Synod of London (England) requires the publication of "the banns of marriage" and public marriages. Kin-marriages are forbidden without specifying the extent.
1215	Fourth Lateran Synod (Italy) decreases the marriage prohibitions to third cousins, and all closer blood relatives and in-laws. They also formalize and integrate prior rulings into a constitution of Canons. This brought pre-nuptial investigation and marriage banns into legislation.
1917	Pope Benedict XV further decreases the marriage prohibitions to second cousins (and all closer blood relatives and in-laws).
1983	The Pope further decreases marriage prohibitions to include relatives only up to first cousins

Table A.1 Eastern and Western Churches' incest regulations. Following Synodal records, the prohibitions are stated from the male perspective. Blue background color in the first column denotes regulations that affected both the Eastern and Western Church (before the formation of the Eastern and Western Roman Empires); grey-colored backgrounds refers to regulations in the Eastern Church, while no background color refers to regulations in the Western Church. Countries in parentheses refer to the location of the event using contemporary national boundaries. The table largely follows Ubl (2008) and the Dictionary of Christian Antiquities, Smith and Cheetham (1875). Additional sources are Goody (1983, 1990, 2000), Gavin (2004), Pontal (1986), Hartman (1989) and Sheehan (1996).

A.2 Country-level Eastern and Western Church exposure: Start Dates

WESTERN CHURCH EXPOSURE (Start date)

Country	Year (CE)	Event
Austria	739	The diocese of Salzburg was founded in 739. This archdiocese was the administrative center of the Roman Catholic Church in Austria, covering an area that included Vienna and Slovenia.
Belgium	506	The area of today's Belgium was part of the heartlands of the Frankish Empire. It was Christianized as part of the Roman Empire when in 380 it became the official religion. In 506, the Synod of Agde was the first Synod to forbid cousin marriage.
Bosnia and Herzegovina	1067	Between 1060 and 1075 (most probably in 1067), the Diocese of Bosna was founded. Power struggles between the Roman Catholic Church and a Bosnian Church lead to a schism in 1255. Hungarian crusades against the Bosnian Church were not successful. The Bosnian Church co-existed with a weak and not-firmly established Roman Catholic Church until the Ottoman Empire gained control over the region. Under Ottoman rule, many inhabitants converted to Islam or Orthodox Christianity as Catholicism experienced greater repercussions. Bosnia is excluded from the analysis due to the existence of the Bosnian Church.
Croatia	850	The first diocese that was founded among the Croatians was Nin in 850. Even before this date, Croatia had been influenced by the Western Church and the Carolingian Empire. Along the coast, bishoprics which originated in the Roman Empire still existed.
Czech Republic	895	Bořivoj, the Duke of Bohemia, converted to Christianity around 883. In 895, Prague became part of the Roman Catholic diocese of Regensburg. In 973, a bishopric was established in Prague.
Denmark	948	Bishoprics were erected by the Archdiocese of Hamburg-Bremen in the year 948 (Aarhus, Ribe, and Slesvig). Odense was founded at some point before the year 988. King Harald Bluetooth converted to Christianity around 960.
Estonia	1219	In 1193, Pope Celestine III called for crusades against pagan Northern Europe. In 1219, the diocese of Reval was founded. In 1227, Estonia was wholly conquered by Christian forces.
Finland	1209	Christianization of Finland is ascribed to a crusade by Erik IX King of Sweden around the year 1150 (the foundation of a diocese at Nousiainen is ascribed to around 1156 by historical sources, but this and the crusade is subject to scholarly debate). Burial places indicate a shift to Christianity took place in southern and south-western Finland as early as the 11th and 12th centuries (Blomkvist et al., 2007) An unnamed bishop is first mentioned by the Pope in 1209. A second Swedish crusade took place around the year 1249, capturing the southern part of Finland.
France	506	France was Christianized as part of the Roman Empire. In 380, Christianity became the official religion. In 506, the Synod of Agde in France was the first Synod to forbid cousin marriage.
Germany	734	The Christianization of large parts of Germany is closely associated with the missionary work of Boniface (675-754). Parts of Germany (including the cities Aachen, Cologne, Fulda as well as Swabia in the south west) belonged to Austrasia, the heartland of the Merovingian kingdom and thus were already Christian before Boniface's missionary work. In Bavaria (southeast), Christianity started to re-emerge around 700. In 734 the diocese of Regensburg was founded by Boniface. By this date most of the area of modern Germany was within the Christian realm. In the northwest, the Massacre of Verden (782) forcefully converted the Saxons to Christianity. The northeastern area of Mecklenburg and Pomerania was only Christianized in the 12th century.
England (UK)	597	The diocese of Canterbury was founded in 597. Æthelberht of Kent was the first king to accept baptism, circa 601. A decisive shift occurred in 655, when pagan King Penda of Mercia died in battle. Before being incorporated into the Western Church in the 11th century, Scotland and Wales practiced Celtic Christianity, which did not prohibit cousin marriage.
Hungary	997	(Baptized) Stephen I became the ruler of Hungary in 997. In the same year, the Ordinariate of Pannonhalma was established, incorporating Hungary into the Western Church administration. Bishoprics were established in Kalocsa (1000) and Pecs (1009).
Iceland	1056	According to the Heimskringla (an Old Norse kings' saga), Iceland adopted Christianity at their governing assembly (Althing) in the year 1000. The diocese of Skalholt was erected in 1056.
Ireland	1101	Even though Christianization began in the 5th century, Ireland developed a Celtic tradition in which sororate, levirate and cousin marriages were not prohibited. In 1101, the reforming Synod of Cashel introduced the full requirements of the Roman Catholic Church. This marked the incorporation of the Irish into the Catholic Church.
Italy	506	Italy has been Christian since the 4th century. In the North, activity against cousin marriage, led by Ambrose and St. Augustine, began at the end of the 4th century. Mainland South was under Langobard or Byzantine rule, while Sicily experienced Muslim rule. The starting date of 506 (Synod of Agde) therefore tends to overestimate Italy's overall Western Church exposure.
Latvia	1186	The Diocese of Uexkuel was established in 1186 (renamed to Riga in 1202). In 1206, the crusaders subdued the Livonian stronghold in Turaida.
Lithuania	1387	Following the baptism of Władysław II Jagiełło, Grand Duke of Lithuania, most of the court and knights converted. The diocese in Vilnius was founded around 1387.
Luxemburg	506	Luxembourg was part of the heartland of the Frankish Empire. It was Christianized as part of the Roman Empire. In 506 the Synod of Agde was the first Synod to forbid cousin marriage.

Malta	1127	Malta came under Christian rule when Roger II of Sicily established Norman rule in 1127.
Netherlands	695	In the south, the Franks became Christians in 496. In 734, the Frisians were defeated by the Franks (though in the north, Christianization took longer). The first bishopric to be established within the boundaries of modern-day Netherlands was the diocese of Utrecht in 695.
Norway	1015	In 995, Christian Olaf Tryggvason became King Olaf I of Norway. The Diocese of Nidaros (Trondheim) was founded around the year 1015.
Poland	986	In 966, Miesko I (first ruler of the Polish state) was baptized along with his court. The first bishop was appointed in 986.
Portugal	1147	In 1147 Christian crusaders captured the city of Lisbon. Most of Portugal was under Christian rule by then.
Slovakia	880	The missionaries Cyril and Methodius arrived in Great Moravia in the 9th century. The Diocese of Nitra (the first bishopric within modern-day Slovakia) was established around 880. After the fall of Great Moravia, it was probably vacant until the 11th century. Around 1000, the area was incorporated into the Kingdom of Hungary. Slovakia's eastern territories belonged to the Diocese of Eger (founded in the 10th century).
Slovenia	745	In 745, Carinthia submitted to Bavaria (which itself was a vassal of the Carolingian Empire). This year is associated with Christianization by Carinthian prince Borut. In 788, it was more fully incorporated into the Carolingian Empire and was administered by the Archdiocese of Salzburg. The first bishopric in the area that constitutes Slovenia today was founded in 1228.
Spain	1085	Following the Umayyad conquest in the year 711, Spain was gradually reconquered by Christian rulers. In 1085, the Muslim Taifa of Toledo was conquered by Christian King Alfonso VI of Leon and Castille bringing large parts of what constitutes modern Spain under Christian rule.
Sweden	990	The first attempts to set up a church in Birka occurred around 830. Another attempt followed in 930. In 995, Olof Skötkonung, the first Christian king, ascended the throne. The Dioceses of Skara (about 990), Vasteras (around 1055), Sigtuna (around 1060), Lund (1060), and Uppsala (around 1080) were founded thereafter. Uprisings against the new religions occurred around 1080.
Switzerland	506	Switzerland was part of the Burgundian kingdom. The region was Christianized as part of the Roman Empire. In 380 Christianity became the official religion. In 506 the Synod of Agde was the first Synod to forbid cousin marriage.

EASTERN CHURCH EXPOSURE (Start date)

Albania	886	The Slavic invasion destroyed the Church organization existing before 600 and rekindled paganism in the Hinterland. Following the iconoclast controversy, Northern coastal bishoprics became part of the Eastern Church in 732. Around 840 the Bulgarian mission of Clemens of Ohrid Christianized the area. The Schism of 1054 divided Albania into an Orthodox South and a Catholic north; Catholicism remained a minority religion though (Ramet, 1998). The Ottoman Empire occupied most of Albania by 1431.
Bulgaria	870	In 863, a mission from the Patriarch of Constantinople Photios converted Tsar Boris. Tsar Boris had been willing to become Roman Catholic. As a response, Byzantium attacked and demanded conversion to Eastern Orthodox. In 870, Bulgaria received an archbishopric (with the seat initially being in Pliska) (Burgess, 2010). The Ottoman Empire conquered Bulgaria in 1396.
Belarus	992	The diocese of Polotsk was found around 992 within the borders of present-day Belarus (Poppe, 2007; Zinkewych et al., 1988). The Mongol invasion of Rus' forced all Rus' principalities to submit to Mongol rule and to become part of the Golden Horde empire from 1380 to 1480.
Cyprus	688	Cyprus was Christianized around 380 as part of the Roman Empire. Following an Arab invasion around 650, Cyprus was ruled jointly by the Arabs and Byzantine Empire from 688-965. In 965, Cyprus was conquered by the Byzantine Empire. In 698, the archbishop returned to Cyprus.
Greece	692	The area that constitutes modern Greece was Christianized in 380, when Christianity became the official religion of the Roman Empire. In 692, the Synod of Trullo forbade cousin marriage (Ubl, 2008). In 1453 the Byzantium Empire fell to the Ottoman empire.
Macedonia	870	See Bulgaria (above)
Moldova	1359	The Principality of Moldova was incorporated into the Church administration in 1359.
Romania	1234	In 1234, an administrative structure east of the Carpathians was mentioned by the Pope.
Russian Federation	991	The following dioceses were founded in the area of what constitutes Russia today: Rostov (around 991), Novgorod (around 992) (Poppe, 2007; Zinkewych et al., 1988). From 1237 to 1240 the Mongol invasion of Rus' occurred forcing all Rus' principalities to submit to Mongol rule and becoming part of the Golden Horde empire from 1380 to 1480.
Serbia and Montenegro	870	Prince Mutimir was baptized in 891. The Eparchies of Ras and Braničevo were founded in 870. The Serbian bishoprics became part of the Archbishopric of Ohrid after the Byzantine conquest of the Bulgarian Empire in 1018. In 1459, Serbia fell to the Ottoman Empire.
Ukraine	988	According to historical sources the baptism of Kievan Rus' occurred in 988. In the same year the metropolitan of Kiev was founded (Poppe, 2007; Zinkewych et al., 1988). From 1237 to 1240 the Mongol invasion of Rus' occurred forcing all Rus' principalities to submit to Mongol rule and becoming part of the Golden Horde empire from 1380 to 1480.

Table A.2: Start dates of countries' Eastern and Western Church exposure

A.3 DATA BASE ON FOUNDATION AND EXISTENCE OF WESTERN CHURCH'S BISHOPRICS

To calculate cities' medieval Church exposure, I complied a data set on the foundation and existence of bishoprics. Its main data source are Catholic hierarchy (http://www.catholic-hierarchy.org due to David M. Cheney) and GCatholic (http://www.gcatholic.org/ due to Gabriel Chow). These websites contain detailed information on the existence of bishoprics in the Western Church. A third source for a sub-set of countries is Menestral ("Medievalists on the web", http://www.menestrel.fr). I cross-validated the data provided in Catholic Hierarchy against GCatholic and Menestrel and added any bishopric that was missing in Catholic Hierarchy. All sources reveal a high level of consistency. In case of disagreements between sources they were most often in the range of less than one or two decades – a rather small inaccuracy in relation to the duration of Church exposure up to the year 1500. For a small number of bishoprics only approximate dates were available (e.g. "first half of the 3rd century"). In these cases, I turned to additional sources (e.g. Sawyer and Sawyer, 1993 for Scandinavia) or resorted to more detailed internet searches. If the uncertainties could not be resolved, I used the average of the century (e.g. the year 325 if the bishopric was founded in the first half of the 4th century.) These uncertainties (low in numbers) mostly occurred for bishoprics before the 5th century, that is, years not included in the Church exposure indicator. For each bishopric I added GIS coordinates. Figure A.1 displays bishoprics in the year 1500.

Not included are bishoprics of southern Italy until the Norman conquest. The Byzantine South belonged to the Eastern Church. In the South Italian Lombard duchies, the Church was based on monasticism, lacked a hierarchical structure based on parishes and bishoprics, and was not integrated with the Church in Rome (Wickham, 1981; Ramseyer, 2006). It is thus unlikely that the marriage prohibitions were implemented in the South. Bishoprics that existed in the Islamic sphere of Portugal and Spain are not included until the seat of the bishopric was conquered by Christian rulers.

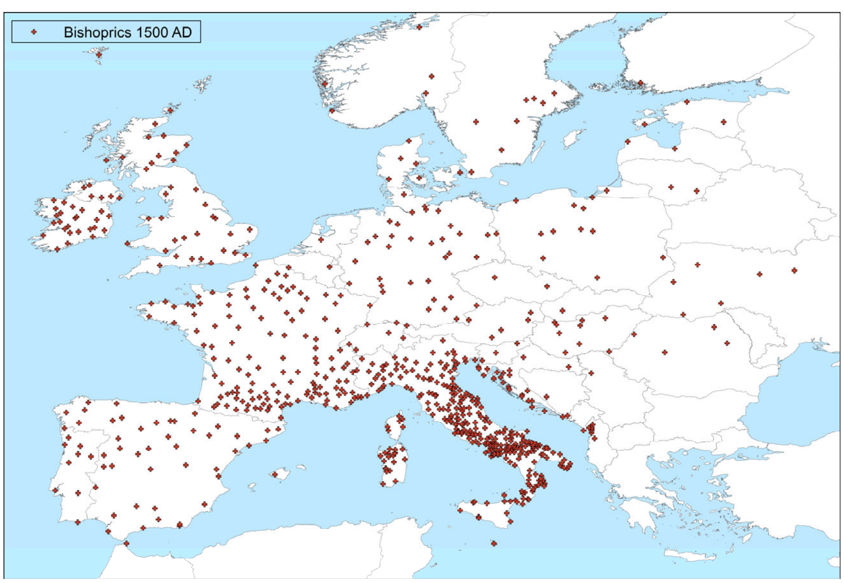

Figure A.1: *The bishoprics of the Catholic Church in the year 1500 AD.*

APPENDIX B ADDITIONAL GLOBAL ANALYSES

B.1 COUNTRY-LEVEL KIN NETWORKS AND DEMOCRACY CONTROLLING FOR LOG GDP PER CAPITA

Table B.1: Kin Networks, GDP per Capita and Democracy: Cross-country Evidence

	Democracy							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cousin-marriage preference	-8.92***	-7.81***	-5.13***	-4.70**	-4.85***	-3.10	-4.42**	-5.12***
N: 148	(1.29)	(1.42)	(1.69)	(1.85)	(1.51)	(1.95)	(1.75)	(1.52)
R^2	0.361	0.393	0.433	0.445	0.489	0.520	0.484	0.465
Cousin-term differentiation	-6.79***	-5.47***	-4.44***	-4.05***	-2.89**	-1.49	-3.61***	-2.94**
N: 148	(1.25)	(1.22)	(1.33)	(1.36)	(1.33)	(1.52)	(1.25)	(1.27)
R^2	0.327	0.372	0.444	0.453	0.467	0.513	0.495	0.443
Log % cousin marriage	-2.69***	-2.07***	-1.04*	-1.13*	-1.24**	0.02	-0.17	-1.24**
N: 69	(0.43)	(0.38)	(0.58)	(0.59)	(0.54)	(0.65)	(0.62)	(0.48)
R^2	0.517	0.624	0.728	0.772	0.651	0.828	0.733	0.653
W. Church exp. (aa. in 100 y.)	1.43***	1.28***	1.11***	1.07***	0.53**	0.64**	0.84***	0.39
	(0.24)	(0.26)	(0.25)	(0.25)	(0.24)	(0.26)	(0.25)	(0.26)
E. Church exp. (aa. in 100 y.)	1.32***	1.11***	1.53***	1.45***	0.07	0.75*	0.91***	-0.18
N: 145	(0.25)	(0.31)	(0.41)	(0.41)	(0.29)	(0.44)	(0.32)	(0.35)
R^2	0.332	0.386	0.493	0.501	0.473	0.529	0.504	0.442
Log GDP per capita	yes	yes	yes	yes	yes	yes	yes	yes
Geographic baseline	-	yes	yes	yes	yes	yes	yes	yes
Further geographic cont.	-	-	yes	yes	yes	-	-	-
Neolithic trans./gen. heterogen.	-	-	-	yes	yes	-	-	-
Irrigation/pathogen stress	-	-	-	-	yes	-	-	-
Continent FE	-	-	-	-	-	yes	-	-
Fraction major religions	-	-	-	-	-	-	yes	-
Fraction European descent	-	-	-	-	-	-	-	yes

Cross-country OLS regressions. Dependent variable is the Polity IV democracy index. Each column reports the results of four regressions; each time a different explanatory variable is used. Explanatory variables are cousin-marriage preference (first rows), cousin-term differentiation (second rows), log % cousin marriages (third rows), and ancestor-adjusted Western and Eastern Church exposure (in 100 years – fourth rows). All columns control for log GDP per capita in 2000CE. Columns 2-8 add the geographic baseline (ruggedness, mean distance to waterways, absolute latitude, caloric suitability); columns 3-5 add further biogeographic covariates (caloric oats suitability, caloric rye suitability, temperature, precipitation, elevation, tropical area), columns 4-5 add ancestor-adjusted timing of the Neolithic transformation, and ancestor-adjusted predicted genetic heterogeneity, and column 5 adds irrigation potential and pathogen stress. Column 6 contain continent fixed effects, column 7 controls for the fraction of adherence to major religions (Christians, Muslim, Hindus, Buddhists), and columns 8 adds fraction of European descent. Robust standard errors are reported in parentheses. * *p≤0.1, ** p≤0.05, *** p≤0.01.*

B.2 COUNTRY-LEVEL KIN NETWORKS AND DEMOCRACY WITH CONLEY STANDARD ERRORS

Table B.2 reports cross country regressions with Conley standard errors (Conley, 1999) to account for spatial and cultural autocorrelation. Reported are Conley standard errors both using countries' aerial distance and genetic distance. The latter accounts for population movements after the year 1500, which led to large aerial distances between culturally and genetically related populations (e.g., due to the migration of Europeans to the Americas). The population-adjusted genetic distance is taken from Spolaore and Wazcniarg (2018). The transformation of pairwise distances into the Euclidean is an approximation. Genetic autocorrelation is modeled as declining linearly away from each observation up to a threshold of FST = 0.0977 of the fixation index (approx. the genetic distance between Russia and Germany). Aerial autocorrelation is modeled as declining linearly up to a threshold of 5,000 km.

Table B.2: Country-level kin networks and democracy with Conley standard errors

	(1)	(2)	(3)
Cousin-marriage preferred (N: 148)	-9.38***	-8.32***	-5.03***
Standard errors	(1.14) {1.77} [1.98]	(1.33) {1.87} [2.17]	(1.82) {1.87} [2.00]
Cousin-term differentiation (N: 148)	-7.66***	-5.98***	-4.22***
Standard errors	(1.00) {1.32} [1.41]	(1.07) {1.22} [1.13]	(1.33) {1.33} [1.13]
Log % cousin marriage (N: 69)	-2.65***	-2.24***	-1.26**
Robust standard errors	(0.29) {0.34} [0.30]	(0.35) {0.31} [0.35]	(0.57) {0.48} [0.38]
W. Church exp. (aa. in 100 y.) (N: 145)	1.31***	1.30***	1.10***
Robust standard errors	(0.12) {0.14} [0.11]	(0.21) {0.30} [0.25]	(0.23) {0.25} [0.21]
E. Church exp. (aa. in 100 y.)	1.23***	1.13***	1.46***
Robust standard errors	(0.20) {0.08} [0.09]	(0.29) {0.31} [0.30]	(0.42) {0.42} [0.35]
Geographic baseline	-	yes	yes
Further controls	-	-	yes

Cross-country OLS regressions. Dependent variable is the Polity IV democracy index. Each column reports the results of four regressions; Explanatory variables in each column are cousin-marriage preferred (first rows), cousin-term differentiation (second rows), log % cousin marriages (third rows), and ancestor-adjusted Western and Eastern Church exposure (in 100 years; fourth rows). Columns 2-3 adds the geographic baseline (ruggedness, mean distance to waterways, absolute latitude, caloric suitability). Column 3 adds further geographic covariates (caloric oats suitability, caloric rye suitability, temperature, precipitation, elevation, tropical area), ancestor-adjusted timing of the Neolithic transformation, and ancestor-adjusted predicted genetic heterogeneity, irrigation potential and pathogen stress. Robust standard errors are reported in normal parenthesis, Conley standard errors based on geodesic distance in square brackets, and Conley standard errors based on genetic distance in curly brackets. Reported significance levels are based on robust standard errors. * p≤0.1, ** p≤0.05, *** p≤0.01.

B.3 Country-level Medieval Church Exposure and Kin Networks

Table B.3: Country-level Medieval Church exposure and kin networks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel 1: Cousin-marriage preferred						
Western Church exposure (aa)	-0.05***	-0.05***	-0.04***	-0.04***	-0.05***	-0.04***	-0.03***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Eastern Church exposure (aa)	-0.05***	-0.03	-0.04*	-0.05**	-0.06**	-0.04*	-0.02
N:146	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
R^2	0.151	0.377	0.568	0.629	0.654	0.676	0.554
	Panel 2: Cousin-term differentiation						
Western Church exposure (aa)	-0.09***	-0.09***	-0.08***	-0.08***	-0.08***	-0.06***	-0.07***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
Eastern Church exposure (aa)	-0.06**	-0.05	-0.06*	-0.06**	-0.06*	-0.04	-0.05*
N:146	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)
R^2	0.314	0.412	0.601	0.666	0.675	0.715	0.507
	Panel 3: Log % cousin marriage						
Western Church exposure (aa)	-0.48***	-0.43***	-0.33***	-0.32***	-0.31***	-0.10	-0.05
	(0.05)	(0.07)	(0.07)	(0.06)	(0.06)	(0.10)	(0.06)
Eastern Church exposure (aa)	1.95	2.24	1.41	-0.42	0.03	1.80	0.56
N: 69	(1.34)	(1.83)	(2.15)	(1.96)	(1.75)	(2.13)	(1.80)
R^2	0.619	0.651	0.788	0.825	0.831	0.858	0.848
Geographic baseline	-	yes	yes	yes	yes	yes	yes
Further geographic cont.	-	-	yes	yes	yes	yes	-
Neolithic transformation (aa) genetic heterogeneity. (aa)	-	-	-	yes	yes	yes	-
Parasite stress irrigation potential	-	-	-	-	yes	yes	-
Continent FE	-	-	-	-	-	yes	-
Fraction major religions	-	-	-	-	-	-	yes

Cross-country OLS regression of cousin-marriage preferred (Panel 1), cousin-term differentiation (Panel 2), and log % cousin marriage (Panel 3) on the ancestor adjusted duration of Western and Eastern Church exposure. Columns 2-7 add the geographic baseline (ruggedness, mean distance to waterways, absolute latitude and caloric suitability); columns 3-6 add further geographic controls (temperature, precipitation, elevation, tropical area, caloric suitability for oats and caloric suitability for rye); columns 4-5 add ancestor adjusted timing of the Neolithic transformation and ancestor adjusted genetic heterogeneity; column 5 adds pathogen stress, and irrigation potential; columns 6 contain continent fixed effects; and column 7 contains the fraction of major religions (Christians, Muslims, Hindi, Buddhists). Robust standard errors are reported in parenthesis. * p≤0.1, ** p≤0.05, *** p≤0.01.

B.4 Regional-Level Church Exposure and Kin Networks

Table B.4 reports on country-fixed-effects regression of regional 20th-century cousin-marriage rates in Spain, Italy, France and Turkey on exposure to the medieval Western Church and the Carolingian Empire (with its more severe enforcement of the marriage prohibitions). Regional Church exposure is taken from Schulz et al. (2019). It is constructed similarly to the city-level indicator. It varies between 0 (no exposure between 550 and 1500CE) and 10 (the whole region was exposed for approximately ten centuries from 550 to 1500CE).

The covariates in Table B.4 mirror the regional-level covariates of Table 5 in the main text. One drawback of this analysis is that forced population movements following the expulsion of Moriscos from southern Spain and Muslims from Sicily weakens the regional association with Church exposure. In addition, due to Muslim conquests coming from the South, Church exposure exhibits a north-south gradient, which hampers efforts to disentangle latitude from Church exposure. Table B.4 therefore reports regressions mostly without controls for latitude; yet, a host of other geographic variables mitigates the likelihood that geographic variables bias the estimates.

The results reveal that one additional century of Western Church exposure is associated with 9.6% ($\approx (\exp(-0.101) - 1) * 100$ lower cousin marriages (panel 1) and Carolingian exposure with -60.1% ($\approx (\exp(-0.944) - 1) * 100$ lower cousin marriages (panel 2). Except for column 3, which controls for latitude, all coefficients for Western Church exposure remain significant to the introduction of the covariates. Coefficients for Carolingian exposure (panel 2) remain significant when controlling for latitude. R^2 reveals that Church and Carolingian exposure alone explain about 85% and 89% of the within-country variation of cousin-marriage rates respectively (column 1).

Table B.4: European regional-level Church exposure and cousin-marriage practices

	Log % cousin marriage						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
W. Church exposure	-0.101**	-0.094**	-0.003	-0.065**	-0.093**	-0.095**	-0.068**
N: 69	(0.045)	(0.046)	(0.048)	(0.031)	(0.046)	(0.047)	(0.031)
R^2	0.847	0.848	0.868	0.916	0.849	0.848	0.922
Carolingian exposure	-0.944***	-1.034***	-0.860***	-0.741***	-1.030***	-1.038***	-0.729***
N: 69	(0.155)	(0.177)	(0.186)	(0.168)	(0.177)	(0.182)	(0.189)
R^2	0.888	0.892	0.897	0.932	0.892	0.892	0.937
Country FE	yes	yes	yes	yes	yes	yes	yes
Geo. baseline w/o lat.		yes	yes	yes	yes	yes	yes
Latitude		-	yes	-	-	-	-
Further geographic cont.				yes			yes
Roman Roads					yes		yes
Pop density 500CE						yes	yes

Notes: OLS regression of log % cousin marriage in regions of Spain, France, Italy and Turkey on medieval Western Church exposure (top rows) and Carolingian exposure (second rows). All columns control for country fixed effects. Columns 2-7 control for the (regional) geographic baseline without latitude (ruggedness, mean distance to the sea, and caloric suitability), column 3 for latitude, column 4 for further geographic variables (precipitation, temperature, elevation, presence of river or lake, irrigation potential, caloric suitability for oats and for rye), column 5 for Roman roads, column 6 for estimates of population density in 500CE, while in column 7 all covariates except latitude are used simultaneously. Robust standard errors are reported in parentheses. * p≤0.1, ** p≤0.05, *** p≤0.01.

B.5 ETHNICITY-LEVEL DEEP CHRISTIANIZATION AND KIN NETWORKS

Table B.5 links "Deep Christianization" to kin networks of pre-industrial ethnicities. Deep Christianization is taken from Korotayev (2003). It is a binary variable taking the value of 1 if an ethnicity was Christian for at least 500 years. Lacking information on exact dates of Christianization of ethnicities, I did not attempt to create my own measure capturing the duration of Church exposure as it is case for country-level Church exposure. The indicators for cousin-marriage practices are based on D-PLACE. Since then D-PLACE extended the Ethnographic Atlas used by Korotayev I coded "Deep Christianization" of those newly added ethnicities after extensive research. Everything holds excluding those newly added ethnicities.

In addition to cousin-term differentiation and cousin-marriage preference, I coded the variable Non-Inuit cousin terms. It takes a value of 0 if the language falls into the Inuit cousin-term classification and 1 otherwise. The Inuit classification emphasizes the nuclear family by differentiating cousins from siblings while deemphasizing lineages by not differentiating between different cousins. It is the prevailing terminology that emerged in Europe following the Churches' marriage prohibitions.

Table B.5 reveals that deep Christianization is a robust predictor of the strength of kin networks: ethnicities that experienced deep Christianization are less likely to prefer cousin-marriage (panel 1), differentiate cousin-terms (panel 2) or use Inuit cousin-terms (panel 3).

Table B.5: Ethnicity-level Deep Christianization, Cousin Terms and Cousin marriage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel 1: Cousin-marriage preference						
Deep Christianization	-0.17***	-0.15***	-0.16***	-0.24***	-0.24***	-0.22***	-0.21***
	(0.03)	(0.04)	(0.06)	(0.07)	(0.06)	(0.06)	(0.06)
N	1042	1042	1042	1041	657	622	622
R^2	0.007	0.023	0.051	0.101	0.128	0.129	0.149
	Panel 2: Cousin-term differentiation						
Deep Christianization	-0.26**	-0.16	-0.16	-0.26**	-0.22*	-0.21*	-0.22**
	(0.11)	(0.12)	(0.13)	(0.13)	(0.11)	(0.11)	(0.11)
N	955	955	955	954	577	551	551
R^2	0.010	0.045	0.064	0.088	0.107	0.107	0.125
	Panel 3: Non-Inuit cousin terms						
Deep Christianization	-0.60***	-0.53***	-0.54***	-0.47***	-0.41***	-0.41***	-0.42***
	(0.09)	(0.10)	(0.10)	(0.10)	(0.11)	(0.10)	(0.11)
N	955	955	955	954	577	551	551
R^2	0.129	0.156	0.163	0.181	0.214	0.207	0.241
Geographic baselines	-	yes	yes	yes	yes	yes	yes
Further geographic controls	-	-	yes	yes	yes	yes	yes
Subsistence	-	-	-	yes	yes	yes	yes
Existence of prop. rights	-	-	-	-	yes	yes	yes
Settlement comp., irriga., jud. hierarchy	-	-	-	-	-	yes	yes
Climate zones	-	-	-	-	-	-	yes

Ethnicity-level OLS regressions of indicators of cousin marriage on deep Christianization. Each row reports the results of three regressions, each with a different dependent variable: cousin-term preference (panel 1), cousin-term differentiation (panel 2), and non-Inuit cousin terms (panel 3). Column 2 adds the biogeographic baseline (ruggedness, absolute latitude, distance to the coast, agricultural suitability); column 3 adds further geographic variables (mean temperature, mean precipitation, elevation and slope), column 4 adds subsistence (percent reliance on fishing, animal husbandry, agriculture); column 5 adds the existence of property rights (both for movable property and land); column 6 adds settlement complexity, irrigation practices and judicial hierarchy; column 7 adds indicator variables for ten climate zones; and column 8 adds deep Christianization. Robust standard errors clustered on language families are reported in parentheses. * *p≤0.1*, ** *p≤0.05*, *** *p≤0.01*.

Appendix C: Additional Historical Analyses

Table C.1 Descriptive statistic of panel data set on Church exposure and Communes

Year (CE)	No. cities above 10K	No. cities above 10K W. Church realm	Urban population (in mio.)	Urban population W. Church realm (in mio)	No. communes	Av. W. Church exposure (years)
800	61	20 (33%)	2.2	0.4 (19%)	0 (0%)	114
900	86	27 (31%)	2.9	0.5 (18%)	0 (0%)	159
1000	129	55 (43%)	3.7	1.0 (26%)	0 (0%)	208
1100	136	60 (44%)	3.8	1.3 (34%)	13 (10%)	266
1200	177	98 (55%)	4.5	2.2 (47%)	103 (58%)	329
1300	232	157 (68%)	6.1	4.0 (66%)	165 (71%)	399
1400	185	120 (65%)	5.1	3.1 (61%)	160 (86%)	469
1500	247	180 (73%)	6.4	4.3 (67%)	170 (69%)	539

This table provides an overview on the panel data set which is used in the difference-in-difference analysis relating Church exposure to communes (section 4). Each row denotes the data in a given year (specified in column 1). Column 2 denotes the total number of cities with at least 10k inhabitants, column 3 the number of cities in the Western Church's realm with more than 10k inhabitants (percentage of total number of cities are in parentheses). Column 4 states the total urban population (in cities with at least 10k inhab.), while column 5 the urban population in the W. Church's realm (percentage of total urban population stated in parentheses). Column 6 states the total number of communes (percentage of total number of cities are in parentheses). Column 7 states the average Western Church exposure of cities.

C.2 Church exposure & communes: Iberian Peninsula, Carolingian emp. & Roman Britain

Table C.2: Church exposure & communes: Iberian Peninsula, Carolingian Emp. & Roman Britain

	Commune							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
W. Church exp. Iberian Pen.	0.170***	0.171***	0.153***	0.172***	0.143***	0.170***	0.179***	0.157***
(in 100 years)	(0.020)	(0.021)	(0.022)	(0.021)	(0.023)	(0.022)	(0.021)	(0.027)
W. Church exp. w/o Iberian Pen.	0.119***	0.115***	0.102***	0.119***	0.097***	0.120***	0.128***	0.099***
(in 100 years)	(0.007)	(0.007)	(0.010)	(0.007)	(0.011)	(0.007)	(0.009)	(0.014)
R^2	0.632	0.637	0.644	0.647	0.643	0.649	0.641	0.685
W. Church exp. Carolingian	0.125***	0.122***	0.108***	0.127***	0.099***	0.127***	0.139***	0.110***
(in 100 years)	(0.007)	(0.007)	(0.010)	(0.007)	(0.011)	(0.007)	(0.009)	(0.015)
W. Church exp. w/o Carolingian	0.110***	0.109***	0.094***	0.108***	0.077***	0.106***	0.118***	0.081***
(in 100 years)	(0.013)	(0.013)	(0.015)	(0.013)	(0.017)	(0.014)	(0.014)	(0.019)
R^2	0.628	0.633	0.640	0.643	0.641	0.646	0.639	0.683
W. Church exp. Roman Britain	0.131***	0.127***	0.118***	0.131***	0.107***	0.132***	0.151***	0.122***
(in 100 years)	(0.026)	(0.027)	(0.026)	(0.028)	(0.028)	(0.027)	(0.033)	(0.039)
W. Church exp. w/o Roman Brit.	0.121***	0.119***	0.105***	0.122***	0.096***	0.123***	0.132***	0.107***
(in 100 years)	(0.007)	(0.007)	(0.010)	(0.007)	(0.011)	(0.007)	(0.008)	(0.014)
R^2	0.627	0.632	0.639	0.642	0.640	0.645	0.638	0.681
City & period FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plundered	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Period FE X sea & river		Yes						Yes
Period FE X soil quality			Yes					Yes
Period FE X Roman roads				Yes				Yes
Period FE X Europe					Yes			Yes
Period FE X bishopric, Bishopric						Yes		Yes
Population & Population lagged							Yes	Yes
N	2712	2712	2712	2712	2712	2712	2373	2373
Cities	339	339	339	339	339	339	339	339

Linear probability regressions of Commune on Western Church exposure. The fist rows report on Church exposure within the Iberian Peninsula vs Church exposure in the rest of Europe; the second rows report on Church exposure within the Carolingian empire; the third row on Church exposure within the area of Roman Britain. An observation is a city in each century between 800 to 1500CE. All regressions control for how often a city was plundered, city and time-period fixed-effects. Access to the sea or navigable river and soil quality (column 2), access to Roman roads (column 3), located in Europe (column 4), and whether the city was ever the seat of a bishopric (column 5) are interacted with time-period fixed effects and included. In addition, column 5 controls for being the seat of a bishopric in a given century, while column 6 controls for city population and population lagged. Column 7 controls for all variables simultaneously. Robust standard errors clustered at 339 cities are reported in parentheses. * $p \leq 0.1$, ** $p \leq 0.05$, *** $p \leq 0.01$.

C.3 *ALTERNATIVE INDICATOR OF PARTICIPATORY CITY-LEVEL INSTITUTION*

Table C.3 parallels the diff-in-diff specification of Table 3 in the main text but employs an alternative measure for cities' institutions due to Wahl (2016). Based on the Deutsche Staedtebuch he coded three indicators: (i) elections of the city council; (ii) guild participation (0: no participation, 1: guilds participate but are the minority, 2: "Zunftverfassung", i.e., guilds are the majority in the city council); (iii) burgher representation (1: burghers have a guaranteed say in some matters of city politics). I combine these indicators into one binary measure "Inclusive city institutions", which takes the value 1 if some form of political participation existed (i.e. one of the three indicators has a value greater than 0) and 0 otherwise. Separate regression for each sub-indicator reveal similar results (available upon request). The panel data set contains the 97 cities within the area that constituted the Holy Roman Empire of Germanic Nations (HRE) north of the Alps, which are contained in Bairoch et al. (1988) and had at least 5000 inhabitants once during the period from 800 to 1500 in 100-year intervals.

Table C.3 reports the regression outputs. In addition to the full sample it reports on a North German sub-sample; the North was never part of the Roman empire and Church exposure was determined by the idiosyncrasies of medieval warfare. I. e., Christianization is associated with the massacre of Verden in 782CE, when Charlemagne had Saxon unwilling to convert killed. Further eastward extensions around 950CE were halted by pagans' resistance. New attempts were made in the 12th century. This Christianization by sword mitigates concerns that unobserved factors related to pagans' attitude towards Christianity or targeted missions biases the analysis.

Table C.3: Western Church Exposure and Inclusive City Institutions in the HRE

	Inclusive city institutions							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Holy Roman Empire of Germanic Nations North of the Alpes (full sample)							
Western Church exposure	0.110**	0.109**	0.119**	0.113**	0.091*	0.108**	0.140**	0.147**
(in 100 years)	(0.052)	(0.052)	(0.051)	(0.055)	(0.054)	(0.049)	(0.068)	(0.068)
N (97 cities)	776	776	776	776	776	776	679	679
R^2	0.589	0.590	0.592	0.593	0.596	0.600	0.594	0.613
	North German Sub-sample							
Western Church exposure	0.162***	0.162**	0.163**	0.162***	0.142**	0.132**	0.199***	0.150
(in 100 years)	(0.059)	(0.060)	(0.063)	(0.059)	(0.057)	(0.064)	(0.072)	(0.094)
N (36 cities)	288	288	288	288	288	288	252	252
R^2	0.521	0.530	0.527	0.521	0.536	0.545	0.531	0.580
City & period FE, plundered	Yes	yes	yes	yes	yes	yes	yes	yes
Period FE X sea & river	-	yes	-	-	-	-	-	yes
Period FE X soil quality	-	-	yes	-	-	-	-	yes
Period FE X Roman roads	-	-	-	yes	-	-	-	yes
Period FE X Carolingian	-	-	-	-	yes	-	-	yes
Period FE X ever bishopric	-	-	-	-	-	yes	-	yes
Bishopric	-	-	-	-	-	yes	-	yes
Population & population lagged	-	-	-	-	-	-	yes	yes

City-level panel data estimates. Dependent variable is an index of political participation of citizens. Explanatory variable is medieval Western Church exposure (in 100 years). Each column reports on two regressions: the top row on the full sample; the lower rows on a North German sub-sample. An observation is a city in each century between 800 to 1500 CE. All regressions control for how often a city was plundered, city and time-period fixed-effects. Access to the sea or navigable river (column 2), pre-Colombian caloric suitability (column 3), access to Roman roads (column 4), located within the Carolingian empire (column 5), and whether the city was ever the seat of a bishopric (column 6) are interacted with time-period fixed effects and included. In addition, column 6 controls for being the seat of a bishopric in a given century, while column 7 controls for city population and population lagged. Column 8 controls for all variables simultaneously. Robust standard errors clustered on cities are reported in parentheses. *p < 0.10, **p < 0.05, ***p < 0.01.

C.4 *CHURCH EXPOSURE AND CITY POPULATION*

Table C.4: Western Church Exposure and City population: Panel Data Estimates

	City population							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
W. Church exposure	1.949**	1.983**	1.020	1.878**	0.811	1.907**	1.592*	0.380
(in 100 years)	(0.764)	(0.800)	(0.708)	(0.742)	(0.620)	(0.796)	(0.811)	(0.686)
	0.711	0.712	0.715	0.713	0.715	0.712	0.723	0.728
City & period FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plundered	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Period FE X sea & river		Yes						Yes
Period FE X caloric suitability			Yes					Yes
Period FE X Roman roads				Yes				Yes
Period FE X Europe					Yes			Yes
Bishopric & Period FE X bishopric						Yes		Yes
Commune & Commune lagged							Yes	Yes
N	2712	2712	2712	2712	2712	2712	2373	2373
Cities	339	339	339	339	339	339	339	339

OLS regressions of city population on Western Church exposure. An observation is a city in each century between 800 to 1500CE. All regressions control for how often a city was plundered, city and time-period fixed-effects. Access to the sea or navigable river (column 2), caloric suitability (column 3), access to Roman roads (column 4), located in Europe (column 5), and whether the city was ever the seat of a bishopric (column 6) are interacted with time-period fixed effects and included. In addition, column 6 controls for being the seat of a bishopric in a given century, while column 7 controls for commune and commune lagged. Column 8 controls for all variables simultaneously. Robust standard errors clustered at 339 cities are reported in parentheses. ** p≤0.1, ** p≤0.05, *** p≤0.01.*

C.5 *CHURCH EXPOSURE AND COUNTRIES' OVERALL AND URBAN POPULATION*

Table C.5: Western Church Exposure and Countries medieval Urban and Overall Population

	Population (in 1,000)			Urban Population (in 1,000)		
	(1)	(2)	(3)	(4)	(5)	(6)
Western Church exposure	386.29***	182.36	176.51	61.15***	58.32**	38.69*
	(55.42)	(191.31)	(167.50)	(9.79)	(24.13)	(22.61)
Eastern Church exposure	249.37**	24.59	20.87	21.69***	18.60	-16.95
	(112.17)	(142.93)	(128.26)	(6.01)	(19.53)	(20.48)
Country FE	yes	yes	yes	yes	yes	yes
Period FE		yes	yes		yes	yes
Roman Emp. X period FE			yes			yes
N	184	184	184	184	184	184
Countries	23	23	23	23	23	23
R^2	0.862	0.877	0.878	0.755	0.760	0.779
F-test (Western=Eastern)	1.20	2.02	1.23	11.79**	12.46***	11.77***

Panel data regression of European countries' population (columns 1-3) and urban population (columns 4-6) on Western and Eastern Church exposure. The data on countries overall population is based on McEvedy and Jones (1978), while the data on urban population is calculated based on Bairoch et al. (1988). The panel contains data in 100-year intervals from the year 800CE to 1500CE for 23 European countries. All columns control for country fixed effects (FE). Columns 2,3,5,6 control for period FE. Column 3&6 controls for belonging to the Roman Empire interacted with period fixed effects. Robust standard errors clustered at the country level are reported in parentheses. * p≤0.1, ** p≤0.05, *** p≤0.01.

C.6 Regression output of event-study design with staggered entry

The left-hand panel of figure 1 of the main text displays coefficients of event-study regressions with staggered entry, which relate Church exposure to commune formation (according to specification 3 of the main text). The corresponding regression outputs are reported in Table C.6, column 1, below. The other columns report on specifications with further covariates (the same as in table 3 of the main text).

Similarly, the right-hand panel of main-text figure 1 displays coefficients of event-study regressions with staggered entry, which relate extended marriage-prohibitions to commune formation (according to specification 4 of the main text). The corresponding regression outputs are reported in Table C.7, column 1, below.

Table C.6: Western Church Exposure and Commune Cities: Specification (3)

	Communal city							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
3 centuries prior	-0.008	-0.012	-0.001	-0.013	-0.001	-0.008	-0.178*	-0.147*
	(0.073)	(0.072)	(0.065)	(0.073)	(0.059)	(0.072)	(0.100)	(0.079)
2 centuries prior	-0.003	-0.008	-0.002	-0.004	-0.015	0.002	-0.093	-0.074
	(0.083)	(0.083)	(0.075)	(0.084)	(0.070)	(0.083)	(0.112)	(0.090)
1 centuries prior	-0.012	-0.020	-0.019	-0.016	-0.047	0.001	-0.127	-0.123
	(0.098)	(0.097)	(0.090)	(0.099)	(0.084)	(0.098)	(0.126)	(0.103)
Start of Church exposure	0.148	0.139	0.129	0.147	0.078	0.133	0.067	0.020
	(0.116)	(0.117)	(0.109)	(0.117)	(0.106)	(0.116)	(0.146)	(0.126)
1 century post	0.195	0.189	0.161	0.185	0.091	0.163	0.097	-0.001
	(0.125)	(0.125)	(0.117)	(0.126)	(0.115)	(0.125)	(0.153)	(0.132)
2 centuries post	0.256*	0.247*	0.198	0.253*	0.107	0.226*	0.156	0.028
	(0.131)	(0.131)	(0.123)	(0.133)	(0.123)	(0.131)	(0.158)	(0.139)
3 centuries post	0.287**	0.278**	0.218*	0.280**	0.116	0.259*	0.210	0.033
	(0.137)	(0.137)	(0.132)	(0.139)	(0.134)	(0.138)	(0.163)	(0.147)
4 centuries post	0.336**	0.324**	0.256*	0.331**	0.140	0.314**	0.256	0.056
	(0.146)	(0.147)	(0.143)	(0.148)	(0.149)	(0.146)	(0.173)	(0.162)
5 centuries post	0.503***	0.487***	0.414***	0.485***	0.289*	0.483***	0.427**	0.190
	(0.157)	(0.158)	(0.157)	(0.159)	(0.163)	(0.158)	(0.184)	(0.177)
6 centuries post	0.909***	0.890***	0.777***	0.863***	0.639***	0.854***	0.831***	0.483**
	(0.165)	(0.166)	(0.168)	(0.167)	(0.177)	(0.165)	(0.192)	(0.191)
7 centuries post	0.887***	0.861***	0.715***	0.878***	0.554***	0.853***	0.804***	0.424**
	(0.171)	(0.172)	(0.178)	(0.174)	(0.189)	(0.171)	(0.198)	(0.204)
8 centuries post	0.832***	0.802***	0.651***	0.837***	0.478**	0.816***	0.761***	0.380*
	(0.175)	(0.176)	(0.186)	(0.178)	(0.200)	(0.174)	(0.202)	(0.214)
9 centuries post	0.828***	0.799***	0.633***	0.852***	0.448**	0.840***	0.755***	0.386*
	(0.185)	(0.187)	(0.200)	(0.188)	(0.215)	(0.183)	(0.213)	(0.229)
City & period FE, plundered	yes	yes	yes	yes	yes	yes	yes	yes
Period FE X sea & river	-	yes	-	-	-	-	-	yes
Period FE X Caloric suit.	-	-	yes	-	-	-	-	yes
Period FE X Roman roads	-	-	-	yes	-	-	-	yes
Period FE X Europe	-	-	-	-	yes	-	-	yes
Bishopric & Period FE X bishopric	-	-	-	-	-	yes	-	yes
Population & population lagged	-	-	-	-	-	-	yes	yes
N (339 cities)	2712	2712	2712	2712	2712	2712	2373	2373
r2	0.644	0.648	0.655	0.651	0.659	0.659	0.655	0.692

City-level panel data estimates. Dependent variables are the indicator variable whether a city is communal. Explanatory variable is Western Church exposure (in 100 years). An observation is a city in each century between 800 to 1500CE. All regressions control for how often a city was plundered, city and time-period fixed-effects. Access to the sea or navigable river (column 2), pre-Colombian caloric suitability (column 3), access to Roman roads (column 4), located in Europe (column 5), and whether the city was ever the seat of a bishopric (column 6) are interacted with time-period fixed effects and included. In addition, column 6 controls for being the seat of a bishopric in a given century, while column 7 controls for city population and population lagged. Column 8 controls for all variables simultaneously. Robust standard errors clustered at 339 cities are reported in parentheses. * $p \leq 0.1$, ** $p \leq 0.05$, *** $p \leq 0.01$.

Table C.7: Western Church Exposure and Commune Cities: Flexible Approach II

	Communal city							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Church exposure								
3 centuries prior	0.226	0.222	0.206	0.219	0.223	0.223	0.065	0.064
	(0.180)	(0.179)	(0.169)	(0.181)	(0.177)	(0.175)	(0.203)	(0.190)
2 centuries prior	0.198	0.195	0.173	0.196	0.180	0.198	0.214	0.202
	(0.160)	(0.159)	(0.149)	(0.161)	(0.158)	(0.157)	(0.190)	(0.181)
1 centuries prior	0.168	0.159	0.137	0.164	0.134	0.176	0.169	0.139
	(0.142)	(0.140)	(0.132)	(0.143)	(0.140)	(0.141)	(0.168)	(0.161)
Start of Church exposure	0.246^{*}	0.230^{*}	0.204^{*}	0.241^{*}	0.181	0.233^{*}	0.285^{*}	0.194
	(0.130)	(0.130)	(0.122)	(0.131)	(0.129)	(0.131)	(0.153)	(0.148)
1 century post	0.132	0.116	0.102	0.115	0.064	0.106	0.132	0.026
	(0.124)	(0.124)	(0.118)	(0.126)	(0.124)	(0.125)	(0.141)	(0.140)
2 centuries post	0.074	0.057	0.054	0.068	0.021	0.049	0.057	-0.023
	(0.126)	(0.127)	(0.122)	(0.129)	(0.126)	(0.127)	(0.138)	(0.141)
3 centuries post	0.046	0.029	0.027	0.037	-0.008	0.022	0.047	-0.031
	(0.135)	(0.137)	(0.134)	(0.140)	(0.136)	(0.136)	(0.141)	(0.148)
4 centuries post	0.017	-0.005	-0.002	0.012	-0.040	-0.001	0.014	-0.066
	(0.154)	(0.156)	(0.154)	(0.160)	(0.154)	(0.153)	(0.158)	(0.166)
5 centuries post	0.084	0.054	0.070	0.064	0.030	0.070	0.080	-0.013
	(0.176)	(0.178)	(0.177)	(0.184)	(0.176)	(0.173)	(0.181)	(0.189)
6 centuries post	0.328	0.294	0.314	0.277	0.277	0.282	0.310	0.172
	(0.200)	(0.202)	(0.201)	(0.210)	(0.199)	(0.195)	(0.206)	(0.214)
7 centuries post	0.198	0.157	0.177	0.186	0.140	0.170	0.170	0.060
	(0.232)	(0.234)	(0.233)	(0.243)	(0.230)	(0.225)	(0.239)	(0.246)
8 centuries post	0.097	0.054	0.076	0.106	0.037	0.086	0.080	-0.005
	(0.262)	(0.265)	(0.263)	(0.274)	(0.259)	(0.252)	(0.273)	(0.278)
9 centuries post	0.007	-0.035	-0.015	0.040	-0.054	0.028	-0.016	-0.058
	(0.293)	(0.296)	(0.294)	(0.307)	(0.289)	(0.281)	(0.307)	(0.309)
Extended prohibitions								
3 centuries prior	-0.090	-0.085	-0.076	-0.088	-0.090	-0.086	-0.032	-0.014
	(0.183)	(0.182)	(0.171)	(0.184)	(0.176)	(0.178)	(0.204)	(0.186)
2 centuries prior	-0.039	-0.035	-0.017	-0.038	-0.010	-0.036	-0.022	0.005
	(0.162)	(0.161)	(0.151)	(0.163)	(0.157)	(0.160)	(0.198)	(0.185)
1 centuries prior	0.011	0.020	0.036	0.012	0.065	0.015	0.033	0.099
	(0.143)	(0.142)	(0.135)	(0.143)	(0.140)	(0.143)	(0.176)	(0.171)
Start of extended prohibitions	0.136	0.156	0.174	0.145	0.219	0.133	0.160	0.272
	(0.137)	(0.137)	(0.135)	(0.138)	(0.143)	(0.138)	(0.167)	(0.176)
1 century post	0.416^{***}	0.436^{***}	0.409^{***}	0.429^{***}	0.463^{***}	0.407^{***}	0.457^{***}	0.531^{***}
	(0.134)	(0.135)	(0.135)	(0.136)	(0.144)	(0.135)	(0.159)	(0.176)
2 centuries post	0.579^{***}	0.599^{***}	0.532^{***}	0.584^{***}	0.536^{***}	0.579^{***}	0.633^{***}	0.623^{***}
	(0.138)	(0.140)	(0.142)	(0.142)	(0.151)	(0.139)	(0.157)	(0.178)
3 centuries post	0.564^{***}	0.577^{***}	0.502^{***}	0.563^{***}	0.493^{***}	0.572^{***}	0.616^{***}	0.570^{***}
	(0.154)	(0.156)	(0.162)	(0.159)	(0.171)	(0.153)	(0.168)	(0.195)
4 centuries post	0.647^{***}	0.655^{***}	0.581^{***}	0.636^{***}	0.544^{***}	0.644^{***}	0.703^{***}	0.620^{***}
	(0.174)	(0.176)	(0.182)	(0.180)	(0.192)	(0.170)	(0.187)	(0.215)
City & period FE, plundered	yes	yes	yes	yes	yes	yes	yes	yes
Period FE X sea & river	-	yes	-	-	-	-	-	yes
Period FE X soil quality	-	-	yes	-	-	-	-	yes
Period FE X Roman roads	-	-	-	yes	-	-	-	yes
Period FE X Europe	-	-	-	-	yes	-	-	yes
Bishopric & Period FE X bishopric	-	-	-	-	-	yes	-	yes
Population & population lagged	-	-	-	-	-	-	yes	yes
N (339 cities)	2712	2712	2712	2712	2712	2712	2373	2373
r2	0.668	0.673	0.672	0.675	0.674	0.682	0.678	0.706

City-level panel data estimates. Dependent variables are the indicator variable whether a city is communal. Explanatory variable are Western Church exposure (in 100 years) and Extended prohibitions. An observation is a city in a century between 800 to 1500CE. All regressions control for how often a city was plundered, city and time-period fixed-effects. Access to the sea or navigable river (column 2), pre-Colombian caloric suitability (column 3), access to Roman roads (column 4), located in Europe (column 5), and whether the city was ever the seat of a bishopric (column 6) are interacted with time-period fixed effects and included. In addition, column 6 controls for being the seat of a bishopric in a given century, while column 7 controls for city population and population lagged. Column 8 controls for all variables simultaneously. Robust standard errors clustered at 339 cities are reported in parentheses. * *p≤0.1,* ** *p≤0.05,* *** *p≤0.01.*

C.7. Incest Legislation Exposure and City Population within the Carolingian Empire

In the main text I exploits variation in (6th to early 8th century) incest legislation exposure based on decentralized synodal activity within the Carolingian Empire and relate it to the existence of communes in the year 1200CE. I choose the year 1200CE because it is the first year with meaningful variation in Commune cities. Here I show that this relation also holds when – instead of commune – I use city population four centuries earlier, in the year 800CE as dependent variable.

Table C.8: Incest Legislation Exposure and City Population within the Carolingian Empire

	City population (800 CE)					
	(1)	(2)	(3)	(4)	(5)	(6)
Incest legislation exposure	5.338***	4.834**	6.154**	5.136***	5.127***	5.381**
(N: 75 cities)	(1.924)	(1.981)	(2.597)	(1.862)	(1.910)	(2.623)
R^2	0.090	0.098	0.104	0.094	0.109	0.128
Synodal activity indicator	yes	yes	yes	yes	yes	yes
Church exposure (800CE)	yes	yes	yes	yes	yes	yes
Lombard (North) Italy	yes	yes	yes	yes	yes	yes
Waterway access		yes				yes
Caloric suitability			yes			yes
Roman road access				yes		yes
Bishopric (800CE)					yes	yes

Linear probability OLS regressions of city population in 800 CE on incest legislation exposure. An observation is a city within the boundaries of the Carolingian empire that had a non-zero population in 1200CE. All regressions control for Church exposure and Lombard (North) Italy (including Rome), and the synodal activity indicator. Access to the sea or navigable river (column 2), pre-Colombian caloric suitability (column 3), access to Roman roads (column 4), whether the city was the seat of a bishopric (column 5) and all previously listed covariates simultaneously (column 6) are added. Robust standard errors are reported in parentheses. * *p≤0.1,* ** *p≤0.05,* *** *p≤0.01*.

D.1 COUSIN-MARRIAGE IN ITALIAN PROVINCES AND POLITICAL PARTICIPATION

This analysis relies on (sub-regional) provincial data on cousin-marriage rates in Italy and two non-self-reported measures: voter turnout at national referenda and judicial inefficiency (based on Guiso, Sapienza and Zingales, 2004). Judicial ineffciency captures the average number of years it takes to complete a first-degree trial. It allows showing that cousin marriage is associated with institutional failure within a country.

Figure D.1 displays the percentage of first-cousin marriages in Italian provinces at around 1960 (left panel), voter turnout (middle panel), and judicial inefficiency (right panel). Cousin-marriage rates are higher in North Italy which was part of the Carolingian empire and experienced severer medieval marriage prohibition compared to the South. As part of the Byzantine empire, Lombard duchies or Islamic kingdom the South did not experience the same severe prohibitions. Figure D.1 also reveals that higher cousin marriage rates are associated with both higher voter turnout and judicial inefficiency.

Regression analyses in Table D.1 corroborate this. Cousin marriage explains 80 percent of the variation of voter turnout and 40 percent of judicial inefficiency within Italy (column 1). The relationships are robust to controlling for geographic conditions, schooling and – in the case of voter turnout – region fixed effects for 19 Italian *regioni. Regioni* are the more important administrative unit above the provincial level, which enjoy constitutionally guaranteed autonomy.

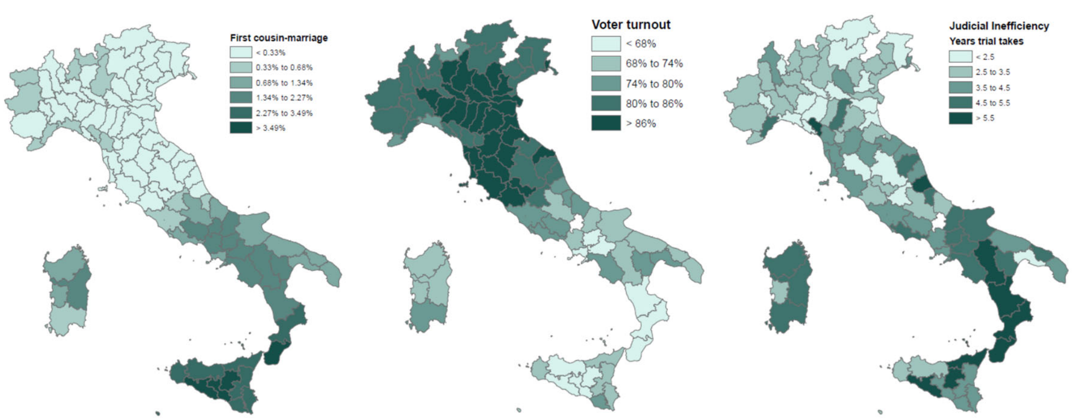

Figure D.1: Percentage of first-cousin marriages (from 1960 to 1964, left-hand side), voter turnout (middle) and judicial inefficiencies (right-hand side).

Table D.1: Cousin marriage, Voter Turnout and Judicial Inefficiency in Italy

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel 1: Voter turnout					
Log % first-cousin marriage	-0.07***	-0.06***	-0.07***	-0.07***	-0.05***	-0.04***
N: 92	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
R^2	0.827	0.836	0.856	0.857	0.879	0.935
	Panel 2: Judicial Inefficiency					
Log % first-cousin marriage	0.83***	0.66***	0.90***	0.82***	0.79**	0.54
N: 92	(0.13)	(0.23)	(0.28)	(0.29)	(0.32)	(0.51)
R^2	0.395	0.481	0.565	0.579	0.571	0.651
Geographic baseline	-	yes	yes	yes	yes	yes
Further geographic controls	-	-	yes	yes	yes	yes
Average years of schooling	-	-	-	yes	-	-
Mainland South / Sicily FE	-	-	-	-	yes	-
Region FE	-	-	-	-	-	yes

Notes: Provincial-level OLS regression of voter turnout (panel 1) and judicial inefficiency (panel 2) on log % cousin marriages. Columns 2-6 control for the geographic baseline (ruggedness, distance to the sea, caloric suitability, absolute latitude); columns 3-6 for further geographic controls (caloric suitability for oats, for rye, elevation, temperature, precipitation, presence of a river or lake); column 4 for average years of schooling; column 5 adds fixed effects for mainland south Italy and for Sicily; and column 6 adds region fixed effects (for the 19 Italian regions above the provincial level). Robust standard errors clustered are reported in parentheses. ** p≤0.1, ** p≤0.05, *** p≤0.01.*

D.2 SECOND-GENERATION IMMIGRANTS AND POLITICAL ACTIVITY

The epidemiological approach in the main text focused on whether people voted. Here I use an alternative dependent variable in a sample that also includes non-citizens. The variable *political activity* is constructed by taking the sum over the following four ESS questions: "*During the last 12 months have you done any of the following?", "…worn or displayed a campaign badge/sticker?", "…signed a petition", "…taken part in a lawful public demonstration?", "…boycotted certain products*?". I then standardized the index.

Table D.2: Kin networks in Parents' Originating Countries and Political Activity

	Political activity (std)					
	(1)	(2)	(3)	(4)	(5)	(6)
Cousin-marriage preferred, fa. o. country	-0.085	-0.166**	-0.137**	-0.148***	-0.102*	-0.143**
N: 16,281	(0.088)	(0.075)	(0.062)	(0.049)	(0.057)	(0.064)
R^2	0.111	0.112	0.129	0.143	0.149	0.112
Cousin-term diff., fa. o. country	-0.065	-0.084	-0.068	-0.087*	-0.053	-0.048
N: 16,281	(0.075)	(0.056)	(0.056)	(0.044)	(0.046)	(0.073)
R^2	0.111	0.112	0.129	0.143	0.149	0.112
Log % cousin marriage, fa. o. country	-0.015	-0.021	-0.016	-0.023*	-0.009	-0.019
N: 9,534	(0.019)	(0.018)	(0.018)	(0.012)	(0.014)	(0.021)
R^2	0.088	0.089	0.111	0.130	0.136	0.089
Wave FE, Resid. country FE, basic individ. cont.	yes	yes	yes	yes	yes	yes
Geographic baseline of originating country	-	yes	yes	yes	yes	yes
Individual controls	-	-	yes	-	yes	-
Religious denom./religiousness	-	-	-	yes	yes	-
Frac. European descent	-	-	-	-	-	yes

OLS regression of political activity (standardized) on fathers' country of origin cousin-marriage practices. An observation is an individual born in the resident country with an immigrant father. Each column reports the outcome of three regressions; In the first rows the explanatory variable is cousin-marriage preferred, in the second rows it is cousin-term differentiation in the third rows it is the log % cousin marriage. All regressions control for survey-wave fixed-effects (FE), resident country FE, basic individual controls (age, age^2 and gender). Columns 2-6 add the geographic baseline of fathers' originating country (ruggedness, mean distance to waterways, absolute latitude, caloric suitability). Columns 3,4 & 6 add further individual controls (feeling discriminated against, unemployed seeking a job, unemployed not seeking a job, educational attainment). Columns 4 & 5 control for religiousness and religious denomination (atheist, Catholic, Protestant, Orthodox, other Christian, Jewish, Islamic, other non-Christian religion). Column 6 controls for the fraction of European descent of father's originating country. Robust standard errors clustered at the resident country are reported in parentheses. ** p≤0.1, ** p≤0.05, *** p≤0.01.*

D.3 Second generation immigrants matched to ancestral ethnicity

Here, I address the possibility that other unobserved effects of the originating country or ancestral ethnicity drive the association between ancestral kin networks and political activity. Matching respondents to an ethnicity based on language allows me to include originating country FE and ethnic-level controls in the regression. The ESS asks responds about their first and second language spoken at home. If either the first or second language was different from the native language in the resident country, I matched it to a society in the EA. In case multiple EA-ethnicities speak the same language, I used the population weighted average of all ethnicities. The sample thus only contains individuals that speak a language different from the majority language in their country of residence as their first or second language at home. It is therefore a more selected sample. However, this approach nevertheless allows me to show that in this selected sample the association between political activity is most likely not driven by other originating ethnicity or country or factors. Table C.1 reports the regression results.

Table D.3: Kin networks of Parents' Ancestral Ethnicities & Political activity

	(1)	(2)	(3)	(4)
	Political activity (std)			
Cousin-marriage preferred,	-0.235^{**}	-0.578^{**}	-0.521^{*}	-0.506^{*}
originating ethnicity (N: 2,484)	(0.115)	(0.240)	(0.269)	(0.256)
R^2	0.204	0.208	0.240	0.248
Cousin-term differentiation,	-0.136	-0.071	-0.051	0.009
originating ethnicity (N: 4,707)	(0.105)	(0.178)	(0.186)	(0.177)
R^2	0.224	0.226	0.243	0.248
Wave FE, Resident country FE, basic indv. contr.	Yes	Yes	Yes	Yes
O. country fixed effects	Yes	Yes	Yes	Yes
Ethnic-level controls	-	Yes	Yes	Yes
Individual controls	-	-	Yes	Yes
Religious denomination / religiosity	-	-	-	Yes

OLS regression of trust on ancestral ethnicity's kin networks. An observation is an individual born in the resident country with at least one immigrant parent. Each column reports the outcome of two regressions; each with a different explanatory variable. In the first row the explanatory variable is Cousin-marriage preferred, in the second row it is Cousin-term differentiation. All regressions control for survey-wave fixed-effects, resident country fixed-effects, basic individual controls (age, age^2 and gender), and both fathers and mothers originating country fixed-effects. Columns 3-4 control for ethnicity characteristics (% reliance on fishing, animal husbandry, and agriculture, judicial-hierarchies, irrigation). Further individual controls (feeling discriminated against, unemployed seeking for a job, unemployed not seeking for a job, married) are added in columns 3 & 4. Column 4 controls for religiosity and religious denomination (atheist, catholic, protestant, orthodox, other Christian, Jewish, Islamic, other non-Christian religion). Robust standard errors clustered at the resident country are reported in parentheses. *p < 0.10, **p < 0.05, ***p < 0.01.

Appendix E – Variable Description

E.1 Country-level covariates

Adherence to major religions: Taken from Barro and McCleary (2003) for the year 2000. Retrieved on March 14, 2016 from https://scholar.harvard.edu/barro/data_sets. Adherents in a country to Catholicism, Protestantism, Orthodox Christianity, other Christian denominations, Islam, Hinduism and Buddhism, as fractions of the country's population.

Absolute latitude: Taken from Ashraf and Galor (2013). The absolute latitude of a country's approximate geodesic centroid, as reported by the CIA's World Factbook.

Caloric suitability: Using data from Galor and Özak (2016), the Caloric Suitability Index captures the average potential agricultural output (measured in calories) based on crops that were available for cultivation after 1500 CE. Caloric Suitability therefore captures the variation in potential crop yield across the globe, as accounted for by calories per hectare per year. The Caloric Suitability Index is constructed based on data from the Global AgroEcological Zones (GAEZ) project of the Food and Agriculture Organization (FAO). The GAEZ project supplies global estimates of crop yield for 48 crops in grids with cell sizes of 5-degree cells. We use the medium level rain-fed potential output.

Caloric suitability for oat: Using data from Galor and Özak (2016), the Caloric Suitability Index for oats captures the medium level rain-fed potential agricultural outputs (measured in calories) of oat.

Caloric suitability for rye: Using data from Galor and Özak (2016), the Caloric Suitability Index for rye captures the medium level rain-fed potential agricultural outputs (measured in calories) of rye.

Genetic heterogeneity (ancestor adjusted): Based on Ashraf and Galor (2013). The expected heterozygosity (genetic diversity) of a country's population, predicted by migratory distances from East Africa (i.e., Addis Ababa, Ethiopia). It is a prediction based on the worldwide sample of 53 ethnic groups from the HGDP-CEPH Human Genome Diversity Cell Line Panel. The measure is ancestor adjusted using the World Migration Matrix, 1500-2000 CE, from Putterman and Weil (2010).

Irrigation potential: Taken from Bentzen et al. (2017). Irrigation potential measures the fraction of land that would have experienced at least a doubling of yields if irrigation were to be introduced into an area where agriculture was previously rainfed. The measure is in relation to all land suitable for agriculture. The measure is based on data from the global Agro-Ecological Zones (GAEZ) 2002 database of the Food and Agriculture Organization.

Log GDP per capita: Real GDP per capita in 2000 CE, in international dollars (adjusted for Purchasing Power Parity), as reported by the Penn World Table, version 6.2. Natural logs are taken.

Distance to navigable waterways: Taken from Gallup, Sachs and Mellinger (1999). The distance, in thousands of km, from a GIS grid cell to the nearest ice-free coastline or sea-navigable river, averaged across the grid cells of a country. It is part of Harvard University's CID Research Datasets on General Measures of Geography.

Parasite stress: The measure is Fincher and Thornhill (2012) 's combined parasite-stress indicator (both non-zoonotic and zoonotic parasites). It is based on the GIDEON database (Global Infectious Disease & Epidemiology Network; www.gideononline.com).

Ruggedness: Taken from Nunn and Puga (2012). At one (grid-cell level) point, the index is given by the square root of the sum of the squared differences in elevation between the central point and the eight adjacent points. The country-level indicator is the average across all the grid cells within a country.

Timing of Neolithic Transformation (Ancestor adjusted): The number of years elapsed, up to the year 2000 CE, since the majority of the population residing within a country's modern national borders began practicing sedentary agriculture as the primary mode of subsistence. This measure is based on Putterman (2008). It is compiled using a wide variety of both region- and country-specific archaeological studies as well as more general encyclopedic works on the transition from hunting and gathering to agriculture during the Neolithic Revolution. We use the ancestry adjusted indicator to take account of migration post-1500 CE. The ancestry weights are obtained from the World Migration Matrix of Putterman and Weil (2010).

Tropical area: Taken from Nunn and Puga (2012). It is based on Kottek et al. (2006), who classify each cell on a 30 arc-minute grid covering the entire land area of the Earth into one of 31 climates in the widely used Köppen-Geiger climate classification (these categories are formed using temperature and precipitation data from the Climatic Research Unit of the University of East Anglia and the Global Precipitation Climatology Centre of the German Weather Service). Based on these data, Nunn and Puga (2012) calculated the percentage of the land surface area of each country that has any of the four Köppen-Geiger tropical climates.

E.2 EUROPEAN-REGIONAL COVARIATES

Absolute latitude: Absolute latitude of the centroid of a region.

Caloric suitability: Taken from Galor and Özak (2016), the Caloric Suitability Index captures the average potential agricultural output (measured in calories) based on crops that were available for cultivation after 1500 CE. Caloric Suitability therefore captures the variation in potential crop yield across the globe, as accounted for by calories per hectare per year. The Caloric Suitability Index is constructed based on data from the Global AgroEcological Zones (GAEZ) project of the Food and Agriculture Organization (FAO). The GAEZ project supplies global estimates of crop yield for 48 crops in grids with cell sizes of 5-degree cells, which allowed us to construct regional indicators. We use the medium level rain-fed potential output.

Caloric suitability for oat: Using data from Galor and Özak (2016), the Caloric Suitability Index captures the medium level rain-fed potential agricultural outputs (measured in calories) of oat.

Caloric suitability for rye: Using data from Galor and Özak (2016), the Caloric Suitability Index captures the medium level rain-fed potential agricultural outputs (measured in calories) of rye.

Carolingian Empire: Based on Shepherd's map (1911), this variable indicates the areal fraction of a region that fell within the boundaries of the Carolingian Empire in the year 814 CE.

Distance to the coast: Distance of the centroid of a region from the coast, constructed based on a coastline physical vector map in 1:10m resolution. Source: Natural Earth (http://www.naturalearthdata.com/).

Elevation: Mean elevation is constructed based on the global map (30 by 30 arcsecond cells) obtained from Global 30 Arc-Second Elevation dataset. Source: GTOPO30 dataset (https://lta.cr.usgs.gov/GTOPO30).

Lake or rivers (presence of): A dummy variable indicating whether there is a river or lake within a region. Rivers primarily derive from World Data Bank 2. Data of Europe primarily derives from Catchment Characterization and Modelling (CCM) Database 2.1 by the European Commission, Joint Research Centre, Institute for Environment and Sustainability. Data for North America derives the North American Environmental Atlas, a collaboration of government agencies in Canada, Mexico and the United States and the trilateral Commission for Environmental Cooperation (CEC). Source: Natural Earth (http://www.naturalearthdata.com/).

Monastic presence. The monastic presence indicator is based on five different monastic orders: Cluniac, Cistercians, Premonstratensians, Franciscans, and Dominicans. For each order we drew 50km radii around all the monastic houses of the corresponding order. Based on the pixels that fall within the 50km radii I calculated the percentage of each region that was exposed to at least one order at some point in time. The underlying geo-located data on Cluniac (existing between before 998 to 1109 or later), Dominican (existing between 1216 to 1500), Franciscan (existing around 1300), and Premonstratensians Houses (existing between 1120 to 1500) are based on the Atlas zur Kirchengeschichte (Hubert et al. 1980) and are taken from the Digital Atlas of Roman and Medieval Civilization (DARM). Cistercian Houses (existing between 1095 and 1675) are based on Donkin (1978) and are taken from Andersen et al. (2017).

Roman roads: Using data from McCormick et al., this measure captures the length of Roman roads within a region (as identified in the Barrington Atlas) per area of the region.

Ruggedness: The regional measure is constructed based on the global map (30 by 30 arc-second cells) obtained from the grid-cell-level data on ruggedness based on Nunn and Puga (2012). For details, see the country-level indicator.

Socialist history: Indicator variable capturing whether a European region has a socialist history (see map in Figure S2 in the main text). Regions that belonged to Yugoslavia are coded as having a socialist history, even though they were not part of the Warsaw pact. (This follows Churchill's original (1948) statement on the "Iron curtain".)

Temperature: The means of the entire annual cycles of temperature is constructed for the period between 1901 and 2014 CE based on monthly global maps (0.5 by 0.5 degree cells) obtained from the CRU-TS 3.1 Climate Database. Source: Harris et al. (2013).

Population density in 500 CE: Taken from Goldewijk et al. (2010), this measures population density of a region in the year 500 CE. These estimates are based on the country estimates by McEvedy and Jones (1978), broken down to the pixel level according to geographic factors that relate to the probability of settlement (e.g., proximity to waterways, temperature).

Precipitation: The means of the entire annual cycles of precipitation constructed for the time period between 1901 and 2014 CE. Based on monthly global maps (0.5 by 0.5 degree cells) obtained from the CRU-TS 3.1 Climate Database. Source: Harris et al. (2013).

E.3 Ethnicity-level covariates

Absolute latitude: Absolute latitude based on geo-location provided by the Ethnographic Atlas

Thermal zones: The Food and Agriculture Organization of the United Nations (FAO) and the International Institute for Applied System Analysis have developed the Agro-Ecological Zones. They categorized the world into 12 thermal zones ranging from tropics (warm) to the Arctic zone.

Distance to the coast: The Ethnographic Atlas provides geo-locations of the ethnicties. Based on this the shortest distance to the coast is calculated.

Elevation: Mean elevation is constructed based on the global map (30 by 30 arcsecond cells) obtained from Global 30 Arc-Second Elevation dataset. Source: GTOPO30 dataset (https://lta.cr.usgs.gov/GTOPO30).

Precipitation: The means of the entire annual cycles of precipitation constructed for the time period between 1901 and 2014 CE. Based on monthly global maps (0.5 by 0.5 degree cells) obtained from the CRU-TS 3.1 Climate Database. Source: Harris et al. (2013).

Ruggedness: The regional measure is constructed based on the global map (30 by 30 arc-second cells) obtained from the grid-cell-level data on ruggedness based on Nunn and Puga (2012). For details, see the country-level indicator.

Temperature: The means of the entire annual cycles of temperature is constructed for the period between 1901 and 2014 CE based on monthly global maps (0.5 by 0.5 degree cells) obtained from the CRU-TS 3.1 Climate Database. Source: Harris et al. (2013).

E.4 City-level covariates

Commune: This binary variable captures whether a city at a given point in time had a local government, in which (at least part of) the citizens participated. Bosker et al. (2013) rely on the Lexikon des Mittelalters to attach a date to the first signs of a local administration. The variable takes the value of one if Lexikon des Mittelalters mentions the existence of a commune, consuls or a town council. If the Lexikon des Mittelalters did not provide the relevant information, the data was amended by the mentioning of the building date of a town hall in that specific city as a proxy for the first appearance of local participative government. A host of secondary sources ranging from specialized books, over Wikipedia (Germany and England), travel guides and various Enciclopedia such as Enciclopedia Italiana, di szienze (for Italy), letter ed arti, Enciclopedia Universal Ilustrada (for Spain), and Grande Enciclopedia portuguesa e brasileira (for Portugal) or Kunstreisboek voor Nederland (for the Netherlands) was used to search for data on the building date of a town house. If data was still missing, information on the naming of a city as "ciudad" (in Spain) or the granting of city rights was used (the latter based on the Lexikon des Mittelalters). Quite often granted city rights belong to a specific category (e.g. those of Magdeburg, Lübeck, etc.) and under auspices of such city rights it was more often than not customary for a local council to operate.

Bishopric: Bosker et al. (2013) coded whether a city was the see of a bishopric in a given century

Caloric suitability: Based on Galor and Özak (2016), the pre-Colombian Caloric Suitability Index captures the average potential agricultural output (measured in calories) based on crops that were available for cultivation before 1500 CE. Caloric suitability at the city level is the average suitability of an area within a 100-km radius around the city.

Located at sea or river: Taken from Bosker et al. (2013) the indicator reflects whether a city is located at a navigable sea or river.

Merovingian kingdom: This indicator captures whether a city is located in the Merovingian kingdom in the boundaries according to Droysen (1886).

Population: Historical urban population is taken from Bairoch et al. (1988).

Roman roads: Whether a city is located at former Roman roads is taken from Bosker et al. (2013).

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