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KIN NETWORKS AND INSTITUTIONAL DEVELOPMENT*

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This study provides evidence that strong kin networks are detrimental for democratic participatory institutions and that the medieval Catholic Church's marriage regulations dissolved Europe's clan-based kin networks, which contributed to the emergence of participatory institutions. I show that weak ancestral kin networks are positively associated with ethnicities' democratic traditions in the past and countries' democracy scores today. At the same time, medieval Church exposure predicts weak kin networks across countries, European regions and ethnicities. In a historical difference-in-difference analysis, I provide evidence that exposure to the Church contributed to the formation of medieval communes—self-governed cities with participatory institutions. Moreover, within Christian Europe, stricter regional and temporal marriage prohibitions are associated with commune formation. Lastly, I shed light on one mechanism, civicness, and show that weak kin networks are associated with more political participation.

Political institutions, ranging from autocratic regimes to inclusive institutions, are widely acknowledged as a critical determinant of economic prosperity and many researchers attribute Europe's growth miracle to its unique institutional setting (e.g., Greif, 2006a; North *et al.*, 2009; Acemoglu and Robinson, 2012).

This article contributes to the debate on the global variation of participatory institutions by testing two long-standing hypotheses. The first hypothesis states that strong kin networks are detrimental to social cohesion and participatory institutions (Weber, [1920] 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 organising society. In some countries first- and second-cousin marriages account for more than 50% 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 fifth century theologian Augustine of Hippo (354–430 CE) pointed out that marrying outside the kin group enlarges the range of social relations and 'should thereby bind social life more effectively' (Augustine, [413/426] 1998, p. 665).

The second hypothesis is due to anthropologist Jack Goody (1983). He hypothesised that, motivated by financial gains, the medieval Catholic Church implemented marriage

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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,b), Greif and Tabellini (2010; 2017), historian Michael Mitterauer (2010) and anthropologist Joseph Henrich (2020) combined these two hypotheses and emphasised the critical role of the Church's marriage prohibitions for Europe's development. They stressed 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 emphasised that those communes were important precursors to Europe's economic rise (e.g., Weber, [1921] 1958b; Mokyr, 1990; Greif, 2006a,b). Thus, long before modernisation Europe experienced local participatory institutions, the rule of law and individual rights, which created a social and cultural setting that was conducive to growth (Mokyr, 2016).

Empirical approach. In this paper, I provide empirical evidence that strong kin networks are detrimental to the formation of participatory institutions and that the Catholic Church's medieval marriage regulations dissolved strong kin networks and contributed to the emergence of participatory institutions in Europe.

I document these relationships among a diverse set of political and cultural entities: first, among contemporary countries and historical ethnicities around the world using cross-sectional data (part 1 of the analysis); then among medieval cities in Europe and around the Mediterranean in a panel data set (part 2 of the analysis). Clearly, there are vast differences between participatory institutions of those three entities. Yet, whether these are modern-day democracies, democratic traditions of ethnicities or medieval communes, they all share a common feature: participation is critical for their proper functioning. In part 3 of the analysis, I provide evidence for this mechanism, namely, that weak kin networks foster political participation.

In part 1, the *global analysis*, I document that across countries high twentieth-century cousin-marriage rates are associated with low democracy scores. Figure 1 provides a preview of this finding. Panel (a) shows a map of countries' percentage of cousin marriages (second cousins and closer; see Subsection 2.1 for details on all measures); panel (b) shows a map of Polity IV democracy scores; and panel (d) shows a scatter plot revealing a highly significant negative relation between cousin marriages and democracy scores.

In the analysis, I show that this relationship is robust to the inclusion of a host of covariates and that it does not reflect simple reverse causality, i.e., that cousin-marriage rates are low because of well-functioning participatory institutions. Rather, this relationship has roots that stretch out far deeper than enlightenment-linked ideas of democracy. The cross-sectional 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 ethnographic records strengthens these findings: across the globe weak kin networks are robustly associated with pre-industrial ethnicities' democratic traditions.[1] Importantly, the relationship between kin networks and these participatory institutions holds globally, i.e., also among societies with entirely different histories than European ones. This rules out that the relationship is solely driven by a uniquely (and possibly omitted) European factor.

[1] A selection-on-unobservable approach reveals that this relationship is unlikely driven by potentially omitted covariates (Oster, 2019).

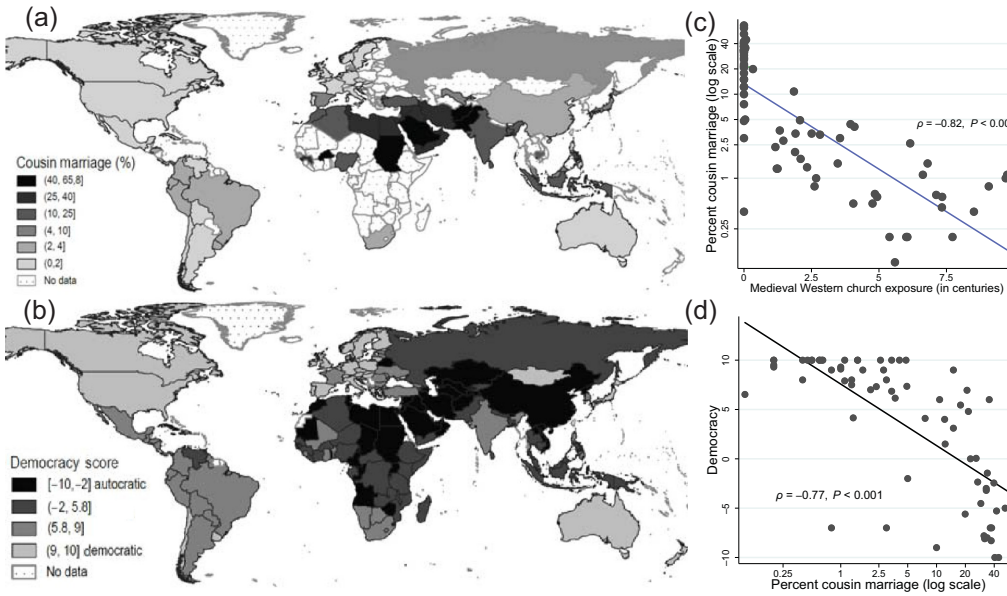

Fig. 1. *Church Exposure, Kin Networks and Democracy across Countries.*
Notes: (a) Map of countries' twentieth-century percentage of cousin marriages (i.e., second cousins and closer). (b) Map of countries' democracy scores (Polity IV scores averaged over the years 1996 and 2015). (c) Scatter plot of countries' ancestor-adjusted medieval Church exposure and percentage of cousin marriages (reported is Spearman's ρ and associated p-value). (d) Scatter plot of countries' percentage of cousin marriages and democracy scores (reported is Spearman's ρ and associated p-value).

This universal pattern raises the question why most European societies had such weak kin networks that they placed them at the extreme of the global distribution and created favourable conditions for the emergence of participatory institutions. Consistent with the Church-marriage-prohibition hypothesis, I establish a robust link between medieval Church exposure and weak kin networks across countries, European regions and ancestral ethnicities. Figure 1(c) displays the highly significant relationship between countries' (ancestor-adjusted) medieval Western Church exposure and twentieth-century cousin-marriage rates (for details on the measures, see Subsection 2.1).

Part 2 consists of a *historical analysis* on medieval commune formation. This analysis—based on panel data—allows me to document that a *change* towards participatory institutions occurred in medieval Europe and that this change is consistent with the Church marriage hypothesis. First, based on difference-in-difference analyses, I provide causal evidence that Church exposure fostered commune formation. Second, I show that within medieval Christianity regional and temporal tighter marriage restrictions are positively associated with commune formation. Absent fine-grained data on medieval kinship, this historical analysis provides indirect evidence on the role of kinship for commune formation. Yet, this indirect evidence is consistent with all other cross-sectional analysis on the role of kinship and thus strengthens empirical support for the overall hypothesis.[2]

[2] The historical commune analysis at the city level also allows me to address concerns that factors related to historical political entities such as state capacity, laws and institutions confound this analysis.

The difference-in-difference analysis linking Church exposure to commune formation rests on a novel panel data set that captures Church exposure and commune organisation of 339 European, Middle Eastern and North African cities in hundred-year intervals from 800 to 1500 CE. The panel 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, which exploit two instances where Church exposure was determined by the idiosyncrasies of medieval warfare (Reconquista of the Hispanic Peninsula and Christianisation of northeastern Germany), mitigate endogeneity concerns further.

Furthermore, while several Church factors plausibly fostered commune formation, the global analysis of part 1 suggests that the dissolution of kin networks is one such factor. In the historical analysis, I strengthen this evidence 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 eleventh century—is associated with commune formation. Second, regionally tighter sixth- to eighth-century incest legislation 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.

Part 3 sheds light on civicness, a key factor that many scholars have emphasised as essential for the formation of participatory institutions (e.g., Tocqueville, 1838; Putnam, 1993; Fukuyama, 1995; Acemoglu and Robinson, 2016; 2019). I show that regions *within* European countries that have had lower twentieth-century cousin-marriage rates have higher contemporary civicness as proxied by voter turnout. Getting closer at causality, 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; Giuliano, 2007). This latter approach aims to identify the effect of intergenerationally transmitted cultural values and thus addresses many potentially confounding factors.

None of these analyses are decisive when considered in isolation and it is possible to think of ad hoc alternative explanations for each. Yet, taken together, all analyses—across contemporary countries, pre-industrial ethnicities, medieval cities around the Mediterranean, regions in Europe and second-generation immigrants—coherently support the hypothesis that weak kin networks foster participatory institutions and that the medieval Church dissolved strong kin networks among European populations. This makes it difficult to find a consistent alternative interpretation: consistent with the marriage hypothesis, the historical difference-in-difference analysis provides causal evidence that the Church fostered the formation of communes. While several Church factors plausibly contributed to this relation, the other analyses suggest that the marriage prohibitions are likely one such factor. 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, which rules out that this association rests on (potentially omitted) European or Church factors that are unrelated to kin networks. 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 as proxied by political participation. This relation holds globally among children of immigrants following the epidemiological approach and among regions within Europe, controlling

for a host of individual characteristics such as religious affiliation, religiousness and educational attainment.[3]

Related literature. This study empirically investigates the role of the medieval Church on the dissolution of kin networks, the rise in civicness and the formation of participatory institutions. It builds on the seminal work by Alesina and Giuliano (2010; 2011; 2014), who showed that stronger nuclear family ties are associated with less political participation and lower institutional quality. I extend this line of research by focusing on anthropological concepts of kin networks and the historical role of the medieval Church in dissolving kin networks. Related to this study are Enke (2019) and Schulz *et al.* (2019). These subsequent studies provided evidence on the role of kin networks for human psychology and thereby extended and strengthened the analysis linking kin networks to civicness. While Enke (2019) emphasised the role of pathogen stress as a determinant of kinship, Schulz *et al.* (2019) likewise provided evidence that the Church marriage regulations dissolved strong kin networks. In contrast to these two studies, this paper's distinct focus is on political institutions. It shows that across space and time weak kinship is robustly associated with participatory institutions among countries, pre-industrial ethnicities and medieval cities within Europe and—consistent with the Church's marriage hypothesis—it provides causal evidence that the medieval Church fostered commune formation. Henrich (2020) used analyses and figures of this paper, highlighted its main findings and prominently cited it in his comprehensive book.[4]

The paper builds on studies in development economics that recognised the importance of kinship for economic prosperity (Cox and Fafchamps, 2008; La Ferrara, 2008; Hoff and Sen, 2016; Platteau, 2017; Edlund, 2018; Guirkinger and Platteau, 2020). For example, Platteau (2009; 2019) discussed the role of missionary activity on kin networks and development in Africa. More recently, the role of kin networks for economic outcomes has been acknowledged more widely. Woodley and Bell (2012) showed that across countries low contemporary cousin-marriage rates are associated with democratic institutions. Akbari *et al.* (2019) presented evidence that cousin-marriage fosters corruption, while Buonanno and Vanin (2017) found that social closure is associated with reduced tax compliance. Moscona *et al.* (2020) presented evidence on how societies organised along segmentary lineages foster violent conflict in Africa. De Moor and van Zanden (2010) and Carmichael and Rijpma (2017) investigated the effect of family systems on women's agency and labour market participation, and Lowes (2017) showed that matrilineal kinship systems decrease intra-household spousal cooperation.

More broadly, this study relates to the literature on deep roots of political institutions. Giuliano and Nunn (2013) showed that local-level pre-industrial democratic traditions are associated with more democratic nations today. Galor and Klemp (2015) presented evidence that human genetic diversity fostered autocratic institutions. Bentzen *et al.* (2017) showed that historic irrigation practices, which made it possible to monopolise water and thereby fostered a powerful elite, are associated with autocratic rule today. Tabellini (2008a) and Gorodnichenko and Roland (2017; 2021) emphasised the effect of cultural values, which emphasise the in-group, as detrimental

[3] Further evidence on the importance of the medieval marriage prohibitions (as opposed to other Church factors) comes from Italy. Southern Italian regions that have been dominated by the Catholic Church for many centuries but were not exposed to the tight incest prohibitions prior to the twelfth century exhibit higher cousin marriages and lower political participation today.

[4] I put the first version of this paper in the public domain in 2016. Learning about my efforts, Joseph Henrich, who was already working on his book (Henrich, 2020), Duman Bahram-Rad, Jonathan Beauchamp and I subsequently joined forces to work on Schulz *et al.* (2019), which focuses on psychology and uses this paper's datasets on Church exposure. I am glad that Henrich (2020) used and prominently referenced the analyses of this paper, addressing a wider audience.

for the functioning of institutions. Here, I show that cultural values and the associated institutional outcomes are linked to kin networks. Furthermore, the study does not only highlight the deep roots and hence persistence of institutions and culture, but also emphasises cultural and institutional *change*—brought about by the Church's marriage prohibitions. More broadly, this study contributes to the emerging field examining the historical, geographical and cultural origins of development (for an overview, see Guiso *et al.*, 2006; Spolaore and Wacziarg, 2013, and for work on cultural transmission, see Bisin and Verdier, 2001; 2017; Boyd and Richerson, 2005).

The paper is structured as follows. Section 1 gives a background on kin networks and the medieval Church's marriage policies. Section 2 consists of the global analysis that links kin networks to countries' and ethnic societies' political institutions. Section 3 presents the historical analysis relating Church exposure to commune formation. Section 4 focuses on civicness. Section 5 concludes the paper.

1. Background

1.1. *Kin Networks and Institutional Development: Conceptual Framework*

In many parts of the world, people live within dense kin networks that are characterised by co-residency of extended families, communal organisation based on descent such as clans and lineages, and norms favouring cousin-marriage practices (Schulz *et al.*, 2019). Dense kin networks likely became increasingly important during the Neolithic transition as people began to invest in land and animal breeding. In contrast to hunter-gatherer groups in which outreaching kin networks allow for risk hedging, dense kin networks facilitate the defence and succession of property (Johnson and Earle, 2000; Walker and Bailey, 2014; Bahrami-Rad, 2021).

Strong economic and social interdependencies make the kin group essential for survival and create intense loyalty demands. These may manifest as voting according to group identity (as opposed to individual preferences), protecting family members from prosecution, facilitating nepotism or, more generally, in any other activity that weakens cooperation across the boundary of the kin group (Banfield, 1958; Fukuyama, 1995; Yamagishi *et al.*, 1998; Cox and Fafchamps, 2008; Tabellini, 2008b; Alesina and Giuliano, 2014; Hillman *et al.*, 2015).[5] 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 participatory institutions.[6] Yet, to prevent an elite from seizing power, people need to 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 the constitution. Thus, as Weber ([1920] 1958a) argues, the dissolution of strong kin networks is likely an essential precondition for the formation of liberal democracy.

[5] In addition, the biological theory of kin selection predicts that cousin marriage increases genetic relatedness and thereby altruistic behaviour among kin (Hamilton, 1964). The inbreeding coefficient of first-cousin offspring is small though (1/16 compared to 1/4 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, models in evolutionary game theory and lab experiments provide evidence that increased network fluidity promotes cooperation (Perc and Szolnoki, 2010; Rand *et al.*, 2011). Consistently, Henrich *et al.* (2001), Herrmann *et al.* (2008) and Gächter and Schulz (2016) found that cooperation and honesty is higher in more individualistic societies.

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 and ultimately liberal democracy (Greif, 2006a; Greif and Tabellini, 2017; Henrich, 2020).

This paper provides empirical evidence for those relationships, i.e., that weak kin networks are detrimental for the formation of participatory institutions and that the medieval Church dissolved European clan-based societies and fostered participatory institutions already in the medieval times. I provide evidence for those relationships among diverse participatory institutions (contemporary countries, historical ethnicities and medieval cities). Even though there are vast differences between those participatory institutions, the unifying feature is that people across the boundaries of kin groups work together and participate in the political process. Consistently, I show that contemporary civicness as proxied by political participation is predicted by the strength of kin networks.

The main purpose of the historical analysis on commune formation is to demonstrate that European pre-Reformation developments are consistent with the Church marriage hypothesis exemplified by the emergence of city-level inclusive institutions. And while many scholars stressed communes as a decisive factor for Europe's growth and the formation of parliaments (e.g., Weber, [1921] 1958b; Mokyr, 1990; Greif, 2006a,b; González de Lara *et al.*, 2008; Van Zanden *et al.*, 2012; Stasavage, 2014; Guiso *et al.*, 2016; Angelucci *et al.*, 2017; Cox, 2017; Wahl, 2018; Cox *et al.*, 2020), it is beyond the scope of the paper to investigate the mechanisms linking communes to national-level inclusive political institutions.[7]

The focus on kin networks should not obscure the fact that other factors contributed to and shaped commune formation, the rise of national democracies and the Great divergence more generally. For example, intricate work has been devoted to understanding regional and temporal variation in commune formation within Europe. This includes Guiso *et al.* (2016), who provided evidence that the presence of bishops, who could act as a guarantor of a sworn pact among citizens, and weak central political power was conducive for commune formation in northern Italy. Scheidel (2019), Cox *et al.* (2020) and Stasavage (2020) provided evidence that political fragmentation and war, which increased rulers' willingness to cease government rights to merchants in exchange for payments, was conducive for the formation of representative institutions.[8]

Conceptually, I view these explanations as part of a co-evolutionary process.[9] And while the paper does not address these (potentially region-specific) political processes, it does suggest that the Church's marriage regulations and the dissolution of clans in Europe is one critical factor in this process since it shaped conditions that were favourable for unrelated people who shared common interests (e.g., merchants) to cooperate across kin groups to form participatory institutions. As such, it highlights one factor that may aid in our understanding of why communes only arose in Christian Europe and why other regions of the world such as China or the Middle

[7] Kin networks likely impacted other determinants of Europe's development such as a culture of growth (Mokyr, 2016), the diffusion of new technologies (De la Croix *et al.*, 2018), the European marriage pattern (Voigtlaender and Voth, 2006; 2013; De Moor and van Zanden, 2010) or feudalism (Blaydes and Cheney, 2013). For example, Mitterauer (2010), Fukuyaman (2011) and Henrich (2020) stressed the role of weak kin networks for the emergence of feudalism.

[8] Religious restrictions (Kuran, 2004; 2011; Rubin, 2017) that hampered the formation of growth-enhancing institutions in the Middle East, parallel cousin marriage in Arabic societies (Chaney, 2020) and the weaker role of the Catholic Church as a legitimising agent compared to Islamic institutions (Rubin, 2017) are further determinants explaining the Great Divergence.

[9] See also Bisin and Verdier (2017) and Nunn (2021) on the co-evolutionary perspective.

East, in which strong kin networks in the form of clans existed, did not experience the formation of communes and representative governments.[10]

1.2. *The Churches' Marriage Regulations: Historical Background*

Paleogenomic evidence, isotope analysis, historic writings, Germanic legal codes, Nordic sagas and historic kinship terminology all highlight the historical importance of strong kin networks among Celtic, Slavic and Germanic tribes (see, e.g., Goody, 1983; Ausenda, 1999; Ubl, 2008; Mitterauer, 2010; Amorim *et al.*, 2018).[11] A finding that is reaffirmed by pre-Christian European kinship terminology, which suggests the presence of lineage-based societies (for details see below). 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 prohibited marriage among biological (cousins), affinal (in-laws) and spiritual (e.g., god children) relatives. Furthermore, Church regulations demanded free consent of groom and bride and prohibited polygamy, divorce, and discouraged remarriage and adoption. The introductions of these regulations were a gradual process, in which different strands of Christianity followed different paths, and even within the same strands regional differences existed.[12] And while it is unlikely that the Church was able to suppress traditional marriage practices instantaneously, to change marriage patterns, it is sufficient that the prohibitions have had some impact. Here I sketch the regulations in the Western (Roman Catholic) and Eastern (Orthodox) Church and discuss the enforcement of the prohibitions. A detailed chronological table of the prohibitions is given in Online Appendix A.1.

1.2.1. *Chronological overview*

In the fourth 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 fifth 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 (Gaudemet, 1996; Ubl, 2008). Between 511 to 627 CE, thirteen out of seventeen 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 751–68) 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 radicalised, i.e., extended to sixth cousins, in the eleventh 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

[10] Consistent with the marriage hypothesis, it also offers an explanation why communes first emerged in the area of the Carolingian Empire (which experienced particularly strong enforcement of the marriage regulations by secular rulers) and why communes only emerged later within the realm of the Eastern Orthodox Church (where the marriage regulations never reached the same significance as in the Catholic Church).

[11] See also DNA and isotope analyses that suggest patrilocality and lineage exogamy across many European Neolithic excavation sites (Haak *et al.*, 2008; Knipper *et al.*, 2017; Zeng *et al.*, 2018; Mittnik *et al.*, 2019; Schroeder *et al.*, 2019; Sjoergren *et al.*, 2020). These elements of high kinship intensity are characteristic of patrilineal clan structures and ethnographic records suggest that they often go hand-in-hand with a preference for cross-cousin marriage.

[12] 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).

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 decentralised Western Church into a strong institution with centralised 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 Online 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 III therefore weakened 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. 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).[13]

1.2.2. *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 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 wilful transgressors were faced with (stigmatic) penance, confiscation of property, corporal punishment, slavery or excommunication.[14] 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 emphasised 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 behavioural effects of beliefs in a punishing moralistic god).

Altogether, this documents that 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, 2010). And even though it is clear that the early medieval Church was not able to immediately and universally eradicate pagan traditions in its entirety, for a change in kin structures to occur, it is sufficient that the Church prohibitions have had some effect. And indeed, historical sources such as legal codes, property registries of abbeys and changing kin terminology document a

[13] For example, the Eastern Church's Patriarch Alexius Studites (Patriarch between 1025–43) ruled that consanguineous marriages are valid if there was genuine ignorance of the relationship. Only in 1166 the Synod of Constantinople ruled that claiming ignorance was not a sufficient excuse (Angold, 1995).

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

shift towards the nuclear family as early as the ninth 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).

1.2.3. *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 (340–97) 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.

2. Global Analysis: Strong Kin networks and Participatory Institutions

Here, I first describe the data (Subsection 2.1) and then establish a robust association between weak kin networks and participatory institutions, both across contemporary countries (Subsection 2.2) and historical ethnicities (Subsection 2.3). I provide evidence on the deep roots of democracy by relying on measures for kin networks that pre-date modern developments. Furthermore, I show that the relationship between kin networks and participatory institutions cannot be explained by an omitted European or Christian factor per se since the relation holds globally, that is, also among societies with very different histories than European ones. Asking what gave rise to Europe's almost uniquely weak kin structure, I show that medieval Church exposure is positively associated with weak historical and contemporary kin networks (Online Appendices B.4–B.6).

2.1. *Data: Measures of Kin Networks and Medieval Church Exposure*

Several features of kin-based institutions, such as co-residence of extended families, the presence of lineages or kin marriages, all determine the strength of kin networks (Schulz *et al.*, 2019). Here, I rely on measures of cousin marriages and cousin-term differentiation as proxy variables for the strength of kin networks. While they do not capture all aspects of the strength of kin networks, both correlate with other features of kin-based institutions.[15] In addition to the two measures that capture kin networks, I created measures for Eastern and Western Church exposure.

2.1.1. *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

[15] Schulz *et al.* (2019) constructed a kinship intensity index (KII) based on the Ethnographic Atlas that incorporates further elements of kin-based institutions (unilineal descent, polygyny, co-residence of extended family, community organisation, cousin-marriage preference). The results hold using the KII as an alternative explanatory variable.

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[16] (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.[17]

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.[18] At the ethnicity level, I coded a binary variable denoting whether ethnicities differentiate cousin terms. At the country level, the variable captures the proportion of people speaking a language that differentiates cousin terms (the aggregation of this and the following indicator follow the methodology of Giuliano and Nunn, 2018, as extended by Bahrami-Rad *et al.*, 2021).

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.

2.1.2. *Cousin-marriage rates*

This indicator gives a quantifiable measure on countries' twentieth-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 vary. 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).

2.1.3. *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

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

[17] The transformation follows Christianisation chronologically. The first Germanic language to transform was English (eleventh 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.

[18] Originally compiled by Murdock, I used the data from the extended version provided by D-PLACE (Kirby *et al.*, 2016). I excluded eight ethnicities whose characteristics refer to a date prior to 1500 CE. The EA classifies cousin 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.

synod that prohibited cousin marriage. In the Eastern Church's sphere, the starting year is 692 when the Synod of Trullo banned cousin marriage. For areas Christianised 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 gradually became Christian (notably Spain, Portugal and Germany), I employ the year that most of the area of the present-day country was incorporated into the Church's administration. Online Appendix Table A2 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 in Western and Eastern Church exposure up to the year 1500.

2.2. *Kin Networks and Modern-Day Democracies*

Here, I show that countries' democracy scores are robustly associated with the strength of kin networks. To capture democracy, I use the Polity IV democracy index averaged over twenty years (from 1996 to 2015). This measure ranges from −10 (hereditary monarchy) to 10 (consolidated democracy). The two pre-industrial explanatory variables, cousin-term differentiation and cousin-marriage preference, rule out simple reverse causality or estimation bias due to omitted factors that only emerged subsequently (independent of any historical deep factor). In addition, I report the reduced-form relation between medieval Church exposure and democracy.

The regression analysis (see 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) showed 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) showed a positive association between pathogen stress and the strength of kin networks, while irrigation is related to collectivism (Buggle, 2020) 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. For this reason, I do not use them jointly together with all other covariates (e.g., in the case of log percent cousin marriage the variance inflation factor is above 10; a value associated with multicollinearity). The ethnicity-level analysis of the next section overcomes this limitation. The data set on ethnicities largely rest on non-European societies, contains more observations and I can thus control for a larger set of covariates simultaneously.

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

	Democracy (Polity IV—average between 1996 and 2015)							
	(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)	(2.00)	(2.18)	(1.75)	(2.16)	(2.00)	(1.81)	(1.49)	(1.98)
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)	(1.41)	(1.13)	(1.23)	(1.13)	(1.12)	(1.18)	(1.39)	(1.15)
R^2	0.299	0.356	0.419	0.428	0.444	0.464	0.494	0.442
Log percent cousin marriage	−2.65***	−2.24***	−1.36***	−1.11***	−1.26***	−1.29***	−0.15	−1.26***
(*N*: 69)	(0.30)	(0.35)	(0.35)	(0.39)	(0.38)	(0.45)	(0.55)	(0.37)
R^2	0.517	0.616	0.717	0.727	0.767	0.647	0.732	0.652
Western Church exp. (a.a. in 100 yr)	1.31***	1.30***	1.06***	1.12***	1.10***	0.51***	0.74***	0.38**
	(0.16)	(0.23)	(0.18)	(0.20)	(0.20)	(0.12)	(0.19)	(0.17)
Eastern Church exp. (a.a. in 100 yr)	1.22***	1.12***	1.35***	1.53***	1.45***	0.04	0.81***	−0.20
(*N*: 145)	(0.22)	(0.21)	(0.22)	(0.31)	(0.37)	(0.32)	(0.26)	(0.41)
R^2	0.329	0.385	0.465	0.492	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 FEs	–	–	–	–	–	Yes	–	–
Fraction major religions	–	–	–	–	–	–	Yes	–
Fraction European descent	–	–	–	–	–	–	–	Yes

Notes: Cross-country OLS regressions. The 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 panel), cousin-term differentiation (second panel), log percent cousin marriages (third panel) and ancestor-adjusted Western and Eastern Church exposure (in hundred years, fourth panel). 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) contains continent fixed effects, column (7) controls for the fraction of adherence to major religions (Christians, Muslim, Hindus, Buddhists) and columns (8) adds the fraction of people with European descent. Conley SEs based on genetic distance (using a Bartlett kernel and a cutoff of FST 0.01) are reported in parentheses. $^{*}p \leq 0.1$, $^{**}p \leq 0.05$, $^{***}p \leq 0.01$.

Cultural practices and shared histories may transcend contemporary country boarders. This raises concerns about the independence of the error terms. Table 1 therefore reports the SEs of Conley (1999) based on genetic distance. Autocorrelation is modelled as declining in genetic distance away from the observation (using a Bartlett kernel) up to a fixation index (FST) threshold of 0.01 (for reference, this represents the genetic distance, e.g., between the United Kingdom and Uzbekistan, or between Saudi Arabia and Uzbekistan). Genetic distance proxies the timing of the divergence of societies and therefore predicts cultural similarities (Spolaore and Wacziarg, 2009; Muthukrishna *et al.*, 2020). Compared to Conley SEs based on geographic distance, this has the advantage that it accounts for non-independence due to historical migration even if there is a large geographic distance as is the case, e.g., for the United States and Western European countries. Conley SEs based on geographic distance and robust SEs are reported in Online Appendix Table B1.

The regression results paint a consistent picture. Countries that differentiate cousin terms have on average roughly a 7.6 units lower democracy score compared to non-differentiating countries (column (1), panel 2). Similarly, countries preferring parallel-cousin marriage have roughly a 9 units lower score compared to countries that do not have a cousin-marriage preference (column (1), panel 1). Doubling cousin marriages decreases the democracy score by about 2 units ($\approx 2.65 \cdot ln(2)$) (panel 3). Moreover, the regressions reveal high R^2. In panel 3, column (1), twentieth-century cousin-marriage rates explain more than 50% 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 (fourth panel). 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. This provides evidence that the link between kinship and political institutions holds more generally and does not simply capture a European effect or one driven by contemporary religious adherence.

Table 1 reports Conley SEs based on genetic distance but all results hold using Conley SEs based on geographic distance (see Online Appendix Table B1). To further address spatial autocorrelation, I estimated specifications that control for the average value of the explanatory variable of nearby countries (i.e., countries whose capitals fall within a 2,000 km radius). These estimates thus rest on local variation in kinship and Church exposure only. Online Appendix Table B2 shows that local variation in kinship explains variation in democracy. Though, unsurprisingly, this relation is less pronounced and not significant in some of the more demanding specifications, i.e., specifications that either rest on fewer observations or contain covariates that are highly correlated with kinship such as the fraction of major religions. In further robustness checks, I confirm that the results are robust to controlling for log GDP per capita (Online Appendix Table B3), even though GDP per capita is most likely also an outcome of kin networks and therefore a bad control.

Online Appendices B.4–B.6 shed light on the relation between Church exposure and the strength of kin networks. They show a robust positive association between medieval Church

exposure and weak kin networks at the country level (Table B4), European regional level (Table B5) and the level of ethnic societies (Table B6). This provides evidence that the Church dissolved strong kin networks in Europe—a transformation that is also reflected by a kin terminology in European languages that changed chronologically following the introduction of Christianity.

2.3. *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 weak kinship robustly predicts local democratic traditions. Those local democratic traditions are associated with modern-day democratic institutions (Giuliano and Nunn, 2013) and already existed around the world before industrialisation or European contact. This is evidence that democratisation is not a uniquely European phenomenon. The analysis rests on the Ethnographic Atlas, which contains characteristics of about 1,600 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 Subsection 2.1).

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 hunting and gathering, fishing, animal husbandry and agriculture, columns (4)–(8)), existence of property rights for movable objects (e.g., livestock) and land (columns (5)–(8)), settlement complexity, judicial hierarchies, and the use of irrigation (columns (6)–(8)). Settlement complexity is a widely used proxy for development (Michalopoulos and Papaioannou, 2013) and together with the other variables mitigates concerns that the coefficients are biased due to factors related to development. Column (8) controls for deep Christianisation. The coding follows Korotayev (2003) and denotes ethnicities following a Christian religion at least since 1500 CE.[19] SEs are clustered on 101 language families, which addresses non-independence due to shared cultural histories as proxied by the shared language family.

The regression results 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 is associated with a decrease in the likelihood of local democratic traditions by 14 percentage points (first panel, column (1)). The coefficients are remarkably robust to the inclusion of the covariates. Following Oster (2019), unobserved omitted variables would need to be twice as important compared to the twenty-six included covariates in column (7) to fully account for

[19] Deep Christianisation is a binary indicator and does not distinguish between strands of Christianity. It mostly rests on the expertise of Korotayev (2003). The regression analysis only contains twenty-three ethnicities that are coded as 'deep Christianisation'. Excluding those ethnicities hardly changes the results.

Table 2. *Ethnicities' Kinship 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 Christianisation	–	–	–	–	–	–	–	Yes

Notes: Ethnicity-level regressions of local pre-industrial democratic traditions on cousin-marriage preference (first panel) and cousin-term differentiation (second panel). Each panel 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 three subsistence indicators (percent reliance on fishing, animal husbandry, agriculture); column (5) adds the existence of property rights (separately 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 Christianisation. Robust SEs clustered on language families are reported in parentheses. $^{*}p \leq 0.1$, $^{**}p \leq 0.05$, $^{***}p \leq 0.01$.

this finding (assuming that unobservables would increase the R^2 by about the same amount as the included covariates). Given that this large number of covariates was specifically selected to address endogeneity, it provides evidence that the relation is unlikely entirely due to an unobserved factor.

The results hold when controlling for 'deep Christianisation' (column (8)). This is evidence that the link between kin networks and democracy is not driven by an omitted factor associated with medieval Christianisation. Online Appendix B.5 reveals a robust negative relation of deep Christianisation with ethnicities' cousin-marriage practices and the Inuit kin terminology, which is associated with the independent nuclear family. This is further evidence that the medieval Church dissolved strong kin networks among European societies.

3. Historical Analysis: Church Exposure and Communes

The global analyses of the previous section provide robust evidence that strong 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 panel 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 (Subsection 3.2).

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 one 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 eleventh to thirteenth centuries—is predictive of commune formation. Second, in a cross-section analysis (Subsection 3.3) I exploit regional variation in sixth- to eighth-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 Online Appendix C.6 I show that, consistent with the marriage hypothesis, countries' urban population is positively associated with Western Church exposure and significantly less so with Eastern Church exposure.

3.1. *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 ten thousand inhabitants between the year 800 and 1500 CE (in hundred-year intervals) and is based on Bairoch *et al.* (1988), as used and amended by Bosker *et al.* (2013). The ten-thousand-inhabitants cutoff follows Bosker *et al.* (2013). Robustness checks on a sub-sample show that results hold using a lower cutoff of five thousand inhabitants. I capped the analysis at 1500 CE 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) relied 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 Online 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 already includes cities with at least five thousand inhabitants.

3.1.1. *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 1500 CE (see Online 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:

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

Church exposure Exp_i^y is the sum of all instances (in fifty-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 550 CE is the first instance, because the first synods prohibiting cousin marriage occurred between 500 and 550 CE. 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 1500 CE when all of Europe was Christianised, 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) estimated that fourteenth-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.[20] All results are qualitatively similar based on smaller (80 km) or larger radii (120 km; analysis available upon request). Online Appendix Table C1 gives a descriptive overview of the panel data set.

3.2. *Difference-in-Difference 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 eleventh and thirteenth centuries (specification 2).

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

3.2.1. *Specification 1: Church exposure and communes*

This analysis is based on a difference-in-difference specification with staggered entry:

$$S_{t,c} = c + \beta CE_{t,c} + \theta P_{t,c} + \lambda_c + \gamma_t + \vartheta_c \times \gamma_t + \varepsilon_{t,c}. \quad (1)$$

Here subscript t denotes the time period (hundred-year intervals) and c the city. The binary outcome measure for the commune is $S_{t,c}$; $CE_{t,c}$ denotes the duration of Church exposure in centuries up to year t in city c; $P_{t,c}$ denotes other time-varying city-level characteristics; the λ_c are city fixed effects and the γ_t are time-period fixed effects. Several specifications interact time-invariant characteristics with year-fixed effects denoted by $\vartheta_c \times \gamma_t$. The error term $\varepsilon_{t,c}$ 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 that potentially co-determine Christianisation 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 ($P_{t,c}$) and time-invariant ones each interacted with the full set of time period indicators ($\vartheta_c \times \gamma_t$). Second, I show that there are no pre-trends in the formation of communes (Subsection 3.3 below). Third, I exploit two instances where Christianisation 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 (Online Appendix Tables C3 and C4).

3.2.2. *Specification 2: extended marriage prohibitions and communes*

Specification 2 exploits a temporal extension of the marriage prohibitions and investigates 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 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 $EP_{t,c}$ is added, which captures the duration and timing of the extended marriage prohibitions:

$$S_{t,c} = c + \beta CE_{t,c} + \beta^{EP} EP_{t,c} + \theta P_{t,c} + \lambda_c + \gamma_t + \vartheta_c \times \gamma_t + \varepsilon_{t,c}. \quad (2)$$

Historian Karl Ubl (2008) suggests that the extended prohibitions were unanticipated. Initially, these extended prohibitions were introduced by Emperor Heinrich II at the Synod of Diedenhofen. They were likely aimed at weakening the power of two specific competitors to Heinrich II's throne and a historical source details the surprise and uproar among the clergy and nobility when the extended prohibitions were introduced; subsequently, the Church would endorse the extensions influenced by the teachings of Peter Damian (Ubl, 2008). This mitigates concerns that the extension reflects unobserved changes in societal attitudes toward incest. Consistently, the

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

	Commune city							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Specification 1								
Western Church exposure	0.122***	0.119***	0.105***	0.123***	0.097***	0.123***	0.133***	0.103***
(in 100 yr)	(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 B: Specification 2								
Western Church exposure	0.060***	0.058***	0.070***	0.061***	0.066***	0.066***	0.064***	0.075***
(in 100 yr)	(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 yr)	(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 FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plundered	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Period FEs × sea & river	–	Yes	–	–	–	–	–	Yes
Period FEs × caloric suit.	–	–	Yes	–	–	–	–	Yes
Period FEs × Roman roads	–	–	–	Yes	–	–	–	Yes
Period FEs × Europe	–	–	–	–	Yes	–	–	Yes
Period FEs × ever bishopric	–	–	–	–	–	Yes	–	Yes
Bishopric	–	–	–	–	–	Yes	–	Yes
Population & pop. lagged	–	–	–	–	–	–	Yes	Yes
N	2,712	2,712	2,712	2,712	2,712	2,712	2,373	2,373
Cities	339	339	339	339	339	339	339	339

Notes: Linear probability regressions of commune on Western Church exposure (panel A), and on Church exposure and extended marriage prohibitions (panel B). Each column thus reports on two regressions. An observation is a city in each century between 800 to 1500 CE. 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. Conley SEs (with a 500 km cutoff) are reported in parentheses. $^{*}p \leq 0.1$, $^{**}p \leq 0.05$, $^{***}p \leq 0.01$.

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.

3.2.3. *Results*

Table 3 reports the regression results. Each column reports on two regressions: panel A on *specification 1* (i.e., Church exposure), panel B 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 (White, 1962; Mitterauer, 2010; Andersen *et al.*, 2016), shifting trade routes (Acemoglu *et al.*, 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) provided 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 for whether a city was the seat of a bishopric in a given century as well as a time-invariant variable indicating whether the city was ever the seat of a bishopric (interacted with time periods). Further controls are current and previous century city populations (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 A 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 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 five thousand inhabitants (Wahl, 2016; Online Appendix Table C4). The results also hold in two instances in which Christianisation was determined by the idiosyncrasies of medieval warfare (Reconquista and eastward expansion of northern Germany)[21] as well as within other historical political entities such as the Carolingian Empire or Roman Britain (Online Appendix Tables C3–C4). This is evidence against the notion that other institutional factors or endogenous Christianisation drive the results. Yet, it is consistent with the historical account of an indiscriminate, medieval Christianisation by Sword, which was determined by geographic proximity to already Christianised areas and the idiosyncrasies of medieval warfare.

Panel B of Table 3 reports the regression results of specification 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 forty-one control variables are used simultaneously, does the coefficient become insignificant. Consistent with the marriage hypothesis, the coefficients for 'Church exposure' in panel B remain significant across specifications. The coefficients capture all Church factors, including the marriage prohibition, which were in place before and after the extended prohibitions.

All results are robust to accounting for spatial autocorrelation using Conley SEs with Bartlett kernels (i.e., with weights declining away from each city) and varying distance cutoffs (starting from 250 km up to 2,500 km in 250 km intervals). Even when the distance cutoff is set at 2,500 km (about a fifty-day travel in medieval times), all coefficients that are at least significant at the 5% level in Table 3 (based on robust SEs) are also significant at the 5% level

[21] 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.

based on Conley SEs (Online Appendix Table C2 reports Conley SEs with 500 and 2,500 km cutoffs, implemented via the user-written 'acreg' stata command Colella *et al.*, 2019). The Online Appendix also reports 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. Online Appendix Table C5 mirrors specification 1 and reveals that Church exposure is significantly associated with cities' population in most specifications. An additional century of exposure is associated with about 1,900 additional individuals living in the city.[22] Church exposure is also positively associated with countries' urbanisation (Online Appendix Table C6). Consistent with the marriage hypothesis, it is less pronounced for the Eastern compared to the Western Church with its stricter prohibitions and enforcement.

3.3. *Event Study with Staggered Entry*

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

$$S_{t,c} = c + \sum_{a=-3}^{a=p} \beta_w^a CExW_{t,c}^a + \theta P_{t,c} + \lambda_c + \gamma_t + \vartheta_c \times \gamma_t + \varepsilon_{t,c},$$

where $CExW_{t,c}^a$ is an indicator variable that takes the value 1 if at time t city c's Church exposure started a centuries later ($a < 0$) or earlier ($a > 0$) or at some point during the century ending in t ($a = 0$). For example, $CExW_{t,c}^1 = 1$ denotes that at time t city c's Church exposure started during the century ending in $t - 1$. The coefficient β_w^a therefore captures the association between Church exposure and commune formation 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_t and city fixed effects λ_c. The regression outputs are reported in Online Appendix Table C7 (column 1).

The left-hand side of Figure 2 plots the estimated beta coefficients β_w^a of the event-study regression (specification 3). There is 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 a city being a commune increases following the first century a city is exposed to the Church ($a = 0$), though this increase is not significant initially. From then on, the probability steadily increases. These results are robust to the inclusion of the same covariates as used in Table 1 (Online Appendix Table C7).

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

$$S_{t,c} = c + \sum_{a=-p}^{a=p} \beta_w^a CExW_{t,c}^a + \sum_{a=-p}^{a=p} \beta_{Ebw}^a ExtBanW_{t,c}^a + \lambda_c + \gamma_t + \vartheta_c \times \gamma_t + \varepsilon_{t,c}.$$

The right-hand side of Figure 2 shows the coefficients of extended marriage prohibitions (reported in Online Appendix Table C8, column 1). Following the introduction of the extended prohibitions, the presence of communes increases. Again, there is no evidence of a

[22] The association is insignificant and the coefficients decrease in the three specifications that control for (i) caloric suitability interacted with period fixed effects, (ii) a European time trend, or (iii) all covariates simultaneously.

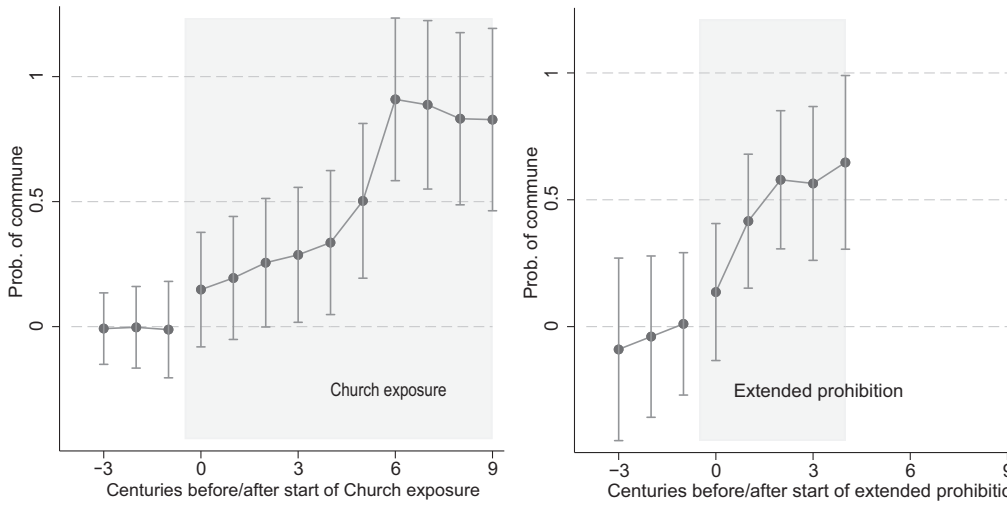

Fig. 2. *Church Exposure and Commune Formation.*
Notes: Event-study estimates of the relationship between Church exposure and the probability of being a commune (left panel, following specification 3 reported in Online Appendix Table C7, column 1); and event-study estimates of the relationship between extended prohibitions and the probability of being a commune (right panel, following specification 4 reported in Online Appendix Table C8, column 1). Displayed are 95% confidence intervals. Grey shading denotes exposure, which starts at some point during the century whose endpoint is denoted by '0'.

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. The event-study results hold using Conley SEs with weights declining away from each city (using cutoffs between 250 and 2,500 km in 250 km intervals) though the SEs are smaller (available upon request).

3.4. *Incest Legislation Exposure within the Area of the Carolingian Empire*

This section adds historical evidence that marriage prohibitions was one Church factor conducive to commune formation by exploiting regional variation in sixth- to eight-century incest legislation within the area that later comprised the Carolingian Empire. In cross-sectional regressions, I establish that anti-incest legislation exposure predicts the occurrence of communes within this area. Clearly, this analysis is not intended to establish an unassailable causal link. Yet, it adds evidence on the marriage-hypothesis and 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-eighth 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 hypotheses and provides a piece of correlational evidence consistent with the marriage hypothesis. Yet, given the shortcomings common to cross-sectional analyses, this section has to be seen in conjunction with the difference-in-difference and global approaches of the previous

sections, as well as the individual-level analysis linking kin networks to political participation in the subsequent section.

3.4.1. *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 centralised power. Sixth- to eight-century incest legislations were spearheaded by bishops' decentralised activity in the Frankish kingdoms. Bishops' differing opinions on incest created regional variation in incest legislation exposure (Ubl, 2008). Well-preserved participation lists of sixth- to eight-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 listed all known Merovingian synods, and Hartmann (1989) for pre-Carolingian (before 750 CE) Roman synods. Except for one (Synod of Auxerre in 585), all other twelve of the thirteen Merovingian and the two pre-Carolingian Roman synods that passed incest legislation contain subscription lists of the participating bishops.[23] 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 favoured a stronger punishment of cousin marriage got a weight of three.[24] 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 standardised the indicator. A high incest legislation exposure of a city thus reflects 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.[25]

[23] Subscription lists for synods, which took place after 750 CE, are missing. The indicator thus captures only pre-Carolingian synodal incest legislation based on Merovingian and Roman synodal activity.

[24] 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.

[25] *Synodal activity* captures twenty-nine out of forty-seven synods in Merovingian Gaul between 511 and 626. For the other eighteen 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.

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.[26] Included in the regression are seventy-five cities that fall within the Carolingian Empire and had non-zero population in the year 1200.

3.4.2. *Results*

Table 4 reports the regression results. Each column reports on two regressions—the first panel on incest legislation exposure, while the second panel 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 Subsection 3.2: 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.

The results reveal a quantitatively large association. An increase of one SD in incest legislation exposure is associated with 14 to 17 higher percentage points of being a commune several centuries later (first panel). Controlling for synodal activity (second panel) leads to similar point estimates, while they are estimated with less precision. Importantly, the results hold when controlling for synodal activity or Church exposure. The results are also robust to Conley SEs to account for spatial autocorrelation (see Online Appendix Table C9). In fact, Conley SEs are considerably smaller, which may indicate that errors are spatially negatively correlated.

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 an indicator variable for Carolingian northern Italy, it addresses concerns that other Church components, political institutions or factors emerging only after the mid-eighth century fully explain the previous section's reduced-form link between Church exposure and communes.

A drawback of the analysis is that it rests on a noisy measure of incest legislation exposure and contains only seventy-five cities, which reduces the power of the analysis. To strengthen the findings, Online Appendix Table C10 reports regressions with a city's population as dependent variable. Data availability allows us to go as far back in time as 800 CE when the Carolingian Empire was forming. The analysis shows that, already in 800 CE, 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.[27]

[26] Communes in northern Italy emerged earlier. Bosker *et al.* (2013) coded 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 versus 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.

[27] The finding that urban population increases first and communes emerge only later following pre-Carolingian incest legislation can be reconciled within a latent variable framework. With the decrease in the strength of kin networks, the propensity to cooperate across the kin group increases. This shows up first as a higher urban population (i.e., people across kin groups living together) and only later is it revealed by a formal change in city institutions.

Table 4. *Incest Legislation Exposure and Communes in the Carolingian Empire.*

	Commune city (1200 CE)							
	(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	−0.06	−0.05	−0.06	−0.06	−0.07	−0.06	−0.06	−0.06
	(0.04)	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)	(0.04)	(0.05)
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)	−0.06	−0.05	−0.06	−0.06	−0.07	−0.06	−0.06	−0.06
	(0.04)	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)	(0.04)	(0.05)
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 (1200 CE)	–	–	–	–	Yes	Yes	–	Yes
City population (1200 CE)	–	–	–	–	–	–	Yes	Yes

Notes: Linear probability OLS cross-section regressions of commune on incest legislation exposure. Each column reports on two regressions, one without (first panel) and one with (second panel) the synodal activity index as an additional control. An observation is a city within the boundaries of the Carolingian Empire that had a non-zero population in 1200 CE. All regressions control for Church exposure and an indicator variable for Carolingian northern 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 SEs are reported in parentheses. $^{*}p \leq 0.1$, $^{**}p \leq 0.05$, $^{***}p \leq 0.01$.

4. 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 the national election. This holds when comparing regions within European countries (Subsection 4.1). 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 (Subsection 4.2). Subsequent work by Schulz *et al.* (2019) and Enke (2019) shows that strong kin networks are also positively associated with psychological traits such as obedience and conformity. These traits are favourable to autocratic rule as they can reduce the likelihood of voicing opinions, launching campaigns or protesting ruling elites.

4.1. *Regional Variation of Cousin Marriage within European Countries and Civicness*

This section exploits regional variation in twentieth-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 data on cousin-marriage rates are based on dispensation records of the Catholic Church. The data were compiled by population geneticists who were granted access to archives of the Catholic Church and contain data for Spain (average of years 1911 to 1943, Pinto-Cisternas *et al.*, 1979), Italy (average of years 1910 to 1964, Cavalli-Sforza *et al.*, 2004) and France (average of years 1926 to 1958, Sutter and Goux, 1964). I augmented these data by Turkish cousin-marriage 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. Online Appendix Table B5 shows that Church exposure predicts cousin-marriage rates in those regions.

Table 5 reports the regression results of whether people voted in the last national election on the log percent 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 more firmly integrated into its infrastructure), addressing concerns that legacies of the Roman empire biases 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 Online Appendix E.2 for details), as well as religiousness

Table 5. *Cousin Marriage and Political Participation in Regions of Europe.*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Voted in last national election							
Log percent first-cousin marriage	−0.026***	−0.027***	−0.018*	−0.027***	−0.030***	−0.025**	−0.027***	−0.015*
(*N*: 20,343; regions: 68)	(0.009)	(0.010)	(0.010)	(0.009)	(0.009)	(0.010)	(0.010)	(0.009)
R^2	0.080	0.080	0.081	0.080	0.088	0.089	0.080	0.099
Wave & country FEs	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	–	–	–	Yes	–	–	–	Yes
Monastic presence religiousness/denom.	–	–	–	–	Yes	–	–	Yes
Educational attainment	–	–	–	–	–	Yes	–	Yes
City size/pop. density 500 CE	–	–	–	–	–	–	Yes	Yes

Notes: Individual-level OLS regressions of whether people voted in the last national election on log percent first-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 500 CE and (contemporary) city size. Column (8) controls for all variables simultaneously. Robust SEs clustered on the sixty-eight regions are reported in parentheses. $^{*}p \leq 0.1$, $^{**}p \leq 0.05$, $^{***}p \leq 0.01$.

(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 do not work through the marriage prohibitions drive 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 500 CE. In column (8) all controls are used simultaneously.

The results show that doubling cousin marriage decreases the probability to vote by about 1.8 ($\approx -0.026\, ln2$) percentage points (column (1)). The relation is robust to the introduction of covariates. All results hold using Conley SEs (with Bartlett kernels and a threshold of 2,500 km; see Online Appendix Table D1). In the Online Appendix, 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 (Online Appendix Table D2).

4.2. *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 analysis rests on respondents to the European Social Survey (ESS, waves 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. Analysis in the Online Appendix (Table D3) also includes 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 labour 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 that are directly related to kin networks.

Table 6. *Kin Networks in the Mothers' Originating Countries and Voting.*

	Voted in last national election					
	(1)	(2)	(3)	(4)	(5)	(6)
Cousin-marriage preferred, orig. 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	0.113	0.131	0.136	0.108
Cousin-term differentiation, orig. country	−0.031*	−0.027	−0.008	−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 percent cousin marriage, orig. 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	0.114	0.132	0.137	0.109
Wave FEs, resident country FEs, basic individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Geographic baseline of the mother's originating country	–	Yes	Yes	Yes	Yes	Yes
Religious denomination FEs & religiousness	–	–	Yes	–	Yes	–
Individual controls	–	–	–	Yes	Yes	–
Fraction European descent of the mother's origination country	–	–	–	–	–	Yes

Notes: Individual-level linear probability regression of whether the respondent voted on their 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 panel the explanatory variable is cousin-marriage preferred, in the second panel it is cousin-term differentiation and in the third panel it is the log percent cousin marriage. All regressions control for survey-wave fixed effects, resident country fixed effects and basic individual controls (age, age^2 and gender). Columns (2)–(6) add the geographic baseline of the mother's originating country (ruggedness, mean distance to waterways, absolute latitude, caloric suitability). Columns (3) and (5) control for religiousness and religious denomination (Atheist, Catholic, Protestant, Orthodox, other Christian, Jewish, Islamic, other non-Christian religion). Columns (4) and (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 SEs clustered at the resident country are reported in parentheses. $^{*}p \leq 0.1$, $^{**}p \leq 0.05$, $^{***}p \leq 0.01$.

To mitigate this possibility, I control for the baseline set of originating country controls. The following equation details the econometric specification:

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

Here 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 the binary outcome whether or not people voted in the last election; CM_c denotes the explanatory variable that captures the strength of kinship ties in country of ancestry c; the α_r are resident-country fixed effects (FEs); X_c is the geographic baseline of the mother's originating country (absolute latitude, ruggedness, mean distance to waterways, caloric suitability) and X_i denotes a vector of individual-level controls: age, age^2, gender, educational attainment (primary, secondary or tertiary), labour 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 FEs, 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 the mother's originating country. The results show that stronger kin networks are negatively associated with voting (column

(1)). In the case of the two indicators, cousin-marriage preferences and log percent 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 noisier measure since it captures the temporally more distant strength of kin networks embodied in language—all coefficients show the expected signs, while they are mostly not significant. Online Appendix D.3 shows that the results tend to hold similarly for a political activity indicator based on factors such as signing a petition or wearing a badge (Table D3) and even when including originating country fixed effects (Table D4).[28]

5. Discussion and Conclusion

This study provides evidence that strong kin networks are detrimental to participatory institutions and that the medieval Church's marriage prohibitions dissolved strong kin networks in Europe and thereby contributed to the emergence of participatory institutions already in the medieval ages.

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 modernisation. This link 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 marriage regulations created an almost uniquely weak kin structure among many European societies in which the nuclear family dominates and descent is traced bilaterally.

Second, I conduct a historical analysis linking the Church to participatory medieval institutions. This analysis allows me to demonstrate that pre-Enlightenment developments in Europe are consistent with the hypothesis that weakened kin networks contributed to the emergence of participatory institutions. The results—based on a difference-in-difference specification and exploiting instances in which Church exposure was purely determined by idiosyncrasies of medieval warfare—support a causal interpretation of the role of the Church on commune formation. Congruent with the global analysis, the historical analysis also provides evidence that kin networks are one factor linking the Church to communes. Regional and temporal tighter marriage prohibitions within Christendom predict the formation of communes.

Third, I shed light on one mechanism: 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 are a building block not only for participatory institutions but also for economic development more generally. For example, transmission of knowledge

[28] 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 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.

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 (McCloskey, 2016; 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 fractionalisation of societies.

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Additional Supporting Information may be found in the online version of this article:

Online Appendix
Replication Package

References

Acemoglu, D. and Robinson, J.A. (2012). *Why Nations Fail: The Origins of Power, Prosperity and Poverty*, New York: Crown.

Acemoglu, D. and Robinson, J.A. (2016). 'Paths to inclusive political institutions', in (J. Eloranta, E. Golson, A. Markevich and N. Wolf, eds.), *Economic History of Warfare and State Formation*, Singapore: Springer.

Acemoglu, D. and Robinson, J.A. (2019). *The Narrow corridor: States, Societies and the Fate of Liberty*, New York: Penguin Random House.

Acemoglu, D., Simon, J. and Robinson, J.A. (2005). 'The rise of Europe: Atlantic trade, institutional change, and economic growth', *American Economic Review*, vol. 95(3), pp. 546–79.

Addis, W.E. (1961). *A Catholic Dictionary*, Aeterna Press.

Akbari, M., Bahrami-Rad, D. and Kimbrough, E.O. (2019). 'Kinship, fractionalization and corruption', *Journal of Economic Behavior and Organization*, vol. 166, pp. 493–528.

Alesina, A. and Giuliano, P. (2010). 'The power of the family', *Journal of Economic Growth*, vol. 15(2), pp. 93–125.

Alesina, A. and Giuliano, P. (2011). 'Family ties and political participation', *Journal of the European Economic Association*, vol. 9(5), pp. 817–39.

Alesina, A. and Giuliano, P. (2014). 'Family ties', in (P. Aghion and S.N. Durlauf, eds.), *Handbook of Economic Growth*, Amsterdam: North-Holland.

Amorim, C.E.G., Vai, S., Posth, C., Modi, A., Koncz, I., Hakenbeck, S., La Rocca, M.C., Mende, B., Bobo, D., Pohl, W., Baricco, L.P., Bedini, E., Francalacci, P., Giostra, C., Vida, T., Winger, D., von Freeden, U., Ghirotto, S., Lari, M., Barbujani, G., Krause, J., Caramelli, D., Geary, P.J. and Veeramah, K.R. (2018). 'Understanding 6th-century barbarian social organization and migration through paleogenomics', *Nature Communications*, vol. 9(1), p. 3547.

Andersen, T.B., Jensen, P.S. and Skovsgaard, C. (2016). 'The heavy plow and the agricultural revolution in Medieval Europe', *Journal of Development Economics*, vol. 118, pp. 133–49.

Angelucci, C., Meraglia, S. and Voigtlaender, N. (2017). 'How merchant towns shaped parliaments: From the Norman Conquest of England to the Great Reform Act', Working Paper 23606, National Bureau of Economic Research.

Angold, M. (1995). *Church and Society in Byzantium under the Comneni 1081–1261*, Cambridge: Cambridge University Press.

Augustine. ([413/426] 1998). *The City of God Against the Pagans*, Cambridge: Cambridge University Press.

Ausenda, G. (1999). *Kinship and Marriage among the Visigoths*, Woodbridge: The Boydell Press.

Bahrami-Rad, D. (2021). 'Keeping it in the family: Female inheritance, inmarriage, and the status of women', *Journal of Development Economics*, vol. 153, 102714.

Bahrami-Rad, D., Becker, A. and Henrich, J. (2021). 'Tabulated nonsense? Testing the validity of the Ethnographic Atlas', *Economics Letters*, vol. 204, 109880.

Bairoch, P., Batou, J. and Chèvre, P. (1988). *La Population des villes Europeenees de 800à 1850: Banque de Données et Analyse Sommaire des Résultats*, Geneva: Centre d'histoire economique Internationale de l'Université de Genève, Libraire Droz.

Banfield, E.C. (1958). *The Moral Basis of a Backward Society*, New York: Free Press.

Bentzen, J.S., Kaarsen, N. and Wingender, A.M. (2017). 'Irrigation and autocracy', *Journal of the European Economic Association*, vol. 15(1), pp. 1–53.

Bisin, A. and Verdier, T. (2001). 'The economics of cultural transmission and the dynamics of preferences', *Journal of Economic Theory*, vol. 97(2), pp. 298–319.
Bisin, A. and Verdier, T. (2017). 'On the joint evolution of culture and institutions', Working paper 23375, National Bureau of Economic Research.
Bittles, A.H. (2001). 'Consanguinity and its relevance to clinical genetics', *Clinical Genetics*, vol. 60, pp. 89–98.
Bittles, A.H. and Black, M.L. (2010). 'Consanguineous marriage and human evolution', *Annual Review of Anthropology*, vol. 39, pp. 193–207.
Blaydes, L. and Chaney, E. (2013). 'The feudal revolution and Europe's rise: Political divergence of the Christian West and the Muslim World before 1500 CE', *American Political Science Review*, vol. 107, pp. 16–34.
Bosker, M., Buringh, E. and van Zanden, J.L. (2013). 'From Bagdhad to London: Unraveling urban development in Europe, the Middle East, and North Africa 800–1800', *Review of Economics and Statistics*, vol. 95, pp. 1418–37.
Bouchard, C.B. (1981). 'Consanguinity and noble marriages in the tenth and eleventh centuries', *Speculum*, vol. 56, pp. 268–87.
Boyd, R. and Richerson, P.J. (2005). *Not by Genes Alone: How Culture Transformed Human Evolution*, Oxford: Oxford University Press.
Buggle, J.C. (2020). 'Irrigation, collectivism and long-run technological divergence', *Journal of Economic Growth*, vol. 25(2), pp. 147–93.
Buonanno, P. and Vanin, P. (2017). 'Social closure, surnames and crime', *Journal of Economic Behavior and Organization*, vol. 137, pp. 160–75.
Carmichael, S. and Rijpma, A. (2017). 'Blood is thicker than water: Geography and the dispersal of family characteristics across the globe', *Cross-Cultural Research*, vol. 51, pp. 142–71.
Cavalli-Sforza, L.L., Moroni, A. and Zei, G. (2004). *Consanguinity, Inbreeding, and Genetic Drift in Italy*, Princeton, NJ: Princeton University Press.
Chaney, E. (2020). 'Islam and political structure in historical perspective', in (M. Cammet and P. Jones, eds.), *The Oxford Handbook of Politics in Muslim Societies*, pp. 33–52, New York: Oxford University Press.
Colella, F., Lalive, R., Sakalli, S.O. and Thoenig, M. (2019). 'Inference with arbitrary clustering', Discussion Paper 12584, Institute of Labor Economics.
Conley, T.G. (1999). 'GMM estimation with cross sectional dependence', *Journal of Econometrics*, vol. 92(1), pp. 1–45.
Cox, G.W. (2017). 'Political institutions, economic liberty, and the great divergence', *Journal of Economic History*, vol. 77(3), pp. 724–55.
Cox, G.W., Dincecco, M. and Onorato, M.G. (2020). 'War, trade, and the origins of representative institutions', Unpublished Manuscript.
Cox, D. and Fafchamps, M. (2008). 'Extended family and kinship networks: Economic insights and evolutionary directions', in (T.P. Schultz and J.A. Strauss, eds.), *Handbook of Development Economics*, pp. 3711–84, Amsterdam: Elsevier.
Daalgard, C-J., Kaarsen, N., Olsson, O. and Selaya, P. (2018) 'Roman roads to prosperity: Persistence and non-persistence of public goods provision', Working Paper DP12745, Centre for Economic Policy Research.
De Jong, M. (1998). 'An unresolved riddle: Early medieval incest legislation', in (I.N. Wood, ed.), *Franks and the Alamanni in the Merovingian Period*, pp. 107–24, Woodbridge: The Boydell Press.
De la Croix, D., Doepke, M. and Mokyr, J. (2018). 'Clans, guilds, and markets: Apprenticeship institutions and growth in the preindustrial economy', *Quarterly Journal of Economics*, vol. 133(1), pp. 1–70.
De Moor, T. and van Zanden, J.L. (2010). 'Girl power: The European marriage pattern and labour markets in the North Sea region in the late medieval and early modern period', *Economic History Review*, vol. 63(1), pp. 1–33.
Diamond, J. (1997). *Guns, Germs and Steel,* London: Vintage Books.
Donahue, C. (2008). *Law, Marriage, and Society in the Later Middle Ages: Arguments about Marriage in Five Courts*, Cambridge: Cambridge University Press.
Edlund, L. (2018). 'Cousin marriage is not a choice: Muslim marriage and underdevelopment', *American Economic Review*, vol. 108, pp. 353–7.
Enke, B. (2019). 'Kinship systems, cooperation and the evolution of culture', *Quarterly Journal of Economics*, vol. 134(2), pp. 953–1019.
Fernández, R. (2007). 'Women, work, and culture', *Journal of the European Economic Association*, vol. 5(2–3), pp. 61–79.
Fukuyama, F. (1995). *Trust: Social Virtues and the Creation of Prosperity*, New York: Free Press.
Fukuyama, F. (2011). *The Origins of Political Order: From Prehuman Times to the French Revolution*, New York: Farrar, Straus and Giroux.
Gächter, S. and Schulz, J.F. (2016). 'Intrinsic honesty and the prevalence of rule violations across societies', *Nature*, vol. 531, pp. 496–9.
Galor, O. and Klemp, M. (2015). 'Roots of autocracy', Working Paper 2015-7, Brown University.
Gaudemet, J. (1996). 'Du droit romain tardif aux conciles merovingiens: Les condamnations de l'inceste', *Zeitschrift der Savigny-Stiftung fuer Rechtsgeschichte*, vol. 82, pp. 369–79.
Giuliano, P. (2007). 'Living arrangements in Western Europe: Does cultural origin matter?', *Journal of the European Economic Association*, vol. 5(5), pp. 927–52.

Giuliano, P. and Nunn, N. (2013). 'The transmission of democracy: From the village to the nation-state', *American Economic Review*, vol. 103(3), pp. 86–92.
Giuliano, P and Nunn, N. (2018). 'Ancestral characteristics of modern populations', *Economic History of Developing Regions*, vol. 33(1), pp. 1–17.
González de Lara, Y., Greif, A. and Jha, S. (2008). 'The administrative foundations of self-enforcing constitutions', *American Economic Review*, vol. 98(2), pp. 105–9.
Goody, J. (1983). *The Development of the Family and Marriage in Europe*, Cambridge: Cambridge University Press.
Gorodnichenko, Y. and Roland, G. (2017). 'Culture, institutions and the wealth of nations', *Review of Economics and Statistics*, vol. 99(3), pp. 402–16.
Gorodnichenko, Y. and Roland, G. (2021). 'Culture, institutions and democratization', *Public Choice*, vol. 187(1–2), pp. 165–95.
Greif, A. (2006a). *Institutions and the Path to Economic Modernity: Lessons from Medieval Trade*, Cambridge: Cambridge University Press.
Greif, A. (2006b). 'Family structure, institutions, and growth: The origin and implications of Western corporatism', *American Economic Review*, vol. 96(2), pp. 308–12.
Greif, A. and Tabellini, G. (2010). 'Cultural and institutional bifurcation: China and Europe compared', *American Economic Review*, vol. 100(2), pp. 135–40.
Greif, A. and Tabellini, G. (2017). 'The clan and the cooperation: Sustaining cooperation in China and Europe', *Journal of Comparative Economics*, vol. 45(1), pp.1–35.
Guirkinger, C. and Platteau, J.-P. (2020). 'The dynamics of family systems', in (J.-M. Baland, F. Bourguignon and T. Verdier, eds.), *Handbook of Economic Development and Institutions*, pp. 449–519, Princeton, NJ: Princeton University Press.
Guiso, L., Sapienza, P. and Zingales, L. (2006). 'Does culture affect economic outcomes?', *Journal of Economic Perspectives*, vol. 20(2), pp. 23–48.
Guiso, L., Sapienza, P. and Zingales, L. (2016). 'Long term persistence', *Journal of the European Economic Association*, vol. 14(6), pp. 1401–36.
Haak, W., Brandt, G., De Jong, H.N., Meyer, C., Ganslmeier, R., Heyd, V., Hawkesworth, C., Pike, A.W.G., Meller, H. and Alt, K.W. (2008). 'Ancient DNA, strontium isotopes, and osteological analyses shed light on social and kinship organization of the later stone age', *Proceedings of the National Academy of Sciences*, vol. 105(47), pp. 18226–31.
Hamilton, W.D. (1964). 'The genetical evolution of social behaviour. I', *Journal of Theoretical Biology*, vol. 7(1), pp. 1–16.
Hamilton, W.D. (1975).'Innate social aptitudes of man: An approach from evolutionary genetics', *Biosocial Anthropology*, vol. 53, pp. 133–55.
Hartmann, W. (1989). *Die Synoden der Karolingerzeit im Frankenreich und in Italien*, Paderborn: Ferdinand Schoeningh.
Henrich, J. (2020). *W.E.I.R.D People: How Westerners became Individualistic, Self-Obsessed, Guild-Ridden, Analytic, Patient, Principled and Prosperious*, Princeton, NJ: Princeton University Press.
Henrich, J., Boyd, R., Bowles, S., Camerer, C., Fehr, E., Gintis, H. and McElreath, R. (2001). 'In search of Homo economicus: Behavioral experiments in 15 small-scale societies', *American Economic Review*, vol. 91(2), pp. 73–84.
Herrmann, B., Thöni, C. and Gächter, S. (2008). 'Antisocial punishment across societies', *Science*, vol. 319, pp. 1362–7.
Hillman, A.L., Metsuyanim, K. and Potrafke, N. (2015). 'Democracy with group identity', *European Journal of Political Economy*, vol. 40, pp. 274–87.
Hoben, A.D., Buunk, A.P., Fincher, C.L., Thornhill, R. and Schaller, M. (2010). 'On the adaptive origins and maladaptive consequences of human inbreeding: Parasite prevalence, immune functioning, and consanguineous marriage', *Evolutionary Psychology*, vol. 8(4), pp. 658–76.
Hoff, K. and Sen, A. (2016). 'The kin-system as a poverty trap?', in (S. Bowles, S.N. Durlauf and K. Hoff, eds.), *Poverty Traps*, pp. 95–115, Princeton, NJ: Princeton University Press.
Johnson, A.W. and Earle, T.K. (2000). *The Evolution of Human Societies: From Foraging Group to Agrarian State*, Stanford, CA: Stanford University Press.
Knipper, C., Mittnik, A., Massy, K., Kociumaka, C., Kucukkalipci, I., Maus, M., Wittenborn, F., Metz, S.E., Staskiewicz, A., Krause, J. and Stockhammer, P.W. (2017). 'Female exogamy and gene pool diversification at the transition from the Final Neolithic to the Early Bronze Age in central Europe', *Proceedings of the National Academy of Sciences*, vol. 114(38), pp. 10083–8.
Kirby, K.R., Gray, R.D., Greenhill, S.J., Jordan, F.M., Gomes-Ng, S., Bibiko, H-J, Blasi, D.E., Botero, C.A., Bowern, C., Ember, C.R., Leehr, D., Low, B.S., McCarter, J., Divale, W. and Gavin, M.C. (2016). 'D-PLACE: A global database of cultural, linguistic and environmental diversity', *PLoS ONE*, vol. 11(7), e0158391.
Kuran, T. (2004). 'Why the Middle East is economically underdeveloped: Historical mechanisms of institutional stagnation', *Journal of Economic Perspectives*, vol. 18(3), pp. 71–90.
Kuran, T. (2011). *The Long Divergence: How Islamic Law Held Back the Middle East*, Princeton, NJ: Princeton University Press.
Korotayev, A.V. (2003). 'Unilineal descent organization and deep Christianization: A cross-cultural comparison', *Cross-Cultural Research*, vol. 37(1), pp. 133–57.

La Ferrara, E. (2008). 'Family and kinship ties in development: An economist's perspective', *Afrique Contemporaine*, vol. 226(2), pp. 61–84.
Lowes, S. (2017). 'Matrilineal kinship and spousal cooperation: Evidence from the matrilineal belt', Unpublished Manuscript.
McCloskey, D. (2016). *Bourgeois Equality. How Ideas, Not Capital or Institutions, Enriched the World*, Chicago: University of Chicago Press.
Michalopoulos, S. and Papaioannou, E. (2013). 'Pre-colonial ethnic institutions and contemporary African development', *Econometrica*, vol. 81(1), pp. 113–52.
Mitterauer, M. (2010). *Why Europe? The Medieval Origins of its Special Path*, Chicago: University of Chicago Press.
Mittnik, A., Massy, K., Knipper, C., Wittenborn, F., Friedrich, R., Pfrengle, S., Burri, M., Carlichi-Witjes, N., Deeg, H., Furtwängler, A., Harbeck, M., von Heyking, K., Kociumaka, C., Kucukkalipci, I., Lindauer, S., Metz, S., Staskiewicz, A., Thiel, A., Wahl, J., Haak, W., Pernicka, E., Schiffels, S., Stockhammer, P.W. and Krause, J. (2019). 'Kinship-based social inequality in Bronze Age Europe', *Science*, vol. 366(6466), pp. 731–4.
Mokyr, J. (2016). *A Culture of Growth: The Origins of the Modern Economy*, Princeton, NJ: Princeton University Press.
Mokyr, J. (1990). *A Lever of Riches: Technological Creativity and Economic Progress*, New York: Oxford University Press.
Morgan, L.H. (1870). *Systems of Consanguinity and Affinity of the Human Family*, Lincoln, NE: University of Nebraska Press.
Moscona, J., Nathan, N. and Robinson, J. (2020) 'Segmentary lineage organization and conflict in Sub-Saharan Africa', *Econometrica*, vol. 88(5), pp. 1999–2036.
Murdock, G.P. (1949). *Social Structure*, New York: Free Press.
Muthukrishna, M., Bell, A.V., Henrich, J., Curtin, C.M., Gedranovich, A., McInerney, J. and Thue, B. (2020). 'Beyond Western, educated, industrial, rich, and democratic (WEIRD) psychology: Measuring and mapping scales of cultural and psychological distance', *Psychological Science*, vol. 31(6), pp. 678–701.
North, D., Wallis, J. and Weingast, B. (2009). *Violence and Social Orders: A Conceptual Framework for Interpreting Recorded Human History*, Cambridge: Cambridge University Press.
Nunn, N. (2021). 'History as evolution', in (A. Bisin and G. Federico, eds.), *Handbook of Historical Economics*, pp. 41–91, London: Academic Press.
Oster, E. (2019). 'Unobservable selection and coefficient stability: Theory and evidence', *Journal of Business and Economic Statistics*, vol. 37(2), pp. 187–204.
Perc, M. and Szolnoki, A. (2010). 'Coevolutionary games - a mini review', *Bio Systems*, vol. 99(2), pp. 109–25.
Pemberton, T.J. and Rosenberg, N.A. (2014). 'Population-genetic influences on genomic estimates of the inbreeding coefficient: A global perspective', *Human Heredity*, vol. 77(1–4), pp. 37–48.
Platteau, J.-P. (2009). 'Institutional obstacles to African economic development: State ethnicity and customs', *Journal of Economic Behavior and Organization*, vol. 71(3), pp. 669–89.
Platteau, J.-P. (2017). *Islam Instrumentalized: Religion and Politics in Historical Perspective*, Cambridge: Cambridge University Press.
Platteau, J-P. (2019). 'The economics of religious conversion in Sub-Saharan Africa', in (E. Nnadozie and A. Jerome, eds.), *African Economic Development*, Chapter 11, pp. 217–31, Bingley: Emerald Publishing Limited.
Pinto-Cisternas, J., Zei, G. and Moroni, A. (1979). 'Consanguinity in Spain, 1911–1943: General methodology, behavior of demographic variables, and regional differences', *Social Biology*, vol. 26(1), pp. 55–71.
Pontal, O. (1986). *Die Synoden im Merowingerreich*, Paderborn: Ferdinand Schoningh.
Purzycki, B.G., Apicella, C., Atkinson, Q.D., Cohen, E., McNamara, R.A., Willard, A.K., Xygalatas, D., Norenzayan, A. and Henrich, J. (2016). 'Moralistic gods, supernatural punishment and the expansion of human sociality', *Nature*, 530, pp. 327–30.
Putnam, R.D. (1993). *Making Democracy Work*, Princeton, NJ: Princeton University Press.
Putterman, L. and Weil, D.N. (2010). 'Post-1500 population flows and the long run determinants of economic growth and inequality', *Quarterly Journal of Economics*, vol. 125(4), pp. 1627–82.
Rand, D.G., Arbesman, S. and Christakis, N.A. (2011). 'Dynamic social networks promote cooperation in experiments with humans', *Proceedings of the National Academy of Sciences*, vol. 108(48), pp.19193–8.
Reyerson, K.L. (1999). 'Commerce and communication', in (D. Abulafia, ed.), *The New Cambridge Medieval History V*, pp. 50–70, Cambridge: Cambridge University Press.
Rubin, J. (2017). *Rulers, Religion, Riches*, Cambridge: Cambridge University Press.
Rolker, C. (2012). 'Worse than Buggery? Incest discourses in the 12th and 13th centuries', in *Fourteenth International Congress of Medieval Canon Law*, August 5–11, University of Saint Michael's College, University of Toronto.
Scheidel, W (2019). *Escape from Rome. The Failure of Empire and the Road to Prosperity*, Princeton, NJ: Princeton University Press.
Schroeder, H., Margaryan, A., Szmyt, M., Theulot, B., Włodarczak, P., Rasmussen, S., Gopalakrishnan, S., Szczepanek, A., Konopka, T., Jensen, T.Z.T., Witkowska, B., Wilk, S., Przybyła, M.M., Pospieszny, Ł., Sjögren, K.G., Belka, Z., Olsen, J., Kristiansen, K., Willerslev, E., Willlerslev, E., Frei, M.F., Sikora, M., Johannsen, N.N. and Allentoft, M.E. (2019). 'Unraveling ancestry, kinship, and violence in a Late Neolithic mass grave', *Proceedings of the National Academy of Sciences*, vol. 166(22), pp. 10705–10.

Schulz, J., Bahrami-Rad, D., Beauchamp, J. and Henrich, J. (2019). 'The Church, intensive kinship, and global psychological variation', *Science*, vol. 366, p. 6466.

Sjögren, K.G., Olalde, I., Carver, S., Allentoft, M.E., Knowles, T., Kroonen, G., Pike, A.W.G., Schröter, P., Brown, K.A., Brown, K.R., Harrison, R.J., Bertemes, F., Reich, D., Kristiansen, K. and Heyd, V. (2020). 'Kinship and social organization in copper age Europe. A cross-disciplinary analysis of archaeology, DNA, isotopes, and anthropology from two Bell Beaker cemeteries', *PLoS ONE*, vol. 15(11), e0241278.

Spolaore, E. and Wacziarg, R. (2009). 'The diffusion of development' *Quarterly Journal of Economics*, vol. 124(2), pp. 469–529.

Spolaore, E. and Wacziarg, R. (2013). 'How deep are the roots of economic development?', *Journal of Economic Literature*, vol. 51(2), pp. 325–69.

Stasavage, D. (2020). *The Decline and Rise of Democracy: A global history from antiquity to today*, Princeton, NJ: Princeton University Press.

Stasavage, D. (2014). 'Was Weber right? The role of Urban autonomy in Europe's rise', *American Political Science Review*, vol. 108(2), pp. 337–53.

Sutter, J. and Goux, J-M. (1964). 'Decline of consanguineous marriages in France from 1926 to 1958', *Eugenics Quarterly*, vol. 11, pp. 127–40.

Tabellini, G. (2008a). 'Institutions and culture', *Journal of the European Economic Association*, vol. 6(2–3), pp. 255–94.

Tabellini, G. (2008b). 'The scope of cooperation: Values and incentives', *Quarterly Journal of Economics*, vol. 123(3), pp. 905–50.

Tocqueville, A. (1838). *Democracy in America*, New York: Saunders and Otley.

Todd, E. (1987). *The Causes of Progress: Culture, Authority, and Change*, Aldeburgh: Wiley-Blackwell.

Ubl, K. (2008). *Inzestverbot und Gesetzgebung. Die Konstruktion eines Verbrechens (300–1100)*, Berlin: Walter de Gruyter.

Van Zanden, J.L., Buringh, E. and Bosker, M. (2012). 'The rise and decline of European parliaments', *The Economic History Review*, vol. 65(3), pp. 835–61.

Voigtlaender, N. and Voth, J. (2013). 'The three horsemen of riches: Plague, war and urbanization in early modern Europe', *Review of Economic Studies*, vol. 80(2), pp. 774–811.

Voigtlaender, N. and Voth, J. (2006). 'Why England? Demographic factors, structural change and physical capital accumulation during the Industrial revolution', *Journal of Economic Growth*, vol. 11(4), pp. 319–61.

Wahl, F. (2016). 'Participate political institutions in pre-modern Europe: Introducing a new database', *Historical Methods. A Journal of Quantitative and Interdisciplinary History*, vol. 49(2), pp. 67–79.

Wahl, F. (2018). 'Political participation and economic development. Evidence from the rise of participative political institutions in the late medieval German Lands', *European Review of Economic History*, vol. 23(2), pp. 193–213.

Walker, R.S. and Bailey, D.H. (2014). 'Marrying kin in small-scale societies', *American Journal of Human Biology*, vol. 26(3), pp. 384–8.

Weber, M. ([1920] 1958a). *The Protestant Ethic and the Spirit of Capitalism*, New York: Scribner's Sons.

Weber, M. ([1921] 1958b). *The City*, New York: The Free Press.

White, l. (1962). *Medieval Technology and Social Change*, New York: Oxford University Press.

Woodley, M.A. and Bell, E. (2012). 'Consanguinity as a major predictor of levels of democracy: A study of 70 nations', *Journal of Cross-Cultural Psychology*, vol. 44(2), pp. 263–80.

Yamagishi, T., Cook, K.S. and Watabe, M. (1998). 'Uncertainty, trust, and commitment formation in the United States and Japan', *American Journal of Sociology*, vol. 104(1), pp. 165–94.

Zeng, T.C., Aw, A.J. and Feldman, M.W. (2018). 'Cultural hitchhiking and competition between patrilineal kin groups explain the post-Neolithic Y-chromosome bottleneck', *Nature Communications*, vol. 9, p. 2077.