CES ifo Working Papers

12023
2025

July 2025

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CES ifo

Imprint:

CESifo Working Papers

ISSN 2364-1428 (digital)

Publisher and distributor: Munich Society for the Promotion
of Economic Research - CESifo GmbH

Poschingerstr. 5, 81679 Munich, Germany
Telephone +49 (0)89 2180-2740

Email office@cesifo.de
https://www.cesifo.org

Editor: Clemens Fuest

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Culture and Social Organizations in the Great Reversal: Europe and China, 1000-2000.

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Prepared for: Benjamin Enke, Paola Giuliano, Nathan Nunn, and Leonard Wantchekon, eds., *Handbook of Culture and Economic Behavior*.

Version of June 2025.

Note: this paper is adapted from Avner Greif, Joel Mokyr and Guido Tabellini, *Two Paths to Prosperity: Culture and Institutions in Europe and China, 1000-2000*. Princeton: Princeton University Press, forthcoming – referred to as GMT (2024) throughout the paper.

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1. Introduction

A large literature has argued that culture is an important mechanism of historical persistence. On the one hand, culture is slow moving, so that current cultural traits often reflect features of the distant past. On the other hand, it is argued, current cultural traits influence economic outcomes and the functioning of institutions. In most of this literature, the mechanism of cultural influence is direct: culture shapes the beliefs and values of individuals, which in turn affect economic and political interactions (Greif, 1994; Guiso et al. 2006, Tabellini 2008b, Roland 2020b).

In this paper we discuss another, more indirect, mechanism of cultural influence, that operates through the effects of culture on the form taken by *social organizations*. We illustrate this mechanism by discussing how ancient and profound cultural differences between China and Western Europe contributed to set these two parts of the world on divergent paths of economic and institutional development between 1000 AD and the period culminating with the industrial revolution.

In all societies, a critical component of economic performance is the emergence of (non-state) social organizations that sustain local cooperation. Households cannot prosper in isolation and need to cooperate with others to attain many of their essential needs, from defense to insurance (see Seabright, 2010 for an excellent exposition). When states were relatively weak or unable to exercise effective authority at the local level, social organizations made cooperation possible and produced essential club- and local public goods.

The past importance of social organizations to economic and social life has been under-emphasized in the literature perhaps because we live in societies where most local public goods are provided by the "state" (inclusive of local and municipal government). For much of human history, however, the "state" provided very few public goods, and was mostly concerned with defense and war, with some attention to justice and maintaining peace, but little more. The lion's share of local public goods and club goods were provided by local organizations. Much of the population lived in rural areas that were too remote to be reached by the state administration. Such services as education, poor relief, local infrastructure, communal religious worship, local protection and conflict resolution were largely carried out by non-state local organizations.

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Although they addressed very similar needs and performed essentially the same functions, the social organizations that emerged to sustain local cooperation around 1000 AD were very different in China and Europe, however. In Imperial China, cooperation was mostly sustained within kin-based social networks, the clan being the prototypical organization. A social network of individuals descending from a common paternal ancestor sustained cooperation among members on a wide array of dimensions: ancestor worship, religious ceremonies, risk sharing, protection, education, and so on.

In Europe, instead, what brought individuals to cooperate was not common kin, but common interest: individuals unrelated by kin joined to pursue specific goals and to provide specific club and local public goods. Following Greif (2006a), we refer to these European organizations as "corporations".[1] Examples of European corporations that emerged during the Middle Ages or later and persisted for several centuries are fraternities, guilds, monastic and religious orders, universities and academic associations, self-governing cities, and eventually the modern business corporation. Compared to their Chinese counterparts, these European social organizations had different membership rules (common kin was not a prerequisite), they were more specialized, cooperation was enforced through more formal methods, and governance rules were more inclusive.

These differences between Chinese and European organizations reflected their different cultural backgrounds. Culture (whether Confucian doctrine or Catholic religion) influenced with whom people cooperated to create local public goods, which social networks were formed, and how local collaboration was sustained. In China during and after the Song dynasty (960 AD-1279 AD), Neo-Confucianism had become the dominant culture. This doctrine stressed the importance of moral obligations towards kin, gave prominence to ancestors' worship, and considered kin-based values as the basis of social order (Bol, 2008). This communitarian value system made it easier to sustain cooperation among kin, who were tied together in many dimensions by strong ties

[1] Following Greif (2006a, p. 309) our formal definition of corporations is that they were voluntary, interest-based, self-governed, and intentionally created permanent associations. In many cases, they were self-organized and not established by the state or another political entity. Because participation was voluntary, corporations had to cater to their members' interests. They were self-governed in that their members participated in specifying the rules that regulated their activities; power was shared and leaders were held accountable for their actions. They were formal and permanent entities in that they could sue and be sued.

of reciprocal loyalty. This favored the spontaneous emergence of kin-based social networks, where interpersonal relations, including cooperation, were governed by filial loyalty, strict gender hierarchy, and respect between relatives.

Europe at the turn of the millennium was very different. Like in most ancient societies, tribal and kin-based values were widespread there after the fall of the Roman Empire, particularly because of the Germanic invasions. But tribal traditions and communitarian values were gradually undermined by the deliberate actions of the Church. Starting in the early Middle Ages, the Church actively discouraged practices such as adoption, polygamy, concubinage, consanguineous marriages, and marriage without the woman's consent. These policies created what is known as the European Marriage Pattern, which was unique in many ways. Christian culture, as elucidated by the Church, also strengthened the commitment towards bilateral (as opposed to unilineal) descent, which raised the cost of keeping track of common ancestors. As kin-based ties became weaker, individuals were left with less protection from the extended family, making cooperation between unrelated individuals for a specific purpose more necessary and easier to sustain. In his recent influential book, Henrich (2020) has stressed the importance of kinship structures in determining the value systems and behavioral patterns of different societies, and the analysis below is clearly indebted to his insights. He and his colleagues have stressed the peculiarity of European marriage and family structures and linked them to long-term economic change (Schulz et al., 2019).

The reasons for this policy by the Church were in part purely practical. The anthropologist Jack Goody (1983) has argued that the Church could acquire the property of unmarried individuals or heirless nuclear families—something that would have been impossible in a clan-based society.[2] Yet political and ideological considerations should not be discounted. One is that the Church set upon to weaken clannish and tribal power simply because these competed with the control over daily life that the Church had over its members. By the early medieval times, one area of control

[2] Goody (1983, p. 44) estimated that if the authorities prohibited close marriage and adoption, discouraged remarriage and divorce, and delegitimized out-of-wedlock descendants and concubinage, 40 percent of all marriages would be left without an immediate male heir and were possibly left to the Church. Moreover, after the fourth Lateral Council in 1215, the prohibition of cousin-marriage promulgated by the Church could be set aside on a case-by-case basis by purchasing dispensations, which was another source of revenue for the Church.

was the family. The Catholic Church, with its heavy emphasis on the concept of sin, became obsessed with the issue of incest and monogamy and was increasingly committed to the European Marriage Pattern (Schulz et al. 2019; Schulz 2022). Tribal and clannish marriage customs were regarded as evil pagan traditions that Christianity had to eradicate.

Although we cannot observe it, we can presume that social organizations in turn exerted strong feedback effects on prevailing culture. As discussed analytically by Tabellini (2008a), an environment in which most interactions occur among kin reinforces kin-based and communitarian values. After all, in a world of clans people deal with relatives they can trust and minimize contacts with "strangers." This kind of society inevitably produces more trust among kinspeople and a larger gap in trust between non-kin. Conversely, frequent interactions among socially distant people reinforce generalized trust and universalistic values, with trust being extended to strangers.

The form taken by social organizations in China and Europe was not neutral with respect to subsequent economic and institutional developments. Both Chinese clans and European corporations fulfilled important administrative functions and had a significant control on day-to-day life. They were thus utilized by the state as pillars of its decentralized administration. This interaction was a source of reciprocal influence. On the one hand, social organizations were strengthened by acting as agents of the state. On the other hand, the evolution of state institutions and of legal systems also reflected the nature of underlying social arrangements. This is particularly evident in Europe, where formal civil law emerged during the Middle Ages through a bottom-up process that standardized existing practices. Being active in the economic domain, clans and corporations shaped market structures, the organization of production, financial arrangements, technological innovations. Moreover, since clans and corporations were largely responsible for education, they influenced knowledge accumulation and helped perpetuate the value systems that conditioned economic behavior.

The rest of this chapter discusses more in detail the main elements of this social, economic and institutional bifurcation between Europe and China, highlighting the key role of social organizations. We start in section 2 by summarizing the opposite paths of economic development in China and Europe. Section 3 describes how their different cultural environments gave rise to different social organizations, while Section 4 highlights similarities and differences between

Chinese clans and European corporations. Section 5 discusses the role of corporations in setting the stage for the industrial revolution. Section 6 draws some general lessons.

2. The Great Reversal

In this section we briefly discuss the opposite trajectories of economic development in China and Europe between the 11th and 19th centuries AD. Towards the turn of the first millennium, China was ahead of Europe in many dimensions. China was more densely populated and more urbanized than Europe (Broadberry et al. 2018), it employed more advanced agricultural techniques often encouraged by the Imperial government (Bray, 1984, pp. 597-99; Von Glahn, 2016, pp. 218-225; Mitterauer 2010, pp.20-25), including extensive irrigation system, it was ahead of Europe in its technological and scientific achievements outside agriculture. Chinese nautical technology led the world, foreign trade was a major source of revenue, and government issued paper money circulated widely throughout the country (Fairbanks and Goldman 2006, p. 88).

One proximate cause of these gaps between East and West is easy to identify. China had a strong and effective unitary state, while Europe was virtually stateless. As explained by Scheidel (2019), despite intense and frequent internal wars during previous centuries, China had been able to preserve its state infrastructures. The state had maintained its coercive capacity and was able to subordinate Chinese elites forcing them to cooperate with the state. Its remarkable state capacity, that was also used to provide public goods such as defense, major infrastructures, some elements of social order, a commonly accepted means of payment. During the Song, central tax revenue is estimated to have approached a tenth of total output and could support an army of about a million soldiers (Scheidel 2019, p. 253). In Europe instead, the collapse of the Roman Empire had been so devastating and prolonged that, by the turn of the first millennium AD, state infrastructures had almost completely disappeared (cf. Strayer 1970). Political and military power was fragmented into a multiplicity of local actors in frequent conflict with each other, and cooperation could not be enforced beyond the local level (Scheidel 2019, ch. 7).

Nine centuries later, the relative positions had totally reversed. Europe was dominating the world economically, politically and intellectually, while China had fallen behind in most dimensions. Around 1850, GDP per capita in China was about one fifth of that of the UK, one

fourth of that of the Netherlands, and less than half of that of Italy (Broadberry et al. 2018). The Industrial Revolution, achieved thanks to European scientific and technological innovations, had transformed the European economies, while China remained stagnant and seemed to have lost its capacity to innovate. Several European nation states had developed sophisticated and inclusive political institutions and had acquired significant state capacity, with tax revenues of the order of 10% of GDP in the second half of the 19th century (Tanzi and Schuknecht 2000, Table III.1). In China, by contrast, state capacity had declined, with tax revenues falling below 2% during the 19th century (Zhang 2022, p. 4), and political institutions remained autocratic and unaccountable. European and Chinese societies also diverged in many other dimensions, such as their culture, their social organizations, their family structures, their educational institutions, their legal systems.

What explains this dramatic reversal of fortunes and the social and political bifurcation between these two parts of the world? Accounts of the Great Divergence (or Great Reversal, as we prefer to call it) between Europe and China have become quite popular among social scientists since Pomeranz's influential book (Pomeranz, 2000). Strikingly, they have become more popular among economists and political scientists than among historians (Zhao, 2015; Mokyr 2016; Root 2020; Wang, 2022; Huang, 2023). A recurrent explanation stresses again the contrast between a politically fragmented Europe and the early formation of a unitary central state in China. Because Europe was politically so fragmented, its rulers were comparatively weak. When nation states finally began to emerge, in the Late Middle Ages, European rulers had to bargain with a plurality of local power holders, and this led to the formation of more inclusive political institutions. In China by contrast, centralized state infrastructures never disappeared, despite frequent internal struggles and their weakening over time. The asymmetry between a powerful center and weaker local élites was much more pronounced than in Europe, allowing autocratic political institutions to persist over time (Stasavage 2020; Jia et al. 2020).

In turn, it is commonly argued, European political fragmentation favored economic development in ways that could not happen in unified and more despotic China. In Europe, knowledge accumulation and innovation found it easier to escape censorship, because neighboring sovereign states competed for intellectual supremacy and were often in conflict with each other (Mokyr 2016). Frequent wars forced emerging European states to invest in tax capacity

(Gennaioli and Voth 2015) and in military technology (Hoffman, 2015), and accelerated the process of urbanization, because walled and well-defended cities offered the needed protection (Rosenthal and Wong 2011). The more inclusive European political institutions also protected business interests, because economic powerholders enjoyed some degree of political representation (Acemoglu and Robinson 2012). None of this could happen in China, where an autocratic central state was in control of education, the sovereign did not face competition from comparable external rivals, and central authority had no interest in protecting property rights from political abuse. Thus, the great economic and institutional reversal is viewed as a byproduct of the same forces that explain why China was ahead of Europe earlier on, namely the initial contrast between prolonged internal and external political fragmentation in Europe, and the early formation of a unitary central state in China.

Although these arguments contain many elements of truth, the importance of the distinction between prolonged fragmentation in Europe and early unification in China should not be exaggerated, when it comes to explaining the great divergence. After all, China too was subject to severe external threats and invasions, and it was frequently ravaged by internal wars and violence. Moreover, conflict did not only have beneficial side effects on the accumulation of state capacity and on city fortification; wars also brought lasting destruction and poverty. Prolonged conflict between neighboring sovereign states and political fragmentation is not unique to Europe, and yet it did not bring about comparable effects on economic and institutional development in other parts of the world.

Following GMT (2024), in this paper we point to the difference in social organizations as a major factor in the divergence. Our approach does not deny the relevance of the contrast between fragmented Europe and unified China, but it adds other crucial elements that distinguished Europe from China around 1000 AD, emphasizing the importance of non-state social organizations and cultural traditions. These other initial differences enhanced the consequences of the contrast between fragmentation and unification. This perspective not only contributes to explain the puzzle of the great divergence between Europe and China. It also illuminates more generally how the evolution of institutions and the process of economic development are shaped by culture through its effects on the internal organization of society.

3. Culture and Social Organizations in Europe and China, 1000-2000

The great reversal between Europe and China was accompanied by an equally striking divergence in the internal organization of society. In China, from the start of the second millennium, the clan — patrilineal inter-family alliances among families who traced their origin to a common ancestor — became an increasingly important element of the social organization of cooperation.[3] A clan's constituting families, be they joint, stem, or nuclear families, remained the basic units of procreation, consumption and production. The Chinese clan, however, increasingly became the main social unit through which inter-family cooperation was organized.[4] At about the same time, Europe instead increasingly organized itself as a world of nuclear families that provided local public goods through social organizations based on common interest rather than kin.

Such a radical transformation took centuries to complete. Yet there can be no question that by the rise of the Qing dynasty in China in 1644, the clan had become the basic unit of organization in China. By that time, much —though not all — of Europe had become a world of nuclear families and corporations, in which local societies were organized into voluntary organizations of unrelated individuals. This divergence in social organizations reflected very different cultural environments.

3.1 China

In China the rise kinship-based organizations was associated with the increased dominance of neo-Confucian philosophy formulated by Zhu Xi and his colleagues in the 12th century.[5] This doctrine placed a substantial emphasis on the virtues of filial loyalty. The family was viewed "in various

[1]Watson (1985, p. 35) describes how the Teng clan she studied in south-east China was formed, namely through the fusion of smaller units by building an ancestral hall and endowing it with land. She notes that this happened as a response to a political and economic environment, but fails to recognize the centrality of the provision of club goods that the clan provided to its members.

[4]The insight that the clan should be seen as a community or a social organization was driven home by the highly influential work of the anthropologist Maurice Freedman (1958, 1966), who pointed to the common ancestor as the key to membership in a social organization with clearly defined objectives and able to own common property to provide services to the members. See also Faure, 2007, p. 1.

[5]Zhu Xi's *Family Rites* was one of the most influential books in Imperial China (Ebrey, 1990, p. 212).

respects the primary locus of moral development and the expression of virtue" (Tiwald, 2020). Although neo-Confucianism merged with other philosophies, it retained Confucius's emphasis on the personal scope of morality, particularly one's moral obligation toward kin. In the words of Fei (1992), p. 74: "Extending out from the self are the social spheres formed by one's personal relationships. Each sphere is sustained by a specific type of social ethic". The most basic social sphere is kinship, and the corresponding values are filial piety and fraternal duty. An additional social sphere is based on friendship, and the corresponding values are loyalty (*zhong*) and sincerity (*xin*). Clearly, this value system lay the moral foundations of a world in which extended kinship became the main form of social organization (Csikszentmihalyi, 2024).

For many centuries, Confucianism had co-existed with other philosophical systems such as Daoism and Buddhism. But during and after the Song period, Confucianism in its new form established its full cultural dominance. As David Faure summarizes, "in time, the neo-Confucian tradition was so successful that it totally changed the shape of Chinese society" (Faure, 2007, p. 39).

Two factors contributed to its success. On the one hand, Confucianism was reinforced by the diffusion of kin-based organizations, with which it was complementary. As kin-based interactions became more organized and structured, the value system consistent with this organization of society was strengthened, as implied by standard theories of fitness-driven cultural evolution (Tabellini, 2008a).

On the other hand, starting with the Song dynasty, neo-Confucianism was deliberately and strongly supported by the imperial regime, because it was viewed as complementary to the imperial system of government. Confucianism posits that all things, including human beings, are unequal, and that men differ greatly in intelligence, ability and moral character. A hierarchical social order thus fits perfectly with Confucian social ideology (Ho 1964). Moreover, besides the primacy of the family, one of the key tenets of this doctrine is that education, rather than coercion, is instrumental to bring out humanity and benevolence in individuals. Hence, Confucianism was also strongly complementary with a distinctive feature of Chinese imperial institutions, namely its highly educated professional bureaucracy selected based on scholarly merit through a civil service exam (*keiju*).

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The examination system through which officials were selected was based on a curriculum that stressed the key principles of Confucian doctrine, including the importance of obligations to the extended family and kin (Bol, 1982, p. 155). As a result, Chinese intellectual civilization became increasingly dominated by the Imperial examination, and Chinese elite education became essentially a preparation for the great test. The scholar-official system governing the Mandarinate meant that most serious intellectuals were members of the administration. One recent scholar assesses that of all the major persuasions, "Confucianism was the only one that was tailor-made for the support of the state. The nature of Confucianism facilitated a symbiosis between the political actors and the ideological actors" (Zhao, 2015, p.280).

The connection between neo-Confucianism and the clan structure was reinforced by the involvement of clans in the provision of education. Clan-members had strong incentives to provide education to bright children in their extended family, in the hope that one of them would beat the odds and pass the challenging civil service exam. If they did, and the candidate became an official, this would spread fame and wealth to the entire family. Hence clans provided free education in clan schools, usually financed by the income from communal properties such as real estate. In principle income from those properties was to be shared among all members of the clan, but in practice the elites spent much of it on local club goods such as the schools, essentially gambling on the success of a few talented lads to succeed and become a member of the mandarinate. In this fashion the culture of neo-Confucianism and the clan system reinforced each other.

A related feature of the cultural environment, that also contributed to the proliferation of kin-based organizations, was the tradition of ancestor worship. The family and the larger clans and lineages were permeated by a culture of ancestor worship (Lang, 1946, pp. 18-19; Baker, 1979, pp. 71-106). Ancestor worship was a means to foster the coherence of the extended family and it was a feature of Chinese society already in antiquity (Lakos, 2010). It can be seen to have operated at two levels. The family worshiped its close lineal forefathers, while the clan worshiped more remote ancestors (Lang, 1946, p. 19). As early as the Zhou dynasty (after c. 1045 BC), the values of ancestor worship went hand in hand with strong lineages and with families in which several generations lived under one roof.

The more pronounced forms of ancestor worship and commoners' obsession with clan lineages emerged only during and after the Song dynasty, however. Ancestor worship became a defining characteristic of Chinese society, and it is one of the most salient cultural differences between Europe and China. David Keightley (1990, pp 44-45) notes that ancestor worship was a "strategic custom" and that it legitimated and sanctified "all other aspects of life." The combination of clan loyalty and ancestor worship had far-reaching implications. Keightley also argues that ancestor worship meant that the kind of class struggles between the "few" and the "many" over economic issues did not play as important a role in China as in Europe. Equally important, kinship ties and their political extensions had priority over economic interests, and hence merchants in China never attained the kind of political independence and influence they did in Europe (Keightley, 1990, p. 47).

The proliferation of clans was encouraged by the imperial government in more direct ways, other than through the civil service exam. Clans did more than provide local public goods and sustain local cooperation; they became a pillar of the local public administration and tax collection. There was a symbiotic partnership between the state and the clan system, which were mutually reinforced while jointly providing the cooperation needed for the economy to function (Wang, 2022). Two major reforms introduced by the first Ming Emperor (Hongwu) exemplify this symbiosis. First, in 1384, all commoners were allowed to worship three generations back (Zhang, 2017, p. 207). Second, and more importantly, in 1370 clans were basically made responsible for local tax collection, through the *Lijia* fiscal system. After this reform, clans became essential as part of the tax collection system. Freedman (1958, p. 74) described the governing elite of the lineage as the "fiscal intermediary between the state and landowners" and noted that in practice landowners did not pay directly to the government but used the local gentry as tax collectors.

Clans also assisted the state in alleviating poverty. The decline of Buddhism removed an important mechanism for poor relief, and the burden of supporting needy individuals was shifted to the extended family. There is some reason to believe that widespread poverty became more prevalent under the Song despite — and possibly because of — rapid economic growth, migration from the North and population pressure (e.g., Liu, 2015). The imperial administration, while debating the scope, details and feasibility of some of its programs, rarely debated the pressing

needs to provide for the poor and increasingly outsourced local relief to the clans.[6] By playing an increasingly central role in poor relief, clans helped the Imperial Bureaucracy solve a major social problem, and one could almost say that they provided the Song with a free lunch.[7] In subsequent centuries, the ability of the Imperial administration to exert its rule into the countryside diminished, even if it never disappeared altogether, and the clan moved into the vacuum that was created. Besides religious services Clans provided conflict resolution, education, poor relief, water management and defense, as well as tax collection and infrastructural investment (Wang, 2022).

The exact timing of the rise of clans as main providers of local public goods is in dispute, and perhaps this debate cannot be easily resolved; some clans were there already before the Song under the Tang dynasty, though they were mostly confined to the upper classes (Lang 1946, p. 15).[8] Some scholars such as Fei and Liu (1982, p. 393) and Twitchett (1959, pp. 97-98) have dated the rise of clans firmly to Song times, but others have noted that it took place later.[9] What is agreed

[6] To be sure, the Song dynasty's central bureaucracy did not cease altogether to provide local public goods (e.g., Kuhn 2009, pp. 55-6; Bol, 2008, pp. 72-76; Scogin, 1978; Levin 2009, pp. 596-600). Initially, it still provided many of them including orphanages, pauper cemeteries and clinics, elderly care, hospitals, fire protection units, and irrigation/transportation projects. Yet over time the clans that emerged after c. 1000 AD increasingly took over those responsibilities. Detailed studies of various localities reveal an Empire-wide trend of creating clans to provide public, and club goods (e.g., Brooks, 1989; Rowe, 1998; Faure, 2007; Bol, 2003.) These studies reveal that clans were formed, compiled genealogies, regularized the assignment of generationally specific names of lineage offspring, constructed lineage halls, set down lineage rules, standardized liturgies for funerals and ancestral rites, and in many cases mobilized resources to accumulate endowments and provide a variety of local public goods. As Zhang (2017, pp. 198-99) summarizes the case for the benefits of the clan system, it provided much of what local social organizations do: resource and information sharing, labor pooling, economic security through social insurance, and a more orderly social life.

[7] The ability of clans to benefit the state by providing these local public goods was clearly expressed by the prominent 18th century scholar-administrator Chen Hongmou "The reason that peace does not prevail among the people is because of differences in wealth. The poor are often not capable of supporting themselves...Confucius once observed that it is not poverty itself which leads to the disaster [of class warfare], but rather inequality." He added that "the implementation of the lineage system is designed to stimulate the basic human impetus to share foodstuffs on the basis of seasonal need, and to foster the collective husbanding of resources to smooth over good and bad years" (cited by Rowe, 1998, p. 383).

[8] In ancient China, the prevalent family structure was the communal or joint family (yihu), namely an extended household including several generations of patrilineal descent that lived in close proximity and shared resources (Lang, 1946; McDermott, 2013, pp. 112-116).

[9] McDermott (2013, p. 430), for example, concluded his comprehensive analysis of social organizations in the South from 900 to 1600 by noting that the civil wars of the mid 14th century (that ended with the rise of the Ming) were crucial in leading to the proliferation of clans. Other scholars have agreed (Chen, 2017).

upon is that on the whole clans occurred earlier and were more pervasive in the south than in the north of China, and that they had their start as religious organizations worshiping a common ancestor, and gradually acquired more economic, administrative and fiscal responsibilities. Initially the activities of clans centered on strengthening group consciousness through ancestral worship, by collecting resources to pay for group rites and gatherings, and by holding common land for burials and ancestral halls.[10] But even when they did not hold common properties, lineages were important and flexible. Ebrey has noted that by 1350, descent groups had become more complex and structured than they had been at the turn of the millennium: they had ancestral halls, followed collective rituals, updated their genealogies and so on (1986, pp. 53-54).

3.2 Europe

In Europe, the decline of kin-based organizations also had a cultural origin. In ancient Europe too, kinship groups were the historical foundations of cooperation. In pre-Roman Europe Celtic tribes were central to its social organization, and similarly in the post-Roman Germanic society, tribes and clans remained basic units. Germanic clans were different from those in China, especially in reflecting bilineal descent, but they were the building blocks of tribes, which in turn provided local public goods to all its members.

These tribal traditions and communitarian values were gradually undermined by the deliberate actions of the Church. Starting in the early Middle Ages, the Church actively discouraged practices such as adoption, polygamy, concubinage, consanguineous marriages, and marriage without the woman's consent. As documented by Greif (2006a), Schulz (2022) and others, these Church policies influenced the European family structures: the extended family gradually became a less important organization, and was replaced by the nuclear family. Marriage in Europe increasingly became neolocal: a young couple that established a new household normally resided with neither parent. This made extended kinship cooperation less effective. This is not to say that extended kinship did not remain a important part of social life and that cooperation

[10] In the words of Ebrey (1986, pp. 55-56): "Lineages organized around large estates appear to be the functional successors of communal families, like communal families they exerted considerable control over individuals, regulated their access to material benefits, and acted as a social and political unit in the larger society."

with relatives did not continue to play a role in many cooperative arrangements. But over time the nuclear family turned into the basic building block of society, and local cooperation on a larger scale required different arrangements.

Christian culture, as elucidated by the Church, also strongly rejected the values associated with unilineal descent groups, and strengthened the commitment towards bilateral descent, already a part of the post-Roman Germanic traditions. But large kinship groups are unfeasible if ancestry is determined by symmetric maternal and paternal criteria, because the number of ancestors quickly becomes too large (cf. Roland 2020a). Last but not least, Church policies also contributed to reinforce universalistic values, by stressing that all human beings are equal in front of God, that individuals are responsible for their own choices, and that loyalty to the community of believers takes priority over kin-loyalty (Siedentop, 2014, pp. 118, 157). Largely thanks to the Church influence, therefore, around the turn of the first millennium the prevailing value system in Europe contained elements of universalism that were absent in China.

Schulz et al. (2019) and Schulz (2022) point to the Merovingian era (481-751 AD) as the period when the assault of the Church on cousin marriage started the long process of the decline of extended families.[11] The transition to a world of nuclear families was, of course, a slow and drawn-out process, and it is hard to know where and when we can determine with any certainty that a society was dominated by the nuclear family.[12]

Why did the Church engage in these policies, that turned out to have such momentous unintended consequences? One answer is that it weakened clannish and tribal power simply because these competed with the control over daily life that the Church had over its members. By early medieval times, one area of control was the family; the Church became obsessed with the

[11] Schulz (2022, p. 2586) maintains that cousin marriage became difficult if not impossible for ordinary peasants as well. The parish system, created by Carolingian rulers, mandated prenuptial investigations, and incentivized relatives and neighbors to denounce incestuous marriages by promises that the property of consanguineous marriages would be distributed to relatives. That said, demographic evidence supporting this view is lacking until much later.

[12] In the view of Schulz et al, "The Church's marriage policies and prohibitions, which we will call the Marriage and Family Program (MFP), meant that by 1500 CE, and likely centuries earlier in some regions, Europe had lost its strong kin-based institutions, and was instead dominated by relatively weak, independent and isolated nuclear or stem families." (Schulz et al., 2019). Yet in many areas this was accomplished much earlier.

issue of incest and monogamy, and was increasingly committed to what eventually became known as the European Marriage Pattern (Schulz et al., 2019, p. 2; Schulz, 2022, p. 2586). Tribal and clannish marriage customs were regarded as pagan traditions that Christianity had to eradicate. Another argument, espoused by Goody (1983, pp. 46, 94-95), is that the Church could acquire the property of unmarried individuals or heirless nuclear families, something that would have been impossible in a clan-based society.[13] Moreover, after the fourth Lateral Council in 1215 the prohibition on cousin marriage could be set aside on a case by case basis by purchasing dispensations, which was another source of revenue for the Church.

The Church did more than just spread values and cultural traits that were congenial to associations between unrelated individuals. The Catholic Church was also the mother of all European corporations, in that it was originally *itself* a corporation, up until the late Middle Ages.[14] Its clergy were unrelated individuals who had entered it voluntarily, and certainly in its early years it had many of the characteristics of a corporation: a community of people sharing an objective with an exit option. The early Christian Church advanced the dogma that an individual's loyalty should be to the congregation and this loyalty transcends his or her loyalty to the kinship group. The first task of the Christian congregation was to care for fellow-members in need and provide impersonal poor relief.

Finally, internal and external developments prompted the Church to create and support corporations inside and outside of its ranks. Beyond monasteries, which were an integral part of the religious structure, the Church supported the emergence of another paradigmatic corporation in Europe: the self-governing town. Before c. 1400, Italian bishops were often the guarantor of the *patta iurata,* the sworn pact, which formed the legal basis of the Northern Italian autonomous cities. Møller and Doucette (2022) document in detail how the Church supported the rise of urban centers, and claim that for a century after the eruption of the Investiture struggle between the

[13] Goody asserts (1983, p. 44) that if the authorities prohibit close marriage and adoption, discourage remarriage and divorce and deligitimize concubinage, forty percent of all marriages will be left without an immediate male heir.

[14] The corporation in Europe was used during the Roman period but the Roman Corporation differed from the later, European corporation. The emperor had to authorize each new corporation and corporations were to serve the interests of the Empire. The Roman corporation was not widely used and was not a means for the social organization of cooperation.

Papacy and Emperor, urban self-government was limited to towns ruled by bishops (pp. 18, 58-61).[15] Guiso, Sapienza, and Zingales (2016) document that indeed towns that were a bishop seat by the year 1000 were more likely to become a free city-state in the following centuries. To be sure, at times cities rebelled against their bishops, yet the Church favored and supported communes, an emblematic example of the kind of corporations that emerged in Europe in the Middle Ages.

Summarizing, by undermining extensive kinship networks, through its concrete example as an organization, and sometimes by deliberate political choice, the Church ended up pushing Europe along a path that was very different from that of China, India, and the Middle East. As Henrich (2020, p. 161) puts it, the "accidental genius" of the medieval Church was that it gradually dismantled kin-based institutions and thus slowly but inexorably dissolved the tribal-clannish nature of Europe, replacing it with organizations of unrelated people. Such "loose kinship" organizations, as Enke (2019) calls them, were at the heart of the game-changing evolution that produced a different way of sustaining local cooperation. The internal organization of European societies in turn influenced the accumulation of knowledge, shaped political European institutions and laid the foundations of European economic and technological take-off. It was a truly striking example of history-changing unintended consequences.

None of this is to imply that in any way a society dominated by "tight kinship structures" (clans or tribes) performs worse than a society based on nuclear families relying on cooperative associations of unrelated people. The relation between the performance of the economy and the nature of social organizations depends a great deal on the commercial and technological ecosystem. If economic interactions are mostly local, extended families can work extremely well. An important contribution that stresses this relation is Kumar and Matsusaka (2009). They distinguish between what they call "local capital" and "market capital", and argue that in societies in which most markets are local, networking with kin and neighbors is efficient. Once economic interactions extend beyond the local level, however, tight kin networks can become a handicap.

[15] Moreover, there was a strong correlation between the establishment of self-governing institutions in medieval towns in the period 1000–1200 and proximity of monasteries which spread the 'Cluniac' reforms (Møller and Doucette, 2022, p. 18).

Kumar and Matsusaka note that "because local capital is inherently limited by the size of the social network, only market capital can support the extensive markets, specialization, and division of labor that are prerequisites for industrialization." A development trap can occur if economies rely on the "wrong type of trading arrangements" that lock economies into a low-income equilibrium (p. 107).[16] While their model is focused on trade and we are more interested in local public goods, the logic of the argument is not all that different. In early stages of development, tight kinship relationships and social organizations based on kinship may indeed be the most efficient arrangement, but as the economy becomes more complex and sophisticated, a system sustained by universalistic values and external legal enforcement, that deals with others at arm's length, provides a more efficient form of organization. A similar argument is made by Enke (2019, p. 970) who points out that the "loose-kinship" society (with universalistic values and presumably social organizations not based on kinship) have an advantage only after industrialization, but that in pre-industrial societies the advantage of such societies is ambiguous.

4. Similarities and Differences between Clans and Corporations

Both clans and corporations were perpetual entities whose ultimate purpose was to make cooperation possible so that public goods and services could be supplied. They were both essentially self-governing entities with enforceable rules and the capacity to sanction those who did not comply.

One key difference between clans and corporations was membership rules. As noted, the European corporation was a voluntary association between unrelated individuals who were organized to pursue specific goals. The Chinese clan was ascriptive: an organization based on kinship. In other words, clan members cooperated and shared interest because of the family into which they were born, while members of corporations cooperated by voluntary choice for a specific purpose. As a result, a Chinese person normally belonged to one clan and that clan was a large part of the person's identity. In Europe corporations overlapped: a citizen of a city (a

[16] A good example is the persistence of tribal forms of organization in the Muslim world after c. 1200, which were a major driver in the emergence of conservative political structures dominated by religious fundamentalists that eventually became a source of the technological and economic stagnation of these states (Chaney, 2022; 2025).

"burgher") could at the same time belong to a guild and a militia and all three had the exit option that clans lacked.

Both clans and corporations organized a similar set of activities, which changed over time together with the level of economic development and with the extension of commerce and specialization of labor. These similarities are not surprising, given that the basic social and economic needs of their members were not too dissimilar. Nevertheless, there are two important differences in the activities of the two organizational types. First, European corporations were more specialized: universities specialized in advanced education, monasteries had the primary purpose of organizing and sustaining monastic life and worship, merchant and craft guilds primarily regulated specific branches of economic activity, militias provided local security, and so on. Chinese lineage organizations, instead, were more generalist and encompassing in their purposes and while they may have had their start as religious worship organizations, eventually they catered to a broader range of activities.

Moreover, some European corporations, like free towns and the Church, had clear political and administrative purposes over a well-defined territory or congregation and they had a great deal of autonomy — that is, the right to set and enforce the rules of the corporation. Moreover, in many cases corporate groups had political rights and responsibilities in the national level of government such as representation in national assemblies. In China, instead, public administration was formally controlled by the central bureaucracy. While clans often participated in local administration and had de facto enforcement powers, they never had full self-governing autonomy over a territorial jurisdiction, and they never had political representation in the central government and formal political rights. The best they could usually do is petition the Imperial government. The only way a clan could influence the central administration directly was to have one of its members enter the imperial government by successfully passing the imperial civil service examinations. As a result, clans never developed a set of articulated representation and governance principles comparable to that of the Western Church or of European self-governing cities. The result was far-reaching: unlike Europe, China never developed anything like a participatory government (Stasavage, 2020; Mokyr and Tabellini, 2024).

Given that both clans and corporations were organizations with the purpose of providing local public goods and services, they needed rules as well as enforcement mechanisms. Clans were hierarchical organizations, where power was largely based on seniority and ancestor worship. Corporations were also hierarchical (some more than others), but they regulated collective decisions through sophisticated and often formal rules, paid heed to individual rights of members, and imposed checks and balances on their leaders' authority (who were not necessarily the most senior members). The power of the leadership was constrained by the exit option that normally existed for corporation members.

In a clan-based society, the frequent interactions among kin-related individuals, clearly facilitated the operation of values-based trust among kin, and beyond that the threat of ostracism or even expulsion from the clan was a key deterrent against rule violations. Many of the rights and duties between family members did not even have to be written down, as they simply followed Confucian philosophy and filial piety. The biggest punishment for being an unfilial son was de facto expulsion from the clan (Teng 1977, p. 142). Moreover, even when formal and explicit, most internal enforcement measures were extrajudicial. Violators of clan rules and of internal agreements could in principle be reported to the authorities for punishment, but generally this happened only as a last resort, after the clan had exhausted its internal procedures for enforcement and dispute resolution.[17] At the highest level of abstraction this reflects the Confucian ideals that viewed formal law as redundant in a society in which wise men realized the unity of their interests, and social order was achieved through obedience to social obligations and rituals, with everyone supervising the actions of other members of their social network (Fei 1992, p. 28).

In contrast, rules governing relations among members of corporations in Europe generally relied on legal procedures and coercive measures, reflecting the weaker moral obligations within a group established on the basis of common interest. In the merchant communities, the ultimate sanction was loss of reputation and ostracism, but even without the power of enforcing penalties, disputes were resolved by courts based on codes of law or previous jurisprudence (Berman, 1983). Such formalities are most transparent in the late Medieval European cities that developed legal

[17] The Chinese word for civil lawsuit was *xishi*, meaning “minor matter”, which is informative about how imperial officials tended to see civil lawsuits (Ruskola 2000, p. 1659; Huang 2010, p. 21-22).

codes to enforce cooperation and compliance. These communes progressed from legal customs to legal codes, and from elected voluntary judges to professional ones (Clark, 1987). Self-governing cities adopted and enforced formal codes of law that applied to commercial transactions and facilitated trade at arm's length between citizens of different cities (Gelderblom, 2013). Moreover, urban law developed to lay out rules and procedures for governing autonomous cities. While at the end of the day both civilizations developed some kind of rule of law, the body of civil law in Europe was codified and formal, embodied in institutions such as judges, juries, and bailiffs, and the extended family played little or no role in enforcing the rule of law.

As noted, both clans and corporations were hierarchical and often complex organizations. But the hierarchy criteria were different. Seniority (measured by generational proximity to the clan ancestor) and age were often important criteria within Chinese clans, besides wealth. The inviolable concept of filial piety, and a general submission of younger kin to more senior members, gave clans a natural hierarchy (Zhang, 2017). Hierarchical roles based on seniority were also recognized by the law. The *lijia* reform, promulgated by the Hongwu Emperor in 1370, gave legal authority regarding various matters to village elders and, in 1397, the Ming legal code granted lineage heads (*zuzhang*) legal status and identified their role as presiding over the ancestral rites (Rowe 1998, p. 389). Under the *lijia* taxation system, groups of households were liable to pay taxes and provide labor according to a decennial rotation (every group paid taxes and supplied labor every ten years). The fulfilment of these obligations rested on the group's leader, typically the largest and wealthiest household in the group. After 1494, the *lijia* families also served as local militia (Huang 1998, p.135).

The details of how the clan was to be organized were not imposed by the central administration, Instead, administrative arrangements gave a formal imprimatur to rules that governed how the clan was to be managed (Faure, 2007, p. 74). In short, "the legal and rhetorical support for the lineage system, the state sponsorship and systematization of local religion, the creation of village schools … all aimed to stabilize and strengthen the local community" (Bol 2003, p. 13). Although clans had legal authority over their members, clan rules rarely specified punishments for transgression but relied on moral and social sanctions and rewards. Clan rules in China had thus primarily a moral rather than a formal legal character: they mostly admonished

members to behave in ethical ways, and protect the weak and the poor (Ruskola, 2000, p. 1660). As one clan book rule states, “a clan without rules leaves its members with no moral standard of conduct to follow” (Liu, 1959, p. 22). Clans were of course aware that inter-clan relations needed to be managed, but clearly intra-clan relations took precedence.[18]

Seniority criteria also extended to the domain of local politics and were reflected in actual power relations, and not just in culture and tradition. Zhang (2017, chapter 4), analyzed the composition of local elites (village chiefs, deputies and other local authorities) in seven villages in Northern China during the late 19th and early 20th century. Almost half of these local leaders owned land below the village average holding size but owed their influential position to their advanced age or belonging to a larger clan. In contrast, the richest households in the village often did not have dominant political authority. In more prosperous areas of the Southeast, where business oriented contractual clans were similar to European corporations, internal authority within the clan was more often directly linked to wealth and economic power. Nevertheless, even there “generational hierarchies were at least the 'default state' from which wealth-based forms of lineage organization might mutate given sufficiently compelling socioeconomic circumstances” (Zhang, 2017, p. 151).

European corporations had a large variety of governance rules and criteria, but generational seniority and age rarely played such an important role and lineage was seldom an important criterion for authority except for its correlation with wealth. Being voluntary associations, corporations often had inclusive and complex governance rules, which assigned control rights to all major stakeholders and held leaders accountable to corporate members. This does not mean that corporations were egalitarian; on the contrary, decision-making authority was often closely related to economic power and wealth. Belonging to a powerful and wealthy family within a corporation was associated with influence and social status. But this power was derived from

[18] Clan regulations in general specified that "a clan should always watch its reputation by preventing its members from harming outsiders and by refusing its offenders clan protection" (Liu, 1959, p. 152). At the same time, however, the moral obligation to kin seems to have limited the credibility and effectiveness of intra-clan punishments for inter-clan transgressions. "The punishment of a member who misbehaves against a non-clan member is usually oral censure" while "the punishment for siding with outsiders in an aggression against fellow clan members is, however, much more severe... the group interest is placed higher than [inter-clan] community solidarity" (ibid.).

contractual arrangements that included specific provisions for how to allocate control rights and executive authority in light of the specific goals of the organization and the composition of its members.

The evolving structure of European local government is most evident in the charters of self-governing cities. Initially cities appointed their own courts, which then acquired administrative responsibilities. Cities also had legislative prerogatives. At first the general meeting of all citizens was the chief legislative body, but soon such mass assemblies became too large and administration was delegated to committees of "good men" (Nicholas, 1997, p. 159).[19] Rural settlements, too, had forms of collective decision making, as open field agriculture required a high level of coordination. Within small groups, it seems that decisions were taken by unanimity, while in other cases decisions would be delegated to jurors or representatives (Reynolds 1997). Within Communes, executive authority was sometimes exercised by "consuls", who represented different groups or economic interests in the city. Not everyone residing in the city enjoyed political rights; only formal citizens did, and although the conditions to gain citizenship differed over time and locations, to become a citizen one usually had to have some wealth and pay taxes for some time. Benefits from citizenship also differed, but Prak (2018, pp. 28, 31) notes the importance of the possibility to join a guild and holding a public office.

Finally, there is the issue of the legal status of social organizations. Both clans and corporations had a de facto legal personality, separate from that of its members, and both could last in perpetuity. But a separate legal personality for the European corporation was a much more formal legal construct than for the Chinese clan. The European legal tradition had to invent the idea of a corporation, because the original holders of legal rights and responsibilities were individuals. The definition of a corporation as a legal entity, separate from that of its members, was first applied to religious and political organizations in the 12th and 13th centuries. In this tradition, the corporation was a "nexus of contracts" between its individual constituents.

[19] Genoa is an interesting example because it is possible to trace the dynamic relationship between the corporation (the commune of Genoa) and its original clannish heritage (see Epstein, 1996, p. 33. Greif 1998, Greif 2006, pp. 172-177).

Ironically, assigning legal personality to a collective entity came much more naturally in China, despite the weakness of a formal concept of legal person. For traditional Chinese law, the legal and administrative unit of reference was the collective, and collective legal personality was the natural standard. “In the Confucian tradition…, the collective was morally prior to the individual … in many ways the family was the Confucian ‘natural person,’ just as the individual is the ‘natural person’ of modem Western legal system” (Ruskola, 2000, pp. 1606, 1652-53). Penal responsibility in China was collective, and tax and military responsibilities were borne by households and were transmitted across generations. It was thus natural that in China civil law would be part of family law. While the older view that China had no civil law has been discarded, it was far more embedded in the extended family than in Europe.[20] For Confucians, the extended family was a single entity, and therefore the property of the family too belonged to a single entity, even after generations. The head of the household acted as a trustee for subsequent generations. Household property was not his personal property. Family heads had authority over the members but were regarded as custodians or trustees of the household's property and had no testamentary powers (Ruskola. 2000, pp. 1627-28).

In sum, in pre-modern societies, when the power of the state was not as pervasive and far-reaching as we are now used to, many social and economic interactions took place in domains where the ruler was absent or weak, primarily in the provision of local public goods. In these domains, non-state social organizations such as the clan and the corporation emerged to facilitate cooperation and to provide essential services that no individual could supply on his or her own. Both in China and in Europe, these social organizations proliferated at about the same time, after the turn of the first millennium. They performed rather similar functions in the two continents, and these functions evolved in similar directions, accompanying the process of economic development, commercialization, and changes in state capacity.

Nonetheless, the social and cultural building blocks of the clan and of the corporation were very different and the long-term effects of this difference on the development of the two economies

[20] At the highest level of abstraction Chinese civil law reflects the Confucian ideals that viewed formal law as redundant in a society in which wise men realized the unity of their interests, and social order was achieved through obedience to social obligations and rituals, with everyone supervising the actions of other members of their social network (Fei 1992, p. 28).

and polities were far-reaching. The clan was a dynastic organization in which a person was born and from which exit was costly or impossible, held together by a mix of reputational incentives and intrinsic motivation of loyalty to a common ancestor. The corporation is a voluntary association between unrelated individuals established to pursue a common interest. That foundational difference had a profound influence in how these organizations were structured and how they evolved, how they interacted with the state, and how they shaped economic and political development.

The effects of this foundational difference between clans and corporations were amplified by other features of the cultural environments in which they operated. The Confucian tradition of ancestor worship and respect for the elderly enhanced the legitimacy of governance rules based on seniority. As mentioned above, Confucian ideology also supports a hierarchical social order, because it stresses differences in ability and moral character between men. Thus, a hierarchic social order was also replicated in Chinese government, and not just in private organizations. As further discussed in GMT (2024) and in Finer (1997), the Chinese principles of the "rule of good men" and "rule of the cultivated" were quite different from the European ideas of the rule of law and from the concept of government by representatives of various interest groups in society. These differences in governance principles between Europe and China permeated the entire society, and can be seen both in private organizations and in the evolution of government institutions.

5. Social Organizations and the Industrial Revolution

The divergence in social organizations had three major consequences. One was political: as elaborated by Mokyr and Tabellini (2024), the emergence of corporations grew into a set of institutions that laid the foundation of participatory government and eventually the growth of liberal democracies.

A second consequence was psychological-cultural: the decline of extended kinship families created different cultural norms, a more individualist state of mind, and a greater propensity toward entrepreneurial behavior, willingness to take risk, and be open to non-conformist beliefs. Henrich (2020) discusses how the expansion of markets and of impersonal relations induced people to pay

more attention to the value of time, to work longer hours and strive for efficiency and higher productivity. Alesina and Giuliano (2013) show that, in contemporary societies, the strength of family ties (measured through survey questions) tends to interfere with activities leading to faster growth, such as geographic mobility and market (as opposed to household) production, particularly among women but also among young adults and elderly. Bahrami-Rad et al. (2022) measure the strength of family ties in a very diverse set of populations, focusing on preferences or social norms related to cousin marriage, polygamy, co-residence of extended families, lineage organization, and community organization. They show that stronger family ties are robustly correlated with lower economic prosperity (measured by light intensity or regional per capita income). To establish causality, they also rely on geographic RDD between pairs of neighboring ethnicities within the same country. Similar results are obtained when the strength of family ties is measured by the extent of genetic inbreeding of local populations. Their results also suggest what are the mechanisms behind these correlations: stronger family ties are negatively associated with division of labor, innovation, lower generalized trust and lower willingness to cooperate with strangers, more conformity and nepotism. Several other studies have extensively documented that stronger family ties are negatively correlated with diverse measures of impersonal trust, moral universalism, conformity, analytic thinking, individualism and cooperation with strangers (eg. Enke 2019, Schulz et al. 2019, Henrich 2020, Alesina and Giuliano 2010).

A third consequence of the divergence of organizations concerns innovation, both scientific innovation and the accumulation of "useful" knowledge. In the remainder of this section we discuss how corporations and the individualism they engendered prepared the conditions for the Industrial Revolution and the sustained economic growth that it eventually triggered.[21] In the following subsections we discuss several linkages between the medieval growth of corporations and the Industrial Revolution.

5.1 Intellectual climate and the Republic of Letters

[21] For a different view of the role of the clan and corporation in the diffusion and acceptance of the new technology during and after the Industrial Revolution, see Desmet, et al, 2020.

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One of the unintended consequences of the decline of the extended kinship family was the absence of anything like ancestor worship in Europe and a decline in the respect that people had for earlier generations. One corollary of that is that it supported the decline of what might be called *intellectual* ancestor worship, that is, the belief that previous generations were intellectually superior, that their knowledge was better than what the current writers could produce, and that therefore answers to questions about the universe should be found in the writings of earlier generations, whether they were the Talmud, the books of Aristotle, the Koran, or the writings of Zhu Xi.

By the end of Middle Ages, when much of Europe had abandoned the extended kinship form of social organization, ancestor worship was rare and with it came a movement of the weakening of intellectual ancestor worship. Skepticism flourished, and its biggest manifestation was the Protestant Reformation. Renaissance scholarship rediscovered much of Greek and Hellenistic science and intellectuals all over the continent studied it. But with that revival came a growing persuasion that the knowledge that Europe had inherited from classical civilization was in large part erroneous, and with it came a belief that they could do better, and that human progress could be sustained.[22] A clan structure, in which ancestor worship played a central role could not display such blatant disrespect toward earlier generations. The belief in progress, while by no means a sufficient condition, was instrumental in creating the cultural environment in which the Industrial Revolution could thrive (Mokyr, 2024).

This intellectual climate was one of the forces that led to the emergence of the Republic of Letters, a virtual rather than a brick-and-mortar organization. This network of European scholars and thinkers was critical in facilitating the growth of useful knowledge that eventually was the central factor in the Industrial Revolution (Mokyr, 2016, chapter 12). Its roots can be traced to the early fifteenth century, but it came into its own in the first half of the sixteenth and by 1600 was a well-understood feature of the intellectual community of Europe. The Republic of Letters was a

[22] An early example was the devastating attack on Pliny's scientific work launched by the Ferrara Professor Niccolò Leoniceno in 1492. In the middle of the sixteenth century, the French philosopher Pierre de la Ramée (1515–1572) already wrote freely "on the errors of Aristotle" and by the early seventeenth century Francis Bacon insolently wrote that "[the Greek writers of science] certainly do have a characteristic of the child: the readiness to talk with the inability to produce anything; for their wisdom seems wordy and barren of works" (Bacon [1620] 2000, aphorism 121, p. 59). Without skepticism, there could be no progress.

transnational network of scholars, that provided the intellectual community of Europe with unity despite the Continent's political and religious fragmentation. The Republic of Letters considered itself a "commonwealth" or separate institution, a "state extremely free" as one of its central figures put it (Bayle, [1696-1697] 1734, vol. II, p. 389, essay on *Catius*). One of the features of the Republic of Letters was its built-in skepticism of the classical canon of knowledge and the commitment of its "citizens" to the principle of contestability.

Was the Republic of Letters a corporation? In the strict sense we have used the term here, it was not. Membership in most corporations was binary, formal, location-specific, and sharply defined, which was not the case with the Republic of Letters. Yet it had many features we associate with corporations and that were inspired by familiarity with corporate organizations. It was self-governing and thus independent of formal political structures (that is, the states or municipalities in which its "members" resided) and had nothing to do with kinship. It set the "rules" of scholarship such as open science, contestability, and the criteria by which novel ideas would be evaluated. It was a transnational, trans-religious network of scholars, who shared, discussed, and evaluated knowledge and ideas. Much like the medieval corporations, the Republic of Letters as a transnational community of scholars in some ways was fashioned after the Church in its transnationality and its universally accepted rules of behavior. Unlike the Church, of course, the Republic of Letters had no formal hierarchy and its means of enforcing its rules were limited.

5.2 Universities and the organization of higher education

Corporations exerted a key influence in the organization of higher education. The European university, that emerged in the twelfth century, was the paradigmatic autonomous corporation, jealously defending its independence of both the city in which it was located and the Church with which it was affiliated. Its history has been well documented and has recently been the subject of a massive data collection project by scholars in Louvain la Neuve (De la Croix et al. 2023). Universities in the form that emerged in Europe were unique, quite different from what we see in the great Asian Civilizations.[23]

[23] A possible exception that proves the rule is the curious case of Nalanda University, founded in the fifth century AD during the Gupta period (c. 300-550 AD). Established in what is now the modern state of Bihar in northeastern

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European universities epitomized and perpetuated the unique trajectory onto which the idea of a corporation led Europe. More specifically, universities were a component of a competitive market for ideas, in which knowledge of various kinds was created and disseminated (De la Croix et al., 2023, pp. 5-6). Universities housed the intellectuals who translated and taught works of philosophy and science, often part of the Greek cultural legacy by way of Arabic writers. Some the most important medieval intellectuals such as Roger Bacon, Duns Scotus, and Albertus Magnus taught at European universities, and almost all of them were educated in one form or another at them. The most prominent institution in early modern Europe was the University of Padua, which benefitted from Venice's wealth and the republic's ability to shield the university from papal interference. It created an environment in which unconventional and heterodox thinkers such as Galileo, Paolo Sarpi (1552-1623), and Cesare Cremonini (1550-1631) could thrive (Muir, 2007). The number of superstar intellectuals who studied or taught at Padua over the years is impressive: instructors included Galileo, the founder of modern anatomy Andreas Vesalius, and the physician Girolamo Fracastoro; and Padua graduates included Nicolaus Copernicus and William Harvey. In later years, a few universities north of the Alps moved into positions of leadership, especially eighteenth-century Leyden, which could count on such leading scientists as Willem s'Gravesande, Herman Boerhaave, and Pieter van Musschenbroek. Equally impressive is the role of eighteenth-century Scottish universities in producing leading intellectuals and natural philosophers in the age of the Industrial Revolution, among them Adam Smith and many of the leading lights of the Scottish Enlightenment, as well as the physicists Joseph Black and John Robison, who personally counseled James Watt. Among their graduates were the mathematician Colin Maclaurin who entered the University of Glasgow at age eleven and by age 19 was appointed Professor of Mathematics, and James Hutton (the "father" of modern geology), who studied at the Universities of Edinburgh and Leyden (though was a businessman, not an academic). The chemist

India, it was a Buddhist institution that combined religious with secular knowledge, as well some practical fields such as mathematics, medicine, iron-casting and astronomy. It prospered for centuries and much like the top European universities, it attracted foreign students coming from places as far as Japan and China. Yet the University did not thrive after the Gupta period, and in c. 1200 what was left of it was thoroughly destroyed by the Muslim invader Muhammad Bakhtiyar Khalji. Buddhism in India proved unable to compete with the Islam and Hindu religions, and a university run mostly by and for Buddhists turned out not to be viable.

William Irvine was an influential academic at the University of Glasgow, with a strong interest in applied and industrial chemistry.

Perhaps the greatest contribution of universities to economic development in the early centuries was through advances in legal studies. As shown by Cantoni and Yuchtman (2014), the legal training provided by European universities contributed to local commercial development in the late Middle Ages, through the evolution of administrative and legal institutions and the associated commercial revolution. Cantoni and Yuchtman demonstrate the direct effect that the establishment of universities had on the emergence and formal certification of markets in Germany. The mechanism they point to is that universities provided the legal training of administrators, lawyers, and notaries whose skills were needed to make these markets function properly and reduce the costs of transacting. Commerce and credit required contract enforcement, and as markets became more sophisticated, more legal and financial professional experts were needed.

Despite their important role in training and in disseminating knowledge, however, the role of university professors in intellectual innovation in Europe was in some ways perhaps less striking than would be expected, and overall their direct role in the Industrial Revolution was at best modest. By one calculation, in the crucial period 1450-1650, 87 percent of all scientists mentioned in *The Dictionary of Scientific Biography* were trained in universities but only half of those (45 percent) ended up teaching at them (Gascoigne, 2000, p. 657). Many of the truly influential intellectual leaders of European thought and science --- among them Francis Bacon, Spinoza, Descartes, Locke, Leibniz, and Lavoisier--- never held academic positions, while still others, such as Newton, Galileo, and Adam Smith left them for non-academic patronage jobs when they had the opportunity to do so. Academics, precisely because they embodied a great deal of human capital, tended mostly to be intellectually conservative and often resisted disruptive innovation.

That said, the significance of universities to the future development of Europe is not just in the increase in supply of human capital that turned out to have economic value. The institutional structure of higher education that emerged in the late Middle Ages and early modern Europe created a decentralized competitive system of independent corporations, dedicated to the transmission and generation of knowledge. Rather than being managed top down, universities

competed for the best students, for resources and reputation, and above all for the best professors. As noted by Gascoigne (2000, p. 657), in a world in which "inherited positions loomed so large, universities provided a haven for another set of values in which learning was valued for its own sake and intellectual distinction received recognition". The university system in Europe was an interconnected pan-European entity, and not only because faculty and students moved around among them. The degrees they conferred were recognized everywhere, and they shared most of the pedagogical methods, especially the lectures and ensuing disputations (Verger, 1992, p. 44). Yet there was a great deal of diversity within the world of European universities. It was exactly this variety, coupled to the competition among these social organizations, that lent them their dynamism and viability. Even if the typical University generated little new knowledge, the ones at the top such as Padua and Edinburgh did matter a lot.

This competitive intellectual and institutional environment facilitated the emergence of alternative organizations devoted to the progress of useful knowledge, like scientific academies and learned societies. These were local organizations in which intellectuals gathered, lectured, conducted public experiments, exchanged notes and information, collaborated, and tried to impress their peers. Many of these congregations were spontaneous local efforts, and when the sponsoring agent, usually a local wealthy gentleman with intellectual interests, passed away or lost interest, the organization could vanish. Others were established top down. In Italy the best-known of these was the *Accademia dei Lincei*, founded at the initiative of Duke Federico Cesi in 1603.[24] By the middle of the seventeenth century such organizations had become much more common and durable, with the Royal Society (which grew bottom-up out of a spontaneous congregation of Baconians at Wadham College in Oxford and was formally chartered in 1660) and the French Académie Royale (established top-down by Jean Baptiste Colbert in 1665) being prime examples. By the middle of the eighteenth century there were many dozens of such scientific societies all

[24] Other examples of such academies were the *Accademia degli Incogniti* in Venice, founded in 1630 by intellectuals inspired by the teachings of Cesare Cremonini (1550–1631). The *Accademia del Cimento*, founded in 1657, was the private venture of Prince Leopold of Tuscany; it was mostly a group of Galileo's students and followers. It consisted of little more than a handful of notable experimental scientists such as Giovanni Alphonso Borelli and Vincenzo Viviani meeting in Florence under the auspices of the prince.

over Europe.[25] These scientific academies and philosophical societies were a prime example of what we have defined as "corporations" — much like universities they were voluntary self-governing organizations that served a common interest (the exchange and vetting of scholarship) and were completely independent of kinship relations. Even when they were sponsored by the state, as was the case in France and Prussia, they retained a fair amount of independence and self-governance.

In China, instead, knowledge accumulation was organized very differently. Higher education was in many ways developed and sophisticated, but it lacked the two characteristics that were crucial to European Universities: autonomy and competition. Far more than in Europe, Chinese higher education served the needs of the Imperial state bureaucracy and consequently its historical role was quite different. The single focus on the Imperial examinations and its set curriculum meant that there was less heterogeneity among the Chinese academies. Even when higher education was not provided by the state, it was offered by clans, which only admitted students from within their own lineage. Hence, students did not have the option to choose among different subject matters and schools. This difference is emblematic of the difference between a world of corporations and one in which clans predominated.

China was a civilization that placed a heavy emphasis on human capital and education, and already had a sophisticated higher-education system long before the emergence of the first universities in Europe. Most scholars agree that academies in China originated during the Tang Dynasty, but there is still significant debate regarding the specific period (Xiao, 2018, p. 19). They were a by-product of the expansion of the Civil Service examination system. During Empress Wu Zetian's term (reigned 690 - 705 CE), the government greatly expanded the civil service examinations to weaken the power of eminent families. By the end of the Five Dynasties and Ten Kingdoms period (907-979 CE), the public had accepted that the civil service examination was the sole method for selecting talented individuals as government officials. Many descendants of the eminent families also had no choice but to take the examinations to enter officialdom (Xiao, 2018,

[25] McClellan (1981) has estimated that 33 "official" learned societies were functioning in the French provinces during the eighteenth century counting over 6,400 members. In Germany around 200 such societies appeared during the half-century spanning from the Seven Years War to the Napoleonic occupation of Germany.

pp. 23-24). For a long time, the academies that prepared students for the examinations were government-run, but due to the weakening of the government during the bloody An Lushan rebellion (755-763), government schools declined and were replaced by private academies (as there was no formal requirement to attend government-run academies). Such private education activities were quite prevalent during the early Song years as well. Additionally, many clans or lineages established private schools with the purpose of teaching their descendants Confucian values to maintain family harmony and preparing them for the civil service examinations (ibid., pp 37-45). As the central government recovered under the early Song, during Emperor Renzong of Song (reigned 1022 - 1063 CE), the government conducted several large-scale educational reforms, re-establishing government schools. As a result, some academies were converted into government schools, and although academies continued to exist alongside government schools, they no longer enjoyed the prominence they had in the early Song period (ibid., p. 167).

The Chinese educational system gradually became committed to the Neo-Confucian school established in the Song period under the influence of a host of philosophers determined to revive and resurrect Confucianism. This school's most prominent members were the Cheng brothers and Zhu Xi, and their influence only grew under the Yuan dynasty. The Yuan (Mongol) rulers appreciated the control functions of Confucianism and supported and promoted privately-run academies from the beginning. This movement culminated in the famous edict of Emperor Renzong of Yuan (reigned 1311-1320, not to be confused with his earlier namesake) establishing the Cheng-Zhu school of neo-Confucianism as the standard curriculum for the civil service examination, further elevating its status to official doctrine. From the early Ming period onwards, "the examination and the school systems became inseparable" (Ho, 1964, p.171). Neo-Confucian (or "way learning") theory established the legitimacy of the dynasty and of the ruling elite during the Song years (Elman, 2013, p. 50). The Yuan and Ming dynasties established village schools in every county in China (Du, 2007, p. 87). Over time, however, these "dynastic schools" became way stations for the examinations and did not do much teaching of subjects that might have useful applications. The academies themselves were wholly committed to neo-Confucianism, and as government schools declined due to financial difficulties during the mid Ming period, they proliferated. However, these academies, at first formally independent of the government, became

less and less so under the Song dynasty, a trend that continued into the Yuan and early Ming years.[22] In later Ming and Qing times, this government control became even tighter (Xiao, 2018).

In short, the obsession of the Chinese with the Imperial examinations introduced a fateful bias in the formation of human capital in China. Studying for these examinations meant a huge investment in education, but over time most of the curriculum came to be based on rote learning and an exegesis of the Chinese Neo-Confucian classics. To be sure, the *keju* system augmented the overall stock of human capital, but much as was true for other backward-looking societies whose human capital was dedicated to the exegesis of ancient texts, this human capital had at best a minor effect on economic progress (Huang, 2023, p. 239).[26]

5.3 Monasteries

Monasteries, too, played a role in knowledge accumulation and dissemination in Europe, although their significance was much diminished after the Middle Ages. Cistercian monasteries had a significant impact on economic development and population growth many centuries later and seem to have left an imprint on people's willingness to work hard, ironically spreading what is often described as the Protestant Ethic (Andersen et al., 2017).[27] In short, the regular (monastic) religious organizations were at the cutting edge of agricultural technology and management. Furthermore, monasteries and monastic orders had several important positive externalities that contributed to local economic development. First, they increased the number of men and women able to read and write, as well as the number of books. Medieval science, especially astronomy,

[22]By the late Ming period, the private academies were seen by the authorities as a form of social control and a means to ensure stability. The Mandarin bureaucracy laid down the rules: the academies were "to serve the needs of the administration" and became part of the establishment, utterly opposed to anything that would disturb the order of society (Meskill, 1982, quotation on p. 151).

[26] Practical studies such as science and mathematics were increasingly excised from the material taught to youngsters preparing for the examinations. If economic progress had been an objective, the imperial examination system represented a misallocation of the resources allotted to human capital formation (Elman, 2000, pp. 261-269; Elman, 2013, pp. 250-79).

[27] Even earlier, the Domesday book of 1086 shows that estates that were under Benedictine monastic ownership were more progressive and productive than those owned by secular landlords or by non-monastic religious organization (Rossignoli and Trombetta, 2021).

geometry, and physics, was largely carried by members of the regular clergy, some of whom made important contributions to philosophy and to science: one thinks of Roger Bacon, William of Ockham, Albertus Magnus, Richard of Wallingford, and John of Sacrobosco (although there is no reason to believe that their scientific activity contributed much to economic development in this age).[28]

Second, by documenting their land properties in charters and written documents, monasteries contributed to a more precise definition of property rights. The corporate form of monasteries and of monastic orders enabled them to acquire titles to land and real estate, holding them in perpetuity and separately from the Church's holdings (Cavanagh 2016). This clarification and the precise definition of property rights provided an example that was followed by others. Increased literacy and more clearly defined property rights, in turn, contributed to the evolution of legal institutions of the twelfth and thirteenth centuries.

Third, monasteries also contributed to pacification and a reduction of violence (Van Zanden 2009, pp. 44-45). Markets for agricultural products developed in the proximity of several monasteries, also because the supply of food often exceeded the needs of the monasteries. As a result, in the early Middle Ages monasteries contributed to the developments of nearby cities, particularly in France and Germany (Nicholas (1997, p. 32), provides several examples). The Cistercians monasteries did in Catholic Europe what Max Weber and others thought happened in Protestant Europe. The growing ethical belief that labor ennobles and pleases God that permeated monastic orders, combined with the considerable intellectual abilities of many monks, led to a number of technological breakthroughs in which monasteries were the vanguard (White, 1962). Finally, as argued recently by Siedentop (2014, p. 188), monasticism had a great success as a model for other corporations. For it consisted of self-governing social organizations founded on consent, and "working under a rule that recognized the moral equality of brothers."

China too had monasteries. Buddhist (and Taoist) monasteries existed in China long before the first European monastic order was formed in the 5th century. Comparing monasteries in the

[28] Even after the Reformation some of the most prominent scientists in Europe belonged to monastic orders such as the Jesuits Christopher Clavius and Athanasius Kircher, as well as the French mathematician and physicist Marin Mersenne who belonged to the Minim order, a small ascetic monastic order.

two regions, however, reveals a critical difference: in Europe, but not in China, monasteries were corporations. European monasteries were self-governing, horizontal associations established by their members to advance their common interest. In China, monasteries increasingly became neither self-governing nor means to advance the common interest of their members. Organizationally, Chinese Buddhist monasteries thus remained isolated from each other and never constituted monastic orders as in Europe.[29] Moreover, monasteries were physically isolated as most tended to be concentrated in remote holy mountains. They did not spread in settled areas the way that European monasteries did. Socially, monasteries promoted a life style alien to most Chinese. As Wright (1990) noted, there was a "conflict between Chinese [Confucian] social morality and the ethics of Buddhism" (p. 69). In particular, Buddhism required monks and nuns to retain celibacy, to refrain from eating meat and were prohibited from physically cultivating land or touching any "impure" object.[30] As a result of these features, Buddhist monasteries did not have the same impact on the social organization of cooperation that the Church—and the Christian monasteries—had in Europe.

5.4 Self-governing cities

One of the more striking differences in the organization of European vs Chinese society is in the governance of cities. Self-governing cities and city states only emerged in Europe and were absent in Imperial China. To be sure, such entities were not new in the world, and classical antiquity for many centuries counted many of them, until they were extinguished by superior military force. But the rise of the European medieval commune, a self-governing urban corporation in which its burghers cooperated by their own rules was matched nowhere in the world, and stands in sharp contrast not just with China but also with the Muslim world (Bosker et al, 2013).

In ancient China, autonomous cities were common in the centuries before the Qin unification in 221 BC (known as Spring and Autumn period and the Warring States era), but

[29] Decay of learning in monasteries began by the 6th century because Dhyāna Buddhism emphasizes looking into oneself (Johnson 1913, pp. 85-6). Gifts made many of the monasteries into large landowners (Walsh 2010, pp. 83-85).

[30] Monasteries thus had to survive by relying on donations, rental income or the labor of slaves and bondsmen (Mather 1981, pp. 418-419, 423). Regarding lay Buddhism at this period, see, for example, Teiser 2020, pp. 155-159.

eventually they were brought wholly under the control of the Imperial government. By the time of the Song dynasty, cities in Imperial China had wholly lost the kind of autonomy enjoyed by European towns; a recent survey (Lincoln, 2021, p. 12) notes that only in modern China did the idea of a municipality replete with councils and mayors burst onto the scene. Mote (1977, p. 114) summarizes the status of Chinese cities in late Imperial China, noting that the Chinese city had no 'citizens' in the European sense, and possessed no corporate identity and no government distinct from that of the surrounding countryside. By way of contrast, European cities insisted on carefully separating themselves from the area around it.

In Europe, the urban communes that emerged in the Middle Ages were constitutional oligarchies that represented the interests of merchants, artisans, bankers, and landowners. Representatives of the urban ruling class initially acted as the link between the town and its feudal overlord, and gradually gained autonomy from external influence and became accountable to the city bourgeoisie. Communal institutions began to develop in some European cities during the tenth and eleventh centuries. They first emerged in Southern Europe, and then they spread to Northern France, Northern Italy, Flanders, Germany, Spain and elsewhere in the following centuries, adapting to each situation differently (Jones 1997; Van Zanden 2009). By the thirteenth century, almost 60% of European cities had gained the status of Commune, with most transitions into Commune status occurring during the twelfth century. The corporate character of communes was evident from the very beginning. Communes generally were founded by these oaths. A communal oath was a "sworn association of inhabitants" (known as a *patta iurata*, or "sworn covenant") that entailed solidarity against outsiders (Pirenne, 1925, p. 201; Nicholas 1997, p. 148-149). Such covenants were often mediated by local bishops (Guiso, Sapienza and Zingales, 2016, pp. 1424-1427). Schulz (2022, pp. 2595-2599) has shown that the emergence of urban communes in medieval Europe was associated with exposure to the Church policies against extended families. The Church also supported the rise of autonomous cities in their struggle against imperial bishops. The diffusion of Communes contributed to creativity and innovation (Serafinelli and Tabellini 2022) and played a crucial role in the political and economic development of Europe (Greif, Mokyr and Tabellini, 2025, pp. 381-383).

Urban communes collected taxes from their citizens, regulated commerce, administered justice, enforced law and order. Many of them had their own militias showing often a surprising military capability. Urban communes invested in infrastructure, commissioned works of art as symbols of the city, constructed a bell tower (eventually with a clock), established and maintained orphanages and hospitals, and even maintained their own historical archives. The Republic of Letters was intimately connected to urban life (Wuthnow, 1989, pp. 41-45). Centuries of urban self-government meant that many urban governments set their own rules as to what intellectual activity was permitted. This implied a great deal of heterogeneity and not all cities were equally welcoming to skeptical and heterodox intellectuals.[31] But in the polycentric environment of Europe there were always enough towns in which innovative intellectuals could do their work, and where they could find a courageous publisher who would print their works. Venice in the first half of the seventeenth century (which included Padua) was an exceptionally tolerant and open-minded environment. It banished the Jesuits, who fought for a more conservative and orthodox curriculum, between 1606 and 1657. Strasbourg, a cosmopolitan border town, was famous for its tolerance, as was Basel, "a city ever hospitable to refugees from oppression in their native countries" (Grafton, 2009, p. 7).

It is this way that self-governing cities, that very characteristic and unique corporate institution, affected the growth of useful knowledge throughout much of Europe. The importance of self-governing and autonomous cities has been emphasized in recent work such as Bosker et al (2013) and Serafinelli and Tabellini (2022), but the contribution of autonomous cities to the evolution of a competitive and effective market for ideas has not been fully appreciated to date.

5.5 The organization of production

Europe and China differed not only in how knowledge accumulation was organized. Another key difference concerns the organization of production. In Europe, with very few exceptions, the average firm was not much larger than a household plus at most a few servants or apprentices.

[31] One thinks of the Rome of Pope Clement VIII where Giordano Bruno was executed, or the Geneva under Calvin which burned Miguel Servetus for heresy. In many cities intolerant local governments put an end to radical ideas promoted in their universities or city squares.

Hence, any firm-specific investments were associated with full control rights by the owner. He or she did not have to worry about other kinspeople claiming their share and having a say as would be the case in social organization based on extended kinship. This led to a proliferation of merchants and artisans, each of them independent (even if organized in guilds and other corporations). The net result was the emergence of a class of small-time "capitalist" entrepreneurs in the West, especially in England, thus creating something of a middle class by 1700. These were the people who could combine commercial and financial ability, marketing and organizational skills, and the technical know-how of the engineers and ingenious mechanics. Eighteenth-century British observers (such as Daniel Defoe and David Hume) identified it as a people of a "middling sort." Historians have included in this group such individuals as well-to-do yeomen and farmers who had managed to augment their holdings, merchants and high-skill craftsmen and some professionals (Smail, 1994, p. 26).

In China, by contrast, productive and commercial activities were dominated by lineage organizations. Zelin (2022, pp. 326-327) summarized the critical importance of the clan for Chinese business organization. Kinship created trust, based on familiarity and mutual dependence, as it did anywhere. Moreover, its ability to enforce its decisions, claim authority, and control joint resources that the clan owned had its deepest influence on the organization of Chinese businesses. Chinese kinship organizations were normally controlled by older clan members belonging to the more senior lines of descent. As described above, seniority, not wealth or entrepreneurial success, was the criterion for allocating authority within lineage organizations (Zhang 2017). This allocation of control rights could give rise to obvious hold-up problems, since the fruits of investments and innovation would be captured by senior clan members, and these were often not the more innovative and entrepreneurial individuals in the organization. Managerial innovation was an important component of the acceleration of productivity that accompanied the Industrial Revolution in Europe, not only in manufacturing but also in agriculture and services. The persistent quest for continuous efficiency-enhancing innovations, referred to by contemporaries as "improvements" throughout the economy was an important aspect of the acceleration of growth that preceded and accompanied the Industrial Revolution in Europe (Slack, 2015). But the management of Chinese lineage organizations, which, as we saw above, was dominated by elder

individuals largely stifled the incentives to pursue efficiency enhancing innovations and investments at the microeconomic level.

Lineage organizations differed from European units of production in another important respect, besides governance arrangements: they seldom employed wage labor, particularly labor not belonging to the same extended dynasty. Even in the most commercialized parts of China, at most 15% of the rural population lived primarily of wages in the mid nineteenth century. In England by contrast, at about the same time, 73% of those working in the countryside were wage-laborers and wage labor was also common in English cities (Vries, 2013, p. 340).

These staggering differences in the organization of production have important implications for economic development. A mode of production based on the extended family discourages labor saving investments and innovations, because redundancies are much more costly and problematic. If the lineage is in any case responsible for the survival of its members, through implicit or explicit risk sharing arrangements, replacing labor with machines does not save resources unless production is increased proportionally. But not all labor savings innovation lead to higher production volumes, often they are introduced mainly to reduce labor costs. This is confirmed for instance by the findings of Caprettini and Voth (2020), who show that labor saving technologies such as threshing machines led to widespread riots in 1830s England, because workers were displaced and could not find alternative employment opportunities. In China such labor-saving innovations were discouraged by the prevalence of risk sharing arrangements inside lineages, and the infrequency of wage compensation as a form of labor contract. In addition, large scale investments in machinery or equipment can also be more difficult for dynastic firms, to the extent that they have smaller scale or smaller retained earnings (Vries 2012).

5.6 A Civil Economy

Yet another linkage between a world of corporations and the Industrial Revolution is the emergence of what may best be called a "Civil Economy" (Mokyr, 2009, ch. 16). A civil economy is an economy in which people by and large cooperate voluntarily with strangers and adopt norms of "gentlemanly behavior" that make this cooperation possible without excessive coercion by third parties. As noted above, the consensus of the literature today is that such universalist norms tend

to be strongly and negatively correlated with the importance of extended kinship. The enforcement mechanism in such societies is in part intrinsic (based on ethical beliefs) and in part reputational. The success of the civil economy was part and parcel of Britain character as a "polite and commercial society" in William Blackstone's famous words. For polite behavior to be an equilibrium, people had to be seen and known to behave in this way and hence their need for social capital. This insight goes back at least to John Locke, in his *Essay Concerning Human Understanding*.[32] At a lower level of abstraction, the importance of a good reputation in the business world of eighteenth-century Britain was clearly paramount. Daniel Defoe was only one of many to realize the value of a good reputation and observed that a shopkeeper may borrow at better terms than a prince "if he has the reputation of an honest man." (Defoe, 1738, Vol. I, p. 361).[33] Economic historians have emphasized the importance of groups and organizations within which the building of reputation and trust created effective markets, as trust reduced transactions costs even in exchange at arm's length and prevented markets from unraveling (Greif, 1994; Landa, 1995). It also encouraged the teaming up of individuals in partnerships, in which the various partners had complementary skills that created synergistic advantages, but mutual trust was needed to make such partnerships viable and stable.

In the end, the provision of local public goods by voluntary associations was a mixed success, and the formal enforcement of laws and contracts by state agencies increasingly supplemented and in some cases replaced them as the main way the market worked. Peter Clark's judgment of the impact of clubs and associations on Britain's political and economic development is decidedly mixed. Yet in the critical area of useful knowledge the impact of the networks and contacts was quite strong. The history of the Industrial Revolution is replete with examples in

[32] Locke [1690], 1975, p. 353, notes that "The measure of what is every where called and esteemed Vertue and Vice is this approbation or dislike, praise or blame, which by a secret and tacit consent establishes it self in the several Societies, Tribes, and Clubs of Men in the World ... For though Men uniting into politick Societies, have resigned up to the publick the disposing of all their Force, so that they cannot employ it against any Fellow-Citizen, any farther than the Law of the Country directs."

[33] Elsewhere Defoe compared the reputation of a tradesman to that of a maiden, easily damaged by evil tongues and almost impossible to repair and describes how such reputations were made and lost around the coffee house through slander (Defoe, 1738, Vol. I, p. 197).

which unrelated partners collaborated and learned to trust one another, thus exploiting complementarities between those with technical and those with managerial abilities.[31] The individualist culture of eighteenth-century Britain led to cooperation and the exchange of information between people who knew things and those who made things, which was key to the interaction of science and technology. Such exchanges took place in taverns and coffeehouses, as well as in more formal organizations. The more illustrious of these societies appealed to the very top of the intellectual elite of Britain, such as the Birmingham Lunar Society and the London Chapter Coffee House. The latter's preoccupation with useful knowledge is well-described by the title of the book reproducing some of their minutes, *Discussing Chemistry and Steam* (Levere and Turner, 2002). A similar environment of trust driven by norms of gentlemanly behavior can be observed in credit markets and the emergence of partnerships as a source of finance.

In what way was a Civil Economy conducive to the Industrial Revolution? A market economy depended on people constraining their inclination to behave opportunistically. In other words, economic agents did not play necessarily "defect" (even if that might have been in their immediate interest) and expected others to do the same. Modern economics teaches that if this was to be effective, agents needed to send out costly signals that indicated to others that they were reliable and trustworthy (see e.g., Posner, 2000). Such signals were what "politeness" [in its eighteenth century sense] was all about: gentlemanly customs and norms in dress, manners, housing, transportation, and speech observed by the British upper classes.[34] The gradual adoption of these costly signals by the professional, commercial, and high-skill artisanal classes in the eighteenth century marks important features of British society. They are the consequence of a society in which people expected to deal primarily with unrelated associates or strangers.

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[31] The teaming up of such people as Boulton and Watt or Matthew Murray with John Marshall (for more examples, see Mokyr, 2009, p. 349) was a common occurrence during the Industrial Revolution. These firms were instrumental in transforming the workshops of small-time artisans and the commercial capitalism of the merchant-entrepreneurs of the early eighteenth century into the plant-managers and industrial capitalists of the first half of the nineteenth.

[34] "Politeness" meant something different in the eighteenth century than it does today: it meant, in Langford's view, a middle-class society that had accepted a set of informal moral codes that regulated behavior, sanctified acquisitiveness, "it both permitted and controlled a relatively open competition for power, influence...and markets" (Langford, 1989, p. 5). In eighteenth century lingo it was equated (among others) with law-abiding behavior, an unquestioning loyalty to certain moral norms of behavior, and it was intuitively sensed that commercial success depended a great deal on such politeness (Langford, 2002).

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One interesting feature of the Civil Economy in Britain was its ability to get individuals to perform public service without pay. This behavior is a powerful illustration of the cooperation at the local level that was made possible with the kind of social organizations that had evolved in the European world. Britain in the eighteenth and early nineteenth century, to a much greater extent than realized, was administered by amateurs, unpaid volunteers who performed various tasks that today are carried out by professional bureaucrats (Heldring, Kedrosky, Robinson and Weygand, 2025). These volunteers provided local public goods such as justice and poor-relief, cooperating and coordinating with unrelated colleagues and constituents. The vast bulk of state administration was run by these people: as late as 1835 out of 183,000 civil servants, only 21,300 worked for the central government; all the rest worked for local authorities. Among those, almost 94 percent were unpaid. This method of managing a state apparatus illustrates how the kind of universalist values and "civic-ness" arose in a society of nuclear families and social organizations based on the ideas of medieval corporations. Heldring et al. show further that such volunteers actually were more efficient civil servants than their paid colleagues. The incentives that drove these people, both intrinsic (fulfilling their civic duty) and extrinsic (reputation effects, respect of their peers and hence a stepping stone toward a political career) are typical of the societies that Enke and Henrich have associated with "loose kinship."

The Civil Economy can be seen to be the direct consequence of social organization that can be traced back to the Middle Ages and that liberated Europe from extended kinship. But how did it foster technological change, the engine of the Industrial Revolution? One mechanism is that low kinship ties have been shown to encourage more entrepreneurial behavior and more non-conformism. Another is the willingness of people who know things (*savants*) to engage with those who make things (*fabricants*). The early industrialists often consulted experts such as chemists and mathematicians, whom they may not have known personally but trusted all the same. This interaction was one of the main features of the Industrial Enlightenment and a factor driving economic progress (Mokyr, 2024).

5.7 Artisans and craftsmen

A final linkage connecting social organizations with the Industrial Revolution is the rise of an artisanal elite of highly skilled craftsmen. As argued by Kelly et al (2014, 2023), the British technological successes in inventing and introducing new techniques that account for its precocity in the Industrial Revolution were driven in large part by the highly skilled workers that implemented and scaled up the new ideas. Skills in the world before 1800 were almost exclusively acquired through personal contact, as much of the knowledge was tacit. The artisanal elite in Europe in the seventeenth and eighteenth centuries was as important to the Industrial Revolution as the natural philosophers, alchemists, and practical mathematicians, who expanded the range of practical science. They included a range of French artisans that Paola Bertucci (2017) calls *artistes*. She sees these people as part of the "Artisanal Enlightenment." They were clever people who were good with their mindful hands, making things that worked even as they were also expected to be things of beauty, mostly living in Paris catering to the French aristocracy. Her artistes were a small elite of skilled, creative, and well-trained workmen, the crème de la crème of French workmen: watchmakers, enamellers, toymakers, instrument makers, high-end furniture makers and other high-skill occupations. They dwelled in the borderland between artisans and intellectuals.

In the English midlands a group of quite different highly-skilled mechanics and clockmakers had emerged over the years who were more interested in the grimy mechanisms of textile equipment that eventually became the heart of the Industrial Revolution in Lancashire and Yorkshire than in the refined toys and artistic enamel work catering to the French rich.[35] These were by no means ordinary workmen; they were well-trained professionals who understood materials, mechanics, lubrication, transmissions, friction, levers, gears, pulleys, and belts. They were the elite of British craftsmanship, the right-tail of the distribution of technical competence, and without them Britain may not have had an Industrial Revolution. The best example — again, one of many — of such craftsmen was John ("iron-mad") Wilkinson, famous for supplying low-tolerance cylinders for the Watt engines.[36] A good description of these men and what they did can

[35] When Thomas Newcomen, the inventor of the Newcomen steam engine, came to the Midlands in c. 1712 to install his steam-powered engine, he and his assistant were "at a loss about pumps, but being near Birmingham and having the assistance of so many ingenious and admirable workmen, they soon came to methods of making the pump-valves, clacks, and buckets" (Desaguliers, 1734–44, Vol. 2, p. 533).

[36] Wilkinson himself was well-educated, having attended a dissenting academy and apprenticed to a merchant. His

be found in Cookson's (2018) work on Yorkshire textile machinery makers. Trained in such skilled occupations as clockmakers, millwrights, or whitesmiths, many of the artisans in her narrative worked in small workshops, often family affairs, aided by a handful of apprentices, journeymen, and a few skilled assistants.

What made the Industrial Revolution possible, then, were technical competence and agility. As Cookson notes repeatedly, not only were they dexterous and well-trained, but their skills were sufficiently flexible to help them adapt to a changing economic and technological environment.[37] What counted was not only their ability to scale up models and to produce reliable machinery, but also to solve unexpected malfunctions and bugs and tweak the equipment to introduce minor improvements that cumulatively made the machinery more productive, more durable, more reliable, and more user-friendly to the textile workers using it. Competent craftsmen, too set in their ways or overly restricted to a production protocol cast by guild regulations, would have difficulty adjusting to the accelerating changes in the demand for skills driven by an Industrial Revolution. Overcoming that kind of inertia was a critical component of progress.

How did social organizations matter to the formation of this highly skilled upper tail of the distribution of artisanal human capital? The answer is to be found in the way mechanics and craftsmen were trained.[38] Before c. 1800 the universal answer to that question is apprenticeship, that is, a period of personal training by an established master in a trade, in exchange for a fee and services rendered by the trainee. The contract between the two was a complex matter, fraught with possibilities for opportunistic behavior, information asymmetries, non-repeated interactions, and low-powered incentives. It was the mother of all incomplete contracts.

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father, Isaac Wilkinson, conforms more closely to the model of the under-educated dexterous artisan-tinkerer: apprenticed in the iron trade, possessing only a rough literacy, he was an enormously skilled iron maker, whose "business sense often did not equal his technical skill" (Harris, 2006).

[37] Cookson (2018, pp. 106, 127) notes, "to remain successful, engineers made structural changes, redesigned working systems, and solved technical problems in both product design and manufacturing process...skills requited of textile engineers were reshaped by the mass adoption of machine tools, for instance new forms of expertise in setting up machines...the move towards a new culture, beyond artisanship, is evident...changing tack came with risk attached but the great danger came from not adapting."

[38] Some of following is adapted from De la Croix, Doepke and Mokyr (2018) and Mokyr (2019).

All the same, in Europe, precisely because of the commitment to nuclear families and corporations and the ability of people to deal with like-minded persons to whom they were not related, the willingness to contract with non-kin increased. By the seventeenth century, apprentices trained by relatives were a distinct minority, estimated in London to be somewhere between 7 and 28 percent.[39] Training within the extended family or clan was less common in Europe, although training by relatives remained an option especially in high-skill occupations such as music — as the examples of Alessandro Scarlatti, Johann Sebastian Bach, and Leopold Mozart indicate.

The significance of the wider choice of masters, as demonstrated by De la Croix, Doepke, and Mokyr (2018) is that the diffusion of more efficient techniques was much enhanced compared to a world in which kinship relations had remained dominant. But technical knowledge also circulated by means of journeymen, who often traveled elsewhere to exercise their crafts. The mobility of young apprentices and journeymen played an important role not only by disseminating best-practice techniques but also by creating a competitive environment in which creative artisans whose ideas were not appreciated at home could move elsewhere (Belfanti, 2004; Berg, 2007).

Social organizations were needed to enforce the apprenticeship contracts, oversee the training, and resolve the disputes when those arose. In extended-kinship-based societies training normally took place within the clan, and clan-loyalty would make sure that the apprenticing process worked properly. As extended kinship declined in Europe, the social organization that carried out that task was primarily the craft guild. Being the main corporate form of social organization in artisanal occupations, craft guilds were instrumental in making apprenticeship work in medieval and early modern times (Steven Epstein, 1991, pp. 103-122). Yet the two are conceptually separate, and apprenticeship, being the more universal of the two, should be in a different category. While craft guilds of some kind existed all over the world, many — but not all — European guilds actively regulated and controlled apprenticeship.[40] The guilds had the power

[39] Leunig, Minns and Wallis, 2011, p. 42; Prak, 2013, p.153; see also Goody, 1989, p. 239. Fragmentary evidence for the Roman period indicates the likelihood that even in antiquity artisans commonly sent their sons to be trained with others: Hawkins, 2016, pp. 198-202.

[40] The canonical statement is by S.R. Epstein (2013, pp. 31-32), who states that the details of the apprenticeship contract had to be enforced through the craft guilds, which "overcame the externalities in human capital formation" by punishing both masters and apprentices who violated their contracts. As late as the eighteenth century, for French bakers, "the guild made the rules for apprenticeship and mediated relations between masters and apprentices . . . it

to enforce compliance with the contract through a variety of sanctions they could impose on wayward apprentices, including "compulsory membership, blackballing, and boycott" (S.R. Epstein, 2013 p. 61). Through much of Europe, guilds were closely associated with regulating apprenticeship, underlining their role in making the institution work properly. This was especially true when the effective power of local government, to say nothing of "the state," was limited.[41] In many cases, apprentices had to pay a special fee (known as *lichtgeld* in Germany) to the guild to start their term, and it stands to reason that this fee was in part a payment for the supervisory functions that the guild exerted on the master-apprentice relationship (Reith, 2007, p. 182; Schalk, 2019, p. 7).

More recent work has qualified how widely guilds were engaged in explicitly enforcing the terms of the contract (Wallis, 2024). In a conflict between a master (and thus a member of the guild) and an apprentice (who was not), it was unlikely that the apprentice would prevail if the guild was called to arbitrate (Prak and Wallis, 2019). This asymmetry would explain why eventually local officials and courts became increasingly involved in contract enforcement, creating conditions in which the market for apprenticeship could operate relatively freely and effectively without guilds. The effect of guilds — by exerting both monopolies in the product markets and monopsony in the labor market — on long-term progress are ambiguous, and Ogilvie (2019) makes an important point when she observes that the two regions in Europe that were the most technologically progressive, the Netherlands and England, were also those in which guilds were relatively weakest.

The guild was not the only "corporate" form of social organization that made the transmission and growth of artisanal human capital more effective in Europe. The urban institutional environment in which non-kinship cooperative arrangements emerged at the city level was central to the development of apprenticeship, especially in the Low Countries and Britain. In

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sought to impose a common discipline and code of conduct on masters as well as apprentices to ensure good order" (Kaplan, 1996 p. 199). The radical Jean Paul Marat, no friend of the ancien régime, worried in 1791 after the abolition of the guilds that apprenticeship would disappear and lead to a decline in the quality of artisanal products. By 1803, the French state had taken control of apprenticeship, which they preferred to restoring the guilds (Fitzsimmons, 2010, pp. 46, 144-46).

[41] As Reith, 2007, p. 181) put it, "the apprenticeship contract and the guild are ... interdependent solution to the problem of conflicting interests of the parties to the contract."

the Netherlands local organizations associated with municipal government named *neringen* were established to regulate and supervise certain industries independently of the guilds. They set many of the terms of the apprenticeship contract, often the length of contract and other details (Davids 2007, p. 71). Even more strikingly, in Britain, most guilds gradually declined after 1600 and exercised little control over training procedures while local courts often arbitrated disputes (Berlin, 2008; Rushton, 1991; Wallis, 2024). In reality, the two systems of corporations — guilds and municipalities — overlapped, cooperated, and reinforced one another all over Europe.[42] One way or another, apprenticeship as an institution mostly functioned comparatively well in Europe, and when it did, it supplied Europe with a relatively high level of skilled labor. The strongest evidence for this is that despite the rising demand for skills, the skill premium stayed at a low and constant level for many centuries, suggesting an elastic supply response and perhaps that a great divergence between West and East in skill premia pre-dates the Industrial Revolution (Van Zanden, 2009).

Were skilled European artisans in some way better than those elsewhere? Although such comparisons must always be impressionistic and speculative, it stands to reason that in terms of the skills and the technical competence of its craftsmen, there is little evidence that in c. 1450 European craftsmen had an edge over those elsewhere in the world. In the following decades, as trade with Asia picked up, Europeans displayed a ravenous appetite for the products of skilled Asian artisans, such as Chinese ceramics and silks, Indian cottons, and Persian rugs. An indication of the rough parity in the levels of skills is that when first exposed to the products of European artisans, those of Asia had no difficulty in emulating goods such as guns and navigational instruments at similar levels of quality.

Yet in the following centuries there is growing evidence that at least in some critical areas the skills of European craftsmen continued to improve whereas those in the rest of the world treaded water. Two centuries after Columbus, Europeans had seen and described objects too small and too remote to be ever observed by unassisted human eyes, proved the shape and dynamics of the solar system beyond any reasonable doubt, manufactured astonishing automated toys, objects

[42] For example, Bellavitis, Cella and Colavizza, 2019, p. 9 point out that in Venice the guilds monitored apprenticeships but needed the Giustizia Vecchia magistracy to enforce their regulations.

that measured time and distance accurately, and musical instruments of a quality that subsequent generations have difficulty matching. By 1750, moreover, European mechanics were acquiring the capabilities that within a century would manufacture the machinery needed to produce mass-produced consumer goods that flooded the Indian market with cheap cotton products. They also built the ships and their armaments that came to dominate the Indian Ocean trade and easily defeated the Chinese navy in the first Opium War, as well as the guns that allowed them to carry out colonial ventures on land and sea world-wide. Once the competence of ingenious mechanics was directed toward the production of capital and consumer goods, the Industrial Revolution became unstoppable. Without detailing the medieval roots of European economic civilization, we will not understand how this transformation happened.

6. Concluding remarks

A large literature has argued that culture directly influences economic outcomes and the functioning of existing institutions, by shaping the beliefs and values of individuals. Our analysis of the Great Reversal points to another mechanism of cultural persistence and cultural influence: the embedding of specific cultural traits in social organizations. Once culture-driven social networks crystallize in an organization form, they exert an unintended and lasting influence on economic and political outcomes, and they maintain the cultural foundations on which they are built.

Although we have focused on the historical divergence between Europe and China, the analysis of social organizations can also shed light on other historical episodes, and on other problems of institutional and economic development. Our analysis has treated Western Europe as a single entity. But within Europe there was substantial heterogeneity in the historical strength of kinship ties, exposure to the Church and family structures (see for instance Todd 1983). Some of this variation has been exploited by Schulz (2022), to explore the influence of the Church policies on the emergence of self-governing towns. But other hypotheses lend themselves to quantitative investigation. For instance, are there patterns linking the emergence of specific corporations – such as universities or specific form of economic partnerships – to local family structures?

The analysis of the economic impact of clans within China also deserves more scrutiny. We

have argued that overall the influence of these dynastic organizations on various aspects of Chinese society and governance contributes to explain why the Industrial revolution occurred in Europe and not in China. Nevertheless, there is also extensive evidence documenting how Chinese clans facilitated commercial activities in Imperial China and may have helped stimulate Smithian economic growth – cf. the chapter by Jia and Kung in this *Handbook*. Similarly, there is robust evidence that dynastic organizations have survived Maoism and facilitated local economic development in modern China, by protecting property rights against political abuse, channeling financial resources to local enterprises and acting as commercial intermediaries – cf. GMT (2024), chp 10. Reconciling this unambiguous positive role of clans in local economic development, with their arguably negative influence on Chinese institutional development and radical and disruptive innovations, deserves more attention from future research.

Other historical differences between Europe and China also deserve to be more extensively studied. The evolution of state capacity is a particularly important area. In both China and Europe, the state had very limited resources to administer distant localities, and it had to rely on the cooperation of unpaid private individuals and local organizations (see GMT 2024, chpt 8). In China, however, local administration was a major source of rent extraction and corruption – cf. Zelin (1984). In Britain, instead, corruption and abuses by unpaid local administrators seem to have been much rarer and the evidence suggests surprisingly that unpaid civil servants and local administrators may have been more effective than professional ones (Heldring et al. 2025). Explaining these differences in the effectiveness of local administrations and in the diffusion of corruption between China and Europe is another interesting question for future research.

More generally, the fundamental challenge of state formation is how to scale up cooperation from the local to the national level. Most societies have found ways to sustain cooperation locally, within small communities such as tribes, villages, clans or other small groups. But scaling up cooperation among strangers poses new challenges and requires different social arrangements. Our historical analysis of China vs Europe, and the work of Henrich (2020), Schulz et al. (2019), Schulz et al., (2019), and Roland (2020b) suggest that these challenges are more easily met in societies where universalistic values are widespread and social organizations have evolved to sustain cooperation among strangers, as was the case with the European corporations. In China,

cooperation was scaled up and conflicts were resolved thanks to the early emergence of a strong autocratic regime, that relied on the enforcement powers of a centralized bureaucracy. In Europe, peaceful resolution of internal political conflicts and the emergence of inclusive political institutions were facilitated by widespread social practices that regulated cooperation among strangers. But the European path of economic and institutional development took centuries. Can this process be accelerated? And how can cooperation be scaled up in social environments where communitarian values are prevalent, and social organizations facilitating interactions among strangers have not yet emerged? Addressing these difficult questions is of fundamental importance for future research on economic and political development.

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