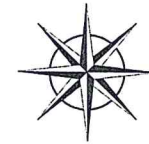


THE PRINCETON ECONOMIC HISTORY  
OF THE WESTERN WORLD

Joel Mokyr, Series Editor

*A list of titles in this series appears at the back of the book.*

WHY DID  
EUROPE  
CONQUER  
THE WORLD?



PHILIP T.  
HOFFMAN

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## CHAPTER 4

### Ultimate Causes

*Explaining the Difference between Western Europe and the Rest of Eurasia*

Throughout the late medieval and the early modern period, western Europe met all the conditions needed to advance the gunpowder technology. No other part of Eurasia could make that claim—not China, not Japan, not India, not Russia, and not the Ottoman Empire. Yes, they could improve the technology on their own and at times catch up with the western Europeans or perhaps even leap ahead in certain respects, but they simply could not keep up the same relentless pace of innovation. In the long run, they all fell behind.

Falling behind does not mean that they were poorer, for if anything their populations were likely better off. Nor does it mean that their leaders shunned the gunpowder technology or refrained from fighting wars or conquering territory—far from it. The Chinese emperors used the technology, waged as much war as the Europeans, and seized enormous amounts of terrain to the north and west in the early modern period. Russian czars gobbled up huge amounts of land too, again with the help of gunpowder weapons. But by 1800, China lagged behind the Europeans in developing the gunpowder technology, and the same held for Japan, India, the Ottoman Empire, and even Russia, whose size and efforts to adopt western innovations had at least made it a major power, though not a technological leader.

Western Europe's technological lead changed the history of the world. What then were the ultimate causes behind it? The tournament model points to the answer, by isolating what was distinctive in western Europe. First, western Europe was fragmented into modestly sized warring states whose rulers were battling for a valuable prize and could mobilize resources at low and similar political costs. It had had no hegemon—no equivalent to the Chinese emperors in East Asia—who would frighten other mighty rulers into sheathing their arms, and the comparable and

relatively small size of western Europe's major powers eased learning by doing and also kept political costs similar and fixed costs low. Political fragmentation (as we shall see) also insulated the rulers of western Europe from nomads and meant that they could wage most of their wars with gunpowder weapons. And finally, while the European rulers were not alone in fighting for glory or victory over enemies of the faith, their attachment to these two prizes was critical. Glory and the defeat of religious enemies blocked peaceful settlement of disputes and kept war going. Both prizes also offset the material damage war did, particularly for rulers who made the decision about going to war but did not personally bear the costs.

So to find the ultimate causes for Europe's technological lead, we really have to explain two things. First, why was western Europe fragmented into small warring states? Why did an enduring hegemon not emerge—a ruler like the Chinese, Mughal, or Ottoman emperors, or, within Japan, the Tokugawa shoguns? Second, why were the exogenous conditions in the western European tournament (in other words, the conditions outside the model) so different? In particular, why did the European rulers cherish prizes such as glory? And why could they mobilize resources at low political cost, by imposing heavy taxes or by borrowing? Or, to ask the same question in a different way, why were the exogenous conditions so different elsewhere in Eurasia? In particular, why were the variable costs so much higher in the eighteenth century both in India and in the Ottoman Empire?

The answers to those questions lie in political history, or in other words in the peculiar chain of past political events in western Europe and the rest of Eurasia, including both what happened and what failed to take place. Acting both in the short and the long run, political history determined both the size of states and the exogenous conditions in the tournament model. It worked in the short run by political learning—in other words, the political equivalent of learning by doing—which changed the costs leaders confronted when waging war and mobilizing resources. And in the long run, it had its way by shifting the incentives elites and rulers faced and by unleashing cultural evolution, which (along with political learning) shaped the size of states.

To untangle its consequences, we will focus on the political history of western Europe and China. Japan, Russia, India, and the Ottoman Empire will get less attention, although their past too will reveal how political

history affected the exogenous conditions in the model. And to make sense of the political history, we will draw upon tools from evolutionary anthropology and experimental economics and also extend our tournament model to allow for political learning. The political learning will in turn impinge on the fixed cost of military action and the variable cost of mobilizing resources and make it possible for them to vary in the same way that military technology did.

The result will be a process that is path dependent. In other words, the initial conditions—the past political history—will matter.<sup>1</sup> Past political history, both in western Europe and elsewhere in Eurasia, will in fact be the ultimate cause here: it will play a major role in explaining Europe's ultimate lead in advancing the gunpowder technology. Its effect will not be deterministic: other outcomes will, at least at certain pivotal times, be possible. But it will certainly not be random or wildly contingent either. Over time, political history directed China, Japan, India, Russia, the Ottoman Empire, and western Europe toward different political geographies and different fiscal systems. Although events could at specific times have taken a different route, over the long run the force of past political history could not be reversed, as it pushed Europe toward domination of the gunpowder technology and made the rest of Eurasia lag behind.

Here historians might object that there must have been other factors at work besides political history—other ultimate causes. There no doubt were, and we will in fact emphasize a second ultimate cause too: western Christianity, whose organized and politically independent clergy set western Europe apart from the rest of Eurasia—even from Orthodox Christian parts of Eastern Europe and the Middle East. Western Christianity was a second ultimate cause, and along with political history, it too tipped western Europe inexorably toward political fragmentation.

To see how western Christianity and political history worked, the first step is to eliminate two competing explanations for the contrasting political geographies of western Europe and China—two alternative explanations for why western Europe was fragmented into warring states, while China, more often than not, was a hegemonic empire: physical geography,

<sup>1</sup> For additional ways in which history influences outcomes, see Greif 2006 and David 1994 for path dependence and the way it allows history to affect institutions.

which Jared Diamond has emphasized, and kinship ties among rulers. The unusual features of Christianity (unusual that is among major religions in Eurasia) will then help us make sense of Europe's fragmentation. So will political history, once it is analyzed with the help of experimental economics and evolutionary anthropology. Political history will also shed light on rulers' attachment to glory in western Europe; and political learning, once it is incorporated into the tournament model, will account for the low and similar variable costs in Europe. The same tools will also reveal that political history was the pivotal force behind the very different exogenous conditions and political geography in China, Japan, Russia, the Ottoman Empire, and eighteenth-century India. Along with western Christianity, political history will be our ultimate cause.

### *Why Was Europe Fragmented?*

The first task is explaining why western Europe was fragmented. It was, to repeat, far from the only part of Eurasia that was split into warring political entities. But after the fall of the Roman Empire in the West, western Europe was always divided politically, except during the short-lived Carolingian and Napoleonic Empires. In other words, it was partitioned for a millennium and a half, from the fifth century on. China, by contrast, was unified under an empire for nearly half of the two millennia between 221 BC and AD 1911.<sup>2</sup> And western Europe's political fragmentation, as we know, had big consequences. Not only did it ease learning by doing and keep political costs similar and fixed costs low, but it also protected western Europe from the nomads.<sup>3</sup> Had Europe, like China, been one large empire, then its western edge would have felt the effects of nomad attacks in the east, with Mongol and Tatar invasions and raids in the Middle Ages and sixteenth century. Its rulers would likely have lavished their resources not on the gunpowder technology but on their cavalry or on

<sup>2</sup> Imperial China did change in size, particularly when it expanded during the Qing Dynasty (1644–1912).

<sup>3</sup> There were of course other forces protecting western Europe too—among them, more inviting targets elsewhere in Eurasia and conflict among different nomadic groups.

building an eastern wall. Instead, it was Russia, Poland, and Hungary that bore the brunt of the attacks, not the western countries.

At first glance, it is actually surprising that western Europe was not unified just like China. The existing theory of state size (at least in political economy) would predict as much, for it implies that all early modern states should have been large, like imperial China or the Ottoman and Mughal Empires. The reason is that all early modern states were, at least by modern standards, autocracies. After all, even the republics or kingdoms with representative institutions had very limited suffrage. But according to the theory, such autocracies should grow in size and take advantage of economies of scale in defense, for their rulers would not have to worry as much as a democratic leader would about disgruntled residents of distant frontier provinces, who might try to secede if they did not get the government posts or the amount of defense spending they wanted. The implication then is that all states should have been large, particularly when war was common, as in Europe.<sup>4</sup> Yet with the exception of Russia, the states in early modern Europe were all an order of magnitude smaller than China or the Ottoman or Mughal Empires.<sup>5</sup> The dimensions of the minuscule European republics could perhaps be attributed to their representative institutions, which allowed them to mobilize large amounts of per capita tax revenue, but how then does one ex-

4 Alesina and Spolaore 2003, especially p. 106. The precise dimensions of such a state would presumably depend on military technology and on the costs of transportation. It might be small when transport costs were high and defense fortifications were effective, as in medieval Europe, and large when defending against nomads. But military technology and transportation costs are themselves affected by state size. A large state is more likely to abut areas vulnerable to attacking nomads, and it can cut transport costs over a wide area by assuring security. Cf. Dudley 1991. Levine and Modica 2013 have a promising evolutionary model of state size; it too tends to hegemony by a large state except when there is an outside threat. Their model would provide another way to reach the conclusions I come to via cultural evolution.

5 Qing Dynasty China measured some 14.7 million square kilometers in 1790, according to Turchin, Adams, et al. 2006. The two biggest countries in western Europe (France and the Austrian Dominions) were under 0.7 million in the late eighteenth century. The comparison leaves aside colonies, which would have made the Spanish Empire even bigger than Qing China. China's dimensions under the Ming Dynasty were smaller—the Chinese empire measured some 6.5 million square kilometers in 1450—but even so it was still an order of magnitude larger than any contemporary European realm. So were the Ottoman and Mughal Empires.

plain why France or Spain or Prussia did not grow until they had absorbed the rest of the continent?<sup>6</sup>

One possibility is that state size is explained by geography. It has in fact been invoked to explain the striking contrast between Europe and China, with Jared Diamond and the physicist David Cosandey having formulated the most persuasive version of the argument, which applies not just to western Europe but to the continent as a whole.<sup>7</sup> Although they do admit a random element in the formation of state borders, they make geography the ultimate cause behind Europe's political fragmentation and China's long-term unity.

Geography, in their view, worked in two ways in China and Europe.<sup>8</sup> First, Europe was more mountainous than China, and because mountain ranges raised transportation costs and thwarted invasions, they created more political boundaries in Europe. Second, Europe had a more irregular coastline than China, and the irregularities—particularly peninsulas—favored the development of smaller states. The claim, as Cosandey explains, is that amphibious invasions were difficult before modern times. A peninsular state could therefore focus its defenses on the neck of the peninsula (where it might station troops or build fortifications) and avoid the cost of extensive protection of its coastline. It would therefore have an advantage over other states, and it would at the same time reap the benefits of the lower cost of water transport for traded goods.

This argument, at least at first glance, seems persuasive. Yet it unfortunately does not stand up to closer scrutiny. Consider first the assertion that Europe was fragmented because it was more mountainous than China.

6 In an era of high transportation costs, it was easier to monitor delegates in a smaller state and therefore easier for smaller states to have representative institutions. In early modern Europe, states with representative institutions could raise more tax revenue per capita, even if we take into account differences in wages, urbanization, and the cost of fighting wars. See Hoffman and Norberg 1994; Dincecco 2009; Stasavage 2010; Dincecco 2011; Stasavage 2011.

7 Kennedy 1987, 16–23; Cosandey 1997; Lang 1997; Diamond 2005, 454–456, 496.

8 Rainfall and river systems may have also played a role. Lang 1997 notes that irrigation and water control favored large states in China. The argument is essentially that a large state can take advantage of economies of scale and internalize externalities in providing the water control infrastructure. But Lang also observes that this advantage cannot be the ultimate explanation for China's unity, because the infrastructure was locally developed and locally maintained in much of China.

TABLE 4.1. Mountainous Terrain in China and Europe

Mountainous if:	Percent Mountainous	
	China	Europe
Elevation > 1,000 meters	33.28	6.28
Slope of terrain > 15 degrees	30.93	2.71
Classified as mountainous by World Bank study	37.40	10.60

Source: Yang 2011. See appendix D for a detailed discussion of the data.

Note: For the measurements of elevation and slope, China is defined as the modern provinces of Anhui, Chongqing, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Yunnan, and Zhejiang. That is approximately the boundary of the Tang (618–907) and Ming (1368–1644) dynasties. This definition, it should be noted, omits the modern provinces of Inner Mongolia, Xinjiang, Qinghai, and Tibet, so they are not included in the calculation. The World Bank study, which is based on China's modern boundaries, does include Inner Mongolia, Tibet, Qinghai, and Xingjiang, but a sensitivity analysis suggests that removing these four provinces would not make Europe more mountainous than China. Europe, for elevation and slope, was defined to be Albania, Andorra, Austria, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Moldova, Monaco, Montenegro, the Netherlands, Norway, Poland, Portugal, Romania, San Marino, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, and the United Kingdom, but not Russia. Because the World Bank study had no data for Andorra, Liechtenstein, Luxembourg, Monaco, and San Marino, they were omitted from the calculations based on the World Bank classification, but the resulting error is minimal since these five small countries constitute less than 0.06 percent of Europe's area. For details, see appendix D.

The problem here is the premise that Europe was more mountainous, for it simply turns out to be false. China was in fact more mountainous, even if we limit ourselves to China's historical borders during the Tang (618–907) and Ming (1368–1644) Dynasties and leave out more recent high-altitude acquisitions such as Tibet. And that result remains the same even if we vary the definition of what mountainous terrain is.

Suppose, for example, that mountainous terrain is defined to be areas over 1,000 meters in elevation. Then only 6 percent of Europe is mountainous versus 33 percent of ancient China (table 4.1). The result is similar

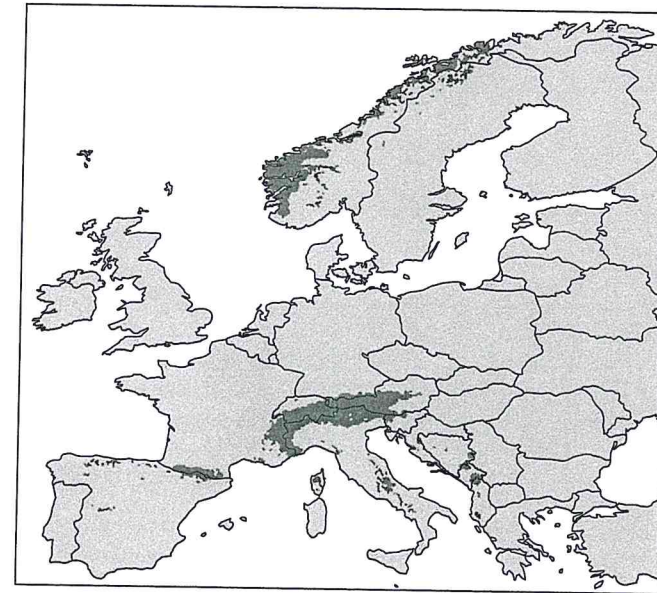


FIGURE 4.1. Mountain ranges and borders in modern Europe. In dark gray: steep areas (those with slope over 25 degrees). Source: Yang 2011.

if the definition is changed to land with a slope over 15 degrees. And a World Bank classification of mountainous terrain leads to the same conclusion (table 4.1). China is once again more mountainous than Europe.<sup>9</sup>

Mountain ranges are therefore not the reason China was unified and Europe was fragmented. If mountains were the ultimate cause for unity or fragmentation, then Europe should have had an enduring empire, while China should have split into separate countries. Maps of national borders suggest as much. Major mountain ranges in Europe do divide Spain from France and isolate Italy from northern Europe, but they do not coincide with other national borders in Europe (figure 4.1). Similarly, mountains do not define China's national boundaries, except in the west, although they may have

<sup>9</sup> Yang 2011. The historian John K. Fairbank reached a similar conclusion (Fairbank 1974, 3) as did the political scientist Hui 2005 in her comparison of warfare and politics during the initial unification of China and the early modern military revolution in Europe.

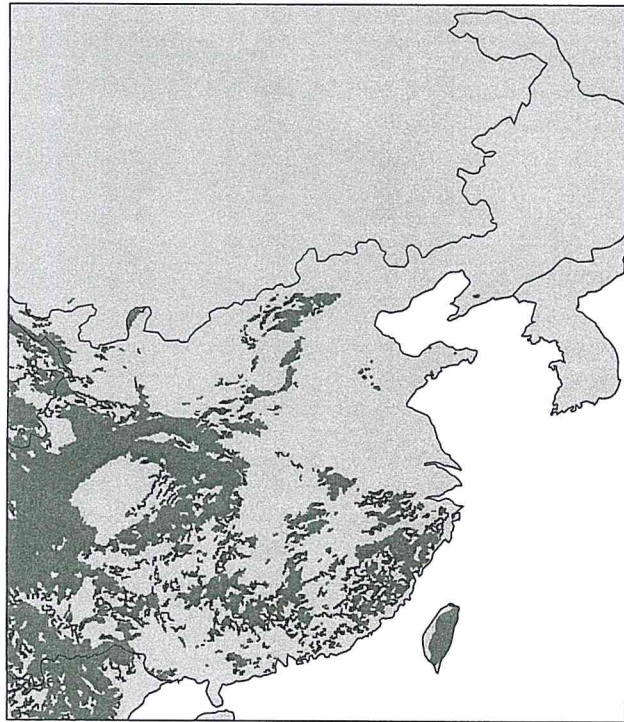


FIGURE 4.2. Mountain ranges and borders in ancient China. In dark gray: steep areas (those with slope over 35 degrees). Note that the map omits part of the western border of China and that the implicit definition of steepness is more restrictive for China than for Europe. *Source:* Yang 2011.

affected provincial boundaries (figure 4.2).<sup>10</sup> We must therefore look elsewhere to explain the different size of states at the two ends of Eurasia.

Does the answer lie with differences in the coastline? Cosandey argues it does, because Europe has a more irregular coastline than China. Measures of the roughness of both coastlines do confirm that China's coast is smoother (table 4.2).<sup>11</sup> But does Europe's jagged coastline actually

<sup>10</sup> Yang 2011.

<sup>11</sup> A measure that Cosandey devised points in the same direction: Cosandey 1997, 299–307.

TABLE 4.2. Measures of the Irregularity of China's and Europe's Coastline

Landmass	China	Europe
Degree of concavity (area of landmass divided by area of its convex hull)	0.68	0.60
Probability that a line segment between two points in the landmass cuts across the shoreline	0.06	0.41

*Source:* Schropp 2012. See appendix D for a detailed discussion of the data.

*Note:* The two measures work as follows: If a landmass has an irregular coastline, its degree of concavity is lower, and the probability that a line segment between two points in the landmass cuts across the shoreline is higher. Because this probability will depend on the depth of the interior of the landmass, it was estimated by creating artificial shapes that have the same shoreline as China or Europe but equivalent interior depths. As for the degree of concavity, the convex hull of a landmass is the smallest convex shape containing it. For a definition of what a convex shape is and an explanation of why the two measures work, see appendix D.

explain its political fragmentation? If the argument about irregular coastlines is correct, we would expect Europe's peninsulas to have coalesced into unified states at an early date, because the peninsulas could defend themselves at low cost and reap the gains of cheap maritime transport. Italy, however, was not unified until 1870, and the Iberian Peninsula is still divided. Another problem for the argument is that parts of the Chinese coast are irregular too, and they would presumably have been breeding grounds for political fragmentation within China.<sup>12</sup>

More important, the fundamental premise of the argument—namely, that amphibious invasions were difficult before modern times—simply turns out to be false. Amphibious raids and invasions were in fact common in the past and frequently successful. In medieval Europe, Muslims raided the coasts of Italy and the Byzantine Empire, and they took over Sicily and much of the Iberian Peninsula, all with the help of amphibious raids. Vikings attacked in England, France, and the Mediterranean, where they established colonies and muscled their way into control of territory. Their descendants then launched invasions to conquer England (1066) and Sicily (1061–1091). England, as the naval historian N.A.M. Rodger

<sup>12</sup> See, for example, Hucker 1974, 275–276; Deng 1997, 4–8.

has observed, was successfully invaded eight times between 1066 and 1485 and was the victim of many other naval landings, and England in turn repeatedly invaded Ireland. It was simply not all that difficult for skilled marauders to storm ashore or to sail up a river and attack inland. Stopping them required a navy or an army large enough to guard the shoreline and rivers.<sup>13</sup> In other words, it necessitated defending all of a state's borders, and not just the neck of a peninsula. There would therefore be no reason to expect that a peninsula or some other coastal irregularity would have a natural advantage as the boundary of a state.

The jaggedness of the coastline therefore cannot explain why Europe was divided and China usually united. Other simple geographic arguments run into similar problems—for instance, that clamor for irrigation drove political unification. The difficulty here is that the irrigation projects in southern China began before an empire was formed.<sup>14</sup> Also troubling here are similar arguments that could be made about water control in Europe, which should have favored political consolidation there too. A unified polity in Europe, for example, could have maximized the total revenue from tolls on European rivers, an important source of tax revenue in an era when overland transport was expensive. Separate kingdoms and principalities could not do so, because one prince's tolls could drive down other rulers' tax receipts.

Not that geography was irrelevant, for it did interact with politics and military technology. Switzerland, after all, would not have remained autonomous without the Alps, and China would have been different without the steppe. The bottom line, however, is that the interaction was more complex than the arguments about mountains and coastlines assume. Geography alone did not determine state size, and it was not the ultimate reason why Europe was divided and China usually an empire. Some rulers—in China in particular—were able to overcome the obstacles of geography and hammer together unified states that endured in time. Others—even with a Charlemagne or a Napoleon on the throne—

<sup>13</sup> Coupland 1995; Kennedy 1995; Rodger 2004, lxv.

<sup>14</sup> Lang 1997. A more fruitful approach than the arguments about coastlines and mountains would be to examine how the geographic environment and the state interact. For an example, see McNeill 1998.

could not do so. The size of states, a political outcome, then dictated the nature of each ruler's enemies. Large states like China were more likely to abut thinly populated regions where low rainfall would rule out sedentary agriculture and where herders, hunters, and armed raiders could thrive but be unable to put together any sort of durable state.<sup>15</sup> The large neighboring state would then face the risk of attacks by these nomadic groups, but the ultimate cause behind that threat would not be the low rainfall in a nearby region but rather the size of the state itself, which was the result of politics.

Perhaps the biggest impact geography actually had was not on state size, but on the shipbuilding technology that made it easier for Europeans to launch intercontinental voyages of exploration and intercontinental naval war. By its very location, western Europe had the advantage of being exposed to two distinct seafaring traditions, one from the Mediterranean and the other from the Atlantic, North Sea, and Baltic. In the fourteenth and fifteenth centuries, the Portuguese wedded features of both to create first the caravel and then the carrack, which made it possible to sail farther down the African coast and out into the Atlantic. The caravel, which like Mediterranean craft was built over a frame, had rigging that borrowed from both traditions and dimensions that were halfway between that of a galley and an Atlantic merchant ship. It was easier to maneuver, a better sailer in adverse winds, and ideally suited for exploring the African coastline. The larger carrack then added more room for cargo and a greater ability to sail with favorable winds once they were discovered. By the time the Portuguese craft reached East Asia, they could outmaneuver Asian vessels, which were made to take advantage of the regular monsoons, and they also found it easier to sail against the wind.<sup>16</sup> Geography had helped the Portuguese build better ships, and the improvements in shipbuilding complemented the gunpowder technology.

But even these advances reflected much more than Portugal's location or the predictability of the monsoons, for politics was also a powerful

<sup>15</sup> Barfield 1989; Turchin 2009.

<sup>16</sup> For the technological changes, I am indebted to Headrick 2010, 12–25, and, for the comparisons with Asian ships, I have drawn upon Needham 1954, vol. 4, part 3: 508–514; Reischauer, Fairbank, et al. 1960, vol. 2: 13–14.

impetus behind Portugal's innovations, not just in shipbuilding, but in navigation too. There too enormous progress was made, which, along with better ships, made it easier to explore the African Coast and sail to Asia: charts and pilot books for recording routes, tables of the sun's position for determining latitude, and the discovery that the fastest way back to Portugal was to sail northwest into the Atlantic and catch the winds known as the Westerlies back home. The driving force behind all these advances was not only the promise of riches from Africa and Asia but also the chance to continue the armed struggle against the Muslims beyond the borders of the Iberian peninsula. That was one of the paths to glory in western Europe's ongoing tournament, and it gave the Portuguese Crown and Portuguese elites all the more reason to support the voyages and to help improve shipbuilding and navigation.<sup>17</sup>

### *Can Kinship Ties among Rulers Explain Why Europe Was Fragmented?*

If geography cannot tell us why Europe was fragmented and China unified, perhaps ties of kinship among rulers can. Perhaps they kept separate polities alive in Europe and prevented them from coalescing into unified states, as in China, the Mughal and Ottoman Empires, or Tokugawa Japan.

The argument, which at first glance seems quite persuasive, concerns western Europe. It begins with the fact that rulers in western Europe were likely to be related to one another, at least from Carolingian times on.<sup>18</sup> In wars against their relatives, victorious western European rulers would presumably hesitate to kill or dethrone the losers because they were kin. If we assume that rulers elsewhere in Eurasia were less likely to be kindred, then they would behave differently in war.<sup>19</sup> When they won,

17 Disney 2009, 2, 27–43; Headrick 2010, 20–42.

18 Bartlett 1993, 39–43.

19 The assumption here may be wrong: rulers elsewhere in Eurasia may be just as likely to be kindred. If so, the argument could fall back on the growing emphasis in western Europe on the Christian virtue of mercy, which is discussed later. It would encourage victorious rulers in western Europe to spare all defeated opponents, and not just those who were kin. On the other hand, the fratricidal strife that could break out in

they would tend to eliminate the losers and then absorb their territory and followers. Over time, the winners would grow in size, except in western Europe, where they would remain small.

Such a process would be easy to model and it would match at least some of the evidence.<sup>20</sup> It would fit Victoria Hui's comparison of warfare in early modern Europe and warfare during the initial consolidation of China by the Qin Dynasty in 221 BC, and jibe with evidence from the unification of early modern Japan as well, where several losing warlords were killed, died in battle, or committed suicide. It could easily be squared with the growing length of monarchs' reigns in Europe (measured relative to the Muslim world) after the year 700, and with the declining rates of violent death for European kings, which fell from an astronomical 23 to 25 deaths per thousand ruler years in the seventh century (some four times the mortality rate of soldiers in heavy combat today) down to less than 3 deaths per thousand ruler years in the sixteenth century. And one could even come up with an additional reason why victorious European rulers might spare the losers, for from Carolingian times on their clerical advisers placed ever greater emphasis on the Christian virtue of mercy that kings and princes were supposed to show.<sup>21</sup>

For this difference in behavior to matter, however, it has to persist into the early modern period. Otherwise, the winners in Europe's incessant early modern wars should gobble up the losers among the continent's major powers, with unification being the result. There is at least some anecdotal evidence that something along these lines was at work in western Europe. The emperor Charles V, whose empire stretched from central Europe to the Americas, nearly conquered western Europe, but he spared his major enemy, the French king Francis I, after his generals

parts of Asia among claimants to a throne (for an example, see Burbank and Cooper 2010, 96) might well make Asian rulers less likely to be related than monarchs in western Europe.

20 The simplest model would be a two-stage game, in which victory in the first stage allowed the winner in the first stage to gain the prize a second time without opposition by killing off the loser in the first stage.

21 Hui 2005; Anton 2006; Eisner 2011; Blaydes and Chaney 2013.



captured him in Italy in 1525.<sup>22</sup> And that is not the only example of a defeated prince who was given quarter.

Anecdotal evidence, though, is not enough. If victors in war were more likely to spare the losers in Europe than in China—or more generally, in the rest of Eurasia—then that difference in behavior should leave a mark in the early modern period, when we have data on the outcome of wars throughout Eurasia. In particular, rulers in early modern Europe who lost wars to foreign enemies should have been more likely to survive than their counterparts elsewhere in Eurasia who found themselves in a similar predicament. But if we look at what happened to defeated rulers elsewhere in Eurasia, we find that there is no difference between Europe and the rest of the landmass. The test is limited to major powers, but that is precisely where we should see a contrast. And there simply is no such contrast in the data (table 4.3).<sup>23</sup> Rulers of major powers in western Europe are 7 percent less likely than the average ruler to be dethroned after a defeat, including losses in civil wars: that is what the  $-0.070$  change in the probability of being dethroned in the righthand column of the table means. But the numbers for major rulers outside of western Europe are almost identical:  $-0.058$ , or 5.8 percent lower likelihood of losing power. The difference is so tiny that it could easily be a statistical fluke; in fact there is a 49 percent chance (the  $p = 0.49$  in the table) that there is really no difference between the fate of major western European rulers and that of their counterparts elsewhere in Eurasia.

So kinship ties among rulers cannot explain why Europe was fragmented. As for why victorious rulers in both Europe and Asia did not want to take over other large powers they defeated, the answer is simple: they were respecting the limits of preindustrial communications and transportation technology.<sup>24</sup> Winning monarchs would gladly absorb a

22 Charles V did imprison Francis I until he agreed to sign a humiliating treaty.

23 Results are similar if one excludes colonial wars or if the variables are recoded by a secondary school student. One might worry about the endogeneity of losing a war and the interaction terms involving it, but an instrumental variables estimate (with the start and end date of the wars, and designation as a great power by Levy as instruments) leads to the same conclusion.

24 For an insightful analysis of these limits and their interaction with military technology, see Dudley 1991. Unfortunately, the technologies he singles out cannot explain the differences between western Europe and China, because they were in use in

TABLE 4.3. Probit Analysis of the Probability That a Ruler Is Dethroned after a Military Defeat: Eurasia, 1500–1789

Effect of:	Estimated Change in the Probability of Being Dethroned (standard errors)
Losing a war	0.294 (0.039)
Difference for rulers of big powers in western Europe	$-0.070$ (0.013)
Difference for rulers of nonwestern big power	$-0.058$ (0.014)
Having a civil war	0.053 (0.025)
Observations	595
Test of hypothesis that there is no difference in the likelihood of survival of great powers in western Europe and great powers elsewhere in Eurasia	$p = 0.49$

Sources: Clodfelter 2002; Langer 1968; Levy 1983; Darby and Fullard 1970.

Note: For an explanation of this table, see the text. Each observation is a war outcome for a particular country, with the estimated effects derived from a probit analysis. The data includes all wars throughout the world that are listed in Clodfelter, ended before 1790, and involved at least one big power. Many of these wars involved smaller states or were fought outside Eurasia. The big powers here are defined as any of the western European states that were ever listed as great powers in Levy, plus China, the Mughal Empire, the Ottoman Empire, Persia, and Russia. The effect of each explanatory variable was calculated under the assumption that the other explanatory variables were set equal to their means.

small realm or incorporate a bit of territory, but ingesting an entire big country risked provoking unmanageable resistance in the form of rebellions and opposition to tax levies. Sending a mobile strike force to repress every act of hostility to their foreign rule would be impossible in a large country, and occupying every town and village would be out of the question.

both. Furthermore, Dudley may exaggerate the role heavy cavalry played in fragmenting medieval Europe, at least according the research of Bernard Bachrach; see Parker 2005.

Unless they had an overwhelming force that could win over allies (like Cortés and Pizarro in Latin America) or unless they could take over the existing administration (like the Manchus in China), they would be better off extracting concessions from the ruler in place and then leaving. And on a more general level, the implication is that something else determined state borders, so that modifying them after a military victory was usually just too costly in a large polity.

### *Political History as an Ultimate Cause: Cultural Evolution in Western Europe*

While geography and kinship ties cannot tell us what distinguished western Europe from the rest of Eurasia, political history can. Along with western Christianity, political history was the ultimate cause behind Europe's political fragmentation and the exogenous conditions in our model that distinguished Western Europe from the rest of Eurasia. It can explain why Europe was splintered politically, why rulers in western Europe found it appealing to fight incessantly for prizes such as glory, and why at least some of them could mobilize resources at low political cost and do so at precisely the moment when the gunpowder technology was militarily advantageous and ripe for improvement via learning by doing. And it reveals why the same conditions failed to hold in Japan, China, India, Russia, or the Ottoman Empire.

Normally, we think of history not as a cause, but as something to be explained. But it can be a cause if past events determine future outcomes or set a society on a path that reinforces itself over time. In western Europe, events had just such an effect: in particular, the centuries of war fought after the collapse of the Roman Empire, when western Europe had warriors and military leaders, but nothing that would qualify as a strong state—in other words, nothing like a state with permanent taxation and a durable fiscal system able to raise appreciable amounts of revenue over the long haul.<sup>25</sup> Elsewhere in Eurasia, lengthy periods of strife like that in medieval Europe usually ended when one of the contending powers van-

<sup>25</sup> Guenée 1971, 167–180, 254–257; *Lexikon des Mittelalters* 1977–, sv “Steuer, Steuerwesen”; Collins 1991, 154.

quished the others and set up a dominant, unified polity. That was what happened when Japan was united under the Tokugawa Shogunate in the early seventeenth century, or (to take the earliest of multiple examples in China) when the Qin state bested its rivals and established the first Chinese imperial dynasty in 221 BC. In Europe, powerful states did eventually emerge from all the turmoil, but not until very late—the late Middle Ages (1300–1500), or the early modern era. In the long intervening period, the lack of strong states and the ongoing warfare unleashed a process of cultural evolution that splintered western Europe into hostile groups dominated by warlords and devoted to fighting.

Here culture means beliefs and preferences that people acquire not by genetic evolution but by imitating what is common or successful or avoiding what is frowned upon. Such cultural evolution can spread norms of behavior and determine the parameters that individuals take as exogenous in models like our repeated tournament. It did just that in western Europe, stamping the region with many of its distinctive features: the huge value that rulers and elites (particularly the nobility) attached to victory in war, or in other words, the large value of the prize in the tournament model, and—even more important—the enduring enmities between peoples that made it difficult for anyone to unify western Europe. Some of these traits, obviously, were not unique to Europe: Ghengis Khan clearly treasured victory too. But when they were combined with the low costs of mobilizing resources that western Europe's major powers finally achieved, they set western Europe apart.

There was (as we have said) a second way in which political history shaped future outcomes as well, both in western Europe and the rest of Eurasia—via political learning. Unlike cultural evolution, which operated over the long run spanning generations, political learning worked over the course of rulers' reigns. It did not happen overnight—it was a matter of years or decades—but it was much faster than cultural evolution. How did it take place? Military victories, for example, could establish a powerful state, which then defeated its enemies or cowed them into submission, as happened when Japan was unified or when the Qin leaders established the Chinese Empire. Or kings could, for the first time, get significant amounts of permanent tax revenue, as in France during the

Hundred Years War. In terms of our model, the rulers here—Qin leaders, the warlords who unified Japan, or the late medieval kings of France—were learning how to lower their own political costs of mobilizing resources.

To see how cultural evolution and political learning operated, let us take up cultural evolution first and begin in western Europe, with the barbarian invasions and the collapse of the Roman Empire and their aftermath, in the years between the third and the eighth centuries. The invasions would start a process of cultural evolution that set western Europe apart, and after analyzing it and the impact of western Christianity, we will turn to political learning in western Europe.

Classical authors, somewhat indiscriminately, applied the label “Germans” to the variegated peoples who were as much migrants as invaders when they moved into the western empire during the invasions. Whether they came as migrants or invaders, the newcomers were clearly devoted to war, in part because they had been militarized by the Romans themselves, who not only fought the barbarians but also hired them to man their army. Through raiding or service in the Roman army, barbarian warriors gained wealth, prestige, or the ability to have more than one wife, and they rallied to leaders in their tribal societies who were victorious in war. The result was the formation of bands of warriors in the fourth and fifth centuries that destabilized the existing barbarian tribes and created new ethnic and cultural groupings from the newcomers and the Roman population, as the western empire faded away. Western Europe was now fragmented into something new: political units that were not by any stretch of the imagination states with fiscal systems and a monopoly of violence, but which were able to wage war by relying on ethnic and cultural solidarity, hostility to other groups, and loyalty to a personal leader.<sup>26</sup>

Among these groupings, one in particular stood out—the kingdom of the Franks, which was stronger than its neighbors and managed to divert its “military energies away from internal conflict and toward profitable aggression on its borders.”<sup>27</sup> Their kingdom expanded through con-

26 The account here is drawn primarily from Geary 1988, especially pp. 43–80, 112–113, 226–231, and from Bartlett 1993, 45–47; van Dam 2005; Wormald 2005.

27 Fouracre 1995, 99–100.

quest, and in 800, when they controlled most of modern day France, Belgium, the Netherlands, western Germany, and northern Italy, the Frankish King, Charlemagne, established a new western empire with the help of the pope. Yet although western Europe was briefly united, Charlemagne’s descendants were soon fighting one another, and under his grandchildren, the empire split into three parts. Eventually, western Europe splintered even more, and by 1300, only the western third of Charlemagne’s realm (roughly western and central France) remained intact. The other two-thirds, though still under the nominal authority of the Holy Roman Emperor, had in fact divided into hundreds of diminutive principalities.<sup>28</sup>

By then the warriors of late antiquity had metamorphosed into medieval knights. Fighting, however, was still what they did, and they still battled in military bands led by a leader, or lord. War brought them the greatest honor and gave them a chance to acquire wealth as a reward for military service for their lord. For a knight, the ideal recompense would be an estate—landed wealth that would allow him to marry and have a family. Victorious lords could dream of grander things—of becoming princes or even kings. Spurred on by such prizes, lords and knights devoted themselves and huge amounts of resources to warfare between the tenth and the fourteenth centuries. They scoured Europe to find ideal sites for ever more elaborate castles, first wood and earth and then impregnable fortresses of stone. Even a single knight on horseback required some 50 pounds of iron for his armor and weapons, which might take 10 to 15 days for a forge to produce.<sup>29</sup> The organizing principle was still the same, for these warrior bands and political groups lacked fiscal systems or any appreciable permanent tax revenue that the princes and kings at

28 For political divisions in Europe ca. 1300, see <http://www.euratlas.net/history/europe/1300/index.html> (accessed October 1, 2012). Charles Tilly counted some 200 to 300 political entities in Italy alone back in 1200, and perhaps 500 of them in Europe as a whole in 1500 (Tilly, 1990, 40–46).

29 Bartlett 1993, 39, 45–51, 60–84; De Charnay and Kaeuper 2005, 22, 34–35, 40–41, 47–50.

the top could collect.<sup>30</sup> As before, war was based on loyalty to the leader, solidarity with other members of his retinue, hostility to enemies, and a willingness to fight them. As one revered knight advised in the fourteenth century, "Love and serve your friends, hate and harm your enemies, relax with your friends, exert yourself with all your strength against your foes."<sup>31</sup>

Although the Carolingian Empire was now long gone from what had once been the Frankish heartland—northern France, western Germany, and the area between—the energies devoted to war were still directed outward, toward the fringes of Europe and the Middle East. Knights from the Frankish heartland fought in northern and eastern Europe and against Muslims in southern Europe and the Middle East between the eleventh and the thirteenth century. They were encouraged by the western Church, which memorialized their exploits and blessed their crusades. In this drive to conquer terrain on the edges of western Europe and beyond, knights from Normandy played a particularly prominent role. They sent their younger sons to fight abroad and won a fearsome reputation for their military prowess and savagery in battle. When the Normans slaughtered a Muslim army from Palermo in 1068, their leader, the Norman count Roger, sent the victims' carrier pigeons home with messages inscribed in the dead men's blood, so that their families would swiftly learn the grisly news.<sup>32</sup>

Muslims were not the only ones terrorized by the Normans. Byzantine Christians were too. To drive a band of the Normans out of southern Italy in 1043, the Byzantines raised a huge army and sent the Normans an ultimatum: either accept a truce and leave, or fight. But the Normans were not intimidated, even though they were greatly outnumbered. When the Byzantine envoy brought them the ultimatum, one Norman, after admiring the messenger's horse, suddenly knocked it unconscious

30 In addition to their own personal wealth, medieval princes did eventually collect revenue from tolls, coinage, and the exercise of justice, and they might also get exceptional contributions to fund war. But they did not have permanent excise or property taxes.

31 De Charnay and Kaeuper 2005, 70.

32 Bartlett 1993, 39–43, 48–51, 85–105, 243–260. The story about the carrier pigeons is from Bartlett 86–87 and Malaterra 2007, vol. 2: 41–42.

with his fist. His aim, according to the monk who recounted the story with admiration, was clear—to frighten the Byzantines. His comrades quickly replaced the horse with an even better one, and the envoy carried the Normans' implicit response back to the Byzantine leaders, who dared not reveal what had happened for fear that their army would be terrified and desert. And the next day the Normans boldly attacked the Greeks and won, despite their small numbers. That brutal incident, and many others like it, swiftly gained the Normans and the Franks an unsavory reputation for violence, and for insatiable greed as well, throughout the Muslim and Greek Christian world.<sup>33</sup>

How, though, could these warrior bands and political groupings wage war without fiscal systems and permanent taxation in what was the impoverished West? How could they get their followers to risk their lives and fight together for a common goal? Making war certainly could bring prizes—wealth, property, glory—that a leader of a warrior band could distribute among his followers, and private rewards of this sort could, as we shall see later, be a powerful incentive to fight. Making war also shielded all the members of a band from enemies. But it was clearly dangerous. How could a leader keep his followers from shirking and leaving the fighting to others? Shirkers, after all, would still be protected from enemies, and they might, at least indirectly, enjoy the benefits of spoils brought back from war. And that must have been a real problem, at least early on, for the Roman historian Tacitus noted that the barbarians had at least occasional trouble with deserters, cowards, and men who were not warlike.<sup>34</sup> How could leaders overcome such problems and provide what we would call the public good of defense? Were loyalty to leaders, solidarity within one's own group, and hostility to enemies that powerful?

They were, but understanding how western Europe's peculiar history gave them such force requires a detour into experimental economics and evolutionary anthropology. Economists, political scientists, and anthropologists have done numerous experiments to analyze, in an idealized way, precisely the sort of dilemma facing the leaders of the warrior bands

33 Bartlett 1993, 85–90; Malaterra 2007, vol. 1: 9.

34 Tacitus 1970, vol. 12: 11, which speaks of punishing "transfugas . . . ignavos et imbelles."

and political groupings in medieval Europe. In the typical experiment, ten participants might be given \$20 each and told they can contribute any portion of it toward a public good that will benefit everyone in the group. They interact anonymously by computer and so do not know one another. For each \$1 they contribute, they and the other participants will all get \$0.30, but they can keep any money that they do not contribute. The \$0.30 is, like defense, a public good since they will all benefit from it, and money they hold back is equivalent to shirking and letting others do the fighting. If the participants were all to contribute \$20, they would each receive \$60—the best possible outcome for everyone—but if they are concerned with nothing but their own winnings, then each one has an incentive to give nothing and to let others make contributions. (Doing so is a dominant strategy if the participants play only once, and it is also the equilibrium if participants play a fixed number of rounds.) In other words, everyone has an incentive to shirk, and in equilibrium, no one should contribute anything.

When the experiment is run, however, that is not what happens. At the start, participants actually make substantial contributions, which then diminish if the game is repeated. The average contribution might drop from roughly \$10 to under \$2 by the tenth round of play. You might think that the participants are inching toward the equilibrium predicted by game theory. But most of them never get to the zero contribution that is the equilibrium, and, worse yet, if the experimenter tells them that he or she is starting the whole experiment over again—say in round ten—then in round eleven the average contribution jumps again.

Apparently, participants take into account more than just the money they earn. It in fact turns out that they are also concerned about how well the whole group makes out, and they get angry if they sense that they are victims of unfair behavior—for instance, if their winnings are lower than the average because other participants have contributed little or nothing. They also seem to be learning what strategies work best with their fellow participants, even if the whole procedure is anonymous.<sup>35</sup>

<sup>35</sup> For a lucid overview of the experiments and the various ways economists have tried to make sense of what happens, see Arifovic and Ledyard 2012. Their explanation for the participants' behavior, which fits the experimental data, assumes partici-

One way to boost the contributions is to harness that anger and let participants punish shirkers by revealing how much everyone contributed in the previous round. Participants will often retaliate against a shirker, even if doing so cuts their individual earnings, and if shirkers are penalized, then contributions will usually rise. Contributions will climb even higher if the punishment makes those who give little ashamed of having violated norms of fairness. The outcome will depend, though, on where the experiment is conducted. In some places—among them Boston, Zurich, and Chengdu, China—shirkers are targeted, but in others—including Athens and Muscat—the ones punished are actually those who contributed a great deal. In some places, then, penalizing shirkers is legitimate, but in others it is clearly not. But when it is legitimate, shirking can be greatly reduced.<sup>36</sup>

How then do such differences between societies arise? Here the most convincing answer comes from evolutionary anthropologists and allies they have in economics, who invoke cultural evolution. For them, to repeat, culture consists of what an economist would call preferences and beliefs, which are acquired by a process of imitation or doing what is successful and avoiding what is frowned upon. In their view, culture accounts for much of the variation between human societies, and in particular, the differences in norms of behavior in the public goods experiments.<sup>37</sup>

If they are right—and I believe they are—then their argument can also explain the willingness of warriors or knights to fight for their leaders or lords in medieval Europe. For the argument to work, all that we would need would be a long period of frequent war between small stateless societies—in other words, just the situation in western Europe at the

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pants have utility functions that are linear in three terms: their own payoff, the average payoff to the group, and the amount by which their payoff is less than the average payoff to the group, which captures the participants' disutility (anger at unfair outcomes, in my words) when they feel they are being taken advantage of. The weights of the three terms are exogenous random variables. The other part of their explanation is that experimental subjects also learn by randomly trying out new strategies and evaluating old ones. With their model, cooperation can then emerge endogenously in the public goods experiments. For more on the experiments and for the role that emotions play in subjects' behavior, see Bowles and Gintis 2011.

<sup>36</sup> Herrmann, Thöni et al. 2008; Bowles and Gintis 2011, 24–29.

<sup>37</sup> Henrich 2004; Boyd and Richerson 2006; Bowles and Gintis 2011.

end of the Roman Empire and during the early Middle Ages (ca. 400–ca. 1000). The war could involve raiding other groups or defending against their attacks. In such a world, a willingness to fight for one's own group and marked hostility to other groups will complement one another and contribute to success in the conflicts, even though both impose costs that would include not only the risk of death or injury in war but also foregone opportunities of trade with other groups. This combination of "bravery" and "belligerence," which has been dubbed "parochial altruism," will then spread via imitation. Victory will bring rewards and encourage emulation of parochial altruism in other societies. As for losing societies, they will disappear or mimic the winners by adopting the same norms of conduct. As a result, warfare will grow more frequent (at least initially) because members of societies with more parochial altruists will know they are likely to defeat societies with fewer. The outcome is not foreordained, because other equilibria are possible, including ones where peaceful dealings among groups predominate. But the slide toward increasing numbers of valiant warriors and growing hostility to other groups is all the more likely if parochial altruists punish shirkers in their own group who fail to fight.<sup>38</sup> The outcome will then be a society of brave warriors who hate their enemies and punish cowards.

That does sound eerily like barbarian society in western Europe from the end of the Roman Empire into the early medieval period. It did splinter into hostile groups devoted to fighting, groups that were dominated by warriors willing to sacrifice their lives in battle for the benefit of their comrades. Increasingly, the warriors had themselves buried with their weapons—archaeological evidence for the growing importance of warfare among the barbarians.<sup>39</sup> And the barbarians did punish cowards, deserters, and unwarlike men, who, according to Tacitus, were hanged or

38 Henrich and Boyd 2001; Boyd and Richerson 2006; Choi and Bowles 2007; Lehmann and Feldman 2008; Mathew and Boyd 2008; Boyd, Gintis, et al. 2010; Bowles and Gintis 2011. One worry here is how punishment can start if there are only a small number of altruists in a society who will punish shirkers. But that is not a problem if the altruists can coordinate their efforts and take advantage of likely economies of scale in the provision of the public good of defense. For skeptical views about the role of punishment, see Dreber, Rand, et al. 2008; Ohtsuki, Iwasa, et al. 2009; Rand, Dreber, et al. 2009.

39 Geary 1988, especially p. 74; Fouracre 1995.

thrown into marshes with hurdles on their heads. Furthermore, not fighting to the death was considered shameful.<sup>40</sup>

With medieval knights and their lords, the importance of warfare, military valor, and hostility to one's enemies persisted into the High Middle Ages (ca. 1000–ca. 1300). At the same time, medieval western Europe became even more fragmented, as kings and princes bestowed wealth and extensive local political powers on their supporters. Meanwhile, there were even signs that medieval Europe developed a comparative advantage in weapons production, for in the ninth and tenth centuries Frankish swords were exported to eastern Europe and the Muslim world.<sup>41</sup>

One bit of evidence in favor of this explanation for Europe's fragmentation is that it fits the sociological analysis of political and ethnic boundaries by the evolutionary biologist Peter Turchin. He too sees hostile ethnic groups forming after the collapse of the Roman Empire, and quantitative evidence bears out his claims.<sup>42</sup>

Still, one might be skeptical. Apart from Tacitus, the archaeological evidence, and the descriptions of modern historians, the only other support for the argument comes from experiments in the modern world or from models of evolutionary games that are calibrated with evidence from prehistoric societies. And how can the experiments shed light on war when at most \$60 is at stake, and not life and limb? Could warfare actually be organized in the way we have argued—in reality, and not just in a game theoretical model? And would there have been enough time for all the cultural change to take place during the Middle Ages?

There was likely enough time for the cultural evolution to have taken place. The birth of new social groups and the extinction of old ones (so anthropological evidence from New Guinea shows) is rapid enough to bring about cultural change in 500 or 1,000 years, and the process can be

40 The hurdles were frames made of wood and wicker that would make those who were punished drown. Tacitus 1970, 12; Geary 1988, 52–57.

41 McCormick 2001, 732–733.

42 One additional element in Turchin's argument is that the strongest ethnic groups would coalesce along borders. They would conquer or absorb other groups and eventually become strong states. These states could, however, be short lived, although they would be most likely to survive in areas that were major ethnic and political frontiers, such as Constantinople. That, in his view, is why the Eastern Roman Empire—Byzantium—survived: Turchin 2009, 51–63, 83–92.

even faster if groups imitate their successful neighbors.<sup>43</sup> Western Europe had that much time in the centuries after the collapse of the Roman Empire in the West, for there were no strong states that could fund war in a very different way—namely, by imposing heavy taxes—nor did some hegemonic conqueror suddenly halt the cultural evolution by establishing the sort of durable empire created in China, or in Japan with the Tokugawa Shogunate. All the pieces—a willingness to fight for one's group, hostility to other groups, and enormous value placed on victory in war—could have easily been in place in western Europe by the eleventh century, if not long before.

Furthermore, there are real examples of groups waging war in this way—in the Amazon or in ungoverned areas of Pakistan and Africa.<sup>44</sup> Perhaps the best example comes from the Turkana in East Africa, a group of some half a million nomadic pastoralists who camp in dispersed settlements and have no hereditary leadership nor any centralized political or military authority. As the anthropologists Sarah Mathew and Robert Boyd have shown, the Turkana fight defensive wars and go on offensive raids to seize cattle from other ethnic groups, much like the barbarians on the edge of the Roman Empire, whose forays sought livestock and slaves. The Turkana's undertakings are dangerous: 14 percent of Turkana men die in warfare between puberty and the start of fatherhood, and 9 percent while they are fathers. Yet no state compels the men to fight, and they do not seem to be motivated by ties of kinship or repeated dealings, for in the raiding parties (their median size is 248 fighters), the men are not relatives or people who interact with one another on a daily basis. Like the barbarians in western Europe, they do have occasional trouble with desertion and cowardice. Their solution is to punish the shirkers. Deserters and cowards may be berated (and presumably shamed) by women, elders, or men of the same age. Or they may be beaten severely or forced to pay a fine.<sup>45</sup>

43 Soltis, Boyd, et al. 1995; Boyd and Richerson 2006, 209–210.

44 Barth 1956; Lindholm 1981; Gray, Sundal, et al. 2003; Fratkin 2006; Beckerman, Erickson, et al. 2009; Mathew and Boyd 2011.

45 Mathew and Boyd 2011; see also Gray, Sundal, et al. 2003; Fratkin 2006.

The barbarians in western Europe were even harsher, at least according to Tacitus. It is entirely plausible then that cultural evolution allowed them, like the Turkana, to wage war even though they as yet had no fiscal system or centralized states. Cultural evolution also split them into hostile groups, made them place an enormous value on war, and got them to fight bravely for their leaders. The kings and princes at the top of society gave these leaders wealth and local political power to win their military allegiance, but that also meant that the leaders became increasingly independent and that the kings and princes had to negotiate with them.

Cultural evolution can therefore explain at least some of western Europe's peculiar features. At the very least, it can explain Europe's enduring fragmentation and the enormous value that kings and aristocrats (particularly nobles) attached to war—what by the early modern period they called glory. This was the particular solution to the problem of providing the public good of security—one equilibrium among other very different ones—that was reached during the centuries when western Europe had not yet developed any powerful fiscal states that could pay for defense with taxes. It was those centuries without strong states—a long-run effect of political history—that drove western Europe's cultural evolution. To be sure, the resulting cultural traits were hardly unique to western Europe. Victory and honor on the battlefield were prized in many other places, as early modern Europeans recognized.<sup>46</sup> Furthermore, by themselves, these cultural attributes are not enough to explain why the western Europeans pushed the gunpowder technology so far. For that, western Europe did have to eventually develop strong states capable of mobilizing huge amounts of tax revenue at low total cost, for without such strong states, it would have remained like the Turkana, who fight a great deal but do not improve military technology. Eventually, it did get strong states, at just the moment when the gunpowder technology had enormous potential for improvement via learning by doing. It got them, as we shall see, by po-

46 Military values were held dear in both India and Japan. For India, see Gommans 2003, chapter 2, and for Japan, see the notes to chapter 3, which mention eighteenth-century Japanese literature and the observations by Europeans from the sixteenth century on.

litical learning, but before taking up that subject, let us see how another centrifugal force also splintered Europe politically—western Christianity.

### *Western Christianity Worked against Europe's Unification*

Along with the hostility between groups spawned by cultural evolution, western Christianity also helped fragment Europe politically. By blocking political unification, it became the second cause for the small and comparable size of European states, which eased learning by doing.

Arguing that Christianity splintered Europe politically may seem counterintuitive, for in 1500, Christianity was arguably the sole bond that held western Europeans together. To be sure, the Reformation and religious wars soon snapped that fragile tie and turned Christianity into a source of violent discord and enduring enmity.<sup>47</sup> But even before then, it helped block political unification.

The reason was simple: the papacy strove to keep the Holy Roman emperor—or any other ruler—from permanently reassembling Charlemagne's empire in western Europe. None of the polities in western Europe managed to subjugate the popes for long, thanks in large part to the Investiture Controversy of the eleventh and twelfth centuries. In this conflict of ideas and political alliances, the papacy struggled to gain greater independence from the Holy Roman emperor and other kings and to limit their power over the Church, particularly the rights they claimed to appoint bishops and other officials. In their battles against the Holy Roman emperors, the popes gained the support of cities and aristocracies in Italy and Germany. They won over reforming monasteries in Germany and got the Normans as allies by recognizing their conquests in southern Italy. They resorted to divide and rule too, by urging powerful vassals to abandon the emperor's cause and by encouraging urban elites in Italy to drive out the bishops whom the emperor had put in charge of city governments. In other words, the popes took advantage of Europe's political fragmentation but then accentuated it.

<sup>47</sup> Adding to the division was the Reformation's abandonment of Latin in favor of the vernacular.

If necessary, they could also apply their terrifying spiritual weapons of excommunication or interdict, as Pope Gregory VII did in his struggles with Emperor Henry IV in 1076. With these weapons and supporters on their side, the popes succeeded in keeping the Holy Roman emperors from getting too powerful and from reuniting western Europe. They worked to keep other rulers from getting too strong too. Pope Innocent III not only excommunicated Emperor Otto IV in 1215; he also put France, England, and Norway under interdict. Conceivably, he himself might have become a European hegemon, although that seems unlikely. In any case, his sudden death and the very different temperament of his successor prevented that from happening.

The rest of Eurasia had no equivalent centrifugal force. There was simply nothing like the western Church elsewhere in Eurasia—no religion that was politically autonomous and equipped with an organized clergy that could keep rulers from getting too strong. Although Japan did have monks who fought in its civil war, they were not united, and in any case, their resistance was crushed and they were brought under tight state control by the warlords who unified Japan. China had monks too, but they were not organized, and religion was in any case not a separate domain from the state. Brahmins in India were not organized either. The Orthodox Christian clergy in Russia and the Byzantine Empire did have a hierarchical organization, but they were not independent of political authority, so it is not just Christianity itself that was at work here. Finally, in the Islamic world, competition between competing schools of Islamic law kept religious authorities divided, and while the Ottoman emperors did create a religious hierarchy under the Sheikh-ul-Islam (the chief doctor of religious law), the emperor appointed and could dismiss him, and usually had no trouble keeping him under control. It is hardly surprising then that Islamic commentators on the papacy were astonished by the pope's political and spiritual powers.<sup>48</sup> In short, the rest of Eurasia lacked

<sup>48</sup> Support for the claims here comes from Strayer 1971, 321–328; Gernet 1987; Hall and McClain 1991, 13, 28, 43–45, 160; Anisimov 1993, 216; Downing 1993, 34–35; Finer 1997, 3: 1079, 1163–1175, 1198–1199, 1216–1221; Lewis 2001, 178–179; Burbank and Cooper 2010, 196–198, 280; Conlan 2010; Fukuyama 2011, 167, 263–267, 280; and a personal communication from Timur Kuran.



the autonomous religious force that helped keep western European rulers from unifying their corner of the world.

One other point deserves mention here. The other cause behind Europe's political fragmentation—cultural evolution—bred hostility between peoples and so discouraged trade. For preindustrial economies, the cost was likely large. But Christianity did not have that effect. It likely facilitated trade, by providing a common basis for morality and for law (including a way to create organizations that have an independent legal existence), in the era before strong states. As for the political fragmentation itself, it too was likely a plus for the economy, so long as it can be separated from the hostility that helped spawn it and from the ensuing damage war did. In the long run, it in fact probably spurred economic growth, by making it harder to suppress innovators and by providing Europeans with abundant examples of different institutions.<sup>49</sup>

#### *Why Some European States Could Mobilize Resources at Low Political Cost*

If western Christianity and cultural evolution are the ultimate cause behind Europe's fragmentation and the high value that European rulers and elites attached to victory in war, that still leaves the task of explaining how some monarchs in western Europe managed to mobilize resources for war at low political cost. And once that task is done, we have to determine why these political costs were different elsewhere in Eurasia—and in particular, why they were so much higher in eighteenth-century India.

The answer, we have said, involves political history and political learning as rulers figured out how to boost taxes in a way that was politically acceptable to elites. The purpose—at least in the early modern period—was usually in order to fund war. The leaders might also expand their ability to borrow or cut the interest rate on their loans. In either case, if they succeeded, their successors could muster more men and equipment to fight wars and do so without major political problems,

49 Mokyr 2007.

implying that their political costs had fallen. Seeing how that happened in western Europe will help us extend the tournament model so as to get a deeper understanding of what was going on. The insights from the model (which involve letting the political costs and fixed costs vary) can then be turned to the rest of Eurasia.

The western European monarchs who managed to assemble resources at low political cost did so at the end of the Middle Ages or in the early modern period itself, when they gained rights to levy appreciable amounts of permanent taxation. Not all western European rulers cleared this fiscal hurdle, and some were simply left with little ability to levy taxes. That was true, for instance, of the Holy Roman emperor, although the family that provided the emperors throughout most of the early modern period (the Habsburgs) did have considerable tax revenue from the lands where they were princes and kings.

The reason why some rulers made it over the hurdle, while others did not, can usually be traced back to a particular king or leader, often one who raised taxes during or after a war. But it could also be the result of external events—a political revolution, or a financial innovation that cut the cost of borrowing.

The kings of France, for example, gained the right to impose permanent taxes during the Hundred Years War (1337–1453), which pitted them against the kings of England in an interminable battle to see who would rule France. At the outset of the war, the French kings could raise money only when a war was being fought; even a truce would bring tax collection to a stop. But that changed after a disastrous French defeat in 1356, when King John II of France was taken prisoner by the English. Peacetime taxes were collected to pay for his ransom, and his son, who became King Charles V in 1364, managed to get the levies increased and made permanent in the 1360s. He did so by tailoring the taxes to suit the powerful nobility and, even more important, by showing that he could use the money effectively to provide the public good of security. In particular, he and his emissaries dealt ruthlessly with widespread brigandage by the bands of furloughed soldiers who ravaged the countryside during periods of truce. Protection against the brigands convinced his subjects that it was worth paying peacetime taxes. To judge from the city of Montpellier, where

useable records survive, the annual amount collected per household may have jumped 21-fold between 1320–1333 and 1368–1370.<sup>50</sup>

Getting such an outcome elsewhere in western Europe also depended on war and on political deals with elites. Because Brandenburg Prussia had been ravaged during the Thirty Years War (1618–1648), its ruler, the Great Elector Frederick William, wanted enough tax revenue to build up a standing army. His first step was to offer concessions to the critical elite, the nobility, including greater power over their serfs. In return, the Brandenburg Estates, a representative assembly of towns and nobles, gave him a temporary tax increase. With his army funded, Frederick William then joined a war between Sweden and Poland (1655–1660) and invoked the fighting to raise taxes even higher, a decision he imposed unilaterally. After the war, his enlarged army quashed resistance to making the tax increases permanent, but he also offered the nobles further inducements to get them to cooperate, including employment as officers in the army and as officials in the civil administration.<sup>51</sup>

Most tax increases in western Europe came in wartime or in the aftermath of wars. And as in France and in Brandenburg Prussia, the path to higher taxes typically passed through concessions to elites or negotiation with them. That was true even for an absolute monarch such as Louis XIV. The resulting concessions did limit tax revenues in western Europe, even though tax rates were high by the standards of early modern Eurasia. Usually, the concessions involved restrictions on who could be taxed or what could be collected in a given region; they might also require some sort of consent (often from a court or a representative body) to impose new levies. The effect was to put a ceiling on overall tax revenues, which could vary greatly from province to province.

The one country in Europe that managed to escape the shackles of this fiscal particularism before the nineteenth century was England, which had something close to uniform taxation. Its tax revenues were then boosted even higher by the Glorious Revolution of 1688–1689, which overthrew

<sup>50</sup> Henneman 1976. The tax figures are from p. 263, and are sums actually collected. The difference, as Henneman shows, was not due to currency manipulation.

<sup>51</sup> Carsten 1954, 189–201, 266–276; Vierhaus 1984, 133–134, 142–144; Volckart 2000, 279–284.

King James II and ultimately gave Parliament control of the purse and the ability to audit expenditures and hold ministers responsible. Parliament could then shape foreign policy and vote to spend generously for wars it considered important. In particular, when the Whigs were in power, they could vote huge sums to battle against what they saw as an ominous threat from France.<sup>52</sup> The Glorious Revolution also greatly expanded England's ability to borrow, particularly via long-term loans, which jumped from nothing in 1693 to some 45 percent of gross domestic product (GDP) in 1715.<sup>53</sup> Financial innovation then magnified the effect of the political change, as the government learned how to consolidate its debt into perpetual annuities that were traded on a public market.<sup>54</sup> And because the annuities were easily sold, they carried a lower interest rate, which further reduced England's variable cost of mobilizing resources for war.

Other European rulers also profited from financial innovations that eased borrowing. In sixteenth-century Spain, a flood of silver from Mexico and Peru swelled King Philip II's revenues, but he also benefited from a novel source of short-term credit offered by international bankers who depended on the silver for repayment. The loans were flexible—they were renegotiated if, say, the fleet carrying the silver was delayed—and they proved essential for funding the king's military campaigns.<sup>55</sup> Similarly,

<sup>52</sup> For this and the previous paragraph, see Brewer 1989; O'Brien and Hunt 1993; Hoffman and Norberg 1994; Hoffman and Rosenthal 2002; O'Brien 2008; Cox 2011; Dincecco 2009; Pincus 2009; Dincecco 2011; Cox 2012; Pincus 2012; Pincus and Robinson 2012.

<sup>53</sup> North and Weingast 1989; Cox 2012. Much ink has been spilled over the Glorious Revolution since North and Weingast's seminal article appeared, but Cox (pp. 576–584) is the most persuasive analysis of the impact the Glorious Revolution had on government debt. His article is the source of the long-run debt figures; the nominal GDP estimate (for England in 1700) comes from the Global Price and Income History website at <http://www.gphi.ucdavis.edu> (accessed March 5, 2014). If measured relative to Great Britain's GDP rather than England's GDP, the stock of long-term debt was 39 percent of GDP.

<sup>54</sup> Neal 1990b, 90, 117.

<sup>55</sup> Drellichman and Voth 2014. According to Drellichman and Voth, these renegotiations were not defaults, contrary to what historians have long believed. Philip II could also draw upon abundant long-term debt. The long-term debt was issued by cities and funded by tax revenue under the cities' control, an arrangement that made the long-term debt secure and hence cut the rate of interest the monarch had to pay: Álvarez-Nogal and Chamley 2014.

the kings of France could peddle their long-term debt more easily thanks to new financial intermediaries who found buyers for the loans.<sup>56</sup>

The tournament model can help us untangle these examples and get a better sense of why some rulers managed to cut their political cost of mobilizing resources, whether it was by greater tax revenues or easier borrowing. What we have to do is to modify the model and allow rulers' political costs to vary, in the same way that military technology does. Imagine then that a ruler fighting a war learns how to work out a political deal with elites that yields him higher taxes or more abundant credit. He might reach the deal during war (as with Charles V in France) or in the aftermath (as with the Great Elector in Prussia). The deal is his political learning, and it would reduce the variable cost that his successors face when assembling resources, in much the same way that learning by doing might lower the price of the weapons his army purchased. Like learning by doing, the political learning would not be guaranteed. Some leaders would fail to strike bargains with elites, while others would try but founder on political constraints.

The process can be modeled in the same way learning by doing was. (The details, which involve a simple extension of the tournament model, are in appendix C.) Spending on war gives a ruler a chance at lowering his variable cost of mobilizing resources, either politically or via financial innovation. For the sake of simplicity, we will assume (as we did for learning by doing) that the lower cost applies to his successors—for instance, the kings of France after Charles V. The ruler will try to get more funding for men and equipment in order to win wars, but the changes will not become permanent until his successor takes office.

There will be two differences between political learning and learning by doing. Some of the biggest expansions of the tax base or borrowing capacity (or equivalently, some of the biggest cuts to a ruler's political cost) stemmed not from political learning during or after war but from political events such as a revolution that created representative institutions. The Glorious Revolution would be a clear example. Such an exogenous political event need not have any connection to war. But it would modify

<sup>56</sup> Hoffman, Postel-Vinay, et al. 2000, 21, 27–28, 48, 93–94, 111; Béguin 2012, 318–321.

the incentives for elites and future rulers (as with the Glorious Revolution), and it would therefore be a clear example of the way that political history acts in the long run. A simple way to incorporate this sort of political event into the model would be to think of it as changing the political constraints rulers faced. It could tighten these constraints so severely that long-term tax revenue would suffer; we will see an example under the Ottoman Empire. But it could also relax the constraints, as the Glorious Revolution did by getting elites to cooperate with the king in raising taxes. If so, it would behave just like greater knowledge in our model of innovation. Like greater knowledge, it would allow political learning to continue and would even accelerate the political learning that takes place.

The second difference is that political learning is harder to imitate than technological advances. In Europe, military leaders could spy on their opponents' technology or copy an enemy's innovations. The French, for example, kept a close watch on English ships in the late seventeenth century, and in the eighteenth, they sent their naval shipwrights to Britain to report on the British navy.<sup>57</sup> But mimicking political learning was harder. The kings of France may have wanted their navy to imitate the British, but they certainly did not want to create a national political assembly and then give it all the powers over borrowing, spending, and taxation that Parliament had in eighteenth-century Britain.

The same was true (at least in the early modern period) for financial innovations. In the eighteenth century, the kings of France hesitated to consolidate their long-term debt and have it traded on a financial exchange, as the English had done, even though it would have cut their costs of borrowing.<sup>58</sup> The reasons were political. Consolidating the debt so that it could be traded would harm influential intermediaries such as the Parisian notaries. Worse yet, by revealing the state of the monarchy's finances to the public, it would have made it harder to favor politically influential groups in case of a default.

<sup>57</sup> Archives nationales, Marine, Armements B/5/3 ("Observations sur . . . vaisseaux de France et d'Angleterre," 1672); Rodger 2004, 411. For the related practice of industrial espionage, see Harris 1998.

<sup>58</sup> Hoffman, Postel-Vinay, et al. 2000, 100, 110–111. In 1789, only 18 percent of French debt was quoted on the Paris stock exchange.

We can incorporate these difficulties into the model by assuming that rulers do not learn politically from their opponents, but only from their own efforts to strike political bargains or from their own political revolutions. The same will hold for financial innovations. Although these two assumptions are admittedly approximations, they are reasonable ones.<sup>59</sup> They amount to saying that the obstacles to political learning from opponents (or copying their financial advances) are always high, whereas they can sometimes be low for learning by doing. We also assume that political learning or financial innovation is usually not forgotten: once the political costs fall, nothing short of financial crisis, revolution, or other major exogenous political cataclysm will raise them again.

If we extend the tournament model to incorporate political learning (the details are in appendix C), the implications are clear:

- Because political learning cuts the variable cost of mobilizing resources, it will affect decisions to go to war. If political learning under a predecessor has reduced a ruler's variable cost, other leaders are less likely to challenge him in war.
- Because political learning from opponents is difficult or impossible, differences in political costs can widen. Rulers with low variable cost will fight (as long as no hegemon emerges) and become great powers. The ones with high variable cost will avoid war and may therefore fall behind technologically as well.
- Revolutions and other exogenous political events that relax political constraints (for instance, by creating representative institutions) will accelerate political learning. Financial innovations will have the same effect. But political events can also change the incentives facing rulers

<sup>59</sup> Financial innovations could sometimes be imitated, and the copy would have the same effect as political learning. The same holds for fiscal reforms. Napoleon, for example, imposed a uniform fiscal system in countries he occupied, and fear of Napoleon prompted the creation of a uniform tax system in Prussia: Dincecco 2011, 22. But imitation of this sort was, as we have said, quite difficult. Eighteenth-century Britain's low cost of mobilizing resources, for instance, depended on a uniform tax system, parliamentary control of the purse, and a highly liquid resale market for government debt. Even the Netherlands lacked the uniform tax system, and the resale market for Dutch government debt was limited: Neal 1990b, 5, 90, 117; Dincecco 2009; Dincecco 2011; and Larry Neal (personal communication).

and elites in a way that tightens political constraints. That can wipe out the effect of past political learning.

- Because lower political costs allow great powers to raise taxes, they may spend the revenue on expanding their fiscal bureaucracy or on building a bigger army or navy. That will raise the fixed cost for any newcomer who wants to enter the ranks of the great powers and further aggravate technological lags.

For western Europe, the model's predictions are clear. War, political revolution, and financial innovation will allow some rulers, but not all, to cut their variable costs. Gaps will then yawn open between rulers who can muster men and equipment at low political cost and rulers who cannot. As long as no hegemon appears (and in western Europe a hegemon was unlikely), great powers will emerge, fight one another, and take the lead in advancing the gunpowder technology. Unless they reign over huge countries or can force men to serve (as with Russian serfs), the great powers will be the rulers who can raise enormous sums by taxing or borrowing, and their ranks will also include countries with smaller populations whose representative institutions let them impose heavy taxes and borrow at low cost. Intimidated by them, weaker rulers within Europe will bow out of military competition, and leaders from outside western Europe will find it increasingly difficult to challenge western Europe's great powers too. The difference in variable costs (and the high fixed cost too if the outsiders have to create a giant military and fiscal system) will simply frighten most of them off.

The extension of the model was of course fashioned with European history in mind. But there is additional historical evidence from early modern Europe that matches its implications. Per capita tax revenue did jump during wars and revolutions, as we would expect if political costs were falling.<sup>60</sup> Great powers did emerge, with far more military resources

<sup>60</sup> Dincecco 2011 has made the case clear by studying per capita tax receipts for a panel of European countries over the years 1650–1913. Political change—in particular, the creation of representative institutions—also reduced borrowing costs. See his analysis of breaks in series of per capita tax receipts and yield spreads, and his regressions of both variables on war, political variables, and measures of the development of the economy: tables 6.4, 6.5, 7.4, 7.5; and pp. 72–82, 99–107.

(as Charles Tilly has emphasized) than smaller states.<sup>61</sup> The list of those early modern great powers does match up with rankings of tax revenue or borrowing ability, and their ranks do include smaller states whose representative institutions allowed them to tax heavily and borrow at low cost.<sup>62</sup> And the great powers (the French and the British in the eighteenth century, for example) did fight one other, mobilize more resources, and lead in advancing the gunpowder technology, just as the tournament model would predict. So the model of political learning fits Europe well. But political learning is even more important for the insight it gives us into the rest of Eurasia.

### *China*

The very different outcome of the tournament in China can be traced back, as in Europe, to political history. The crucial difference between China and western Europe was that China, more often than not, was unified politically as a large empire. That made it a hegemon most of the time and slowed improvements to the gunpowder technology, not just in China itself but throughout East Asia. It was also the reason nomads were China's major enemy, for like most big states, China had expanded into the areas where nomads lived, which were too thinly populated to support a long-lived competing state. So instead of focusing on the gunpowder technology, China relied more heavily on mounted archers than western European rulers did. It of course had other ways of warding off the nomads, including the Great Wall, where firearms were employed, but one of its other principal defenses—the strategic use of foreign policy—also meant less spending on gunpowder weapons. The strategy rewarded loyal nomads by allowing them to trade for manufactured goods they craved (and in return China got the horses it needed). Or since the death of a nomad ruler usually triggered a civil war among his possible successors, China could exploit the resulting divisions to keep

61 Tilly 1990, 38–47, 170–181.

62 Hoffman and Norberg 1994, 299–301; Dincecco 2009; Pamuk and Karaman 2010, figures 4, 5; Stasavage 2010; Dincecco 2011; Stasavage 2011.

the nomads weak.<sup>63</sup> Again, the result in the long run was less spending on the gunpowder technology, and the outcome stemmed from China's size.

In political economy, as we know, models of state size predict that polities will usually be big, particularly if they are not democracies, and the examples of Russia, the Mughal Empire, and the Ottoman Empire make it clear that mega-states were not unusual in early modern Eurasia.<sup>64</sup> But China's political history provides an additional argument for why China was so often an enormous empire.

The story begins with political learning during and in the aftermath of war. The first dynasty to unify China, the Qin (221–206 BC), defeated and absorbed its rival states in two centuries of warfare. During the fighting, Qin leaders gained an ability to mobilize resources by taxing and conscripting troops that rival states simply could not match. In terms of our model, they were learning how to cut their variable cost, and as could be expected, the Qin became one of the great powers that emerged. When they defeated the last of the other powers in 221, the Qin king became the hegemon and the first emperor of China.<sup>65</sup>

The Qin and the next dynasty, the Han (206 BC–AD 220), also created a centralized bureaucracy, which contributed to the Qin victory and was centuries ahead of its time.<sup>66</sup> Establishing it was part of the political learning that took place during and after the warfare, for besides lowering the Qin ruler's variable cost, it also raised the fixed cost that the Qin's enemies had to pay. But the bureaucracy also had a major long-run effect via cultural evolution: it changed the incentives for local elites in a way that helped the unified empire survive and thus put China on a path that was radically different from western Europe's.

63 Fairbank 1974, 11–13; Barfield 1989, 62–63, 230–231; Rossabi 1998, 228–235; Burbank and Cooper 2010, 96; Stanziani 2012, 70–71.

64 Alesina and Spolaore 2003; Levine and Modica 2013.

65 Hui 2005, 85–87, 96–98, 141–142. I want to thank Peter Perdue for recommending Hui's insightful book.

66 Hui 2005, 35, 66–71, 96–98, 127–128, 141–142; Fukuyama 2011, 110–136. For a brief but insightful account of what the Qin accomplished, see Tetlock, Lebow, et al. 2006, 210–212.

It did so by drawing elites into service as officials and rewarding them, for that loosened their ties to local society and kept them loyal to the central government. Officials even had an incentive to preserve the bureaucracy if the dynasty itself was toppled by invaders, for the officials could keep working for the invaders and continue to receive their rewards. And it made the task of ruling China correspondingly easier for outsiders who conquered the Chinese Empire, for they could often just take over the bureaucracy, as happened, for instance, when the Manchus dethroned the Ming Dynasty.

The political outcome here (as Jane Burbank and Frederick Cooper have observed) makes for a striking contrast with the Roman Empire. Roman policy was very different and it ultimately helped undermine the Roman Empire. Unlike Chinese officials, elites in the Roman Empire did not depend on government service for rewards. They could return to their provincial estates and lead a comfortable life, even if the Roman Empire was invaded, and it therefore mattered less to them whether the Roman Empire survived. Their incentives to keep the Roman Empire together were dulled, even if it was invaded.<sup>67</sup>

Cultural evolution in the Chinese Empire acted in other ways as well, which also reinforced the empire's political unity. To begin with, since the bureaucracy offered rewards, military careers lost their appeal for the Chinese elite. Instead, elites pursued scholarship and education, which opened the door to posts as officials.<sup>68</sup> Once elites were serving as officials rather than as military leaders, they would be less likely to resist invaders with force or to lead rebellions. They would also be more likely to serve invaders who were intent on keeping the bureaucracy intact.

Confucian thought, which took hold among the officials, may have heightened the aversion to the military, for it condemned war and urged rulers and officials to attend instead to people's livelihood.<sup>69</sup> That is at least the traditional argument, although recent research has certainly raised serious doubts about it. After all, Confucian officials did lead mili-

67 For this and the previous paragraph, see the insightful comparison of the Roman and early Chinese Empires in Burbank and Cooper 2010, 54–59, and the important comparative treatment in Fukuyama 2011, 149.

68 Fairbank 1974, 2–9.

69 Hsiao 1979, 9–21, 148–153.

tary reforms, and military prowess turns out to have been extremely important during the Qing Dynasty. Nonetheless, Confucian thought still might have given officials reason to hesitate before advocating war, because they knew that their rivals in the bureaucracy could invoke Confucianism to oppose them.<sup>70</sup> (The contrast with western Europe here is striking, for in Europe elites with a political voice almost uniformly favored war, up until at least the late eighteenth century.) The officials' hesitation would in turn help preserve the empire's unity.

The cultural evolution affected the populace as well. Unification under an empire had halted a long period of war and given people the precious gift of security. Preserving unity then became an essential part of the very idea of state, even when China was wracked by rebellions and intra-Chinese wars.<sup>71</sup> That helped keep the empire intact, and so too did efforts to reduce ethnic differences, by education, migration, and imposition of a dominant culture. Those efforts left an undeniable mark on ethnic and linguistic differences in China. Outside China, ethnic and linguistic diversity usually reflects variations in soil quality and elevation. The reason is simple: when people in the past learned how to farm different types of land, they built up region-specific human capital (essentially, knowledge of what and when to plant or how to raise livestock) that was hard to transfer to other areas, making it difficult for them to move. But in China, something else was at work, for adjacent regions are more homogenous ethnically than the characteristics of the land would lead one to expect. That something else, it has been suggested, is likely the effort that the Chinese state has invested in cultural homogenization over the years.<sup>72</sup> The cultural homogeneity would be another force binding the empire together.

70 For examples of Confucian officials leading military reforms and of the problems they could run into with rivals, see Andrade forthcoming, 143–173, 181, 276–278. For the military ethos of the Qing and their drive to expand to the West, see Perdue 2005; Waley-Cohen 2006.

71 Gernet 1987. Strife in China could of course turn on the question of who would best unite the empire.

72 Elvin 1973, 21, 69, 83; Gernet 1987; Hui 2005; Michalopoulos 2008 (for ethno-linguistic diversity). As Michalopoulos shows, in China adjacent regions with the same soil quality and elevation are 89 percent similar ethnically, far more than the 71 percent one would expect.

So political history set China on a path that was completely different from the route taken in western Europe. Once again, political history acted in the short run via political learning. After two centuries of war, the Qin unified China for the first time; they and the Han Dynasty then created a bureaucracy that tied elites to the empire. Then, over the long run, unification set cultural evolution in motion, which strengthened the empire even more and allowed it to survive even when outsiders invaded. As a result, China, more often than not, was a hegemon with nomads as the major military threat. Although the emperors used the gunpowder technology, over the long run they had less reason to spend money on it and less reason to advance it via learning by doing.

#### *Japan, Russia, the Ottoman Empire, and Eighteenth-Century India*

As in China, political history pushed Japan, Russia, the Ottoman Empire, and eighteenth-century India toward outcomes unlike the one prevailing in western Europe. It operated through political learning in the short run and changed incentives for elites in the long run.

In Japan, the turning point was the unification of the country under the Tokugawa Shogunate, which, as a hegemon, stopped the tournament within Japan and put an end to Japanese innovations with the gunpowder technology. Unification had the great virtue of halting the civil war that had been ravaging Japan, and it established a durable regime that blessed Japan with over two centuries of peace. How did the three warlords who united Japan bring it about?

Obviously, the three figured out how to mobilize resources on a large scale. That was part of the political learning, and it allowed them to defeat their enemies and establish peace within Japan. But their achievement was more than that. Peace benefits everyone, but even so, a defeated but restive warlord might have preferred seeking a revenge that was sweeter than respecting the peace. Peace, in short, could easily be upset, and preserving it required changing the elite's incentives.

The first of the three warlords, Oda Nobunaga, relied on violence and destruction of his enemies. But that strategy would have likely provoked vengeance and resistance, not enduring unity. The second, Toyotomi Hideyoshi, was different. He favored conciliation and the building

of a coalition among the military lords who rallied to his cause and even among those whom he had defeated. The result was a stable, federal state, in which the military lords retained extensive local powers. As for the third warlord, Tokugawa Ieyasu, he and his successors then suppressed any remaining resistance and tightened their control over the military lords by requiring them to reside in Edo or leave their families as hostages there, where they would be under the control of the shogun. That (and other measures) raised the fixed cost for opposing the Tokugawa, but since the military lords still enjoyed their local powers, they continued to support the regime.<sup>73</sup> In terms of our extended model, unification had, in the long run, changed the elite's incentives and made rebellion unlikely. That in turn reinforced the shogun's position as a hegemon within Japan.

What about the Ottoman Empire? Its enemies meant that it could not focus on the gunpowder technology, which kept it from the forefront of innovation. Over time, the Ottoman army did increasingly emphasize its infantry and gunpowder weapons rather than cavalry, but the empire's skimpy tax receipts in the eighteenth century weakened the empire militarily even when it could wholeheartedly adopt western technology.

The limited tax receipts are a surprise, for in the sixteenth century, the Ottoman sultan had seemed far more powerful than the rulers of France. That at least was Machiavelli's judgment, for in his view, the sultan—unlike the king of France—was not hemmed in by the rights of local elites.<sup>74</sup> But by the eighteenth century, the local leaders who collected taxes, served as provincial administrators, and took on military commands were pocketing growing amounts of the tax revenue, defying imperial orders, or even defecting to the enemy. The sultan could threaten them with execution or loss of their family property, but in the end they would likely be pardoned because the sultan had no way to replace them.

<sup>73</sup> The other measures included the exchange of gifts and the manipulation of the warlords' family ties. As time passed, the Tokugawa also showed greater solicitude for the warlords (for instance, by giving them ways to avoid confiscation of their estates for lack of an heir), which reinforced the warlords' vested interest in the status quo: Berry 1982, 1–7, 50–51, 66–67, 164–166, 237–239; Hall and McClain 1991, 1–14, 49–50, 151–159, 207–210; Ferejohn and Rosenbluth 2012; and Philip Brown (personal communication).

<sup>74</sup> Machiavelli 1977, 129; Fukuyama 2011, 214–215.

The local revenue and local resources that loomed so large in the sultan's military operations had simply escaped from his control.<sup>75</sup>

Western Europe's chief monarchs had not been that weak since at least the early seventeenth century. The result was that the Ottoman emperors faced a much higher political cost of mobilizing resources. They could not increase the taxes they collected or even have their commands carried out.

Part of the emperor's weakness derived from the halt to Ottoman expansion in the seventeenth century, which left him with no more new land rights to award to those in command of his large cavalry forces.<sup>76</sup> It also reflected the growing autonomy of the janissaries, the military slaves who supplied him with his increasingly important infantry. Common in the Middle East, the janissaries had originally provided disciplined and loyal soldiers who posed no threat to a Muslim ruler's power. Over time, however, they became an entrenched interest group that blocked military reform until they were finally suppressed and abolished in 1826.<sup>77</sup> They were, in other words, a serious political constraint that kept the emperor from making his army more effective.

In terms of the tournament model, that was equivalent to keeping the emperor from reducing his variable cost. But the janissaries limited the emperor's revenues in a potentially even more important indirect way. By relying on the military slaves, a Muslim ruler had less reason to negotiate with elites than the weaker rulers in the medieval West. What Machiavelli considered a source of strength—that the Ottoman emperors did not have to negotiate with local elites over their rights—ultimately proved a devastating weakness, for the Ottoman sultans therefore never got the permanent tax levies that the negotiation ultimately gave their western counterparts.<sup>78</sup> Earlier political history—the decision to use the

75 Finer 1997, vol. 3: 1206–1209; Sahin 2005; Agoston 2011, 306–309; Agoston 2014, 120–122. Sahin provides the most striking example of this loss of control. Here I have also relied on helpful e-mail exchanges with Sevket Pamuk and Gabor Agoston.

76 Pamuk 2008.

77 Ralston 1990, 48–56; Faroqhi, McGowan, et al. 1994, vol. 2: 640; Fukuyama 2011, 214–215, 223–228 (the source of the phrase “entrenched interest group”). Initially, the janissaries were Christian boys, but over time they became almost entirely Muslim.

78 Blaydes and Chaney 2013.

janissaries—had ruled out an alternative way to mobilize resources, via negotiation with elites, in what might have become representative assemblies. The janissaries no doubt cut the political cost of mustering men and equipment, and adopting them therefore amounted to political learning, but it had the unforeseen effect of eliminating an alternative source of revenue that in the long run might have been far more bountiful. It was, in short, a political constraint that severely limited political learning.

Russia did not face all those constraints from past political history. The czars—particularly Peter the Great—learned how to build an alliance with the serf-owning nobility that let the czars conscript huge numbers of serfs in return for granting the nobles land and reinforcing their powers over their serfs.<sup>79</sup> By giving the czars conscription, political learning had cut their cost of mobilizing resources, and with the czars' effort to adopt the latest gunpowder technology from western Europe, Russia became a great power. The only thing that held it back was the backwardness of the Russian economy.

Finally, there is eighteenth-century India, where the issue is clear: the leaders and states that arose as the Mughal Empire disintegrated were fighting constantly, but they could not mobilize resources on a large scale. They could not set up effective fiscal systems or wrest resources away from local elites. What barriers stood in their way?

The obstacles were largely the result of political history. In India, the Mughal Empire itself was decentralized, even at the height of its power. With a bureaucracy that faded away on the ground, it relied on local power holders to collect taxes even before it disintegrated in the eighteenth century, and it granted them considerable autonomy. Although European kings had once done the same, their control over tax revenues grew stronger, beginning in the late Middle Ages, at least in the states that succeeded in imposing permanent taxation. In India, by contrast, the local powers gained the upper hand by the 1720s. Allying with provincial governors who were supposed to keep them under control, the local powers resisted Mughal efforts to gather information about taxable resources and limited the revenue they sent to the central government.

79 Anisimov 1993, 60–61; Lieven 2006, 10–11; Burbank and Cooper 2010, 185–199; Stanziani 2012, 131.



With the Mughal emperor unable to make the local elites and the provincial governors obey, the provinces (including Bengal, the key to the East India Company's conquest) were on their way to becoming autonomous principalities.<sup>80</sup>

A devastating invasion by Nadir Shah in 1739 only accelerated the disintegration of the Mughal Empire. After defeating the Mughal army, Nadir seized control of northern India, and although he and his army left after several months, they carried enough plunder back to give Persia a three-year tax holiday. The invasion did even more to sap the Mughal emperor's crumbling authority, and it further impaired his ability to rein in provincial governors or local elites who were escaping from his control. That was particularly true in the northeastern provinces, such as Bengal.<sup>81</sup>

The new powers that emerged from the rubble, however, did not have effective fiscal systems. Unlike invaders who conquered China, they could not simply take over a productive fiscal bureaucracy, for with local revenues escaping from the central government's control, the Mughal Empire no longer had anything close to an effective fiscal system. They would have to create one from scratch, which would not be easy. They lacked needed information about wealth and revenues that could be taxed, and their local alliances had been geared toward resisting efforts to increase taxes. They would, in short, have an immense amount of political learning to do and a daunting administrative task. And the political constraints they had inherited from the Mughal Empire severely limited what learning could do. That is why Mysore, the power that was further along than the others, had so much trouble prying money loose from local elites.

The East India Company, which was fighting these emerging Indian powers, had a great advantage here, for as we know, it could profit from the political learning that had already taken place in Europe. It could draw

80 For India, see Stein 1984; Marshall 1987, 48–54; Alam and Subrahmanyam 1994; Finer 1997, vol. 3: 1228–1231; Subrahmanyam 2001, 349–351; Gommans 2003, chapters 3 and 4; Parthasarathi 2011, 56–57; Streusand 2011, 284–288. For the comparison with Europe, see Guenée 1971, 148–150; O'Brien 2012.

81 Subrahmanyam 2001, 359–364; Tetlock, Lebow, et al. 2006, 376–378. I wish to thank a press reader for recommending these two insightful works.

upon funds and military resources sent from Britain (along with advanced military technology) to combat the French in South Asia. That let it grab hold of taxes in wealthy Bengal, and the deals it struck with elites there gave it even more tax revenue in return for providing military security. The revenue then paved the way for further conquests and takeovers as it left the emerging Indian powers behind, at least in the race for money. That is the sort of lead that can build up with political learning, a lead that creates big differences in the cost of mobilizing resources for war.

### *Conclusion*

By the early modern period then, a millennium of war and ensuing cultural evolution had therefore split western Europe into small, hostile states, whose rulers and elites were engrossed in the fight for glory and the other prizes of battle. Some leaders, though not all, emerged from the process able to mobilize enormous resources at low political cost, and in combating one another, they all relied heavily on the gunpowder technology, for they were shielded from nomads by Russia, Poland, and Hungary. In short, all the conditions singled out by the tournament model were satisfied in western Europe and satisfied throughout the early modern period. No other part of Eurasia could make that claim.

That outcome was the result of political history, as were the strikingly different outcomes elsewhere in Eurasia. Political history worked in the short run through political learning, and in the long run through cultural evolution and political events that changed incentives for rulers and elites. Ultimately, it put western Europe on a different path of political development.

In contrast to East Asia, no enduring hegemon arose in Europe, and unlike the Ottoman emperors, western Europe's kings did not rely on military slaves and so had to negotiate with local elites to get more resources. The result was not just a technological lead, but a political one too, at least if our yardstick is the ability to assemble military resources at low political cost. By the eighteenth century, most of the major western European powers could borrow, and they imposed heavier per capita taxes than in the rest of Eurasia. Most had representative institutions for at least some local elites, which facilitated government borrowing and

the imposition of new taxes, and thanks to political revolutions (primarily in the nineteenth century) they eventually got representative institutions at the national level, which lifted tax revenue even higher. Here the rest of Eurasia lagged behind. Fiscal systems and representative institutions were not as developed.<sup>82</sup> Lending to rulers was not unknown, but it was rudimentary by European standards. To take a particularly telling example, China had no public debt in the eighteenth century and much lower per capita taxes.<sup>83</sup>

Our model would lead us to expect that such political leads would open up, just as they had in the past, allowing the Qin to unify China and the Tokugawa to unite Japan. The Tokugawa shoguns, however, became hegemon within Japan, and the Chinese emperors (more often than not) were hegemon in East Asia. Western Europe was spared that fate: it never had a lasting hegemon, because of western Christianity and the centuries during the early Middle Ages without anything we call a strong state. So the major powers in western Europe ended up able to mobilize resources with a much lower variable cost than in other parts of Eurasia. Ultimately, the effect was to widen western Europe's military lead even more, for whenever the leaders of the major western powers used their tax revenue to enlarge their armies or navies, it meant that their counterparts elsewhere in Eurasia had an even bigger fixed cost to meet if they wanted to challenge the westerners. Only if the powers outside western Europe were fighting close to home (or could, like Russia, impose conscription on a large scale and then borrow the military technology) would they dare to do so.

The different path Europe took, it should be stressed, was in no way foreordained. It was the result of political history, and much of that history was not simply political learning during war, but was shaped (as Charles Tilly stressed) by many forces, including international relations

<sup>82</sup> Downing 1993; Hoffman and Norberg 1994, 299–300; Dincecco 2009; Dincecco 2011; Fukuyama 2011; O'Brien 2012; Blaydes and Chaney 2013.

<sup>83</sup> Hoffman, Rosenthal, et al. 2007, 16–17; Brandt, Ma, et al. 2014, table 3. China's huge size was one reason it had no public debt. The government could move resources across space—for instance, from a province where there was peace to one where there was war. Smaller European states had to shift resources across time by borrowing.

and domestic political economy.<sup>84</sup> Other scenarios were possible, at least at certain times; we will sketch some in the next chapter. But the outcome was not at all widely contingent, because over time western Europe's political and technological lead grew bigger and bigger, even before the Industrial Revolution. And it was therefore much harder for the other Eurasian powers to catch up.

But before we explore alternative scenarios, there is one final trait that also distinguished western Europe from the rest of Eurasia—one final trait that has to be explained. In western Europe, private entrepreneurs could easily take advantage of widespread familiarity with the gunpowder technology and use it for private expeditions of trade, exploration, and conquest. Few legal or political obstacles stood in their way, and it was not difficult to raise money or to organize partnerships or corporate ventures to fund their undertakings, which played an essential role in Europe's conquest of the world. The same was not true elsewhere in Eurasia. There major hurdles blocked the private use of the gunpowder technology and hampered private efforts to engage in foreign trade, making it much harder for private entrepreneurs to launch expeditions of conquest and exploration. That difference is a question for the next chapter; it proved to be crucial.

<sup>84</sup> Tilly 1990.