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January 6, 2021

Abstract

Despite a large consensus among economists on the strong interdependence and synergy between pro-development institutions, how should one understand why Imperial China, with weaker rule of law and property rights, gave the commoners more opportunities to access elite status than Premodern Europe, for example via the civil service exam and the absence of hereditary titles? Supported by rich historical narratives, we show that these institutional differences reflect more general differences in the power structure of society: (1) the Ruler enjoyed weaker absolute power in Europe; (2) the People were more on par with the Elites in China in terms of power and rights. Based on these narratives, we build a game-theoretical model and analyze how the power structure can shape the stability of an autocratic rule. If we read greater absolute power of the Ruler as conditioning more of the power and rights of the ruled on the Ruler's will, we show that a more symmetric Elite–People relationship can stabilize autocratic rule. If absolute power is stronger, this stabilizing effect will be stronger, and the Ruler's incentive to promote such symmetry will be greater. The theory explains the power structure differences between Imperial China and Premodern Europe, as well as specific institutions such as the bureaucracy in China and the role of cities in Europe. It is also consistent with the observation that autocratic rule was more stable in Imperial China than in Premodern Europe.

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1 Introduction

The very influential literature on institutions and development has taught us a general lesson: there is a strong interdependence and synergy between institutional arrangements that are conducive to sustainable political, economic, and social development such as rule of law, property rights, and more inclusive access to elite status (e.g., North, Wallis and Weingast, 2009; Besley and Persson, 2011, 2014; Acemoğlu and Robinson, 2012). When we compare Imperial China and Premodern Europe, however, a contrasting image arises: why did China, with clearly weaker rule of law and property rights, present the commoners more opportunities to access elite status, for example through the civil service exam, compared to Europe where hereditary titles governed elite status? Answering this question would help us better understand the interaction between these well-studied institutions in the literature.

This paper addresses the question in three steps. First, by examining rich comparative historical narratives, we find that China and Europe's difference in rule of law and property rights reflects a more general difference between the two societies: the *absolute power of the Ruler* was weaker in Europe. The difference in the inclusiveness of access to elite status reflects another general difference: the *power and rights relationship between the common People and the Elites,* which include primarily the lords in Europe and the bureaucrats in China, was less unbalanced in China. Both differences concern how power was allocated across the Ruler, Elites, and People, i.e., the *power structure* of society, and were the most prominent during the 9th–14th centuries, with persistence beyond. Second, based on the narratives, we build a simple game-theoretical framework to analyze how the power structure can shape the stability of an autocratic rule. This leads to a comparative institutional theory where the stronger the Ruler's absolute power, the greater his incentive to promote more symmetric power and rights between the Elites and People. Finally, we provide further discussion and stylized facts on the historical relevance of our theory.

Between the two general differences in the power structure between Imperial China and Premodern Europe, the one in the Ruler's absolute power has been well recognized by the political economy literature that emphasizes stronger rule of law and property rights in Europe (e.g., Acemoğlu and Robinson, 2019; Stasavage, 2020; Greif, Mokyr and Tabellini, Forthcoming). It was also reflected in the different degrees of the Ruler's ultimate ownership and control over land and population in the two societies (e.g., Bloch, 1962a; Chao and Chen, 1982; Levi, 1988; Finer, 1997b). Historical narratives suggest that the essence of the absolute power of the Ruler concerns how much of the power and rights of the ruled, i.e., the Elites and People, is conditional on the Ruler's will.

The difference in the Elite–People relationship in terms of power and rights has been largely ignored by economists and political scientists, while historians and sociologists have provided useful insights. For instance, elite status was predominantly hereditary in Europe, while it was governed by a civil service exam in China, more accessible to the common people, more meritocratic, and nonheritable (e.g., Levenson, 1965; Finer, 1997b); as serfdom gradually prevailed in feudal Europe, peasants in Imperial China were mostly free and enjoyed de facto land user rights (e.g., Chao and Chen, 1982; Wickham, 2009); partly because China had early adopted partible inheritance while primogeniture spread in Medieval Europe, land ownership in China was also less concentrated and thus less unequal (e.g., Goody, Thirsk and Thompson, 1976; Goldstone, 1991; Zhang, 2017).

The co-existence of these two differences motivates the setting of our theoretical framework. We start with a Ruler, who prefers to maintain a particular status quo of autocratic rule, and a Challenger, who could try to alter it. Since the Challenger can be interpreted as an outside aggressor, defiant elite, or group of rebellious common people, since the Challenger's goal does not necessarily involve dethroning the Ruler, and since the challenge can be armed or nonviolent, our framework is sufficiently general to cover a wide range of threats that would destabilize the autocratic rule. In the model, we assume whether the challenge would succeed to alter the status quo depends on whether the Elites and People would choose to side with the Ruler. In the model, more symmetric power and rights between Elites and People is represented by less unequal payoffs, if they have not defied the Ruler; we model stronger absolute power of the Ruler as less of the payoffs of the ruled would remain if they defied the Ruler.

Analysis of the model yields our comparative institutional theory. It starts from our reading of absolute power of the Ruler as about the *conditionality* of power and rights of the ruled on the Ruler's will. Given any non-zero level of such conditionality, the more power and rights the People enjoy when they have not defied the Ruler, the more they will lose if they defy the Ruler, and, therefore, the more willing they will be to side with the Ruler during a challenge. We call this the *punishment* effect of more power and rights of the People. Knowing that the now stronger alliance between the Ruler and People has worsened the prospect of a challenge to the Ruler, the Elites will be more willing to side with the Ruler, too. We call this the *political alliance* effect.[1] The Challenger would then be deterred from challenging the status quo, stabilizing the autocratic rule and thus creating an incentive for the Ruler to promote a more symmetric Elite–People relationship. Since stronger absolute power of the Ruler implies a greater aforementioned conditionality, it will make the initial

[1] As remarked by Orwell (1947, p. 17), this idea of the Ruler and the People "being in a sort of alliance against the upper classes" is "almost as old as history" in Europe; in China the same idea can be traced to not later than *Han Feizi* (Watson, 1964, p. 87) from the 3rd century BC, which has been the most representative text in the Chinese Legalist tradition since then.

punishment effect and, therefore, the total stabilizing effect stronger. The Ruler's incentive to promote the Elite–People symmetry will thus be greater when she has stronger absolute power. We can thus explain the correlation between more inclusive access to elite status and weaker rule of law or property rights across Imperial China and Premodern Europe, as an application of the general compatibility between the Ruler's absolute power and a more symmetric Elite–People relationship in power and rights.

A few additional implications arise from the model. For instance, because a more absolutist Ruler may be willing to grant more power and rights to the People, it is possible for the People to tolerate a more absolutist Ruler. Our simple model can also be extended by allowing the current political stability to influence the future power structure, making possible a dual divergence of the power structure and stability of autocratic rule.

Given these analytical results, we further explore the historical relevance of our theory. We first discusses how our theory can help understand specific institutions. For example, we can interpret the bureaucracy with the civil service exam in China and the important role of cities in Europe as the Ruler's efforts to reduce the Elite–People asymmetry and align with the People.[2] Second, we examine the auxiliary predictions from our model about the impact of the power structure on the stability of autocratic rule. We systematically compare Imperial China and Premodern Europe in the frequency of wars, risk for a Ruler to be deposed in a given year, and the resilience of unified autocratic rule. Consistent with the predictions of our model, the data show that autocratic rule was more stable in China than in Europe over the 9th–14th centuries, when the differences in the power structure were the most prominent, with persistence in later centuries.

Our study contributes to the political economy literature on institution and sustainable development by investigating the relationship between major components of the inclusive or open-access institution in the literature (e.g., North, 1989; North and Weingast, 1989; Acemoğlu, Johnson and Robinson, 2001, 2005a,b; North, Wallis and Weingast, 2009; Besley and Persson, 2011, 2014; Acemoğlu and Robinson, 2012, 2019; Mokyr, 2016; Cox, North and Weingast, 2019). The literature often analyzes a society by categorizing it into two estates (e.g., the ruler vs. ruled, state vs. society, elites vs. mass, those with vs. those without access to political and economic resources and decisions). We extend this two-estate framework into a three-estate one, helping us to understand the power structure in a richer way. This helps us show that the more repressive an institution is in the dimension of the Ruler's absolute power, the more inclusive it may be in the dimension of the power and rights equality between the Elites and People, and this pattern may well persist. This result

[2]To be sure, the development of cities in Europe was to a large extent based on autonomous factors and exogenous shocks, but as we show below, various kings acted to help it.

is, to our knowledge, new in the political economy literature.

Our comparative institutional analysis also reveals the fundamental role of the strong conditionality of the power and rights of the ruled in incentivizing the Ruler to grant more power and rights to the People when the Ruler has strong absolute power. This helps us clarify the difference between meritocratization pushed by an absolutist Ruler, and other institutions that promote political inclusiveness given strong rule of law, for example, democratization as understood in Acemoğlu and Robinson (2000, 2001). Democratization can serve as a credible commitment to redistribution because when the democratic procedure is binding, it transfers absolute power from the rich to the poor, i.e., changing redistribution from being conditional on the will of the rich to being conditional on the will of the poor; the political stability it achieves is thus the stability of democracy. In contrast, meritocratization promoted by an absolutist Ruler can co-opt the People in a paternalistic way, without changing where absolute power lies; the political stability it achieves is thus the stability of the Ruler's autocratic rule.

The political divergence between China and Europe has been well documented: the unified autocratic rule of a dominant state could hardly be maintained in Europe since the fall of the Roman Empire, while in Imperial China it was relatively resilient. Moreover, the literature has argued that this divergence has been highly consequential, for example, making economic and scientific innovations more likely in Europe than in China (e.g., Rosenthal and Wong, 2011; Mokyr, 2016). On its origin, a few inspiring explanations are fundamentally geographical or environmental (e.g., Wittfogel, 1957; Jones, 1981; Turchin, 2009; Dincecco and Wang, 2018; Ko, Koyama and Sng, 2018; Scheidel, 2019; Roland, 2020; Fernández-Villaverde, Koyama, Lin and Sng, 2020). On the institutional front, Acemoğlu and Robinson (2019) argue that the German–Roman tradition of a balanced state–society relationship put Europe in the narrow corridor of social, political, and economic development, whereas the state has been too dominant since the early history of China. Stasavage (2020) underscores that a strong bureaucracy in ancient China led it to a path different from Europe, favoring a stronger autocratic regime. Greif and Tabellini (2010, 2017) show that the cooperation-supporting institutions were fundamentally different in premodern China and Europe, and Greif, Mokyr and Tabellini (Forthcoming) make a forceful argument for the complementarity between the evolution of social organization and that of political institutions in the two societies.

In line with these efforts, we focus on the interaction between different dimensions of institutions, and provide a power structure approach to the stability of autocratic rule, which is to our knowledge unique in the literature. With dynamic extensions of the model, we can also understand the political divergence as part of a dual divergence of the power structure and its political consequences. Without explicitly modeling details of various specific institutions in history, our model can be useful in interpreting their roles, such as the bureaucracy in Imperial China and cities in Medieval Europe. We also provide a systematic comparison using different measures of the stability of autocratic rule, documenting the higher stability in Imperial China.

The paper is organized as follows. Section 2 presents briefly historical narratives on the two differences in the power structure between Imperial China and Premodern Europe. Section 3 presents the theoretical framework and comparative institutional analysis. Section 4 explores the historical relevance of the theory with further discussion and stylized facts. Section 5 concludes the paper.

2 Power Structure in Historical Narratives

In this section, we provide historical narratives on differences in the power structure between Imperial China and Premodern Europe. When doing so, we sometimes refer to "Europe" as if it were a single entity or discuss a specific country as an example for Europe. Admittedly, there exists important variation across geographical locations within Europe and within China. We focus on, instead, identifying the "ideal type" of Imperial China and Premodern Europe's power structures, which can help interpret the variations within each of the two societies.

As institutions evolve over time, we follow the *longue durée* approach by focusing on significant, persistent features of the power structure. The most relevant period of our narratives was the 9th–14th centuries, with persistence beyond. This period covered the rise and decline of feudalism in Europe (e.g., Ganshof, 1952), with the Black Death taking place in the middle of the 14th century; in Imperial China, it was since the Tang dynasty (618–907) that the theme of political institutions had largely been stable, after the swings during the 800 years before (e.g., Yan, 2009). We summarize the historical narratives in Table 1 and elaborate on them below.

2.1 Absolute Power of the Ruler

The first difference we emphasize in the power structure between Imperial China and Premodern Europe is that Chinese Rulers enjoyed greater absolute power than their European counterpart, by which we mean that the power and rights of the ruled were more dependent of the Ruler's will in China compared to Europe. This difference is first reflected in the strength of rule of law, and then in the ultimate ownership and control over the most impor-

Table 1: Power Structure in Imperial China and Premodern Europe

	China	Europe	Examples of references
Absolute power of the Ruler			
Strength of rule of law	Ruler less constrained by law	Ruler constrained by Church and law	Bloch (1962b), Unger (1977), Mann (1986) Finer (1997a,b), Tamanaha (2004) Fukuyama (2011), Acemoğlu and Robinson (2019) Greif, Mokyr and Tabellini (Forthcoming)
Ultimate ownership of land	Reserved for Ruler; confiscation legitimate when Ruler deemed it necessary	Confiscation highly constrained; Ruler expected to "live of his own"	Chao and Chen (1982), Levi (1988) Finer (1997b), Wang (2000)
Ruler's control over population	Ruled considered Ruler's subjects; harsh penalty for disloyalty	Limited control; much less harsh punishment for disloyalty	Bloch (1962a), Lander (1961) Mann (1986), Finer (1997a,b)
Asymmetry in power and rights between Elites and People			
General comparison	Much less unbalanced	Elites a supreme class; oppressive to the poor	Bloch (1962b), Finer (1997b)
Access to elite status	Through the Civil Service Exam	Hereditary nobility	Lü (1944), Ho (1959), Levenson (1965) Wickham (2009), Yan (2009)
Inequality in land ownership	Mostly free and landowning peasantry; land ownership less concentrated	Serfdom common in Middle Ages; land ownership much more concentrated	Esherick (1981), Chao and Chen (1982) Beckett (1984), Finer (1997a), Wickham (2009) von Glahn (2016), Zhang (2017)
Inheritance rule	Partible inheritance	Primogeniture increasingly more common	Goody, Thirsk and Thompson (1976) Goldstone (1991), Bertocchi (2006) von Glahn (2016)

tant assets in historical societies: land and population. Next, we summarize the narratives and explain how we model the degree of absolute power based on these narratives.

Strength of rule of law. As noted by many scholars, Chinese emperors were less constrained by rule of law (Finer, 1997a,b; Stasavage, 2016; Ma and Rubin, 2019, p. 227; Acemoğlu and Robinson, 2019; Greif, Mokyr and Tabellini, Forthcoming).[3] As put by Finer (1997a,b, p. 455, 836), all the ruled, including the top bureaucrats, were "subjects not citizens" and had only "duties not rights;" as observed by Fukuyama (2011, p. 290) and Unger (1977, p. 104), "law was only the positive law that [the emperor] himself made" and it "could be as general or as particular as the policy objectives of the rulers might require."[4]

In contrast, European Rulers faced strong constraints from the Christian church (Mann, 1986; Fukuyama, 2011; Johnson and Koyama, 2019; Scheidel, 2019; Greif, Mokyr and Tabellini, Forthcoming). Given the Pope's threat to delegitimize and excommunicate them, "[k]ings . . . could not defy the Pope for very long," as shown in many examples (Southern, 1970, p. 130).[5] The king also faced much tighter legal constraints. In the famous words of Bracton (1968, vol. 2, p. 33), "[t]he king must . . . be under the law, because law makes the king." Having emerged from the 9th-century customary law, a man's right to judge and resist when his king had acted unlawfully had been repeatedly recognized by significant legal documents through the Middle Ages (Bloch, 1962b, p. 172–173).[6] Importantly, this right was "not subject to the king's justice" and "not upon the desires of the king" (Tamanaha, 2004, p. 26).[7]

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[3]The Chinese Ruler had the obligation to act benevolently towards the ruled and to follow the "Mandate of Heaven," but as noted by Stasavage (2016, p. 148), "the concept of a Mandate of Heaven never extended to obtaining consent, nor did it involve assembling representatives to achieve this goal." Finer (1997a, p. 462) also notes: "[i]deally, government must be of the people, for the people: but, emphatically, Mencius never for a moment hints that it can ever be by the people. Very much the reverse. . . . Nor did a dissatisfied populace have the right to rebel."

[4]For example, the founding emperor of the Ming dynasty created "law beyond the law" when he was frustrated by the Great Ming code of his own, while insisting that only he could use the newly created law (Brook, 2010, p. 87). Unger (1977, Ch. 2) discusses the characteristics of law in Imperial China in detail.

[5]Famous examples include the dramatic scenes of Henry IV of Germany at Canossa, Henry II of England at Canterbury, and King John of England at Dover, and the destruction of Holy Roman Emperor Frederick II's family.

[6]Bloch (1962b, p. 173) raises examples of "the English Great Charter of 1215; the Hungarian 'Golden Bull' of 1222; the Assizes of Jerusalem; the Privilege of the Brandenburg nobles; the Aragonese Act of Union of 1287; the Brabantine charter of Cortenberg; the statute of Dauphiné of 1341; the declaration of the communes of Languedoc (1356)."

[7]For more extensive discussion on the rule of law, see Finer (1997b), Tamanaha (2004), Fukuyama (2011), Vincent (2012), Fernández-Villaverde (2016), Acemoğlu and Robinson (2019), and Greif, Mokyr and Tabellini (Forthcoming).

Ultimate ownership of land. While land could be owned by individuals in normal times in China, the ultimate legitimacy of land ownership was always reserved for the Ruler, so the emperor could re-centralize the ownership when he deemed it necessary (Chao and Chen, 1982; Wang, 2000). Since even before the Qin dynasty unified China in 221 BC, land confiscation from the noble families and landed gentry had been a common practice of the Chinese Ruler to raise revenue for military projects (Ebrey and Walthall, 2013).[8] Depending on the emperor's will, systematic persecutions against Buddhism, Manichaeism, and other religions also repeatedly happened, regularly entailing large-scale confiscation of temple properties (Zhang, 2015; von Glahn, 2016, ch. 5).

In contrast, when European Rulers needed revenues, they could usually not confiscate land from the Elites or the Church. Instead, they had to exchange rights or resources with revenues. Levi (1988, p. 99) states it clearly: "[d]uring the medieval period, a monarch was expected to 'live of his own' (*vivre du sien*). That is, funds for the monarch were to come from royal lands and customary dues. ... Should monarchs need more, even if it was to fund a campaign on behalf of the country as a whole, they had to obtain assent to some form of 'extraordinary' taxation. They could neither expropriate property at will nor rely on a regular levy."[9]

Ruler's control over population. As the population were subjects of the Ruler in China (Finer, 1997a, p. 455), he could reward or punish anyone arbitrarily, which precisely reflected his absolute power. Consistent with the emphasis of Confucianism on the loyalty of the ruled to the Ruler (Greif, Mokyr and Tabellini, Forthcoming), one person's rebellion, treason, or even slight disobedience, regardless of her social status, would be punished extremely harshly, usually leading to eradication of the whole family line (Finer, 1997b, p. 778).[10] Sometimes mere suspicion from the Ruler could guarantee the calamity, as shown in the fall of Princess Taiping in 713.[11] Following the Legalist tradition in Chinese political philosophy, the harsh

[8]Among famous early examples, Duke Xiao of the Qin state confiscated land from the feudal nobles in the 340s BC, sharing it among the peasants; in 114 BC, Emperor Wu of Han confiscated land from nobles and merchants to raise additional revenue to fund the Han–Xiongnu War.

[9]See also Finer (1997b, p. 887) for a similar observation. Besides, when Louis XIV managed to tax the nobility for the first time, the taxes happened only at the end of his reign and were insignificant in size and subject to numerous exemptions (McCollim, 2012). Even when Philip IV of France coveted properties of the Templars, he had to have them disbanded by Pope Clement V first and acted under the Pope's name, not overtly expropriating. Expropriations did happen but mostly under Eminent Domain (Reynolds, 2010); in case of serious crimes like treason, the nature of the crime had to be determined by law, not merely the Ruler's will (Lander, 1961).

[10]In a famous case, when Fang Xiaoru, a prominent minister, refused to write an inaugural address for Emperor Yongle of Ming, the emperor sentenced 873 people to death, including Fang's family, kinfolk, friends, and students, before having Fang himself executed.

[11]In 713, Emperor Xuan of Tang, merely suspecting that his aunt Princess Taiping had been planning a coup, forced her to commit suicide and executed several dozens of her extended family and allies. Literary

punishment was the Ruler's most effective way to grip control of the population (Watson, 1964).

In feudal Europe, on the contrary, the peasants were controlled by their overlords so that the king, in practice, did not have direct control over these peasants. The peasants could, as a rule, be punished by local courts controlled by their overlords, and the king did not have control over these local courts (Bloch, 1962a). Although loyalty was also emphasized in Europe and enforced through mechanisms like oaths, treason was punished much less harshly than in China. First, although execution of the traitor and attainder could apply, killing the family was seldom entailed, and the attainder would often be reversed later (Lander, 1961).[12] Second, it was common in the feudal system that a vassal had two or more overlords (Bloch, 1962a) and when in conflict, he could simply choose which superior or more likely to win to follow (e.g., Cantor, 1964, p. 202; Tuchman, 1978; Mann, 1986). Eventually, as Finer (1997b, p. 881) observes, the Ruler's control over the population was "abysmal" and he "could not always count on the fidelity of the vassal," precisely because his lack of ability to punish them: "after all, [they were] in possession of his lands and what could he do if defeated?"

Formalization in our model. Motivated by these narratives, we assume that the Ruler, the Elites and the People are sharing a surplus of size π; when the Ruler has survived after the ruled had not sided with him, he can punish the defier by having her enjoy only γ of her share of the surplus. The parameter γ then measures negatively the conditionality of the power and rights of the ruled on the Ruler's will. Given the initial distribution of the surplus, the Ruler who has stronger absolute power, i.e., a lower γ, is thus capable of exerting much severer punishment on the ruled for defiance.

2.2 Asymmetry in Power and Rights between Elites and People

The differences in power structure between Imperial China and Premodern Europe lied also in the relationship between the Elites and the People. In Bloch's words, the disparity between "[a] subject peasantry" and "the supremacy of a class of specialized warriors" was one of "the fundamental features of European feudalism" (Bloch, 1962b, p. 167), and his final verdict on the system concerns only its bindings on the Rulers and its oppressiveness to the poor (Bloch, 1962b, p. 173). In contrast, in Imperial China there was much less class

inquisitions for merely *potentially* subversive attitudes to the Ruler were also conducted at a frequency and scale much more significant than in Europe (e.g., Xue and Koyama, 2020).

[12]For example, during the reigns from Henry VI to Henry VII of England, 64% of the attainders were eventually reversed (Lander, 1961, p. 149).

difference in practice among the ruled and between the Elites and People (Finer, 1997b, p. 836). The difference in the Elites–People relationship was reflected by differences in, for example, access to elite status, inequality in land ownership, and the inheritance rule. As above, we summarize the narratives and then explain how we formalize them in our model.

Access to elite status. As pointed out by Levenson (1965, p. 39), the infinite power of the Chinese Emperor was his ability to "raise and lower his subjects at will" that rendered the relative symmetric Elites–People power structure. Lü Simian, a prominent historian, summarized the Chinese scenario elegantly: "when fathers and elder brothers possess the Empire, younger sons and brothers are low common men" (Lü, 1944, p. 347). As early as during the 5th–4th century BC, accompanied by reforms that strengthened the absolute power of the Ruler, the Warring States in China had started to abolish hereditary titles and make elite status dependent solely on military merit and open to the common People (Yan, 2009, p. 23–24). As an important institution to facilitate the fluid change between the Elites and the People, China invented the civil service exam to regulate elite status in the 6th century and greatly developed it during the Tang dynasty (618–907), and elite status gained via success in the exam could not be inherited.

Different from China, the difference between the Elites and the People in Europe was much more rigid, since elite status mostly relied on hereditary nobility. Government positions, especially in courts and in the army were reserved for aristocrats. While in the early Middle Ages, ordinary peasants routinely performed military service, which was seen as a privilege, this stopped to be the case later and was reserved for the nobility (knights and higher titled nobles – see Wickham, 2009 for more discussion).

One may wonder how much of the *de jure* difference in access to elite status was transformed into *de facto* difference. As a response, first, it is important to note that the *de jure* access to elite status can shape the belief in society about the *de facto* access, affecting the stability of the autocratic rule. For example, Bai and Jia (2016) show empirically that China's abolition of the civil service exam in 1905 caused an increase in revolutionary activities against the Qing court, contributing to the end in 1912 of not only the Qing dynasty but also the imperial era. One interpretation for such evidence is that the People's belief in the alliance with the Ruler was temporarily broken when abolishing the civil service exam shut down the main access of the commoners to elite status.[13]

Second, statistics on *de facto* social mobility, despite being scarce, appears consistent with the difference in access to elite status. Ho (1959) provides a comprehensive description

[13] Recently, Huang and Yang (2020a) also argue that the civil service exam contributed to China's imperial longevity by restricting aristocrats and other wealth-holders from accessing power.

of social mobility in China between the 13th and the 19th century based on data from the civil service exam. It is difficult to find comparable data in Europe. He compares China with Cambridge students during 1752–1938. With such an unfair comparison, he still finds a higher social mobility in China: 78%–88% of Cambridge students came from elite families whereas only 50%–65% of the highest degree holders (Jinshi) came from elite families in China.

Inequality in land ownership. Circumstances on land ownership inequality are also suggestive. In Imperial China, peasants "were mostly free" (Finer, 1997a, p. 205), "land-owning peasantry had been the main agent and form of agricultural production," and they "had mostly enjoyed the freedom of choice" (Chao and Chen, 1982, p. 192–193).[14] In contrast, in the early-Medieval Europe, mostly between the eighth and tenth century, small peasants became gradually expropriated by rich aristocrats as well as by the Church, making peasants gradually fall entirely under the control of landlords. This happened in many ways, as documented by Wickham (2009): First, in the aftermath of the Viking incursions, some landlords became richer and acquired more land, usually from poor peasants, either through payment or expropriation. Tenant peasants faced higher rents and greater control over their labor. They became gradually submitted to the judicial control of landlords and completely lost their freedoms to become feudal serfs. The only escape route for encaged peasants was to flee to the cities, a process that accelerated with the Black Death, but those living in the countryside remained heavily under the control of landlords until much later on.[15] In the 17th century in England, around 70% of the land was still owned by landlords and gentry (Beckett, 1984). Almost all scholars on China would agree that the corresponding number remained below 45% from the 6th century to modern China (e.g., Esherick, 1981; Chao and Chen, 1982).[16]

Inheritance rule. The differences in land ownership concentration are partly related to differences in inheritance rules. China gradually switched from primogeniture to partible inheritance in the Qin and Han dynasties, while primogeniture became more common in Europe during the Middle Ages (Goody, Thirsk and Thompson, 1976; Bertocchi, 2006; von Glahn, 2016, ch. 2, 8). The consequence of these rules on elite privilege is intuitive: partible inheritance makes it more difficult for elite families to accumulate assets over generations.

[14] See von Glahn (2016, ch. 6, 8) for a similar observation from the mid-late Tang dynasty on.

[15] It is important to note that the stronger property rights of land in Europe documented by historians in reality concern mainly whether the rights of landlords were independent of the arbitrary will of the Ruler, not whether small peasants enjoyed certain rights in their normal, everyday life.

[16] For extensive discussion on the many works on England and China, see Zhang (2017).

As Goldstone (1991, p. 380) observed, in China, "land was generally divided among heirs, and over a few generations such division could easily diminish the land holdings of gentry families. At the same time, peasants, who could purchase clear and full title to their lands, might expand their holdings through good luck or hard work. Thus the difference between the gentry and the peasantry was not landholding per se, but rather the cultivation, prestige, and influence that came from success in the imperial exams."

Formalization in our model. Motivated by these narratives, we capture the relative power of the Elites and the People by a simple parameter β. With the surplus of size π mentioned above, the Elites will get a and the People will get βa, if they have been loyal to the Ruler, where $0 \leq \beta \leq 1$ and a higher β indicates a more symmetric Elites–People relationship.

Remarks. To be sure, both China and Europe experienced changes and challenges of the power structure over the centuries. It should not be surprising that multiple Rulers in Europe attempted to make the Elite–People relationship more balanced. For example, Louis XIV insisted on depriving the nobility of actual power after the rebellions of the *Fronde*, attempted to choose ministers and officials on merit, and used commoners to replace aristocrats. Nevertheless, the weaker *de facto* power of the Ruler and the multiple checks on executive power by the Elites in Europe generally made it less possible for the Ruler to consistently succeed in these kinds of endeavors. For instance, even though Louis XIV succeeded temporarily, access to nobility through a judiciary and administrative office became practically barred in the 18th-century France. In Appendix C, we show that our main model can be extended to accommodate this interpretation, where we allow the current political stability to affect the future power structure. In Section 4, helped by our theory, we discuss further the rise of cities in Medieval Europe, another phenomenon related to the Ruler's hope to enlist the People as allies against the Elites by granting more power and rights to urban commoners.

3 Comparative Institutional Analysis

Now we introduce the setting of our model. We assume that there is a Ruler (R), who prefers a certain status quo of autocratic rule. The nature of the status quo is open to interpretation: for example, it can be a peaceful, unified autocratic rule across the territory. There is also a Challenger (C), who is unhappy about and can challenge the status quo. She could be an outsider, one or a group of nobles, lords, or bureaucrats, or some common people; her challenge may or may not seek to dethrone R or be violent. With such flexibility in interpretation, the model is sufficiently general to accommodate different types of threat to autocratic rule, such as external conflict, elite revolt or secession, popular uprising, independence war, and other apparently non-violent attempt to alter the status quo, with or without a competing claim over the ruling position.

Besides R and C, we assume that there are also the Elites and the People, which represents the nobles, lords, and bureaucrats, and the People (P), which includes peasants and urban commoners, who are relevant to whether R can preserve the status quo.[17] Depending on the identity of C, we exclude the initial challenger from E and P. For example, if C were a group of elites, then E would be the other elites; if C were a group of members of the people, then P would be the other members of the people. Naturally, unanimous actions were rare in reality both within E and within P. Therefore, we interpret their actions as whether all significant members of each estate actively side with and fully support R to preserve the status quo or not, focusing on the alliance across R, C, E, and P.

The four players play a game of two stages. Stage 2 is about the stability of the status quo of autocratic rule, where C, E, and P play a subgame while taking as given the power structure. Stage 1 is about R's design of the power structure, where R foreseeing Stage 2 and chooses the degree of asymmetry between E and P in terms of their power and rights, while taking as given the level of her absolute power. Across the two stages, we assume all payoffs are von Neumann–Morgenstern utilities so that all players maximize their own expected payoff. Given the two-stage structure, we now introduce in detail and analyze Stage 2, and then move back to Stage 1.

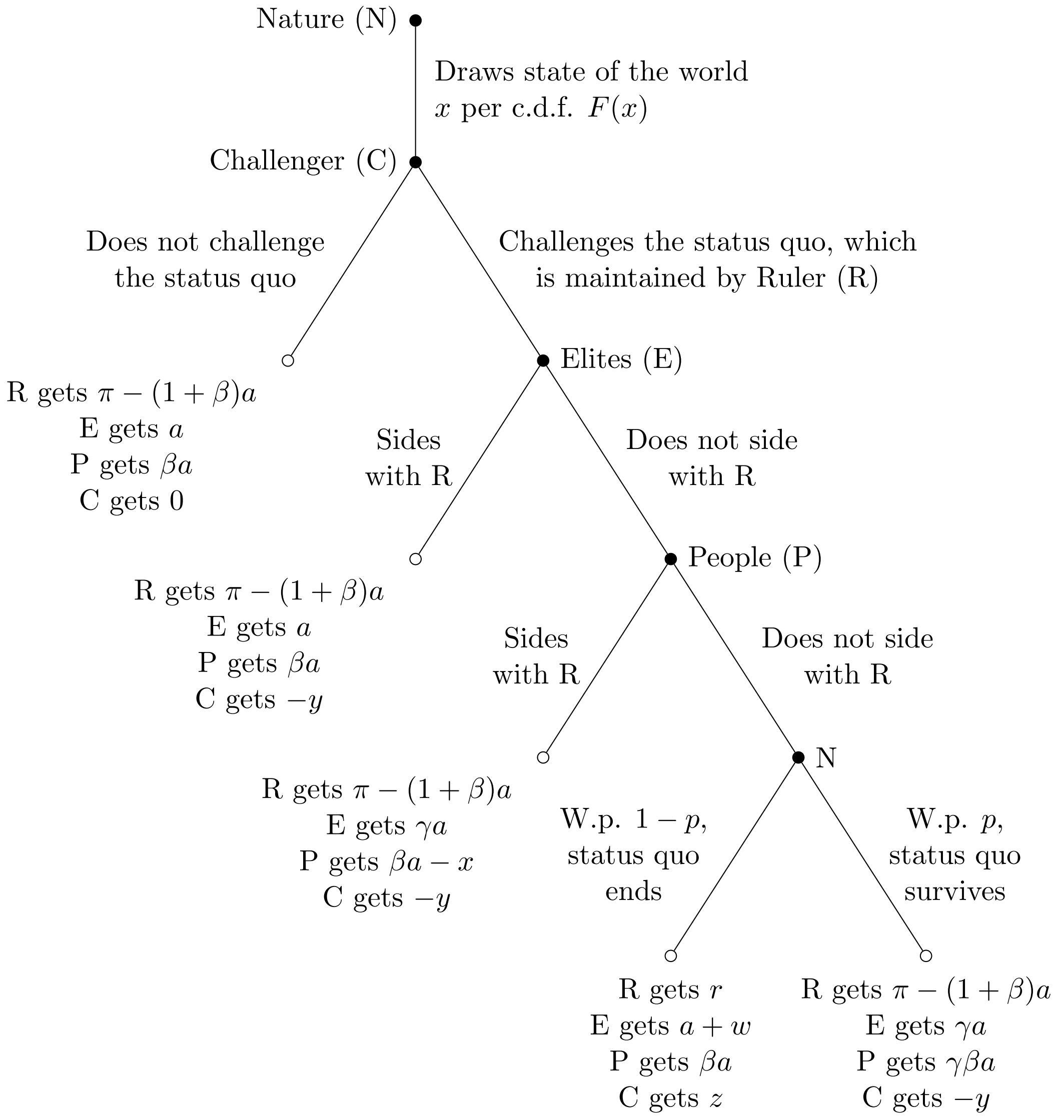
3.1 Stage 2: Stability of Autocratic Rule

3.1.1 Setting

Figure 1 presents the setting of Stage 2. Nature (N) first randomly draws a state of the world $x \geq 0$, following the exogenous cumulative distribution function $F(x)$. The state of the world x will appear later in the game as the cost born by P if she sides with R.

Given x, C will decide whether to challenge the status quo, which is maintained by the rule of R. If C does not challenge, then C will get her default payoff 0; E will get her status quo payoff $a > 0$, which is exogenous; P will get βa, where $\beta \in [0, 1]$ measures the power symmetry between E and P in the status quo and is exogenous at this stage; R will get the exogenous total surplus π net of the sum of E and P's status quo payoffs $(1 + \beta)a$, which is $\pi - (1 + \beta)a$ in total. Stage 2 then ends there.

[17]Appendix E provides narratives on the relevance of the Elites and the People in determining the outcome of a conflict, an important type of threat to the stability of the Ruler's rule.



$x \geq 0$, $a > 0$, $\pi - 2a > r$, $0 \leq \beta \leq 1$, $0 \leq \gamma \leq 1$, $0 < p < 1$, $w > 0$, $y > 0$, $z > 0$

Figure 1: Stage 2: Stability of Autocratic Rule

If C instead does challenge, then E will decide whether to side with R. If E sides with R, then the status quo will survive. Stage 2 will end there with R, E, and P all getting their status quo payoffs, respectively, while the failed challenge will incur an exogenous loss $y > 0$ to C, leaving her the payoff $-y$.

If E instead does not side with R, then it will be P's turn to decide whether to side with R. If P decides to side with R, then the state of the world x comes in as the cost incurring to P for the choice, while the status quo will survive. In this scenario, C will still get $-y$ for the failed challenge; R will still get her status quo payoff $\pi - (1 + \beta)a$; P will get her status quo payoff βa but net of the cost x, which is $\beta a - x$ in total; E will now suffer a punishment because she has not sided with R, getting only γa instead of her status quo payoff a, where $\gamma \in [0,1]$ is exogenous. A lower γ measures the stronger absolute power of R to punish its subjects who have defied her. Stage 2 then ends there.

If P does not side with R either, then R will be left on her own. N will then determine randomly whether the status quo will survive. With exogenous probability $p \in (0,1)$, the status quo will survive, so C will still get $-y$ for the failed challenge; R will still get her status quo payoff $\pi - (1+\beta)a$; E will be punished, getting γa; P will be punished, too, getting $\gamma\beta a$. Stage 2 then ends there.

With probability $1-p$, the status quo will end, leaving C with an exogenous prize $z > 0$ and R an exogenous reservation payoff r, where we assume, intuitively, $\pi - 2a > r$ so that, given any $\beta \in [0,1]$, R would prefer the status quo to survive. P will still get her status quo payoff βa, while E will now get an exogenous incentive $w > 0$ for having not sided with R, in addition to her status quo payoff a, so her total payoff will be $a + w$. Stage 2 then ends there.

About the random elements, we assume that N's draws of x and whether the status quo will survive on R's own are mutually independent. About the informational environment, we assume that Stage 2 has complete and perfect information. We will thus use backward induction to solve for its subgame perfect equilibria.

For simplicity, we assume that E and P will side with R if indifferent, respectively, and C will not challenge if indifferent, ruling out mixed strategies. Appendix A shows that the insights from our results would remain robust if mixed strategies were allowed.

Before analyzing Stage 2, we make a few remarks on the conceptual and technical issues around the current setting.

Remarks. First, as discussed in Section 2, we interpret that China has a high β and a low γ, while Europe has a low β and a high γ. The β–γ characterization of power structure captures the idea that power and rights are specific to estates and scenarios, as β measures the E–P asymmetry and γ measures how much the power and rights of the ruled depend on whether they have defied R. As we will show, first recognizing the estate- and scenario-specificness and then characterizing power structure this way are instrumental in understanding how power structure determines stability, since both β and γ shape P, E, and C's strategies in equilibrium, affecting the fate of the status quo of autocratic rule. In this sense, β and γ indeed characterize the structure of R's *power* over the others: as Dahl (1957, p. 203) famously puts, "A has power over B to the extent that he can get B to do something that B would not otherwise do."

Second, as mentioned, C can be an outsider or an elite member or part of the people; the incentive for E not to side with R also depends on the specific context.[18] Thus, for generality and simplicity, we have left C's identity unspecified and modeled incentives of C and E via exogenous parameters, i.e., w, y, and z. This treatment makes these incentives independent of the β–γ power structure and the strategies of all the players in equilibrium. To address this limitation, in Appendix D, we collapse C and E into one player E from the inside of the status quo, make her look forward infinitely in a Markov game, and allow her to replace R. The β–γ power structure thus determines the punishment upon E in case her challenge fails, and her aspiration for challenge is thus the difference between the equilibrium values of being R and being E, in turn determined by all players' strategies in equilibrium. Therefore, Appendix D can be seen as the fullest yet simplest extension of the current setting. We show parallel results in Appendix D to all results in the current framework. Relatedly, note that R does not make any decision at Stage 2. That said, in Appendix D, as we endogenize the incentives of C and E at Stage 2, R's payoff in equilibrium at Stage 2 will affect other players' strategies in equilibrium at the same stage.

Third, having the random variable x is a simple yet useful way to model the incentive for P's choice. P's incentive not to side with R depends also on the specific context, for example, P's level and prospect of income, R's level of legitimacy, whether and how severely R is in a crisis, and whether P has an opportunity to revolt, all of which can be affected in turn by many random factors. We thus model this component of her incentive as a single, exogenously drawn, state-of-the-world variable, i.e., the random cost for siding with R, x. Modeling it alternatively as a reward for not siding with R would not affect our analysis.

Fourth, in the current setting, we have assumed that C, E, and P move sequentially. As we will show, this has the advantage of simplicity when we highlight the political alliance channel through which γ and β affect E's equilibrium strategy by affecting P's equilibrium strategy, and they also affect C's equilibrium strategy by affecting E and P's equilibrium strategies. Assuming an alternative sequence of moves or simultaneous moves would not affect the insights of our analysis.

Finally, we have chosen not to focus on the possibility of contracting among R, C, E, and P at Stage 2. It is not too unreasonable in reality, since any threat R or C can exert upon E and P depends on the status quo's own survival or the success of C's challenge, respectively, and any reward R or C can promise to E and P is not too credible, since the need for cooperation will disappear once the status quo survives or C's challenge succeeds, respectively. That said, when considering R's preference about β at Stage 1, one can interpret a higher β as an

[18] For example, E could hope to replace R in the challenge, or simply to get more power, rights, or other economic interests, or even to secede from the Ruler, without necessarily taking the ruling position; similarly, C could hope to replace R, or to secede from the Ruler, or simply to loot a great fortune in the challenge.

implicit contract between R and P where R grants more rights to P in exchange for support in scenarios where P would not support R with a lower β. At the same time, the severity of the credibility problem may be endogenous to the β–γ power structure. A more explicit exploration on the contracting across R, C, E, and P could be an interesting direction for future research.

3.1.2 Equilibrium Characterization

We start the backward induction from P's strategy. In any subgame perfect equilibrium, P will not side with R if and only if

$$\beta a - x < (1-p) \cdot \beta a + p \cdot \gamma \beta a, \tag{1}$$

i.e., the cost of siding with R is not greater than the probability-adjusted punishment for not siding with R in case that C's challenge fails:

$$x \leq p \cdot (1-\gamma)\beta a \equiv \hat{x}. \tag{2}$$

Now consider E's strategy while expecting this strategy of P in equilibrium. When $x \leq \hat{x}$, P would side with R, so E will side with R; when $x > \hat{x}$, P would not side with R, so E will not side with R if and only if

$$a < (1-p) \cdot (a+w) + p \cdot \gamma a, \tag{3}$$

i.e., the incentive for not siding with R is greater than the probability-adjusted punishment in case that C's challenge fails:

$$w > \frac{p}{1-p} \cdot (1-\gamma)a. \tag{4}$$

This analysis implies that if this condition does not hold, then in any subgame perfect equilibrium, E will always side with R so that it will be impossible for the status quo to end. Such equilibria are empirically irrelevant, as in reality the chance for the status quo to end was always strictly positive; such equilibria are also theoretically trivial, in the sense that E and P will always side with R regardless of the state of the world. Therefore, to narrow our focus onto empirically more relevant and theoretically less trivial scenarios, we assume $w > a \cdot p/(1-p)$ so that for any $\gamma \in [0,1]$, in any subgame perfect equilibrium, E will not side with R if and only if $x > \hat{x}$.

Under this assumption, now consider C's strategy while expecting these strategies of E and P in equilibrium. When $x \leq \hat{x}$, E would side with R, so C will not challenge the status quo; when $x \leq \hat{x}$, E and P would not side with R, so C will challenge the status quo if and only if

$$0 < (1-p)z - py, \tag{5}$$

i.e., the prize from a successful challenge is greater than the probability-adjusted loss from a failed challenge:

$$z > \frac{p}{1-p} \cdot y. \tag{6}$$

This analysis implies that if this condition does not hold, then in any subgame perfect equilibrium, C will never challenge the status quo. Similar to the equilibria of little relevance we mentioned above, such equilibria are empirically irrelevant and theoretically trivial. Therefore, to further narrow our focus onto empirically more relevant and theoretically less trivial scenarios, we further assume $z > y \cdot p/(1-p)$ so that in any subgame perfect equilibrium, C will challenge the status quo if and only if $x > \hat{x}$.

Note that under the two assumptions we have introduced, we have found the unique strategy of each player in any subgame perfect equilibrium, so these strategies constitute a unique subgame perfect equilibrium. To summarize:

Proposition 1. *If*

$$w > \frac{p}{1-p} \cdot a \quad \text{and} \quad z > \frac{p}{1-p} \cdot y, \tag{7}$$

then for any $\beta \in [0,1]$ and $\gamma \in [0,1]$, there exists a unique subgame perfect equilibrium at Stage 2, in which C will challenge the status quo if and only if $x > \hat{x}$, E will not side with R if and only if $x > \hat{x}$, and P will not side with R if and only if $x > \hat{x}$, where

$$\hat{x} \equiv p \cdot (1-\gamma)\beta a. \tag{8}$$

This equilibrium is indeed theoretically non-trivial, since in the equilibrium, whether C will challenge the status quo and start a challenge and whether E and P will side with R all depend on the state of the world; this equilibrium is also empirical relevant, since in the equilibrium, a challenge of the status quo can happen and E and P may not side with R, i.e., the probability of challenge $1 - F(\hat{x})$ can be strictly positive and the survival probability of the status quo

$$S = 1 - \big(1 - F(\hat{x})\big) \cdot (1-p) \tag{9}$$

can be strictly lower than one. Therefore, to focus on this equilibrium, from now on we assume that the condition in Proposition 1 holds, i.e., $w > a \cdot p/(1-p)$ and $z > y \cdot p/(1-p)$.

3.1.3 Impact of Power Structure on Stability of Autocratic Rule

How does the β–γ power structure shape the probability of challenge and the survival probability of the status quo in equilibrium?

Proposition 2. *At Stage 2, a higher β and a lower γ decrease the probability of challenge and increase the survival probability of the status quo of autocratic rule in equilibrium.*

Proof. By Proposition 1, the probability of challenge is $1-F(\hat{x})$ and the survival probability of the status quo is $S = 1 - \big(1 - F(\hat{x})\big) \cdot (1-p)$, so a higher $\hat{x}$ lowers $1 - F(\hat{x})$ and raises S. Since a higher β and a lower γ increase $\hat{x} \equiv p \cdot (1-\gamma)\beta a$, the proposition then follows. $\square$

The intuition of Proposition 2 deserves more discussion. In the model, β and γ influence the stability of the status quo in equilibrium by their impacts on P, E, and C's equilibrium strategies. We discuss each of these impacts. First, the impacts of β and γ on P's strategy in equilibrium are straightforward: by Equation (2), P's strategy hinges on the comparison between her cost x for siding with R and the probability-adjusted punishment $\hat{x} \equiv p(1-\gamma)\beta a$ for not siding with R in case C's challenge fails; both a higher β and a lower γ impose a heavier punishment $(1-\gamma)\beta a$, making P more willing to side with R in equilibrium. We can say that these impacts work through a generic, *punishment* channel.

Second, the impact of γ on E's strategy in equilibrium generally has two channels. The first is again the punishment channel: a lower γ imposes a heavier punishment $(1-\gamma)a$ on E in case C's challenge fails, making E more willing to side with R *given any strategy of P*, including the one in equilibrium. The second, which is new, is a strategic, *political alliance* channel: a lower γ makes P more willing to side with R in equilibrium, lowering the chance for C's challenge to succeed and, therefore, making E more willing to side with R in the first place.[19] Therefore, through both channels, a lower γ makes E more willing to side with R in equilibrium.

In the specific case of Proposition 2, under the condition $w > a \cdot p/(1-p)$, E always prefers "both herself and P not siding with R" to "herself siding with R", and further to "herself not siding with R while P siding with R." Meanwhile, P will always either side with or not side with R, and her decision solely depends on x, so E does not face strategic uncertainty about P. Therefore, a heavier punishment upon E brought by a lower γ would not change the fact that E's best response to P's strategy in equilibrium is to "follow" P's strategy, i.e.,

[19] To see the point, observe that when deciding whether to side with R, E compares the payoff of doing so, i.e., a, versus the payoff of not doing so, i.e., $\mathbf{P}[\text{P sides with R}|x,\gamma] \cdot \gamma a + \big(1 - \mathbf{P}[\text{P sides with R}|x,\gamma]\big) \cdot \big((1-p)\cdot(a+w) + p \cdot \gamma a\big)$, where P's strategy is represented by $\mathbf{P}[\text{P sides with R}|x,\gamma]$. There are two channels via which γ can influence this comparison: first, γ can affect γa in the payoff of siding with R, which is the punishment channel; second, γ can affect $\mathbf{P}[\text{P sides with R}|x,\gamma]$, which is the political alliance channel.

to switch between to side or not to side with R at $x = \hat{x}$. Therefore, the punishment channel is muted and we observe only the political alliance channel.[20]

Third, the impact of β on E's strategy in equilibrium has only the political alliance channel: a higher β imposes a heavier punishment $(1-\gamma)\beta a$ on P for not siding with R in case C's challenge fails, but does not change the punishment $(1-\gamma)a$ on E. Therefore, it would make P more willing to side with R, lowering the chance for C's challenge to succeed, and making E more willing to side with R in the first place.

Finally, the impacts of β and γ on C's strategy in equilibrium has only the political alliance channel, too: a higher β and a lower γ will not affect C's payoffs at any of the five ending nodes in the game, but they will encourage E and P to side with R, therefore lowering C's chance to succeed in her challenge. Expecting this, C will be more reluctant in equilibrium to challenge the status quo.

To summarize, Proposition 2 reveals that both a higher β and a lower γ will make P more willing to side with R, thus E more willing to side with R, and, therefore, C more reluctant to challenge the status quo in the first place. The probability of challenge is then lowered and the status quo becomes more stable. In our specific setting, a generic punishment channel appears in β and γ's impacts on P's strategy; it exists in γ's impact on E's strategy but is muted, with only a strategic political alliance channel visible; in β's impact on E's strategy and β and γ's impacts on C's strategy, only the political alliance channel exists. All these make the impacts of β and γ on political stability come from only their impacts on P's switching threshold $\hat{x}$, providing much simplicity for the result.

Proposition 2 thus highlights that how well R can form an alliance with P is critical in shaping the stability of autocratic rule.[21] This proves crucial in R's design of the power structure at Stage 1, which comes below. Also, by Proposition 2, compared with Europe, both a higher β and a lower γ make an autocratic rule more stable in China. We will come back to this implication in Section 4.

[20] If E faced strategic uncertainty about P, the punishment channel would not be muted. For example, suppose E did not observe x when deciding whether to side with R. She would then compare a versus $\int_0^{\hat{x}} \gamma a \cdot dF(x) + \int_{\hat{x}}^{\infty} \big((1-p)\cdot(a+w) + p \cdot \gamma a\big) \cdot dF(x)$. As a lower γ will strictly lower the latter sum by lowering γa, its impact on E's decision via the punishment channel would be visible.

[21] Chapter 17 in *Han Feizi* argues that "too much compulsory labor service" upon the People (low β) would make it easy for the Elites to shelter the People in exchange for their financial and political support against the Ruler (low $\hat{x}$), damaging the Ruler's "long lasting benefit" (low S, Watson, 1964, p. 87). This argument follows exactly the modeled impact of β on the stability of autocratic rule via the political alliance channel in this analysis and Appendix D.

3.2 Stage 1: Design of Power Structure

3.2.1 Setting

This stage characterizes how R's incentive to promote the symmetry between E and P can depend on the level of her absolute power. We assume that R at this stage simply chooses β, while foreseeing the equilibrium at Stage 2 and taking γ as given. R's program is thus

$$\max_{\beta} \quad V^R = (\pi - (1+\beta)a) \cdot S + r \cdot (1 - S), \text{ subject to} \tag{10}$$

$$0 \le \beta \le 1, \quad S = 1 - \big(1 - F(\hat{x})\big) \cdot (1-p), \quad \hat{x} = p \cdot (1-\gamma)\beta a, \tag{11}$$

where V^R is R's expected payoff from Stage 2. Without losing generality, we also assume that the state of the world x's probability density function is always strictly positive while finite in the relevant range, i.e., satisfies $f(x) \in [\underline{f}, \bar{f}] \subset (0, \infty)$ over $x \in [0, pa]$.

3.2.2 Institutional Compatibility

How will R choose β by the program? There is a political–economic trade-off: a higher β will increase the survival probability S of the status quo at Stage 2, which is political; at the same time, it will decrease the status quo payoff $\pi - (1+\beta)a$ at Stage 2, which is economic.

The economic side of the trade-off is straightforward: a higher β will decrease the status quo payoff at a marginal rate of a. The political side is less so, as it depends on the impact of β on the survival probability, i.e., $dS/d\beta$. Intuitively, this impact is largely governed by γ: a higher γ suggests that P will not lose much of her status quo payoff after she has not sided with R and C's challenge has failed, so any additional status quo payoff would not make her much more loyal to R and, therefore, it will not make E much more loyal toward R, and neither would C be much more reluctant to challenge.

The key assumption that leads to this intuition is that the punishment upon P, i.e., $(1-\gamma)\beta a$, is multiplicative between $1-\gamma$ and β. We find this assumption uncontroversial, since in reality, given the punishing institution against defying behaviors, the ones who own more would often be more concerned about losing it.

We can formalize this intuition by showing that the impact of β on the survival probability of the status quo can be approximated by two positive and increasing functions of $1-\gamma$:

Lemma 1 (Impact of β on stability governed by γ)**.** *There exist* $\underline{c} \equiv (1-p)p\underline{f} > 0$ *and* $\bar{c} \equiv (1-p)p\bar{f} > \underline{c}$ *such that*

$$\underline{c}a \cdot (1-\gamma) \le \frac{dS}{d\beta} \le \bar{c}a \cdot (1-\gamma). \tag{12}$$

Proof. By Proposition 1, the marginal impact of β on S is

$$\frac{dS}{d\beta} = (1-p) \cdot \frac{dF(\hat{x})}{d\beta} = (1-p)pf(\hat{x}) \cdot a \cdot (1-\gamma), \tag{13}$$

where $\hat{x} \equiv (1-\gamma)\beta p \cdot a \in [0, pa]$. By $f(x) \in [\underline{f}, \bar{f}]$ over $x \in [0, pa]$, the lemma follows. □

The proof of Lemma 1 also suggests that the approximation would be exact if and only if the state of the world x followed a uniform distribution, i.e., $f(\hat{x})$ is a constant. Such an assumption could be arbitrary. Therefore, our approximating result captures the most robust part of the intuition.

Lemma 1 suggests that R's trade-off around β is largely governed by γ, too:

Proposition 3 (Institutional compatibility). *At Stage 1, if $\gamma < \underline{\gamma} \equiv 1 - 1/(\pi - 2a - r)\underline{c}$, then R will prefer β to be as high as possible, i.e., $\beta^* = 1$; if $\gamma > \bar{\gamma} \equiv 1 - p/(\pi - a - r)\bar{c}$, then R will prefer β to be as low as possible, i.e., $\beta^* = 0$, where $\underline{\gamma} < \bar{\gamma} < 1$ and, if $\pi > 2a + r + 1/\underline{c}$, then $\underline{\gamma} > 0$.*

Proof. The marginal impact of β on R's expected payoff in equilibrium at Stage 2 is

$$\frac{dV^R}{d\beta} = \big(\pi - (1+\beta)a - r\big) \cdot \frac{dS}{d\beta} - aS. \tag{14}$$

By Lemma 1, $\beta \in [0,1]$, and $S \in [p, 1]$, we have

$$\begin{aligned} \frac{dV^R}{d\beta} &\geq \big(\pi - (1+\beta)a - r\big) \cdot \underline{c}a \cdot (1-\gamma) - aS \\ &\geq \big((\pi - 2a - r) \cdot \underline{c} \cdot (1-\gamma) - 1\big) \cdot a, \end{aligned} \tag{15}$$

so if

$$(\pi - 2a - r) \cdot \underline{c} \cdot (1-\gamma) - 1 > 0, \tag{16}$$

i.e.,

$$\gamma < 1 - \frac{1}{(\pi - 2a - r) \cdot \underline{c}} \equiv \underline{\gamma}, \tag{17}$$

then $dV^R/d\beta > 0$. At the same time, we have

$$\begin{aligned} \frac{dV^R}{d\beta} &\leq \big(\pi - (1+\beta)a - r\big) \cdot \bar{c}a \cdot (1-\gamma) - aS \\ &\leq \big((\pi - a - r) \cdot \bar{c} \cdot (1-\gamma) - p\big) \cdot a, \end{aligned} \tag{18}$$

so if

$$(\pi - a - r) \cdot \bar{c} \cdot (1-\gamma) - p < 0, \tag{19}$$

i.e.,

$$\gamma > 1 - \frac{p}{(\pi - a - r) \cdot \bar{c}} \equiv \bar{\gamma}, \tag{20}$$

then $dV^R/d\beta < 0$. Finally, note $\underline{\gamma} < \bar{\gamma} < 1$, and $\underline{\gamma} > 0$ is equivalent to $\pi > 2a + r + 1/\underline{c}$. The proposition is then proven. □

The intuition of Proposition 3 is as follows. When γ is sufficiently low, a higher β will increase the punishment P will face in case C's challenge fails, so the increase in the stability at Stage 2 will be significant; therefore, the political side of R's trade-off at Stage 1 will always be dominant; R then prefers the highest possible β. If γ is sufficiently high, the opposite will happen, and the economic cost of a higher β will dominate the political gain.

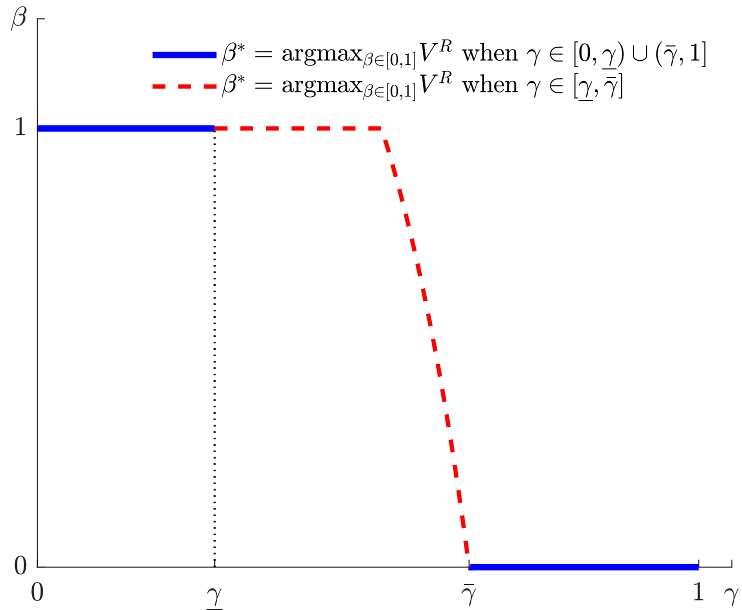
Proposition 3 explains the institutional differences in Imperial China and Premodern Europe: as in the European history, a high γ, which represents weak absolute power of the Ruler, for example, strong rule of law and property rights, and a low β, which represents a highly unbalanced relationship between the Elites and People's rights and power, for example, limited access of the People to elite status, are compatible, while as in the Chinese history, a low γ and a high β are compatible.

One may wonder why we did not show a result for $\gamma \in [\underline{\gamma}, \bar{\gamma}]$. It is not straightforward to derive such a result without further restrictions on the distribution of x. To see this point, observe that

$$\frac{dV^R}{d\beta} = \big(\pi - (1+\beta)a - r\big) \cdot \frac{dS}{d\beta} - aS \quad \text{and} \quad \frac{dS}{d\beta} = (1-p)pf(\hat{x}) \cdot a \cdot (1-\gamma). \tag{21}$$

A lower γ increases S, $1-\gamma$, and $\hat{x}$, but its impact on $f(\hat{x})$ depends on properties of $f(\cdot)$. Therefore, any unambiguous result about the impact of $\gamma \in [\underline{\gamma}, \bar{\gamma}]$ on R's preference over β would rely on further restrictions on the distribution of x, which would have to be more or less arbitrary. As an example, Appendix B derives a result that R will generally prefer a higher β given a lower γ with an additional restriction on the distribution of x. For theoretical robustness, Proposition 3 only touches upon the extreme cases and, therefore, the first-order implications of γ.

That said, we provide a numerical example in Figure 2. We plot R's choice β^* against γ: consistent with Proposition 3, $\beta^* = 1$ if $\gamma < \underline{\gamma}$, while $\beta^* = 0$ if $\gamma > \bar{\gamma}$; silent in Proposition 3, given the specification of the example, β^* weakly decreases with γ over $\gamma \in [\underline{\gamma}, \bar{\gamma}]$.



Specification: $F(x) = 1 - e^{-x}$, $p = 0.8$, $\pi = 20$, $a = 0.6$, $r = 5$. Under this specification, $\pi - 2a > r$. The Ruler's expected payoff in equilibrium at Stage 2 is denoted as V^R. The blue line plots β^* when $\gamma \in [0, \underline{\gamma}) \cup (\bar{\gamma}, 1]$, which is consistent with Proposition 3. The red line plots β^* when $\gamma \in [\underline{\gamma}, \bar{\gamma}]$, about which Proposition 3 is silent.

Figure 2: Ruler's choice β^* a function of $\gamma \in [0, 1]$

3.3 Additional Implications from Extensions

Extensions of our model can provide a few additional implications. Here we introduce two examples.

People's perspective on Ruler's absolute power. Proposition 3 shows the institutional compatibility between γ and β, while taking γ as exogenous. One may argue that γ would eventually depend on the legitimacy that P has granted to R in the first place. Along this argument, if before Stage 1 P has an opportunity to choose γ, how would her preference of γ look like?

Corollary 1. *If P could choose γ before Stage 1, then P would prefer any $\gamma < \underline{\gamma}$ over any $\gamma > \bar{\gamma}$.*

Proof. Given the β–γ power structure, P's expected payoff at Stage 2 is

$$
\begin{aligned}
V^P &= \gamma\beta a \cdot \big(1 - F(\hat{x})\big) \cdot p + \beta a \cdot \Big(1 - \big(1 - F(\hat{x})\big) \cdot p\Big) \\
&= \Big(1 - \big(1 - F(\hat{x})\big) \cdot p \cdot (1 - \gamma)\Big) \cdot \beta a. \qquad (22)
\end{aligned}
$$

By Proposition 3, if $\gamma > \bar{\gamma}$, R will choose $\beta = 0$; if $\gamma < \underline{\gamma}$, R will choose $\beta = 1$. Therefore,

$$V^P\big|_{\gamma<\underline{\gamma},\beta=1} > 0 = V^P\big|_{\gamma>\bar{\gamma},\beta=0}. \tag{23}$$

The corollary is then proven. □

The intuition is as follows. On the equilibrium path at Stage 2, P will never side with R when called upon. Therefore, she will receive either her status quo payoff βa or her post-punishment payoff $\gamma\beta a$. Given a sufficiently high $\gamma > \bar{\gamma}$, R will prefer the lowest possible $\beta = 0$ at Stage 1, so P will receive exactly a zero payoff eventually; any sufficiently low $\gamma < \underline{\gamma}$ will induce R to choose $\beta = 1$, granting P a strictly positive payoff eventually. P will then prefer any sufficiently low $\gamma < \underline{\gamma}$ over the sufficiently high $\gamma > \bar{\gamma}$ before Stage 1.

To clarify, we focus on the extreme case to highlight that it is not always the case that P will prefer a high to a low γ, and P may tolerate a quite absolutist R. We will come back to this insight in Section 4 when discussing the bureaucracy with the civil service exam in China.

Allowing current stability to shape future power structure. On the institutional compatibility, one may also argue that the European Rulers might have wanted to raise β but were not able to do so. Appendix C provides a response to this argument in several steps. First, it is easy to see that before Stage 2, R will prefer γ to be as low as possible, since a lower γ stabilizes the autocratic rule without sacrificing the status quo payoff, as seen in Equation (10).

Second, Proposition 2 implies that, if the total surplus π is sufficiently big, then the political side of R's trade-off with respect to β will be dominant, as long as the conditionality of the power and rights of the ruled exists, i.e., $\gamma < 1$. In that case, any R would prefer β to be as high as possible, as in Corollary 3 in Appendix C.

Third, the last two results suggest that when the total surplus is sufficiently big, any R would like to invest in a lower γ and a higher β at the same time. Given this preference, we can consider an alternative setting in which Stage 2 gets played repeatedly over different periods and, instead of letting R choose β only once, we can justify a mechanical link from the current stability of autocratic rule in equilibrium to the future power structure: the more stable R's autocratic rule is today, the more successful she would be in investing in the power structure toward the direction that she would favor, so the higher the degree of R's absolute power and the more symmetric the Elite–People relationship tomorrow. This effect on the future power structure, by Proposition 2, would eventually lead to a higher future stability, creating a dynamic complementarity.

Finally, given this dynamic complementarity, multiple stable steady states of (β, γ, S), i.e., the power structure and stability of autocratic rule, may exist, and, among these steady states, the stronger the absolute of R and the more symmetric the Elite–People relationship, the higher the stability of autocratic rule, as derived in Proposition 6 in Appendix C. A dual divergence of the power structure and stability of autocratic rule from slightly different initial conditions can thus appear, as shown in Proposition 7 in Appendix C. Here we summarize the implication as follows:

Corollary 2. *Compared with Premodern Europe, Imperial China could have been given a slightly lower γ, a slightly higher β, or a slightly higher S at very early times. This slight difference could have led the two societies to diverge into different stable steady states, where compared to Europe, China had a lower γ, a higher β, and a higher S.*

4 Further Discussion and Stylized Facts

4.1 Understanding Specific Institutions

Bureaucracy and civil service exam in China. Our model can help us understand specific institutions without explicitly modeling their details. One such example is the bureaucracy with the civil service exam in Imperial China, the hallmark of the Chinese institution (e.g., Finer, 1997a,b). Following our model, we can read it primarily as the Ruler raising β by generalizing access to elite status between the Elites and People.[22] By Proposition 3, Chinese Rulers had a great incentive to do so because they enjoyed a low γ, i.e., strong absolute power. Given the bureaucratic system, the Elites became mainly bureaucrats who were appointed by the Ruler, so they became further relying on the Ruler for legitimacy, making their power and rights more conditional on the Ruler's will, i.e., further lowering γ. Not only did the Ruler favor the stability of autocratic rule, i.e., a high S, as the result of the combination of a consolidated generalized access to elite status and strong absolute power, i.e., a higher β and a low γ, but by Corollary 1, the People might also have been satisfied with the power structure and the resulted stability, without too much urge for stronger rule of law or property rights.

[22]Our reading of the civil service exam is different from that by Huang and Yang (2020b), who argue that the civil service exam in China revealed the competence of the Elite (bureaucrats) to the Ruler, while the representative system in Europe revealed information about the Ruler to the Elites (lords); both institutions reduced information asymmetry between the Ruler and Elites, facilitating political stability while distributing rents differently. Besides our difference in understanding the civil service exam, as we show below, autocratic rule was largely more stable in Imperial China than in Premodern Europe.

Cities in Medieval Europe. In a similar vein, we can also read part of the rise of cities in Medieval Europe in relation to the Ruler's effort to raise β, by issuing charters that granted certain rights to the People in cities against other local Elites. This effort could eventually help stabilize the Ruler's autocratic rule. For example, "Philip [II of France] knew that in recognizing a commune, he was binding the citizens of that town to him. At critical moments in the reign the communes ... proved staunch military supporters [of Philip II] ... From the point of view of the communes ... the king was their natural ally, a counter to the main opponents of their independence, the Church or the magnates" (Bradbury, 1998, p. 236).[23]

By Lemma 1 and Proposition 3, however, this stabilizing effect was not guaranteed when the Ruler's absolute power was as weak as in Medieval Europe. As an European Ruler was generally constrained by his own charters, he would find it difficult to punish the cities by retracting the granted rights. Exactly because of this, granting more power and rights to cities might not help the Ruler much in creating the political alliance with urban commoners and securing his position. In this sense, when a Ruler in Europe freed a city from its local lords, he ran the risk of having freed it also from himself. For example, in May 1215, facing rebelling barons, John of England chartered the right of Londoners to elect their own mayor, together with other rights, "[i]n a last attempt to win the city" (Williams, 1963, p. 6). This proved futile: in June, still, "discontent citizens joined the barons in enforcing the signing of Magna Carta; the Mayor [of London] was the only commoner whose name appeared among the signatories" (Porter, 1994, p. 25–26). Given the uncertainty of this stabilizing effect under the Ruler's weak absolute power, together with the dual divergence of the power structure and stability as in Corollary 2 and Appendix C, the population that enjoyed cities' privileges was eventually relatively small in Europe at the eve of the modern times, reflecting the limited success of the Ruler's effort to raise β in Premodern Europe (Cantor, 1964; de Vries, 1984, p. 76).

4.2 Comparing Stability of Autocratic Rule

Proposition 2 states that stronger absolute power of the Ruler and a more symmetric relationship between the Elites and People, as in Imperial China compared to Premodern Europe, imply a higher stability of autocratic rule. As the nature of the challenge and the status quo of autocratic rule in our model are open to flexible interpretation, Proposition 2 can generate several auxiliary predictions that we could bring to data from historical China and Europe.

[23] Philip II's practice followed Louis VII, who "gave encouragement to the commune movement and received reciprocal support from the communities, at the expense of local lords" (Bradbury, 1998, p. 32). Relatedly, on the economic consequences of cities freeing peasants from local lords, see Cox and Figueroa (Forthcoming).

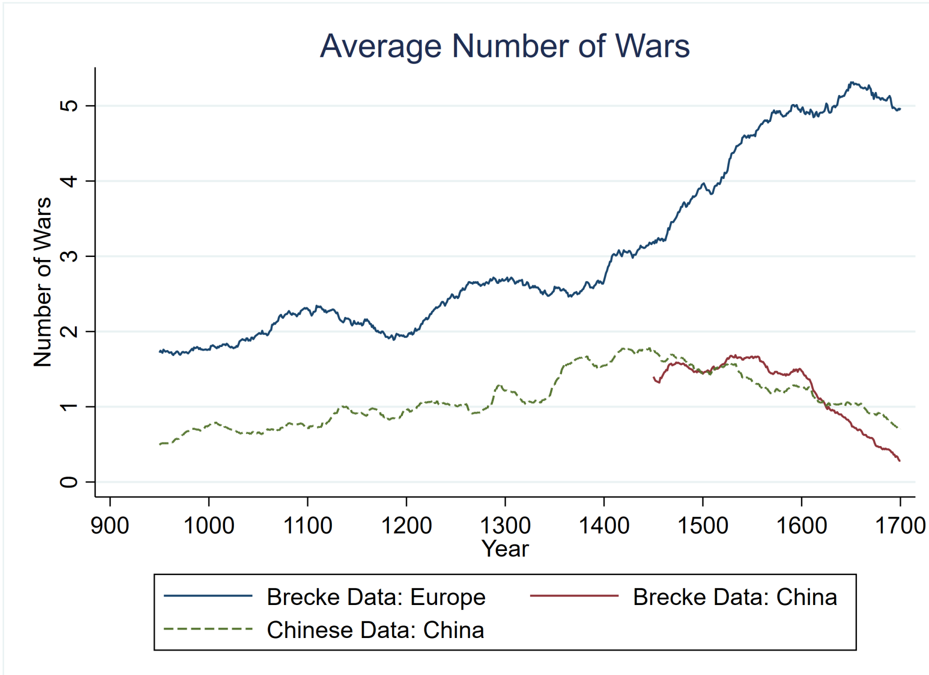
Number of wars. First, if we interpret the challenge in our model as an armed conflict, Proposition 2 then predicts that anyone in Europe who preferred an alternative to the status quo she was facing would be more willing to start a war than her counterpart in China. Note that this prediction does not depend on the challenger's identity and her status in the respective status quo: she could be either a foreign power, a rebellious local lord or regional governor, or a group of commoners. We also find it difficult to argue for a systematic difference in the number of all these possibly relevant entities between China and Europe in either way. Therefore, we should compare the total number of wars fought in Europe, regardless of the type of the war, with the number for China.

We are not aware of systematic evidence on this subject that covers the period of our interest. That said, Brecke (1999) provides comprehensive information on wars in Europe from 900 and that in China from only 1400. We complement the data with information from the Chinese Military History (2003) project from 900.[24] We visualize in Figure 3a the retrospective 100-year moving-averages of the number of wars that started in each given year. For robustness, for each retrospective 100-year window, we calculate the Olympic average in the window, i.e., taking the average in the window after removing one of the highest and one of the lowest values in the window.

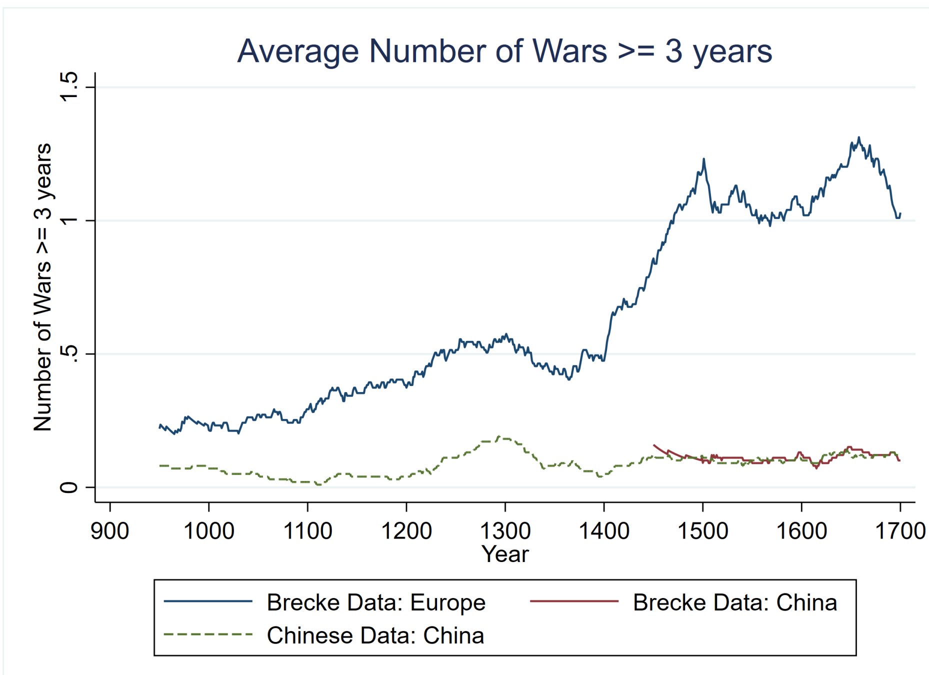
Figure 3a first shows that Brecke (1999)'s data and our data give comparable numbers of wars in China during 1400–1700, strengthening our confidence on our data. The figure also shows that the number of wars in Europe was consistently higher than that for China from 900 to 1700. These patterns remain robust when we restrict attention in Figure 3b to more significant wars that lasted three years or longer. We conclude that there were significant more wars in Europe than China during 900–1700, consistent with Proposition 2.

Risk of deposition. Second, if we interpret the challenge in our model as to depose the Ruler, Proposition 2 then predicts that a Chinese Ruler should have faced a lower risk of deposition in each given year than a European Ruler. On the data, the historical information of all monarchies in the world has been compiled by Morby (1989) and some of it has been used in a few studies (e.g., Blaydes and Chaney, 2013; Kokkonen and Sundell, 2014). Using the same data, to compare the risk of deposition between China and Europe, we first calculate for each given year a measure of the risk of deposition in that year, i.e., the share of the Rulers who were deposed in that year among all the Rulers who had been in power in that

[24]The original data in the Chinese Military History (2003) project are at the level of individual battles. We first compare the battle-level data from the Chinese Military History (2003) project with the war-level data from Brecke (1999), finding out Brecke (1999)'s criteria of categorization. Complementing the criteria with information from Wu (2016) and Tian (2019), we finally manually categorize the battles recorded in the Chinese Military History (2003) project into wars.



(a) All wars

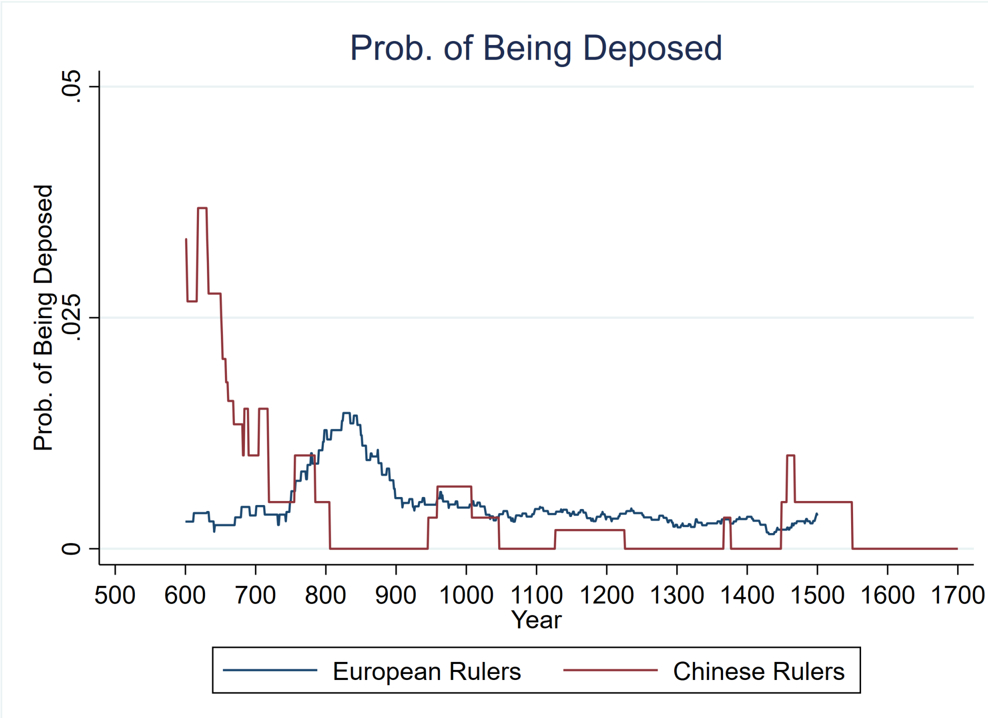


(b) All three-year or longer wars

Olympic average within each retrospective 100-year window. Data sources: Brecke (1999) for the "Brecke data," Chinese Military History (2003) for the "Chinese data."

Figure 3: Number of wars of all types started in a given year, China vs. Europe

year; we then visualize in Figure 4 the comparison between China and Europe by plotting the retrospective 100-year moving-averages of the measure. For robustness, again, the Olympic average is used.

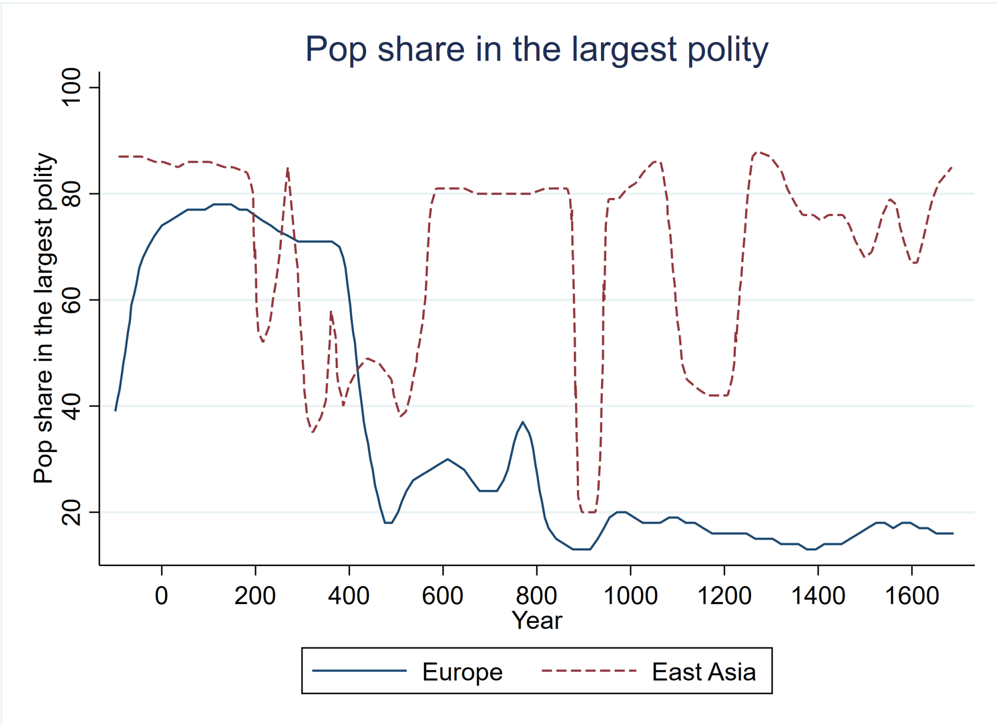


Olympic average within each retrospective 100-year window. Data source: Morby (1989).

Figure 4: Risk for a Ruler to be deposed in a given year, China vs. Europe

As shown in Figure 4, the risk for a Ruler to be deposed in a given year was generally lower in China than in Europe during the 9th–14th centuries, when the two differences we emphasize in the power structure between the two societies were the most prominent. That said, there existed a short period around 970 where the risk in China appeared to be higher, when China entered the Five Dynasties and Ten Kingdoms period. In light of this, we conduct a Kolmogorov–Smirnov test to check whether the differences in the risks between China and Europe are systematic. The test reports that at a significance level of 0.1%, we can accept the claim that the risk for a Ruler to be deposed in a given year was generally lower in China than in Europe during 800–1400, whereas the opposite claim must be rejected. These results are consistent with Proposition 2.

Resilience of unified autocratic rule. Finally, if we interpret the status quo of autocratic rule in our model as a unified one across the territory, Proposition 2 then predicts that a unified autocratic rule should have been more resilient in China than in Europe. As discussed, the literature has well documented that China had been more unified than Europe in history. Among many other measures, here we present in Figure 5 only a replication of the comparison by Scheidel (2019, fig. 1.11) as an example, plotting the share of the population in Europe that was controlled by the largest polity in the continent, together with the same measure for East Asia, where China is located.



Replicated from Scheidel (2019, fig. 1.11).

Figure 5: Percentage of population claimed by the largest polity, Europe vs. East Asia

As shown in the figure, since 800, in East Asia, the population share in the largest polity, which was the dominant empire in China, had usually been above 75%, except for short subperiods of turbulence. In contrast, the number for Europe had been below 20%, consistent with a more fragmented pattern. This comparison is consistent with Proposition 2. Therefore, our model provides a power-structure approach to the unification–fragmentation cleavage between Imperial China and Premodern Europe.

5 Conclusion

In recent years, economists have made a lot of progress in understanding the importance of institutions and the relationship between major components of pro-development institutions.

In this paper, we address the correlation between more inclusive access to elite status and weaker rule of law or property rights in the comparison between Imperial China and Premodern Europe. Historical narratives reveal that the correlation reflects two fundamental differences in the power structure between the two societies: Chinese Rulers had stronger absolute power, while the relationship between the Elites and People in terms of their power and rights was more asymmetric in Europe.

By building a model and analyzing how the power structure can shape the stability of an autocratic rule, we show that, once we recognize that the Ruler's absolute power is about the conditionality of the power and rights of the ruled on the Ruler's will, a more symmetric Elite–People relationship will strengthen the political alliance between the Ruler and the People, thus creating more loyalty to the Ruler, and deterring potential challenges, stabilizing the autocratic rule. This effect and, therefore, the Ruler's incentive to promote a more symmetric Elite–People relationship depend on the Ruler's absolute power. This comparative institutional analysis explains the coexistence of the two power-structure differences between Imperial China and Premodern Europe. Besides guiding us to understand specific institutions, the model also suggests higher stability of autocratic rule in Imperial China. Data on the number of wars, risk of deposition, and resilience of unified autocratic rule support the implication.

Admittedly, our theory is highly stylized as we capture the power structure with only two parameters, and we only examine the stability of autocratic rule as the outcome. The benefit of doing so is that we can deliver our key insights in a simple manner. That said, there can be more insights to gain if one applies our framework of power structure to other parts of the world, e.g., the Muslim world, or if one employs different frameworks to link the power structure with other political, economic and social outcomes (e.g., taxation, social mobility, and innovation).[25] We thus hope that our study opens new avenues for future research.

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[25]For example, Blaydes and Chaney (2013) show that Christian kings in Western Europe enjoyed higher political stability than Muslim sultans during the 9th–15th centuries. This difference can be explained in our framework: lords in feudal Europe owned land and military forces on a daily basis, suggesting a high status quo payoff a to the Elites, while Mamlukism in the Muslim world was designed to remove elite Mamluks "from the luxuries of settled life" (Blaydes and Chaney, 2013, p. 23), suggesting a low a; one can show in our model that a higher a would increase the stability of autocratic rule.

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Online Appendix

A Allowing for Mixed Strategies

In this section we allow for mixed strategies at Stage 2 by dropping the earlier assumption that E and P will side with R when indifferent and C will not challenge when indifferent. We then characterize all the subgame perfect equilibria that are empirically relevant (possible for C to challenge and for the status quo to end) and can involve mixed strategies at a strictly positive share of the states of the world. We then examine whether the main insights from the main text would maintain.

When doing so, we adopt a few additional assumptions without losing much generality. We consider only the empirically relevant, nontrivial case $\gamma < 1$. We also assume that x is a continuous random variable so that its distribution does not have any mass point, and that $F(ap) < 1$ so that $1 - F(\hat{x}) > 0$ always holds.

By backward induction, in any subgame perfect equilibrium at Stage 2, P will side with R when $x < \hat{x}$ and not side with R when $x > \hat{x}$.

Taking this into consideration, in any subgame perfect equilibrium, E will side with R when $x < \hat{x}$; when $x > \hat{x}$, E will side with R if

$$w < \frac{p}{1-p} \cdot (1-\gamma)a; \tag{24}$$

E will not side with R if

$$w > \frac{p}{1-p} \cdot (1-\gamma)a; \tag{25}$$

E will side with R with probability $q_E(x)$ if

$$w = \frac{p}{1-p} \cdot (1-\gamma)a, \tag{26}$$

where $q_E(x)$ is a function and satisfies $q_E(x) \in [0,1]$ for any $x > \hat{x}$.

Taking this into consideration, in any subgame perfect equilibrium, C will not challenge when $x < \hat{x}$. When $x > \hat{x}$, C will not challenge if

$$w < \frac{p}{1-p} \cdot (1-\gamma)a; \tag{27}$$

C will also not challenge if

$$w > \frac{p}{1-p} \cdot (1-\gamma)a \text{ and } z < \frac{p}{1-p} \cdot y; \tag{28}$$

C will challenge if

$$w > \frac{p}{1-p} \cdot (1-\gamma)a \text{ and } z > \frac{p}{1-p} \cdot y; \tag{29}$$

C will challenge with probability $q_C(x)$ if

$$w > \frac{p}{1-p} \cdot (1-\gamma)a \text{ and } z = \frac{p}{1-p} \cdot y, \tag{30}$$

where $q_C(x)$ is a function and satisfies $q_C(x) \in [0,1]$ for any $x > \hat{x}$; if

$$w = \frac{p}{1-p} \cdot (1-\gamma)a, \tag{31}$$

however, C will compare

$$0 \text{ vs. } q_E(x) \cdot (-y) + (1 - q_E(x)) \cdot \big((1-p) \cdot z - p \cdot y\big), \tag{32}$$

i.e.,

$$0 \text{ vs. } (1 - q_E(x))(1-p) \cdot z - \big(1 - (1 - q_E(x))(1-p)\big) \cdot y, \tag{33}$$

so C will challenge with probability $q_C(x)$, where, for any $x > \hat{x}$, $q_C(x) = 1$ if

$$z > \frac{1 - (1 - q_E(x))(1-p)}{(1 - q_E(x))(1-p)} \cdot y, \tag{34}$$

$q_C(x) = 0$ if

$$z < \frac{1 - (1 - q_E(x))(1-p)}{(1 - q_E(x))(1-p)} \cdot y, \tag{35}$$

and $q_C(x) \in [0,1]$ if

$$z = \frac{1 - (1 - q_E(x))(1-p)}{(1 - q_E(x))(1-p)} \cdot y. \tag{36}$$

We have then specified all equilibrium strategies at any $x \neq \hat{x}$. Therefore, at Stage 2, the only families of subgame perfect equilibria that are empirically relevant and can involve mixed strategies at a strictly positive share of the states of the world are:

- When $w > \frac{p}{1-p} \cdot (1-\gamma)a$ and $z = \frac{p}{1-p} \cdot y$, in any subgame perfect equilibrium, if $x < \hat{x}$, then C will not challenge, E would side with R, and P would side with R; if $x > \hat{x}$, then C will challenge with probability $q_C(x) \in [0,1]$, E will not side with R, and P will not side with R.

  In any equilibrium of this family, the probability of challenge is $\int_{\hat{x}}^{\infty} q_C(x) dF(x)$, while the survival probability of the status quo is

$$S = 1 - \int_{\hat{x}}^{\infty} q_C(x) dF(x) \cdot (1-p). \tag{37}$$

All impacts of γ and β on political stability still come from their impacts on $\hat{x}$. All main insights from the main text would then remain.

- When $w = \frac{p}{1-p} \cdot (1-\gamma)a$, in any subgame perfect equilibrium, if $x < \hat{x}$, then C will not challenge, E would side with R, and P would side with R; if $x > \hat{x}$, then C will challenge with probability $q_C(x)$, where $q_C(x)$ depends on

$$z \text{ vs. } \frac{1 - (1-q_E(x))(1-p)}{(1-q_E(x))(1-p)} \cdot y, \tag{38}$$

E will side with R with probability $q_E(x)$, and P will not side with R.

In any equilibrium of this family, the probability of challenge is $\int_{\hat{x}}^{\infty} q_C(x) dF(x)$, while the survival probability of the status quo is

$$S = 1 - \int_{\hat{x}}^{\infty} q_C(x)(1-q_E(x))(1-p) dF(x). \tag{39}$$

Still, all impacts of γ and β on political stability come from their impacts on $\hat{x}$. All main insights from the main text would then remain.

B Institutional Compatibility under Additional Restriction on the Distribution of the State of the World

Proposition 4. *If the distribution of x satisfies*

$$\epsilon \equiv -\frac{x \cdot f'(x)}{f(x)} \leq \bar{\epsilon} \equiv 1 - \frac{a}{\pi - 2a - r} \tag{40}$$

over $x \in [0, pa]$, then a lower $\gamma \in [0,1]$ would make R prefer a higher $\beta \in [0,1]$.

Proof. Observe that

$$\frac{dV^R}{d\beta} = \big(\pi - (1+\beta)a - r\big) \cdot \frac{dS}{d\beta} - aS, \quad \frac{dS}{d\beta} = (1-p)pf(\hat{x}) \cdot a \cdot (1-\gamma), \tag{41}$$

and

$$S = 1 - \big(1 - F(\hat{x})\big) \cdot (1-p). \tag{42}$$

Therefore,

$$\begin{aligned}\frac{\partial^2 V^R}{\partial\gamma\partial\beta} &= \big(\pi-(1+\beta)a-r\big)\cdot\frac{\partial S}{\partial\gamma\partial\beta}-a\cdot\frac{dS}{d\gamma}\\ &= -\big(\pi-(1+\beta)a-r\big)\cdot(1-p)pa\cdot\big((1-\gamma)f'(\hat{x})\cdot pa\beta+f(\hat{x})\big)-a\cdot\frac{dS}{d\gamma}\\ &= -\big(\pi-(1+\beta)a-r\big)\cdot(1-p)pa\cdot\big(f'(\hat{x})\cdot\hat{x}+f(\hat{x})\big)+a\cdot(1-p)f(\hat{x})p\beta a\\ &= -(1-p)pa\cdot\Big(\big(\pi-(1+\beta)a-r\big)\cdot\big(f'(\hat{x})\cdot\hat{x}+f(\hat{x})\big)-f(\hat{x})\beta a\Big)\\ &= -(1-p)pa\cdot\Big(\big(\pi-(1+\beta)a-r\big)\cdot f'(\hat{x})\cdot\hat{x}+\big(\pi-(1+2\beta)a-r\big)\cdot f(\hat{x})\Big). \end{aligned} \tag{43}$$

Therefore, $\partial^2 V^R/\partial\gamma\partial\beta \leq 0$ if and only if

$$\big(\pi-(1+\beta)a-r\big)\cdot f'(\hat{x})\cdot\hat{x}+\big(\pi-(1+2\beta)a-r\big)\cdot f(\hat{x})\geq 0, \tag{44}$$

i.e.,

$$\epsilon\equiv-\frac{f'(\hat{x})\cdot\hat{x}}{f(\hat{x})}\leq\frac{\pi-(1+2\beta)a-r}{\pi-(1+\beta)a-r}=1-\frac{\beta a}{\pi-(1+\beta)a-r}. \tag{45}$$

Since

$$\frac{\beta a}{\pi-(1+\beta)a-r}\in\left[0,\frac{a}{\pi-2a-r}\right], \tag{46}$$

we have

$$1-\frac{\beta a}{\pi-(1+\beta)a-r}\in\left[1-\frac{a}{\pi-2a-r},1\right]. \tag{47}$$

Therefore, $\partial^2 V^R/\partial\gamma\partial\beta \leq 0$ can be guaranteed by

$$\epsilon\leq 1-\frac{a}{\pi-2a-r}\equiv\bar{\epsilon},\quad\text{where}\quad\bar{\epsilon}<1. \tag{48}$$

The proposition then follows. □

C Allowing Current Stability to Shape Future Power Structure

Based on the equilibrium at Stage 2, R's preference over γ is straightforward: a lower γ stabilizes the status quo (higher S) without any impact on R's status quo payoff; therefore, R will prefer the lowest possible γ.

Proposition 3 also implies:

Corollary 3 (Higher β almost always preferred by R)**.** *As* $\pi - r \to \infty$, $\underline{\gamma} \to 1^-$.

This result suggests that when the surplus R would enjoy is sufficiently large, given any $\gamma < 1$, R will prefer β to be as high as possible. This result and R's preference over γ allow us to consider the following setting:

- At t:
  - The ruling position's historical strength S_{t-1} is given.
  - $\gamma_t = \gamma(S_{t-1})$ and $\beta_t = \beta(S_{t-1})$ are realized, where $\gamma(S)$ and $\beta(S)$ satisfy $\gamma_S(S) < 0$ and $\beta_S(S) > 0$, respectively.
  - The modeled Stage 2 plays out $S_t = 1 - (1 - F(\hat{x})) \cdot (1 - p) \equiv S(\beta_t, \gamma_t, \theta)$ as in the unique subgame perfect equilibrium; θ include all factors that conditional on S_{t-1}, affect S_t but do so not through γ_t or β_t.
- At $t + 1$: The same happens.

The dynamics then follows

$$\beta_t = \beta(S_{t-1}), \quad \gamma_t = \gamma(S_{t-1}), \quad S_t = S(\beta_t, \gamma_t, \theta), \tag{49}$$

or just

$$S_t = S\left(\beta(S_{t-1}), \gamma(S_{t-1}), \theta\right). \tag{50}$$

Steady states are then defined by

$$\begin{cases} S^* = S(\beta^*, \gamma^*, \theta): & \text{steady-state political stability;} \\ \beta^* = \beta(S^*): & \text{steady-state right symmetry;} \\ \gamma^* = \gamma(S^*): & \text{steady-state rule of law,} \end{cases} \tag{51}$$

or just

$$S^* = S\left(\beta(S^*), \gamma(S^*), \theta\right). \tag{52}$$

Existence and stability of steady states. The defining equation of steady states can help establish a few technical results. The first result is about the possible range of S_t in the dynamics:

Lemma 2. *Any S_t in the dynamics must satisfy $\underline{S} \leq S_t \leq \bar{S}$, where $\underline{S} = p$ and $\bar{S} = 1 - (1 - p) \cdot (1 - F(pa)) < 1$.*

Proof. Note that $S_\beta \geq 0$ and $S_\gamma \leq 0$. Therefore, the minimum $\underline{S}$ is reached when $\beta_t = 0$ and $\gamma_t = 1$ and the maximum $\bar{S}$ is reached when $\beta_t = 1$ and $\gamma_t = 0$. The lemma then follows. □

The first result helps establish the second result, which is about the existence of a steady state given a reasonable assumption about $\beta(\cdot)$ and $\gamma(\cdot)$:

Lemma 3. *If $\beta(\underline{S})$, $\gamma(\underline{S})$, $\beta(\bar{S})$, and $\gamma(\bar{S})$ are all within the range $(0,1)$, then there exists at least one steady state S^*, at which $S_t = S\left(\beta(S_{t-1}), \gamma(S_{t-1}), \theta\right)$ crosses $S_t = S_{t-1}$ from $S_t > S_{t-1}$ to $S_t < S_{t-1}$, and $0 \leq S_\beta \cdot \beta_S + S_\gamma \cdot \gamma_S \leq 1$.*

Proof. Note that $S_\beta > 0$ and $S_\gamma > 0$ for any $\beta > 0$ and $\gamma < 1$. Therefore, by $\beta(\underline{S}) > 0$ and $\gamma(\underline{S}) < 1$, we have $S\left(\beta\left(\underline{S}\right), \gamma\left(\underline{S}\right), \theta\right) > \underline{S}$; by $0 < \beta(\bar{S}) < 1$ and $0 < \gamma(\bar{S}) < 1$, we have $S\left(\beta\left(\bar{S}\right), \gamma\left(\bar{S}\right), \theta\right) < \bar{S}$. Since $S\left(\beta(s), \gamma(s), \theta\right)$ is continuous in s, the defining equation $S^* = S\left(\beta\left(S^*\right), \gamma\left(S^*\right), \theta\right)$ must have a solution $S^* \in \left[\underline{S}, \bar{S}\right]$, i.e., a steady state exists, at which $S_t = S\left(\beta(S_{t-1}), \gamma(S_{t-1}), \theta\right)$ crosses $S_t = S_{t-1}$ from $S_t > S_{t-1}$ to $S_t < S_{t-1}$. Moreover, note that

$$\frac{dS\left(\beta\left(s\right), \gamma\left(s\right), \theta\right)}{ds} = S_\beta \cdot \beta_S + S_\gamma \cdot \gamma_S \geq 0, \tag{53}$$

so $S_t = S\left(\beta(S_{t-1}), \gamma(S_{t-1}), \theta\right)$ is increasing in S_{t-1}. Therefore, at S^*,

$$0 \leq \frac{dS\left(\beta\left(s\right), \gamma\left(s\right), \theta\right)}{ds} = S_\beta \cdot \beta_S + S_\gamma \cdot \gamma_S \leq 1. \tag{54}$$

□

The third result is the condition for a steady state to be stable:

Lemma 4. *A steady state S^* is stable if and only if at S^*, $S_t = S\left(\beta(S_{t-1}), \gamma(S_{t-1}), \theta\right)$ crosses $S_t = S_{t-1}$ from $S_t > S_{t-1}$ to $S_t < S_{t-1}$ and $0 \leq S_\beta \cdot \beta_S + S_\gamma \cdot \gamma_S \leq 1$.*

Proof. First, suppose a steady state S^* is stable, then at S^*, $S_t = S\left(\beta(S_{t-1}), \gamma(S_{t-1}), \theta\right)$ crosses $S_t = S_{t-1}$ and

$$-1 < \frac{dS\left(\beta\left(S^*\right), \gamma\left(S^*\right), \theta\right)}{dS^*} = S_\beta \cdot \beta_S + S_\gamma \cdot \gamma_S \leq 1. \tag{55}$$

Note that

$$S_\beta \cdot \beta_S + S_\gamma \cdot \gamma_S \geq 0, \tag{56}$$

so

$$0 \leq S_\beta \cdot \beta_S + S_\gamma \cdot \gamma_S \leq 1. \tag{57}$$

Therefore, the crossing must be from $S_t > S_{t-1}$ to $S_t < S_{t-1}$.

The other direction of the lemma is straightforward. The lemma is then proven. □

The last two results establish the existence of stable steady states:

Proposition 5. *If $\beta(\underline{S})$, $\gamma(\underline{S})$, $\beta(\bar{S})$, and $\gamma(\bar{S})$ are all within the range $(0,1)$, then there exists at least one stable steady state, and at all the stable steady states, $S_t = S\left(\beta(S_{t-1}), \gamma(S_{t-1}), \theta\right)$ crosses $S_t = S_{t-1}$ from $S_t > S_{t-1}$ to $S_t < S_{t-1}$ and $0 \leq S_\beta \cdot \beta_S + S_\gamma \cdot \gamma_S \leq 1$.*

Institutional compatibility under multiple steady states. Assuming $\beta(\underline{S})$, $\gamma(\underline{S})$, $\beta(\bar{S})$, and $\gamma(\bar{S})$ are all within the range $(0,1)$, we can have the following result: when multiple steady states exist given θ, any two different steady states must be different in a certain way, i.e., follows institutional compatibility:

Proposition 6. *Given θ, if there are two steady states $\{S^*, \beta^*, \gamma^*\}$ and $\{S^{*\prime}, \beta^{*\prime}, \gamma^{*\prime}\}$, then any one among the following three statements will imply the other two: 1) $S^* \geq S^{*\prime}$; 2) $\beta^* \geq \beta^{*\prime}$; 3) $\gamma^* \leq \gamma^{*\prime}$.*

Proof. The result follows the three defining equations of steady states and their monotonicity. □

Given multiple steady states, the second result is about the divergence of compatible institutions:

Proposition 7. *If there are $N \geq 2$ different stable steady states $S_1^* < \cdots < S_N^*$, then there are $N-1$ different unstable steady states $\tilde{S}_1 < \cdots < \tilde{S}_{N-1}$, they satisfy $\underline{S} < S_1^* < \tilde{S}_1 < S_2^* < \tilde{S}_2 < \cdots < S_{N-1}^* < \tilde{S}_{N-1} < S_N^* < \bar{S}$, and the institutional dynamics is determined by the initial strength of the ruling position S_0:*

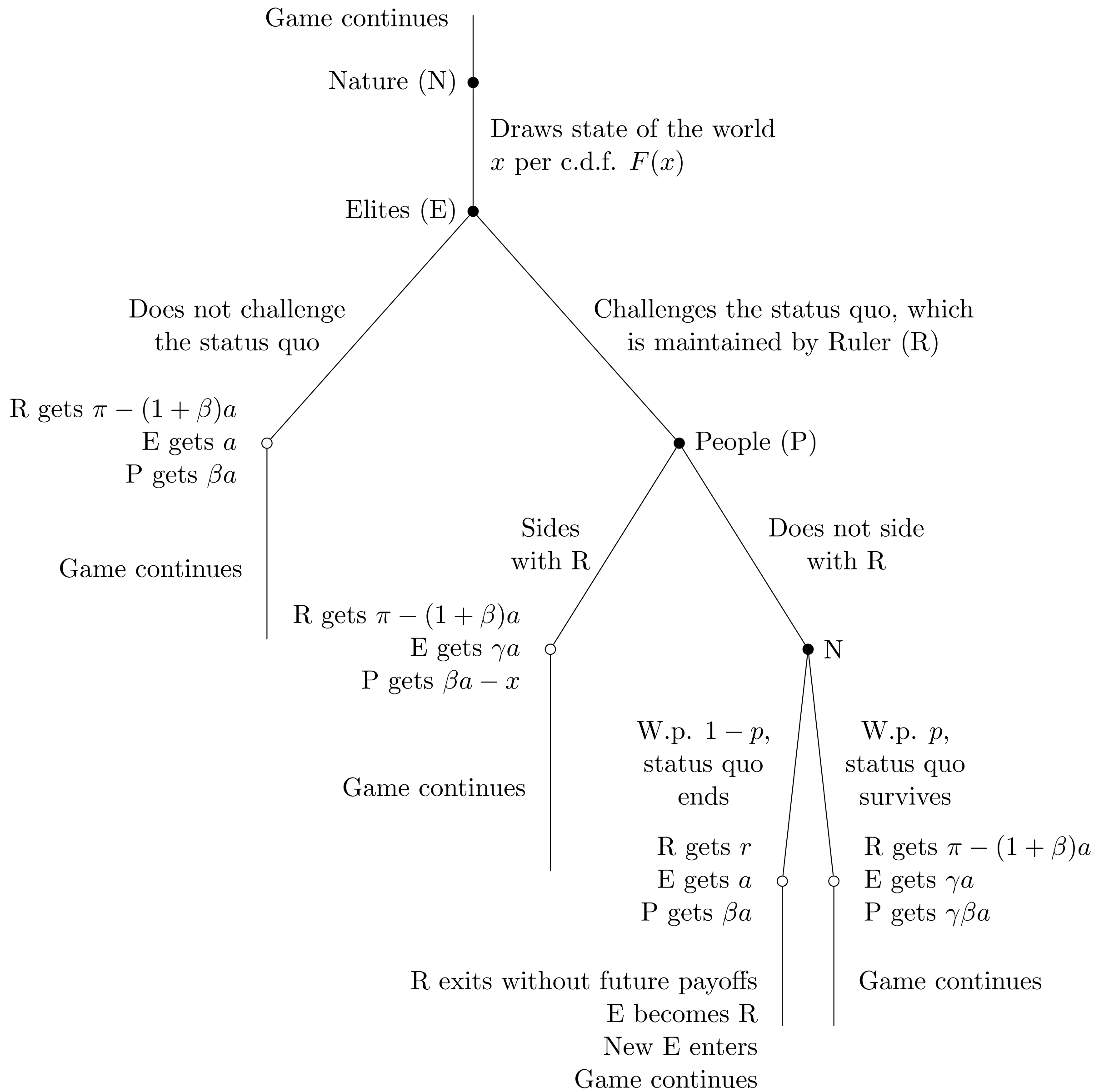
- *if $\tilde{S}_n < S_0 < \tilde{S}_{n+1}$, where $n = 1, \ldots, N-1$, then $S_t \to S_{n+1}^*$ as $t \to \infty$;*
- *if $\underline{S} \leq S_0 < \tilde{S}_1$, then $S_t \to S_1^*$ as $t \to \infty$;*
- *if $\tilde{S}_{N-1} < S_N^* < \bar{S}$, then $S_t \to S_N^*$ as $t \to \infty$.*

Proof. As eventually $S_t = S\left(\beta(S_{t-1}), \gamma(S_{t-1}), \theta\right)$ has to cross $S_t = S_{t-1}$ from $S_t > S_{t-1}$ to $S_t < S_{t-1}$, we can rank the stable and unstable steady states as proposed. Neighboring unstable steady states then divides the possible range of S into sub-ranges, starting from each of which S_t will converge to the stable steady state in it. □

This result implies that the institutional difference between China and Europe can be thought as different stable steady states given the same primitives but different initial strengths S of the ruling position in history, which is compatible with different β and γ at very early times.

D Endogenizing the Challenger and Elites' Incentives in a Markov Game

In this extension of Stage 2 we collapse C and E into a single player E, make her look forward in a Markov game with an infinite number of discrete periods, and allow her to replace R. Figure 6 shows each period of the Markov game.



$$x \geq 0,\ a > 0,\ \pi - 2a > r,\ 0 \leq \beta \leq 1,\ 0 \leq \gamma \leq 1,\ 0 < p < 1$$

Figure 6: Extended Stage 2: Each period in the Markov game

Compared with Figure 1, Stage 2 will now continue after each period; the prize z for C to challenge and the incentive w for E not to side with R are replaced by the aspiration of E to replace R at the end of this period; the loss y for C if her challenges fails is replaced by the punishment that would reduce E's payoff from the status quo level a to γa. About the stochastic elements of the game, we assume that N's draws of x and whether R will survive the challenge on her own within each period and across periods are mutually independent. About the dynamic elements of the game, we assume that all the players have an infinite horizon with an exogenous intertemporal discount factor $\delta \in (0, 1)$. All other assumptions in the main text remain here.

We will adopt the Markov perfect equilibrium as the solution concept in our analysis. For simplicity, we still assume that E will not challenge and P will side with R if they are indifferent in their decision, respectively, ruling out mixed strategies. Appendix D.3 shows that allowing for mixed strategies would accommodate a mixed-strategy equilibrium when and only when pure-strategy equilibria do not exist, while the key insights would remain robust.

D.1 Equilibrium Characterization

Now we analyze the extended Stage 2 by first characterizing all possible Markov perfect equilibria and finding the conditions under which they exist. We denote the net present values that the players enjoy at the beginning of each period as V^R, V^E, and V^P, respectively. We have a first result to partially characterize all Markov perfect equilibria:

Lemma 5. *In any Markov perfect equilibrium, P will side with R if and only if* $x \le \hat{x} \equiv (1-\gamma)\beta p \cdot a$, *where* $\hat{x} \in [0, pa]$; *when* $x \le \hat{x}$, *E will not challenge the status quo, and when* $x > \hat{x}$, *E will challenge if and only if the inspiration to replace R in equilibrium dominates the probability-adjusted punishment in case of a failed challenge:*

$$V^R - V^E > \frac{p}{(1-p)\delta} \cdot (1-\gamma)a. \tag{58}$$

Proof. In any Markov perfect equilibrium, P will side with R if and only if

$$\beta a - x + \delta V^P \ge (\beta a + \delta V^P) \cdot (1-p) + (\gamma \beta a + \delta V^P) \cdot p, \tag{59}$$

i.e.,

$$x \le (1-\gamma)\beta p \cdot a \equiv \hat{x}. \tag{60}$$

Given this strategy of P and the continuation strategy of E in the equilibrium, E will not challenge if $x \leq \hat{x}$, since

$$a + \delta V^E \geq \gamma a + \delta V^E \tag{61}$$

holds for any $\gamma \in [0, 1]$ and V^E; when $x > \hat{x}$, E will challenge if and only if

$$a + \delta V^E < (a + \delta V^R) \cdot (1 - p) + (\gamma a + \delta V^E) \cdot p, \tag{62}$$

i.e.,

$$V^R - V^E > \frac{p}{(1-p)\delta} \cdot (1 - \gamma)a. \tag{63}$$

The lemma is then proven. □

Note that the analysis is parallel to Section 3.1.2, the definition of $\hat{x}$ is the same as in Section 3.1.2, and Condition (58) is parallel to Conditions (4) and (6).

By Lemma 5, only two Markov perfect equilibria are possible. The first one is a secured-R equilibrium:

Proposition 8 (Secured-R equilibrium in the Markov game)**.** *If*

$$h(\beta, \gamma) \equiv \frac{\pi - (2 + \beta)a}{1 - \delta} - \frac{p}{(1-p)\delta} \cdot (1 - \gamma)a \leq 0, \tag{64}$$

then "E never challenges the status quo; P would not side with R if and only if $x > \hat{x}$" is a Markov perfect equilibrium; in this equilibrium, the survival probability of the status quo is $S = 1$.

Proof. For "E never challenges the status quo; P would not side with R if and only if $x > \hat{x}$" to be a Markov perfect equilibrium, the condition

$$V^R - V^E \leq \frac{p}{(1-p)\delta} \cdot (1 - \gamma)a \tag{65}$$

must hold, where, given E and P's strategies in this equilibrium,

$$V^R = \frac{\pi - (1 + \beta)a}{1 - \delta} \quad \text{and} \quad V^E = \frac{a}{1 - \delta}. \tag{66}$$

The condition is then equivalent to

$$\frac{\pi - (1 + \beta)a}{1 - \delta} - \frac{a}{1 - \delta} \leq \frac{p}{(1-p)\delta} \cdot (1 - \gamma)a, \tag{67}$$

i.e.,

$$h(\beta, \gamma) \equiv \frac{\pi - (2 + \beta)a}{1 - \delta} - \frac{p}{(1-p)\delta} \cdot (1 - \gamma)a \leq 0. \tag{68}$$

The proposition is then proven. □

The intuition of the result is as follows: the function $h(\beta,\gamma)$ measures E's inspiration $V^R - V^E = (\pi - (2+\beta)a)/(1-\delta)$ to replace R given the specified strategies, net of the probability-adjusted punishment $\big(p/(1-p)\delta\big)\cdot(1-\gamma)a$ on E in case the challenge fails. The condition $h(\beta,\gamma)\le 0$ then suggests that the inspiration cannot dominate the punishment. Lemma 5 then implies that we have the secured-R equilibrium.

Note that this equilibrium is parallel to the scenario in Section 3.1.2 when Conditions (4) and (6) do not hold. Following the same argument as in Section 3.1.2, this equilibrium is empirically not much relevant, as in reality the chance for R to be ousted was always strictly positive; it is also trivial, in the sense that no challenge will happen in equilibrium.

The second equilibrium is an unsecured-R equilibrium:

Proposition 9 (Unsecured-R equilibrium in the Markov game)**.** *If*

$$g(\beta,\gamma) \equiv \frac{\big(\pi-(1+\beta)a\big)\cdot S + r\cdot(1-S)}{1-\delta S} - \frac{a}{1-\delta} - \frac{p}{(1-p)\delta}\cdot(1-\gamma)a > 0, \tag{69}$$

where

$$S = 1-\big(1-F(\hat{x})\big)\cdot(1-p)\in[p,1] \quad \text{and} \quad \hat{x}\equiv(1-\gamma)\beta p\cdot a, \tag{70}$$

then "E will challenge the status quo if and only if $x>\hat{x}$; P would not side with R if and only if $x>\hat{x}$" is a Markov perfect equilibrium; in this equilibrium, R's stability is $S\le 1$.

Proof. For "E will challenge the status quo if and only if $x>\hat{x}$; P would not side with R if and only if $x>\hat{x}$" to be a Markov perfect equilibrium, the condition

$$V^R - V^E > \frac{p}{(1-p)\delta}\cdot(1-\gamma)a \tag{71}$$

must hold, where, given E and P's strategies in this equilibrium,

$$\begin{aligned} V^R &= \Big(\pi-(1+\beta)a+\delta V^R\Big)\cdot S + r\cdot(1-S) \\ &= \big(\pi-(1+\beta)a\big)\cdot S + r\cdot(1-S) + \delta V^R\cdot S \\ &= \frac{\big(\pi-(1+\beta)a\big)\cdot S + r\cdot(1-S)}{1-\delta S} \end{aligned} \tag{72}$$

and

$$
\begin{aligned}
V^E &= a \cdot \Big(1 - \big(1 - F(\hat{x})\big) \cdot p\Big) + \gamma a \cdot \big(1 - F(\hat{x})\big) \cdot p + \delta V^E \cdot S + \delta V^R \cdot (1 - S) \\
&= a \cdot \Big(1 - (1 - \gamma) \cdot \big(1 - F(\hat{x})\big) \cdot p\Big) + \delta V^E \cdot S + \delta V^R \cdot (1 - S) \\
&= \frac{a \cdot \Big(1 - (1 - \gamma) \cdot \big(1 - F(\hat{x})\big) \cdot p\Big) + \delta V^R \cdot (1 - S)}{1 - \delta S},
\end{aligned}
\tag{73}
$$

with

$$
S = 1 - \big(1 - F(\hat{x})\big) \cdot (1 - p) \in [p, 1]. \tag{74}
$$

The condition is then equivalent to, with some algebra,

$$
g(\beta, \gamma) \equiv \frac{\big(\pi - (1 + \beta)a\big) \cdot S + r \cdot (1 - S)}{1 - \delta S} - \frac{a}{1 - \delta} - \frac{p}{(1 - p)\delta} \cdot (1 - \gamma)a > 0. \tag{75}
$$

The proposition is then proven. □

Again, the intuition of Proposition 9 follows Lemma 5: the function $g(\beta, \gamma)$ indicates, given the specified strategies, how E's inspiration $V^R - V^E$ to replace R is compared with the punishment in case the challenge fails. The condition $g(\beta, \gamma) > 0$ then suggests that the inspiration dominates the punishment. Lemma 5 then implies that we have the unsecured-R equilibrium.

Following the same argument as in Section 3.1.2, the unsecured-R equilibrium is empirically relevant and nontrivial. We thus now explore the conditions under which it always exists and is the unique equilibrium. The following result first shows that the secured-R equilibrium and the unsecured-R equilibrium cannot exist simultaneously:

Corollary 4. *Given $r \leq \pi - 2a$, if $g(\beta, \gamma) > 0$, then $h(\beta, \gamma) > 0$, i.e., if the unsecured-R equilibrium exists, then the secured-R equilibrium does not exist.*

Proof. Observe that, by $r \leq \pi - 2a$, for any $S \in [p, 1]$, $g(\beta, \gamma) \leq g(\beta, \gamma)\big|_{S=1} = h(\beta, \gamma)$. Therefore, if $g(\beta, \gamma) > 0$, then $h(\beta, \gamma) > 0$. □

The intuition of Corollary 4 is as follows. Since R is safer in the secured-R equilibrium than in the unsecured-R equilibrium, E's inspiration to replace R is stronger, too. Therefore, if E's inspiration is already so strong that the unsecured-R equilibrium is supported ($g(\beta, \gamma) > 0$), then given the strategies specified in the secured-R equilibrium, E's inspiration must be too strong to support the secured-R equilibrium ($h(\beta, \gamma) > 0$).

This corollary helps derive a set of conditions under which the unsecured-R equilibrium will generally exist and be the unique equilibrium, parallel to Proposition 1:

Proposition 10 (Focus on unsecured-R equilibrium in the Markov game)**.** *If* $\big((1-\delta p)/(1-\delta)(1-p)\delta\big)\cdot a \leq r \leq \pi - 2a$*, then given any* $\beta \in [0,1]$ *and* $\gamma \in [0,1]$*, the unsecured-R equilibrium exists and is the unique Markov perfect equilibrium.*

Proof. For any $\beta \in [0,1]$ and $\gamma \in [0,1]$, by $0 < \Big((1-\delta p)/(1-\delta)(1-p)\delta\Big)\cdot a \leq r \leq \pi - 2a$ and $S \in [p,1]$, we have

$$\begin{aligned} g(\beta,\gamma) &\geq \frac{(\pi-2a)\cdot S + r\cdot(1-S)}{1-\delta S} - \frac{a}{1-\delta} - \frac{p}{(1-p)\delta}\cdot a \\ &\geq \frac{r}{1-\delta S} - \frac{(1-p)\delta + p(1-\delta)}{(1-\delta)(1-p)\delta}\cdot a > \frac{r}{1-\delta p} - \frac{1-p+p}{(1-\delta)(1-p)\delta}\cdot a \\ &\geq \frac{r}{1-\delta p} - \frac{1}{(1-\delta)(1-p)\delta}\cdot a \geq 0. \end{aligned} \tag{76}$$

Therefore, $g(\beta,\gamma) > 0$, i.e., the unsecured-R equilibrium exists, and by Corollary 4, the secured-R equilibrium does not exist. Therefore, the unsecured-R equilibrium is the unique equilibrium. □

In this result, $\Big((1-\delta p)/(1-\delta)(1-p)\delta\Big)\cdot a \leq r$ is parallel to $w > ap/(1-p)$ and $z > yp/(1-p)$ in Proposition 1, guaranteeing that E's aspiration to replace R is sufficiently strong so that E will challenge if P will not side with R.

D.2 Analysis of the Unsecured-R Equilibrium

To focus on the empirically relevant, nontrivial unsecured-R equilibrium in our analysis, from now on we assume that the condition in Proposition 10 holds, i.e., $\big((1-\delta p)/(1-\delta)(1-p)\delta\big)\cdot a \leq r \leq \pi - 2a$, so that the unsecured-R equilibrium exists and is the unique Markov perfect equilibrium. Without losing generality, as in Section 3.2, we also assume that the state of the world x's probability density function satisfies $f(x) \in [\underline{f}, \bar{f}] \subset (0,\infty)$ over $x \in [0, pa]$.

Now we can derive parallel results to Sections 3.1.3 and 3.2. First note that as in Section 3.1.3, the probability of challenge is still $1 - F(\hat{x})$ and the survival probability of the status quo is still

$$S = 1 - \big(1 - F(\hat{x})\big)\cdot(1-p), \tag{77}$$

where $\hat{x} \equiv (1-\gamma)\beta p \cdot a$, so Proposition 2 still holds in this Markov game.

Now examine R's preference over γ and β. The net present value of R's payoffs in equilibrium is

$$V^R = \frac{\big(\pi - (1+\beta)a\big)\cdot S + r\cdot(1-S)}{1-\delta S} = \frac{\big(\pi - (1+\beta)a - r\big)\cdot S + r}{1-\delta S}, \tag{78}$$

which differs from Equation (10) only at that it includes the future payoffs. Therefore, R will still prefer γ to be as low as possible.

On R's preference over β, first, since Proposition 2 still holds in this Markov game, the political–economic trade-off still appears and Lemma 1 still holds. We can then derive the following result parallel to Proposition 3:

Proposition 11 (Institutional compatibility in the Markov game)**.** *If* $\gamma < \underline{\gamma} \equiv 1 - (1-\delta)\big/ \big((1-\delta(1-p))(\pi - 2a - r) + \delta r\big)\,\underline{c}$*, then R will prefer* β *to be as high as possible; if* $\gamma > \bar{\gamma} \equiv 1 - (1-\delta)p\big/ \big(\pi - a - r(1-\delta)\big)\,\bar{c}$*, then R will prefer* β *to be as low as possible, where* $\underline{\gamma} < \bar{\gamma} < 1$ *and if* $\pi > 2a + \left(\frac{1-\delta}{\underline{c}} + (1-\delta(2-p))r\right) \big/ \big(1-\delta(1-p)\big)$*, then* $\underline{\gamma} > 0$.

Proof. The marginal impact of β on R's net present value in equilibrium is

$$\frac{dV^R}{d\beta} = \frac{\left(\pi - (1+\beta)a - r + \frac{\delta\left(\left(\pi-(1+\beta)a-r\right)S+r\right)}{1-\delta S}\right) \cdot \frac{dS}{d\beta} - aS}{1-\delta S}. \tag{79}$$

By Lemma 1, $\beta \in [0,1]$, $S \in [p,1]$, and $0 < \Big((1-\delta p)/(1-\delta)(1-p)\delta\Big) \cdot a \le r \le \pi - 2a$, we have

$$\begin{aligned}\frac{dV^R}{d\beta} &\ge \frac{\left(\frac{(1-\delta(S-p))(\pi-2a-r)+\delta r}{1-\delta S}\right) \cdot \underline{c}a \cdot (1-\gamma) - a}{1-\delta S} \\ &\ge \frac{a}{1-\delta S} \cdot \left(\frac{(1-\delta(1-p))\,(\pi-2a-r)+\delta r}{1-\delta} \cdot \underline{c} \cdot (1-\gamma) - 1\right),\end{aligned} \tag{80}$$

so, if

$$\frac{(1-\delta(1-p))\,(\pi-2a-r)+\delta r}{1-\delta} \cdot \underline{c} \cdot (1-\gamma) - 1 > 0, \tag{81}$$

i.e.,

$$\gamma < 1 - \frac{1-\delta}{\big((1-\delta(1-p))\,(\pi-2a-r)+\delta r\big) \cdot \underline{c}} \equiv \underline{\gamma}, \tag{82}$$

then $dV^R/d\beta > 0$. At the same time, we have

$$\begin{aligned}\frac{dV^R}{d\beta} &\le \frac{\left(\pi - a - r + \frac{\delta(\pi-a)}{1-\delta}\right) \cdot \bar{c}a \cdot (1-\gamma) - ap}{1-\delta S} \\ &= \frac{a}{1-\delta S} \cdot \left(\left(\frac{\pi-a}{1-\delta} - r\right) \cdot \bar{c} \cdot (1-\gamma) - p\right),\end{aligned} \tag{83}$$

so, if

$$\left(\frac{\pi - a}{1-\delta} - r\right) \cdot \bar{c} \cdot (1-\gamma) - p < 0, \tag{84}$$

i.e.,

$$\gamma > 1 - \frac{(1-\delta)p}{\big(\pi - a - r(1-\delta)\big) \cdot \bar{c}} \equiv \bar{\gamma}, \tag{85}$$

then $dV^R/d\beta < 0$. Finally, note $\underline{\gamma} < \bar{\gamma} < 1$, and $\underline{\gamma} > 0$ is equivalent to $\pi > 2a + \left(\frac{1-\delta}{\underline{c}} + (1-\delta(2-p))r\right) / \big(1-\delta(1-p)\big)$. The proposition is then proven. □

Proposition 11 differs from Proposition 3 only at that $\underline{\gamma}$ and $\bar{\gamma}$ are differently defined, respectively, due to the change in the expression of V^R. This is then followed by parallel results to Section 3.3. We have then shown that we can derive all the parallel results to the main text from the Markov game.

D.3 Allowing for Mixed Strategies

Here we allow for mixed strategies by dropping the earlier assumption that E will not challenge and P will side with R if they are indifferent between their options. We then re-characterize all the Markov perfect equilibria of the game at Stage 2 and examine whether the main insights would remain. As in Appendix A, we assume $\gamma < 1$; we also assume that x is a continuous random variable so that its distribution does not have any mass point, and that $F(ap) < 1$ so that $1 - F(\hat{x}) > 0$ always holds.

In any Markov perfect equilibrium, P's strategy is then to not to side with R when $x > \hat{x}$ and to side with R when $x < \hat{x}$. As x is a continuous random variable, we can leave P's strategy when $x = \hat{x}$ unspecified without much real consequence.

By $\gamma < 1$, given P's strategy and E's continuation strategy in the equilibrium, E's strategy is then not to challenge when $x < \hat{x}$; when $x > \hat{x}$, E will challenge with a given probability $q_E(x) \in [0,1]$, which is a function of $x > \hat{x}$, and we denote

$$\bar{q}_E \equiv \frac{\int_{\hat{x}}^{\infty} q_E(x) dF(x)}{1 - F(\hat{x})} \in [0,1]. \tag{86}$$

In particular, if in equilibrium

$$V^R - V^E > \frac{p}{(1-p)\delta} \cdot (1-\gamma)a, \tag{87}$$

then $q_E(x) = 1$ for any $x \geq \hat{x}$, with $\bar{q}_E = 1$; if in equilibrium

$$V^R - V^E < \frac{p}{(1-p)\delta} \cdot (1-\gamma)a, \tag{88}$$

then $q_E(x) = 0$ for any $x \geq \hat{x}$, with $\bar{q}_E = 0$; if in equilibrium

$$V^R - V^E = \frac{p}{(1-p)\delta} \cdot (1-\gamma)a, \tag{89}$$

then $q_E(x)$ should make this condition hold. Again, as x is a continuous random variable, we can leave E's strategy when $x = \hat{x}$ unspecified.

In the equilibrium with such strategies, we must have

$$V^R = \frac{\big(\pi - (1+\beta)a\big) \cdot S + r \cdot (1-S)}{1 - \delta S}, \tag{90}$$

$$\begin{aligned} V^E &= a \cdot \Big(1 - \big(1 - F(\hat{x})\big) \cdot \bar{q}_E \cdot p\Big) + \gamma a \cdot \big(1 - F(\hat{x})\big) \cdot \bar{q}_E \cdot p + \delta V^E \cdot S + \delta V^R \cdot (1-S) \\ &= \frac{a \cdot \Big(1 - (1-\gamma) \cdot \big(1 - F(\hat{x})\big) \cdot \bar{q}_E \cdot p\Big) + \delta V^R \cdot (1-S)}{1 - \delta S}, \end{aligned} \tag{91}$$

and

$$S = 1 - \big(1 - F(\hat{x})\big) \cdot \bar{q}_E \cdot (1-p). \tag{92}$$

By some algebra, the function that governs the existence of the equilibrium turns out to be

$$\begin{aligned} &V^R - V^E - \frac{p}{(1-p)\delta} \cdot (1-\gamma)a \\ &= \frac{1-\delta}{1-\delta S} \cdot \left(\frac{\big(\pi - (1+\beta)a\big) \cdot S + r \cdot (1-S)}{1-\delta S} - \frac{a}{1-\delta} - \frac{p}{(1-p)\delta} \cdot (1-\gamma)a \right). \end{aligned} \tag{93}$$

Now define

$$k(\beta, \gamma, \bar{q}_E) \equiv \frac{\big(\pi - (1+\beta)a\big) \cdot S + r \cdot (1-S)}{1-\delta S} - \frac{a}{1-\delta} - \frac{p}{(1-p)\delta} \cdot (1-\gamma)a, \tag{94}$$

where

$$S = 1 - \big(1 - F(\hat{x})\big) \cdot \bar{q}_E \cdot (1-p) \quad \text{and} \quad \hat{x} = (1-\gamma)\beta p a. \tag{95}$$

Note that by $F(pa) < 1$ and $\pi - 2a > r$, $k(\beta, \gamma, \bar{q}_E)$ is strictly decreasing over $\bar{q}_E \in [0, 1]$. We can then characterize the Markov perfect equilibria in three scenarios, except for E and P's strategies when $x = \hat{x}$:

1. When $k(\beta, \gamma, 0) < 0$, the unique family of Markov perfect equilibria that can exist must satisfy:

   - P will side with R when $x < \hat{x}$ and will not side with R when $x > \hat{x}$;
   - E will never challenge when $x \neq \hat{x}$.

2. When $k(\beta, \gamma, 1) > 0$, the unique family of Markov perfect equilibria that can exist must satisfy:

   - P will side with R when $x < \hat{x}$ and will not side with R when $x > \hat{x}$;
   - E will not challenge when $x < \hat{x}$ and will challenge when $x > \hat{x}$.

3. When $k(\beta, \gamma, 0) \geq 0$ and $k(\beta, \gamma, 1) \leq 0$, there exists a unique $\bar{q}_E \in [0, 1]$ such that

$$k(\beta, \gamma, \bar{q}_E) = 0, \tag{96}$$

   and the unique family of Markov perfect equilibria that can exist must satisfy:

   - P will side with R when $x < \hat{x}$ and will not side with R when $x > \hat{x}$;
   - E will challenge with a given probability $q_E(x) \in [0, 1]$, where the function $q_E(x)$ satisfies

$$\frac{\int_{\hat{x}}^{\infty} q_E(x) dF(x)}{1 - F(\hat{x})} = \bar{q}_E, \tag{97}$$

     when $x > \hat{x}$ and will not challenge when $x < \hat{x}$.

Note that Scenario 1 corresponds to Proposition 8, where $h(\beta, \gamma) \equiv k(\beta, \gamma, 0)$, and Scenario 2 corresponds to Proposition 9, where $g(\beta, \gamma) \equiv k(\beta, \gamma, 1)$. Now examine whether our main messages remain in Scenario 3.

In Scenario 3, in equilibrium, we always have

$$k(\beta, \gamma, \bar{q}_E) \equiv \frac{\big(\pi - (1 + \beta)a\big) \cdot S + r \cdot (1 - S)}{1 - \delta S} - \frac{a}{1 - \delta} - \frac{p}{(1 - p)\delta} \cdot (1 - \gamma)a = 0, \tag{98}$$

i.e.,

$$\big(\pi - (1 + \beta)a - r\big) \cdot S + r = \left(\frac{1}{1 - \delta} + \frac{p \cdot (1 - \gamma)}{(1 - p)\delta}\right) \cdot a \cdot (1 - \delta S). \tag{99}$$

This implies

$$dS = \frac{\frac{pa(1-\delta S)}{(1-p)\delta} \cdot d(1 - \gamma) + aS \cdot d\beta}{\pi - (1 + \beta)a - r + \left(\frac{1}{1-\delta} + \frac{p \cdot (1-\gamma)}{(1-p)\delta}\right) \delta a}. \tag{100}$$

By $\pi - 2a > r$, we see that a higher β and a lower γ will increase in equilibrium the survival probability of the status quo S, corresponding to Proposition 2, which is for Scenario 2.

This result also suggests that in equilibrium

$$\frac{dS}{d\beta} = \frac{aS}{\pi - (1+\beta)a - r + \left(\frac{1}{1-\delta} + \frac{p\cdot(1-\gamma)}{(1-p)\delta}\right)\delta a}$$
$$= \frac{a \cdot \left(\left(\frac{1}{1-\delta} + \frac{p\cdot(1-\gamma)}{(1-p)\delta}\right)\cdot a - r\right)}{\left(\pi - (1+\beta)a - r + \left(\frac{1}{1-\delta} + \frac{p\cdot(1-\gamma)}{(1-p)\delta}\right)\delta a\right)^2}. \tag{101}$$

This implies

$$\frac{dS}{d\beta} \leq \frac{a \cdot \left(\left(\frac{1}{1-\delta} + \frac{p\cdot(1-\gamma)}{(1-p)\delta}\right)\cdot a - r\right)}{\left(\pi - 2a - r + \frac{1}{1-\delta}\cdot \delta a\right)^2} \equiv \bar{b}(\gamma) \tag{102}$$

and

$$\frac{dS}{d\beta} \geq \frac{a \cdot \left(\left(\frac{1}{1-\delta} + \frac{p\cdot(1-\gamma)}{(1-p)\delta}\right)\cdot a - r\right)}{\left(\pi - a - r + \left(\frac{1}{1-\delta} + \frac{p}{(1-p)\delta}\right)\delta a\right)^2} \equiv \underline{b}(\gamma), \tag{103}$$

where both $\bar{b}(\gamma)$ and $\underline{b}(\gamma)$ are decreasing in γ. The insight in Lemma 1 then maintains. A result similar to Proposition 11 would then follow.

To summarize, allowing for mixed strategies would allow the mixed-strategy, Scenario-3 equilibria, in which the main insights from Scenario 2 would maintain, but with more technical complexity. In light of this, we can rule out mixed strategies from the Markov game, gaining in simplicity without losing much intuition.

E Relevance of Elites and People in Conflicts

There existed a wide range of conflicts in both Chinese and European histories. Having carefully examined significant examples, we argue that the positions taken by the Elites and the People were critical in determining the outcome of the conflict. Below we discuss some examples.[26]

[26]An incomplete list of the examples we examine include, for China, the Qin–Han turnover, Rebellion of the Seven Prince States, Western Han–Xin turnover, Xin–Eastern Han turnover, Eastern Han–Three

History has shown that given the Elites' political, economic, and military resources, whether they sided with the Ruler when the Ruler was challenged was critical to the outcome of the challenge. For example, the fate of the French throne during the Hundred Years' War closely followed whether the Duke of Burgundy, first John the Fearless and later his son Philip the Good, allied with the English or veered back to the French ruler (Seward, 1978). During the Wars of the Roses (1455–1485), "crucially, Thomas, Lord Stanley, refused to answer Richard [III of England]'s summons" in the battle of Bosworth (1485), and his brother "Sir William Stanley committed his men, tipping the battle decisively in Henry [Tudor, later Henry VII of England]'s favour," delivering the demise of Richard III and the coronation of Henry VII (Grummitt, 2014, p. 123). In China, during the civil war at the end of the Sui dynasty (611–618), Emperor Yang was killed in a coup by Yuwen Huaji, the commander of the royal guard and the son of Duke Yuwen Shu; during the late Tang dynasty, after Qiu Fu, Wang Xianzhi, and Huang Chao led peasants to revolt all over the country (859–884), it was the regional governors, such as Wang Chongrong and Li Keyong, who fought hard to recover Chang'an, defeated the uprisings, and restored the throne of Tang.

The People's position was more than often crucial, too, as we can see in the history of not only China but also Europe. In Chinese history, in the final years of the Qin, Xin, Sui, Tang, Yuan, and Ming dynasties, following the initial rebellion within the country or invasion from the outside, peasants revolted and contributed to the end of these dynasties. In Europe, for example, Morton (1938, p. 46, 63) commented on English history: "the king was able to make use of the peasantry in a crisis when his position was threatened by a baronial rising," and "even the strongest combination of barons had failed to defeat the crown when, as in 1095 [Robert de Mowbray's rebellion] and in 1106 [the challenge of Duke Robert Curthose of Normandy over the throne of Henry I], it had the support of other classes and sections of the population."[27] In the Hundred Years' War, the turning point toward the eventual French triumph was the rise of Joan of Arc, as she inspired the common people of France to join the war.[28] In England, shortly before and during the Wars of the Roses,

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Kingdoms turnover, Western–Eastern Jin turnover, Eastern Jin–Southern Dynasties turnover, Sui–Tang turnover, Tang–Zhou turnover, An Lushan Rebellion, Huang Chao Rebellion and Tang–Five Dynasties and Ten Kingdoms turnover, Northern–Southern Song turnover, Yuan–Ming turnover, Ming–Qing turnover, and Revolt of the Three Feudatories; for Europe, the Rebellion of Robert de Mowbray, Henry I's invasion of Normandy, 1215 Magna Carta, Second Barons' War, Hundred Years' War, Jacquerie, Wat Tyler's Rebellion, Richard II–Henry IV of England turnover, Jack Cade's Rebellion, Wars of the Roses, German Peasants' War, Dutch Revolt, and Thirty Years' War. Some examples include more than one entries of examination. These cover 15 and 14 entries for China and Europe, respectively, and 29 in total.

[27] Finer (1997b, p. 901) also observes that the English fyrd "was retained, and even called out by the Norman kings against their rebellious Norman barons."

[28] For more details on the French throne's lack of popular support before Joan of Arc, the change after that, and the implications of the change on the development of the war, see Morton (1938) and Seward (1978).

popular support was generally important in determining the fates of Richard II, Henry IV, Edward IV, and Richard III (Grummitt, 2014). In the German Peasants' War, as the status quo was challenged by peasants across southwestern Germany, the uprisings were eventually defeated by the Swabian League, given that the support from the common people in cities were inconsistent.

These examples show that both the Elites and the People are highly relevant in conflicts. This gives us confidence to link the power structure among the Ruler and both the Elites and the People to the stability of autocratic rule.