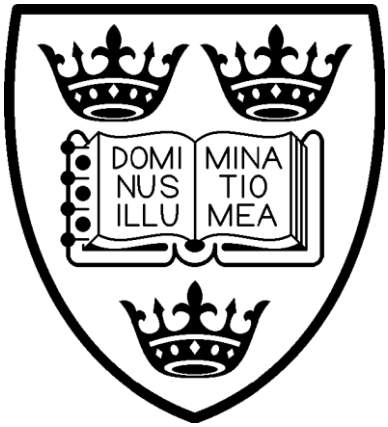

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States and Wars: China's Long March towards Unity and its Consequences, 221 BC – 1911 AD

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Abstract: We examine the long-term pattern of state formation and the mythical historical Chinese unity under one single political regime based on the compilation of a large geocoded annual data series of political regimes and incidences of warfare between 221 BC and 1911 AD. By classifying our data sets into two types of regimes - agrarian and nomadic – and three types of warfare– agrarian/nomadic, agrarian/agrarian and internal rebellions – and applying an Autoregressive Distributed Lag (ARDL) model, we find that nomadic-agrarian warfare and internal rebellion strengthens unification but agrarian/agrarian warfare entrenches fragmentation. We complement our econometrics exercise with an in-depth historical narrative by demonstrating that while warfare is a proximate cause for Chinese state formation and unity, the ultimate cause lies in a tripartite synthesis of Chinese ideology, institution and environment. We further discuss the long-run implications of Chinese unity on economic performance in a global context.

Keywords: Agrarian-nomadic warfare, China, country size, state formation, warfare

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「天下大勢，分久必合，合久必分」

Those long divided shall be united;

those long united shall be divided:

such is the way of the world under the heaven.

The Romance of Three Kingdoms 三国演义by Guanzhong Luo (14th century)

1. Introduction

The line above that opens the *Romance of the Three Kingdoms* – one of China's most famous historical novels written in the 14th century – encapsulates China's deeply embedded belief in the historical inevitability of cycles of imperial fragmentation and unification. The novel itself – part history and part fiction – narrates the legendary rise and fall of three independent kingdoms in China's Northern, Central and Southwestern regions during 169-280 AD. The three kingdom era came into being after the fall of the Han dynasty, an empire that matched the scale of contemporaneous Roman empire in Europe. Ironically, during the 14th century when the novel was published, political fragmentation as in the Three Kingdom era had long been a nostalgic – albeit romantic - memory. China by then had come under the firm grip of a single unified ruler while fragmentation became deeply entrenched in Europe since the fall of the Roman Empire.

The unparalleled Chinese unity remained an enduring riddle in world history, possibly the mega-puzzle behind all others in Chinese history ranging from the Needham puzzle – why industrialization did not take off in China's glorious Song era (AD 960-1279) – to the Great

Divergence debate – why China fell behind Western Europe in early modern or modern era.[1] The consequence of Chinese unity – its pros and cons as compared with the European pattern fragmentation – has often been alleged to have accounted for the contrast between European growth and Chinese stagnation in political cultural, intellectual, military and technological development and ultimately economic outcome (Baechler 1975; Diamond 1997, p. 414, Hoffman 2015; Mokyr 2016). A more recent literature more specifically extended this contrast to account for differential patterns of public finance, legal system, financial market and private property rights.[2]

Our paper represents one of the series of new scholarly attempts to explain the cause – rather than the consequence – of Chinese unity. Distinguished from previous studies, the central thesis of our paper locates the mythical unity of Chinese empire in a tripartite synthesis of geography (or environment), ideology and institutions with their effects forged through two millennia of sustained warfare - in particular the agrarian-nomadic conflict - along either side of the Great Wall.[3] More importantly, we argue that both ideology and institutions persisted beyond those geographic factors even after they became less relevant.

For our thesis, we start with China's geographic location as a case of a closed space – or what some called "social cage or environmental circumscription" - bounded by Himalaya on the

[1] See Brandt et al. (2014). For an insightful Chinese language discussion on both the causes and phenomenon of Chinese unity, see Jin and Liu (2011).

[2] See Ma (2012); Ma and Rubin (2019) on the impact on Chinese public finance. On the other hand, see Rosenthal and Wong (2011) for the benefits of unification in China and Epstein (2000) for the cost of political fragmentation in Europe. Also see Alesina and Spolaore (2003, 2005) on the economic costs and benefits of the size of states.

[3] For the importance of geography and warfare, see two recent outstanding studies by Ko et al. 2018 and Fernández-Villaverde et al in progress. There has also been a long-standing literature that highlights the importance of wars and national defenses as critical factors for state formation often focused on the European experience with recent empirical works expanded to Asia and Africa. See Tilly 1985,1990; Turchin et al. 2006; Besley and Persson 2008; Turchin 2009; Turchin et al. 2013; Gupta et al. 2016; Dincecco and Wang 2018; Dincecco et al. 2019, Hoffman 2015.

West and Pacific on the East. [4] This background of circumscribed geography along the East-West axis – the issue of China's open Northern and Southern frontiers will be discussed later - may have spawned China's precocious ideology of a single unified ruler (大一统) for all under the heaven (天下一家) – the second part of our tripartite explanation. The most concrete expression of Chinese geographic circumscription is in the legendary Chinese idea of Nine States (九州) as all under the Heaven (天下).[5] Warfare and conquest to achieve unity within this legendary space and beyond led to massive resource mobilization that propelled the rise of Chinese institution characterized by absolutist rule, political centralization, direct administrative rule (郡县制) and the world's first impersonal bureaucratic institution on a nationwide scale. This political regime was founded on an agrarian production system based on *de-facto* private property rights in land and small-holding peasantry.

But this agrarian based political system had to confront the vast Northern steppes frontier broadly north of the current Great Wall, a man-made infrastructure broadly demarcating the vast ecological differences between China's agrarian and nomadic regions. Nomadic economies were shaped by very different political institutions and social structures, heavily dependent on the grazing of vast herds of animals but vulnerable to unfavorable continental climatic conditions with relatively little rainfall. The steppes environment in the nomadic or semi-nomadic areas led to the rise of tribal-based, loosely structured and mobile societies with unstable property rights, low capital accumulation and population density. The agrarian-based Chinese empire eventually attained unity first by sealing off the Northern frontier with the Great Wall, then – when that wall was repeatedly breached - through an Agrarian-Nomadic synthesis where nomadic rulers conquered the agrarian China but perpetuated or strengthened the agrarian based system of absolutism based on centralization, bureaucracy and social control. For nearly two millennia, this agrarian-nomadic synthesis had not faced

[4] See Mayshar et al (2017) and Allen (1997) on the importance of closed geographic space or the absence of the exit option as the critical element for the rise of coercive and centralized bureaucracy in ancient Egypt and Middle East.

[5] See Ge (2008, chapter 1). The word "Great Unity" (大一统) can be traced to *Gongyangzhuan* (公羊传) a work existed in the Spring-Autumn period. For an extensive and insightful treatment on the rise of this ideology of a singular ruler, see Yuri Pines (2012) especially chapter 1.

any major challenge from China's southern coastal until the onset of Western imperialism in the mid-19th century.

We build our qualitative (historical and narrative) analysis on the interactive role of geography and ideology (and institution) through a quantitative study on the impact of the incidences of warfare on state formation. We look at the entire two millennia across phases of fragmentation and unification with changing number and size of states over time. We compile a large geocoded annual data series of political regimes and warfare between 221 BC and 1911 AD from both primary and secondary sources. We classify our data sets into two types of regimes - agrarian and nomadic – and three types of warfare– agrarian/nomadic, agrarian/agrarian and internal rebellions – as fought between and within the two regimes. Applying an Autoregressive Distributed Lag (ARDL) model on our data sets, we find nomadic-agrarian warfare leads to a reduction in the number of agrarian regimes but an increase in their territorial size. We also adopt an IV approach to confirm the direction of causality between warfare and state formation. By splitting our samples and running separate regressions, we find that while agrarian nomadic warfare and internal rebellion enhance unification but civil war reinforce fragmentation in historical phases of fragmentation but not during unification.

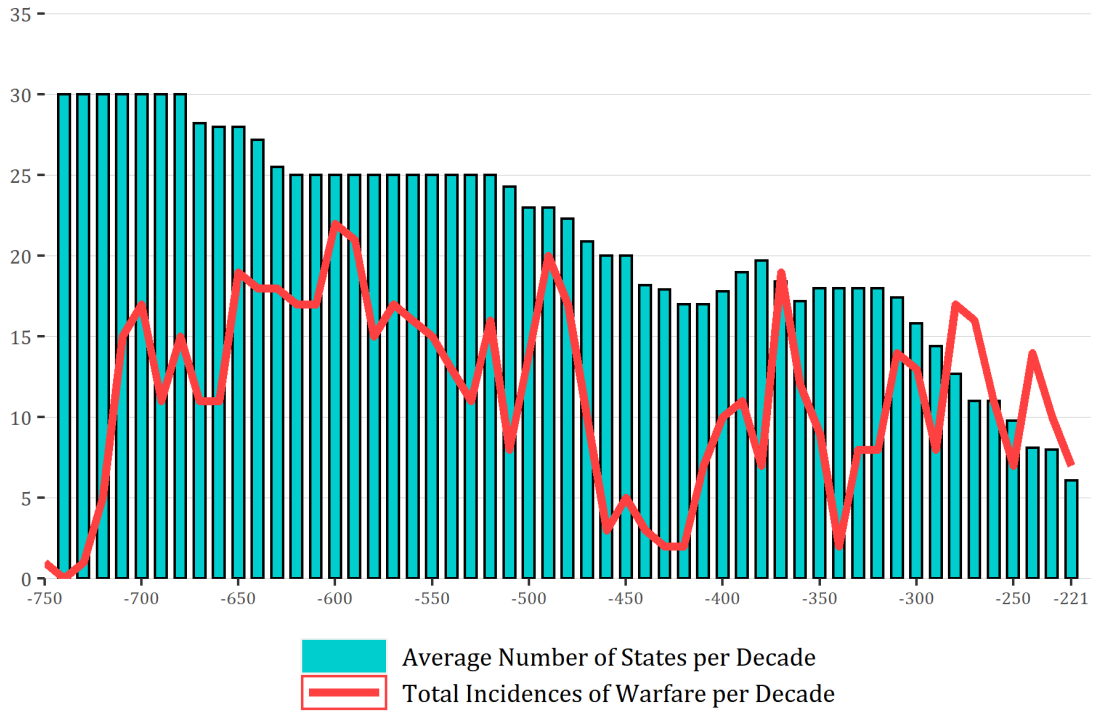
2. The Origin of an Ideology and Institution

China's so-called Spring-Autumn and Warring States era (770BC – 221BC) saw a total of thirty political regimes in that contentious five centuries (see Appendix Table 1 for the full list of Chinese dynasties). Indeed, in contrast to the recent prevailing view that Chinese geography favored political unity (Diamond 1997), John King Fairbank, writing in the 1980s, argued exactly the opposite: "Chinese geographic terrain nurtured particularism and fragmentation as seen in the rise of more than 100 separate states or even 30 some states in the Warring State period (Fairbank 1987, p.15)."[6] Figure 1 captures this by plotting the total

[6] As Fairbank (1987) pointed out that geographically China is far from unified: "Yellow River, being generally unnavigable, does not link Shensi and Shansi to the area. Peripheral areas like Yunnan and

incidences of warfare and the number of states during this Spring-Autumn and Warring-States era. The first of the five centuries began with a total of 30 states but eventually shrank as warfare persisted and intensified. However, as shown in figure 1, the collapse towards a single state under China's first emperor Qinshihuang秦始皇, the one feature most distinguished from the European experience, as we show later, would turn out to have fateful historical consequence.

Figure 1. States and Wars in 750 BC – 221 BC



China's Spring Autumn and Warring States era marked the beginning and organic growth of a set of Chinese ideology that was later to dominate Chinese ruling philosophy for the next two millennia. Two schools of thought, neither of which were oriented towards individuals or their rights, became the most prominent. Confucians emphasized certain virtues of a highly hierarchical and patriarchal society while Legalism promoted the state power at the expense

especially Sichuan and Shanxi have fertile cores ringed by mountains, ideal for independent bases. The Yangzi gorges limit the eastern access to Sichuan and the Yellow River Plain in North China from Beijing to the Huai River is no easier to traverse than North European plain from the Urals to Hamburg, see Fairbank (1987, p. 19). Indeed, recent more systematic cartographic works reveals that China was actually more mountainous than Europe, see Hoffman 2015, Fernández-Villaverde et al in progress.

of individuals.[7] In the end among the various schools that emerged in the Warring state period - or what Zhao Dinxin (2015) defined as the age of Total War - Legalism came to dominate practical politics. By advocating a form of military and administrative meritocracy governed by strict discipline of punishment and reward and through total political and social control, legalism served as the most potent instrument of rule propelling Qin's unification conquest of China in 221 BC under the ruthless Qinshihuang. The key winning strategies of the Warring State period included the replacement of local feudal control by direct administrative rule under the prefectural system (郡县制), the establishment of military-based meritocracy in place of hereditary nobility, the registration of agricultural land and households for direct taxation and military conscription and the promulgation of standardized legal codes under a system of collective punishment. The prefectural system had its origin in the military infantry developed for the state warfare and were based on the control and extraction of an agrarian based peasant household whose fixed location and land investment were much more susceptible to coercion and extraction.[8] In contrast, the rulers disparaged the highly mobile and elusive commercial capital and ranked merchants at the bottom of the social class. The Legalist teaching laid the very foundation for the rise of a Chinese absolutism (or something that comes closest to a form of pre-modern totalitarianism).[9] Similarly, as many argue, China's headlong plunge towards a single unitary state of Qin in 221 BC may have spelled the beginning of the end of Chinese intellectual and ideological diversity.

The Qin rule based on conquest and raw punishment became short-lived, collapsing in 15 years after the death of the first emperor. Subsequently, the second dynasty of Han that

[7] As expounded by Zhao (2015), all the major ancient Chinese philosophies based their reasoning on a strong sense of historical rationalism, which is to evaluate the effectiveness of an action through historical precedent and holistic/dialectic perspective, a contrast, for example to the Greek counterparts which tended to have an analytic and theoretical dimension (Zhao 2015, p.187).

[8] See Mayshar et al. (2020) for the importance of agricultural cultivation to the rise of bureaucracy and hierarchy.

[9] Chinese absolutism is more "absolute" than European versions who were often checked by religious actors, aristocrats and bourgeoisie. See Acemoglu and Robinson (2019), Ma 2012 and Zhao (2015, Chapter 7).

reunified China resurrected the once banished school of Confucius as the new ruling orthodox whose emphasis on social virtues, filial piety and social hierarchy softened the harshness of Legalism. This Confucius-Legalist synthesis created the ideological basis of a ruler-centered institution founded on monopoly of power under a single ruler governed directly by an administrative bureaucracy in an agrarian based economy. The growth of the prefectural system eventually created a class of bureaucrats and scholarly elites based on the selection from China's renowned nationwide Civil Service Examination system inculcated in the teaching of Confucius classics. This scholarly class, subservient to and dependent upon the regime, supplied the ruler with ideological and political legitimacy (Ma 2012; Zhao 2015).

Fairbank (1987) pointed out that it is highly significant that the Confucian classics adopted by Han rulers as the orthodox arose before China's unification of 221 BC. The disorder of the centuries before 221BC sanctioned the ideal of a unified order during the two millennia to follow (p.20). As mythical as it may be, the ideal of unity enshrined the aspiration for peace and order in an age of disorder. Hence, Fairbank concluded that China's ancient unity marked a triumph of human institutions over geography (p.16).

This Confucian-legalist synthesis supplied the rulers with both an instrument of coercion and an ideology of persuasion (Zhao 2015). More importantly, as argued cogently by Jin and Liu (2011, chapter 5), the durability of this ideology and institution held the secret code behind imperial China's mythical resilience that not only sustained unity but also resurrected it each time after its collapse or prolonged phases of fragmentation. In the end, warfare or fragmentation, rather than destroy the unification ideology actually reinforced it (Zhao 2015).

3. States

3.1 Defining and Quantifying States and Regimes

When quantifying the number of states throughout Chinese history, we first need to define a historical territory consistently through time. In our study, we use the territory size of Qing

in 1820 throughout, which was one of the largest territory the Chinese empire had ever achieved based on the atlas constructed by the landmark works of Tan (1996). It is important to emphasize that our choice to take this territory bears no direct reference to or implication for any claims of current and past Chinese national boundaries, or whether or not Qing China had exercised actual or nominal administrative control. It is rather to include the maximum number of relevant states contending for geo-political supremacy or survival in this China-dominated political order during the two millennia.

Given our interest, we classify the political regimes into two types – agrarian or nomadic – based on the geographic location of each regime's respective capital – whether situated south or norther of the Great Wall. The political and geographic significance of the Great Wall as the dividing line between the agrarian and nomadic states have been long-noted (see for example, Lattimore, chapter XIV). We believe the use of the location of the capital rather than ethnicity of rulers as a criterion is much more objective given that we are interested in the nature of the political rule whereas ethnicity is more fluid. In our database, a regime once classified as nomadic will be reclassified as agrarian after they migrated and re-established their capital to the South of the Great Wall simply because they were adopting ideology and institutions of the agrarian regimes. The most typical examples are Yuan (1271-1368) and Qing dynasty (1636-1912). Established by the Mongols, but Yuan's founding emperor, Kublai Khan moved her capital to Beijing in 1272 and began to take on agrarian institutions such as formalized bureaucracy and land-tax based fiscal system. Similarly, founded by Jurchen, a semi-nomadic tribe in Northern China, the Qing ruler moved her capital from Shenyang (in today's Northeastern province of China) outside the Great Wall to Beijing in 1644, began a systematic process of adopting Chinese ideology and institutions and incorporating Han Chinese into the formal bureaucratic system.

Figure 2 displays the locations of all the imperials capitals of the two regimes between 221 BC and 1911 AD. Figure 3 plots the entire series of number of nomadic and agrarian regimes from 221 BC to 1912 AD (the final year of China's last dynasty of Qing). Our database reveal

that more than ten nomadic tribes or nations established altogether thirty-three dynastic regimes while the mainly agrarian Chinese rulers established 76 different states throughout this period based on the criteria we set out.

Figure 2. Geographic Locations of Capitals of Nomadic and Agrarian Regimes

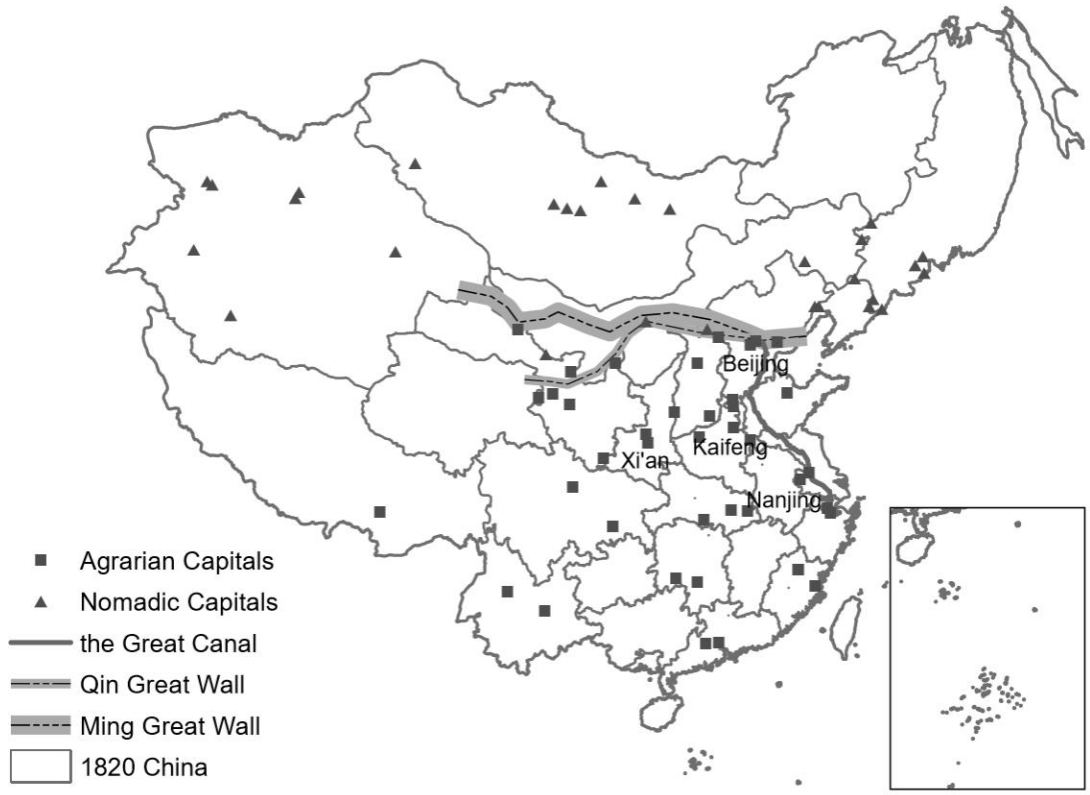
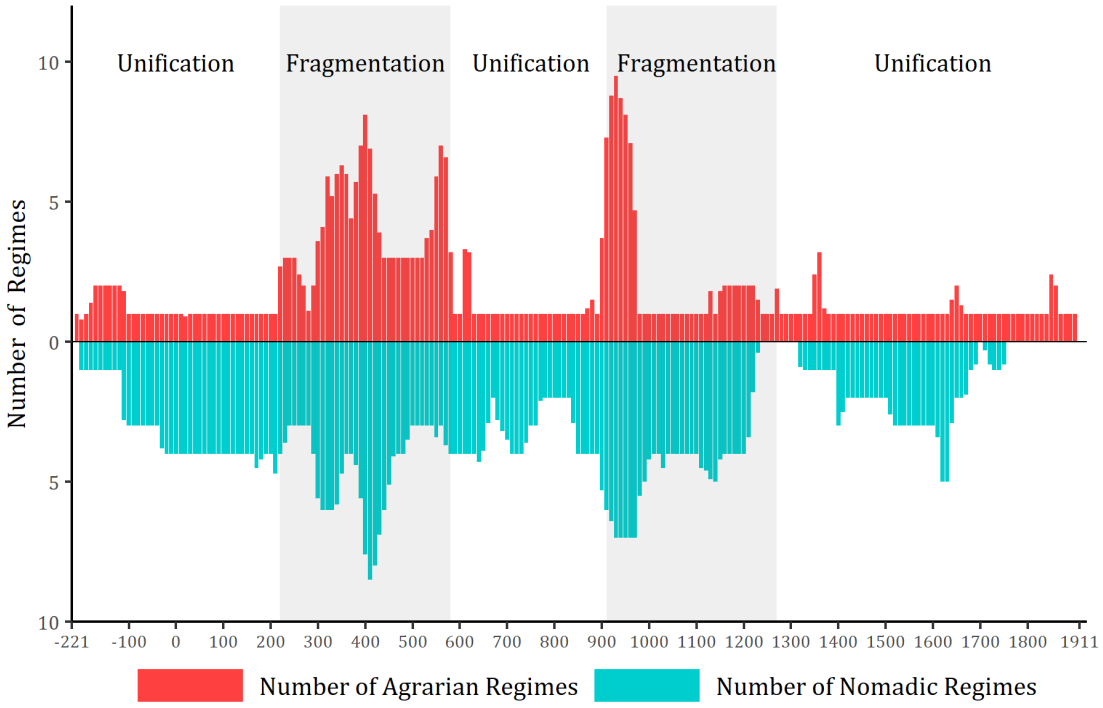


Figure **3** traces how this Chinese ideology of monopoly rule endured through the entire cycles of unification and fragmentation from 221 BC onward (see Appendix Table 1 for Chinese dynasties). It shows that China's first phase of unification began with the rise of the Qin and Han dynasties between 3rd BC and 3rd AD. On the heels of this unification came the second phase of fragmentation (220 AD – 581 AD) in China's so-called age of aristocracy that saw a total of ten nomadic regimes and thirty-five agrarian regimes along the north and south of China's Great Wall respectively. Among these agrarian regimes included the legendary Three Kingdoms of Wei, Shu and Wu. After more than two and half centuries of

Figure 3. Agrarian and Nomadic Regimes in China during 221 BC – 1911 AD



fragmentation, reunification ensued the founding of Sui and Tang dynasties between 6th and 8th century, which at one point achieved a territory of 5.5 million square kilometers. But collapse of the Tang in 907 AD saw the re-emergence of China's phase of fragmentation which lasted another 364 years. In the earlier phase of the so-called "Five Dynasties Ten Kingdoms" era (907-979), as many as seven nomadic and ten Han Chinese agrarian regimes co-existed.

However, after the founding of the Northern Song in 960 up until the Mongol conquest in 1280, political fragmentation in China took the form of sustained rivalry usually among the large political entities pitting Northern and Southern Song against the non-Han rulers of Liao, Jin, Qiang and later Mongol consecutively. Even this latter phase of fragmentation, a trend towards a single unitary rule began to strengthen from the tenth century (or Song) with periods of disintegration becoming shorter and the number of competing states smaller but their sizes larger. Chinese unification in the final and third phase became almost permanently entrenched following the founding of the Mongol dynasty in the 13th century. Fragmentation was by then more the subject of historical fiction such as the Ming era

Romance of the Three Kingdoms.[10]

3.2 The Agrarian-Nomadic Synthesis and China's March towards Unity

One important determinant to the contrasting institutional trajectories between the agrarian and nomadic regimes is the vastly different ecological and geographic conditions on either side of the Great Wall. Political rule on the agrarian side was firmly rooted in the establishment of a stable economic infrastructure and agrarian grain base marked by the construction of massive public works of water control, irrigation, dams and dikes – the foundation of what Wittfogel once termed as Oriental Despotism (Wittfogel 1957; Chi 1963).[11] As Chi's classic study reveals, the key to successful conquests and potential unification of China by any political regime hinges on its ability to secure and develop the agricultural base and transport links of a key economic area or areas as a reliable source of grain tribute (Chi 1963, p.5). Indeed, the control and development of the so-called fertile Guanzhong (关中) plain, centered around the imperial capital of what is today's Xi'an) was behind Qin and Han's first unification of China. Along with the expansion of warfare and empire, China's key economic areas shifted eastward and southward towards ever larger agrarian plains often through extensive construction of canal infrastructure and irrigation (Chi 1963). The most iconic is the construction of the Grand Canal from the 7th century that allowed China political regimes based in the North to reach the newly developed and highly productive economic zones of the Lower Yangzi delta (Chi 1963; Quan 1976).

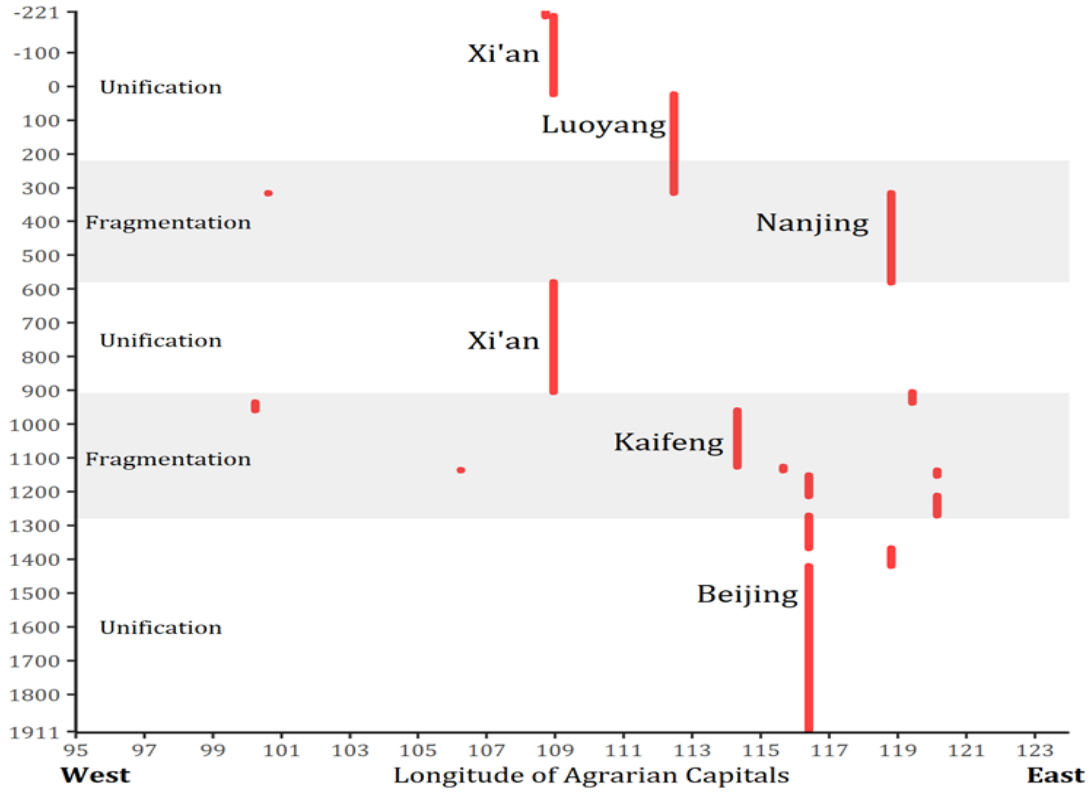
Military and administrative capacity developed in Northern China enabled Chinese conquest of China's south and southwest that had not seen comparable scale of state infrastructure. These conquests in turn reduced external threat to the agrarian empire at the same time

[10] Our quantitative data and narrative confirm much of the descriptive literature on dynastic cycles of unification and fragmentation. See Chi chapter 1, Barfield p.13, Lattimore, chapter XVII, Turchin et al. 2006.

[11] For an insightful critique on the Oriental Despotism thesis, see Zhao, p.204 who argued that it was bureaucratic-military state that led to the construction of infrastructure rather than the other way around. For the importance of cereal production and agricultural surplus in the rise bureaucracy on a global setting, see Mayshar et al. (2020).

allowed greater resource extractive capacity of the new regions.[12] Hence, despite the rising importance of Chinese territories south of the Yangzi river – most notably the Lower Yangzi, for example, which was to emerge as China's most prosperous economic regions in the second millennium - Northern China remained politically and militarily dominant. Peter Turchin noted that all but one of the fifteen unifications that occurred in Chinese history – with the exception of the establishment of the Ming c. 1368 – originated in the North.[13]

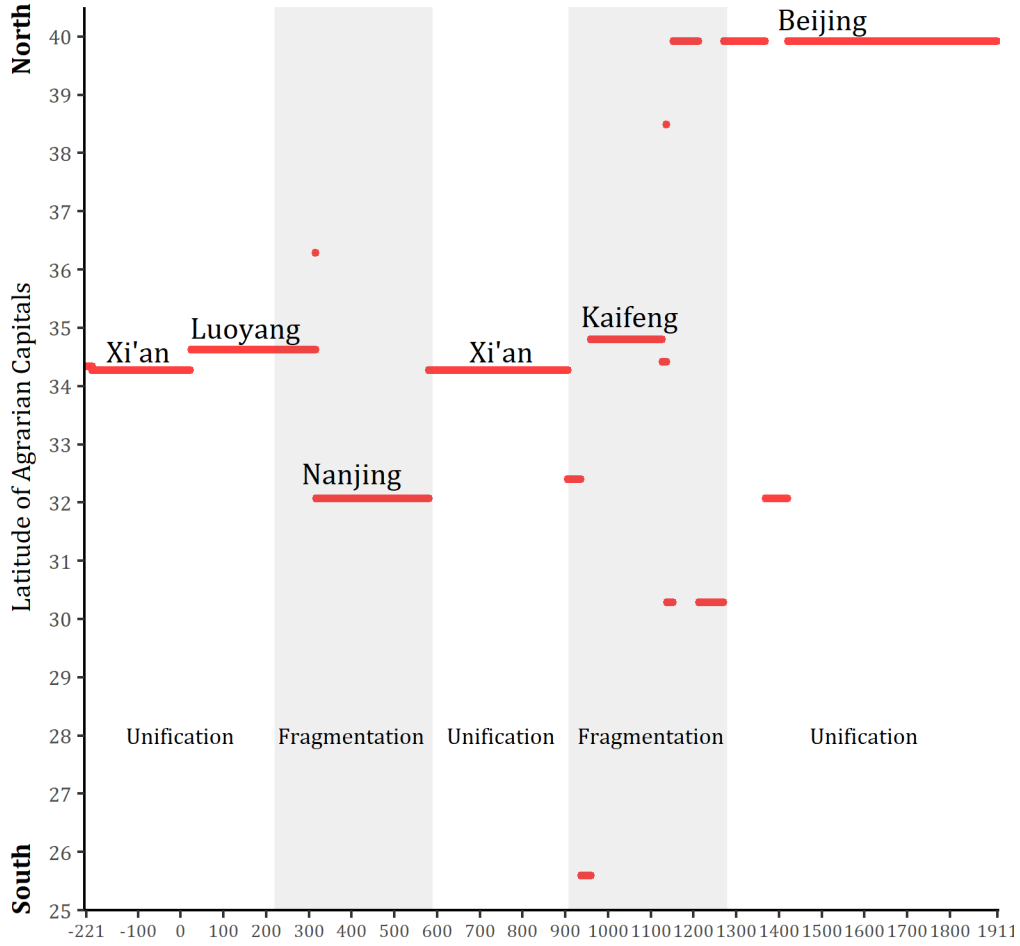
Figure 4. The Eastward drift of Agrarian Capitals



[12] As Ge (2008) pointed out that in order to attack the nomadic forces in Northern China, the aggressive Hanwu emperor conquered the local tribes of China's Southwest territory of Western Sichuan Plateau and Yun-Gui Highlands around 112 BC and then further annexed two tribes in Dian and Kunmin (in current Yunnan province) and established the administrative prefecture of Yizhou (益州郡) in 109 BC. Like many of the Chinese conquests, these annexations provided stability to the Chinese rulers stability and peace and generated potential new economic resources to focus on dealing with the Nomadic threats.

[13] Three began from the north-east (the Liao peninsula, Manchuria), three from the north central region (Yellow River), and eight from the north-west. See Turchin p. 192. Fernandez-Villaverde et al (in progress) develops theoretical models supported by mathematical simulations to demonstrate the critical importance of China's highly productive Northern Chinese plain as the core region.

Figure 5. The Northward Drift of Agrarian Capitals



Using our database, Figure 4 and Figure 5 provide a comprehensive validation of these observations on the duration and frequency of Chinese agrarian imperial capitals. Our database reveals the top three agrarian capitals with the longest duration are Beijing, Xi'an and Nanjing, the first of the three all in Northern China. But if we use the number of regimes that had chosen as capital, Nanjing came out on top, followed by Xi'an, Luoyang and Kaifeng all three of which had three regimes each. Nanjing which had been the capital of Wu in the Three-Kingdom era and briefly of the Ming dynasty (1368-1644), an explicitly Han Chinese dynasty that rebelled against and defeated the Mongol Yuan dynasty had been the only capital in the South. However, the Ming capital moved back to Beijing from 1421, the originally Yuan dynasty capital in order to shore up defence against the nomadic threats from outside the Great Wall. Indeed, except for this brief interlude, no other agrarian regime

had ever had a capital in the south of the Yangzi River across the phases of unification. Both figures 4 and 5 reveal clear eastward and northward drift of Chinese imperial capitals overtime reflecting precisely the geographic extension of Chinese political center following the development of agricultural base and transport links to counter the rising scale of nomadic-agrarian conflict.

China's steppes territory outside the Great Wall is a vastly different geographic environment inhospitable to agrarian based absolutist institutions founded on the ideology of Confucius-legalist synthesis. Nomadic and semi-nomadic societies on the steppes frontier are highly mobile and tribal with relatively little infrastructure or fixed investment. As Turchin pointed out, the political organization of pastoral nomads on a large scale requires a nearby settled society, because the nomadic society does not produce surplus in a form useable or taxable to support the state as their chief product – livestock – cannot be stored easily, unlike the grain produced by agrarian economies. Despite being fewer in number, the nomadic population derived a comparative advantage in violence from their mobility and the availability of horses. In particular, mounted archery on horses with stirrups invented and practiced from the beginning of the first millennium BCE turned them into formidable opponent to sedentary agriculture society south of the Wall (Li 2018). Often, nomadic empires rise and fall as a matter of response to warfare with the agrarian Chinese empire. But when the empire collapses, the nomadic frontier could quickly revert to anarchy ruled by autonomous tribal organization (Barfield, p. 8).

Our database on the geographic location of nomadic imperial capitals confirm far less stability in both their duration and frequency than those of the agrarian imperial capitals. The total of 41 agrarian regime capitals has an average duration of about 136 years with a standard deviation 175 years while the total of 27 nomadic capitals has an average duration of about 99 years with a standard deviation 66 years.

Scholars have long noted the importance of agrarian-nomadic conflict as both a critical

threat and impetus to Chinese unification as witnessed by a progressive escalation in the scale of warfare and the size of political units mobilized for warfare between the two types of regimes on two sides of the Great Wall. (Lattimore 1988; Barfield 1989; Turchin 2009; Bai and Kung 2011). For example, the rising scale of military build-up in agrarian China made by the construction of Grand Canal, were only matched by the scaling-up of imperial confederations of nomadic and semi-nomadic tribes. Indeed, Turchin (2009) noted a striking degree of synchrony and feedback loop between the rise of the steppe imperial confederations and Chinese empires – Xiongnu and Qin/Han, Turks and Sui/Tang, Mongols and Song (p.194). Indeed, it is important to note that the history of agrarian-nomadic confrontation is not just unidirectional nomadic conquest. Agrarian rulers also aggressively moved beyond the Great Wall for conquest as well as forcibly resettling nomadic tribes within the territories south of the Great Wall for ethnic assimilation and political stability (Latimore, p. 275-8). As pointed out by Latimore and others, the so-called "barbarians" (non-Han Chinese) tribes may well be the descendants of those pushed out from the northern or northwestern parts of China by the expansion of a unitary agrarian Chinese empire. Steppes or Inner Asian frontier offered a refuge or resistance to the expansion of Chinese institution and rules.

The importance of nomadic origin of many Chinese rulers can be re-examined by the database for Figure 2. Among the 134 regimes in total, there are 92 agrarian regimes and 42 nomadic regimes based on the criterion of the geographic location of regime capital north or south of the Great Wall. But actually among the 92 agrarian regimes, thirty-three of them were originally nomadic rulers who migrated to the south of the Great Wall.[14] All these go to show the military advantage of the nomadic tribal societies derived from the strategic use of horses in the steppes environment that could exert disproportionately large impact on state formation and political institutions in China despite much smaller population. Indeed, the inability of the agrarian regime of production and rule to spread to or control the nomadic frontier becomes a perennial challenge to the very concept of monopoly rule for all under the

[14] Indeed, among the fifteen Chinese dynasties listed by Turchin (2009), about half of the rulers are of non-Han origin. See p. 193.

heaven in the Chinese system. Hence, Chinese nomadic frontier remained in the collective historical memory as forever the "external", "the outsider" or more aptly in the Chinese lexicon "the barbarian" (夷).

In the end, the group that went beyond raiding but also ruled and integrated China was the semi-nomads with intimate knowledge and intermediary institutions and environment of both agrarian and nomadic origin. Most notable is the Manchus, a semi-nomadic group that had close contact with Chinese culture and institutions. The Manchus founded the Qing empire that ruled across the most expansive territories across both sides of the Wall (which we used its 1820 territory as our map), representing the epitome of a nomadic-agrarian synthesis that vastly expanded the original ideology of Confucius-Legalist synthesis (Zhao 2015).[15]

4. Wars

We now turn to our second data set on incidences of warfare largely culled from from the two-volume works compiled by China's Military History Committee.[16] For our purpose, we classify our total warfare data into three types.[17] The first and most important kind is warfare fought between nomadic and agrarian regimes (as defined by their respective capitals north or south of the Great Wall). We define the second type of warfare as "Civil War" fought between agrarian regimes (with their capitals located both within the Great Wall) – the proto-example would again be the Three-Kingdom era. We define the third type

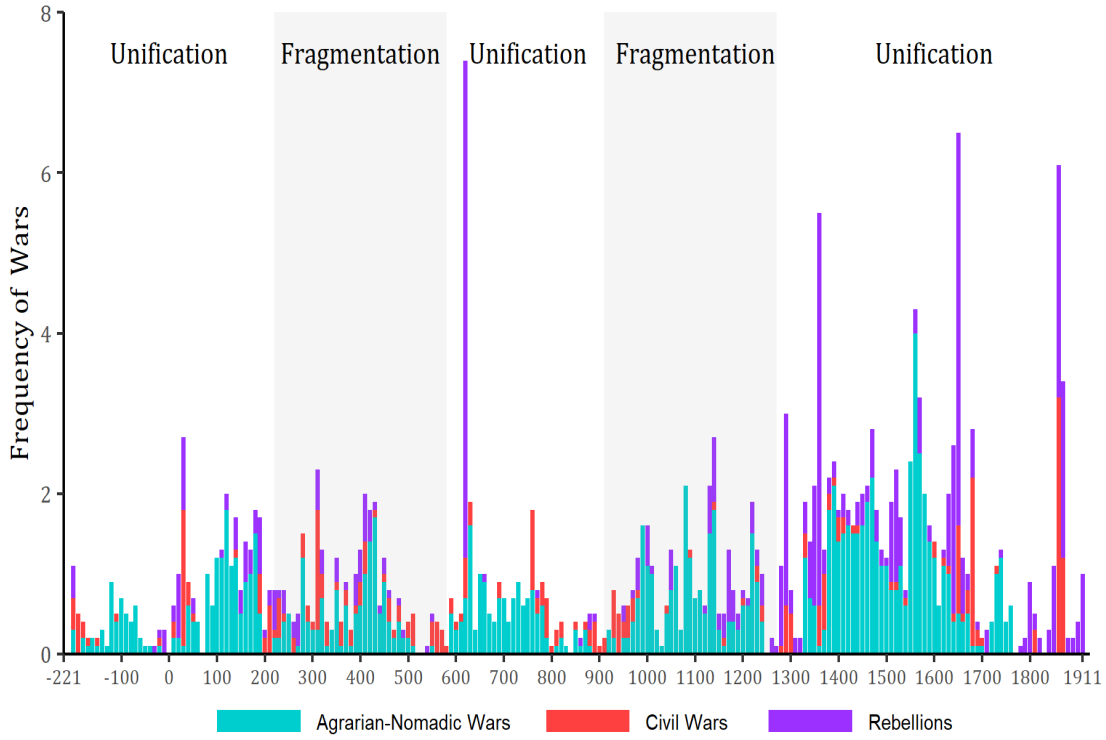
[15] The Mongol conquest of China as argued by Barfield (1989) was actually an exception. For an interesting comparison on the differences in the degrees of centralization of Mongol and Manchu political organization, see Yin (2020).

[16] According to the brief introductory notes, the two-volume works are largely based on the laborious team project that compiled incidences of warfare mostly from the twenty-four historical annals with some additional sources. Although brief narrative was provided for each incidence of warfare recorded, the records do not capture the scale, duration or intensity of each incidence of warfare. Nonetheless, we believe it is very useful information to give broad quantitative indication of the historical narrative or at least the official or prevailing perceptions of the magnitude of warfare in Chinese history. For a cross-check on the validity of this data source against another independent work for the Qing dynasty (1644-1911), see Bai and Kung (2011).

[17] We exclude Chinese warfare with Western powers from the mid-19th century onward, an issue we will discuss in the conclusion.

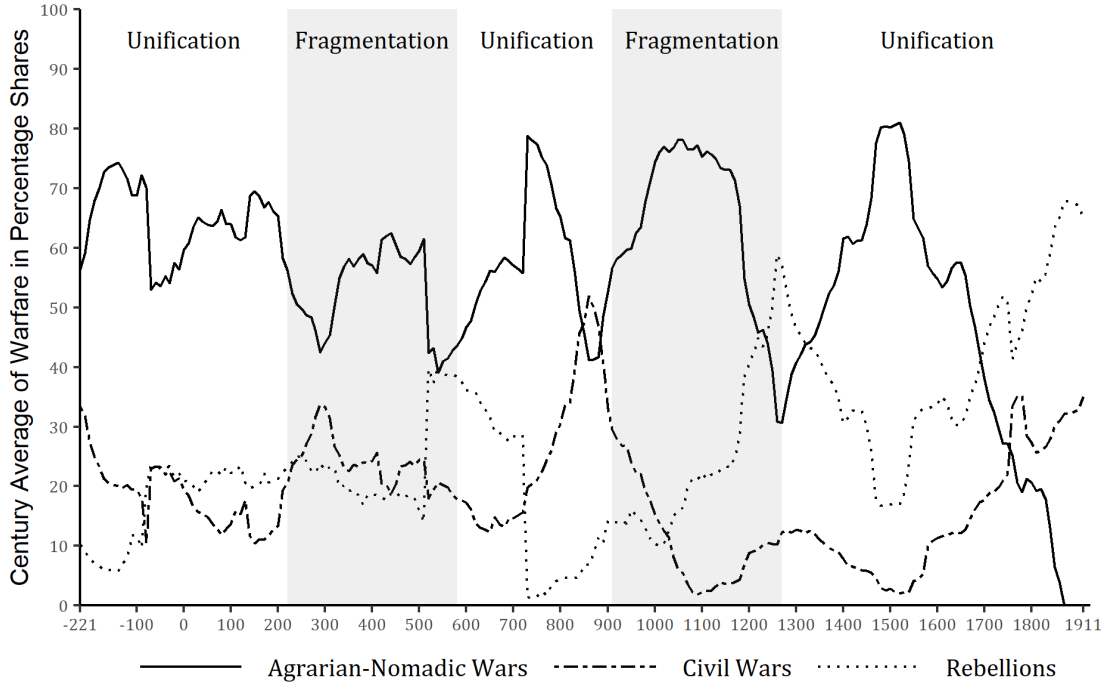
of warfare as "Rebellion" that were fought between local insurgents (without or before the establishment of any formal imperial capitals) against an established dynastic regime with capital. In this sense, Rebellion as distinguished from Civil War is being relatively more disorganized violence.[18] For example, that we classify Taiping rebels' warfare with the Qing government (1850-1864) before their founding of capital in Nanjing in 1853 as Rebellions but as Civil Wars after. Figure 6 plots the entire time series of these three types of warfare. For a total of 2471 incidences of warfare, we find 990, 789 and 692 incidences of Agrarian-Nomadic, Civil Wars and Rebellion respectively. Figure 7 plots the century average of the three types of warfare in percentage shares.

Figure 6. Warfare by Types across Time



[18] This type of warfare is often classified - but mistakenly - as "peasant rebellion" in the Marxist scholarship. For rebellion, we drop warfare data where an insurgency was launched by nomadic or non-Han ethic groups (without a nomadic imperial capital) against an agrarian regime. They amount to around 12% of incidences of our rebellion warfare.

Figure 7. Warfare by Types across Time (Percentage)

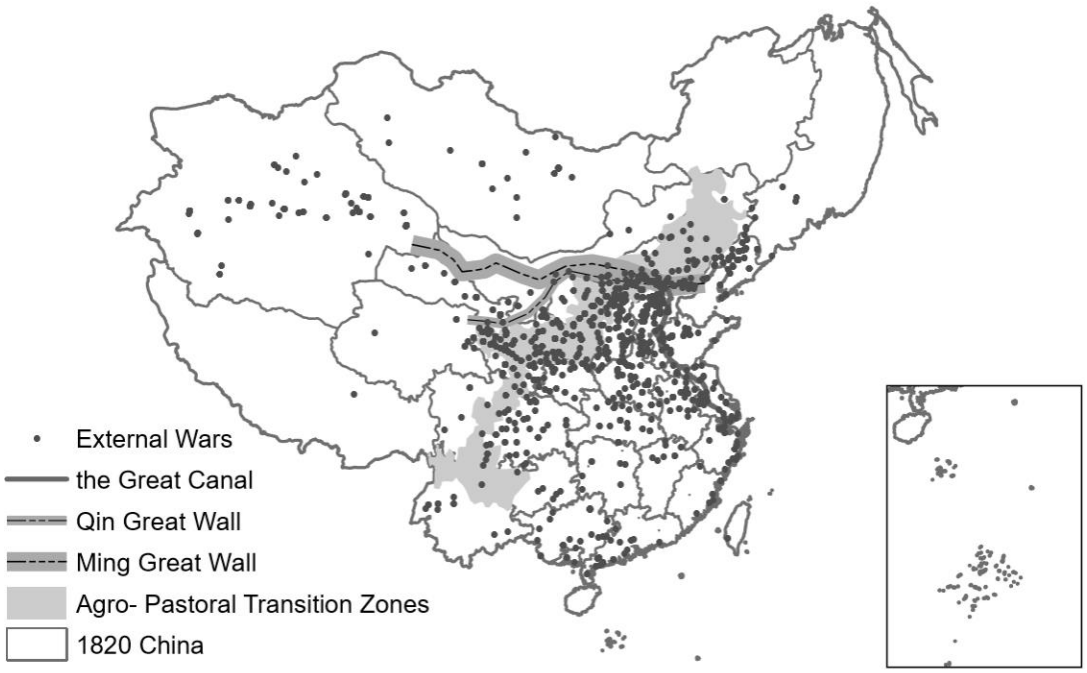


The first salient feature in Figure 6 and 7 is the dominant share of agrarian-nomadic warfares in the total warfares. It is clear that Agrarian-Nomadic Warfare remained at a stable and high level throughout, averaging about 60% of the total warfare. Agrarian-Nomadic warfare took a very high ratio of 69% in the second phase of fragmentation (shaded area) largely because most of these warfares took place in the Norther Song (960-1127) which saw sustained organized violence between relatively several large states. Indeed, out of the 222 incidences of Agrarian-Nomadic warfare, 108 of them occurred in the Northern Song period. The ratio of Agrarian-Nomadic warfare reached 79% in the Northern Song according to our database.

In Figure 8, we show the geographic distribution of Agrarian-Nomadic Warfare that reveals the disproportionate concentration in the so-called Agrarian-Nomadic transition zone, the Semi-arid and semi-wet area of Hetao area of Huang River, Northern Shanxi and Beijing. Our database reveals the geographic importance of the inter-transition zone as the space for Agrarian-Nomadic War. Over 34% or 47% of total Agrarian-Nomadic warfare happened

either within the zone or within fifty kilometers of the zone respectively, compared with 14 or 27% respectively for the Civil Wars and 12 and 25% for the Rebellions respectively. All these highlight the geo-significance of agrarian-nomadic conflict in Chinese history.

Figure 8. Geographic Distribution of Agrarian-Nomadic Wars



Note: Agrarian pastoral transition zone based on the study by Man (2009). The Agro-pastoral Transition zones is defined the average yearly rainfall of 400mm.

The other striking feature in Figure 6 is that the pattern of the incidences of rebellions displayed episodic periods of sudden upsurge. For example, there were as many 6.2 incidences per year during the decade of AD 620s and they averaged about five per year during the decade of 1260s, 1550s and 1850s. On the other hand, incidences of rebellion remained relatively low during periods of unity, averaging 0.32 incidences per year. These episodic upsurges capture the occasionally extremely violent and anarchic nature of sudden crisis or collapse of unitary states, often leading to massive losses of human sacrifices or dynastic changes. The highly destructive and un-predicable nature of these rebellions may have inclined China a strong preference towards unity and stability and high tolerance for the associated costs of repression and control (Jin and Liu (p. 132-144).

Figure 7 also shows that the peak and trough of Agrarian-nomadic warfare seem to correlate negatively with those of the Civil Wars and Rebellions, indicating cyclic shifts between the external (agrarian versus nomadic) and internal (agrarian versus agrarian) warfare particularly from the 10th century onward. Not surprisingly, the ratio of Agrarian-Nomadic warfare in the final phase of unification were relatively low precisely because the two mighty nomadic regimes of Yuan and Qing dynasties prevailed as agrarian rulers over more or less the entire territory. Similarly, there was secular decline in the level of Civil Wars replaced by a secular increase of Rebellions overtime from the tenth century onward when China became increasingly unified. Chinese unity under a single regime changed the types of warfare increasingly away from more organized inter-state based civil war towards internal rebellion. Overall, the incidences of Civil Wars far exceeded those of Rebellions in phases of fragmentation than in unification. For example, there were 0.21 incidences of Civil Warfare per year in the first phase of fragmentation compared with 0.13 in the first phase of unification.

The fragmenting civil wars among the agrarian regimes – even fading after the 10th century - had been an important feature of the Chinese empire. Indeed, there is no inevitability of a single unified state within the Chinese civilizations at least before the 10th century.[19]

5. Empirical Test

5.1 The ARDL Model

From the above historical narrative and statistical series, we are able to generate an important testable hypothesis: agrarian-nomadic warfare would reduce the number of agrarian regimes and correspondingly increase the average size of their ruling agrarian territories but having no clear effects on the number of nomadic regimes controlling for other factors. As the number of regimes, territorial sizes and frequencies of warfare exhibit correlation with feedback loops and also high persistence overtime, we thereby apply the Autoregressive Distributed Lag (ARDL) approach, which posit sufficient numbers of lags to

[19] See Chi (1963)'s insightful study on relatively independent geographic regions and economic regions that were prone to setting up autonomous or independent political regimes, p. 30-34.

capture this data generating process within a general-to-specific modeling framework and do not rely on strict exogeneity conditions. We posit the following dynamics relationship in the estimation equation:

$$y_t = \beta_0 + \sum_{i=1}^{p} \beta_{1,i} y_{t-i} + \sum_{i=0}^{q} \beta_{2,i} w_{t-i} + \sum_{i=0}^{J} \beta_{3,i}{}' W_{t-i} + X_t{}' \gamma + \varepsilon_t \qquad (1)$$

Here, t denotes decade, y is dependent variable which includes size of regime (y_1) and number of agrarian regimes (y_2). w is the key variable of our interest: incidences of Agrarian-nomadic wars. Vector W includes the two other types of wars: civil wars and rebellions. p, q and J are lag orders for $y, w \text{ and } W$ respectively.[20] For the control variables, we have the exogenous climate data, denoted as vector X, that include the current and lag effects of extreme weather. ε_t is the normally distributed and serially uncorrelated disturbance term.

Although possible to estimate empirically, Equation (1) is difficult to interpret intuitively due to the existence of lags in the variables on the right hand of the equation. For that, we apply the Error Correction Models (ECM thereafter) which is a linear transformation of Equation (1) that integrates the short-run dynamics with the long-run equilibrium, without losing long-run information. In Equation (2), we use the error correcting transformation to estimate long-run and short-run effects of warfare in a single equation:[21]

$$\Delta y_t = \sum_{i=1}^{p-1} \theta_{1i} \Delta y_{t-i} + \sum_{i=1}^{q-1} \theta_{2,i} \Delta w_{t-i} + \sum_{i=1}^{J-1} \theta_{3,\mathrm{i}}{}' \Delta W_{t-i} + \delta * ECT_{t-1} + X' \gamma_2 + \varepsilon_t \quad (2)$$

where $\Delta y_t, \Delta w_{t-i}$ and ΔW_{t-i} denote first-differenced variables for $y, w \text{ and } W$ respectively and $\theta_{1,i}$, $\theta_{2,i}$ and $\theta_{3,\mathrm{i}}$ are their short run coefficients. ECT_{t-1} is the one period lag residual of long-run equilibrium Error Correction Term (ECT)：

[20] Lag order J is a vector since W includes two control variables.

[21] Furthermore, ECM can be used to conduct conventional Granger non-causality tests (Granger et al. 2000; Morley 2006), and therefore offers us additional examination on the causality from warfare to size of nations.

$$ECT_t = y_t - c - \alpha_2 w_t - \alpha_3{}' W_t \quad (3)$$

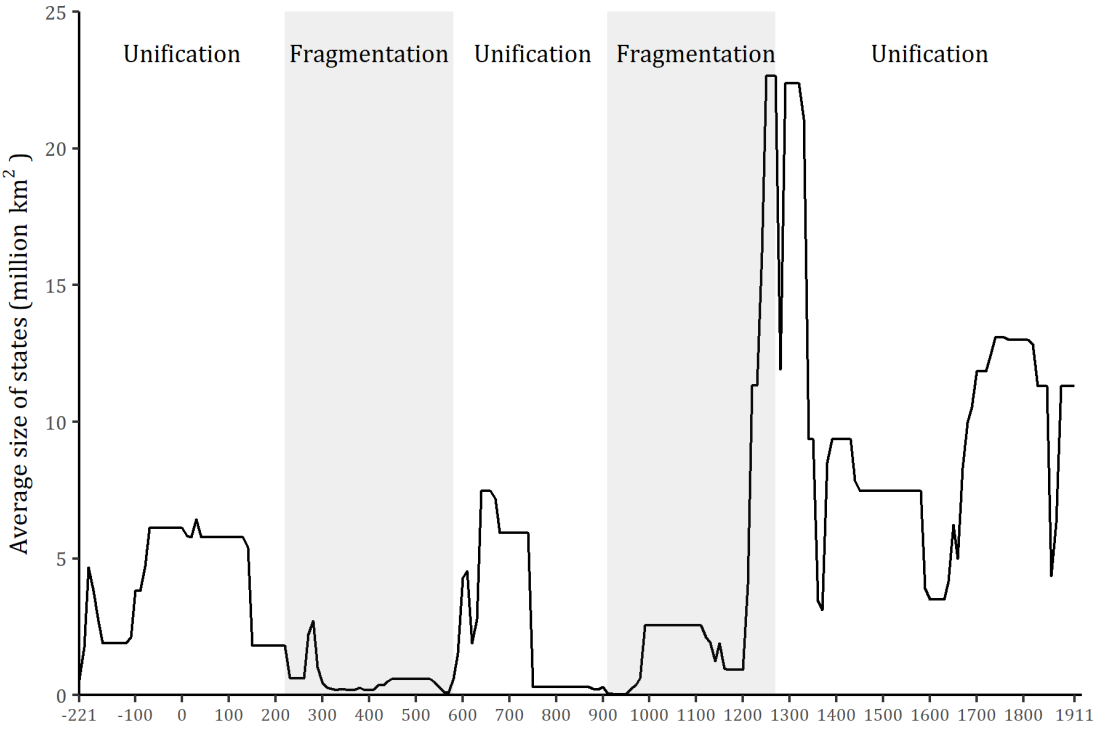
This correction term captures deviation of the system (y_t, w_t, W_t), from a hypothesized long-run equilibrium between variables such as wars and number and size of states as specified in $y = c + \alpha_2 w + \alpha_3{}' W$. And α_2 *and* α_3 measure long-run effects of warfare on size of agrarian states and indicates how dependent variable permanently change due to one unit of change in the independent variables. Specifically, coefficient δ represents the rate of adjustment to the path of long run equilibrium which is expected to range between 0 and -1.

5.2 Descriptive Statistics

For our empirical exercise, we put together decadal series of data for the period of 221 BC – 1911 AD. We have two interrelated but not overlapping dependent variables. The number of political regimes as measured by the number of agrarian and nomadic capitals as shown in Figure 2. Our second variable is the average territorial size of political regimes within a year based on the GIS measure of the landmark *China Historical Atlas* compiled by Tan (1996). In the case of more than on regime at a time, we use their averages. Obviously, there is a statistically significant inverse relationship between these two dependent variables a correlation coefficient of -0.474 (significant at 1% level). Figure 9 gives a plot of the number of agrarian regimes and the average territorial size alongside the frequency of agrarian-nomadic warfare.[22]

22. Figure 9 shows a huge spike during the 13th century due to the Mongolia Yuan dynasty that greatly exceeded even Qing's territory in 1820. The use of Yuan territory instead of the Qing 1820 territory do not affect our statistical results.

Figure 9. Average Size of States (million km²)



We test the two dependent variables of the number and territorial sizes of political regimes against the core independent variable of Agrarian-nomadic warfare alongside a set of weather and natural disaster control variables (Wittfogel 1957; Zhang et al. 2008; Burke et al. 2009; Burke et al. 2015; Buckley et al. 2010; Bai and Kung 2011; Hsiang et al. 2013; Hsiang and Meng 2014). Given the shifting relationships among the three types of warfares in Figure 7, we also control for Civil Wars and Rebellions. Table 1 provides descriptive statistics of these variables.

Table 1. Summary Statistics

	Variables	Obs	Mean	SD	Source
y_1	Size of agrarian regime	214	814.732	514.193	A
y_2	Number of agrarian regimes	214	0.963	0.442	B C D
w_1	Agrarian-nomadic wars	214	0.463	0.491	F
w_2	Civil wars	214	0.139	0.265	F
w_3	Rebellions	214	0.321	0.828	F
x_1	High temperature	214	0.178	0.383	G
x_2	Serious locust plague	214	0.127	0.333	G
x_3	Heavy floods	214	0.145	0.353	G
x_4	Heavy droughts	214	0.154	0.362	G

Note: Specifically, we defined "extreme weather" (e.g. High temperature, Serious locust plague, Heavy floods and Heavy droughts) as the value of a certain weather in a given decade exceeding the mean value of the weather variable by one or more standard deviation. This ensures that the share of extreme periods is smaller enough relative to the whole sample period.

Source: A. Tan (1996); B. Shen (1998) C. Bai and Chen (1997); E. Military History of China Writing (2003); G. Wang (1992)

5.3 Wars and States

We conduct our empirical exercises in three steps. First, we perform a unit-root test to determine the order of integration of each variable, and to see whether any variable would require first or higher order differencing. We then proceed with a bounds test to confirm the existence of a long-run equilibrium relationship between warfare and size of nation; Once confirmed, we go on to the estimation of ECM to determine the long and short-run effects of Agrarian-nomadic wars on size of nations. We conduct three different unit-root tests to determine the number of orders: Augmented Dickey-Fuller Test (ADF), Phillips-Perron Test (PP) and Elliot-Rothenberg-Stock Dickey-Fuller GSL Detrended Test (DF-GLS). All our variables pass the first two steps of our diagnostic tests, which were presented in the Appendix 2. Here, we focus on reporting the main results of our ARDL test.

Table 2 presents the baseline results on the short and long-term impact of agrarian-nomadic wars on the two outcomes variables: size and number of agrarian regimes. As expected, the

Table 2. Baseline Model: Agrarian-nomadic Wars and Size and Number of Agrarian Regimes

Y_i	(1) Size of Agrarian Regimes	(2) Number of Agrarian Regimes
Panel A: Long-run coefficients		
Dependent variable: Y_i		
Agrarian-nomadic wars	596.60**	-0.60**
	(293.11)	(0.28)
Civil wars	762.6	0.63
	(509.8)	(0.43)
Rebellions	391.1	-0.12
	(240.6)	(0.21)
Panel B: Short-run coefficients		
Dependent variable: ΔYit		
L.ECTi	-0.11***	-0.11***
	(0.03)	(0.03)
LD. Yi	-0.05	0.19***
	(0.07)	(0.07)
L2D. Yi	0.11*	
	(0.07)	
L3D. Yi	0.14**	
	(0.07)	
D. Peasant uprisings	-86.96***	0.09***
	(20.27)	(0.02)
LD. Peasant uprisings	-76.50***	0.06***
	(16.51)	(0.02)
Constant	-22.42	0.15***
	(27.09)	(0.04)
Control for extreme weather	YES	YES
Time trend	YES	YES
Adj. R^2	0.17	0.28
AIC	2782.30	-133.50
BIC	2832.50	-90.00
t-statistic on ECT	-3.54**	-3.80*
Optimal lag	[4,0,0,2]	[2,0,0,2]
N	210	210

Notes: Optimal lags are selected by the Akaike information criterion (AIC). T-statistic on ECT reports the result of Granger non-causality test on long-run causality, which tests the significance of the coefficient of the lagged ECT. Wald test reports the F statistic from a Wald test on the lagged differences of the Agrarian-nomadic wars. Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

long-run coefficient of agrarian-nomadic wars on size and number of agrarian regimes in Panel A is 596.6 and 0.6 (both statistically significant at 5% level). Intuitively, each additional incidence of agrarian-nomadic warfare in a decade will lead to a long-term increase of territorial size of 596.6 square kilometers for the agrarian regime and a long-term reduction of 0.6 number of agrarian regimes. Panel A also shows that the other two types of warfare exert no significant long-run effects on the two outcome variables. Turning now to the short-run coefficients, we find a significant statistics of -0.11 on ECT., indicating a speed of

convergence back to equilibrium size of states and number of agrarian regimes of 9.09(=1/0.110) and 8.93(=1/0.112) respectively. Given the decadal frequency our data series, this translates into an average speed of convergence of 91 and 89 years respectively.

To sharpen our findings, we run an identical ADRL between the total number of warfare (by summing the three types of warfare) on the two outcome variables along with the other identical controls in Table 2. We find the long-term coefficients are 433 and -0.16 for the size and number of agrarian regimes respectively with the first coefficient statistically significant at 5% level. Comparing these with the figure of 596 and -0.6 respectively for agrarian-nomadic warfare alone (both significant at 5% level) shows that it is the Agrarian-Nomadic warfare rather than all warfare that drives the pattern of state formation in China.

We further conduct a Granger-Causality test (Granger et al. 2000) and report *T*-statistic on the coefficient of the lagged ECT. The significant t-statistics on the lagged ECT in two models strongly suggests that the long-run causality is running from wars to the size and number of agrarian regimes rather than the other way around. The three statistics on the fitness of the mode, adjusted R square, Akaike's Information Criterion (AIC) and Schwarz's Bayesian Information Criterion (BIC), are also reported in Table 2.

To extend the result of our Granger-Causality test, we further conduct an IV approach to address the potential endogeneity of Agrarian-nomadic wars as we might worry about unobserved time-varying variables that correlate with both war and nation. We utilize an IV approach by instrumenting incidences of warfare by changes in temperature in Northern China based on works that show changing temperature would likely affect the incidences of Agrarian-nomadic wars (e.g. Bai and Kung 2011). It is well-known that nomadic tribes and economies are far more susceptible to perverse changes in climate and temperatures which often prompt nomadic incursion into agrarian regions to relieve potential subsistence crisis (Barth,1964; Khazanov,1994; Graff and Higham,2002).

Based on this, we construct the following IV estimate equation in the following two equations:

$$Y_t = \alpha + \beta_1 \widehat{War_t} + \gamma X_t{}' + \varepsilon_t \qquad (4)$$

Where $\widehat{War_t}$ was the estimated variable of agrarian-nomadic wars generated by the first-stage regression in the IV framework:

$$\widehat{War_t} = \alpha + \alpha_1 Northtemp_t + X'_t + \varepsilon_t \qquad (5)$$

Here, $Northtemp_t$ is the temperature deviation in Northern China from the National average. All other variables in Y_t, $X_t{}'$ and ε_t are the same as in the rest of the paper. The IV results are presented in Table 3, where Column (1) and (2) show the first-stage regression results on the correlation between IV and agrarian-nomadic wars. The first-stage results suggest that the IV is significantly negatively correlated with Agrarian-Nomadic Warfare. This confirms the validity of our first stage analysis showing a reduction in temperature would lead to higher incidences of agrarian-nomadic warfare. Columns (3) – (5) show the 2SLS results with different dependent variables that are the size of nation, the number of agrarian regimes and the number of nomadic regimes respectively. The results are consistent with the estimated outcome from ARDL model, namely, after controlling other wars and extreme weather, nomadic-agrarian warfare strengthens unification, increases the size of average territorial sizes and reduces and the number of agrarian regimes.

Table 3: IV Estimates Results

	First Stage	2SLS		
	(1)	(2)	(3)	(4)
	Agrarian-nomadic wars	Size of nation	Agrarian regimes	Nomadic Regimes
Agrarian-nomadic wars		1,315***	-0.595**	-0.403
		(435.3)	(0.255)	(0.352)
North temperature	-0.484***			
	(0.161)			
Civil wars	-0.243**	161.8	0.194	0.188
	(0.094)	(172.0)	(0.175)	(0.144)
Rebellions	-0.038	102.4*	-0.0104	-0.173**
	(0.036)	(59.35)	(0.039)	(0.070)
High temperature	-0.202***	39.13	-0.153	0.0619
	(0.066)	(120.2)	(0.097)	(0.100)
Serious locust plague	0.050	-40.32	-0.133	0.002
	(0.154)	(211.1)	(0.105)	(0.140)
Heavy floods	-0.087	-22.19	0.121	0.232
	(0.088)	(179.5)	(0.106)	(0.150)
Heavy droughts	-0.262***	969.6***	-0.303***	-0.829***
	(0.082)	(161.5)	(0.103)	(0.155)
Constant	0.637***	-352.6	1.323***	1.603***
	(0.055)	(265.0)	(0.152)	(0.219)
Observations	190	190	190	190
R-squared	0.133			0.091

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

While our empirical results confirm the expectation that agrarian-nomadic warfare lead to the expansion in the size of agrarian regimes and reduction in the number of agrarian regimes, no such effect may exist on the number of nomadic regimes as argued in our narrative. In Table 4, we confirm this with our finding that the long-run coefficient of agrarian-nomadic warfare on the number of nomadic regimes is statistically insignificant. This may also reflect the outcome that agrarian-nomadic warfare also led to the merging or conversion of nomadic regimes into an agrarian regime after their conquest and move of their capitals behind the Great Wall.

Table 4. Agrarian-Nomadic Wars and Nomadic Regimes

Y_i	(1) Nomadic Regimes	(2) Nomadic Regimes (with time trend)
Panel A: Long-run coefficients		
Dependent variable: Y_i		
Agrarian-nomadic wars	-0.19	0.03
	(0. 36)	(0.28)
Civil wars	0.20	0.11
	(0.65)	(0.49)
Peasant uprisings	-0.41*	-0.23
	(0.22)	(0.17)
Panel B: Short-run coefficients		
Dependent variable: ΔY_{it}		
L.ECT_i	-0.06***	-0.08***
	(0.02)	(0.02)
LD. Y_i	0.32***	0.32***
	(0.07)	(0.07)
Constant	0.09***	0.14***
	(0.03)	(0.04)
Control for weather	YES	YES
Time trend	NO	YES
Adj. R^2	0.10	0.11
AIC	-212.30	-214.50
BIC	-178.90	-177.70
t-statistic on ECT	-3.02**	-3.60**
Optimal lag	[2,0,0,0]	[2,0,0,0]
N	210	210

Notes: Optimal lags are selected by the Akaike information criterion (AIC). T-statistic on ECT reports the result of Granger non-causality test on long-run causality, which tests the significance of the coefficient of the lagged ECT. Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.4 Unification and Fragmentation: an Exposition

To illustrate more clearly how the impact of warfare on the size and number of agrarian regimes vary between phases of unification and fragmentation, we run the same baseline ARDL regression by dividing our sample into four subsets going from the most fragmented (with the largest number of agrarian regimes) to the most unified (with the lowest number of agrarian regimes). The results are illuminating as shown in Table 5. Indeed, warfare exert the most significant impact in China's most fragmented period: Agrarian-nomadic warfare and rebellions increase/decrease the size/number of agrarian regimes, but Civil Wars have the opposite effect. The most interesting is that Civil Wars reinforced fragmentation or multi-state competition during China's phases of fragmentation. But these warfare effects disappeared as China was becoming increasingly unified or achieved near unity. All these are

consistent with our narrative.

We perform similar same econometric exercise by grouping our sample into subsets of fragmentation and unification that are composed of the concatenation of the second and third phase of fragmentation and the first through the third phases of unification respectively in Appendix Table 1. The results presented in Table 6 confirm the conclusion reached in Table 5: agrarian-nomadic warfare and rebellions increase/decrease the size/number of agrarian regimes, but Civil Wars have the opposite effect of reinforcing fragmentation or multi-state competition during China's phases of fragmentation. But these warfare effects disappeared as China was becoming increasingly unified or achieved near unity.

Table 5. A Quantile Baseline Regressions

	(1) 0-25th percentage	(2) 25-50th percentage	(3) 50-75th percentage	(4) 75-100th percentage
Panel A. Dependent variable: Size of Agrarian Regimes				
Agrarian-nomadic wars	16.55*	27.93	10.88	-148.38
	(8.84)	(36.41)	(36.37)	(399.65)
Civil wars	-84.34***	-83.31	99.17**	333.52
	(17.10)	(112.34)	(43.29)	(489.68)
Rebellions	61.38**	-48.48**	48.91**	697.22
	(28.10)	(20.44)	(20.43)	(523.41)
Control for extreme weather	YES	YES	YES	YES
Time trend	YES	YES	YES	YES
Adj. R^2	0.98	0.80	0.88	0.28
AIC	391.38	577.78	503.13	866.20
BIC	425.80	603.39	528.73	899.97
t-statistic on ECT	-47.28***	-8.46***	-11.21***	-2.87
Optimal lag	[3,4,1,1]	[1,1,2,0]	[4,0,0,1]	[1,4,0,2]
N	50	53	46	61
Panel B. Dependent variable: Number of Agrarian Regimes				
Agrarian-nomadic wars	-5.88	-0.45**	0.02	-0.02
	(6.76)	(0.21)	(0.03)	(0.05)
Civil wars	3.01	0.40	-0.18*	-0.04
	(3.54)	(0.61)	(0.10)	(0.06)
Rebellions	4.75	0.36***	0.24**	-0.18**
	(6.41)	(0.12)	(0.09)	(0.09)
Control for extreme weather	YES	YES	YES	YES
Time trend	YES	YES	YES	YES
Adj. R^2	0.11	0.65	0.96	0.80
AIC	-10.54	32.23	-172.42	-145.85
BIC	14.32	-4.65	-132.19	-112.07
t-statistic on ECT	-0.92	-5.02***	-19.25***	-5.12***
Optimal lag	[1,3,0,0]	[2,1,2,0]	[1,4,4,4]	[1,4,0,2]
N	50	53	46	61

Notes: Optimal lags are selected by the Akaike information criterion (AIC). T-statistic on ECT reports the result of Granger non-causality test on long-run causality, which tests the significance of the coefficient of the lagged ECT. Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6. Regressions on Split Samples of Phases of Unification and Fragmentation

	(1)	(2)	(3)	(4)
	Unification		Fragmentation	
	Size	Number	Size	Number
Agrarian-nomadic wars	210.27	-0.30	-110.17	-0.39*
	(153.93)	(0.18)	(227.95)	(0.22)
Civil wars	386.10	0.03	26.30	1.14*
	(298.45)	(0.29)	(274.04)	(0.65)
Rebellions	83.81	0.10	54.91	1.16**
	(119.57)	(0.14)	(298.41)	(0.46)
Control for extreme weather	YES	YES	YES	YES
Time trend	YES	YES	YES	YES
Adj. R^2	0.26	0.35	0.49	0.41
AIC	1919.92	-116.24	812.05	-33.53
BIC	1958.53	-74.66	847.08	-5.07
t-statistic on ECT	-4.20**	-3.07	-11.21***	-4.54**
Optimal lag	[2,0,0,2]	[3,0,0,2]	[4,0,0,1]	[2,0,2,0]
N	144	144	66	66

Notes: Optimal lags are selected by the Akaike information criterion (AIC). T-statistic on ECT reports the result of Granger non-causality test on long-run causality, which tests the significance of the coefficient of the lagged ECT. Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

We expound the above empirical findings by invoking the theoretical insights in Ko et al (2018) that unidirectional threats enhance unity (as in the case of nomadic attacks on China) whereas multi-sided military threats (as in the case of inter-state based military competition in Europe) reinforces fragmentation. As in their model, multiple sided military threats in a European inter-state framework were conducive to political fragmentation or decentralization as resources needed to counter such threats tended to be raised locally, hence strengthening local autonomy. We can surmise that state-based Civil Wars in Chinese history had similar decentralizing role as the European pattern of warfare.

Then, why did Civil Wars along with the inter-state competition fade away in China while they prevailed in Europe overtime? Here, we propose the critical role of ideology for this divergence through the case of late Qing Taiping Rebellion (1850-1864). Taiping Rebellion was initially launched from the Southwestern province of Guangxi in 1850 by a rebel leader, Hong Xiuquan, whose dream of joining the Qing elite came to tatters after failing the Civil Service Exams four times. The rebellion spread northward into China's rich hinterland provinces along the Yangzi river, inflicting massive human disasters and rendered the Qing rulers in Beijing completely powerless. Then, it was local militia men raised by the powerful Han Chinese bureaucrats headed by a native of the mid-Yangzi province of Hunan, Zeng

Guofan, who came to Qing's rescue. Zeng earned his political elite status in the Qing empire through his success in passing brutal rounds of Civil Service Exams. He raised the so-called Hunan army based on his native networks and fiscal resources to eventually suppress the once unstoppable Taiping Rebellions (Bai, Jia and Yang 2021, Luo 1939). By then, the Hunan army, loyal only to Zeng could rival or overwhelm any military power including that of the Qing rulers. Remarkably, Zeng disbanded his Hunan army merely a few months after the capture of Taiping capital of Nanjing in 1864, thus dispelling any potential distrust from the Qing court. A devout Confucian bureaucrat, Zeng placed his faith in legitimacy of a single imperial ruler – albeit of Manchu ethnicity - and went on to become the most powerful Han Chinese bureaucrats in the post-Taiping era to engineer the so-called Self-strengthening movement within a traditional imperial ideology. (Wright 1957).

The ideology of unity helped also dampen warfare in the Chinese international order of tributary system beyond China in the early modern era. The widespread diffusion of the ideogrammatic Chinese characters to the so-called Chinese character zone of Japan, Korea and Northern Vietnam in East Asia has forged a common ruling ideology of Confucianism.[23] By compiling warfare datasets for Korea and Vietnam during the early modern era, David Kang et al (2018) shows that warfare there were more characterized by internal rebellion rather than external conflicts between and among the various tributary states. They argue that the Confucian ideology of hierarchy has played an independent role in dampening state-based organized violence among tributary states sharing the same Confucian ideology.

Early modern Japan stands out as the most fascinating "natural experiment" in her different juxtaposition of ideology, institutions and geography. Sharing the Chinese ideology of Confuscianism but geographically sheltered from the nomadic threat thanks to the vast Japan sea, Japan politically remained decentralized and "feudal", failing to adopt the key centralizing Chinese institution of direct administrative rule, Civil-Service Examination

[23] See Ma 2019 for a description of the cultural zone of using Chinese characters that would include Japan, Korea and Northern Vietnam. See Dell et al (2018) for an interesting test case on the influence of Chinese political tradition on Northern Vietnam.

system and nationwide bureaucracy.[24] Ironically, it may well be these pre-Qin Chinese feudal features of early modern Japan that possibly enabled her a much smoother transition to modernity through Japan's Meiji Reform of 1868.[25]

6. Conclusion: The Long-term Consequences of Chinese Unification

Our research on Chinese state sheds new insights on the relationship between warfare and states in the European context. As summarized by Zhao, a polity could mobilize resource for warfare through financial capital, nationalism or pure coercion depending on her underlying political structures. Eventually, relatively capital rich states with weak despotic power would more likely resort to the first and second method, leading these states down towards a path of some form of constrained political regime, civil society and constitutionalism. For China, the Legalist reform implemented by Shang Yang endowed imperial China with massive coercive power to employ the third method that is coercion (Acemoglu and Robinson 2019, chapter 8). In this case, given that its effectiveness hinges far more on the state's coercive power, warfare actually further strengthen state power at the expense of autonomous economic, ideological, or political actors (Zhao p. 199-200). In that regard, the durability of Chinese absolutism found some equivalence with Tilly's characterization on the rise of coercion intensive European states.[26] Thus, state capacity mobilized for external warfare were more likely turn into tools of domestic political repression in coercive states rather than serving as an impetus to the rise of common national interest in more constrained states as described in Besley and Perrson (2011). It is not a coincidence the heightened pace of agrarian nomadic warfare (and the corresponding reduction in the share of civil wars) from the tenth century in China corresponded to an increasing concentration of imperial

[24] See Friday 2010. For the geographic commonality between Japan and Western Europe of being sheltered from nomadic military threat, see the view of Japanese anthropologist, Tadao Umesao in chapter 5 in Murakami (2001).

[25] For similarities and differences between European and Japanese feudalism, see Murakami (2001).

[26] Tilly's point about coercion-intensive path of state building is confirmed by the rise of rural-based authoritative states such as Prussia and Russia in a new study by Karaman and Pamuk (2013).

power, the strengthening of imperial bureaucracy and the associated Civil Service Exam system and ultimately social control.[27]

Unification under a single emperor allowed China to change the nature of warfare from Civil War towards Internal Rebellion. Internal repression actually weakens state capacity as surveillance and propaganda were often far more effective than massive military build-up and resource mobilization (Ma and Rubin 2019). Hence, unification diminished the frequency of Civil Wars as well as the degree of inter-state competition and the dynamism of state building. In the end, when the ideology of one ruler for all under heaven became the source of legitimacy, this ideology itself gave rise to a peculiar Chinese form of political legitimacy that substituted cross-dynastic competition for inter-state competition. [28] This also meant that historically, Chinese political reform or changes had no alternative frame of reference or models except her own past to look up to (Ma 2012). Moreover, historical lessons on the rise and fall of Chinese dynasties served as mirrors to reflect on the legitimacy of the current and future imperial rulers. Indeed, the greatness and glories of the Chinese emperors throughout history would be measured by their records in "unification" whatever that may mean and however that may be achieved (Fairbank 1987). This in turn give us renewed insights into the current Chinese ideology of "one country two systems" on the issues of Hong Kong and Taiwan.

From a millennial perspective, Chinese unification is truly a mixed blessing as noted by Fairbank (1987). While unity preserved the continuity of Chinese civilization and forged the world's single largest economy during the early modern era, it also bounded her people today within a single contiguous territory and (written) language while the population of a fragmented and contentious Europe expanded its people and civilization across several

[27] See Ma 2012 on the strengthening of Chinese imperial power from the Song dynasty onward. Dincecco and Wang 2018 (quoting Wang's work) shows that the state repeatedly used rebellion threats as an opportunity to double down its coercive power. It argues that military garrisons during the Ming Dynasty (1368–1644) constructed for national defence were often turned into tools of domestic repression.

[28] For a recent exposition of multi-state competition acting as an "exit option", see Dincecco and Wang (2018).

continents. Today, the descendants of Han Chinese empire and the Rome Empire in Europe and the Americas are comparable in population size, but "a billion or so Europeans expanded to Europe and the Americas occupying some fifty separate and sovereign states across three vast continents, while more than a billion Chinese live in only one state." (Fairbank p. 14).

Indeed, by the time the descendants of these two civilizations encountered again in the form of encroaching European imperialism on the shores of East Asia by the mid-19th century, Qing China had suddenly confronted a challenge on her southern frontier that no previous nomadic invaders from her North frontier had ever posed: an entirely new system of ideology and governance. The vast Chinese empire was to witness a wrenching century and half of struggle against the Western challenge. The fact that experiments with modernization by much smaller geographic units that were under the Chinese cultural sphere such as Japan, Taiwan, South Korea or Hong Kong (or even Singapore) were far more successful have raised the question of whether size could be an advantage or impediment for political and economic reform. Much more importantly, in the age of Western Imperialism, the space for "all under the heaven" had vastly expanded beyond the China centered political order in East Asia. With China's re-emergence as the world's second largest economy after four decades of rapid economic growth, can the ideology of a single ruler under Confucian-legalist synthesis endure in the new global order?

References:

Acemoglu, Daren, and James A. Robinson. 2019. *The Narrow Corridor: States, Societies, and the Fate of Liberty*. New York: Penguin.

Allen, Robert C. 1997, "Agriculture and the Origins of the State in Ancient Egypt." *Explorations in Economic History* 34 (2): 135–54. https://doi.org/10.1006/exeh.1997.0673.

Alesina, Alberto, and Enrico Spolaore. 2003. *The Size of Nations*. Cambridge, MA: MIT Press.

Alesina, Alberto, and Enrico Spolaore. 2005. "War, Peace, and the Size of Countries." *Journal of Public Economics* 89 (7): 1333-54. https://doi.org/10.1016/j.jpubeco.2003.07.013.

Baechler, Jean. 1975. *Revolution*. Oxford: Basil Blackwell.

Bai, Ying, Ruixue Jia and Jiaojiao Yang. 2021. "The Nexus of Elites and War Mobilization." *NBER Working Paper*. http://www.nber.org/papers/w28667.

Bai, Ying, and James Kai-sing Kung. 2011. "Climate Shocks and Sino-nomadic Conflict." *Review of Economics and Statistics* 93 (3): 970-81. http://www.jstor.org/stable/23016089.

Barfield, Thomas J. 1989. *The Perilous Frontier: Nomadic Empires and China.* Cambridge, MA: John Wiley & Sons.

Besley, Timothy, and Torsten Persson. 2011. *Pillars of Prosperity: The Political Economics of Development Clusters.* Princeton: Princeton University Press.

Brandt, Loren, Debin Ma, and Thomas G. Rawski. 2014. "From Divergence to Convergence: Reevaluating the History behind China's Economic Boom." *Journal of Economic Literature* 52 (1): 45-123.

Brendan M. Buckley, Kevin J. Anchukaitis, Daniel Penny, Roland Fletcher, Edward R. Cook, Masaki Sano, Le Canh Nam, Aroonrut Wichienkeeo, Ton That Minh, Truong Mai Hong. 2010. "Climate as a Contributing Factor in the Demise of Angkor, Cambodia." *Proceedings of the National Academy of Sciences* 107(15): 6748-52. https://doi.org/10.1073/pnas.0910827107.

Burke, Marshall B., Edward Miguel, Shanker Satyanath, John A. Dykema, and David B. Lobell. 2009. "Warming Increases the Risk of Civil War in Africa." *Proceedings of the National Academy of Sciences* 106(49): 20670-4. https://doi.org/10.1073/pnas.0907998106.

Burke, Marshall, Solomon M. Hsiang, and Edward Miguel. 2015. "Climate and Conflict." *Annual Review of Economics* 7(1): 577-617. https://doi.org/10.1146/annurev-economics-080614-115430.

Chi, Ch'ao-Ting. 1963. *Key Economic Areas in Chinese History, as Rvealed in the Development of Public Works for Water-Control.* New York: Paragon Book Reprint Corp.

Dell, Melissa, Nathan Lane, and Pablo Querubin. 2018. "The Historical State, Local Collective Action, and Economic Development in Vietnam." *Econometrica* 86 (6): 2083-121. https://doi.org/10.3982/ECTA15122.

Diamond, Jared M. 1997. *Guns, Germs, and Steel.* New York: Norton & Company.

Dincecco, Mark, James E. Fenske, and James E. Fenske. 2019. "Is Africa different? Historical Conflict and State Development." *Economic History of Developing Regions* 34 (2): 209-50. http://dx.doi.org/10.2139/ssrn.2538198.

Dincecco, Mark, and Yuhua Wang. 2018. "Violent Conflict and Political Development Over the Long Run: China Versus Europe." *Annual Review of Political Science* 21 (1): 341-358. https://doi.org/10.1146/annurev-polisci-050317-064428.

Epstein, Stephan R. 2000. *Freedom and growth: the rise of states and markets in Europe, 1300-1750.* London: Routledge.

Fairbank, John K. 1987. "The Reunification of China." In *The Cambridge History of China*, edited by Roderick MacFarquhar and John K. Fairbank, 1-48. Cambridge: Cambridge University Press.

Friday, Karl. 2010. "They Were Soldiers Once, the Early Samurai and the Imperial Court." In *War and State Building in Medieval Japan,* edited by John A. Ferejohn, and Frances McCall Rosenbluth. Stanford: Stanford University Press.

Fernández-Villaverde, Jesus, Mark Koyama, Youhong Lin, and Tuan-Hwee Sng Fractured-Land and Political Fragmentation. NBER Working Paper. http://www.nber.org/papers/w27774.

Ge, Jianxiong. 2008. *Tongyi Yu Fenlie: Zhongguo De Qishi [Unification and Division: The Enlightenment Of Chinese History]*. Beijing: Zhonghua Shuju.

Graff, David A., and Robin Higham. 2002. *A Military History of China.* Boulder, Co: Westview

Press.

Gupta, Bishnupriya, Debin Ma, and Tirthankar Roy. 2016. "States and Development: Early Modern India, China, and the Great Divergence." In *Economic History of Warfare and State Formation*, edited by Jari Eloranta, Eric Golson, Andrei Markevich and Nikolaus Wolf, 51-69. Berlin: Springer.

Hoffman, Philip T. 2015. *Why did Europe Conquer the World?* New Jersey: Princeton University Press.

Hsiang, Solomon M., and Kyle C. Meng. 2014. "Reconciling Disagreement over Climate–Conflict Results in Africa." *Proceedings of the National Academy of Sciences* 111 (6): 2100-3. https://doi.org/10.1073/pnas.1316006111.

Hsiang, Solomon M., Marshall Burke, and Edward Miguel. 2013. "Quantifying the Influence of Climate on Human Conflict." *Science* 341 (6151): 1235367. https://doi.org/10.1126/science.1235367.

Jin, Guantao, and Qingfeng Liu. 2011. *Xingsheng Yu Weiji, Lun Zhongguo Shehui Chaowending Jiegou [The Cycle of Growth and Decline, On the Ultrastable Structure of Chinese Society]*. Beijing: Chinese Law Press China.

Kang, David C., Dat X. Nguyen, Ronan Tse-min Fu and Meredith Shaw. 2018. "War, Rebellion, and Intervention under Hierarchy: Vietnam-China Relations, 1365 to 1841." *Journal of Conflict Resolution* 63 (4): 896-922. https://doi.org/10.1177/0022002718772345.

Kang, David C., Meredith Shaw and Ronan Tse-min Fu. 2016. "Measuring War in Early Modern East Asia, 1368-1841: Introducing Chinese and Korean Language Sources." *International Studies Quarterly* 60 (4): 766–77. https://doi.org/10.1093/isq/sqw032.

Karaman, K. Kıvanç, and Pamuk, Şevket. 2013. "Different Paths to the Modern State in Europe: the Interaction between Warfare, Economic Structure, and Political Regime." *American Political Science Review* 107 (3): 603-26. https://doi.org/10.1017/S0003055413000312.

Khananov, Anatoly M. 1994. *Nomads and the Outside World.* Maddison: University of Wisconsin Press.

Ko, Chiu Yu, Mark Koyama, and Tuan-Hwee Sng. 2018. "Unified China and Divided Europe."

International Economic Review 59 (1): 285-327. https://doi.org/10.1111/iere.12270.

Narayan, Paresh Kumar, and Baljeet Singh. 2007. "The Electricity Consumption and GDP Nexus for the Fiji Islands." *Energy Economics* 29 (6): 1141-50. https://doi.org/10.1016/j.eneco.2006.05.018.

Lattimore, Owen. 1988. *Inner Asian frontiers of China.* Oxford University Press.

Li, Shuo. 2018. *Nanbei Zhanzheng Sanbai Nian [Three Hundred Years of Wars between South and North]*. Shanghai: Shanghai People's Publishing House.

Luo, Ergang. 1996. *Xiangjun Xinzhi [A New History of the Hunan Army]*. Shanghai: Shanghai Shudian.

Ma, Debin. 2012. "Political Institution and Long-run Economic Trajectory: Some Lessons from Two Millennia of Chinese Civilization." In *Institutions and Comparative Economic Development*, edited by Masahiko Aoki, Timur Kuran and Gerard Roland, 78-98. Basingstoke: Palgrave Macmillan.

Ma, Debin. 2019. "Economic Change in East Asia from the Seventeenth to the Twentieth Century." In *Global Economic History*, edited by Giorgio Riello and Tirthankar Roy, 287-298. London: Bloomsbury Publishing.

Ma, Debin, and Jared Rubin. 2019. "The Paradox of Power: Principal-agent problems and administrative capacity in Imperial China (and other absolutist regimes)." *Journal of Comparative Economics* 47(2): 277-294. https://doi.org/10.1016/j.jce.2019.03.002.

Man, Zhimin. 2009. *Zhongguo Lishi Shiqi Qihou Bianhua Yanjiu [Research on Climate Change in Chinese Historical Period]*. Jinan: Shandong Education Press.

Mayshar, Joram, Omer Moav, and Luigi Pascali. 2021. "The Origin of the State: Land Productivity or Appropriability?" *Journal of Political Economy*, Just Accepted. https://doi.org/10.1086/718372.

Mayshar, Joram, Omer Moav, and Zvika Neeman. 2017. "Geography, Transparency and Institutions." *American Political Science Review* 111 (3): 622 – 36. https://doi.org/10.1017/S0003055417000132.

Military History of China (Writing Group). 2003. *Zhongguo Lidai Zhanzheng Nianbiao [A Chronology of Warfare in Dynastic China].* Beijing: Chinese People's Liberation Army

Publishing House.

Mokyr, Joel. 2016. *A Culture of Growth: the Origins of the Modern Economy*. New Jersey: Princeton University Press.

Murakami, Yausuke. 2001. *Bumei no taikeishikan. (A Multi-Perspective Historical View on Civilization)*. Tokyo: Chukoron-Shinsha. Inc.

Narayan, P. K. 2005. The saving and investment nexus for China: evidence from cointegration tests. *Applied Economics*, 37(17), 1979-1990.

Quan, Hansheng. 1976. *Zhongguo Jingjishi Yanjiu [Research on Chinese economic history]*. Hong Kong: New Asia Institute of Advanced Chinese Studies.

Pesaran, M. H., Shin, Y., and Smith, R. J. 2001. Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289-326.

Pines, Yuri. 2012. *The Everlasting Empire, the Political Culture of Ancient China and Its Imperial Legacy.* Princeton: Princeton University Press.

Rosenthal, Jean-Laurent, and Wong, R. Bin. 2011. *Before and Beyond Divergence.* Cambridge, MA: Harvard University Press.

Shen, Youliang. 1998. *Zhongguo Beifang Minzu Ji Qi Zhengquan Yanjiu [A study of nationalities and regimes in north China]*. Beijing: China Minzu University Press.

Tan, Qixiang. 1996. *Zhongguo Lishi Dituji [China Historical Atlas]*. Beijing: Sinomap Press.

Tilly, Charles. 1985. "War Making and State Making as Organized Crime." In *Bringing the State Back In*, edited by Dietrich Rueschemeyer, Peter B. Evans and Theda Skocpol, 169-191. Cambridge: Cambridge University Press.

Tilly, Charles. 1990. *Coercion, Capital, and European States, AD 990-1990.* Oxford: Basil Blackwell.

Turchin, Peter. 2009. "A theory for Formation of Large Empires." *Journal of Global History* 4 (2): 191-217. https://doi.org/10.1017/S174002280900312X.

Turchin, Peter, Jonathan M. Adams, and Thomas D. Hall. 2006. "East-West Orientation of Historical Empires and Modern States." *Journal of World-Systems Research* 12 (2): 219-29. https://doi.org/10.5195/jwsr.2006.369.

Turchin, Peter, Thomas E. Currie, Edward A. L. Turner, and Sergey Gavrilets. 2013. "War,

Space, and the Evolution of Old World Complex Societies." *Proceedings of the National Academy of Sciences* 110 (41): 16384-9. https://doi.org/10.1073/pnas.1308825110.

Wang, Cun. 1992. *Zhongyuan Diqu Lishi Hanlao Qihou Yanjiu He Yuce [Research and Prediction of the Drought and Flood Climate in Historical Central China]*. Beijing: China Meteorological Press.

Wittfogel, Karl August. 1957. *Oriental Despotism: A Comparative Study of Total Power.* New Haven: Yale University Press.

Wright, Mary Clabaugh. 1957. *The Last Stand of Chinese Conservatism: The T'Ung-Chih Restoration, 1862–1874*. Stanford, CA: Stanford University Press.

Yin, Weiwen. 2020. "Climate Shocks, Political Institutions, and Nomadic Invasions in Early Modern East Asia." *Journal of Conflict Resolution* 64 (6): 1043-69. https://doi.org/10.1177/0022002719889665.

Zhang, Pingzhong, Hai Cheng, R. Lawrence Edwards, Fahu Chen, Yongjin Wang, Xunlin Yang, Jian Liu, *et al.*. 2008. "A Test of Climate, Sun, and Culture Relationships from an 1810-Year Chinese Cave Record." *Science* 322 (5903): 940-2.

Zhao, Dingxin. 2015. *The Confucian-Legalist State, a New Theory of Chinese History.* Oxford: Oxford University Press.

Appendix Table 1. Chinese Dynasties and Warfare

Chinese Dynasties	Years	Number of Recorded Warfare	Average Number of Warfare per Year
Spring and Autumn and Warring States			
Spring and Autumn Period	770BC-476BC	386	1.31
Warring States Period	475BC-221BC	228	0.9
Unification Phase (I)			
Qin	221BC-206BC	10	0.67
Western Han	206BC-AD24	114	0.5
Eastern Han	25-220	273	1.4
Fragmentation Phase (I)			
Three Kingdoms	220-265	70	1.56
Western Jin	265-317	82	1.58
Eastern Jin	317-420	234	2.27
Southern and Northern Dynasties	420-589	109	0.64
Unification Phase (II)			
Sui	581-618	88	2.38
Tang	618-907	186	0.64
Fragmentation Phase (II)			
Five Dynasties and Ten Kingdoms	907-960	72	1.36
Northern Song	960-1127	192	1.15
Southern Song	1127-1279	241	1.59
Unification Phase (III)			
Yuan	1280-1368	209	2.38
Ming	1368-1644	565	2.05
Qing	1644-1911	376	1.41

Source: Number of warfare calculated from Military History of China (Writing Group) (ed.), *A Chronology of Warfare in Dynastic China* (*Zhongguo Lidai Zhanzheng Nianbiao*).

Appendix 2. Unit-root Test and Cointegration Test

We conduct three different unit-root tests to determine the number of orders: Augmented Dickey-Fuller Test (ADF), Phillips-Perron Test (PP) and Elliot-Rothenberg-Stock Dickey-Fuleer GSL Detrended Test (DF-GLS).[29] For robustness of our test results, we conducted above tests both with and without a trend term. The results are reported in Appendix Table 2. It shows that all the variables in Equation (2) are I(0) (stationary). In this case, the confirmation of pure I(0) in system and absence of I(2) or higher order allows us to proceed to the bounds test.

Next, we use Bounds test to confirm the existence of a long-run relationship between warfare and nation size and number of Agrarian regimes.[30] Pesaran et al. (2001) point out that the validity of Bounds test requires that there is no serial correlation between the residual terms between the residual terms of regression. Therefore, we conduct Breusch-Godfrey test of one-period or four-period lag, and the results show that there doesn't exist serial correlation, which means that Bound test can be carried out. The results can be seen from Appendix Table 3. It presents the values of *F*-statistics on the existence of long-run equilibrium between wars and the two outcome variables. As suggested by Pesaran et al. (2001) and Kumar Narayan and Singh (2007), we report our results in three scenarios: unrestricted constant without trend (Panel A), unrestricted constant with restricted trend (Panel B), and unrestricted constant with unrestricted trend (Panel C). Furthermore, optimal lag orders selected by AIC for size of nation model and agrarian regimes model are: [4,0,0,2], [2,0,0,2], respectively. In addition, the results of Bounds test show that the F statistics is statistically significant at 1% level under above three situations, which means that there is a long-term equilibrium relationship between warfare and nation size and Agrarian regimes.

[29] The null hypotheses of all them is that the variable contains a unit root, and the alternative is that the variable was generated by a stationary process. Comparing with ADF and PP tests, DF-GLS has the advantage of higher power properties, which implies a low probability of type-II error.

[30] Bounds test is a F test for the coefficients of Error Correction Term, Narayan (2005) and provided the critical values of F statistics.

Appendix Table 2. Unit-Root Test and Cointegration Test

Series	Variables	Without trend			With trend			Order of Integration
		ADF	PP	DF-GLS	ADF	PP	DF-GLS	
Panel A: Dependent variables								
y_1	Size of nation	-2.68(1)*	-2.82*	-1.90(1)*	-3.17(1)*	-3.37*	-3.07(1)**	I(0)
y_2	Agrarian regimes	-3.46(3)**	-4.25***	-1.55(2)	-3.66(3)**	-4.29***	-3.20(2)**	I(0)
Panel B: Explanatory variables								
w_1	Agrarian-nomadic wars	-7.05(1)***	-7.12***	-1.52(13)	-7.08(1)***	-7.16***	-2.29(13)	I(0)
w_2	Civil wars	-6.52(3)***	-12.39***	-2.38(13)**	-6.53(3)***	-12.39***	-5.84(2)***	I(0)
w_3	Peasant uprisings	-10.52(1)***	-10.42***	-1.63(14)	-11.00(1)***	-10.83***	-9.29(1)***	I(0)

Notes: Lags for ADF test and DF-GLS test are selected by Akaike Information Criterion (AIC) and are reported in parenthesis respectively. PP reports the *t*-statistics of Phillips-Perron unit-root test. *, **, *** denote the statistical significance of rejecting the null hypothesis of existence of unit-root.

Appendix Table 3. Bounds Test for Cointegration between Wars and Agrarian Regimes

Dependent variables	Size of nation	Agrarian regimes
	(1)	(2)
Panel A: Unrestricted constant		
F	5.86***	5.88***
$\chi^2_{SC}(1)$	0.02	0.00
$\chi^2_{SC}(4)$	2.72	0.41
Optimal lag	[4,0,0,2]	[2,0,0,2]
Panel B: Unrestricted constant, restricted trend		
F	4.78***	4.68***
$\chi^2_{SC}(1)$	0.001	0.001
$\chi^2_{SC}(4)$	2.99	0.46
Optimal lag	[4,0,0,2]	[2,0,0,2]
Panel C: Unrestricted constant, unrestricted trend		
F	5.97***	5.85***
$\chi^2_{SC}(1)$	0.001	0.001
$\chi^2_{SC}(4)$	2.99	0.46
Optimal lag	[4,0,0,2]	[2,0,0,2]

Notes: F reports the F-statistics for bounds test of each underlying model with optimal lags selected by AIC. $\chi^2_{SC}(p)$ reports the test statistics and significance level for Breusch-Godfrey LM test for p^{th} order serial correlation (H_0: no serial correlation), p=1,4. Optimal lag reports the optimal lag selected by AIC. ***, ** and * denote significance at the 1%, 5% and 10% levels.

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