

Leviathan’s Offer: State-Building with Elite Compensation in Early Medieval China*

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Abstract

How to soften resistance to state-building efforts by reform losers? This paper highlights a strategy of compensation via the bureaucracy, in which the ruler offers meaningful government offices in exchange for elites’ acceptance of state-building reforms. We empirically explore this strategy in the context of the Northern Wei Dynasty (386 - 534 AD), which terminated an era of state weakness in early medieval China that initially resulted from entrenched landowning interests and fragile barbarian kingdoms. Our unique dataset combines geocoded family background and career histories of around 2,600 elites with information on medieval Chinese strongholds, which we use to infer state weakness. Leveraging a comprehensive state-building reform in the late 5th century, difference-in-differences estimates document that the reform led to a sustained, substantial increase in the total number of powerful aristocrats from localities with strongholds recruited into the imperial bureaucracy. Subsequent estimates provide evidence for three mechanisms through which compensation facilitates state-building. First, offices taken by these elites came with direct benefits of power and prestige. Second, by transforming these aristocrats from local powerfults into national stakeholders, these offices potentially induced the realignment of their interests toward those of the dynasty. Third, bureaucracy provided the regime with institutional tools of power-sharing to mitigate credible commitment problems. Findings in this paper shed light on the causes of the “First Great Divergence,” where similar barbarian invasions at similar times led to political fragmentation in Europe but further state consolidation in China.

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JEL codes: D73, H70, N45, O1.

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1 Introduction

State capacity is pivotal for economic development, but enhancing state capacity is a difficult task. This difficulty is intuitive in the various established findings that state weakness tends to persist over time (e.g. [Bockstette, Chanda and Putterman 2002](#), [Besley and Persson 2011](#), [Dell, Lane and Querubin 2018](#), [Besley et al. 2021](#)). Across space and time, state-building efforts often fail because they provoke resistance from potential reform “losers” with vested interests in the status quo. Local elites, in particular, can block or undermine such efforts using the considerable powers available to them (e.g. [Boone 2003](#), [Soifer 2005](#), [Dincecco 2015](#), [Garfias and Sellars 2021a](#)).

How can state-builders weaken elite resistance? We answer this critical question by highlighting an important yet often overlooked strategy: directly *compensating* the losers through prestigious and powerful positions in the bureaucracy that facilitate interest realignment and credible commitment. By exploiting a major state-building episode in Early Medieval China (ca. 220-589 AD), we find that powerholders in regions previously lacking state penetration saw their political careers substantially improved during and after the reform as part of a deal to relinquish local autonomy to the state.

The theoretical inquiry addressed here is also related to a historical puzzle. “Barbarian” invasions in Late Antiquity brought down the Western Roman Empire and sowed the seeds of the so-called “Feudal Revolution.” An emerging consensus in political economy argues that this process created the conditions of state weakness and political fragmentation that underlied the great political and economic divergence between Europe and the rest of the world (e.g., [Blaydes and Chaney 2013](#), [Ko, Koyama and Sng 2018](#), [Leon 2020](#)).¹ Often referred to as the “Age of Disunion,” Early Medieval China almost witnessed an identical phenomenon. As the Inner Asian equivalents of the Visigoths and Vandals destroyed the Chinese empire in the 4th century, political order collapsed into warring kingdoms and fragile dynasties that held “nominal sway over families who could rival the government in their own territory” ([de Crespigny 2019](#): 49). Two centuries later, however, a remarkably different outcome emerged as the Chinese state re-consolidated.

A key step in this “First Great Divergence”² is the Reform of 485-486 AD (hereafter “the Reform”),³ the focus of this paper. In studying how the proponents of the Reform softened elite resistance, we highlight bureaucracy, in addition to geography (e.g. [Ko and Sng 2013](#); [Ko, Koyama and Sng 2018](#)), as another key mechanism explaining the different trajectory taken by China. Bureaucratic compensation of the medieval aristocrats and the Reform it made also underpinned

¹As summarized in [Stasavage \(2016: 146\)](#): “no barbarian invasions, no democracy.”

²This term is used by [Scheidel \(2019\)](#) to describe the divergence in state formation between China and Europe that took place between 500 and 1000 AD.

³This state-building reform is *not* the “sinicization reform” (*Hanhua Gaige*) in 493 AD. The sinicization movement consisted of cultural and ethnic integration policies and is highly emphasized in the history curriculum and media propaganda in China. See Appendix [D.2](#) for a thorough discussion.

broader trends that would further distinguish China’s historical political economy from Europe, such as the making of a centralized state-strengthening elite that would only disappear in the 11th century (Wang 2021c) and the robust link between autocracy and bureaucracy from the 14th century onwards (Xi 2019, Huang and Yang forthcoming).

The Reform, carried out under the Northern Wei Dynasty (386-534 AD, hereafter “NW”), revived the mobilization capacity of the Chinese state for centuries to come. The consensus among historians is that, by deploying state-appointed agents at the grassroots for population registration and establishing a state-controlled land redistribution program for the commoners, the Reform substantially deepened state penetration and solidified its fiscal foundation especially in regions previously dominated by local powerholders (von Glahn 2016: 170-173). Rulers of the NW were acknowledged for their “outstanding success” in creating a fiscal infrastructure on the basis of a large group of tax-paying peasants (Huang 1996: 91).

The Reform undermined the aristocracy in regions previously lacking state penetration. The respective aristocratic clans had enjoyed centuries of local autonomy without state presence, but now saw their vested interests severely challenged and thus had incentives to block or undermine the Reform. The theoretical framework in Section 2 informs our empirical results on a *bureaucratic compensation strategy*, one adopted by the NW regime to soften the resistance by potential Reform losers. Our framework underscores the conditions in which this strategy is adopted by the ruler, as in NW and other cases, and those in which it is not adopted.⁴

We hand-collect and geocode datasets on the career histories of 2,590 elites of NW as well as their family background, choronym, and ethnicity, using official histories compiled in the 6th century complemented with excavated tomb epitaphs. We also geocode mentions of 4th century fortified castles (hereafter “strongholds”) that predate the NW from a variety of historical records. With the collapse of political order and prolonged warfare among fragile semi-nomadic kingdoms, peasants had to flee in massive numbers and become dependents of local aristocrats in exchange for subsistence and personal safety. Strongholds enabled aristocrats to shelter a large number of dislocated people as their private clients and serfs from the state, which desperately needed taxation revenue and manpower for military conscription. We therefore use the existence of strongholds to measure the lack of prior state penetration.

Two patterns from our data motivate the need to study loser compensation in state-building: 1) the Reform enabled NW to substantially deepen its penetration in localities with strongholds, and 2) it did not lead to more rebellions in localities with strongholds by antagonizing the local aristocrats.⁵ Our theoretical framework predicts that, as the rulers implemented the state-building

⁴We discuss the Late Roman Empire in Section H and premodern Korea in Appendix H.2.

⁵These results are in Appendix C. In contrast, reforms in Bourbon Mexico (Garfias and Sellars 2021b) and Tsarist Russia (Finkel, Gehlbach and Olsen 2015) incited large-scale social unrest.

policies of direct population control and land redistribution, they would directly compensate the aristocratic clans in regions with strongholds as potential losers and blockers of the Reform.

Using a difference-in-differences (DD) strategy, we find that the treatment group—prefectures with strongholds—experienced a substantial, sustained surge in the number of aristocrats recruited into the imperial bureaucracy compared with the control group, prefectures without strongholds, during and after the Reform. We present rich evidence supporting the interpretation that our result reflects a proactive compensation scheme for powerholders in regions that would experience vast expansion of the state apparatus due to the Reform. The increase in aristocratic recruitment from regions with strongholds following the Reform was not driven by a demographic expansion, or rising demand for elites with specific characteristics. There were no statistically significant differences between aristocrats in the treated and control groups across a wide range of personal characteristics, such as military prowess, governance capacity, experience in institutions building, literature, intelligence, and integrity. Our result is robust to an extensive set of checks, including but not limited to: a restrictive definition of aristocracy, using adjacent prefectures as the control group, removing elites with disputed identity or migration history, using non-aristocratic recruitment as a placebo test, and controlling for the time-varying effects of earlier warfare, political development, and the pattern of earlier aristocratic settlement.

Having established that the regime adopted a bureaucratic compensation strategy to mute loser resistance, we proceed with individual-level analyses to unpack the mechanisms of compensation. For a deal to be reached between the state-builders and local powerholders, two conditions must be met: (1) compensation should carry substantial and tangible direct benefits so as to offset the losses of vested interests; and (2) the deal should be *credible* in that reneging on it would incur a huge political cost to the ruler. In addition, we argue that a key mechanism of compensation through the bureaucracy is realigning the interests of the local elites with those of the regime, by having the former serve in offices designated to further the interests of the regime as a whole.

We provide evidence for all these components with a triple-differences (DDD) strategy examining the characteristics of office-holding. Our estimates reveal that aristocrats from prefectures with strongholds were more likely to hold higher-ranked and more prestigious offices after the Reform. This reflects the lucrative direct benefit in the compensation deal. We then show that aristocrats in the treated group were more likely to take senior posts in the *national* government but no more likely to take senior posts at the *regional* level. This finding indicates that state-builders took the compensation opportunity to realign the aristocrats' interests with those of the regime by trying to transform them into national stakeholders through service in the central government. Moreover, we find that even though aristocrats in the treated group were more likely to be regional governors, they were more likely to serve in jurisdictions *away* from their hometown. This result further suggests

that the reformers deliberately adopted a rotation strategy to reduce aristocrats' localist orientation.

To explore the credible commitment mechanism underpinning the compensation deal, we exploit a unique institution in the bureaucracy: offices in charge of the recruitment, evaluation and promotion of bureaucratic personnel. As such offices determine political selection, they enable the officeholders to develop networks of political allies. Our DDD estimates indeed show that aristocrats from stronghold prefectures were more likely to take offices in charge of personnel affairs during and after the Reform. By doing so, the rulers increase their own cost of renegeing on the compensation promises. As expected, the Reform did not lead to more purges against aristocrats in the treated group. Rather, they were more likely to receive promotions after the Reform. These results further substantiate the success of credible commitment through bureaucratic compensation.

Last, Section [H](#) extends our vision beyond China and discusses bureaucratic compensation in the Late Roman Empire, arguing that this case is consistent with our theoretical framework.⁶

Theoretical contributions

We contribute to research on state capacity. Extant studies recognize the role of elite incentives, but emphasize *ex ante* conditions for incentive alignment in support of state-building, including war (e.g., [Tilly 1990](#), [Gennaioli and Voth 2015](#)), internal conflict (e.g., [Blattman and Miguel 2010](#), [Slater 2010](#)), and demographic and economic crises ([Garfias 2018](#), [Garfias and Sellars 2021a](#)).

We recognize state-building as a difficult and uncertain process that not only could be prevented from initiation, but also stopped, undermined, or backfire (e.g., [Acemoglu, Moscona and Robinson 2016](#), [Wang 2021b](#)). The reform in our setting is successful in that it led to deeper state penetration *without* inciting more rebellions ([Finkel, Gehlbach and Olsen 2015](#)), and how the ruler could proactively mute elite resistance therefore deserves more scholarly attention ([Berman 2010](#)). Our paper fills this lacuna by empirically demonstrating a strategy of compensating the losers. We also revise an existing paradigm based on the analytical dichotomy of the ruler versus the local elites. Through elite compensation with offices in a centralized bureaucracy, our results show that state-builders may in fact try to align the preferences of local elites with that of the state by turning them into national stakeholders. These findings on interest realignment via bureaucratic compensation are related to [Haber, Maurer and Razo \(2003\)](#) and [Jha \(2015\)](#), where developing stakes in a different framework mobilizes the individual to support reforms facilitating that framework.

Though relatively underexplored in the state capacity scholarship, the idea of compensating the losers figures prominently in the literature on political and economic reforms. Most works in this tradition emphasize avenues of new economic gains ([Roland 2002](#)), such as the welfare state that helps compensate losers of free trade agreements (e.g., [Rodrik 1998](#), [Adsera and Boix 2002](#)),

⁶We include an additional case on premodern Korea in Appendix [H.2](#).

financial integration and asset mobility that reduce elites’ willingness to resist democratization (Boix 2003, Freeman and Quinn 2012, Jha 2015), and the transfer of asset control rights to incumbent stakeholders (e.g., Shleifer and Treisman 2000). This paper underscores *political* compensation via the bureaucracy as a new mechanism through which reformers soften resistance. Our finding on interest realignment points to a suggestive solution to problems created by partial reform, where early reform winners use their growing resources to block further reform (Hellman 1998).

In addition, we speak to a vast literature on authoritarian power-sharing by empirically highlighting that a key to compensation is indeed credible commitment (in our case facilitated by the bureaucracy) (e.g., Myerson 2008, Boix and Svolik 2013, Xi 2019). This result thus contributes to a broader scholarship linking institutional credibility to state capacity (e.g., Dincecco 2011, Garfias 2019). Relatedly, we also extend the cooptation literature, which has predominantly studied how incumbent politicians neutralize challengers via institutional and government positions (e.g., Truex 2014; Meng 2020). Our findings on loser compensation reveal the wider strategic use of government offices going beyond enhancing incumbent political survival to facilitating broader policy changes.⁷

This paper is organized as follows. Section 2 presents our theoretical argument. Section 3 provides the historical context of our empirical setting. Section 4 describes the data sources and identification strategy. Section 5 reports evidence on compensation. Section 6 examines the mechanisms of compensation. Section 7 concludes.

2 State-building and Bureaucratic Compensation

This section presents a theoretical framework of state-building through bureaucratic compensation that centers on a ruler and an aristocrat. It is formalized by a model in Appendix F.⁸

State-building. The aristocrat is a local powerholder, who controls the productive assets and population of a locality. He is able to extract resources—productive and military outputs—from the population. The ruler decides to *engage in state-building*: she takes over the aristocrat’s control of resources by deploying state-appointed agents to directly manage the local population. She is then able to directly extract taxes and military services from the local people.

In doing so, the ruler faces resistance from the aristocrat who suffers economic losses. Such resistance is common, as local powerholders across various contexts of the developing world are

⁷The word “cooptation” is also employed in the literature on indirect rule in colonialism (e.g. Müller-Crepon 2020). Bureaucratic compensation differs from indirect rule not just because the reform we study marked a period of transition from indirect to *direct* rule in Chinese history. More importantly, cooptation in indirect colonial rule is chiefly based on the formal recognition of existing pre-colonial authorities, whereas bureaucratic compensation theorized here entails highly valued offices and thus substantial elite integration into the top echelon of political power in the conquering party.

⁸Appendix F also includes an explicit discussion of off-the-equilibrium actions and historical examples.

endowed with the means to undermine or obstruct state-building efforts. They could deploy patron-client ties sustained through landed wealth, or mobilize the local population to defy control by the state. Attempting to subdue resistance to state-building, the ruler thus has two options: she could build the state with force, or with a compensation offer.

It should be noted that state-building, whether by force or by compensation, requires some level of military strength on behalf of the ruler. Otherwise, the aristocrat can use force to defend their local autonomy with relative ease.⁹ Moreover, state-building by force incurs economic and political costs, and is only attractive when such costs are small relative to the expected gains. A ruler who is sufficiently strong will prefer to use force as she can easily take over local resources without having to make any concessions or incurring too much cost.¹⁰ Thus, when the ruler is neither too strong nor too weak, compensation offer emerges as an attractive strategy for state-building.¹¹

Compensation through the Bureaucracy. Under the compensation strategy, the ruler gives the aristocrat offices in the bureaucracy to offset his economic losses from the ruler’s state-building venture. Bureaucratic administrations, both historical and modern, display a number of stereotypical components: well-defined spheres of responsibility, hierarchical organization of officials based on these spheres, and a high degree of record keeping (Weber 1978: 956-8).¹² An official of a bureaucracy has clear knowledge of the power that his office permits him to exercise and the prospects of career advancement in the hierarchy, which helps him form reliable expectations on the payoffs from office-holding. Thus, the existence of a bureaucracy as such is the premise for political compensation.¹³

A bureaucratic office generates positive payoffs to its holder from three sources: monetary remuneration, power, and prestige. Money is obviously valuable. The power attached to the office enables its holder to extract rents (e.g., Xu 2018). Prestige brings social and political recognition, which facilitates the accumulation of political capital by its holder. Differences in the values of offices allow the ruler to compensate aristocrats in accordance with the size of their economic losses and the level of their abilities to resist state-building. Aristocrats who suffer greater losses or are more powerful should receive more valuable offices.

⁹This lower-bound on ruler strength coincides with the observation in Berman (2010) that a compensation-based state-building strategy requires enough military power to increase the cost of resistance by local strongpersons. Wang (2021a) provides a framework of how relative military capacity determines institutions.

¹⁰The “by force” option can be exercised without force *per se* actually carried out but only implied in the background. See Garfias and Sellars (2021a) for how exogenous increase in the ruler’s relative strength enables her to centralize political authority and enhance state capacity dictatorially against the wish of local powerholders.

¹¹See Proposition 2 in Appendix F.

¹²Administrations of the Qin-Han empires (nominally from 221 BC to 220 AD and further developed under the Western Jin until 306 AD), although not completely bureaucratic, were significantly closer to this ideal compared to other premodern empires (Zhao 2015).

¹³Proposition 2 in Appendix F formalizes this condition and discusses Northern Wei’s inheritance of the bureaucratic legacies of the Qin-Han empires.

The nature of the payoffs that an aristocrat can acquire from office-holding has implications for his behavioral incentives to serve the public interest or his own private interest. We conceptualize the payoffs as comprising an *appropriable* part, which the aristocrat can convert into his private asset and retain after leaving office, and an *inappropriable* part, which only the incumbent office-holder can receive. An appropriable payoff is the political capital that an aristocrat develops while holding office, which can be transmitted to his descendants. An inappropriable payoff is the flow of rents that the ruler shares with the incumbent office-holder: wages, privileges and other benefits.

This payoff structure enables the ruler to exercise *interest realignment*, that is, to align the incentives of state officials with her own. She can do so by inviting the aristocrat to develop a stake in the regime and to share the gains of a strong state, thereby incentivizing him to participate in activities that benefit the state as a whole (Jha 2012). Intuitively, interest realignment is feasible if the regime has sufficiently high rents to share with its officials; and a Reform that grows the national “pie” would thus become mutually reinforcing with interest realignment.¹⁴ Offices conducive to interest realignment are ones that can transform the aristocrat’s once localist interests into nationalized ones, or facilitate political ventures that help expand the interests of the state. Senior posts in the central government, as opposed to regional ones in the aristocrat’s hometown, are an example of such offices.

Lastly, this compensation deal between the ruler and the aristocrat must be credible (Roland 2002, Acemoglu 2003).¹⁵ First, the institution of bureaucracy implies delegation of power in the form of a principal-agent relationship. By construction, such relationship consists of various formal rules that are common knowledge to both the ruler and members of her ruling coalition.¹⁶ This feature facilitates credible power-sharing because further expansion of personal power by the ruler at the expense of the ruling coalition entails the violation of one or more of such rules, the process of which could send a signal for all members of the ruling coalition to resist the ruler’s power-grab (Svolik 2009). Second, certain offices in the bureaucracy can help their holders build personal power in the organization, thereby forming a *de facto* check on the ruler’s power. Prominent ones include those that select, appoint and manage personnel in the bureaucracy. Holders of such offices could use this public power to build networks of personal loyalists and put them into important positions.¹⁷

To sum up, two testable implications from the foregoing discussion guide our empirical analyses. A state-builder who enjoys a medium level of strength implements political compensation through the bureaucracy in the following ways:

¹⁴See Proposition 5 of Appendix F for a formal derivation and a discussion in relation to Northern Wei.

¹⁵See Haber, Maurer and Razo (2003) for how political and economic elites, through institutions such as the bureaucracy, shared rents and achieved credible commitment.

¹⁶See McCubbins, Noll and Weingast (1987) for how principal-agent relationships entail formal rules to ensure compliance.

¹⁷Joseph Stalin is an example of how this particular type of officeholders can become real contenders to the throne.

1. Local powerholders receive offices in the bureaucracy as compensation for accepting state penetration. In particular, the more powerful among them receive even higher compensation.¹⁸
2. Powerholders receive compensation in the form of offices that: (a) carry actual benefits such as power and prestige, (b) realign his interest with that of the ruler and (c) mitigate the credible commitment problems.¹⁹

3 Historical Background

This section begins by describing the trend towards local autonomy and state weakness, and the rise of the medieval Chinese aristocracy in 2nd-4th centuries AD. It then discusses the state-building Reform of 485-486 AD under the Northern Wei regime that paved the way for the revival of unified Chinese dynasties from the late 6th century onwards. Note that this state-building Reform is *not* to be confused with a cultural reform of ethnic integration beginning in 493 AD under Emperor Xiaowen. Although ethnic relations have become the most popularly discussed aspect of Northern Wei history, historians consider state revival as another major, if not more important, legacy of the dynasty (Huang 1996, Yan 2017).²⁰

See Figure 1 for a timeline of dynasties and important developments. We describe the end of Northern Wei in Appendix D.3.

3.1 State Weakness and Aristocratic Families in Northern China

Well noted by scholars of Chinese history were two long-term developments already underway during the unified rule of the Later Han Dynasty (25-220 AD), also known as the Eastern Han Dynasty: the decline in the power of the imperial government, and the growth of large estates owned by prominent local aristocrats obsessed with family pedigree and capable of transmitting wealth and power through generations (e.g., Ebrey 1978, Wang 2003). These aristocrats grew more powerful amid the political division after 220 AD, as aspiring rulers had to offer them immense institutionalized privileges in exchange for their political support (Lewis 2011: 37-44). State concessions to the landed aristocrats culminated in two mutually-reinforcing policies during the Western Jin Dynasty (265-316 AD): politically, via the “Rectifying System,” members of the most prestigious clans in each

¹⁸See Proposition 3. Proposition 2 briefly discusses the cost of this bureaucratic compensation strategy.

¹⁹See Propositions 3, 5 and 1.

²⁰We describe the ethnic integration reform in Appendix D.2. Empirically, patterns of ethnic relations (between Xianbei and ethnic Han Chinese) in the dynasty are orthogonal to the results in this paper, as models in Section 5 exploit comparisons *within* the aristocracy (who are exclusively ethnic Han) and models in Section 6 control for ethnic identity. Substantively, as explained in Appendix D.2, by uncovering the bureaucratic compensation strategy in this paper, we also make an original contribution to the study of medieval history as our results reveal a strategic logic of the later ethnic integration reform that has not been previously noticed.

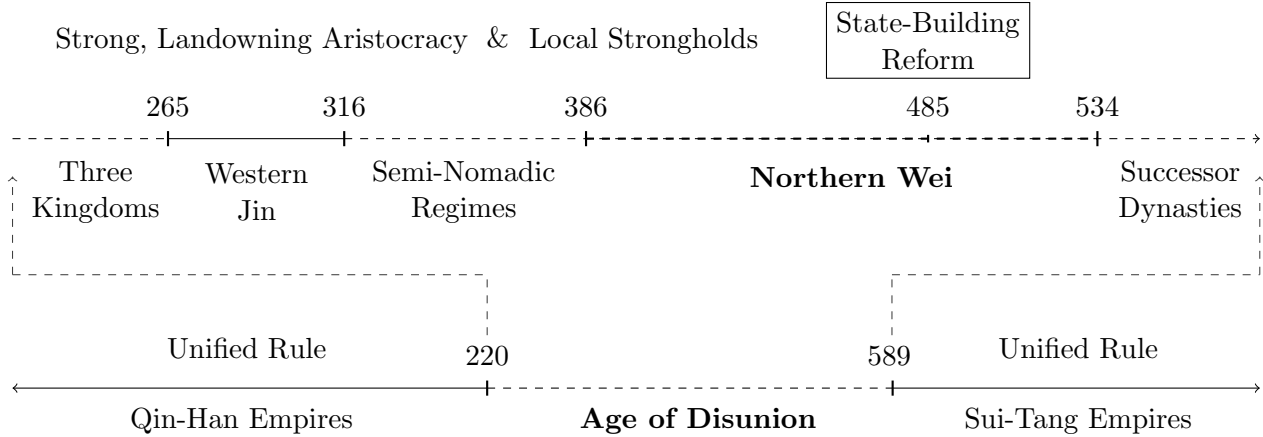


Figure 1. Historical Timeline of Early Medieval China

Notes: this figure illustrates the historical timeline of Early Medieval China, with a focus on the Age of Disunion (220-589 AD). This era is characterized by political fragmentation and intense warfare, except for a brief period of unification under the Western Jin (265-316 AD). Dashed timeline indicates political division, and solid timeline indicates unified rule.

locality now dominated the pool of candidates from their area for government positions (Lewis 2011: 42);²¹ economically, holders of government positions (as well as the offspring of prominent prior holders) were offered serfs and vast amounts of new land for their families (Wang 2003: 171-172). While state capture by local interests had become increasingly prevalent in the 2nd century,²² the imperially-sanctioned privileges in the 3rd century further enhanced the position of the elite landowners at the expense of the state, making them “a danger to the dynasty through their possession of both financial and administrative power” (Chaussende 2019: 90).²³

The true nadir of imperial authority came in the 4th century (Lewis 2011: 42). Via a similar process to the end of Roman rule in Europe, the Chinese empire, briefly reunified under Western Jin, completely collapsed and disintegrated into various successive kingdoms in the early 300’s. These regimes were led by nomadic or semi-nomadic peoples previously living within or just beyond the imperial border.²⁴ Some aristocrats migrated and formed another Chinese dynasty in the south.²⁵ Many powerful, prominent aristocrats, however, remained in the north and exercised local influence with the political, economic, and cultural capital accumulated through their roles in the prior dynasties (Ebrey 1978: 19-20).

It was during this century of “endemic warfare, widespread misery, and political and economic

²¹We empirically examine how the “Rectifying System” (*jiupin zhongzheng zhi*) fared after the Reform in Table 6.

²²Brown and Xie (2015).

²³Von Glahn (2016) noted the further erosion of state capacity from these developments (serfdom and private clientage in particular), as evidenced by the decline of state-registered population under Western Jin (p.268).

²⁴For the gradual movements of these peoples into the Chinese sphere of influence over centuries, see Holcombe (2019: 119-124) for an introduction.

²⁵The capital of this new dynasty is *Jiankang*, the modern day Nanjing, which is situated on the south side of the Yangtze River.

collapse”²⁶ that mentions of “strongholds” (*wubao* or *wubi*) became prevalent in the historical records.²⁷ In massive numbers, dislocated people in the north took refuge in regions with strongholds for protection and subsistence, and subsequently became serfs in the estates of aristocratic families (Lewis 2011: 131, von Glahn 2016: 265-266).²⁸ With strongholds dotted across northern China in the absence of state, governance in many regions fell to the hands of local aristocrats with self-sufficient estates managed by the refugee population now dependent on them as clients in arms (Graff 2003: 55-56; von Glahn 2016: 265-266).

This locally fragmented landscape fell under the rule of warring barbarian regimes only nominally, and none of the regimes was able to establish a stable government (Ebrey 1978: 24). Self-perpetuating state weakness thus manifested itself in the barbarian rulers’ struggle to extract manpower (let alone revenue) from the regions, as well as their failure to conquer one another.²⁹ Due to their “inability to register population and politically mobilize the elites,” the northern regimes’ administration in the 4th century “seem to have extended little beyond the immediate hinterland of the capital” (Lewis 2011: 125).

3.2 Northern Wei, Local Autonomy, and the Reform of 485-486 AD

Founded by the Tuoba branch of the Inner Asian Xianbei people, the NW Dynasty would effectively reverse the process of feudalization in medieval China (Scheidel 2019: 227-247). In the several decades spanning from the end of the 4th to early 5th centuries, the Tuoba rulers first secured Xianbei hegemony in the modern-day Inner Mongolia and then launched attacks southward, conquering the barbarian kingdoms located in the Chinese hinterland.³⁰ Their governance of northern China for most of the 5th century also involved the service by a small number of Chinese aristocrats in the imperial court, who helped establish basic Chinese institutions and rituals largely inherited from the earlier empires.

To sustain nominal unification, the regime abandoned its efforts to register population in regions with strongholds by formally recognizing their local autonomy in exchange for a small amount of financial contribution and corvée labor delivered by local aristocrats (Pearce 2019: 174, Li 1986).

²⁶Holcombe (2019: 144).

²⁷English translations of the same Chinese phrase are “strongholds,” “forts,” “fortified villages,” “fortified communities,” etc. We adopt “strongholds” as used in Pearce (2019). Strongholds were the Chinese equivalents to the “castles of Japan or medieval Europe” (de Crespigny 1995: 6). We believe that direct parallels to the Chinese aristocrats in stronghold regions were the Roman aristocratic “potentates” in the 5th century AD Gaul during barbarian invasions (Mathisen 2011).

²⁸The same process through which disastrous wars led aristocrats to build fortifications, absorb dislocated people as their clients seeking protection, and expand their possessions of land and serfs was already in full display during Han Dynasty’s collapse and the resulting Three Kingdoms period in the 3rd century (Wang 2003: 136-137). The phenomenon took on an even larger scale in the 4th century.

²⁹For a detailed military history of the barbarian kingdoms and their fragile, indirect rule of the regions through local elites of fortified estates, see Chapter 3 of Graff (2003).

³⁰See Graff (2003: 69-72) for a short introduction to NW’s military conquest of northern China.

Such formalization further deepened aristocrats' control over the local society in these regions, and as the small number of independent farmers found the burden of corvée labor increasingly heavier, they fled to the private clientage of local aristocrats, further reducing the size of the registered populace for NW (von Glahn 2016: 299-300).

Under the reign of Empress Dowager Feng, NW implemented a reform package in 485-486 AD ("the Reform") that broke the vicious cycle of state weakness. The Reform comprised of two interlocking procedures. The "equal-field system" (*juntian-zhi*) claimed state ownership of all land on earth and redistributed land to commoners.³¹ The goal was to undermine the economic dominance of local aristocrats, whose dependents lived in strongholds that spread across the North and were sheltered from taxation to the state (Xiong 2019: 313). To better achieve this objective, the state accompanied the equal-field system with the "three-elders system" (*sanzhang-zhi*). This system saw the deployment of state-appointed villagers to detect and re-register population outside of state accounts (Hou 2002), and resulted in the creation of new county government offices to administer the newly registered people. The Reform thus "not only weakened the dominance of local magnates but also created a network of grassroots organizations that kept local residents under surveillance" (Xiong 2019: 313). Altogether, the Reform created a stable fiscal basis for the empire, allowing NW rulers to fully exploit the manpower and wealth in the Chinese hinterland (Pearce 2019: 174, Li 2018: 369). Consensus among scholars of Chinese history credits the NW regime with laying the foundation for China's eventual unification in 589 AD under the Sui Dynasty.

Having so thoroughly shifted the status quo, the Reform saw potential losers and blockers in the locally powerful aristocrats of regions with strongholds. With clients re-registered by the state and offered new land of their own, the aristocrats suffered a political blow to their local influence and now foresaw the coming financial strain on their offspring for generations to come.³² As in elsewhere, reforms to improve state capacity were met with strong resistance in medieval China. An attempt of much lesser extent in the 3rd century resulted in the execution of state-builders by the antagonized landed aristocrats (de Crespigny 2019: 47). Prior to the Reform, tentative efforts to remove some population from aristocrats' control were met with resistance at the grassroots and had to be aborted.³³ When the Empress Dowager discussed the Reform's promulgation at court,

³¹Land was classified into two types. After reaching an advanced age, land recipients (male and female) would return one type of land ("open fields") to the state, but their offspring would inherit the other type ("mulberry fields") (Xiong 2019: 313).

³²The *equal-field* system was different from the Land Reform in the 1950s where the Chinese Communist Party confiscated the vast majority of land from the landlords. The *equal-field* system stipulated that those without land (e.g. serfs) would gain relatively equal shares of previously unused land. It also banned the already-landowning aristocrats from further expanding their landholdings by encroaching upon the previously unused land. See Ebrey (1978: 82-83) for a discussion.

³³*Book of Wei*, vol. 24. More specifically, these efforts resulted in a series of social unrest allegedly engineered by local aristocrats.

three elites voiced opposition, all of whom came from prominent aristocratic families in stronghold regions.³⁴ As the Reform went on, however, no records indicate further resistance by aristocrats in the imperial court.

The discussion thus far reveals two aspects of the Reform: a) the Reform had astonishing success in enhancing state capacity, and b) despite clear potential and initial action, resistance to the Reform by local powerholders became muted later on. Appendix C brings forward key findings by historians of China that are further supportive of a), and reports quantitative evidence using our data on state penetration and local rebellions that is consistent with both a) and b). The Reform is thus puzzling from a political economy perspective. In making sense of NW’s success in re-establishing centralized direct rule over the Chinese population, Ebrey (1978) speculates that the regime might have reached a deal with the landed aristocrats, in which the former would offer powerful and prestigious government positions in exchange for the latter’s local autonomy (p.25).³⁵ This compensation strategy will receive systematic evidence in the ensuing sections.

4 Data and Empirical Strategy

This section presents the data used for our empirical analysis and their sources, discusses the construction of key variables, and describes the main empirical strategy.

4.1 Data Sources

Political Elites. We hand-collect data on elites of Northern Wei. The main source we use is the *Book of Wei* (*Weishu*) that describes the dynastic history of Northern Wei and is part of the official “Twenty-Four Dynastic Histories” collection. It was compiled in 544 AD, under Northern Wei’s immediate successor regime, with exclusive access to Northern Wei archives and the wide availability of oral histories of elite families. The *Book* is also the only historical text exclusively devoted to describing Northern Wei that survives to this day. In a format consistent with other dynastic histories, the *Book of Wei* includes biographies of Northern Wei statesmen and notable individuals.

³⁴In addition to the Empress herself (whose family had completely relocated to the capital one generation ago), the two supporters of the Reform, Li Chong and Tuoba Pi, were both centralized elites. Li Chong was Empress Dowager’s lover, and his family had completely relocated to the capital one generation ago, and his niece was married into the royal household. Tuoba Pi was a royal prince. Appendix D.1 describes this court discussion in detail.

³⁵Historians used to speculate that perhaps NW compromised at the implementation stage by letting clan members of landed aristocrats be the state-appointed villagers in charge of population registration and surveillance in the *three-elders* system. This view is systematically rejected by more recent research by Hou (2002), which points out that these villagers were petty clerks of immense responsibility and career risks who were also in a different track than other government officials, so aristocratic families would not condescend themselves to such service. Our data lends further support to Hou (2002): 0% of the elites ever served such a role.

We complement the *Book of Wei* with excavated tomb epitaphs of Northern Wei individuals, assembled by the China Stone Inscription Database.³⁶ These tomb epitaphs are slabs of stones on which biographies of the deceased are inscribed, and are widely used by historians as primary sources for studying relevant historical periods.³⁷

These two sources cover *every* political elite in Northern Wei that is currently known to contemporary scholars.³⁸ For each of the 2,590 elites in our sample (2,308 from the *Book of Wei* and 282 from tomb epitaphs), we digitize and geocode his biographical and career information. The biographical data contains the elite’s name, ethnicity, choronym (place of origin), and family pedigree; and the career data contains the offices and noble titles he held, where he was stationed and the reigning emperor during the tenure of each office.

Offices in the Bureaucracy. We construct a dataset on the characteristics of several hundred bureaucratic offices in NW, from a number of historical and modern scholarly sources.³⁹ For each office, we have information on its rank, functions (whether it is civil or military, in the central or in the regional government), and quality (whether it is “pure” or “sullied”, substantive or insignificant).⁴⁰

To facilitate empirical analysis, we convert office rank to a numerical scale. Ranks in the Chinese imperial bureaucracy follow a nine-rank system, with one being the highest rank, and nine being the lowest. Our conversion method rearranges ranks into an ascending order, where an increase in numerical value of 2 corresponds to a rise of one rank (see Appendix G.2 for details).

Strongholds. We collect data on 4th century strongholds, which predate the Northern Wei, from records in three sources: *Book of Jin (Jinshu)*, *Comprehensive Mirror in Aid of Governance (Zizhi Tongjian)*, and *Commentary to the River Classic (Shuijing Zhu)*.⁴¹ We search for mentions of strongholds using a list of six keywords: strongholds, castles, (erected) walls, (erected) barriers, defend (oneself) at natural obstacles, and self-fortify.⁴² We find 105 mentions of strongholds with prefecture-level location information, excluding mentions of strongholds raised by government armies for military purposes. These mentions usually contain explicit references to civilian communities, sometimes up to tens of thousands of households, who were serfs to stronghold owners. Moreover,

³⁶See [China Stone Inscription Database](#).

³⁷For example, [Tackett \(2014\)](#) used epitaphs to study the great clans of the Tang dynasty. See Figure B1 for an example epitaph.

³⁸When describing the data and empirical analyses hereafter, we use the word “elite” to mean an individual in our data. See Appendix G.1 for a discussion of the sample of elites.

³⁹The main source is the *Treatise on State Offices (guanshi-zhi)* in the *Book of Wei*. We use [Zhang \(2017\)](#) for information on pure and sullied offices, and [Zhang \(2004\)](#) for information on military generals and substantive offices.

⁴⁰In short, a “pure office” (*qingguan*) is deemed suitable for men of high birth, and a substantive office entails real responsibilities ([Lewis 2011: 44](#)). For more details, see discussion in Section 6.1.

⁴¹See Appendix G.1 for details on these sources.

⁴²The corresponding Chinese terms are *wu*, *bao*, *bi*, *lei*, *juxian* and *zigu*.

recent archaeological discovery reveals that local government may have already delegated important functions to stronghold owners by the early 4th century (Zhang 2015a). Stronghold mentions in our dataset thus reflect substantial local autonomy and therefore a lack of state penetration. They map to 41 prefectures, which are 16.5% of all prefectures in our dataset.

Other Data. We hand-collect data on counties in each prefecture from Mu, Wu and Wei (2016), a study of historical administrative divisions in China. For each county on record, we know its name, present-day location, and years of creation and abolition.

We also compile a dataset on conflicts in NW.⁴³ We are able to identify 157 conflicts with prefecture-level information. Conflicts are of three types: external war between NW and other regimes, peasant uprisings led by civilians, and rebellions led by NW elites.

We collect a host of geographic characteristics for each prefecture as our baseline controls: terrain ruggedness,⁴⁴ river density,⁴⁵ and the suitability indexes of two staple foods in China, rice and wheat.⁴⁶ Since a map of NW prefectures with clear boundaries does not exist, we compute the average values of each of those four variables across a 50-kilometer radius of the capital cities of each prefecture. Summary statistics and definitions for the main variables used in our empirical analysis can be found in Tables A2 and G4 respectively.

4.2 Defining Aristocracy

The centerpiece of our paper is the powerful aristocratic families, some of whom exercised control over local population and economy through local strongholds and therefore stood to lose from NW’s state-building reforms. We operationalize the concept of aristocracy—one that captures the enormous political, economic, and cultural capital possessed by the aristocratic families—by tracing the activity of affiliated individuals in earlier empires.

We employ the following definition of aristocracy throughout our analysis: an elite is an *aristocrat* if an individual with the same choronym-surname has a biography in the dynastic histories of earlier empires between 25 AD and 300 AD.⁴⁷ These records are *Book of the Later Han*, *Records of the Three Kingdoms* and *Book of Jin*.⁴⁸ They belong to the official “Twenty-Four Dynastic Histories”

⁴³Data on conflicts are extracted from two sources: the *Book of Wei*, and the *Catalogue of Historical Wars: Zhongguo Lidai Zhanzheng Nianbiao*, compiled by China’s Military History Editorial Committee.

⁴⁴The metric we use to compute this index is the amount of elevation difference between adjacent cells of a digital elevation grid using data provided by [United States Geographic Services \(USGS\)](#).

⁴⁵Source: [CHGIS database](#).

⁴⁶Source: [Food and Agriculture Organization \(FAO\)](#). The index ranges between 0 and 10,000, and a larger number indicates higher suitability.

⁴⁷We perform a validation check for this measure in Appendix G.3.

⁴⁸*Book of the Later Han* is an early 5th century text covering the history from 6 to 189 AD. *Records of the Three Kingdoms* is a late 3rd century text covering the history from 180 to 280 AD, approximately. We choose 25 AD as the starting point because it was the founding year of the Later Han Empire. As explained in Section 3, it was during Later Han that the seeds of the medieval Chinese aristocracy were sown. We choose 300 AD as the ending point

collection. We use choronym-surname to identify family affiliations because it was common practice for prominent families in imperial China to distinguish themselves by associating the family surname with their place of origin. Famous examples of the medieval period include the Clan Cui of Qinghe and Clan Du of Jingzhao, whose members held prestigious offices in various regimes and wielded significant social and political influence.

We choose the Later Han Dynasty as the earliest dynasty from which to draw historical biographies because the first century was commonly understood as the era during which many prominent medieval Chinese families began to emerge (see Section 3.1). Inclusion in historical biographies suggests that ancestors of the family were politically active and highly likely to have made accomplishments in administration, military, literature or moral integrity. Thus, they were at a particularly advantageous position to further accumulate and transmit political, economic and cultural capital to their descendants.⁴⁹ Importantly, regime transitions in the 3rd century, which were elite-led coups or usurpation, forced aspiring rulers of the new dynasty to offer other politically active elites many privileges in order to enlist their support.⁵⁰ Ancestors featured in prior historical biographies were therefore more likely to take advantage of these developments, and the individuals in our dataset with ancestors featured were therefore more likely to have stronger local power bases.

We further devise a more restrictive definition of aristocracy, which is used in our heterogeneity analysis and robustness checks. This definition states that an elite is an *aristocrat* if an individual with the same choronym-surname held top bureaucratic offices in earlier empires.⁵¹ In other words, only elites with the most prestigious family pedigree qualify as aristocrats.

Under the main and restrictive definitions, 29.24% and 20.09% of all elites, and 46.66% and 32.27% of all ethnic Han elites in our sample are aristocrats.⁵² Given that elites who appear in our data sources are already in the top echelon of the imperial bureaucracy, these percentages suggest that the socio-political status of medieval Chinese aristocrats demonstrated remarkable persistence over centuries.

Figure 2 presents a map of NW, with blue castles denoting prefectures with strongholds. Most strongholds are located in present-day central China. It also displays the spatial distribution of all aristocrats in our sample.

because it was the last year of political stability in northern China: a brief but excessively catastrophic civil war erupted in 301 AD and was followed immediately by barbarian invasions.

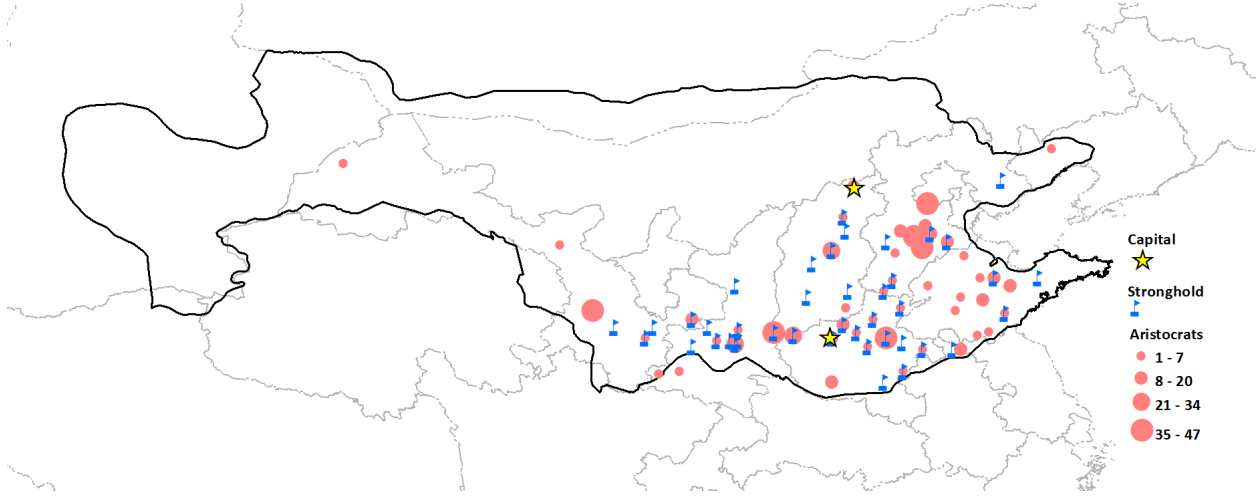
⁴⁹For the semi-hereditary nature of political power in medieval China, see Johnson (1970) and Mao (1988).

⁵⁰A prominent example is the land enclosure policies under Western Jin, where officials of the dynasty and offsprings of prominent officials in the former dynasties were given a green light to expand their landholdings and take on serfs (see Section 3.1).

⁵¹These are Grand Councilors (*zaixiang*); Minister of Works, Minister over the Masses, and Defender-in-Chief (*sikong*, *situ* and *taiwei*, collectively called the Three Dukes (*sangong*)); Grand Preceptor, Grand Mentor, Grand Guardian, Great Steward, General-in-Chief and Great Manager of Mounts (*taishi*, *taifu*, *taibao*, *taizai*, *da-jiangjun* and *da-sima*, collectively called *shangshi*). Translations are from Hucker (1985).

⁵²This paper uses “ethnic Han,” “ethnic Han Chinese,” and “Chinese” interchangeably.

Figure 2. Geographical Distribution of Strongholds and Aristocrats



Notes: This figure displays the geographical distribution of strongholds and aristocrats (main definition) recruited into the NW regime at the prefecture level. The black line depicts the territory of Northern Wei in approximately 504 AD.

4.3 Empirical Strategy

In the ideal world, our theory would be tested with data on more direct measures of elite wealth such as land and the number of private serfs and armed clients, but such information do not exist for a context as far back as 1,600 years ago. Thus, we focus on *aristocrats in stronghold prefectures* as the group of powerful landed elites who were willing to and capable of resisting the Reform and therefore needed to be compensated, and aristocrats in prefectures *without* strongholds as their counterparts whom the regime did not need to compensate.⁵³ By restricting our attention to the most politically prominent group, our method of measuring locally powerful extractive elites is similar to the one in [Acemoglu, Reed and Robinson \(2014\)](#) that identifies a list of local chiefs in modern-day Sierra Leone. Although our argument is based on economic vested interests and power, this method is well suited to our research because, as described in Section 3, a family's local economic dominance largely dovetailed with its socio-political capital that is reflected in the enduring clan pedigree and the strongholds that helped prevent state penetration.⁵⁴

We employ a standard difference-in-differences (DD) strategy to test Prediction 1 of Section 2. We assess the effect of the Reform by estimating Equation 1 below at the level of prefecture-time.⁵⁵ The treatment group consists of prefectures with mentions of pre-existing strongholds, which reflects

⁵³ As in [Acemoglu, Reed and Robinson \(2014\)](#) and [Garfias and Sellars \(2021a\)](#), we do not further distinguish between willingness and capacity to resist state-building reforms because the amount of economic vested interests, which reflect willingness, also underpin the ability to hire self-defense and engage in practices of subversion.

⁵⁴ Of course, strongholds can also be viewed as a *direct*, though imperfect, indicator of additional economic dominance.

⁵⁵ Each time period corresponds to approximately 10 to 14 years of reign under a specific ruler. See Table A1 for how time periods are defined. Prefectures (*jun*) were the second lowest level of the imperial administrative hierarchy in medieval China, with the lowest level being counties.

a high degree of aristocratic control of the local economy and population, and the control group consists of prefectures without strongholds. Aristocrats in prefectures with strongholds are the local powerholders, and therefore economic losers of the Reform that the regime seeks to compensate.

$$Y_{pt} = \beta \text{Stronghold}_p \times \text{Reform}_t + \phi_p + \gamma_t + \epsilon_{pt} \quad (1)$$

Here, Y_{pt} is the outcome of interest for prefecture p during period t , which, in our main analysis, is the number of aristocrats recruited per year. Stronghold_p is an indicator variable that is equal to 1 if prefecture p has 4th century strongholds. Reform_t is equal to 1 if period t is during or after the reign of Empress Dowager Feng, which is from 477 to 490 AD. Prefecture fixed effects ϕ_p control for time-invariant unit-specific differences, and time fixed effects γ_t control for variations over time that are common to all prefectures. To allow for serial correlation of the error terms, we cluster standard errors at the prefecture level.

The identifying assumption for our DD strategy is that non-stronghold prefectures provide an appropriate counterfactual for what would have happened in stronghold prefectures in the absence of the Reform. The coefficient β therefore estimates the causal effect of the Reform on the outcomes of interest.

5 Main Results

As described in Section 3, the Reform was remarkable both for its success in reviving the Chinese state and for the relative lack of documented resistance. We provide detailed evidence in Appendix C, both quantitative and qualitative, that the Reform enhanced state capacity but did not lead to local resistance, the facts of which motivate us to investigate how a state-building regime could soften resistance by powerful vested interests.⁵⁶ This section and the next report a diverse array of evidence to document the bureaucratic compensation strategy theorized in Section 2.

5.1 Reform and Recruitment

We now establish the main result of the paper: the NW massively recruited aristocrats from stronghold areas as a result of the Reform. We estimate Equation 1, using as dependent variable the number of aristocrats who first held state offices in time period t , divided by the number of years in t .⁵⁷

Table 1 reports the results. Column (1) indicates that 0.081 additional aristocrats from stronghold prefectures are recruited into the regime per year, compared to non-stronghold prefectures. This

⁵⁶We discuss additional background of the Reform and other parts of NW history in Appendix D.

⁵⁷Recall that each time period corresponds to a particular ruler's reign. This weighting does not affect our results.

Table 1. Effects of Reform on Aristocratic Recruitment

	Number of Aristocrats Recruited			
	(1)	(2)	(3)	(4)
Stronghold $\times$ Reform	0.081*** (0.030)	0.077** (0.030)	0.072** (0.029)	0.056** (0.022)
Mean of D.V.	0.020	0.020	0.020	0.020
Time FE	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes
Province-Time FE	No	No	Yes	No
Prefecture Linear Trend	No	No	No	Yes
Observations	2,739	2,739	2,739	2,739
R-squared	0.486	0.499	0.510	0.805

Notes: This table presents the effect of the Reform on aristocratic recruitment. The unit of observation is prefecture-time. Controls include the number of civil conflicts and foreign invasions (lagged), and the interaction between time dummies and terrain ruggedness index, river density, and suitability index of rice and wheat. Robust standard errors in parentheses are clustered at prefecture level. ***, **, * denote significance at 1%, 5%, 10% level.

magnitude represents a 4.05 fold increase relative to the mean of 0.02, which is statistically significant at the 1% level. This estimate remains practically unchanged with the addition of geographical characteristics (interacted with the time dummies) and prefecture-level lagged conflicts as controls (column 2), or with province-time fixed effects, and is robust to prefecture-specific linear trends.⁵⁸ The results are also robust (and become more precise) to using spatial standard errors (See Table A3). These estimates show that the Reform caused a large number of aristocrats to be recruited from the strongholds prefectures. Table C2 of Appendix C shows that the extent of aristocratic recruitment as Reform compensation is associated with the amount of state penetration that the regime was able to achieve in stronghold localities through the Reform.

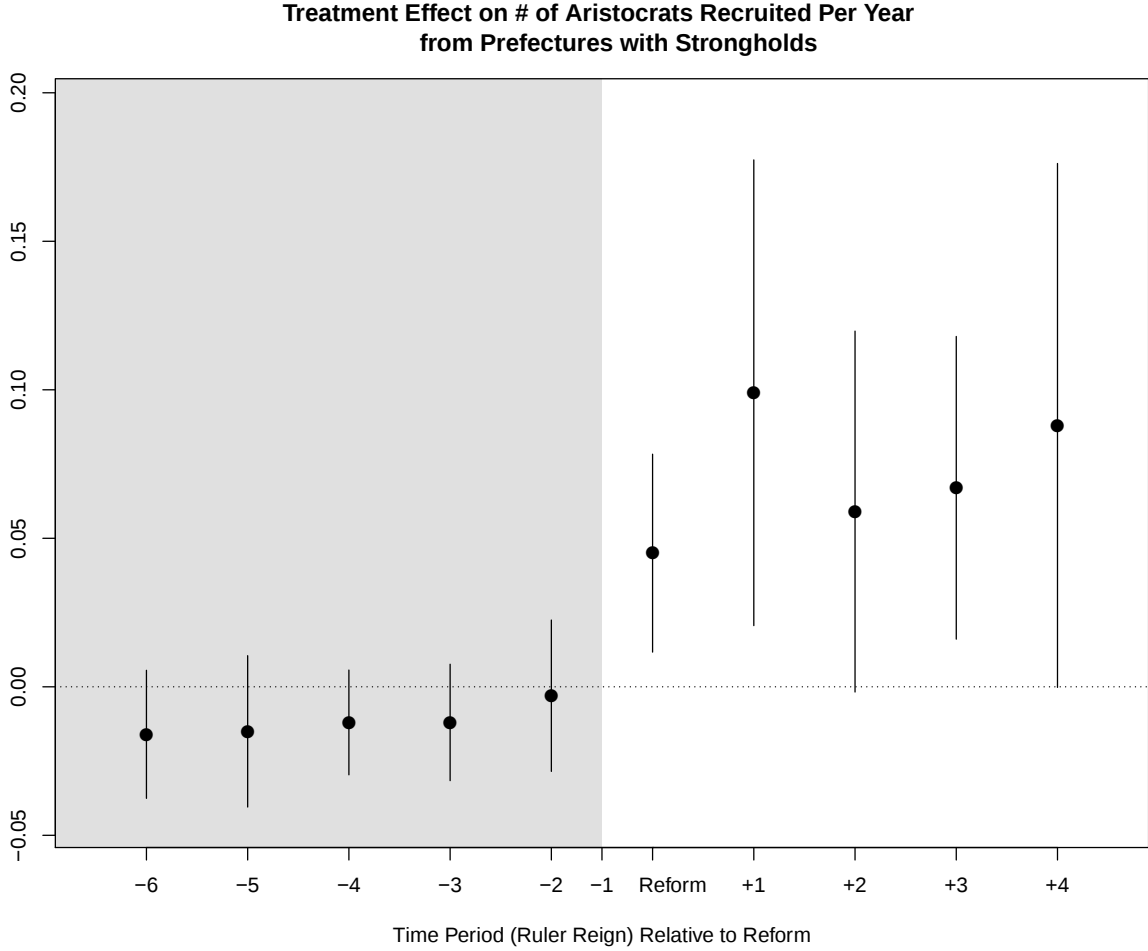
Parallel Pre-Trends. The DD design relies on the parallel trend assumption. To provide stronger support that this assumption holds, we perform an event study analysis by estimating a dynamic version of Equation 1:

$$\text{NumAristocrats}_{pt} = \sum_{j=1}^N \beta_j \text{Stronghold}_p \times \text{Period}_j + \phi_p + \gamma_t + \epsilon_{pt}, \quad (2)$$

where Period denotes dummy variables indexed by j for each time period.

⁵⁸Geographical controls include terrain ruggedness index, river density, and suitability index of rice and wheat. Prefecture-level lagged controls are the number of civil conflicts and foreign invasions. Provinces are higher-level administrative divisions, and we follow Yan (2007) to determine which prefectures fall under which provinces.

Figure 3. Test for Parallel Pre-trend



Notes: This figure plots lags-and-leads estimates for Equation 2. Vertical bands represent 95% Confidence Interval.

Figure 3 presents the coefficient plot for each time period.⁵⁹ The omitted category serving as the benchmark is the time period right before the reign of Empress Dowager Feng. Coefficients for pre-reform periods are not statistically or substantively different from zero, and estimates for post-Reform periods are positive and statistically significant. This exercise shows that there are no differential pre-trends in aristocratic recruitment for stronghold and non-stronghold prefectures. Equally importantly, the substantial spike of the treatment effect sustains in the long run and becomes even larger.

5.1.1 Robustness Checks

This subsection reports a large battery of robustness checks for our result on aristocratic recruitment.

⁵⁹ Regression results are reported in Appendix Table A4.

Alternative Definition of Aristocracy. We re-estimate our baseline results using the more restrictive definition of aristocracy as stated in Section 4.2, that an elite is an aristocrat if individuals with the same choronym-surname took top government offices in earlier empires. Results are robust to this exercise (Table A5).

Adjacent Prefectures Only. In our baseline results, we control for pre-existing differences between prefectures by interacting a set of geographical characteristics with the time dummies. To further exclude the effects of any pre-existing differences not picked up by the control variables, we re-estimate the main regression, restricting our sample to prefectures that either have strongholds themselves (treatment group) or do not have strongholds but are adjacent to a prefecture with strongholds (control group). This exercise using spatially similar prefectures does not affect our results (columns (1) and (2) of Table A6).

Territorial Changes. Our baseline results use the territory of NW in 504 AD. Even though most of NW’s territorial expansion had taken place during the early 5th century, more than 50 years before the Reform, we nevertheless remove prefecture-time observations that were unoccupied from our sample to eliminate the effects of territorial changes.⁶⁰ Our results remain robust (columns (3) and (4) of Table A6).

Measurement. In medieval China, individuals of humble origins occasionally tried to fabricate aristocratic identity by claiming that their families belonged to a prestigious choronym-surname. Even though historians do not believe that this was a problem for dynasties before Sui and Tang Dynasties (before 581 AD) (Fan 2014), we nevertheless exclude aristocrats with disputed origins from our sample.⁶¹ Our results are robust to this exercise (columns (1) and (2) of Table A7).

Warfare and political turmoil in the 4th century caused migration. We re-estimate our baseline regression on the sample of elites who never migrated, and show that results remain robust in columns (3) and (4) of Table A7.

Alternative Outcomes. Recall that our main dependent variable is the number of aristocrats who entered the bureaucracy for the first time in each time period. To verify that aristocrats from stronghold prefectures also enjoyed continued presence in the bureaucracy, we re-estimate our baseline results, using as dependent variable the total number of aristocrats serving in each period. Results in columns (1) and (2) of Table A8 show that the Reform produced a persistent, positive effect on the political presence of aristocrats from stronghold prefectures. For an additional test, we also use the log number of aristocrats as the dependent variable to diminish the impact of outliers

⁶⁰The year of NW occupation for each prefecture is compiled from Mu, Wu and Wei (2016).

⁶¹An elite has disputed origin if the *Book of Wei* recounts that he “self-reported” or “asserted” his family to be some choronym-surname.

(columns (3) and (4) Table A8).

Placebo Tests. Non-aristocrats did not have the socio-political capital required to maintain local economic dominance and were therefore not the losers the regime had to compensate. We use the number of non-aristocrats and the number of non-aristocratic ethnic Han elites as placebo outcomes, and Table A9 reports that the Reform did not lead to higher recruitment of those elites. This verifies that increased recruitment of aristocrats in stronghold prefectures was not driven by unobserved shocks to these prefectures.

Other Factors. Proximity to the national capital may reflect strong political ties and therefore affect recruitment. We use two methods to account for any potential impact that capital regions might have on aristocratic recruitment. First, we include interaction terms between the distance from prefectures to the two capital cities and the time dummies (columns (1) and (2) of Table A10).⁶² Second, we exclude capital prefectures from our sample (columns (3) and (4) of Table A10).

In columns (1) to (4) of Table A11, we account for the occurrence of historical warfare in the 4th century and national/provincial capital status by interacting these dummies with time FE. We also include more stringent controls for geography by interacting longitude and latitude with time FE (columns (5) and (6)).

5.2 Recruitment as Compensation

Having established the causal relationship between Reform and aristocratic recruitment in stronghold areas, we now discuss richer evidence for the theory of bureaucratic compensation and against alternative interpretations.

Heterogeneity Analysis

Even though stronghold prefectures saw higher levels of aristocratic recruitment in the post-Reform period, the theoretical framework in Section 2 suggests that the extent of recruitment should not have been shared equally across all clans if the state had adopted a compensatory approach. More specifically, clans with higher socio-political capital likely controlled more local resources and posed a stronger threat of resistance to the Reform. In order to weaken such resistance, the Northern Wei regime may need to recruit greater numbers of them as concessions.

To examine this implication, we conduct further analysis at the clan level. We use two proxies to measure the socio-political capital of aristocratic clans. The first proxy, *TopOffice*, is a dummy equal to 1 if a clan’s ancestors held top bureaucratic offices in earlier empires. It captures the fact that more prominent statesmen could amass greater political and economic privileges that would

⁶²The capital of NW had been Pingcheng until 494 AD, when Emperor Xiaowen moved the central government to Luoyang. See Sections D.2 and D.3 of the Appendix.

be transmitted to future generations. The second proxy, Longevity, is a dummy equal to 1 if a clan’s ancestors have biographies in at least two of the three dynastic histories of earlier empires. It reflects the clan’s degree of local entrenchment.

We then interact this proxy with Reform_t , and examine the heterogeneous effect of socio-political capital on recruitment for aristocratic clans in stronghold and non-stronghold prefectures separately. We estimate the following regression model:

$$\text{NumAristocrats}_{pkt} = \beta \text{HighCap}_{pk} \times \text{Reform}_t + \phi_{pk} + \gamma_t + \epsilon_{pkt}. \quad (3)$$

Here, HighCap_{pk} is a dummy equal to 1 if clan k from prefecture p has a high level of socio-political capital. ϕ_{pk} is the clan-prefecture fixed effect.

Results for clans in stronghold prefectures are reported in Panel B of Table 2. The first (last) two columns use TopOffice (Longevity) as proxies for socio-political capital. Consistent with our prediction, clans with higher socio-political capital had a significantly greater number of members recruited into the Northern Wei bureaucracy, compared to clans with lower capital. As a placebo, we do not find a statistically significant effect for prefectures without strongholds (Table A12).

Aristocratic Population

Geographic controls in Equation 1, the DD design and the likely parallel trends in Figure 3 already help rule out secular population growth as an alternative explanation to our main result. We further present two findings against any interpretation based on potentially different demographics between stronghold and non-stronghold aristocratic families.

First, we re-estimate Equation 1 with an alternative dependent variable: the total number of aristocratic *clans* that had one or more members recruited. If our main result is driven by secular population expansion within aristocratic clans in stronghold areas, then we should not find any effect using this alternative coding. Indeed, the population growth interpretation to our results is rejected by estimates in Panel A of Table 2, which indicate that the Northern Wei state recruited from a *greater number* of aristocratic *clans* in the stronghold prefectures as a result of the Reform, compared with non-stronghold prefectures.

Second, one may concern that the surge in aristocratic recruitment in stronghold prefectures might reflect pre-existing differences in patterns of aristocratic settlement. To address this concern, we first compute the number of aristocratic clans in each prefecture by counting the number of distinct surname-choronym pairs at a prefecture. We verify that stronghold prefectures did not statistically have more clans to begin with. We then re-estimate our baseline regression, adding an interaction term between the number of aristocratic clans and time FE. Our main result remains robust (see Table A13), suggesting that it is not driven by differences in aristocratic settlement.

Table 2. Number of Aristocratic Clans Producing New Recruits

Panel A: Clan-Level Heterogeneity in Recruitment

	Number of Clan Members Recruited			
	(1)	(2)	(3)	(4)
Top office×Reform	0.126** (0.056)	0.155** (0.068)		
Longevity×Reform			0.140** (0.057)	0.173** (0.071)
Mean of D.V.	0.051	0.051	0.051	0.051
Clan FE	Yes	Yes	Yes	Yes
Time FE	Yes	No	Yes	No
Prefecture FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Province-Time FE	No	Yes	No	Yes
Observations	517	517	517	517
R-squared	0.503	0.561	0.513	0.571

Panel B: Recruitment of Aristocratic Clans

	Number of Aristocratic Clans Recruited			
	(1)	(2)	(3)	(4)
Stronghold × Reform	0.285*** (0.109)	0.284** (0.110)	0.275** (0.109)	0.169* (0.098)
Mean of D.V.	0.116	0.116	0.116	0.116
Time FE	Yes	Yes	No	Yes
Prefecture FE	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes
Province-Time FE	No	No	Yes	No
Prefecture Linear Trend	No	No	No	Yes
Observations	2,739	2,739	2,739	2,739
R-squared	0.540	0.540	0.549	0.722

Notes: The unit of observation is clan-time in Panel A and prefecture-time in Panel B. Standard errors (clustered at the prefecture level) in parentheses. ***, **, * denote significance at 1%, 5%, 10% level.

Demand for Talent

As two alternative interpretations to compensation, the observed pattern of aristocratic recruitment may be driven by an increase in demand for: (1) officials at the front-line bureaucracy, or (2) more capable officials, following the state-building reform. Our own empirical evidence and the consensus in historical research rule out these interpretations.

The first interpretation has no bearing on our quantitative results because 0% of the elites in our data (aristocrat or non-aristocrat) had ever assumed the office of “three-elder,” a front-line post in the bureaucracy created by the Reform to register and monitor local population under state control. This empirical pattern is not surprising at all because the NW elites were indeed unwilling to serve positions in the new *three-elders system*. It is important to note that the *three-elders system* was a grassroots state organ that created a network of village-level petty clerks (von Glahn 2016:175). Positions as such were at the bottom level of imperial officialdom, and had low social status (Hou 2002). Moreover, “three-elders” officials were tasked with gruelling work, and enjoyed few privileges: they were required to meet stringent targets in tax collections, and even had to make up for the deficiency themselves. Taken together, existing evidence shows that our results on aristocratic recruitment could not have been driven by a surge in demand for officials in the front-line bureaucracy.

To rule out the second interpretation, we systematically demonstrate that aristocrats from stronghold prefectures, the treated group, did not possess more superior administrative and personal ability compared to aristocrats from non-stronghold prefectures, the control group. To do so, we manually extract descriptions of six types of personal merits from elites’ biographies in the *Book of Wei*.⁶³ We classify those merits into two categories, administrative ability and personal character. The administrative ability category consists of military prowess, good governance, and institutions and policy; and the personal character category comprises of literature, intelligence, and integrity (see Appendix G.4 for one example of each merit.).⁶⁴

Table 3 displays comparisons of personal merits. We exclude from our sample members of the imperial household and eunuchs, as they were not recruited into the bureaucracy in the same way as other elites. We first establish the validity of those merits records by comparing the merits of aristocrats and non-aristocrats. Results in Panel A suggest that aristocrats demonstrate higher ability in institutions and policy and literature, and lower ability in military prowess, in comparison

⁶³We leave out elites from the tomb epitaphs because epitaph passages are intended to describe the accomplishments of the deceased, and therefore lack objectivity when it comes to personal merits. *Book of Wei*, on the other hand, was solo-authored and therefore lends much more consistency in its evaluations of elites.

⁶⁴Military prowess: if an elite is good at personal combat, masters weapons, or has success in the battlefield. Governance: if an elite demonstrates good or effective governance, is praised by the local people, or is good at conciliating civilians. Institutions and policy: if an elite has accomplishments in making laws, ritual codes, or policy recommendations for the state. Literature: if an elite is well-read, well-trained in literature, or is a scholar or instructor. Intelligence: if an elite is bright, gifted, or good at strategy. Integrity: if an elite takes bribes.

Table 3. Merits Comparison for Northern Wei Elites

<i>Panel A: Aristocrats vs. Non-Aristocrats, Pre-Reform</i>			
Merits	Aristocracy	Non-Aristocracy	Difference
Military Prowess	0.117 (0.323)	0.260 (0.439)	-0.143*** (0.000)
Governance	0.207 (0.407)	0.202 (0.402)	0.005 (0.909)
Institutions & Policy	0.144 (0.353)	0.057 (0.233)	0.087*** (0.014)
Literature	0.261 (0.441)	0.108 (0.311)	0.153*** (0.001)
Intelligence	0.171 (0.378)	0.129 (0.335)	0.042 (0.280)
Integrity	0.063 (0.244)	0.032 (0.177)	0.031 (0.210)
Observations	111	435	546

<i>Panel B: Aristocrats from prefectures with and without Strongholds, Pre-Reform</i>			
Merits	Stronghold	Non-Stronghold	Difference
Military Prowess	0.159 (0.370)	0.090 (0.288)	0.070 (0.293)
Governance	0.205 (0.408)	0.209 (0.410)	-0.004 (0.956)
Institutions & Policy	0.182 (0.390)	0.119 (0.327)	0.062 (0.381)
Literature	0.205 (0.408)	0.299 (0.461)	-0.094 (0.262)
Intelligence	0.227 (0.424)	0.134 (0.344)	0.093 (0.226)
Integrity	0.045 (0.211)	0.075 (0.265)	-0.029 (0.521)
Observations	44	67	111

Notes: T-tests are used for comparing differences in the mean value. ***, **, * denote significance at 1%, 5%, 10% level. Military prowess: if an elite is good at personal combat, masters weapons, or has success in the battlefield. Governance: if an elite demonstrates good or effective governance, is praised by the local people, or is good at conciliating civilians. Institutions and policy: if an elite has accomplishments in making laws, ritual codes, or policy recommendations for the state. Literature: if an elite is well-read, well-trained in literature, or is a scholar or instructor. Intelligence: if an elite is bright, gifted, or good at strategy. Integrity: if an elite takes bribes. All metrics are dummy variables taking the value of 1 if a merit description is recorded in the *Book of Wei*. Members of the imperial household and eunuchs are excluded from the sample.

to non-aristocrats. This finding is consistent with historical research showing that medieval Chinese aristocratic families were characterized by a rich tradition of literature, classics, and institutional and policy knowledge (Yan 2021, Chen 1998).

To examine pre-treatment “balance,” we now restrict our sample of to *aristocrats only*, and compare the merits of aristocrats from stronghold prefectures with ones from non-stronghold prefectures. Results in Panel B of Table 3 indicate that there exist no statistically meaningful differences between those two groups of aristocrats along all dimensions of merit in the *pre*-Reform period. This suggests that aristocrats who came from stronghold prefectures and held offices in the regime did not exhibit superior ability compared to their counterparts from non-stronghold prefectures *prior* to the Reform (for the post-Reform period, see Table A14).⁶⁵ Taken together, these findings reject the interpretation that the increase in the number of aristocrats from the stronghold prefectures was due to superior ability. In addition, there is no evidence that the social capital of stronghold aristocrats differed from non-stronghold ones prior to the Reform, as the strength of social ties is also balanced across treatment and control groups (see Table A15).

6 Mechanisms of Compensation

Our empirical findings thus far demonstrate that, in order to ensure the success of state-building policies, the regime compensated potential losers—aristocrats from the stronghold prefectures—by granting them offices in the imperial bureaucracy. In this section, we present evidence on three types of mechanisms through which aristocrats were compensated: direct benefit, interest realignment, and credible commitment.

6.1 Direct Benefits and Interest Realignment

We explore the mechanisms of compensation by examining offices held by elites. The power, prestige, and duties attached to each office allow us to distinguish the exact forms of compensation received by the holder of the office.

We use the rank of an office to proxy for its value in terms of power, prestige, and wealth. That rank reflects power and prestige should be self-evident. In medieval China, rank was also tied to a range of benefits such as tax exemptions and legal privileges (Yan 2010:169). Another

⁶⁵Since the compensation strategy recruited mass numbers of aristocrats from one particular group to serve in government offices as political concessions, the selection process may not have been highly meritocratic (Proposition 4 in Appendix F formalizes this idea). Table A14 provides supportive evidence: aristocrats recruited from stronghold prefectures in the post-Reform period are less capable in governance, institutions and policy, literature and intelligence. In Table A17, we show that for the sample of aristocrats from stronghold prefectures in the post-Reform period, less capable elites are appointed to less important offices. This suggests that the NW rulers try to minimize the cost of compensating stronghold aristocrats who have lower ability by appointing them to less important offices.

measure of prestige exploits a unique feature of medieval Chinese bureaucracy: the existence of “pure offices,” which were deemed suitable for men of high birth (see [Lewis 2011](#), [Zhang 2017](#)). Examples include advisory posts close to the emperor, secretary positions for the crown prince, and certain appointments to the Department of State Affairs, which carry enormous prestige and recognition. Such offices were highly sought after by the aristocracy ([Yan 2009](#)).

We employ a triple-differences (DDD) strategy to examine the effect of the Reform on office-holding outcomes for aristocrats from stronghold prefectures. We introduce a third dimension of differences—the group of non-aristocrats—to control for any unobserved changes in the structure of the imperial bureaucracy that may differentially affect office-holding for elites from stronghold prefectures. We estimate the following regression model:

$$\begin{aligned}
Y_{ipt} = & \beta \text{Stronghold}_p \times \text{Reform}_t \times \text{Aristocracy}_i \\
& + \text{Stronghold}_p \times \text{Reform}_t + \text{Aristocracy}_i \times \text{Reform}_t + \text{Stronghold}_p \times \text{Aristocracy}_i \\
& + X_i + \phi_p + \gamma_t + \epsilon_{ipt}
\end{aligned} \tag{3}$$

where i , p , and t denote individual, prefecture, and time respectively. Y_{ipt} is the outcome of interest for individual i from prefecture p in time t . Aristocracy_i is a dummy that is equal to 1 if individual i is an aristocrat. X_i is a set of individual-level controls that include indicator variables for aristocracy status, membership to imperial household, ethnic Han status, and whether the individual’s father has ever held offices above Rank Five.⁶⁶ Reform_t , ϕ_p are γ_t are defined as in Equation 1. To allow for serial correlation of the error terms, we cluster standard errors at the prefecture level. The coefficient of interest, β , captures the treatment effect of the Reform on office-holding outcomes for aristocrats from stronghold prefectures.

Results are reported in Table 4. Column (1) uses the maximum rank achieved by an elite during each time period as the dependent variable, and shows that aristocrats from stronghold prefectures on average held higher-ranked offices in the post-Reform period. Since an increase in numerical value of 2 corresponds to a rise of one rank (see Sections 4.1 and Appendix G.2), the coefficient of 3.381 indicates a rise of 1.69 in actual rank. This is a substantial change, given that offices only have nine ranks. From column (2), it is evident that aristocrats from stronghold prefectures were also more likely to hold pure offices. Taken together, these results suggest that the NW regime compensated aristocrats by giving them higher-ranked and more prestigious offices.

We now give closer scrutiny to high-ranked offices, as they reflect substantial power and responsibilities. We define senior offices to be ones that are above Rank Three Junior, and divide them based on whether they are in the central or in the regional bureaucracy.⁶⁷ For instance, Left

⁶⁶Rank Five is the middle rank of all state offices, which are ranked from nine (lowest) to one (highest).

⁶⁷Offices above Rank Three Junior are in the top echelon of the bureaucratic hierarchy and consist of positions

Table 4. Mechanism of Compensation: Direct Benefit and Interest Realignment

	Max Rank (1)	Pure Offices (2)	Senior Offices		Junior Offices	
			Central (3)	Regional (4)	Central (5)	In South (6)
Reform×Stronghold×Arist	3.381*** (1.117)	0.190** (0.079)	0.164** (0.067)	0.043 (0.071)	0.016 (0.089)	0.121 (0.074)
Stronghold×Arist	-2.435** (1.015)	-0.267*** (0.081)	-0.128* (0.073)	-0.033 (0.077)	-0.068 (0.088)	-0.099 (0.078)
Reform×Stronghold	-1.932*** (0.640)	-0.155*** (0.054)	-0.070* (0.038)	-0.038 (0.034)	-0.036 (0.049)	-0.041 (0.043)
Reform×Arist	-0.934 (0.659)	-0.128*** (0.037)	0.021 (0.042)	-0.044 (0.042)	-0.127** (0.056)	-0.059 (0.047)
Mean of D.V.	11.172	0.435	0.175	0.096	0.668	0.125
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,509	3,671	3,671	3,671	3,671	3,509
R-squared	0.088	0.111	0.097	0.061	0.099	0.078

Notes: This table presents results on direct benefits of compensation. The unit of observation is individual-time. Robust standard errors in parentheses are clustered at prefecture level. ***, **, * denote significance at 1%, 5%, 10% level. Controls include aristocracy, membership to imperial household, ethnic Han and father’s rank.

Aide to the Imperial Secretary is an office in the central bureaucracy, whereas Prefecture Governor is an office in the regional bureaucracy.

Columns (3) and (4) display regression results using central and regional senior offices respectively, and show that compensation to aristocrats came through powerful offices in the central, but not the regional, bureaucracy. This result provides evidence for the interest realignment mechanism, where NW rulers aligned the incentives of the aristocrats with those of the state by tying their careers to the health and longevity of the state, thereby enabling them to “share the future” as national stakeholders (Jha 2012). Our findings are also consistent with the macro-history of medieval China, which witnessed an extended period of centralization for local aristocrats (*shizu zhongyang hua*) that continued well into the Tang dynasty (618 - 905 AD) (Mao 1988: 242, Tackett 2014).⁶⁸

Without prior knowledge of medieval Chinese history, one may interpret this result to imply that the regime actively recruited aristocrats from stronghold prefectures into the central bureaucracy in

heading different central departments and regional governments (Liu 2019). In this analysis, we only include substantive offices—ones that entail real responsibilities.

⁶⁸Wang (2021c) argues that the aristocracy in the Tang dynasty had a strong state-strengthening preference precisely because their centralized identity - their families having resided in the national capitals for generations - induced them to develop an interest in the wealth and strength of the nation as a whole as opposed to particularistic local interests. The NW elites were the ancestors of the Tang aristocracy. In Table A16, we provide micro-foundational evidence for historians’ conjectures that high offices in the national bureaucracy were related to this residential trend, showing that father’s appointment to senior central government offices is associated with the son growing up in the national capital.

order to hold them hostage. Such interpretation already runs counter to the fact that they were given powerful offices, as is obvious from historians' works on this era (e.g., [Ebrey 1978](#); [Mao 1988](#)) and further verified by our findings in the previous paragraphs. The next subsection will also provide evidence on the particular phenomenon where the ruler deliberately reduced her own power by letting these stronghold aristocrats take offices in charge of personnel appointment and management. Nevertheless, we empirically examine whether these aristocrats were also more likely to hold less powerful central offices, which could make them vulnerable to potential purges by the emperor. Column (5) uses as dependent variable an indicator equal to 1 if an elite held a junior central office (ones that are below Rank Three Junior). The estimate is small and statistically indistinguishable from zero. We also test whether the ruler is less likely to appoint these aristocrats to offices along NW's southern border: elite defections were not uncommon between NW and the southern dynasties and regional officials close to the borders were especially positioned to do so ([Zhang 2008a](#)). The estimate in column (6) is positive and statistically insignificant, which suggests that the ruler did not distrust these aristocrats. These results further rule out the hostage interpretation.

We further explore the interest realignment mechanism by examining elites' appointments to important regional offices. We focus on the civil and military chiefs of regional government. Civil regional chiefs include the governors of counties, prefectures, and *zhou*,⁶⁹ and military regional chiefs are commanders of regional armies.⁷⁰ Many of those offices are not senior in rank, but entail substantive local power as they are the highest offices at different levels of regional government.

We find strong evidence, again, for the interest realignment mechanism. Column (1) of Table 5 reports estimate for civil chiefs, and columns (2) and (3) break down this result for civil chiefs at home and non-home jurisdictions respectively. While aristocrats from stronghold prefectures are more likely to be civil regional chiefs, this result is almost exclusively driven by appointments to jurisdictions *away* from their hometown, with estimates being statistically significant at the 1% level. This offers strong evidence for the interest realignment mechanism, as the promotion prospects of regional chiefs largely depended on the quality of their governance in the region, and appointments to non-home jurisdictions meant that these aristocrats' careers were tied to the health of the regime as a whole as opposed to only their hometowns. Columns (4)-(6) repeat the same analysis for military chiefs, and find that aristocrats from stronghold prefectures are neither more nor less likely to be appointed military chiefs, both for home and non-home jurisdictions. While consistent with the interest realignment mechanism, these results also suggest that the regime did not distrust those aristocrats by deliberately barring them from military power.

To sum up, our findings reveal that NW rulers compensated aristocrats from stronghold

⁶⁹ *Zhou* is the administrative level that is above prefectures and below provinces.

⁷⁰ Corresponding Chinese terms are: *xianling*, *taishou*, *cishi*; *dudu* and *zhenjiang*.

Table 5. Mechanism of Compensation: Interest Realignment

	Civil Regional Chiefs			Military Regional Chiefs		
	All (1)	Other Jdx (2)	Home Jdx (3)	All (4)	Other Jdx (5)	Home Jdx (6)
Reform $\times$ Stronghold $\times$ Arist	0.297*** (0.107)	0.299*** (0.110)	0.030 (0.061)	0.054 (0.069)	0.048 (0.068)	0.010 (0.006)
Reform $\times$ Stronghold	-0.209* (0.115)	-0.217* (0.111)	-0.015 (0.052)	0.013 (0.064)	0.013 (0.064)	-0.003 (0.003)
Reform $\times$ Stronghold	-0.100 (0.066)	-0.078 (0.064)	-0.041* (0.023)	0.030 (0.033)	0.035 (0.032)	-0.008** (0.004)
Reform $\times$ Arist	-0.118 (0.073)	-0.112 (0.070)	-0.001 (0.024)	-0.021 (0.037)	-0.022 (0.037)	-0.003 (0.003)
Mean of D.V.	0.319	0.290	0.040	0.155	0.153	0.003
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,671	3,671	3,671	3,671	3,671	3,671
R-squared	0.060	0.063	0.055	0.069	0.070	0.042

Notes: This table provides the results of credible commitment of Northern Wei's reform. The unit of observation is the individual-time. Robust standard errors in parentheses are clustered at commandery level. ***, **, * denote significance at 1%, 5%, 10% level. Controls include aristocracy, membership to imperial household, ethnic Han and father's rank.

prefectures—who were losers of the Reform—by appointing them to offices with tangible benefits, and took meaningful measures to transform them into national stakeholders.

6.2 Credible Commitment

So far, our empirical findings provide evidence for a compensation strategy adopted by the Northern Wei regime. For the compensation deal to proceed, however, the ruler should credibly commit to upholding her promise (see Section 2). That is, she cannot remove compensation recipients from office after they have given up local autonomy. This subsection empirically highlights the Ministry of Personnel (*libu*) in the central state bureaucracy as a pivotal device for credible commitment.

The Ministry of Personnel is responsible for recruiting, assigning offices to, evaluating, and promoting bureaucrats. This feature would enable its officials to make new friends in the officialdom in support of his career. Such advantage at building alliance networks substantially increases the cost for the ruler to renege on the compensation deal. The ruler would face costly consequences for punishing stronghold aristocrats.⁷¹

We begin by establishing the fact that our proposed mechanism of credible commitment was utilized by the Northern Wei regime as part of its compensation strategy. Column (1) of Table 6

⁷¹Appendix F.3 provides an example illustrating the enormous cost of killing a former Minister of Personnel.

Table 6. Mechanism of Compensation: Credible Commitment

	Central: State Affairs Department		Regional		
	Personnel (1)	Other (2)	Rectifier (3)	Promoted (4)	Punished (5)
Reform×Stronghold×Arist	0.041** (0.017)	-0.015 (0.066)	0.002 (0.030)	0.281*** (0.081)	0.114 (0.087)
Stronghold×Arist	-0.029 (0.019)	0.007 (0.069)	-0.029 (0.026)	-0.245*** (0.075)	-0.107 (0.101)
Reform×Stronghold	-0.024 (0.016)	0.011 (0.050)	-0.000 (0.017)	-0.131*** (0.041)	0.001 (0.048)
Reform×Arist	0.004 (0.004)	0.021 (0.024)	0.027 (0.024)	-0.054 (0.063)	-0.074 (0.060)
	(0.004)	(0.024)	(0.024)	(0.063)	(0.060)
Mean of D.V.	0.021	0.151	0.041	0.506	0.087
Time FE	Yes	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes	Yes
Observations	3,671	3,671	3,671	3,612	3,671
R-squared	0.034	0.047	0.050	0.085	0.097

Notes: This table presents results on credible commitment. The unit of observation is individual-time. Robust standard errors in parentheses are clustered at prefecture level. ***, **, * denote significance at 1%, 5%, 10% level. Controls include aristocracy, membership to imperial household, ethnic Han and father's rank.

shows that aristocrats from stronghold prefectures indeed were more likely to hold offices in the Ministry of Personnel. Since the Ministry of Personnel is part of the Department of State Affairs, the core of the executive branch of the central government, we verify that our Personnel-specific result was not driven by the regime's overall attempts to recruit stronghold aristocrats into this Department. To do so, we use offices in other ministries in the Department of State Affairs as a placebo.⁷² Column (2) shows that the estimate is small and statistically indistinguishable from zero.

We perform a series of tests to demonstrate that the credible commitment device was functional for aristocrats from stronghold prefectures. First, the regime did commit itself to the compensation deal: columns (4) and (5) of Table 6 suggest that those aristocrats were more likely to receive a promotion, and no more likely to be punished.⁷³ Second, offices in the Ministry of Personnel did help elites build alliances, and therefore can serve as a credible commitment device.⁷⁴ In Table 7, we examine whether having clan members hold personnel offices would affect career outcomes for

⁷²They include the Ministry of War, Ministry of Provisions, Ministry of Revenue, Census Section, Land Tax Section and Justice Section. Corresponding Chinese terms are *jiabu*, *kubu*, *duzhi*, *zuo-mincao*, *you-mincao* and *duguan*.

⁷³Punishment: removed from office, killed by the emperor, or death sentence for committing crimes.

⁷⁴Liao (2017) has historical evidence on how elite faction networks in Northern Wei fed off positions in the Ministry of Personnel.

Table 7. Importance of Offices in the Ministry of Personnel

	Senior Offices		
	Central (1)	Regional (2)	Pure Office (3)
Clan Member in Personnel Ministry in Periods $\leq t$	0.088*** (0.026)	0.052*** (0.016)	0.085** (0.033)
Mean of D.V.	0.176	0.096	0.434
Clan FE	Y	Y	Y
Time FE	Y	Y	Y
Prefecture FE	Y	Y	Y
Observations	3,714	3,714	3,714
R-squared	0.164	0.112	0.184

Notes: This table presents the effect of personnel office-holding on the career development. The unit of analysis is individual-time. Patronage network in personnel office denotes whether other clan members of a elites had served in the personnel office before the current position. Robust standard errors in parentheses are clustered at prefecture level. ***, **, * denote significance at 1%, 5%, 10% level.

fellow clansmen. Estimates show that an elite whose clan members had experiences in personnel offices would be more likely to hold senior offices in both central and regional bureaucracies as well as pure offices, compared to an elite whose clan members had never held such office. Last, one may be concerned that the regime could strategically weaken the credible commitment mechanism by undermining the function and importance of the Ministry of Personnel in the post-Reform period. We verify that this was not the case by comparing the effects of holding personnel office on clan members' career outcomes before and after the Reform (Table A18).

It should be emphasized that the lucrative, comprehensive compensation package the regime offered to the stronghold aristocrats does *not* mean that stronghold aristocrats somehow had colluded to capture the regime. This interpretation is the opposite of that suggested by actual historical records (Section 3 and Appendix D.1), where it was the rulers who took the Reform initiatives and it was the stronghold aristocrats who initially resisted.

There are also ample logical and empirical reasons to refute this alternative story. First, Northern Wei remained a conquest dynasty where the Tuoba emperor, other members of the imperial household, and nobles of the non-Chinese, Xianbei ethnicity continued to be the main drivers of court politics.⁷⁵ Second, as shown in Figure 2, the stronghold areas were scattered across northern China. It is easy for the aristocratic clans to undermine the Reform individually when implemented in their own areas and to voice their opposition through representatives at the court. To communicate across a

⁷⁵See Chen (1998) for a political history of how power shifted among these three groups.

large territory to actually devise a scheme to capture the central government, however, would be much more difficult. Third, our discussion of the interest realignment mechanism from theoretical, empirical and historical perspectives suggests that the Reform created incentives for aristocrats to further strengthen rather than weaken the regime.

We also have two findings against this alternative explanation. In column 3 of Table 5, stronghold aristocrats were no more likely to take senior positions in their home jurisdictions. This result, coupled with evidence on deepened state penetration in Appendix C, suggest that the stronghold aristocrats did not have enough power even to protect their local interests, let alone capturing the central government.⁷⁶ More importantly, in Column (3) of Table 6, we examine a position with significant power over the evaluation of candidates for bureaucratic offices in their respective regions, the “rectifier” (*zhong-zheng*) post. In medieval China, rectifiers were in charge of implementing the “Rectifying System” in their home regions.⁷⁷ As discussed in Section 3, it was precisely through this system that the aristocrats *did* capture the government in the 3rd century. The estimate, small in magnitude and statistically indistinguishable from zero, suggests that stronghold aristocrats were not more likely to be appointed as rectifiers to capture the government as a result of the Reform.

7 Conclusion

State-building is a challenging endeavor. Enhancing centralized control and extraction of resources by the state usually comes at the expense of local powerholders, and its success crucially depends on how these “losers” are dealt with. This paper provides theory and evidence for a compensatory strategy used by rulers of medieval China, in which economic losers from a nationwide state-building reform were given offices in the bureaucracy in exchange for their acceptance of the reform. Offices came with direct benefits of power and prestige, interests of the local powerholders became realigned with the state through service at the central government and at non-home jurisdictions, and commitment problems were mitigated by offices that oversaw bureaucratic recruitment and promotion.

State-building through bureaucratic compensation has happened elsewhere in the world. Responding to the “Crisis of the Third Century,” the Late Roman Empire in the 4th century AD strengthened its fiscal capacity and took away the autonomy of local aristocrats. The emperors offered prestigious government posts as concessions, and this strategy saw immediate success and long-term benefit in the eastern regions where it was applied (Heather 2018). In contrast, the western regions consisting of Britain, Spain, and Gaul ended up de-bureaucratized. This might

⁷⁶Nor did they have the power to defy meritocracy in bureaucratic appointment: Table A17 shows that stronghold aristocrats with lower ability received less important offices.

⁷⁷Rectifiers are responsible for assigning “grades” to local candidates who aspire to enter civil service. A given local grade corresponds to a given level of initial appointment at court (Lewis 2011).

explain why the new Germanic rulers in the Migration Period did not inherit the tools of bureaucracy that would enable them to implement a compensation strategy to rebuild the state in the same way the Tuoba Xianbei nomads did in China.⁷⁸

Autocracy is a very robust and persistent form of political development when equipped with a bureaucracy, as exemplified by the historical experiences of China and the Middle East ([Stasavage 2016](#)). This mode of governance, along with political fragmentation and polycentricity in Europe, constitutes the defining feature of the institutional divergence between the East and the West that took place in the early Middle Ages and foreshadowed the onset of the Great Divergence in the next millennium ([Scheidel 2019](#)). By exploring the state-building process in Early Medieval China, this paper provides a theory for and detailed empirical evidence on how bureaucratic legacies facilitated state re-consolidation at this critical juncture in history, and more broadly, a mechanism for how bureaucracy functions to reinforce the state.

⁷⁸See [Mathisen \(2011\)](#) for how the lack of bureaucratic legacies affected the way aristocrats in Gaul reacted to their new Germanic rulers. Appendix [H](#) contains more details on the Roman case and an additional case on premodern Korea.

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A Additional Tables

Table A1. Definition of Time Period

Years	Time Period Name	Reigning Emperor
398–409	Later Daowu	Emperor Daowu
410–423	Mingyuan	Emperor Mingyuan
424–437	Earlier Taiwu	Emperor Taiwu
438–451	Later Taiwu	Emperor Taiwu
452–465	Wencheng	Emperor Wencheng
466–476	Xianwen	Xianwen, first as Emperor, then as Emperor Emeritus
477–490	Empress Dowager Feng	Xiaowen as Emperor, Empress Dowager Feng as Regent
491–499	Xiaowen	Emperor Xiaowen
500–514	Xuanwu	Emperor Xuanwu
515–528	Xiaoming	Emperor Xiaoming
529–534	Last Years	Emperors Xiaozhuang, Jiemin and Xiaowu

Notes: This table displays our definition of time periods. We choose 398 as our starting year because this is the year in which Tuoba Gui (Emperor Daowu) had conquered most of the territory of northern China, declared himself emperor and named his empire Wei.

Table A2. Summary Statistics of Main Variables

Variables	N	Mean	SD	Min	Max
<i>Panel A: Prefecture-Period Level</i>					
Aristocrats recruited per year (main)	2,739	0.020	0.100	0	1.500
Aristocratic clans recruited per year	2,739	0.101	0.393	0	4
Civil conflicts	2,739	0.050	0.270	0	5
Foreign invasions	2,739	0.010	0.120	0	2
<i>Panel B: Prefecture Level</i>					
Has stronghold(s)	249	0.165	0.372	0	1
Terrain ruggedness index	249	466.816	362.069	7.106	1,388.678
River density	249	447.986	185.522	0	1,247.706
Rice suitability index	249	669.794	1,011.557	0	5,749.424
Wheat suitability index	249	3,300.505	1,965.893	0	8,277.250
<i>Panel C: Individual-Period Level</i>					
Max rank	3,509	11.172	4.651	0	18.25
Pure office	3,671	0.435	0.496	0	1
Regional senior office	3,671	0.096	0.295	0	1
Central senior office	3,671	0.175	0.380	0	1
Central junior office	3,671	0.668	0.471	0	1
Regional civil chief	3,671	0.318	0.466	0	1
Regional civil chief: other jurisdictions	3,671	0.290	0.454	0	1
Regional civil chief: home jurisdiction	3,671	0.040	0.195	0	1
Regional military chief	3,671	0.154	0.361	0	1
Regional military chief: other jurisdictions	3,671	0.153	0.360	0	1
Regional military chief: home jurisdiction	3,671	0.003	0.057	0	1
Personnel office	3,671	0.021	0.144	0	1
Rectifier	3,671	0.041	0.199	0	1
Promotion	3,612	0.506	0.500	0	1
Punishment	3,671	0.087	0.283	0	1
<i>Panel D: Individual Level</i>					
Father above rank five	2,524	0.601	0.490	0	1
Member of imperial household	2,524	0.175	0.380	0	1
Ethnic Han	2,524	0.622	0.485	0	1

Notes: This table presents summary statistics of main variables used in the analysis. For definitions of main variables, see Table [G4](#).

Table A3. Addressing Spatial Correlation

	Number of Aristocrats Recruited			
	(1)	(2)	(3)	(4)
Stronghold $\times$ Reform	0.081*** (0.025)	0.077*** (0.025)	0.072*** (0.023)	0.056*** (0.020)
Mean of D.V.	0.020	0.020	0.020	0.020
Time FE	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes
Province-Time FE	No	No	Yes	No
Prefecture Linear Trend	No	No	No	Yes
Observations	2,739	2,739	2,739	2,739
R-squared	0.042	0.065	0.087	0.637

Notes: This table presents the effect of the Reform on aristocratic recruitment. The unit of observation is prefecture-time. Controls include the number of civil conflicts (lagged), foreign invasions (lagged), and the interaction between time dummies and the terrain ruggedness index, river density, and the suitability index of rice and wheat. Conley (1999) standard errors adjusted for auto-correlation are reported in parentheses. In the spatial dimension, we retain a radius of 100 km for the spatial kernel. The horizon at which serial correlation is assumed to vanish is 11 periods. ***, **, * denote significance at 1%, 5%, 10% level.

Table A4. Pre-trend Test

	Number of Aristocrats Recruited (1)
Stronghold $\times$ Reform $_{t-6}$	-0.016 (0.011)
Stronghold $\times$ Reform $_{t-5}$	-0.015 (0.013)
Stronghold $\times$ Reform $_{t-4}$	-0.012 (0.009)
Stronghold $\times$ Reform $_{t-3}$	-0.012 (0.010)
Stronghold $\times$ Reform $_{t-2}$	-0.003 (0.013)
Stronghold $\times$ Reform	0.045*** (0.017)
Stronghold $\times$ Reform $_{t+1}$	0.099*** (0.040)
Stronghold $\times$ Reform $_{t+2}$	0.059* (0.031)
Stronghold $\times$ Reform $_{t+3}$	0.067*** (0.026)
Stronghold $\times$ Reform $_{t+4}$	0.088* (0.045)
Time FE	Yes
Prefecture FE	Yes
Observations	2,739
R-squared	0.489

Notes: This table presents the event study results. The unit of observation is prefecture-time. Robust standard errors in parentheses are clustered at prefecture level. ***, **, * denote significance at 1%, 5%, 10% level.

Table A5. Alternative Definition of Aristocracy

	Number of Aristocrats Recruited			
	(1)	(2)	(3)	(4)
Stronghold×Reform	0.063** (0.027)	0.057** (0.027)	0.055** (0.026)	0.035* (0.019)
Mean of D.V.	0.014	0.014	0.014	0.014
Time FE	Yes	Yes	No	Yes
Prefecture FE	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes
Province-Time FE	No	No	Yes	No
Prefecture Linear Trend	No	No	No	Yes
Observations	2,739	2,739	2,739	2,739
R-squared	0.476	0.489	0.499	0.806

Notes: This table presents results using the restrictive definition of aristocracy. The unit of observation is prefecture-time. Controls include the number of civil conflicts and foreign invasions (lagged), and the interaction between time dummies and terrain ruggedness index, river density, and the suitability index of rice and wheat. Robust standard errors in parentheses are clustered at prefecture level. ***, **, * denote significance at 1%, 5%, 10% level.

Table A6. Robustness Checks with Sub-samples

	Number of Aristocrats Recruited			
	(1)	(2)	(3)	(4)
Stronghold×Reform	0.068** (0.032)	0.054** (0.027)	0.074** (0.032)	0.057** (0.028)
Mean of D.V.	0.033	0.033	0.028	0.028
Time FE	Yes	No	Yes	No
Prefecture FE	Yes	Yes	Yes	Yes
Adjacent Prefectures Only	Yes	Yes	No	No
Dropping Unoccupied Prefectures	No	No	Yes	Yes
Controls	No	Yes	No	Yes
Province-Time FE	No	Yes	No	Yes
Observations	1,309	1,309	1,938	1,938
R-squared	0.467	0.517	0.540	0.560

Notes: This table presents the robustness checks using adjacent prefectures that didn't have strongholds as the control group. The unit of observation is prefecture-time. Controls include the number of civil conflicts (lagged), foreign invasions (lagged), and the interaction between time dummies and the terrain ruggedness index, river density, and the suitability index of rice and wheat. Robust standard errors in parentheses are clustered at prefecture level. ***, **, * denote significance at 1%, 5%, 10% level.

Table A7. Measurements

	Number of Aristocrats Recruited			
	(1)	(2)	(3)	(4)
Stronghold×Reform	0.063** (0.027)	0.054** (0.025)	0.064** (0.028)	0.058** (0.027)
Mean of D.V.	0.014	0.014	0.014	0.014
Time FE	Yes	No	Yes	No
Prefecture FE	Yes	Yes	Yes	Yes
Excluding Aristocrats with Disputed Origins	Yes	Yes	No	No
Excluding Migrated Aristocrats	No	No	Yes	Yes
Controls	No	Yes	No	Yes
Province-Time FE	No	Yes	No	Yes
Observations	2,739	2,739	2,739	2,739
R-squared	0.486	0.517	0.503	0.518

Notes: This table presents the robustness check addressing measurement issues arising from disputed origins and migration. The unit of observation is prefecture-time. Controls include the number of civil conflicts and foreign invasions (lagged), and the interaction between time dummies and terrain ruggedness index, river density, and suitability index of rice and wheat. Robust standard errors in parentheses are clustered at prefecture level. ***, **, * denote significance at 1%, 5%, 10% level.

Table A8. Alternative Outcomes

	Total Aristocrats Serving		Aristocrats Recruited (logged)	
	(1)	(2)	(3)	(4)
Stronghold×Reform	0.154*** (0.054)	0.138*** (0.053)	0.064*** (0.022)	0.057*** (0.022)
Mean of D.V.	0.036	0.036	0.016	0.016
Time FE	Yes	No	Yes	No
Prefecture FE	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
Province-Time FE	No	Yes	No	Yes
Observations	2,739	2,739	2,739	2,739
R-squared	0.494	0.518	0.520	0.542

Notes: This table presents the robustness checks using alternative outcomes. The unit of observation is prefecture-time. Controls include the number of civil conflicts (lagged), foreign invasions (lagged), and the interaction between time dummies and the terrain ruggedness index, river density, and the suitability index of rice and wheat. Robust standard errors in parentheses are clustered at prefecture level. ***, **, * denote significance at 1%, 5%, 10% level.

Table A9. Placebo Test Using Non-Aristocrats

	Non-Aristocrats		Non-Aristocratic Han	
	(1)	(2)	(3)	(4)
Stronghold×Reform	0.033 (0.023)	0.020 (0.025)	0.035 (0.022)	0.029 (0.021)
Mean of D.V.	0.031	0.031	0.018	0.018
Time FE	Yes	No	Yes	No
Prefecture FE	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
Province-Time FE	No	Yes	No	Yes
Observations	2,739	2,739	2,739	2,739
R-squared	0.822	0.835	0.570	0.612

Notes: This table presents the results of the placebo tests. The unit of observation is prefecture-time. Controls include the number of civil conflicts (lagged), foreign invasions (lagged), and the interaction between time dummies and the terrain ruggedness index, river density, and the suitability index of rice and wheat. Robust standard errors in parentheses are clustered at prefecture level. ***, **, * denote significance at 1%, 5%, 10% level.

Table A10. Addressing the Effect of Capitals

	Number of Aristocrats Recruited			
	(1)	(2)	(3)	(4)
Stronghold×Reform	0.065** (0.028)	0.054** (0.027)	0.077** (0.031)	0.070** (0.029)
Mean of D.V.	0.020	0.020	0.019	0.019
Time FE	Yes	No	Yes	No
Prefecture FE	Yes	Yes	Yes	Yes
Distance to Capitals×Time FE	Yes	Yes	No	No
Drop Capital Prefectures	No	No	Yes	Yes
Controls	No	Yes	No	Yes
Province-Time FE	No	Yes	No	Yes
Observations	2,739	2,739	2,717	2,717
R-squared	0.506	0.541	0.488	0.511

Notes: This table presents the robustness results addressing the effects of capitals. The unit of observation is prefecture-time. Capitals of the NW are Pingcheng and Luoyang. Distance to capitals is the prefecture's shortest great-circle distance to the nearest capitals of the NW. Controls include the number of civil conflicts (lagged), foreign invasions (lagged), and the interaction between time dummies and the terrain ruggedness index, river density, and the suitability index of rice and wheat. Robust standard errors in parentheses are clustered at prefecture level. ***, **, * denote significance at 1%, 5%, 10% level.

Table A11. Other Confounding Factors

	Number of Aristocrats Recruited					
	(1)	(2)	(3)	(4)	(5)	(6)
Stronghold×Reform	0.071** (0.035)	0.065** (0.032)	0.078** (0.031)	0.069** (0.030)	0.078** (0.030)	0.066** (0.027)
Mean of D.V.	0.020	0.020	0.020	0.020	0.020	0.020
Time FE	Yes	No	Yes	No	Yes	No
Prefecture FE	Yes	Yes	Yes	Yes	Yes	Yes
Wars (4 th century)×Time FE	Yes	Yes	No	No	No	No
Provincial Capital×Time FE	No	No	Yes	Yes	No	No
Longitude and Latitude×Time FE	No	No	No	No	Yes	Yes
Controls	No	Yes	No	Yes	No	Yes
Province-Time FE	No	Yes	No	Yes	No	Yes
Observations	2,739	2,739	2,739	2,739	2,739	2,739
R-squared	0.491	0.514	0.487	0.511	0.501	0.522

Notes: This table presents the robustness checks with additional controls. The unit of observation is prefecture-time. Controls include the number of civil conflicts (lagged), foreign invasions (lagged), and the interaction between time dummies and the terrain ruggedness index, river density, and the suitability index of rice and wheat. Robust standard errors in parentheses are clustered at prefecture level. ***, **, * denote significance at 1%, 5%, 10% level.

Table A12. Placebo Test Using Non-Stronghold Prefectures

	Number of Clan Members Recruited			
	(1)	(2)	(3)	(4)
TopPosts×Reform	0.121 (0.114)	0.106 (0.075)		
Longevity×Reform			0.117 (0.073)	0.124 (0.088)
TopPosts×Reform	0.113 (0.076)	0.134 (0.114)		
Longevity×Reform			0.128 (0.079)	0.134 (0.093)
Mean of D.V.	0.059	0.059	0.059	0.059
Clan FE	Yes	Yes	Yes	Yes
Time FE	No	Yes	Yes	No
Prefecture FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Province-Time FE	Yes	No	No	Yes
Observations	484	484	484	484
R-squared	0.564	0.596	0.566	0.598

Notes: This table presents placebo results of the heterogeneous effect of the reform. We restrict our sample to aristocratic clans and prefectures without strongholds. Controls include the number of civil conflicts (lagged), foreign invasions (lagged), and the interaction between time dummies and the terrain ruggedness index, river density, and the suitability index of rice and wheat. Robust standard errors in parentheses are clustered at prefecture level. ***, **, * denote significance at 1%, 5%, 10% level.

Table A13. Accounting for Aristocratic Settlements

	Number of Aristocrats Recruited			
	(1)	(2)	(3)	(4)
Stronghold $\times$ Reform	0.079*** (0.030)	0.076** (0.030)	0.072** (0.029)	0.056** (0.022)
Mean of D.V.	0.020	0.020	0.020	0.020
Time FE	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes
Historical Clans $\times$ Time FE	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes
Province-Time FE	No	No	Yes	No
Prefecture Linear Trend	No	No	No	Yes
Observations	2,739	2,739	2,739	2,739
R-squared	0.491	0.502	0.515	0.806

Notes: This table presents the effect of the Reform on aristocratic recruitment. The unit of observation is prefecture-time. Controls include the number of civil conflicts and foreign invasions (lagged), and the interaction between time dummies and terrain ruggedness index, river density, and suitability index of rice and wheat. Robust standard errors in parentheses are clustered at prefecture level. ***, **, * denote significance at 1%, 5%, 10% level.

Table A14. Merits Comparison for Aristocrats from Prefectures with and without Strongholds, Post-Reform

Merits	Stronghold	Non-Stronghold	Difference
Military Prowess	0.124 (0.331)	0.145 (0.353)	-0.021 (0.502)
Governance	0.145 (0.353)	0.220 (0.415)	-0.074** (0.032)
Institutions & Policy	0.017 (0.128)	0.063 (0.243)	-0.046*** (0.008)
Literature	0.203 (0.403)	0.278 (0.449)	-0.075* (0.050)
Intelligence	0.050 (0.218)	0.090 (0.287)	-0.040* (0.077)
Integrity	0.037 (0.190)	0.043 (0.204)	-0.006 (0.743)
Observations	241	255	496

Notes: T-tests are used for comparing differences in the mean value. ***, **, * denote significance at 1%, 5%, 10% level. Military prowess: if an elite is good at personal combat, masters weapons, or has success in the battlefield. Governance: if an elite demonstrates good or effective governance, is praised by the local people, or is good at conciliating civilians. Institutions and policy: if an elite has accomplishments in making laws, ritual codes, or policy recommendations for the state. Literature: if an elite is well-read, well-trained in literature, or is a scholar or instructor. Intelligence: if an elite is bright, gifted, or good at strategy. Integrity: if an elite takes bribes. All metrics are dummy variables taking the value of 1 if a merit description is recorded in the *Book of Wei*. Members of the imperial household and eunuchs are excluded from the sample.

Table A15. Strength of Social Ties for Aristocrats from Prefectures with and without Strongholds

	Stronghold	Non-Stronghold	Difference
Strong Social Tie	0.705 (0.462)	0.612 (0.491)	0.093 (0.315)
Observations	44	67	111

Notes: T-tests are used for comparing differences in the mean value. ***, **, * denote significance at 1%, 5%, 10% level. Strong social tie is equal to 1 if individuals with the same choronym-surname as the elite held top offices in earlier empires.

Table A16. Further Evidence on Elite Centralization

	Son Grows Up in Capital		Marriage Tie with Imperial Household	
	(1)	(2)	(3)	(4)
Central Senior Offices	0.246*** (0.032)	0.090*** (0.024)	0.069*** (0.014)	0.056*** (0.014)
Mean of D.V.	0.330	0.330	0.042	0.042
Controls	No	Yes	No	Yes
Observations	1,335	1,335	2,979	2,979
R-squared	0.048	0.453	0.015	0.032

Notes: The unit of observation is prefecture-time. Controls include aristocracy, ethnic Han and father's rank. Robust standard errors are used. Members of the imperial household and eunuchs are excluded from the sample. ***, **, * denote significance at 1%, 5%, 10% level.

Table A17. Merits and Office-holding

	Panel A: Central Senior Office					
	(1)	(2)	(3)	(4)	(5)	(6)
Military	0.131** (0.051)					
Governance		0.043 (0.075)				
Institution & policy			0.293*** (0.111)			
Literature				0.011 (0.036)		
Intelligence					0.063 (0.074)	
Integrity						0.486** (0.220)
Mean of D.V.	0.119	0.119	0.119	0.119	0.119	0.119
R-squared	0.028	0.020	0.015	0.001	0.001	0.005
	Panel B: Civil Governor					
	(1)	(2)	(3)	(4)	(5)	(6)
Military	0.105* (0.063)					
Governance		0.214** (0.102)				
Institution & policy			-0.007 (0.109)			
Literature				-0.074 (0.051)		
Intelligence					-0.076 (0.089)	
Integrity						0.043 (0.221)
Mean of D.V.	0.360	0.360	0.360	0.360	0.360	0.360
R-squared	0.006	0.010	0.000	0.004	0.001	0.000
	Panel C: Military Governor					
	(1)	(2)	(3)	(4)	(5)	(6)
Military	0.163*** (0.055)					
Governance		0.226** (0.098)				
Institution & policy			0.213** (0.108)			
Literature				0.023 (0.040)		
Intelligence					0.034 (0.074)	
Integrity						0.257 (0.220)
Mean of D.V.	0.146	0.146	0.146	0.146	0.146	0.11465
Observations	479	479	479	479	479	479
R-squared	0.021	0.001	0.033	0.000	0.002	0.023

Notes: This table presents relationship between office-holding and personal merits, for the sample of aristocrats from stronghold prefectures in the post-Reform period. The unit of analysis is individual-time. Robust standard errors are used. ***, **, * denote significance at 1%, 5%, 10% level.

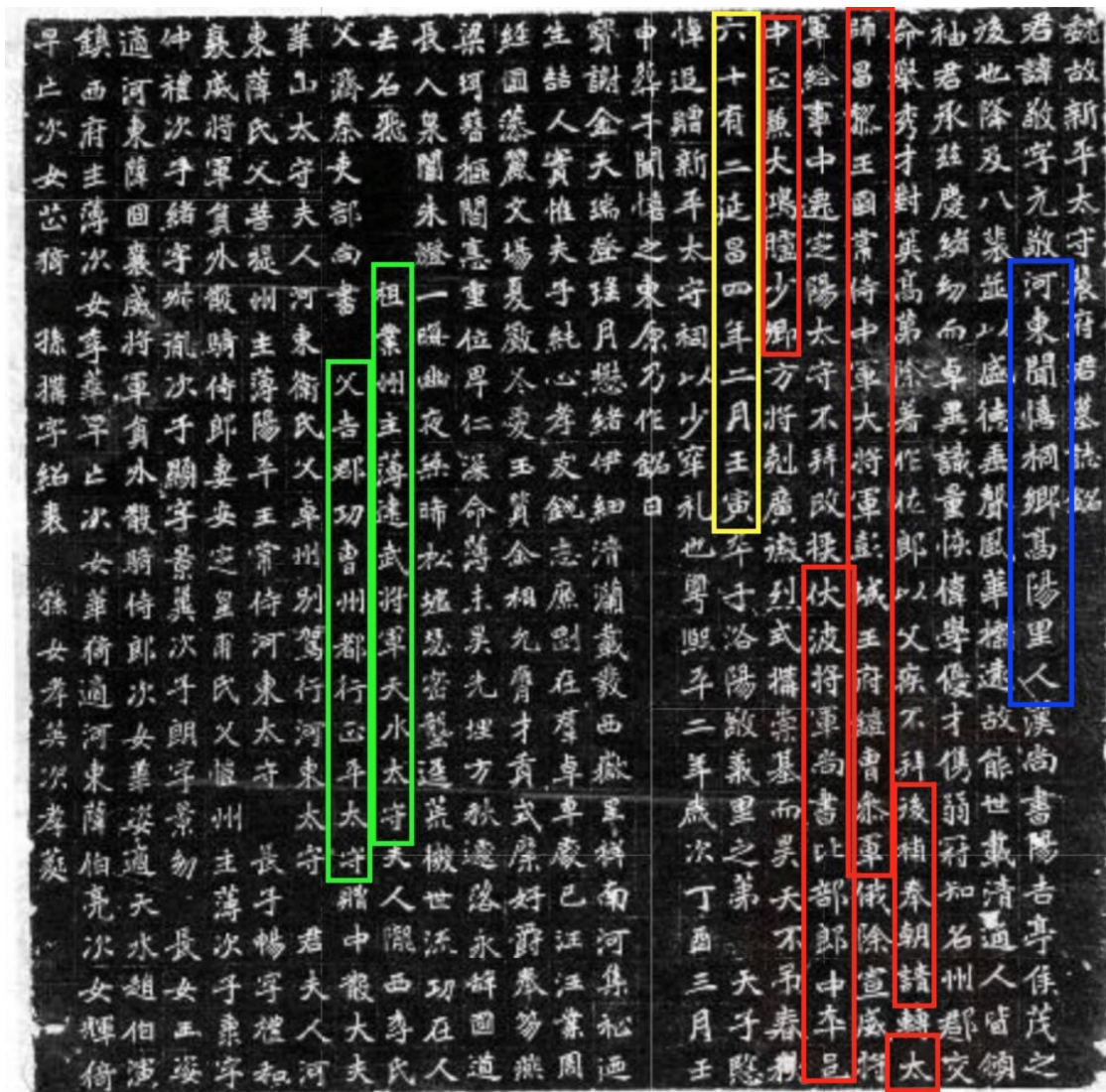
Table A18. Importance of Offices in the Ministry of Personnel

	Senior Offices		
	Central (1)	Regional (2)	Pure Office (3)
Clan Member in Personnel Ministry in Periods $\leq t \times$ Reform	0.018 (0.038)	0.105*** (0.038)	0.002 (0.039)
Clan Member in Personnel Ministry in Periods $\leq t$	0.074** (0.030)	-0.032 (0.032)	0.083** (0.037)
Mean of D.V.	0.176	0.096	0.433
Clan FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes
Observations	3,714	3,714	3,714
R-squared	0.164	0.114	0.184

Notes: This table presents the differential effects of having a clan member hold personnel offices on elites' career development, for periods before and after the reform. The unit of analysis is individual-period. Patronage network in personnel office denotes whether other clan members of a elites had served in the personnel office before the current position. Robust standard errors in parentheses are clustered at prefecture level. ***, **, * denote significance at 1%, 5%, 10% level.

B Additional Figures

Figure B1. Example of a Tomb Inscription from Northern Wei



Notes: This figure displays the epitaph of Pei Jing (454-515). The blue rectangle shows that Pei Jing comes from Wenxi county of Hedong prefecture. The red rectangle shows his career history with office title description. The yellow rectangle shows his age and date of death. The green rectangle shows offices held by his father and grandfather.

C Empirical Motivation

This section presents a set of qualitative and quantitative evidence, from our archival research, our reading of secondary works by historians, as well as our data, to highlight the fact that the Reform had substantially enhanced the overall strength and wealth of the NW.

C.1 Population and Tax Base

C.1.1 Historians' Consensus

The long-term impact of the Reform is overwhelmingly acknowledged by scholars of Chinese and world history. From a comparative perspective, NW's state-building efforts contributed to the "First Great Divergence" between China and Europe that had faced similar barbarian invasions but saw the contrasting outcomes of state consolidation versus political fragmentation ([Scheidel 2019](#)). From the perspective of Chinese economic history, recent scholarship identifies the year 485 AD as a key watershed of the first millennium ([von Glahn 2016](#)). The "Northern Dynasty Thesis" in recent historiography argues that the Reform provided a necessary condition for the revival of state capacity and imperial power that ultimately enabled China to climb from the "trough" to the "crest" of history ([Yan 2017](#): 192-193). This view echoes an earlier observation in [Huang \(1996\)](#) that credited the Tuoba rulers of NW for having built "the infrastructure of a regenerated empire" through "the creation of a new, homogeneous peasantry base, which had proven indispensable to any working imperial order" (pp. 93-94).

Historians have also assessed the impact of the Reform on state capacity at a more micro level. By comparing changes in registered population in the few prefectures that were once controlled by the southern dynasties and then became part of NW, [Zhou \(1997\)](#) finds compelling evidence that the Reform increased the regime's tax base and improved its ability to detect and re-register peasants sheltered by local aristocrats. Population data only exist in a small number of cross-sections over the course of medieval China, but [Hou \(2002\)](#) confirms this finding using another metric: the number of county government agencies. Indeed, [Hou \(2002\)](#) provides a variety of examples showing that the regime greatly enhanced its state capacity as evidenced in the increase in the number of county government agencies established after the Reform.

C.1.2 Our Evidence

In a similar spirit, we present systematic evidence to show that the Reform led to an increase in state capacity in stronghold prefectures. Since there are no comprehensive data on taxation and population—conventional measures of state capacity—for NW prefectures before and after the Reform, we use the number of county governments as an alternative measure. Our measurement

choice is consistent with the more recent political economy literature. According to [Acemoglu, García-Jimeno and Robinson \(2015\)](#), [Acemoglu, Moscona and Robinson \(2016\)](#) and [Jensen and Ramey \(2020\)](#), the number of local state functionaries and agencies measures state capacity as it embodies the “infrastructural power” of the state ([Mann 1986, 1993](#)). In imperial China, counties are precisely the lowest level of the administrative hierarchy that is responsible for population registration, tax collection and military recruitment. An increase in the number of county governments in stronghold prefectures following the Reform would therefore suggest that the regime is now able to manage, tax, and conscript a bigger population, some of which it had not possessed previously.⁷⁹ This reflects an increase in the regime’s extractive capacity in both fiscal and military dimensions.

We estimate Equation 1 using the number of counties during each time period as the dependent variable. Results are reported in columns (1) and (2) of Table C1. Column (1) is the baseline specification with two-way fixed effects, column (2) adds interaction between geographic controls and the time dummies and prefecture-level controls, and province-time fixed effects to eliminate any time-varying confounding at the province level. Findings show that the Reform led to an expansion of county government offices in stronghold prefectures. Coefficient sizes are between 0.944 and 1.05, which represent a rise between 22.78% and 25.34% compared with the mean of 4.144. Both estimates are statistically significant.

In columns (3) to (6) of Table C1, we re-estimate Equation 1 using the number of elite-led rebellions and peasant uprisings as the dependent variables. The coefficient of interest is statistically insignificant and small in magnitude across all specifications, suggesting that NW’s state-building efforts did not incite rebellions led by either local elites or commoners in stronghold prefectures. These quantitative non-results are in line with the narrative in Section 3 that the Reform saw initial but by and large muted resistance. They are surprising from a political economy point of view - a reform with such a success should have antagonized the local powerholders.⁸⁰ We argue in Section 2 and demonstrate in Sections 5 and 6 that this was because the NW regime implemented a compensation strategy that successfully re-aligned the interests of the aristocrats with the state and therefore resolved their resistance.

Direct Link Between Stronghold Recruitment and Reform Success The main purpose of this paper, through Sections 5 and 6, is to empirically demonstrate the bureaucratic compensation

⁷⁹This result is direct evidence for the regime’s success in taking over the localities previously under the *de facto* rule by the aristocrats and thus the most relevant to the distributional conflict conceptualized in this paper. In addition, the historical discussions in this section and Section 3 suggest that the Chinese state also strengthened in manifold dimensions across all localities under NW as a result of the Reform.

⁸⁰A reform that undermines the interests of the local powerholders may induce their rebellions directly, but also indirectly induce more rebellions by the commoners as it could reduce local elites’ willingness to repress rebellions against the ruler ([Garfias and Sellars 2021b](#)).

Table C1. Effects of Reform on State Capacity and Elite Rebellions.

	County Government Offices (1)	County Government Offices (2)	Elite Rebellions _{t+1} (3)	Elite Rebellions _{t+1} (4)	Peasant Uprisings _{t+1} (5)	Peasant Uprisings _{t+1} (6)
Stronghold $\times$ Reform	1.063*** (0.336)	0.861*** (0.313)	0.012 (0.047)	0.037 (0.048)	-0.016 (0.092)	-0.055 (0.093)
Mean of D.V.	4.144	4.144	0.087	0.087	0.207	0.207
Time FE	Yes	No	Yes	No	Yes	No
Prefecture FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes	No	Yes
Province-Time FE	No	Yes	No	Yes	No	Yes
Observations	1,479	1,479	2,739	2,739	2,739	2,739
R-squared	0.893	0.907	0.275	0.465	0.314	0.478

Notes: This table shows the effect of reform on the state capacity building, measured by the number of counties, elite rebellions and uprisings. The unit of observation is prefecture-time. The data of county is not available for each prefecture so we only have 1479 observations. Controls include the number of civil conflicts (lagged), foreign invasions (lagged), and the interaction between time dummies and the terrain ruggedness index, river density, and the suitability index of rice and wheat. Robust standard errors in parentheses are clustered at prefecture level. ***, **, * denote significance at 1%, 5%, 10% level.

strategy adopted to promote the Reform and unpack the specific components of the strategy. Here we provide additional evidence to document a direct link between the implementation of this strategy and the success of state-building. As shown in Table C2, among stronghold prefectures, there is a direct, sizable relationship between the extent of aristocratic recruitment after the Reform as compensation and the level of state penetration that the regime was able to achieve via the Reform.

C.2 Military Power and Transportation Infrastructure

The Reform substantially enhanced the military power of NW by enabling it to recruit vast numbers of infantry units who were much needed to fight protracted warfare against its southern enemies.

C.2.1 From Raid to Conquest

The NW had been in a long period of militarized disputes with the southern dynasties until a decade prior to the Reform.⁸¹ Wars during this period usually took the form of offensives that were taken by the southern Chinese rulers to “recover the north from barbarians” and would later be defeated by NW’s ethnic Xianbei horsemen. The cavalymen would then raid civilians in revenge or in an attempt to extract concessions, but would founder in the region between the Huai and the Yangtze

⁸¹As the Western Jin empire collapsed in the early 4th century, a branch of its royal house fled southward and founded a smaller empire that would rule the southern half of the China proper, under successive dynasties, until 589 AD. The capital of these dynasties was Jiankang, the present-day Nanjing that sits south of the Yangtze River.

Table C2. Association between Aristocratic Recruitment and State Capacity

	Number of County Government Offices		
	(1)	(2)	(3)
Arist Recruits×Stronghold × Reform	2.413*** (0.862)	2.304*** (0.815)	2.337*** (0.828)
Stronghold × Reform	0.755** (0.346)	0.758** (0.360)	0.620** (0.313)
Mean of D.V.	4.144	4.144	4.144
Time FE	Yes	Yes	No
Prefecture FE	Yes	Yes	Yes
Controls	No	Yes	Yes
Province-Time FE	No	No	Yes
Observations	1,479	1,479	1,479
R-squared	0.897	0.901	0.911

Notes: This table shows the effect of aristocratic recruitment on state penetration, measured by the number of counties established. The unit of observation is prefecture-time. Controls include the number of civil conflicts and foreign invasions (lagged), and the interaction between time dummies and terrain ruggedness index, river density, and suitability index of rice and wheat. Robust standard errors in parentheses are clustered at prefecture level. ***, **, * denote significance at 1%, 5%, 10% level.

Rivers. Nomadic cavalries, while advantageous in ground warfare, proved futile in siege battles and missions against military fortifications built around southern waterways. Their ability to defend newly acquired territories was also limited (Li 2018).

Ten years into the Reform, the regime resumed its war with the south under Emperor Xiaowen, the grandson and successor of the Reform architect Empress Dowager Feng. Rather than nomadic raids, his offensives were genuine efforts to conquer the south and bring all of China “under heaven” (Zhang 2008a). These campaigns featured the systematic deployment of mass *infantry* recruited from the Chinese hinterland. These new soldiers took the task of fighting in the waterways and laying cities under siege. As detailed in Li (2018: 350-420), sustained conquest campaigns were the fruitful results of the state-building policies, as they enabled the regime to directly penetrate and recruit from the Chinese peasantry once made unavailable by the stronghold aristocrats.

China’s eventual “reunification” between the north and south would happen in 589 AD under Yang Jian, the son of a NW official and founder of the Sui Dynasty (581-618 AD). Armies in the conquest campaigns led by him were similar to those in post-Reform NW, mainly consisting of ethnic Han Chinese infantry (Li 2018). Recent research in military history suggests that such reunification could have been achieved earlier under NW (an accomplishment that would further enhance the legitimacy and wealth of the regime) had Emperor Xiaowen not died too prematurely and left his young son to misjudge and miss the strategic opportunity presented by a civil war of the south in

500 AD (Zhang 2016: 499-500).⁸²

C.2.2 Roads, Highways, and Bridges

The Reform enabled the NW rulers to reorder the peasantry base against the wishes of local strongpersons and extract resources and manpower from it. This development not only allowed the regime to expand, strengthen, and diversify its armies, it also substantially improved the transportation infrastructure of northern China. With a large number of peasants freed from serfdom and back into state registry, the regime oversaw the construction of new roads, highways, and bridges. These infrastructural accomplishments were partially related to the war effort: conquest campaigns must be supported by a full set of proper infrastructure on land and water for rapid troop deployment and reliable supply lines (Li 2018).

The proliferation of transportation networks was noted with awe and fear by contemporaries in the southern dynasties. Xiao Zixian, a senior official in the Southern Qi Dynasty (NW's primary competitor at the time), became very concerned about the dramatic increase in the wealth and power of NW (his northern enemy) that he observed. He remarked that, with the construction of new roads, food, materials and people could easily move across major regions under NW all the way to its southern frontier (therefore facing his own country) with dramatic speed.⁸³

C.3 Legitimization Projects

C.3.1 The Bright Hall

With the manpower provided by the Reform, the regime was able to carry out major construction projects aimed at enhancing imperial authority through grand palace buildings and ritual sites. It announced the plan to construct the “Bright Hall” (*mingtang*) in 486 AD, the same year when the *three-elders* system was introduced to detect and re-register hidden population. The project began in 491 AD and completed within two years.⁸⁴ This mega-building served as the central site for administration and, more importantly, ritual performance that further elevated the authority of the ruler.⁸⁵ It is particularly noteworthy that the regime's first capital, Pingcheng of Dai Prefecture, sits at the northern edge of the Chinese hinterland and is not known for growing residential construction materials. Ambitious projects such as the Bright Hall were inconceivable without a strong state

⁸²The incompetence of Emperor Xiaowen's successor, Emperor Xuanwu, would lead to another missed strategic opportunity that would have further enhanced regime legitimacy through successful southern campaigns (*Book of Wei*, vol. 65).

⁸³*Book of Southern Qi*, vol. 58.

⁸⁴*Book of Wei*, vol. 7.

⁸⁵The discovery of the Bright Hall remains in 1995 was a major episode of international archaeology. For the first major archaeological report in English, see Yintian, W., Ghenming, C., & Shengcun, H. (2002). The Mingtang Site at Pingcheng of the Northern Wei Dynasty in Datong City, Shanxi Province. *Chinese Archaeology*, 2(1), 251-257.

to recruit peasants further south of the capital and transport them, as well as the construction materials, into the capital.

C.3.2 Relocation of the Capital to Luoyang

The regime later took another major step of legitimization by relocating its capital to Luoyang of Henan Prefecture. Having served as the capital of the ancient Eastern Zhou (770 - 256 BC), Later Han (225 - 220 AD), Cao Wei (220 - 265 AD) and Western Jin dynasties and destroyed due to barbarian invasions, Luoyang offered immense symbolic and cultural resources for NW rulers to tap into to further enhance regime legitimacy.⁸⁶ The re-construction of Luoyang into the so-called (now known as) “The City of Luoyang by NW” (*Beiwei Luoyang Cheng*) is a well-studied episode of Chinese urban history. The new capital reached its heyday with almost one million residents and one hundred square kilometers of living space, making it the largest city in East Asia at the time and one of the largest cities in the world.⁸⁷ The considerable development of urban space and the construction of a vast number of gigantic palace buildings under NW were subjects of wide academic interests from archaeologists and architectural historians.⁸⁸

Such an ambitious project required a considerable amount of state capacity. One should immediately note that the imperial court had already been in Pingcheng (the first capital) for a hundred years. Relocating the entire court and its wider communities *300 miles southward* would have been prohibitively difficult in any premodern society. Equally importantly, there was a concentrated presence of local strongholds and stronghold aristocrats in the Henan prefecture, where Luoyang was located, and its adjacent prefectures. While culturally advantageous due to its specific historical meanings for the Chinese civilization, this region was *politically and administratively* difficult in Early Medieval China for constructing a national capital because state penetration was low. The NW was able to complete this project because the Reform had greatly enhanced the position of the central government vis-a-vis the localities and improved its state capacity.

⁸⁶For extensive discussions on how the capital relocation improved political legitimacy, see Tsiang, K. R. (2002). Changing Patterns of Divinity and Reform in the Late Northern Wei. *The Art Bulletin*, 84(2), 222–245. <https://doi.org/10.2307/3177267> and Liu P. (2018). Becoming the Ruler of the Central Realm: How the Northern Wei Dynasty Established its Political Legitimacy. *Journal of Asian History*, 52(1), 83–117. <https://www.jstor.org/stable/10.13173/jasiahist.52.1.0083>

⁸⁷The size and population varied from time to time across medieval history with estimated averages of 700,000 residents and 75 square kilometers.

⁸⁸Recently, the Harvard University CAMLab has released the “Digital Luoyang” project to offer a virtual, interactive experience of Luoyang under NW. <https://camlab.fas.harvard.edu/Digital-Luoyang>, access date: Oct 23, 2021

D Additional Historical Context

This section provides additional historical context for interested readers.

We begin by presenting a simple chronology of the rulers mentioned in the ensuing paragraphs (for other rulers, see Table A1). Empress Dowager Feng, the chief architect of the Reform, was the *de facto* ruler of the NW between 477 and 490 AD, with the reigning emperor being Xiaowen, her grandson. After her death, Emperor Xiaowen began his rule, and orchestrated the relocation of NW’s capital to Luoyang. He was superseded by his son, Emperor Xuanwu, who was then superseded by his son, Emperor Xiaoming.

D.1 Additional Background of the Reform

As described in Section 3, the Reform comprised of the interlocking procedures of the *three-elders* and *equal-field* systems. The *Book of Wei* records the origin and discussion of the *three-elders* system at the imperial court before its implementation. These records help reveal a clear demarcation between a centralized, state-building elite centered on the members of the Tuoba imperial household and the local landowning aristocratic families in stronghold regions. It was Li Chong who initially proposed the idea of the *three-elders* system to Empress Dowager Feng in a private conversation.⁸⁹ Li Chong was the member of a prominent family who used to rule a region in China’s northwest as warlords and then monarchs. Li Chong’s father was the kingdom’s last ruler and surrendered it to NW. The family then had to completely relocate to Pingcheng, NW’s capital, no longer extensively connected to their local origins.⁹⁰ Li Chong and his elder brothers all grew up in the palace. Li Chong later became Empress Dowager Feng’s lover.⁹¹ His niece and two of his daughters were also married to members of the Tuoba clan (the ruling clan of NW). In line with our theoretical discussion, the initiator of the Reform thus already had a vested interest not in the localities but in the central government and the wealth of the regime as a whole.

The Empress Dowager was impressed with Li Chong’s proposal and decided to discuss it publicly at the court. Two officials immediately issued an objection against it, both of whom turned out to be members of the aristocratic families in stronghold prefectures. They were Zheng Xi of Xingyang and Gao You of Bohai. They emphasized the impracticality of ”ruling the whole country with one policy.”⁹² This rhetorical strategy may have been employed to remind the rulers (the Empress Dowager and the young Emperor Xiaowen) that stronghold regions were different. Zheng Xi went so far as to say: ”If you don’t believe me then you can try it, and then you will realize that you

⁸⁹ *Book of Wei*, vol. 53.

⁹⁰ *Book of Wei*, vol. 39.

⁹¹ *Book of Wei*, vol. 53.

⁹² *Ibid.*

are wrong and I am right.”⁹³ Tuoba Pi, a senior official in the central government and a member of the Tuoba imperial clan, came to defend Li Chong’s proposal. Li Chong then remarked again. This time he not just emphasized the importance of the policy, but added that the regime must implement the system immediately and in a rapid fashion across the country so that the peasants would quickly enjoy and understand its benefits to them. Fu Siyi, another stronghold aristocrat, joined the discussion by siding with Zheng and Gao. He objected that “chaos may ensue.”⁹⁴ This rhetorical strategy can be understood in light of recent political economy research showing that local elites undermine reforms by allowing local rebellions to rise (Finkel, Gehlbach and Olsen 2015; Garfias and Sellars 2021b). The Empress Dowager broke the stalemate by emphasizing that the *three-elders* system would surely resolve the “hidden population problem.” The *Book of Wei* later said that the system then got implemented despite the different opinions expressed in this court discussion. Note that the Empress Dowager shared a similar background with Li Chong. Her family used to be rulers of a kingdom in China’s northeast, but after the conquest by NW they had to relocate to NW’s capital. She grew up in the palace and was married to Empress Xiaowen’s grandfather.⁹⁵

As Empress Dowager Feng was the *de facto* regent at the time, the court politics behind the *three-elders* system did not feature the young Emperor Xiaowen. But the Emperor played a more active role in promoting the next logical step of the Reform, the *equal-field* system. It’s worth noting that the benefits of the *three-elders* system to the regime were immediate and Emperor Xiaowen and other state-builders likely strategically used such benefits as a pretext for the land redistribution policies under the *equal-field* system. The memorial presented to Xiaowen began by recalling that many peasant families had been dislocated for generations. This situation was precisely what we had described in Section 3, where endemic warfare in the 4th century compelled peasants to seek refuge in aristocrats’ strongholds and work on their manors as serfs. Then, the memorial highlighted that, “*after the implementation of the three-elders system*” (emphasis ours), the peasants (having been freed from serfdom) now demanded new lands but met resistance from local aristocrats, and that numerous disputes ensued as a result, which became difficult to handle.⁹⁶ Emperor Xiaowen was recorded to have accepted this proposal in its entirety and it became the *equal-field* system as contemporaries knew it.

⁹³Ibid.

⁹⁴Ibid.

⁹⁵*Book of Wei*, vol. 13.

⁹⁶*Book of Wei*, vol. 53.

D.2 Emperor Xiaowen’s Sinicization Reforms

The Chinese Communist Party propaganda tends to highlight a cultural reform of ethnic integration beginning in 493 AD under Emperor Xiaowen.⁹⁷ This so-called “sinicization” narrative focuses on the Tuoba rulers adopting Han Chinese clothing, language, and surnames, as well as relocating the central government to Luoyang, the capital of former Chinese dynasties such as the Later Han and Western Jin empires.⁹⁸ Historical research both in and outside China, alongside historical records themselves, however, accords a much greater importance to two other components of the sinicization movement: the (renewal of) military invasions of the south (e.g., [Pearce 2019](#), [Zhang 2008a](#), [Li 2018](#)) and the “aristocratization” policies (e.g., [Pearce 2019](#), [Ebrey 1978](#)). For the former component, Emperor Xiaowen and his successors now saw themselves as fully Chinese rulers who would have to bring *all of China* under heaven into the rule of their dynasty through conquest ([Li 2018](#)). We discuss this aspect of sinicization in Appendix [C.2](#).

The latter component refers to state-sponsored reclassification of status hierarchy for supposedly all clans under NW, a process that further elevated several dozens of Chinese aristocratic families and merged the royal household as well as other Xianbei nobles with those families into a unified Chinese aristocracy ([Pearce 2019](#); [Ebrey 1978](#)). From a political economy perspective, our empirical findings reveal that this part of the sinicization movement was probably to provide a cultural pretext for the continuation of the compensation strategy that would continue to benefit the aristocrats from the stronghold regions (and benefit them mainly) into and well after Emperor Xiaowen’s reign.⁹⁹

D.3 The End of NW in 534 AD

In hindsight, the division of NW in 534 AD began with rebellions that were initiated by the Six Garrison populations settled in the regime’s northern frontier in 524 AD ([Pearce 2019](#): 181). Those uprisings led to a destructive chain of events culminating in the state general Erzhu Rong marching to the capital and massacring the ruling elites attending his arrival ceremony with a large army consisting of co-opted rebels.

Traditional accounts tend to portray the rebellions as a backlash against Emperor Xiaowen’s sinicization drive that alienated the left-behind northerners with the relocation of capital southward to Luoyang and the aristocratization policy. More recent research, however, rejects this interpretation. Analyzing detailed data on the profiles of elites involved in this episode, [Xue \(2020\)](#) shows that the

⁹⁷A recent example is the [short documentary](#) produced by the Chinese Central State Television, “Reform under Emperor Xiaowen of Northern Wei” (access date: May 28, 2021).

⁹⁸ibid

⁹⁹The sinicization movement is chronologically post-treatment. The cultural channel as an explanation is also automatically excluded: as both our treated and control groups consist of Han Chinese aristocrats only, the DD and DDD analyses essentially investigate the differential career privileges *within* the Han Chinese aristocracy.

so-called “Six Garrison Rebellion” had little to do with the northerners’ resentment of the elevated, integrated Chinese-Xianbei aristocracy based in Luoyang. Instead, it was essentially a class conflict *within* the northern frontier settlement seeded in the inequality between the upper-class military officers and lower-class soldiers and settlers. The trigger of the conflict was the severe weather conditions in early 6th century that further worsened the living conditions of the lower-class groups and exacerbated their resentment against the upper-class officers in the Garrison (Chapters 1-2).¹⁰⁰ Cutting-edge research in medieval Chinese history is in fact consistent with a well-known finding in political economy: climate shocks increase the odds of conflict (Burke, Hsiang and Miguel 2015). Traditional accounts relating the Six Garrison Rebellion to resentment against aristocratization also fail to reconcile with the fact that NW’s successor dynasties, founded by the very elites *who participated in the Six Garrison Rebellion*, continued the aristocratization policy (Zhang 2015b).

In addition to temperature shocks as the most obvious reason for the weakening of the NW regime, another cause has to do with the poor health and young age of a series of NW rulers. It’s well-established in empirical political economy research that individual national leaders could have a large causal impact on a country’s political fate, particularly in authoritarian regimes like NW (e.g., Jones and Olken 2005, 2009). A closer attention to the basic demographic data of NW emperors helps make sense of why such a strong regime nonetheless would meet its eventual downfall. Due to natural illness, Emperor Xiaowen died of a young age at 33, his successor (Emperor Xuanwu) even younger at 25. The death of Emperor Xuanwu left a 6-year-old child on the throne, later known as Emperor Xiaoming. The *de facto* regent was Empress Dowager Hu. As recorded in the *Book of Wei*, Hu’s excessive corruption, manifested in the construction of extravagant Buddhist architectures, put a severe drain on state finance.¹⁰¹ Her power grab and attempts to enrich her own clan also led to a series of conflict with the Tuoba imperial clan.¹⁰² Successive unexpected departures of emperor left the regime inherently unstable and unable to cope with the severe natural disasters hitting the northern frontier.¹⁰³

In any case, the state-building Reform of 485-486 AD was unlikely the cause of regime division—they were correlated only chronologically.¹⁰⁴ More specifically, the division of NW resulted from

¹⁰⁰Note that the timing of NW’s division coincided with a local minimum of the temperature series over China spanning the last two thousand years. For a geophysical discussion of China’s climate conditions over the first two millennia, see Ge, Q. S., Zheng, J. Y., Hao, Z. X., Shao, X. M., Wang, W. C., & Luterbacher, J. (2010). *Temperature variation through 2000 years in China: An uncertainty analysis of reconstruction and regional difference*. Geophysical Research Letters, 37(3).

¹⁰¹The most famous architecture was the Yongning Pagoda, a temple of 147 meters in height, the world’s tallest building at the time, and the tallest Pagoda in world history. See McNair, A. (2006). *Donors of Longmen: faith, politics, and patronage in medieval Chinese Buddhist sculpture*. University of Hawaii Press.

¹⁰²Book of Wei, vol. 13

¹⁰³We discuss how the incompetence of Emperor Xuanwu likely prevented NW from gaining further political legitimacy in Appendix C.2.

¹⁰⁴In other words, one would not argue that the implementation of the French civil law in 1804 was the cause of Napoleon’s final defeat in 1815 simply because the two events were chronologically adjacent.

a deep distrust and dissension between the emperors and Gao Huan, a powerful military general who took over Erzhu Rong's army after his death and single-handedly controlled court politics. A failed attempt to contain Gao Huan with the help of armies stationed in the western provinces of the country ultimately led Emperor Xiaowu to flee westward for protection under Yuwen Tai, the commander of those armies. As Gao Huan subsequently enthroned a new emperor in Luoyang, NW became split in two, known as the Western and the Eastern Wei, each claiming itself to be the legitimate Wei regime.

More importantly, policies of the Reform survived well beyond the NW regime. The *three-elders* system lasted for a century (Hou 2002), and the *equal-field* land policy continued well into the 700s (Huang 1996). The immediate geopolitical legacy of the Reform is China's swift re-unification in 589 AD under Yang Jian, the son of a NW official, who subdued the southern dynasty with a formidable army raised and supplied with the immense extractive capacity of the northern Chinese state (Huang 1996: 94-97).

E An Illustrative Case Study: the Zhengs of Xingyang

To illustrate the mechanisms of our argument at work, this section provides a case study that details the changing political fortunes of a prominent stronghold aristocratic family, the Zhengs of Xingyang. With vested interests in the pre-Reform status quo, the family initially voiced opposition to the Reform. To compensate the family for their loss, the Northern Wei court continued to offer them powerful and lucrative positions in the bureaucracy. This strategy resulted in the family's transformation from a local powerholder into a national elite whose interests eventually became intertwined with that of the Chinese state.

The Zhengs had been a locally prominent family since the dawn of the First Millennium AD, when Zheng Xing got rewarded for his active role in the founding of the Later Han Dynasty (25 - 220 CE). His son became a senior court official, whose great grandson, Zheng Tai, was widely regarded as a powerful landowning elite whose influence rivaled that of the state in his region ([Chen 1998](#): 138). According to the *Book of Later Han* (vol. 70), Zheng Tai owned a manor of 270,000 square meters and had built a network of local armed groups in light of the breakdown of political order during the Han Dynasty's collapse. As waves of civil wars and famines plagued central China, the Zhengs offered patronage and protection to numerous political families in exile and continued to enjoy a high quality of life. Zheng Tai's son, Zheng Mao, became a power broker among chief warlords of the era and eventually received a top office position by the founder of the Western Jin Dynasty in the late 3rd century. Mao's grandson, Qiu, also attained top office.

As the semi-nomadic kingdoms waged disastrous wars upon one another following Western Jin's collapse in the 4th century, the Zhengs managed to maintain their status as an autonomous local powerholder with their manors and castles whose support was highly sought after by the various tribal leaders vying for domination in northern China. As described in Section 3, having conquered other northern kingdoms, the Northern Wei regime continued to respect the local autonomy of stronghold aristocratic families like the Zhengs until the Reform. The Zhengs boasted of armed clients and huge landed wealth, particularly in Xingyang, a prefecture in the central region of the China proper where their influence was densely concentrated ([Chen 1998](#): 143). The regime once had to rely on the Zhengs to combat a rebellion and restore order in the surrounding regions ([Chen 1998](#): 143) in a way similar to that described in [Garfias and Sellars \(2021b\)](#) for the Mexican local powerholders. As the Reform sought to take down vested interests and rebuild the presence of the local Chinese state, the Zhengs had obvious incentives to resist it and thus became a target of Northern Wei's compensation strategy.

Empress Dowager Feng and her Reform supporters picked Zheng Xi, whose father did not hold any office in the Northern Wei bureaucracy. In fact, no member of the Zheng clan in the generations

prior to him occupied any position in the core of Northern Wei's political system (Chen 1998: 141). Zheng Xi was recruited into the bureaucracy to serve a lower-level post. He then faced some career obstacles but later received fast-tracked promotion all the way into a senior position in the national government with the help of Li Chong, the Empress Dowager's lover and a chief architect of the Reform (see Section D.1).

Interestingly, as if this compensation was not enough, Zheng Xi later voiced opposition in the court to Li Chong's Reform proposal. As described in Section D.1, the Reform nonetheless entered into force at the insistence of the Empress Dowager and other Xianbei imperial elites. Despite this confrontation, the Northern Wei rulers continued its bureaucratic compensation of the Zhengs. Consistent with our theoretical framework in Section 2 and quantitative results in Section 6.2, Zheng Xi's son soon received a key position in the Ministry of Personnel, enabling him to enlist political allies in support of his career as well as his family.¹⁰⁵ This and his other son both attained senior positions in the national government later in their careers. Consistent with results in Table A16, their senior positions facilitated the building of marriage ties between their clan and the Northern Wei imperial household. Emperor Xiaowen, the Dowager's successor, married Zheng Xi's daughter as a concubine.

Since the rise of Zheng Xi, clansmen of the Zhengs began to enter the Northern Wei bureaucracy in large numbers, taking high positions in the national government and in various regions across the empire. The most powerful member was Zheng Yan, a grandnephew of Zheng Xi. For a long time he had held concurrent positions in policy making and the palace guard. At the peak of his career, he concurrently held both the positions of Chief Secretariat (*Zhongshu Ling*) and Edict Drafter (*Zhongshu Sheren*).¹⁰⁶ This arrangement was institutionally remarkable. The former post usually served as the head of the policy-making council, while the latter was the former's underling in charge of drafting policy directions into actual policy documents. The two positions were always held by different individuals until Zheng Yan's joint appointment, the nature of which was to merge the "principal" and the "agent" into one with immense power and responsibility. The historical records considered him as the sole policy maker during his tenure in the national government.¹⁰⁷

Chen (1998) notes that the recruitment of the Zhengs into the Northern Wei bureaucracy had transformed the family from a "locally rooted lord" into a "national elite" with close ties to the capital and "empire-wide prominence" (p. 144). Consequently, "the political and economic interests of the Zhengs and the Xianbei royals gradually became aligned" (Chen 1998: 146). It is therefore not surprising that the historical records documented no further resistance from any member of the Zhengs to the Reform. In fact, ample evidence suggests that the Zhengs accepted the arrival of

¹⁰⁵ *Book of Wei*, vol. 56.

¹⁰⁶ *Book of Wei*, vol. 93.

¹⁰⁷ *Book of Wei*, vol. 93.

centrally-appointed officials in their home prefecture to curb the excessive influence of their own clansmen.¹⁰⁸ This “intervention of imperial power” after the Reform meant the “erosion of Zhengs’ local powerbase” (Chen 1998: 148). This process was so thorough that the historical records even specifically documented the Zhengs’ inability to raise private militia toward the end of Northern Wei (Chen 1998: 149). From our perspectives, the rulers’ persistent compensation that eventually turned one of the most powerful and stubborn stronghold aristocratic families into a national, bureaucratized elite willing to give up their own local autonomy is a clear illustration of Proposition 3 in Section F.

¹⁰⁸*Book of Wei*, vol. 88.

F An Illustrative Model

F.1 Model Setup

In the model, there is one autocratic ruler, R , and one aristocrat, A . The ruler has total political rents s . The aristocrat controls the productive assets (e.g. land) and population of a locality L . He is able to extract from L a total resource of τ_L , which consists of the population's taxable productive output and military output.¹⁰⁹

We first describe the full sequence of events, which is illustrated in Figure F1. The self-interested ruler decides to build state capacity. That is, she decides to take over the aristocrat's resources from locality L . In the historical context of Northern Wei, this corresponds to distributing land to A 's dependents (the *equal-field* system) and managing them directly (the *three-elders* system) so that instead of cultivating A 's land, paying taxes to A and supplying military services to A , those people can now work on their own land, pay taxes to R and become R 's army conscripts. The ruler can choose to seize A 's control by force, or by giving him an office i in the bureaucracy as compensation for his economic loss. If the ruler gives out an offer, then it becomes the aristocrat's turn to decide whether to accept the offer, or to reject the offer and rebel.

If R chooses to seize A 's resources by force, or if A rejects R 's offer and rebels, a violent conflict breaks out. This conflict incurs a fixed cost c_R to the ruler, and c_A to the aristocrat. The winner receives τ_L , the aristocrat's resources from locality L . The probability that A wins the conflict follows a function $P(\tau_L)$, which takes a value between 0 and 1 and is increasing in τ_L . That is, more resources can translate to greater military strength and therefore a higher probability of success at conflict, and as a result the aristocrat's expected gain $P(\tau_L)\tau_L$ is increasing in τ_L .¹¹⁰

Now, we turn to describe the compensation outcome. If R gives A an office i , and A accepts the offer, the payoffs to both sides are modeled as follows. The ruler seizes the resource of locality L , τ_L , as part of the deal; the aristocrat assumes office i , and makes a policy investment as a state official. Then, the ruler has the option of revoking the compensation deal by removing the aristocrat; and if he does so, which would be an off-equilibrium scenario when the compensation deal is credible, the aristocrat can choose to stage a coup, with success probability Q_i . A rare example in post-Reform

¹⁰⁹This formulation is similar to [Hirshleifer \(1995\)](#) and [Bates, Greif and Singh \(2002\)](#), where the population divides their time between production and fighting. Our model abstracts away from the problem of optimal time allocation, and instead assumes that A 's payoff and probability of success in conflict are both increasing in total resource level. See the next footnote for a derivation of this property.

¹¹⁰This functional property can be derived from the following maximization problem: $\max_{m_A} [\rho(m_A, m_R)(\tau_L - m_A)]$. The aristocrat allocates total resource τ_L between military output m_A and production, to maximize his expected income from a conflict against the ruler. m_R denotes the ruler's military strength, and $\rho(m_A, m_R) = \frac{m_A}{m_A + m_R}$ is the contest success function commonly used in the literature on conflict (see [Dixit 1987](#), [Skaperdas 1996](#)). By the Envelope Theorem, the value function of this problem is increasing in τ_L . m_R is treated as a constant and is abstracted away from A 's payoffs.

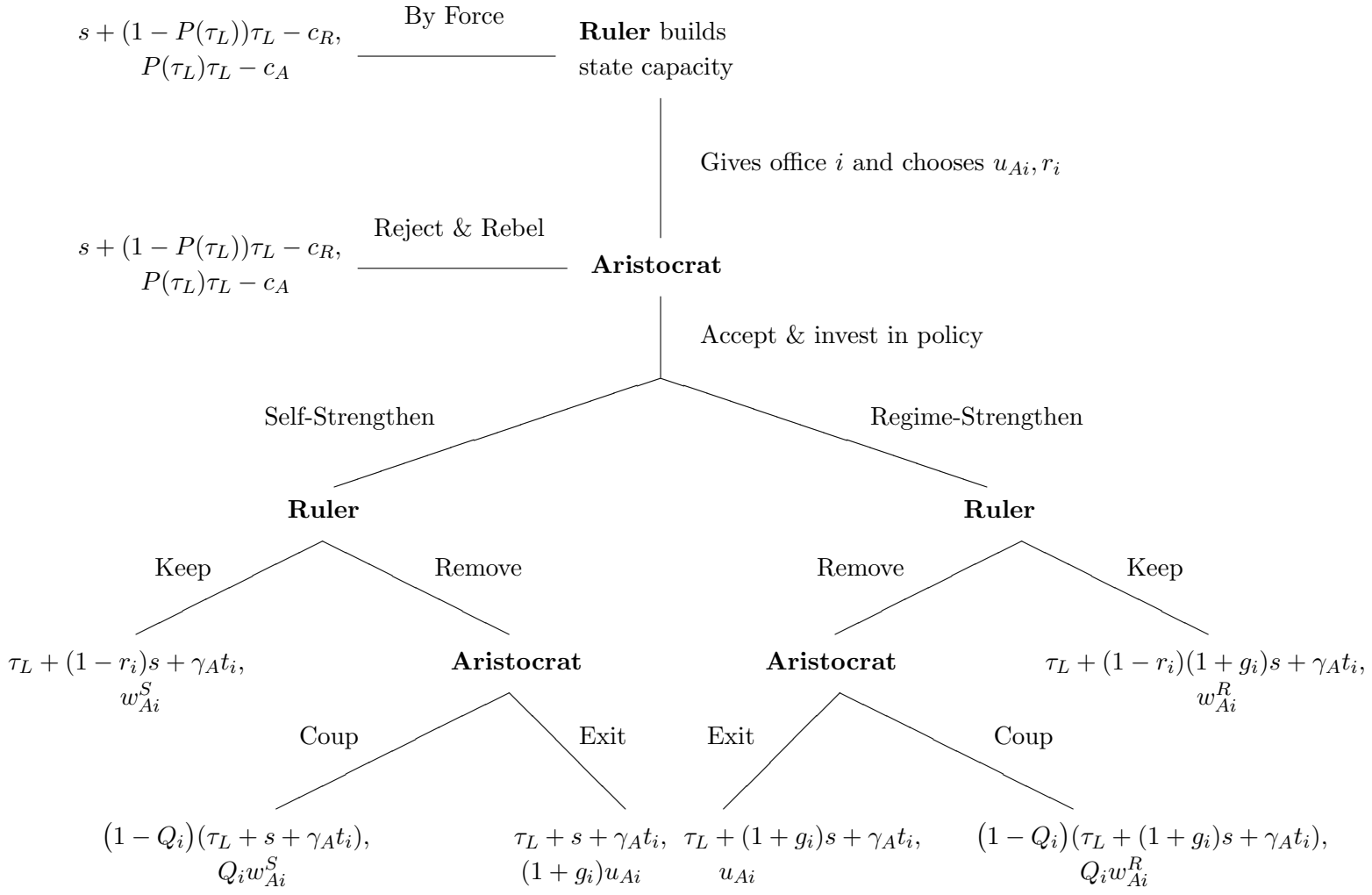


Figure F1. Game Tree

history of Northern Wei illustrates the use of coup after removal from office. Yu Zhong, a powerful royal relative who became the *de facto* ruler of Northern Wei when Emperor Xiaoming was between 5 and 8 years of age, removed Guo Zuo, who was once the Minister of Personnel, from his position at court. Guo Zuo conspired with a close ally, Wei Jun, to exile Yu Zhong from the court. Before this plan was put in action, Guo and Wei were both murdered by Yu.¹¹¹

To the ruler, office i generates a payoff $\gamma_A t_i$. Here, t_i embodies the administrative or military services performed by the holder of office i that help stabilize, protect or enhance the interests of the regime. The value of these services is increasing in γ_A , which denotes the aristocrat's competence at those services.

To the aristocrat, office i generates two types of payoffs—an *appropriable* payoff, u_{Ai} , and rents shared with the ruler, $r_i s$ —and contains mobilization potential κ_i . u_{Ai} reflects what the aristocrat can appropriate from the office as his private asset, which can be kept even after he leaves office. Recall from Section 3.1 that aristocratic families in medieval China accumulated political and economic capital through their history of office-holding in prior dynasties. u_{Ai} thus captures the prestige and political capital attached to office i that can be used by the aristocrat to enhance his family's socio-political status and power. $r_i \in (0, 1)$ entails the fraction of total political rents of the state that is paid to the holder of office i . This can include, for instance, wages, economic privileges and career advancement prospects as an official of the imperial bureaucracy. Lastly, κ_i reflects the degree to which office i can facilitate the formation of personal factions and the use of such factions by its holder for political gains. It directly affects the aristocrat's probability of coup success, such that $Q_i = Q(\kappa_i)$ and $Q(\cdot) \in [0, 1]$ is monotonically increasing in its argument.

After assuming office, the aristocrat chooses to invest in a policy that increases either u_{Ai} or s by a positive rate $g_i \in (0, 1)$. That is, he can choose a policy that only increases his own political capital (for example, a tax exemption that only applies to his hometown, which increases his local popularity); or a policy that enhances the interests of the entire regime, a share of which will be paid out to him (for example, laws and regulations that reduce nationwide corruption). In the former case, his payoff becomes $w_{Ai}^S = (1 + g_i)u_{Ai} + r_i s$, and in the latter case, his payoff becomes $w_{Ai}^R = u_{Ai} + r_i(1 + g_i)s$.

Lastly, the ruler can choose to keep or remove the aristocrat, which correspond to committing to and reneging on the deal respectively. If she removes A from office, A can exit office-holding peacefully or stage a coup. In the former case, A receives zero rents but retains his appropriable payoff u_{Ai} , and R does not share rents with A . In the latter case, A succeeds with the coup with probability $Q(\kappa_i)$. If successful, A receives his due payoff from holding office i , and R gets none; otherwise, A gets none, and R gets to keep total rents s to herself.

¹¹¹As we will discuss in Section F.3, this off-equilibrium move would prove to be extremely costly to the ruler.

Before going on to solve the model, we outline an assumption on parameter values.

Assumption 1. $V_A := P(\tau_L)\tau_L - c_A < s$.

This assumption says that the aristocrat's outside option of rejecting the compensation offer is smaller than the ruler's total rents. It rules out the possibility that the aristocrat cannot be fully compensated with rents.

F.2 Model Solution

This game is solved by backward induction. We consider each player's action step by step.

Aristocrat: Coup/Exit. It is straightforward to see that, given office i , the self-strengthening aristocrat (which we denote as A^S) chooses coup if

$$\begin{aligned} Q_i((1 + g_i)u_{Ai} + r_i s) &\geq (1 + g_i)u_{Ai} \\ \Rightarrow \frac{u_{Ai}}{r_i s} &\leq \frac{Q_i}{(1 + g_i)(1 - Q_i)}. \end{aligned} \quad (4)$$

Similarly, the regime-strengthening aristocrat (which we denote as A^R) chooses coup if

$$\begin{aligned} Q_i(u_{Ai} + (1 + g_i)r_i s) &\geq u_{Ai} \\ \Rightarrow \frac{u_{Ai}}{r_i s} &\leq \frac{(1 + g_i)Q_i}{1 - Q_i}. \end{aligned} \quad (5)$$

From the two inequalities above, we can see that, holding all parameter values constant, A^R is more likely to choose coup relative to A^S . The reason is that the A^R receives higher rents from staying in office. Moreover: (1) a rise in κ_i , and thus Q_i , makes both aristocrats more likely to choose coup due to higher probability of winning; (2) a rise in $r_i s$ makes both aristocrats more likely to choose coup due to higher rents from staying in office; (3) a rise in g_i works in opposite directions for the two— A^R becomes more likely to choose coup due to higher rents from staying in office, and the A^S becomes less likely to choose coup as a result of higher outside option from a peaceful exit.

Also, it is clear that R will remove A if A chooses to exit. This is intuitive, as R can costlessly break the compensation deal and thus secure a higher payoff for herself if A does not have means of punishing her for it. Thus, an aristocrat who chooses exit will always invest in the self-strengthening policy to raise his exit payoff. To summarize:

Remark 1. *The aristocrat will never choose {Regime-strengthen, Exit} in equilibrium.*

Given this observation, for the rest of the analysis we focus on equilibria in which Inequality 4 holds (which implies that Inequality 5 holds). That is, we assume that the aristocrat always finds it optimal to choose coup.

Ruler: Keep/Remove. Under the assumption that the aristocrat optimally chooses coup, the ruler keeps A^S if

$$\begin{aligned}\tau_L + (1 - r_i)s + \gamma_A t_i &\geq (1 - Q_i)(\tau_L + s + \gamma_A t_i) \\ \Rightarrow \frac{r_i - Q_i}{Q_i} &\leq \frac{\tau_L + \gamma_A t_i}{s}.\end{aligned}\tag{6}$$

Similarly, the ruler keeps A^R if

$$\begin{aligned}\tau_L + (1 - r_i)(1 + g_i)s + \gamma_A t_i &\geq (1 - Q_i)(\tau_L + (1 + g_i)s + \gamma_A t_i) \\ \Rightarrow \frac{r_i - Q_i}{Q_i} &\leq \frac{\tau_L + \gamma_A t_i}{(1 + g_i)s}.\end{aligned}\tag{7}$$

It is clear that R will only consider removing A if $r_i > Q_i$, which implies that R 's share of rents paid to the aristocrat is greater than the expected rent loss from letting A stage the coup. When $r_i > Q_i$, R is more likely to keep A^S over A^R because the level of rents paid to the former is relatively low. This means that there exists parameter values such that R keeps A^S , but not A^R . Using G to denote $\tau_L + \gamma_A t_i$, we can see that:

Remark 2. *The ruler's decision to keep or remove the aristocrat can be characterized as follows:*

1. When $\frac{r_i - Q_i}{Q_i} \leq \frac{G}{(1 + g_i)s}$, ruler keeps both A^S and A^R .
2. When $\frac{r_i - Q_i}{Q_i} \in \left(\frac{G}{(1 + g_i)s}, \frac{G}{s}\right]$, ruler keeps A^S and removes A^R .
3. When $\frac{r_i - Q_i}{Q_i} > \frac{G}{s}$, ruler removes both A^S and A^R .

Aristocrat: Self/Regime-Strengthen. Again, supposing that the aristocrat optimally chooses coup in all situations, A chooses self-strengthen over regime-strengthen in Cases 1 and 3 if

$$\frac{u_{Ai}}{r_i s} \geq 1.\tag{8}$$

And A chooses self-strengthen over regime-strengthen in Case 2 if:

$$\frac{u_{Ai}}{r_i s} \geq \frac{(1 + g_i)Q_i - 1}{1 + g_i - Q_i}.\tag{9}$$

Ruler: Choose Payoffs. Inequalities 4 to 9 show that decisions by R and A can be fully characterized by u_{Ai} and r_i , payoffs from office i . Combining this observation with Remarks 1 and 2, we see that the ruler needs to choose u_{Ai}, r_i to optimize among seven cases,¹¹² summarized in Table F1

¹¹²If parameter values are such that A^S chooses to exit when he is removed, then R will never choose to keep A^S , since removing him incurs no cost.

below. For brevity, we use π_R^x to denote ruler's payoff in case x , r^x to denote equilibrium share of rents paid in case x .

Table F1. Game Cases

	$\frac{r_i - Q_i}{Q_i} \leq \frac{G}{(1+g_i)s}$ (Keep A^S, A^R)	$\frac{r_i - Q_i}{Q_i} \in \left(\frac{G}{(1+g_i)s}, \frac{G}{s}\right]$ (Keep A^S , remove A^R)	$\frac{r_i - Q_i}{Q_i} > \frac{G}{s}$ (Remove A^S, A^R)
A^R coups	<u>Case 1a</u> $\pi_R^{1a} = G + (1 - r^{1a})(1 + g_i)s$	<u>Case 2a</u> $\pi_R^{2a} = (1 - Q_i)(G + (1 + g_i)s)$	<u>Case 3a</u> $\pi_R^{3a} = \pi_R^{2a}$
A^S coups	<u>Case 1b</u> $\pi_R^{1b} = G + (1 - r^{1b})s$	<u>Case 2b</u> $\pi_R^{2b} = G + (1 - r^{2b})s$	<u>Case 3b</u> $\pi_R^{3b} = (1 - Q_i)(G + s)$
A^S exits	-	-	<u>Case 3c</u> $\pi_R^{3c} = G + s$

F.3 Equilibrium Analysis

We begin our analysis by examining the ruler's options in Table F1. An observation that should immediately emerge is that: $\pi_R^{3c} > \pi_R^{1b}, \pi_R^{2b}, \pi_R^{3b}$. That is, R strictly prefers to choose payoffs in such a way that she will remove A^S and let him make a peaceful exit rather giving him enough incentives to choose coup regardless of removal. This is intuitive, as coup is costly to R .

We derive this observation more formally and combine it with an additional result (see Section F.4 for proof) to arrive at the following proposition:

Proposition 1 (Credible Commitment). *The ruler prefers to keep rather than remove the regime-strengthening aristocrat when*

$$V_A \leq Q_i \left(\min \left\{ \frac{(1+g_i)Q_i}{1-Q_i}, 1 \right\} + 1 \right) \left(\frac{G}{1+g_i} + s \right). \quad (10)$$

Moreover, if the aristocrat chooses to self-strengthen, the ruler would then prefer to remove him and let him make a peaceful exit. Taken together, the compensation deal is credible only if Inequality 10 holds.

- From Inequality 10, we see that credible commitment is more likely to happen when $Q_i = Q(\kappa_i)$ takes on a larger value. This is intuitive, as R will honor the deal only if A chooses coup, and A is more likely to choose coup if he has a higher probability of winning. This suggests that,

as part of a *credible* compensation deal, R needs to give A offices with a sufficiently effective patronage network κ_i that A can use for political gains and protection.

- Relevance to Northern Wei: Section 6.2 provides evidence that offices in the Ministry of Personnel function as credible commitment devices as they facilitate the creation of personal patronage networks. That removing an individual who held personnel offices is costly to the ruler can be perfectly illustrated using the same case as described in Subsection F.1. Recall that Yu Zhong, the *de facto* ruler of Northern Wei when Emperor Xiaoming was a child, murdered Guo Zuo, who used to serve as the Minister of Personnel. The death of Guo triggered grievances among many state officials both in and outside of the capital, and subsequently “brought a serious backlash against Yu that cost him substantial political support” (Zhang 2008b: 24). Two months later, Yu was removed from his court duties and exiled out of the capital.¹¹³ This example illustrates the enormous cost of killing an individual with a background in the Ministry of Personnel.

For the ensuing analysis, we assume that Inequality 10 holds, so that it is possible for a credible compensation deal to arise in equilibrium. This implies that only two outcomes can transpire in a compensation equilibrium: the ruler keeps a regime-strengthening aristocrat, or that the ruler removes a self-strengthening aristocrat who then exits peacefully.

We first outline conditions under which compensation will arise in equilibrium. It is straightforward to see that for compensation to happen, both A and R ’s participation constraints must be met. That is, A ’s payoff from compensation must be higher than his outside option of rebelling, and R ’s payoff from compensation must be higher than his outside option of state-building by force. More specifically:

$$\begin{aligned} \text{Ruler: } \quad & \tau_L + \gamma_A t_i + \max \{s, (1 - r^{1a})(1 + g_i)s\} \geq s + (1 - P(\tau_L))\tau_L - c_R \\ & \Rightarrow P(\tau_L)\tau_L + c_R + \gamma_A t_i + \max \{s, (1 - r^{1a})(1 + g_i)s\} \geq 0 \end{aligned} \quad (11)$$

$$\text{Aristocrat: } \quad \max \{(1 + g_i)u^{3c}, u^{1a} + (1 + g_i)r^{1a}s\} \geq P(\tau_L)\tau_L - c_A \quad (12)$$

Examining Inequalities 11 and 12 above, we arrive at the following:

Proposition 2 (Scope Conditions). *The compensation equilibrium is more likely to prevail when:*

1. τ_L is in an intermediate range: it is neither too large nor too small.

2. $u, rs, \gamma_A t_i$ are large.

¹¹³Book of Wei, vol. 64.

Below, we describe what these conditions reflect and how they relate to Northern Wei.

1. τ_L is neither too large nor too small.

- Since $P(\tau_L)$ increases in τ_L , it follows that $P(\tau_L)\tau_L$ is increasing in τ_L . Thus, for $P(\tau_L)\tau_L$ to lie in an intermediate range, τ_L cannot be too large or too small. This means that, compared to the ruler, the aristocrat is neither too strong (has a high level of economic sources), nor too weak (has a low level of economic resources).
- The intuition is straightforward. If A is weak, then R can easily seize A 's control over τ_L by force, and does not need to resort to compensation. In contrast, if A is strong, then A can resist the ruler's state-building efforts by force with a relatively high probability of success, and does not need to accept the compensation offer.
- Relevance to Northern Wei: recall from Section 3.2 that the Northern Wei state, upon unification, formally acknowledged aristocrats' local autonomy, and aristocratic households subsumed much of the population as private clients (von Glahn 2016: 172). This implies that the aristocrats were not too weak vis-a-vis the Northern Wei ruler. Historical facts suggest that they could not have been too strong, either. Even though the Northern Wei, prior to the Reform, had not been able to extract much taxes from the peasantry, it derived substantial military strength from its nomadic traditions. The Northern Wei state controlled armies of heavy cavalry units which demanded regular duty from Xianbei men and asserted the emperors' "superiority over any opposing force" (Pearce 2019: 161, Lewis 2011: 80). Military units were also stationed across northern China to help consolidate Northern Wei rule by enforcing local order.

2. $u, rs, \gamma_A t_i$ are large.

- The intuition is straightforward: both R and A are more likely to enter the compensation deal if both can derive higher payoffs from it.
- $\gamma_A t_i$ in reality: R is more willing to choose bureaucratic compensation when the new officeholder creates real value to the regime through his services. This is jointly determined by the spheres of responsibility of that office as well as A 's own competence. Taking as given the total amount of work performed by the bureaucracy, t_i will begin to decrease as the number of offices increases past a critical threshold such that the bureaucracy becomes "overstaffed". That is, bureaucratic compensation is constrained by the size of the bureaucracy.
- Relevance to Northern Wei: that bureaucratic compensation is constrained by the size of the bureaucracy implies that the ruler's compensation strategy will mean that certain

groups of elites may no longer occupy powerful offices as much as before. In a companion project, we compare office-holding outcomes for different groups of elites before and after the Reform, finding that the Xianbei aristocrats and non-aristocratic Han Chinese elites entered the bureaucracy in smaller numbers than before during the Reform period.¹¹⁴

- u, rs in reality: for R to be able to give out offices with large u, rs she must have a functioning national bureaucracy to begin with. The reason is that offices in a functioning bureaucracy have well-defined spheres of authority and are organized in a stable hierarchy, and therefore powers and privileges associated with offices are much more institutionalized and less vulnerable to R 's discretion.
- Relevance to Northern Wei: By the time of the Reform, the Northern Wei state already had a long history of bureaucratic governance. Fifty years prior to its founding, Northern Wei's predecessors had instituted a rudimentary bureaucracy with the help of Chinese advisers, as nomadic polities needed a literati bureaucracy to perform routine administration (Pearce 2019: 158, Lewis 2011: 146). Upon its establishment, the Northern Wei dynasty drafted a series of law codes that were primarily drawn from the laws of the Han Dynasty (202 BC - 220 AD), and put in place a set of bureaucratic institutions that closely modeled the Chinese empires (Lou 2017: 167-196, Zhang 2008c: 287).¹¹⁵

We focus on the compensation equilibrium. The next propositions follow directly from Inequality 12.

Proposition 3 (Bureaucratic Compensation). *In the compensation equilibrium, an aristocrat receives a higher level of compensation if he controls more resources τ_L .*

- A compensation offer that is optimal for the ruler and will be accepted by the aristocrat should satisfy Expression 12. From this expression, it is clear that if A has higher τ_L , then a higher compensation payoff is required for Expression 12 to hold.
- The intuition is simple. If A controls more economic resources, τ_L , he will have more to lose from R 's attempt to build state capacity, and thus will have greater incentives to resist R 's efforts. He will also have a higher ability to resist R , as he can invest more resources into building his own military strength. Thus, this aristocrat will accept the compensation deal only if the deal gives him a sufficiently high payoff.

¹¹⁴Note that statistically the northern settlers were treated equally well before and after the Reform, which is consistent with our interpretation of the end of Northern Wei in Section D.3. These results are available upon request.

¹¹⁵Bureaucratization in Qin and Han, although far from complete by modern standards, was much closer to the four dimensions of Weber's ideal type compared to other premodern empires (Kiser and Cai 2003). Thus, the Northern Wei can be said to have an institutionalized, functioning bureaucracy.

Proposition 4 (Aristocratic Ability). *Let A, A' be two aristocrats, with claims to resources τ_L, τ'_L , and administrative ability γ_A, γ'_A respectively. Suppose $\tau_L > \tau'_L$. All else being equal, there exists $\gamma^* < \gamma'_A$ such that the ruler prefers A over A' when $\gamma_A \in [\gamma^*, \gamma'_A]$. In other words, the ruler is willing to trade off lesser ability for more resources.*

- The part of R 's payoff in the compensation equilibrium that depend on τ_L and γ_A are, respectively, τ_L and γ_{At_i} . From this expression, it is clear that R will prefer A over A' as long as her extra gain from seizing A 's resources can fully or more than offset her loss arising from A 's lesser ability.

Recall that only two outcomes can emerge in a compensation equilibrium: R keeps A^R who would choose coup in the off-equilibrium scenario of removal (Case 1a), and R removes A^S who then peacefully exits (Case 3c). Lastly, we compare R 's payoffs under these two outcomes and show that (see Section F.4 for proof):

Proposition 5 (Interest Realignment). *When s or g_i increases, the ruler is more likely to choose the outcome of keeping a regime-strengthening aristocrat who would choose coup in the off-equilibrium case of removal, rather than removing a self-strengthening aristocrat who then exits.*

- The intuition is as follows. For R , the benefit and cost of the regime-strengthening policy are: growth on the stock of s , and rents shared with A . Since the latter is bounded by V_A , the ruler will prefer the regime-strengthening policy if growth on the stock of s can more than offset the cost of this policy. In other words, she will prefer to have A 's interests aligned to the regime if gains from policy investments are sufficiently high. For A , a higher level of g_i and s raises the payoff of staying in office, and therefore gives him greater incentives to choose coup should removal happens. This in turn places a constraint on R to commit to the deal by keeping A in office.
- Relevance to Northern Wei: this proposition predicts that R would have an incentive to align A 's interests with her own when s is sufficiently large. This explains why the Northern Wei regime only carried out the state-building reform after having unified and established stable rule over northern China, that is, having consolidated a territory large enough to produce sufficient rents for interest realignment. The completion of military conquest over a large territory, among other things, means that the “pie” of spoils that holders of high central government office could access is now large. Viewed through this lens, the improvement of regime strength as a result of the Reform (improvement of s in Section C) and the compensation strategy are mutually reinforcing.

- Relevance to Northern Wei: this proposition also predicts that interest realignment takes place when g_i is high. What kinds of offices have these features? Recall that g_i captures the extent to which a policy exercised by the holder of office i can strengthen his own interests or the state's interests. Offices with a high degree of policy influence are usually ones with substantial administrative power, i.e. senior offices. Moreover, Inequality 5, which must hold for A to choose coup, suggests that A cannot derive a large appropriable payoff u_{Ai} from office-holding. This implies that offices should not be stationed in A 's hometown—otherwise, A can readily use official appointments as an opportunity to enhance his prestige and influence and to deepen his local entrenchment.

F.4 Proofs of Propositions

F.4.1 Proof of Proposition 1

We first solve for u^{1a}, r^{1a} and derive an expression for π_R^{1a} in terms of exogenous parameters.. More specifically, the ruler faces the following optimization problem:

$$\begin{aligned}
& \max_{u_{Ai}, r_i} \{G + (1 - r_i)(1 + g_i)s\} \\
& s.t. \quad u_{Ai} + r_i s \geq V_A \quad (A : \text{Participation}) \\
& \quad r_i s \geq \frac{u_{Ai}}{\min\left\{\frac{(1+g_i)Q_i}{1-Q_i}, 1\right\}} =: \frac{u_{Ai}}{Z} \quad (A : \text{Coup and Regime-Strengthen}) \\
& \quad r_i s \leq Q_i \left(\frac{G}{1 + g_i} + s\right) =: W \quad (R : \text{Keep})
\end{aligned}$$

Since only r_i enters π_R^{1a} , R will try to minimize r_i , and choose u_{Ai} to make the constraints hold. Moreover, only two constraints are binding as there are only two choice variables.

First, u_{Ai} can always be made sufficiently small for the latter two constraints to possibly hold at the same time, that is, for the interval $r_i s \in [\frac{u_{Ai}}{Z}, W]$ to be valid. Since R tries to minimize r_i , we see that $r_i s \geq \frac{u_{Ai}}{Z}$ is always binding and that $r_i s = \frac{u_{Ai}}{Z}$ in equilibrium. Now the ruler's problem becomes: choose u_{Ai} such that $u_{Ai} + \frac{u_{Ai}}{Z} = u_{Ai}(1 + \frac{1}{Z}) \geq V$ and $\frac{u_{Ai}}{Z} \leq W$. Thus, as long as $V_A \leq (Z + 1)W$, R will choose (under Assumption 1, r^{1a} is less than 1):

$$u^{1a} = \frac{V_A}{Z + 1}Z, \quad r^{1a}s = \frac{V_A}{Z + 1}. \quad (13)$$

Now we consider the two equilibria in which R removes A^R . Since $\pi_R^{2a} = \pi_R^{3a}$ is unaffected by the ruler's choice of payoffs, R only needs to choose $(u^{2a}, r^{2a}), (u^{3a}, r^{3a})$ such that A 's participation

constraint and necessary inequalities as outlined in Section F.2 hold. Then:

$$\begin{aligned}
\pi_R^{1a} - \pi_R^{2a} &= G + (1 - r^{1a})(1 + g_i)s - (1 - Q_i)(G + (1 + g_i)s) \\
&= Q_i G + (1 + g_i)Q_i s - (1 + g_i)r^{1a}s \\
&\geq Q_i G + (1 + g_i)Q_i s - (1 + g_i)W \quad (\text{Since } r^{1a}s = \frac{u^{1a}}{Z} \leq W) \\
&= Q_i G + (1 + g_i)Q_i s - Q_i[G + (1 + g_i)s] \\
&\geq 0.
\end{aligned}$$

Thus, when $V_A \leq (Z + 1)W$, the ruler will prefer to keep rather than remove the regime-strengthening aristocrat.

Lastly, we show that Case 3c from Table F1 is feasible. The necessary inequalities are:

$$\begin{aligned}
u_{Ai} + r_i s &\geq V_A \quad (A : \text{Participation}) \\
r_i s &< \frac{u_{Ai}}{\max\left\{1, \frac{Q_i}{(1+g_i)(1-Q_i)}\right\}} =: \frac{u_{Ai}}{H} \quad (A : \text{Exit and Self-Strengthen}) \\
r_i s &> Q_i(G + s) \quad (R : \text{Remove})
\end{aligned}$$

Since u_{Ai} is a choice variable and does not enter π_R^{3c} , it can always be made sufficiently large for the latter two constraints to possibly hold at the same time, that is, for the interval $r_i s \in (Q_i(G + s), \frac{u_{Ai}}{H})$ to be valid. Let $m = \frac{Q_i(G+s)+\epsilon}{u_{Ai}/H}$ such that $\epsilon > 0$ and $m < 1$. Then, $r^{3c}s = \frac{mu_{Ai}}{H}$ and $u_{Ai} = \frac{V_A}{1+m}$ constitute a feasible solution for Case 3c.

F.4.2 Proof of Proposition 5

We perform a simple comparison of π_R^{3c} and π_R^{1a} :

$$\begin{aligned}
\Delta\pi_R &:= \pi_R^{1a} - \pi_R^{3c} = G + (1 - r^{1a})(1 + g_i)s - G - s \\
&= g_i s - (1 + g_i)r^{1a}s
\end{aligned}$$

It is clear that $\Delta\pi_R$ is increasing in s . And:

$$\begin{aligned}
\frac{\partial \Delta\pi_R}{\partial g_i} &= s - r^{1a}s - (1 + g_i)\frac{\partial r^{1a}s}{\partial g_i} \\
&= (1 - r^{1a})s - (1 + g_i)\frac{\partial}{\partial g_i}\left(\frac{V_A}{Z + 1}\right) \quad (\text{Sub in Equation 13})
\end{aligned}$$

When $Z = 1$, the second term vanishes and $\frac{\partial \Delta\pi_R}{\partial g_i} = (1 - r^{1a})s > 0$ (recall that Assumption 1 guarantees $r^{1a} < 1$). When $Z = \frac{(1+g_i)Q_i}{1-Q_i}$, $\frac{\partial}{\partial g_i}\left(\frac{V_A}{Z+1}\right) < 0$, so that the second term is negative and $\frac{\partial \Delta\pi_R}{\partial g_i}$ is positive. Hence, $\Delta\pi_R$ is increasing in g_i .

G Additional Details on Data

G.1 Discussion of Sources

Elite Sample. The *Book of Wei* provides the near universe of the most prominent and politically active elites of the Northern Wei dynasty. We complement the *Book of Wei* data with data from epitaphs (15% of our sample). As discovery of epitaphs is highly random (Tackett 2014), they form a nearly representative sample of the Northern Wei elites.

It’s extremely difficult for sample selection issues to actually challenge our identification strategy. For our identification strategy to be invalid, holding all else constant, *both* of the following would have to be true: a) an aristocrat’s probability of entering our dataset varies for stronghold versus non-stronghold identity, and b) that variation further varies before and after the Reform.

The randomly discovered epitaphs are evidently immune to both aspects. As for the *Book of Wei*, where the majority of our sample comes from, there is also no reason to expect either to be true. Wei Shou, its author, was neither an aristocrat by our definition nor came from a stronghold prefecture. The *Book* was written in 544 AD, only ten years after the split of Northern Wei, when archival materials from Northern Wei were abundant and oral histories of elite families were widely available. Thus, intentional bias due to authorship and “physical” bias due to differential survival of materials across political groups over time are highly unlikely, making our DD estimates unlikely to suffer from sample selection problems. This is not to deny that the *Book of Wei* may have biases. All dynastic histories do. “History Writing” has recently become a cutting-edge and the most popular subfield in the study of Chinese history, in which dynastic histories receive intense scrutiny and biases and the reasons for such biases, political or not, are detected and discussed (see Sun (2016) for a critical review). Yet, none of such studies have ever touched on *stronghold* as a source of biases in the writing and production of official histories (let alone Stronghold×Reform, which is our treatment setup.)

Stronghold Mentions. We use three primary sources to construct our sample of stronghold mentions. The first source is the *Book of Jin*. Though officially compiled in the mid-7th century, it uses written materials and records from the 4th century. It describes the history of Western and Eastern Jin, and is part of the “Twenty-Four Dynastic Histories” collection. The second source, the *Comprehensive Mirror in Aid of Governance*, is a chronological narrative of Chinese history up to 960 AD. It was compiled by Sima Guang in the 11th century, but the Western Jin section of this book, which we use for data construction, was based on written materials and records from the 4th century.¹¹⁶ The third source, the *Commentary to the River Classic*, is an early 6th century work

¹¹⁶We follow the social science convention to describe the *Book of Jin* and *Comprehensive Mirror in Aid of Governance* as “primary” or “archival” sources. However, by historians’ convention, it is the written materials and records from

Table G1. Using Strongholds Mentioned in *Book of Jin*

	Number of Aristocrats Recruited			
	(1)	(2)	(3)	(4)
Stronghold $\times$ Reform	0.083*** (0.031)	0.079** (0.031)	0.074** (0.030)	0.057** (0.023)
Mean of D.V.	0.020	0.020	0.020	0.020
Time FE	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes
Province-Time FE	No	No	Yes	No
Prefecture Linear Trend	No	No	No	Yes
Observations	2,739	2,739	2,739	2,739
R-squared	0.487	0.499	0.511	0.805

Notes: This table presents the effect of the Reform on aristocratic recruitment. The unit of observation is prefecture-time. Controls include the number of civil conflicts and foreign invasions (lagged), and the interaction between time dummies and terrain ruggedness index, river density, and suitability index of rice and wheat. Robust standard errors in parentheses are clustered at prefecture level. ***, **, * denote significance at 1%, 5%, 10% level.

on Chinese geography.¹¹⁷ All three sources are extensively used by scholars of Chinese history. In addition, results are robust to using just the stronghold mentions from *The Book of Jin* as shown in Table G1.

Definition of Aristocracy. We use three primary sources for our definition of aristocracy. The first source, the *Book of the Later Han*, is an early 5th century text covering history from 6 to 189 AD. The second source, *Records of the Three Kingdoms*, is a late 3rd century text covering history from 180 to 280 AD. The third source, the *Book of Jin*, is as previously described.

Note that all of these sources were either written or based on materials that predate the Northern Wei. This means that our definition of aristocrats is immune from the post-treatment bias, because the choices of which biographees should appear in the sources were made prior to the Reform. In other words, an elite's inclusion in the dynastic histories only depended on his socio-political status as perceived by history writers before the Reform, and not contaminated by the socio-political status of his descendants which may have been changed by the Reform. And as emphasized previously, even in the unlikely scenario where certain sample selection issues do exist, those issues would have to vary with the interaction between the timing of Reform and whether or not the prefecture has strongholds in order to actually bias our estimates.

the 4th century upon which these two books were based that are the actual "primary" sources. Such sources were available during the compilation of these books that we use, but do not exist today.

¹¹⁷The author made extensive visits to the actual sites and remnants of castles and consulted stone steles, written materials, as well as oral histories at the time.

G.2 Rank of Offices

Our main source of information on office ranks is the *Treatise on State Offices* in the *Book of Wei*. The *Treatise* records two decrees released by Emperor Xiaowen that tabulated office titles against ranks, one in 493 and the other in 499 AD. The two decrees differ in two respects: first, they cover different offices, though some overlaps do exist; second, they follow different rank classifications, which we discuss below.¹¹⁸

We use the tabulation in the 499 decree as the basis of our rank-number conversion, the objective of which to assign each rank to a numerical value that represents its position in the bureaucratic hierarchy. If an office appears in the 499 decree or in both decrees, we use its rank in the 499 decree. If it only appears in the 493 decree, we use its rank in this decree. Since the two decrees have different rank classifications, we design our conversion algorithm in such a way that ranks in the two decrees are assigned to numbers that reflect their relative positions within their respective classifications.

We first convert Chinese ranks in the 499 decree into numerical values. Our conversion algorithm derives from the decree's rank classifications, which work as follows. All state offices falls under nine ranks, with Rank 9 being the lowest and Rank 1 being the highest. Each rank is divided into the principal class (*zheng*, denoted by A) and the junior class (*cong*, denoted by B). From Rank 4 downwards, each class is further subdivided into the upper grade (*shang*, denoted by number 1) and the lower grade (*xia*, denoted by number 2). In other words, each rank above Rank 4 has two half-ranks, and each rank below Rank 4 has four quarter-ranks.

Our conversion method is as follows.

1. The lowest rank, which is Rank 9B2 (Rank Nine Junior Lower, *cong-jiupin-xia*), is assigned number 1.
2. Then, each quarter-rank corresponds to a difference of 0.5 in numerical value. Thus, Rank 9B1 would be 1.5, and Rank 4A1 would be 12.5.
3. Since ranks above Rank Four do not have quarter-ranks, the rank that is immediately above Rank 4A1 is Rank 3B. It would be assigned a value of 13.25 for the following reason: if Rank 3B2 and 3B1 had existed, they would have been converted to 13 and 13.5 respectively. Therefore, Rank 3B, which lies in between 3B2 and 3B1, should receive an intermediate value between 13 and 13.5.

¹¹⁸As pointed out in Liu (2016), the two decrees actually differ very little in how they reflect the relative status and importance that the NW regime accords with each office. The two tabulations differ mainly in format. And the NW elites referred to the two decrees jointly in court discussions on offices.

4. Each half-rank then corresponds to a difference of 1 in numerical value. Thus, Rank 3A would be 14.25, and Rank 1A would be 18.25.

We then return to the 493 decree. Its rank classification works as follows. All offices fall under nine ranks, but *every rank* is divided into two classes, and *every class* is subdivided into three grades. That is, the 493 decree creates 54 uniform “levels” within nine ranks. To ensure that numerical ranks in the two decrees are comparable, we assign number 1 to Rank 9B3 (the lowest rank), and number 18.25 to Rank 1A1 (the highest rank) in the 493 decree. We then divide the difference between the highest and lowest numerical values ($18.25 - 1 = 17.25$) by 53, as there are 53 “steps” among the 54 distinct levels. Each level therefore corresponds to a difference of 0.3255 in numerical value.

G.3 Validation of Aristocracy

We validate our definition of the aristocracy using a cross-section of politically powerful families in Western Jin. We obtain this cross-section from a list of Imperial Academicians who accompanied the Emperor and the Crown Prince at the Confucian Ceremonies hosted by the Academy in 277-278 AD. As a widely publicized political move, this event was inscribed in great detail on a stone stele named the Piyong Monument (unearthed in 1931), with a thorough record of the names and choronyms of the Imperial Academician attendees.

Located in the capital city, the Imperial Academy was the highest educational institution in medieval China that was chiefly responsible for training candidates for state offices. Enrolment at the Imperial Academy was generally restricted to sons of state officials or other prominent families. Thus, one’s appearance on the Piyong Monument would reflect the political and cultural accomplishment of one’s family. This is exactly what our definition attempts to capture by linking NW elites to biographees in the three previous dynastic histories (Later Han, Three Kingdoms and Western Jin).

We perform our validation exercise using a simple regression at the clan level, using as dependent variable a dummy equal to 1 if a clan in our data appeared on the Piyong Monument and was thus politically powerful by the time of Western Jin, and as explanatory variable a dummy equal to 1 if a clan is aristocratic according to our definition. Table G2 reports the results, with column (1) using the full sample of clans and column (2) using ethnic-Han clans only. Coefficients are positive and statistically significant at 1% and 5% levels respectively. This confirms that, in our NW data, aristocrats by our definition came from historically more prominent clans compared to non-aristocrats.

Table G2. Validation Check for Definition of Aristocracy

	Whether Clan Is Politically Powerful	
	(1)	(2)
Aristocracy	0.131*** (0.048)	0.104** (0.050)
Observations	345	262
Sample	Full	Ethnic-Han
R-squared	0.033	0.020

Notes: This table presents a validation check for the definition of aristocracy used in our paper. Unit of observation is the clan. Robust standard errors are used. ***, **, * denote significance at 1%, 5%, 10% level.

G.4 Coding of Personal Merits

We use excerpts from *Book of Wei* to provide one example for each merit coding, summarized in Table G3.

Table G3. Examples of Merits Coding

Person	Merit	Excerpt
Yang Lingbao	Military Prowess	“[Lingbao] had strong arms and was good at archery... He fought at Huainan, and secured many victories in the battlefield.” (Vol. 71)
Bi Yuanbin	Governance	“Yuanbin governed with justice and fairness, was good at conciliating civilians, and was well-loved by the people.” (Vol. 61)
Cui Heng	Institutions & Policy	“Heng presented over fifty policies which helped defend against enemies, and which were beneficial to the nation and the people.” (Vol. 24)
Cui Hao	Literature	“Since youth, [Hao] was fond of literature, and was well-versed in classics and history.” (Vol. 35)
Pei Jun	Intelligence	“[Jun]’s intelligence had surprised his relatives since a young age, and [Jun] was nicknamed ‘exceptional colt’.” (Vol. 45)
Yu Zuo	Integrity	“Greedy, cruel, and took many bribes.” (Vol. 31)

Notes: This table displays examples for our merits coding.

G.5 Variable Definitions

The following table summarizes the definitions of main variables used in the analysis.

Table G4. Definitions of Main Variables

Variables	Sources	Definition
Aristocrat, main	1-4,7	If individual with the same choronym-surname as elite has biographies in <i>Book of the Later Han</i> , <i>Records of the Three Kingdoms</i> and <i>Book of Jin</i> between 25 AD and 300 AD.
Aristocrat, restricted	1-4,7	If individuals with the same choronym-surname as elite held the following offices in Later Han, Three Kingdoms or Jin between 25 AD and 300 AD: prime ministers (<i>zaixiang</i>); minister of works, minister of education and defender-in-chief (<i>sikong</i> , <i>situ</i> and <i>taiwei</i> , collectively called <i>sangong</i>); grand perceptor, grand mentor, grand guardian, great steward, general-in-chief and great manager of mounts (<i>taishi</i> , <i>taifu</i> , <i>taibao</i> , <i>taizai</i> , <i>da-jiangjun</i> and <i>da-sima</i> collectively called <i>shangshi</i>).
Aristocratic clans (4th century), number of	2-4	Number of distinct choronym-surname pairs at a commandery, where each pair is associated with at least one biographee in the historical books of earlier empires.
Central offices	1	Offices in the central bureaucracy.
Civil conflicts, number of	1,11	Peasant uprisings and rebellions led by NW elites.
County government offices, number of	9	Number of active county government offices under the jurisdiction of each commandery.
Elite, disputed origin	1	If the <i>Book of Wei</i> recounts that an elite “self-reported” or “asserted” his family to be some choronym-surname.
Elite, ethnic Han	1,7	If elite is recorded to be Han Chinese.
Elite, migrant	1,7	If elite or his ancestors were recorded to have moved home.
Elite, royal member	1,7	If elite is a member of the imperial Tuoba household.
Foreign invasions, number of	11	Invasions led by nomads or foreign states.
Historical provincial capital, dummy	9-10	Equal to 1 if a commandery has a county that had served as provincial capital (<i>zhouzhi</i>) or national capital prior to NW.
Historical wars, dummy	11	Equal to 1 if a commandery experienced warfare in the 4th century.
Junior offices	1	Offices below Rank Three Junior (<i>cong sanpin</i>) and are substantive.

Personnel offices	1,7	Offices in the ministry of personnel (<i>libu</i>) at the state affairs department (<i>shangshu-sheng</i>), with the following keywords: chief of personnel, director of personnel, evaluations, ministry of personnel, personnel section. Chinese terms are <i>libu-shangshu</i> , <i>libu-lang</i> , <i>kaogong</i> , <i>xuanbu</i> and <i>libu-cao</i> .
Promotion	1,7	If elite sees a rise in office rank.
Punishment	1,7	If elite is removed from office, killed by the emperor, or received death sentence for committing crimes.
Pure offices	1,7,8	Suitable for men of high birth (Lewis 2011). Chinese term is <i>qingguan</i> .
Rank	1	See Appendix G.2 .
Rectifiers	1,7	Local dignitaries who register and classify all males in their jurisdictions who were considered eligible for government office on the basis of their hereditary social status, assigning them to 9 ranks, theoretically reflecting their meritoriousness (Hucker 1985 : 189). Chinese terms are <i>zhongzheng</i> and <i>zhoudu</i> .
Regional civil chiefs	1,7	Governors of counties/commanderies/ <i>zhou</i> . Chinese terms are <i>xianling</i> , <i>taishou</i> and <i>cishi</i> .
Regional military chiefs	1,7	Commanders of regional armies. Chinese terms are <i>dudu</i> and <i>zhenjiang</i> .
Regional offices	1	Offices in the regional bureaucracy.
Rice suitability	12	Index ranges between 0-10,000; a larger number indicates higher suitability.
River density	14	Total kilometers of rivers within a 50-kilometer radius of a commandery's capital, divided by the area of a circle with 50-kilometer radius.
Senior offices	1	Offices that are above Rank Three Junior (<i>cong sanpin</i>) and are substantive.
Strongholds	2-5	A commandery has a stronghold if it is associated with any mentioning of the following keywords: stronghold, castle, (erected) walls, (erected) barriers, defend (oneself) at natural obstacles, and self-fortify. Chinese terms are <i>wu</i> , <i>bao</i> , <i>bi</i> , <i>lei</i> , <i>juxian</i> and <i>zigu</i> .
Substantive offices	15	Offices that entail real responsibilities and are not ceremonial.

Terrain ruggedness	13	Amount of elevation difference between adjacent cells of a digital elevation grid.
Wheat suitability	12	Index ranges between 0-10,000; a larger number indicates higher suitability.

Data sources:

1. *Book of Wei (Weishu)*.
2. *Book of Later Han (Hou Hanshu)*.
3. *Records of Three Kingdoms (Sanguo Zhi)*.
4. *Book of Jin (Jinshu)*.
5. *Comprehensive Mirror in Aid of Governance (Zizhi Tongjian)*.
6. *Commentary to the River Classic (Shuijing Zhu)*.
7. The [China Stone Inscription Database](#).
8. [Zhang \(2017\)](#).
9. [Mu, Wu and Wei \(2016\)](#).
10. [Zhou, Li and Zhang \(2016\)](#), [Hu, Kong and Xu \(2016\)](#).
11. *Catalogue of Historical Wars (Zhongguo Lidai Zhanzheng Nianbiao)*.
12. [Food and Agriculture Organization \(FAO\)](#).
13. [United States Geographic Services \(USGS\)](#).
14. [CHGIS Database](#).
15. [Zhang \(2004\)](#).

H Additional Case Studies

H.1 Late Roman Empire

In response to the so-called “Crisis of the Third Century,” emperors from Diocletian to Constantine I took major steps to enhance the Roman state, strengthening its fiscal capacity and extractive power. The resulting “Late Roman Empire” was a much more centralized bureaucratic machinery capable of exploiting and deploying material resources and manpower efficiently.¹¹⁹ Critical to the state-building project was the shift from indirect to direct rule over grassroots population that “confiscated the annual flow of funds” to the local city councils, which in turn lost its administrative power before eventual disappearance, in ways that “all the work and none of the play were left for local elites” (Heather 2018: 63).

As concessions to the local aristocrats who saw their vested interests in the pre-reform status quo severely undermined, the Empire massively recruited them into the new imperial bureaucracy and even designed institutionalized routes for their advancement (Heather 2018: 63 - 67). Extensive historical evidence in the 4th century now reveals that “the vast majority of the new imperial bureaucrats were actually recruited from the old city-level gentry and above, the same class that had previously run the city councils” (Heather 2018: 63). The Roman case also provides evidence for the interest realignment component of our theory, where state-building through elite compensation “was massively to increase the extent to which local landowning elites had a direct stake in the imperial administrative system” (Heather 2018: 64).

Why, then, didn’t the European state re-consolidate like its Chinese counterpart did following similar nomadic invasions? A question of such a scale would render any monocausal explanation futile.¹²⁰ Here we only provide a bureaucracy-centered *mechanism* to shed new light. It is noteworthy that the strategy of bureaucratic compensation, while successful in bolstering the Roman fiscal state, was only employed in regions of the East, such as Greece, the Balkans, Egypt, and Antioch, but not Western regions such as Gaul, Spain, and Britain. In fact, much of the Roman West experienced *de-bureaucratization* starting in the 5th century.¹²¹ Some ostensible Roman legacy notwithstanding, the Germanic rulers might have found themselves with fewer precedents and protocols of the Roman bureaucracy from which to develop a central state and compensate the local aristocrat-turned castle magnates than the Xianbei leaders had with the Chinese bureaucracy in Northeast Asia.¹²² Another obstacle to employing a bureaucratic compensation strategy to deepen

¹¹⁹For a general introduction to the Late Roman imperial bureaucracy, see Eich (2015). Also see Chapter 2 of Heather (2018) for the transformation from early to late Roman imperial bureaucracy.

¹²⁰See Scheidel (2019) for discussions of various existing explanations.

¹²¹The withdrawal of Roman presence from Britain completed between 383 and 410 AD. For de-administration in Gaul, see Mathisen (2011): x-xii and Matthews (1975): 347.

¹²²In very much the same way with the Chinese aristocrats in the 3rd and 4th centuries, the Gallo-Roman aristocrats

local state penetration lies in the presence of “competing offers” from opportunities to become leaders of Christian churches. Mathisen (2011) provides a detailed discussion of how local Roman potentates, in an attempt to sustain their aristocratic prestige despite the lack of office-holding opportunities in the de-bureaucratized 5th century, became bishops in large numbers. For example, the highly prestigious Gallo-Roman aristocratic family of Sidonius Apollinaris, whose status, careers, and interactions with the nomadic rulers shared fascinating parallels to the clan of Cui Hao in Appendix G.4, eventually chose the paths of local bishops despite their strong preference for continuing the office-holding tradition in the bureaucracy.

Overall, the comparative perspective suggests that the lack of a strong imperial bureaucratic legacy and the competing institution in the Christian Church could explain why the bureaucratic compensation strategy, while successful in enhancing state capacity early on, was not fully employed to re-consolidate the state in the Roman West by nomadic rulers.¹²³ The fiscal-military skeleton built with this strategy in the 4th century continued to benefit the Eastern Empire, however. Just as the Sui-Tang emperors re-unified the whole of China using Northern Wei’s highly extractive state built one hundred years earlier, the Roman leviathan born in the 4th century enabled Justinian’s reconquest of the Mediterranean world two centuries later (Heather 2018: 363).

H.2 Premodern Korea

The argument in this paper could also inform our understanding about the *longue durée* of state-building struggles in premodern Korea. The nominal unification of the Later Three Kingdoms in 935 AD under the Koryo Dynasty (918-1392 AD) belied the significant *de facto* independence of local aristocrats, known as the *hyangni*, around the peninsula who had governed their territories for generations with bureaucracies and private armies of their own (Duncan 2000: 31). The several decades since the unification saw steady progress made by the Koryo regime in establishing control over the localities, with policies that freed up the armed retainers previously enslaved by the local aristocrats and asserted the authority of central government with a rationalized salary system for officials recruited by and loyal to the throne (Seth 2012: 86, Kim 2012: 124-125). The regime also confiscated arms from local lords and dispatched centrally-appointed officials to head the newly created local administrative units starting in 983 AD, further undermining *hyangni* power bases (Duncan 2000: 38, Kim 2012: 125-126).

The Koryo court took pains to incorporate the *hyangni* elites into the central bureaucracy as

became castle lords providing refuge to dislocated people and expanding landholdings in the context of local state withdrawal and nomadic invasions in the 5th century. For details, see Mathisen (2011): 50-57. For the heavy influence of the imperial legacies from the Han and Jin dynasties over early state-building by Northern Wei rulers, see Lou (2017).

¹²³Offices in a weakly institutionalized bureaucracy cannot generate sufficient benefits for their holders. This understanding is formalized when w_{Ai} becomes too small in the model in Appendix F.

compensation for their acceptance of greater state presence in the countryside. An analysis of biographic data for officials in the central bureaucracy of early Koryo reveals striking similarities between the strategy adopted by the Korean rulers and the one documented in Table 2 by the Xianbei-Chinese counterparts: recruitment benefited a wide spectrum of aristocratic clans while the more powerful ones gained even further (Duncan 2000: 55). Institutionalized compensatory methods included the civil service examination system, introduced in 958 AD to recruit and solidify the loyalty of the *hyangni* in the countryside, as well as honorary office titles, which formed another route by which the *hyangni* strongpersons could join the central bureaucracy (Duncan 2000: 192-194). In short, the “concessions that the tenth-century kings made to the local elites ... in effect incorporated the *hyangni* into the dynasty’s ruling class” (Duncan 2000: 199).

As suggested by our theory, the compensatory strategy effectively realigned the interests of the local powerholders to those of the Korean central state. The descendants of the *hyangni* elites, having relocated as centralized aristocrats in the capital for generations, “had begun to see themselves as deriving their status primarily from family traditions of office holding in the central bureaucracy, rather than from their more remote forebears’ positions as autonomous local strongmen” (Duncan 2000: 87). As the Korean state emerged from the Mongol conquest chronically incapacitated, the already centralized aristocratic clans, now known as the *yangban*, “whose primary source of status and prestige was the offices they and their forebears held in the dynastic government,” took on an ideology oriented towards a “strong, activist central regime” and championed state-building reforms to crush particularistic local interests once and for all (Duncan 2000: 264). They saw in the military strongman Yi Seong-gye the ideal candidate to provide monarchical leadership for reform, and thus supported the latter’s bid for power in the palace coup that replaced the Koryo with Choson Dynasty (1392 - 1897 AD) (Duncan 2000: 274-275). The renewed centralization drive, proposed by the *yangban* and approved by early Choson rulers, significantly tightened the state’s grip over human resources and radically deepened the degree of direct central control over localities.¹²⁴

¹²⁴The state-building package created the first system of provincial civilian governorship in Korean history along with systematic administrative reorganization at the lower level and substantially expanded the new dynasty’s tax base by freeing the peasants from dependence on local elites with a series of land reforms. For details, see Duncan (2000: 204-213).