

Ideology, Elite Cohesion, and Authoritarian State Building: Evidence in Southern Song China

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“In order to understand the genesis of the state, priority has to be given to symbolic capital. This reverses the materialist view... The function of the notion of symbolic capital is to make possible a materialist theory of the symbolic.”

— *Pierre Bourdieu, On the State, p. 193*

“Rather than a mind and a body, man is a mind with a body, a being who can only get to the truth of things because its body is, as it were, embedded in those things.”

— *Maurice Merleau-Ponty, The World of Perception, p. 56*

“Faith is therefore no aesthetic emotion, but something far higher, exactly because it presupposes resignation; it is not the immediate inclination of the heart but the paradox of existence.”

— *Søren Kierkegaard, Fear and Trembling, p. 95*

Abstract

How do authoritarian states foster elite cohesion and loyalty, and in turn, state capacity? Existing scholarship emphasizes material co-optation or war preparation, but often overlooks the role of ideology as an endogenous mechanism of state building. This paper develops a formal model and applies network dependency theory to compare purges and ideology as alternative strategies of elite integration. Using original datasets of 1,488 elites across three historical episodes of the Song dynasty, I conduct Social Network Analysis and regression analysis to evaluate the mechanisms’ effects. The results show that purges fail to enhance elite cohesion, while the institutionalization of Neo-Confucianism significantly strengthened elite networks and increased wartime loyalty. The study contributes to Historical Political Economy by demonstrating that durable state capacity depends not only on coercion and institutions, but also on the symbolic infrastructures of ideology.

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1 Introduction

How does the authoritarian state foster elite cohesion and elite loyalty? Classic studies of authoritarian governance (Svolik, 2012; Geddes, Wright and Frantz, 2018) have typically focused on institutional mechanisms of elite co-optation, emphasizing how dictators manage ruling coalitions. However, this institutionalist perspective often overlooks the role of elite network configurations in shaping state-building processes (Wang, 2022). Similarly, historical sociologists (Skocpol, 1979; Lachmann, 2010) tend to explain elite incorporation into state-dominated hierarchies through state-society power relations, privileging rationalist logics of interests and capacity. Yet such rational calculations are deeply mediated and conditioned by norms (Ikegami, 1997). War preparation, meanwhile, is widely regarded as a key driver of state building due to its demands for large-scale resource mobilization (Anderson, 1974; Tilly, 1990). But war is merely an exogenous condition—the endogenous requirement for elite cohesion lies in a transformation of elite action logic (Wimmer, 2013).

To better understand authoritarian state-building, this paper draws on the sociological theory of network dependency, which emphasizes how ideational homogeneity facilitates elite network formation, and how embeddedness in such networks constrains elite behavior. Building on this framework, I theorize that elite cohesion is driven by ideology through the ideational logic of identifying “friendship” relations. Further, the more widespread the ideology, the more deeply elites become embedded in the network, and the more likely they are to maintain loyalty and resist during wartime. The analytical logic of this study follows a meso–micro–macro sequence: it begins by identifying the mechanisms through which the state promotes elite cohesion, then analyzes their impact on individual elite behavior, and finally evaluates these mechanisms through macro-level network structures.

This paper proceeds as follows. First, I elaborate the role of ideational structure by applying network dependency theory. Integrating the claim of Schmitt (2007) that the political is defined by the distinction between friend and enemy and the distinction of Gerschewski (2023) between over-politicization and de-politicization as competing authoritarian logics, I conceptualize purge and ideology as two ideational mechanisms that may potentially generate elite cohesion. Second, I induct a formal model to derive the behavioral effects of each mechanism and theorize their resulting impact on elite network structure, leading to a set of testable hypotheses. Third, I conduct a Social Network Analysis of an original database to evaluate these hypotheses, showing through comparisons with control cases that only ideology, not purge, enhances elite cohesion. Fourth, I examine a regression model to assess how variation in ideological dissemination across cities influenced elite resistance during wartime, thereby providing evidence that ideology contributes to elite loyalty.

To test these arguments empirically, I draw on the case of Southern Song (1127–1279), a medieval dynasty of Imperial China, constructing two original databases: Dataset 1 ($N = 1,488$) to evaluate the effect of purge and ideology on elite cohesion, and Dataset 2 ($N = 118$) to assess ideology’s impact on elite wartime loyalty. The Southern Song represents a critical turning point in imperial Chinese political development, with a defining feature of this period being the dominance of Confucian literati among the political elite, marking a shift in authoritarian rule from military aristocracy to scholar-bureaucratic governance (Naitō, 1915). Persistent factional struggles defined elite politics, and emperors, often allied with court favorites, launched personalist purges to eliminate cliques and impose unity—yet these efforts frequently backfired, intensifying elite polarization (Twitchett and Smith, 2009). In contrast, Neo-Confucianism gradually achieved institutionalization through philosophical systematization and its integration into official selection criteria, eventually becoming the state ideology (Kuhn, 2009). Moreover, the Southern Song state was born from the

military collapse of the Northern Song, and its entire existence was shaped by the looming threat of war against northern empires (Tackett, 2017). These historical features make the Southern Song an ideal context for testing the theoretical mechanisms proposed in this study.

2 Theoretical Framework

2.1 Elite Cohesion, Network Dependency, and State Building

Beyond dominant paradigms that view state-building through class structure (Anderson, 1974), regime types (Moore, 1966), or institutional incentives (Acemoglu and Robinson, 2012), a growing literature in historical sociology and political economy emphasizes the relational foundations of elite loyalty. That is, elites are not atomistic actors maximizing short-term payoffs in the bargain with dictator (Geddes, Wright and Frantz, 2018; Svolik, 2012); rather, they are embedded in enduring social ties that shape their behavior and expectations. This embeddedness forms not only the micro-foundation of individual loyalty, but also a macro-foundation for long-term state resilience and effectiveness (Garfias and Sellars, 2023).

In historical sociology, elite cohesion has long been viewed as a structural condition for state durability. Skocpol (1979) argues that revolutions succeed not merely due to state weakness, but when elite coalitions disintegrate under external pressure. Tilly (2005) similarly highlights “trust networks” among elites as prerequisites for scalable rule, noting that regimes with cohesive elite structures required less coercion to maintain order. Somers (1995) further develops this insight, contending that political authority is not reducible to formal rules, but emerges from historically contingent webs of elite discourse and interaction.

Recent work in historical political economy echoes this view. Centeno and Ferraro (2013) show that in Latin America and Spain, when formal institutions failed, rulers relied on kinship, patronage, and interpersonal trust to stabilize policy implementation. Wang (2022a; 2022b) argues that in imperial China, elite kinship and marriage networks significantly enhanced state integration and governance performance by improving bureaucratic cooperation and the consistency of policy implementation. Bai, Jia and Yang (2023) demonstrate that elite ties forged through shared wartime experience facilitated both mobilization and administrative continuity. Similarly, Qiu (2018) finds that in early medieval China, aristocratic family networks shaped the formation and circulation of state power. These studies suggest that elite networks—especially those dense in scholarly, political, or ritualized relations—are crucial infrastructures for state-building.

In sum, building a state is not merely about designing institutions; it is about constructing relational orders among elites. Durable authoritarianism, in particular, depends not only on coercion or ideological dominance, but on the state’s ability to embed elites in networks that cultivate trust, discourage betrayal, and facilitate coordination.

To clarify how elite embeddedness contributes to state cohesion, network dependency theory offers a relational answer. Emerged from the collective action problem in social movement (Gould, 1991; Crabtree, Kern and Pfaff, 2018; Kern, 2011), network dependency theory emphasizes that elite behavior is shaped not merely by ideology or incentives, but by structural position within dense, cohesive networks. The more embedded elites are, the more likely they are to conform to regime expectations and avoid defection, not because of ideological conviction, but due to the reputational and relational costs imposed by their network position (Coleman, 1990; Granovetter, 1985). In this sense, loyalty becomes a structural effect rather than an autonomous decision. Duxbury (2024) shows that even under conditions of extreme political polarization, network embeddedness can still strengthen both the demand for and the capacity of elite coordination. This

suggests that relational structures continue to shape elite behavior even when institutional consensus and structure deteriorates. Yet this comes at a cost: over-reliance on prior collaborators constrained innovation and limited responsiveness—an effect known as the “paradox of embeddedness” (Uzzi, 1997; Portes, 1998).

Network dependency can be realized through three mechanisms. First, networks produce reputational constraints. In cohesive networks, defection inflicts reputational harm across multiple spheres. Padgett and Ansell (1993) show that the Medici’s dominance stemmed not from strategic genius, but from entrenchment in multiplex relational ties—marital, commercial, and civic—that prevented rivals from aligning. Ermakoff (2008) finds that French parliamentarians’ collective abdication in 1940 was driven by reputational interdependence within shared networks. Similarly, Shih (2008) shows that Chinese bureaucrats navigate factional appointments through interpersonal reputation within elite clusters, where betrayal incurs long-term exclusion.

Second is relational surveillance and strategic inhibition. Proximity within trust-based networks enables elites to monitor, anticipate, and regulate one another’s behavior. Tilly (2005) conceptualizes these as relational infrastructures of political order. In authoritarian regimes, such networks constrain elite fragmentation through observability and informal sanction rather than overt repression (Magaloni, 2006).

Third and most important mechanism is access to network capital. Embeddedness grants elites access to valuable social capital—resources, recognition, and legitimacy—accumulated through sustained interaction (Lin, 2001). Mizruchi (2013) links the decline of coordinated business power in the U.S. to elite network fragmentation. In imperial China, Xiao, Lu and Tan (2024) demonstrate that Confucian institutions fostered bureaucratic loyalty by embedding elites in shared academic and ritual structures, where exit entailed reputational and relational costs. In sum, by integrating mechanisms of reputational sanction, relational surveillance, and social capital, cohesive networks serve as an efficient structural foundation for generating behavioral convergence among elites.

2.2 Three Mechanisms of Elite Cohesion

If elite loyalty is structurally sustained through network embeddedness, then the key theoretical question becomes: how are such networks created? Authoritarian regimes do not inherit cohesive elite structures—they must generate them. This section theorizes three mechanisms through which elite cohesion may arise: war preparation, political purges, and ideological institutionalization. Among these, war preparation is an exogenous material condition, while purges and ideology are considered endogenous and ideational strategies that rulers design to engineer elite behavior.

Historical sociology has long emphasized war as a catalyst for elite cohesion and state consolidation. First, war preparation compels the state to mobilize coercive and extractive resources, forcing elites into administrative alignment and shared responsibility (Tilly, 1990; Mann, 1984). Second, military pressure restructures ruler–elite relations. In absolutist state formation, war shaped centralized bureaucracies and new elite-state alliances (Anderson, 1974; Ertman, 1997; Stasavage, 2011). Third, war provides ideological legitimation. Nationalism and religious revival unify fragmented elites under shared symbolic frameworks (Bendix, 1978; Anderson, 1983). Fourth, war generates institutional crises that demand elite realignment. Facing invasion or revolution, regimes often transform rapidly, with elites forming parties or collective institutions to preserve status and coordinate survival (Moore, 1966; Skocpol, 1979; Levitsky and Way, 2022). Fifth, war expands the elite opportunity structure. As Wimmer (2013) argues, wartime regimes mobilize elites by granting access to new offices and administrative roles. Simultaneously, military demands elevate professionalism over heredity, as soldiers, bureaucrats, and technical experts displace traditional elites and

establish hierarchies of competence-based loyalty (Downing, 1992; Elias, 1983).

Taken together, these dynamics illustrate how war preparation—despite its exogenous character—has historically served as a powerful driver of elite cohesion. However, unlike ideological indoctrination or purges, war is not a mechanism regimes can strategically design or replicate. Its analytical value lies in clarifying what is possible when cohesion emerges, and what must be substituted when it does not.

According to network dependency theory, the core of network formation is ideational homophily (Lazarsfeld and Merton, 1954). Although materialist approaches have long dominated the study of authoritarianism, they fall short in explaining the persistence of elite loyalty—prompting a shift of attention toward constructivist conceptions of ideational structures. As Svolik (2012) and Geddes, Wright and Frantz (2018) argue, authoritarian durability depends on credible mechanisms of elite control—yet credibility is not a function of material incentives alone, but is rooted in normative expectations widely internalized within society. Thus, institutional incentives can only achieve integrative effects when embedded within deeper ideational structures.

For example, Protestantism, as a shared idea, exemplifies how such ideational structures generate institutionalized elite identity (Weber, 2013), while also providing the social-institutional foundation through which state infrastructure integrates elite actors (Gorski, 2003). Crucially, ideational structures are not merely auxiliary to material control—they are equally foundational institutional arrangements. Althusser (1971) famously distinguishes between the state's repressive apparatus, which governs mass compliance, and the ideological apparatus, which secures elite co-optation through the preservation of moral autonomy. Bourdieu (2014) further argues that the state monopolizes symbolic power—defining legitimacy through classification—and thereby captures elite worldviews and action logics through symbolic means.

This paper adopts Émile Durkheim (1986)'s theory of moral integration, which views social order as sustained not by coercion but by collective representations that bind individuals into moral communities. In this view, the state integrates elites not through violence, but through symbolic frameworks that generate shared beliefs, legitimate classifications, and mutual recognition. This macro-symbolic perspective aligns with Arendt (1951)'s insight that ideology functions as a totalizing interpretive logic. Rather than persuading through evidence, it produces a closed epistemic system for elites in which alternatives become unthinkable. At the micro-level, Fromm (1941) demonstrates that elites often internalize this logic through authoritarian personality structures—a psychological need to submit to systems that offer order and certainty. In sum, Miłosz (1953) offers an empirical elaboration: intellectual elites under authoritarian regimes do not simply comply; they rationalize, aestheticize, and emotionally invest in ideational frameworks that structure their loyalty. Taken together, these perspectives suggest that elite cohesion is not merely material—it is symbolic, affective, and moral. As Weber (1978) argues, hierarchical structures of domination are sustainable only when grounded in obedience-oriented legitimacy, not material interest. The internalization of belief, rather than the distribution of goods, renders authority durable.

To theorize the emergence of elite-integrating mechanisms under autocracy, this paper builds on Schmitt (2007)'s concept of the political, which he defines as the ability of the sovereign to draw a fundamental friend-foe distinction. In this logic, political order is not sustained through negotiation or institutional pluralism, but through the capacity to define existential threats and consolidate unity against them. Building on this insight, Gerschewski (2023) argues that autocratic regimes operate through two ideal-type logics: over-politicization, which mobilizes elites and citizens alike through the inflation of ideological distinctions; and de-politicization, which demobilizes them through institutional routinization and performance-based legitimacy. the former logic is also rooted in the same Schmittian dichotomy—either a regime actively

creates internal enemies (purges), or it actively manufactures normative allies (ideology).

From this perspective, elite integration in autocracies is not a matter of administrative optimization but of political survival. To secure cohesion, regimes must either eliminate untrustworthy elites via purges (making foes), or bind them into shared belief systems through ideology (making friends). These are not simply alternative tools—they are mutually exclusive logics of authoritarian governance (Xiao, Lu and Tan, 2024). One defines trustworthiness by exclusion, the other by inclusion. Thus, with a constructivist approach to elite integration, purges and ideology represent two structurally opposed yet functionally equivalent strategies of generating elite cohesion under the logic of friend–foe distinction.

Purge represents a coercive mechanism of elite control in authoritarian regimes, in which rulers remove disloyal or potentially threatening elites through material sanctions—imprisonment, demotion, or execution. Yet its integrative effect lies not in the punishment itself, but in the ideal order of fear it constructs. Purges serve precisely the function of *making enemy*: they delineate insiders and outsiders, signaling to elites that political survival depends on clear alignment with the center. This symbolic boundary alters elite expectations. As Svolik (2012) demonstrates, in the absence of independent enforcement, autocrats often rely on purges to make threats credible. Elites internalize the risk of non-alignment not merely as career cost but as existential peril. Rather than coordinating horizontally, they isolate themselves, increase dependence on vertical ties, and seek safety in visible loyalty. Geddes, Wright and Frantz (2018) similarly argue that personalized rule depends less on institutions than on the constant signaling of threat and punishment. The result is a paradoxical form of cohesion: elite networks become thinner but tighter—less interconnected, but more centralized and inward-looking. In this sense, purges may produce elite cohesion not by trust or belief, but by constraining behavioral divergence through politicized fear: they might be purged even if loyal (Gregory, Schröder and Sonin, 2011).

The ideological mechanism fosters elite cohesion primarily through value homophily—the tendency for individuals to form stronger, more durable ties with those who share similar moral convictions, cultural orientations, and political beliefs (Lazarsfeld and Merton, 1954). In authoritarian settings, state-promoted ideologies function not just as propaganda but as symbolic frameworks that standardize what elites should believe, feel, and signal. This shared symbolic space facilitates norm-consistent interaction, reduces reputational risk, and increases predictability among elites. Homogeneity, in this view, is not the byproduct of coercion, but the outcome of strategic convergence: elites prefer ties that affirm their legitimacy and align with regime-sanctioned norms. The result is a horizontally cohesive elite network, structured not by trust in persons, but by trust in shared meanings.

The integrative power of ideology is best captured by normative institutionalism, which holds that actors follow rules not for material gain, but because they see them as appropriate to their role and identity (March and Olsen, 1989, 2011). In authoritarian regimes, ideological institutions embed elites in a symbolic order where acting “appropriately” means acting ideologically. What matters is not belief, but conformity to a shared grammar of legitimacy. Over time, ideological behavior persists not through conviction, but through institutionalized expectations of symbolic appropriateness (Bourdieu, 2014; Wedeen, 1999), not like the fragile preference falsification (Kuran, 1991). As ideological conformity becomes institutionalized, elite behavior gradually converges, since the regime’s ideological language has become the default standard for evaluating political legitimacy. This also explains why ideological systems can persist even as belief wanes—what endures is the institutional reproduction of appropriateness.

At this point, I would like to clarify several potential concerns. First, one might ask whether purge and ideology can coexist, since some communist regimes exhibit both mechanisms. Empirically, the answer is

yes. However, my typology is not derived inductively from historical cases, but rather constructed theoretically from the perspective of ideational structures as ideal types. The purge mechanism—centered on identifying enemies and generating fear through personalist power—is fundamentally different from ideology, which, according to an institutionalist approach, identifies friends and facilitates norm internalization. These mechanisms thus represent two distinct logics of elite cohesion. In fact, the collapse of some authoritarian regimes may be partly attributable to the incoherent combination of these mechanisms. I argue that purges can reduce the size of the loyal elite, thereby undermining the positive integrative function of ideology. According to winning coalition and selectorate theory (de Mesquita et al., 2003), this dynamic may cause the regime to degenerate rapidly into a bandit state (Olson, 1993), in which private goods are delivered to a narrow elite rather than public goods to a broad coalition.

Moreover, one might argue that the friend–enemy distinction does not clearly separate purge from ideology, since any ideology that defines “friends” necessarily implies the existence of “enemies.” This is true to some extent. However, according to Svolik’s (2012) seizure group theory, most authoritarian regimes are initially established by a homogeneous elite with a strong collective identity. That is, the enemies of shared elite norms are excluded *a priori* at the founding of the regime, and ideology functions to institutionalize and reproduce this norm-based boundary (Schurmann, 1966). Therefore, the “enemies” identified by ideology are located primarily within the governed population, rather than among elites. Even nationalism, which lacks a formal philosophical system and is often excluded from strict definitions of ideology, serves the same functional role by promoting elite homogeneity and group identity (Wimmer, 2002)—all the more so for formalized ideologies. In the following section, I will further elaborate this distinction by presenting a formal model that traces the impact of these two mechanisms from the meso level (mechanisms), to the micro level (elite behavior), and finally to the macro level (network structure), in the hope of clarifying the theoretical architecture of my argument.

In sum, while war preparation creates external pressures that compel elite mobilization, it is not in itself a mechanism of elite cohesion. Its effects are conditional and episodic—dependent on crises and rarely institutionalized. By contrast, the two genuinely endogenous mechanisms of elite network integration in authoritarian regimes operate through opposing logics rooted in friend–foe distinction: the purge mechanism consolidates cohesion by identifying and eliminating enemies, while the ideological mechanism fosters solidarity by producing symbolic allies. One operates through fear and exclusion, the other through belief and inclusion. The crucial question, then, is not whether elites can be mobilized under pressure, but whether cohesion can be sustained through endogenous political mechanisms. Do regimes more effectively build cohesive elite networks by threatening disloyalty, or by cultivating symbolic homogeneity? The next section introduces a formal model to adjudicate this question, deducting the intuition of the distinct behavioral logics and structural outcomes produced by each mechanism.

3 Formal Modeling and Hypotheses

This section formalizes how purges and ideology shape elite behavior and network cohesion, providing micro-foundations for the SNA analyses and the wartime regressions. I specify the environment, derive threshold strategies, aggregate to a birth–death dynamic, characterize steady states and local stability, and obtain comparative statics with substantive meaning. Throughout, a meso-level embeddedness variable $x_t \in [0, 1]$ links micro decisions to macro network structure in line with network-dependency theory.

3.1 Environment and Timing

There is a unit mass of elites $i \in [0, 1]$ and a ruler. Time is discrete $t = 0, 1, 2, \dots$. Within a historical episode the governing mechanism is fixed as $m \in \{P, I\}$, where P denotes purges and I denotes ideology. Let x_t be the share of elites embedded in the regime-aligned (cohesive) network at time t . Network returns combine reputational sanction, relational surveillance, and social capital and are summarized by $\gamma > 0$. Two idiosyncratic shocks capture heterogeneity: ideological compliance cost $\kappa_i \sim F$ and purge exposure $\xi_i \sim G$, where F, G are continuous, strictly increasing CDFs with densities f, g . Baseline office benefits are normalized to zero.

3.2 Preferences and Parameters

Deterministic parameters and their meanings:

- $\theta > 0$: identity/legitimacy payoff from ideological alignment;
- $\gamma > 0$: structural network return (reputation, monitoring, social capital);
- $c \geq 0$: opportunity/reputational loss from remaining outside the network;
- $\tilde{c} \geq 0$: state dependence favoring staying embedded (status-quo inertia);
- $\delta \geq 0$: late-joiner discount (trust/promotion delay upon entry);
- $p \in [0, 1)$: baseline purge probability (even if loyal);
- $\pi \geq 0$: associative/contagion factor of purges (increases with density);
- $D > 0$: damage from being purged (material plus reputational);
- $\bar{c} \geq 0$: cost of strategic isolation under purges.

3.3 Mechanism I: Ideology

If an elite embeds ($e = 1$),

$$U_i^I(e = 1 | x) = \theta + \gamma x - \kappa_i.$$

If she remains outside ($e = 0$),

$$U_i^I(e = 0 | x) = -c.$$

Entry threshold (previously outside). Entry occurs iff

$$\theta + \gamma x - \kappa_i \geq -c - \delta \iff \kappa_i \leq \theta + \gamma x - c - \delta.$$

Hence the entry probability among outsiders is

$$\alpha_I(x) = F(\theta + \gamma x - c - \delta). \quad (1)$$

Exit threshold (previously embedded). Staying embedded is optimal iff

$$\theta + \gamma x - \kappa_i \geq -c + \tilde{c} \iff \kappa_i \leq \theta + \gamma x - c + \tilde{c},$$

so the exit probability among insiders is

$$\beta_I(x) = 1 - F(\theta + \gamma x - c + \tilde{c}). \quad (2)$$

Monotonicity.

$$\alpha'_I(x) = f(\theta + \gamma x - c - \delta) \cdot \gamma > 0, \quad \beta'_I(x) = -f(\theta + \gamma x - c + \tilde{c}) \cdot \gamma < 0.$$

Interpretation: larger x makes entry more attractive and exit less attractive (normative homophily and role appropriateness), generating self-reinforcement.

3.4 Mechanism P: Purges

If an elite keeps ties (no isolation; $k = 1$),

$$U_i^P(k = 1 | x) = \gamma x - (p + \pi x)D - \xi_i.$$

If she isolates ($k = 0$),

$$U_i^P(k = 0 | x) = -\bar{c}.$$

Keep threshold. Keeping ties is optimal iff

$$\xi_i \leq \phi(x) \equiv \gamma x - (p + \pi x)D - \bar{c}.$$

Thus

$$\alpha_P(x) = G(\phi(x)), \quad \beta_P(x) = 1 - \alpha_P(x). \quad (3)$$

Monotonicity.

$$\alpha'_P(x) = g(\phi(x))(\gamma - \pi D), \quad \beta'_P(x) = -\alpha'_P(x).$$

If $\pi D > \gamma$, then $\alpha'_P(x) < 0$: denser networks raise associative risk and discourage continued embedding (self-undermining).

3.5 From Individuals to Macro Dynamics

Aggregate embeddedness follows a birth–death dynamic:

$$x_{t+1} = x_t + (1 - x_t)\alpha_m(x_t) - x_t\beta_m(x_t), \quad m \in \{I, P\}. \quad (4)$$

A steady state $x^* \in [0, 1]$ satisfies

$$(1 - x^*)\alpha_m(x^*) = x^*\beta_m(x^*).$$

Define $H(x) \equiv (1 - x)\alpha(x) - x\beta(x)$. Then $H(x^*) = 0$ and local stability obtains when

$$H'(x^*) = -\alpha(x^*) - \beta(x^*) + (1 - x^*)\alpha'(x^*) - x^*\beta'(x^*), \quad \text{with stability iff } |1 + H'(x^*)| < 1. \quad (5)$$

Interpretation: in discrete time, local stability requires $|1 + H'(x^*)| < 1$ (i.e., $-2 < H'(x^*) < 0$);

intuitively, marginal joining must not only be smaller than marginal leaving but also avoid overshooting around x^* .

3.6 Propositions and Comparative Statics

Let us assume a stable interior fixed point exists (sufficient conditions are provided in the Appendix). Using the implicit function theorem on $H(x^*; \psi) = 0$,

$$\frac{\partial x^*}{\partial \psi} = -\frac{H_\psi(x^*)}{H'(x^*)}, \quad \text{with local stability requiring } |1 + H'(x^*)| < 1 \quad (\text{i.e., } -2 < H'(x^*) < 0). \quad (6)$$

Proposition 1 (Ideological self-reinforcement). *Under mechanism I with $\alpha'_I(x) > 0$ and $\beta'_I(x) < 0$, any stable steady state x^* satisfies:*

$$\frac{\partial x^*}{\partial \theta} > 0, \quad \frac{\partial x^*}{\partial \gamma} > 0, \quad \frac{\partial x^*}{\partial c} < 0, \quad \frac{\partial x^*}{\partial \tilde{c}} > 0, \quad \frac{\partial x^*}{\partial \delta} < 0.$$

Meaning: *stronger ideology and network returns expand embeddedness; outside penalties and late-joiner discounts deter entry; status-quo inertia retains insiders. The predicted SNA signature is a denser, more horizontally cohesive network (higher density/triadic closure, shorter paths, lower modularity).*

Proposition 2 (Purge-driven self-undermining). *Under mechanism P, if $\pi D > \gamma$ then $\alpha'_P(x) < 0$ and $\beta'_P(x) > 0$, and dynamics tend toward a low- x^* (possibly 0) steady state. Moreover,*

$$\frac{\partial x^*}{\partial p} < 0, \quad \frac{\partial x^*}{\partial \pi} < 0, \quad \frac{\partial x^*}{\partial D} < 0, \quad \frac{\partial x^*}{\partial \gamma} > 0.$$

Meaning: *mis-targeting, contagious purges, and harsh punishments erode embeddedness; networks fragment (lower density/clustering, longer paths, higher modularity, often greater degree centralization).*

3.7 Link to Wartime Outcomes

Let $L = h(x)$ denote the probability of coordinated elite resistance in wartime, with $h'(\cdot) > 0$. Then the above comparative statics transmit to behavior via the chain rule:

$$\frac{\partial L}{\partial \psi} = h'(x^*) \cdot \frac{\partial x^*}{\partial \psi}.$$

Mechanisms that raise x^* (ideology) increase L ; parameters that depress x^* (purges) reduce L . Substantively, once elites' benefits are structurally tied to embeddedness within an ideologically homogeneous network, loyalty becomes a property of position rather than idiosyncratic conviction; crises reveal higher collective resistance.

3.8 Uniform-[0,1] Special Case (for quick replication)

Assume $\kappa \sim U[0, 1]$, $\xi \sim U[0, 1]$ and threshold arguments lie strictly in $(0, 1)$ (*interior-case assumption*). Then $F(z) = G(z) = z$, $f = g = 1$.

Ideology I. Let $A \equiv \theta - c - \delta$, $B \equiv 1 - \theta + c + \delta - \tilde{c}$ so that $A + B = 1 - \tilde{c}$. Then

$$\alpha_I(x) = A + \gamma x, \quad \beta_I(x) = B - \gamma x,$$

and the unique interior steady state is

$$x_I^* = \frac{A}{1 - \tilde{c} - \gamma} = \frac{\theta - c - \delta}{1 - \tilde{c} - \gamma}, \quad (7)$$

which is locally stable iff

$$\gamma + \tilde{c} < 1. \quad (8)$$

Clipping note: If thresholds fall outside $[0, 1]$, α_I, β_I are clipped to $[0, 1]$ and the steady state lies at the boundary $x^* \in \{0, 1\}$ (see Appendix).

Purges P. Write $\phi(x) = A_P + sx$ with $A_P \equiv -pD - \bar{c}$ and $s \equiv \gamma - \pi D$. Then

$$\alpha_P(x) = A_P + sx, \quad \beta_P(x) = 1 - \alpha_P(x),$$

and the interior steady state solves $x^* = \alpha_P(x^*)$:

$$x_P^* = \frac{A_P}{1 - s} = \frac{-pD - \bar{c}}{1 - \gamma + \pi D}, \quad (9)$$

which is locally stable iff

$$|s| < 1 \quad \Leftrightarrow \quad |\gamma - \pi D| < 1. \quad (10)$$

Clipping note: If thresholds fall outside $[0, 1]$, apply clipping and the steady state collapses to $x^* \in \{0, 1\}$ (see Appendix).

3.9 Hypotheses

H1 (Purges). Purge-based governance does not generate sustained cohesion of elite networks; its expected net effect on cohesion is non-positive.

H2 (Ideology). Ideological institutionalization increases the cohesion of elite networks; its expected net effect on cohesion is positive.

H3 (Wartime loyalty). During wartime, higher ideological embeddedness among elites increases coordinated resistance to foreign invasion.

4 Historical Background and Analytical Framework

This section explains the historical background of this paper with a specific focus on how Confucianism became an institutionalized ideology in the Southern Song and outlines a comparative strategy to test its impact on elite cohesion. By tracing the philosophical consolidation and integration of Neo-Confucianism into the Imperial Examination, I show how it acquired the features of an organizational ideology. In order to design the research framework of **H1** and **H2** with three cases, then a method-of-difference design is applied

to compare three wartime cases, each controlling for war preparation, to assess whether purge or ideology better explains variation in elite network structure.

The institutionalization of Confucianism as an ideology marked a crucial transition in Chinese history—from conceptual pluralism to symbolic unification. As Schurmann (1966) has argued in his theory of organizational ideology, political ideology is not merely a collection of beliefs or policy preferences; rather, it constitutes a system of ideas that claims universal applicability and reproduces itself through institutional mechanisms. According to this definition, some interpretations of Chinese imperial ideology, such as the study of Qing China’s fiscal system (Zhang, 2022), reduce ideology to a set of policy preferences. Although Confucianism has been widely recognized as the principal source of ideological legitimacy and normative orthodoxy in the Chinese empire (Zhao, 2015), it was not until the mid-Southern Song dynasty that it became a true political ideology in this sense. Specifically, Confucianism exhibited two defining characteristics of an organizational ideology: first, a highly integrated body of knowledge and philosophical system; second, institutionalization through integration with the Imperial Examination system of official selection. Based on this framework, political philosophers have referred to this ideologically institutionalized belief system as *Institutional Confucianism* (Gan, 2006).

During the Northern Song period, Confucianism was fragmented internally, with fierce contention between the Yuanyou partisans and the proponents of Wang Anshi’s reforms—groups representing conventional Confucianism and legalist Confucianism, respectively. Although both claimed to represent the Confucian orthodoxy, they treated Confucianism more as an administrative tool than as a moral end. Particularly the legalist Confucians approached Confucian doctrines as instruments for advancing their own policy preferences without constructing a coherent philosophical foundation (Kuhn, 2009; Twitchett and Smith, 2009). As a result, no symbolic structure of orthodoxy could be established, and elite networks lacked shared normative frameworks. Liu (1989) argues that Confucianism in the Northern Song failed to cohere into a unified ideology and instead devolved into a contested set of preferences, which became tools for political struggle. This fragmentation, Liu contends, contributed to the rapid collapse of the Northern Song under the Jurchen invasion and to the lack of elite cohesion in the early Southern Song.

The ideological transformation began with Zhu Xi’s systematic reconstruction of the Confucian tradition. By placing *li* (principle) at the center, Zhu established a philosophical system that integrated cosmology, political order, and personal moral cultivation. His works, such as the *Collected Commentaries on the Four Books*, constructed a symbolic logic linking cosmic order to bureaucratic ethics (Kuhn, 2009; Twitchett and Smith, 2009). During Zhu’s lifetime, his ideas were condemned as “fake learning” and met with strong resistance from pragmatic thinkers—many of whom aligned with legalist Confucianism. Nevertheless, Zhu’s Neo-Confucianism provided a rigorous philosophical foundation and normative ethics, distinguishing it from policy preferences and fulfilling the first condition of organizational ideology (Liu, 1989; Kuhn, 2009). In this sense, Institutional Confucianism represents an exogenous condition for the ideological cohesion of elites: rather than elite factions first gaining dominance and then codifying Neo-Confucianism as ideology through state power, the ideological turn originated from the intellectual innovation of an independent philosopher. It was only after this system proved attractive to authoritarian rulers—due to its structured disciplinary function—that it became institutionalized as authoritarian ideology.

Furthermore, the institutionalization of Neo-Confucianism was achieved through its elevation as the sole official content of the Imperial Examination. This transformation began after the Qingyuan Party Purge (1195–1206), when critics of Zhu were marginalized and his teachings gained increasing official support. Under Emperors Ningzong and Lizong, Zhu’s commentaries were incorporated into the *Four Books*, which

subsequently became the exclusive content of the exams. This shift redefined the regime's epistemological standards and embedded Confucian ideology into the mechanism of elite production (Liu, 1989; Kuhn, 2009). As Peng (2025) emphasizes, the Imperial Examination was not simply a means of selecting competent bureaucrats, but a mechanism of cultural control and ideological construction aimed at cultivating loyalty and identity. Through integration with bureaucratic recruitment, Neo-Confucianism was thus diffused across the political elite (Elman, 2013; Miyazaki, 2003, 2007; Ho, 1967), enabling ideological disciplining at scale (Elman, 1991; Xiao, Lu and Tan, 2024). This marked the historical moment in which Neo-Confucianism truly became a political ideology, and the Song dynasty, for the first time, possessed a full-fledged organizational ideology.

To examine how elite cohesion varies under different political strategies, this paper compares three pivotal episodes from the Song dynasty. Each case shares the common external condition of existential military threat but diverges sharply in its internal response to elite coordination.

The Jingkang Crisis (1125–1126) marked the collapse of the Northern Song under the Jurchen-led Jin dynasty's invasion. Despite active war preparation since 1114, when the war between Jin and Liao began, the regime failed to unify elite support, with many officials and generals choosing to surrender rather than resist. This case is selected as the control group, with the control variable War-Preparation.

The Qingyuan Purge (1195–1202), orchestrated by the emperor's relative Han Tuozhou with imperial approval, targeted Neo-Confucian scholars and eliminated their influence from official institutions. Though intended to restore elite unity, the purge exacerbated factionalism and eroded trust. The absence of a shared ideological framework made cohesion unsustainable. The purge was launched with the policy purpose of attacking Jin and retaking lost lands. However, it not only failed to generate elite cohesion but also contributed to military failure. This case is selected as the alternative treatment group, with the control variable War-Preparation and the independent variable Purge.

The Mongol Invasion (1268–1276) occurred at a time when Zhu Xi's Confucian orthodoxy had become fully institutionalized within the exam system and political discourse. Unlike earlier episodes, the state now possessed an ideational infrastructure that symbolically integrated the elite. While the military outcome was still defeat, elite loyalty remained unusually stable, reflecting the power of ideology over material alignment alone. This case is selected as the treatment group, with the control variable War-Preparation and the independent variable Ideology.

Drawing on the method of agreement and method of difference in comparative historical analysis (Moore, 1966; Skocpol, 1979), I select three cases that control for the common explanatory variable of war preparation, and use them to test two distinct mechanisms: purge and ideology. Treating the elite social networks in each case as the dependent variable, I compare the structural characteristics of their overall cohesion. Due to the limitations of historical records, which do not allow precise reconstruction of elite relationships by specific year, I extend the temporal scope of Network 1 back to 1114—the point at which the Song dynasty officially initiated its military mobilization. Similarly, I extend Network 2 forward to 1206, the year when Han Tuozhou lost power. These adjustments align with major historical turning points and preserve the internal validity of case selection. Based on this comparative analysis, if Network 1 and Network 2 exhibit no significant structural differences, Hypothesis 1 is supported. Conversely, if Network 1 and Network 3 differ significantly, Hypothesis 2 is corroborated. Following is the table of analytical Framework.

Case	Period	War-Preparation	Purge	Ideology	Expected Network
1 Jingkang Crisis	1114–1126	Yes	No	No	Loosely Connected (Control Group)
2 Qingyuan Purge	1195–1206	Yes	Yes	No	Loosely Connected (falsification)
3 Mongol Invasion	1268–1279	Yes	No	Yes	Tightly Connected (Treatment Effect)

Table 1: Framework of Comparative Network Analysis

5 Empirical Study: Elite Cohesion

5.1 Data and Methods

To compare elite network cohesion across the three historical cases, I employ Social Network Analysis (SNA) to construct three original datasets of elite relationships—Y1, Y2, and Y3—corresponding to each case period.

First, nodes in each network represent court officials active during the relevant period of the Song dynasty. These elites were identified primarily through primary historical sources in classical Chinese (Toqto’a, 1984; Bi, 2021; Chen, 1975; Li, 2000, 2013), and cross-verified using curated lists of officials compiled by historians (Li, 2003). Only political elites confirmed to be active in the respective timeframes were retained.

Second, edges represent social or political relationships between these elites. During the process of node identification, I also recorded their interpersonal ties, which were further cross-validated and supplemented using the China Biographical Database (CBDB) (Harvard University, Academia Sinica, and Peking University, 2018). If two individuals were found to share a relationship of political or academic support, an undirected tie with a weight of +1 was assigned. If the historical record indicated a political opposition relationship, the tie was coded as −1.

The resulting networks ($N = 1488$) are as follows: Y1 consists of 475 nodes and 770 edges; Y2 consists of 522 nodes and 645 edges; Y3 consists of 491 nodes and 2,332 edges. To visualize embeddedness within the elite structure, I compute eigenvector centrality for each node, which captures not only how well-connected a node is but also how well-connected its neighbors are (Bonacich, 1987). Nodes with higher centrality are depicted in darker shades in the network graphs.

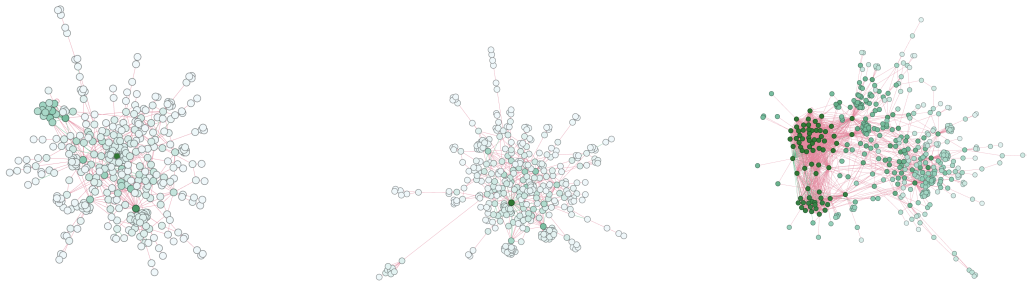


Figure 1: Three Elite Networks in Song China

In the following analysis, I evaluate the two hypotheses of this paper through comparative analysis at both the node-level and graph-level of the networks.

5.2 Node-Level Comparison

To evaluate the structural cohesion of elite networks under different institutional arrangements, this study focuses on two centrality metrics: betweenness centrality and closeness centrality. This selection is grounded not in the exclusion of other possible indicators (e.g., degree, eigenvector), but in the theoretical objective of capturing network-level structural properties, rather than individual-level prominence or localized influence. Betweenness centrality reflects the extent to which a node serves as a bridge for information flow, offering a proxy for horizontal coordination capacity and gatekeeping roles. Closeness centrality, in contrast, measures the average shortest path between a node and all others, thus indicating the overall efficiency of relational access within the network (Rawlings et al., 2023). Both are particularly suited for assessing how tightly connected a network is—an essential feature of elite cohesion. The exclusion of degree-based measures, which are more sensitive to local variation or hierarchical clustering, reflects a deliberate focus on network integration rather than elite stratification. Empirically, both statistical and historical comparison confirm that only these two indicators exhibit significant divergence across cases—particularly between Network 1 and Network 3—validating their analytic relevance in this study.

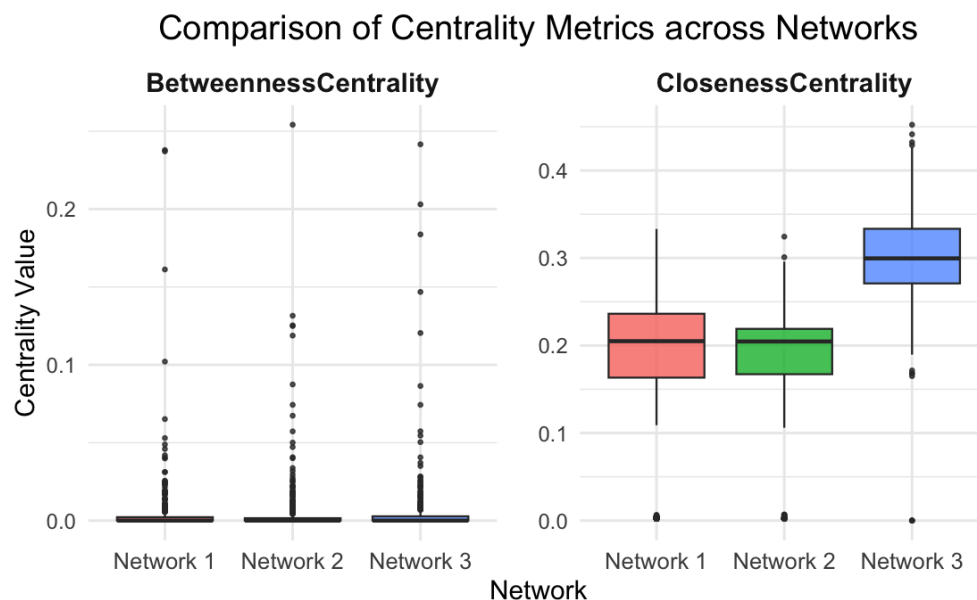


Figure 2: Centrality Metrics Comparison

To formally assess the differences in node-level cohesion across historical networks, I apply the Wilcoxon rank-sum test—a non-parametric method designed to evaluate whether two independent samples are drawn from the same distribution. This method is particularly appropriate in the context of historical social network data, where centrality scores are often non-normally distributed and may contain extreme skewness due to sparse or hierarchical connectivity patterns. The test operates by ranking all observations jointly and comparing the sum of ranks across groups. If the two samples originate from identical distributions, their rank sums should not differ systematically.

Metric	Comparison	p-value	Significance
Betweenness Centrality	Network 1 vs 2	0.5980	ns
	Network 1 vs 3	0.0160	*
Closeness Centrality	Network 1 vs 2	0.2020	ns
	Network 1 vs 3	0.0000	****

Table 2: Wilcoxon Rank-Sum Test Results

The test results reveal no statistically significant difference between Network 1 (Jingkang Crisis) and Network 2 (Qingyuan Purge) on either metric. This suggests that the personalist purge mechanism, though politically consequential, failed to produce structural transformation in elite cohesion. In other words, the removal of dissident elites did not translate into a denser or more coordinated network of survivors. In contrast, Network 3 (Mongol Invasion)—corresponding to the full institutionalization of Confucian ideology—exhibits statistically significant increases in both betweenness and closeness centrality. This indicates not only greater access between elites but also the emergence of more central nodes facilitating coordination. These findings align with the theoretical claim that ideological integration, unlike punitive exclusion, generates network convergence and horizontal alignment among elites.

While statistical significance (p-values) tells us whether a difference exists, it does not indicate how substantial or meaningful that difference is in practice. In network analysis, where we are concerned with the structural embeddedness of elites, this distinction is crucial: a statistically significant shift in centrality may still be negligible in real terms. To evaluate the magnitude of structural divergence across historical elite networks, I calculate Cliff’s Delta—a nonparametric effect size measure that quantifies how much the centrality distribution in one network differs from another.

Comparison Group	Metric	Cliff’s Delta	Interpretation
Network 1 vs 2	Closeness Centrality	+0.048	Negligible effect (no difference)
Network 1 vs 2	Betweenness Centrality	+0.017	Negligible effect (no difference)
Network 1 vs 3	Closeness Centrality	−0.873	Large effect (significantly higher)
Network 1 vs 3	Betweenness Centrality	−0.081	Small effect (minor higher)

Table 3: Effect Size (Cliff’s Delta) of Network Comparison

The results reveal a stark contrast between the two mechanisms under study. Between Network 1 and Network 2, where both cases involve wartime mobilization—with the latter additionally featuring political purges—Cliff’s delta for both closeness ($\delta = 0.048$) and betweenness ($\delta = 0.017$) centrality remains near zero. This indicates that elite connectivity and positional roles within the network remained largely unchanged, even under repressive conditions. In contrast, the comparison between Network 1 and Network 3—where ideology had been fully institutionalized—shows a large structural shift: closeness centrality yields a $\delta = -0.873$, indicating that elites in Network 3 were systematically and substantially closer to each other within the network. This suggests a higher level of embeddedness and cohesion. Although the betweenness $\delta = -0.081$ is smaller in magnitude, it remains directionally consistent with the pattern observed in closeness centrality.

Back to Figure 2, visual comparisons of the distributions across networks further illustrate the distinct

structural implications of ideological embedding. In terms of betweenness centrality, Network 3 shows a thicker tail with a greater number of elites occupying strategic brokerage positions—suggesting the emergence of actors capable of bridging otherwise disconnected factions. This implies a latent infrastructure for relational coordination, likely undergirded by shared normative commitments. The pattern in closeness centrality is even more pronounced: elites in Network 3 exhibit significantly higher proximity to all others, implying a globally tighter network with shorter path lengths and faster potential for information diffusion or collective mobilization. This structural proximity is not observable in Networks 1 or 2, whose flatter distributions indicate fragmented elite landscapes with lower systemic accessibility. The implication is clear: Confucian ideological institutionalization did not merely eliminate dissent or elevate favored actors—it transformed the logic of interaction, embedding elites within a shared epistemic order that reinforced both symbolic alignment and structural cohesion. In this way, the observed centrality shifts lend empirical support to the theoretical claim that ideology, not fear, binds.

Taken together, these statistical results demonstrate that ideological institutionalization, not personalist purges, was the key force that reshaped the underlying structure of elite relations. The effect was not only statistically significant, but structurally transformative, suggesting that both **H1** and **H2** have been supported regarding the statistic node-level comparison.

While statistical comparison of node-level and graph-level metrics helps identify whether elite networks differ structurally across time, such analyses alone do not reveal who actually occupies positions of influence within those networks. To bridge this gap between structural analysis and historical interpretation, this study conducts a qualitative comparison of the most central actors in each network, based on the HITS (Hyperlink-Induced Topic Search) algorithm introduced by (Kleinberg, 1999). The HITS algorithm was originally developed to identify authoritative nodes on the web by distinguishing between two roles: authorities (nodes widely endorsed by others) and hubs (nodes that point to many authoritative ones). In the context of elite political networks, a high HITS score indicates that a figure is not merely well-connected, but embedded in a mutual structure of recognition and reinforcement—acting as both a source and recipient of influence.

Incorporating HITS-based historical comparison serves two analytical purposes. First, it helps verify whether quantitative shifts in cohesion or centrality are reflected in the actual composition of elite leadership—that is, whether new political or ideological actors gained prominence over time. Second, it allows for tracing factional continuity and transformation across different political contexts by identifying the dominant intellectual or institutional alignments of the most authoritative elites. This approach provides a necessary interpretive complement to purely statistical findings, anchoring abstract metrics in historical agency and political identity.

Statistical comparisons suggest that political purges did not significantly reshape the structural cohesion of elite networks. Historical evidence from the HITS-based analysis offers a compelling explanation for this pattern. In Network 2, which corresponds to the Qingyuan purge period, the top-scoring elites remain deeply embedded within their respective ideological camps. Although Han Tuo Zhou, the leading anti-Neo-Confucian figure, held institutional power during the purge, several key Neo-Confucians—including intellectual Zhu Xi and Supreme Military Commander Zhao Ruyi—also ranked highly in authority. This reflects a core limitation of purges as a cohesion-enhancing mechanism: even when faction leaders are removed from office, their social and intellectual networks often persist, supported by overlapping kinship, educational, and scholarly ties. In this context, the purge failed to eliminate factional cleavages or foster a new consensus; rather, it reinforced a polarized structure where rival camps continued to coexist within the political system.

Network	Figure	HITS Score	Faction
Network 1	Tong Guan	0.324	Legalist Confucian
	Cai Jing	0.265	Legalist Confucian
	Sun Di	0.163	Conventional Confucian
	Li Gang	0.123	Legalist Confucian
	Wang Zao	0.092	Conventional Confucian
Network 2	Han Tuozhou	0.537	Anti-Neo Confucian
	Zhao Ruyu	0.280	Neo Confucian
	Zhu Xi	0.193	Neo Confucian
	Wei Jing	0.156	Anti-Neo Confucian
	Yuan Xie	0.106	Neo Confucian
Network 3	Chen Yizhong	0.152	Neo Confucian
	Wen Tianxiang	0.139	Neo Confucian
	Gao Side	0.136	Neo Confucian
	Zhang Shijie	0.135	Neo Confucian
	Lu Xiufu	0.135	Neo Confucian

Table 4: Top Elite Figures by HITS Score and Faction in Three Networks

In contrast, Network 3, constructed during the Mongol invasion, demonstrates not only a higher level of structural cohesion but also greater ideological unity among its most central elites. All top-scoring actors were deeply embedded in the Neo-Confucian tradition. Unlike the residual polarization seen in Network 2, the ideological homogeneity of Network 3’s leadership likely facilitated collective coordination and strategic clarity. Wen Tianxiang, in particular, stands out not only for his symbolic martyrdom, but also for his practical role in wartime mobilization. As a high-ranking official, commander, and moral exemplar, his leadership embodied the fusion of Confucian loyalty and state service. In this sense, institutionalized ideology not only fostered tighter network structures, but also produced a coherent leadership aligned in both thought and action, thus offering a stronger foundation for elite cohesion under existential crisis.

5.3 Graph-Level Comparison

This section compares three elite networks using six graph-level metrics that capture cohesion and segmentation: average path length (the average number of steps required to connect any two individuals within the network) (Watts and Strogatz, 1998; Newman, Moore and Watts, 2000), clustering coefficient (the degree to which an elite’s immediate contacts are also connected to each other—that is, how likely a node’s neighbors form closed triads) (Blondel et al., 2008; Lambiotte, Delvenne and Barahona, 2009; Rawlings et al., 2023), core-periphery structure (the degree to which a network exhibits internal stratification—specifically, whether it can be divided into a dense, tightly connected core and a loosely connected periphery) (Borgatti and Everett, 1999; Rombach et al., 2014; Kojaku and Masuda, 2023), density (the proportion of actual ties in the network relative to all possible ties) (Wasserman and Faust, 1994; Hanneman and Riddle, 2005; McCarty et al., 2001), factionalization score (how internally divided a network is based on structural alignments—essentially, how prone the network is to internal cleavages or cohesion) (Gonthier and Guerra, 2022; Warncke, 2025), and modularity (how easily a network can be partitioned into internally dense, but externally sparse

subgroups) (Blondel et al., 2008; Lambiotte, Delvenne and Barahona, 2015). Figure 3 reports the values.

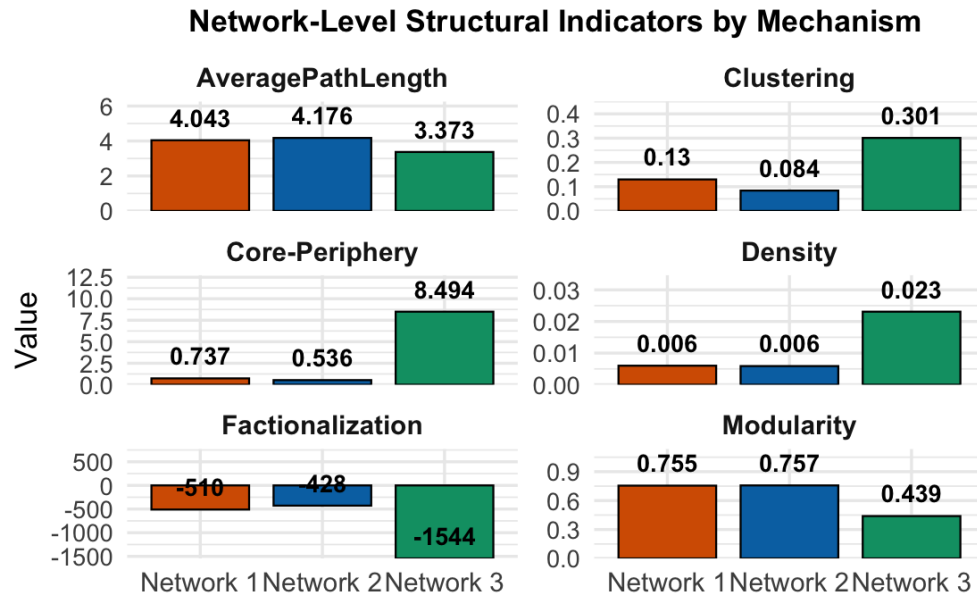


Figure 3: Six Graph-Level Metrics Comparison

Across the six metrics, Network 1 and Network 2 are substantively similar. Average path length is virtually unchanged (4.043 vs. 4.176), clustering declines (0.130 to 0.084), density is flat (0.006 to 0.006), core-periphery weakens (0.737 to 0.536), factionalization moves slightly toward fragmentation (-510 to -428), and modularity is stable (0.755 to 0.757). This pattern is consistent with historical accounts of purges: selective removals fracture local intellectual pathways without constructing new integrative ties, dislocating leadership (e.g., the elimination of Neo-Confucians like Zhu Xi) rather than consolidating it (Kuhn, 2009). In short, purge subtracts but does not add to the relational infrastructure of governance.

By contrast, Network 3 shows a cohesive shift on all six metrics: path length shortens (to 3.373), clustering rises sharply (to 0.301), density increases nearly fourfold (to 0.023), a strong core emerges in the core-periphery measure (to 8.494), factionalization becomes far more negative (-1544), and modularity drops (to 0.439). Substantively, this indicates that institutional Confucianism provided a shared normative language and standardized elite pipelines (examinations, rituals, canonical texts), generating overlapping, mutually reinforcing communities and cross-cutting ties (Peng, 2025). These structural gains map onto historical mobilization: elites coordinated resources through personal and bureaucratic networks, as seen in both late imperial cases and Southern Song wartime administration (e.g., resource mobilization in Qing (Bai, Jia and Yang, 2023); Wen Tianxiang’s re-organization after early failures (Bi, 2021)). The result is a denser, faster, and less segmented elite field capable of unified response under pressure.

Taken together, the metrics support H1–H2 and the broader purge–ideology distinction: purge, a fear-based “enemy-identification” mechanism, fails to produce cohesion and may intensify fragmentation; ideology, a “friend-identification” mechanism, fosters horizontal integration and accelerates coordination.

5.4 Machine Learning-Based Robustness Check

Historical elite networks are often incomplete and biased due to archival omissions, fragmentary documentation, and retrospective data construction. To mitigate these limitations and examine whether missing ties might alter structural conclusions, I implemented a machine learning-based link prediction approach using the Random Forest (RF) classifier. This serves as a robustness check for the validity of the observed network patterns.

For each of the three elite networks, I trained a Random Forest model to classify whether a link exists between two nodes, using topological characteristics including Common Neighbors, Jaccard Coefficient, Adamic-Adar Index (Adamic and Adar, 2003; Liben-Nowell and Kleinberg, 2007), PageRank scores (Brin and Page, 1998) and node degrees. The training set comprises observed ties (labeled 1) and an equal number of randomly sampled unobserved ties (labeled as 0).

To ensure fair comparison between networks, I employed a Top-N prediction strategy (Liang et al., 2018; Xu et al., 2023), adding the top 1000 most probable unobserved links to each original network. This uniform augmentation controls for prediction volume and avoids biases caused by varying network sparsity or classifier sensitivity.

After augmenting each network with predicted ties, I recalculated key network-level indicators such as clustering coefficient, density, modularity, node connectivity, and k-core centrality. The results reinforce the theoretical expectation: Network 3 consistently exhibits the highest structural cohesion; Network 2 shows only marginal differences from Network 1 across most metrics.

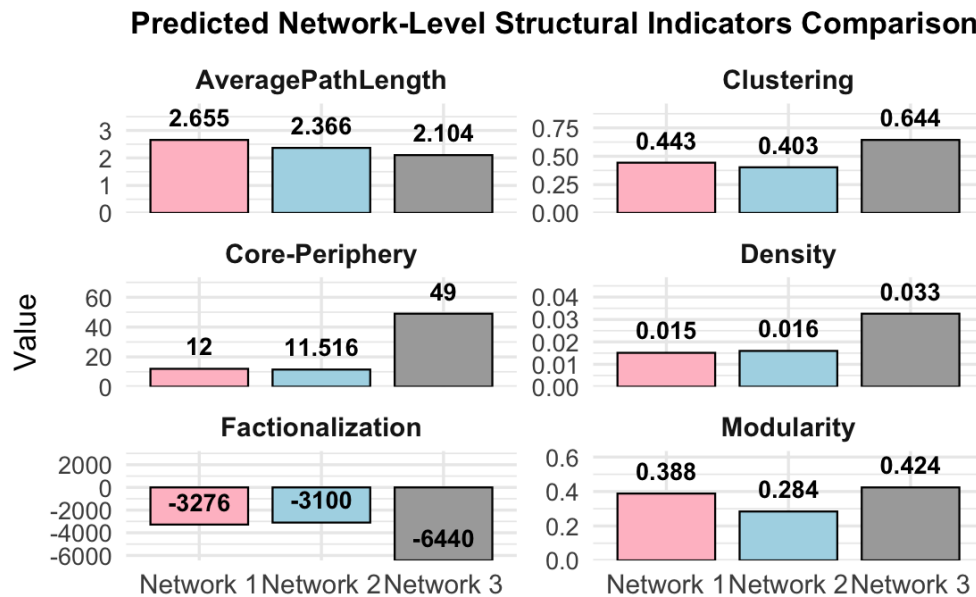


Figure 4: Predicted Graph-Level Metrics Comparison

This machine learning-based robustness check thus supports the central argument that Confucian institutionalization, rather than coercive purges alone, significantly enhances elite cohesion in historical authoritarian governance.

In sum, both node-level and graph-level Social Network Analysis provides robust statistical and historical evidence supporting the validity of the following two hypotheses.

- **H1:** *Purge has no significant positive effect on the cohesion of elite networks.*
- **H2:** *Ideology has significant positive effects on the cohesion of elite networks.*

6 Empirical Study: Elite Loyalty

6.1 Data and Methods

Having demonstrated through Social Network Analysis that ideology promotes elite cohesion while purges do not, I now turn to the second implication of network dependency theory: does ideology also enhance elite loyalty, and in turn, fosters state capacity during wartime?

To empirically evaluate this question, I conduct a comparative study of two analogous cases: the Jingkang Crisis (1125–1126), which led to the fall of the Northern Song, and the Mongol Invasion (1268–1276), which culminated in the fall of the Southern Song. Both involved advanced wartime preparation and prolonged siege warfare. Yet, whereas the Northern Song collapsed rapidly under elite factionalism, the Southern Song continued resisting even after its main army was defeated and its capital captured, with the emperor ultimately committing suicide by drowning at China’s southernmost frontier. My hypothesis (**H3**) is that ideology increases the willingness of elites to resist foreign invasion.

To test this, I construct a cross-sectional database of cities during each war and examine whether ideology and network dependency affected elite loyalty. The unit of analysis is the city. The key independent variable is the total number of *jinshi* degree-holders—Confucian scholar-officials—produced by each city under each regime. Since the Imperial Exam was based primarily on Confucian texts, this variable captures both the extent of elite network embedding and the diffusion of ideology. Data were collected from the Harvard China Biographical Database (CBDB) for both the Northern and Southern Song.

The dependent variable is the duration of days a city resisted before falling. Because siege warfare during this era was often led by local elites mobilizing community resources rather than formal armies, longer resistance is interpreted as stronger elite loyalty. Based on primary and secondary historical sources (Bi, 1999; Li, 2008; Toqto’a, 2019; Li, 2013), I calculate the time lag between the fall of different cities along the invading army’s route (Gu, 2012*a,b*; National Defense University (Taiwan), 2013). This indicator is admittedly imperfect, as it does not control for variation in invading troop speed, but it remains the most consistent and tractable measure available.

I also include two logarithmic transformed control variables: commercial tax quota between 1068 and 1077 as a proxy for city’s economic development (Xu, 2014), and number of clans in 1078 to account for population (Wu, 2000). Furthermore, these variables represent effects of two other local network organizations except for political elites: commercial elites and kinship-based landlord elites.

The main regression ($N = 118$) estimates the effect of Confucian ideology on elite resistance:

$$Y_{\text{resist}} = \beta_0 + \beta_1 X_{\text{scholar}} + \beta_2 X_{\text{south}} + \beta_3 (X_{\text{scholar}} \times X_{\text{south}}) + \beta_4 \log(X_{\text{tax}}) + \beta_5 \log(X_{\text{clan}}) + \varepsilon$$

This model tests whether ideology (proxied by *jinshi* count) increases elite resistance. The Southern Song dummy (X_{south}) captures structural differences between the two regimes, while the interaction term ($X_{\text{scholar}} \times X_{\text{south}}$) captures the additional ideological effect of Confucianism as an organizational ideology. The most important coefficient is β_3 , as it isolates the marginal impact of ideology compared to that of

confucianism not as an ideology.

Following the robustness strategy in Acemoglu, Johnson and Robinson (2001), I conduct a subsample OLS regression restricted to the Southern Song period. The purpose is to directly evaluate the effect of ideological penetration on elite loyalty, independent of regime difference. Given the smaller sample ($N = 73$), I use bootstrap-based inference to ensure valid estimation:

$$Y_{\text{resist}} = \beta_0 + \beta_1 X_{\text{scholar}} + \beta_2 \log(X_{\text{tax}}) + \beta_3 \log(X_{\text{clan}}) + \varepsilon$$

6.2 Empirical Results

Table 5 reports the baseline regression and robustness check. The dependent variable is the duration of urban resistance before capitulation. In the full-sample model, the key explanatory variables are Scholar density, a dummy for the Southern Song, and their interaction, with logged measures of tax revenue and clan size as controls. To account for potential heteroskedasticity in cross-sectional data, I employ HC3 robust standard errors, which provide more reliable inference in finite samples.

As a robustness check, I restrict the sample to Southern Song cities only, thereby eliminating regional heterogeneity. Given the limited number of observations ($N=73$), I use a bootstrap procedure with 1000 replications to compute standard errors. This approach ensures that the inference is not overly dependent on small-sample assumptions.

	Baseline (Full Sample)	Robustness (Southern Song Only)
Intercept	-42.50** (18.28)	-59.24 (35.93)
Scholar	0.04 (0.12)	0.30*** (0.10)
South	19.03*** (3.90)	—
Scholar $\times$ South	0.24* (0.15)	—
log(Tax)	1.89 (1.53)	3.43 (2.74)
log(Clan)	1.79 (2.15)	2.82 (4.75)
Observations	118	73
Adjusted R^2	0.593	0.519

Notes: For the full sample, HC3 heteroskedasticity-robust standard errors are reported in parentheses. For the Southern Song subsample, bootstrap standard errors are based on 1000 replications.

Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Confucian Elites and the Duration of Siege Resistance in the Song Dynasty

The full-sample regression shows a strong and positive effect of the Southern Song dummy (coef. = 19.03, $p < 0.01$), indicating that Southern cities resisted nearly three weeks longer on average than their Northern

counterparts. Importantly, the interaction term *Scholar* $\times$ *South* is positive and marginally significant at the 10% level under HC3 robust errors. This suggests that the effect of scholar density on resistance duration is conditional on the Southern Song context. In contrast, the coefficients for $\log(\text{Tax})$ and $\log(\text{Clan})$ are statistically insignificant, indicating that fiscal capacity and kinship structure do not systematically explain variation in wartime endurance.

Turning to the Southern Song subsample, the bootstrap estimates show that scholar density remains strongly positive and statistically significant (coef. = 0.30, SE = 0.10, $p < 0.01$). This implies that the addition of one *jinshi* degree holder was associated with roughly one-third of a day longer resistance, even after resampling adjustment. Again, the fiscal and clan controls remain statistically insignificant.

These findings provide robust support for Hypothesis 3: the effect of institutional Confucianism was not uniform across the empire, but materialized specifically in the Southern Song, where Confucian ideology had been fully institutionalized. In this context, scholar density significantly enhanced elite cohesion, thereby extending urban resistance against external threats. Substantively, the results highlight that ideology operates as an institutional mechanism of elite cohesion, strengthening state capacity during wartime beyond what material or kinship-based factors can explain.

7 Conclusion and Discussion

This paper has examined the fundamental question of how authoritarian states foster elite cohesion and elite loyalty. By analyzing the Southern Song dynasty through a combination of formal modeling, social network analysis, and historical evidence, I have advanced three central arguments. First, purges do not strengthen elite networks. While they may generate temporary compliance through fear, they fail to transform the structural foundations of cohesion, leaving networks fragmented and fragile. Second, ideology enhances elite cohesion by embedding elites in homogeneous symbolic frameworks that reduce reputational risk, create predictable interaction, and institutionalize shared legitimacy. Third, once institutionalized through mechanisms such as the Confucian examination system, ideology increases elite loyalty during wartime by creating a collective identity that transcends short-term material incentives. These findings suggest that authoritarian state building is not only about coercive capacity or institutional design, but equally about the creation of ideational orders that reconfigure elite behavior.

Placed in a broader theoretical perspective, the study contributes to three major literatures. For research on authoritarianism, it challenges the prevailing institutionalist paradigm by showing that elite loyalty cannot be fully explained by material incentives or coalition management. Instead, the durability of authoritarian regimes depends on their ability to embed elites in ideationally structured networks, where loyalty is sustained by relational constraints and symbolic appropriateness rather than fear alone. For historical sociology, the study extends the classical “war–state building” thesis by demonstrating that war preparation is an exogenous condition, but cohesion emerges endogenously through ideology. Military threats alone cannot account for state resilience; they must be mediated by ideational frameworks that transform elite identities. For network theory, the findings refine our understanding of network dependency: elites conform not only because of their structural positions but also because those positions are ideologically defined. The contrast between purge-based fragmentation and ideology-based convergence demonstrates that authoritarian cohesion depends on the symbolic logic embedded in relational orders.

The case of the Southern Song further underscores the importance of ideology for long-term political development. Even though the dynasty ultimately succumbed to the Mongol conquest, the institutional-

ization of Neo-Confucianism reshaped elite networks in ways that endured beyond military defeat. The symbolic order of Institutional Confucianism not only bound elites into a coherent community but also left an enduring legacy for the Yuan and Ming states, which inherited and expanded this ideological foundation. This suggests that state capacity should not be measured solely by military success or territorial durability, but by the extent to which states can create ideational infrastructures that generate cohesive elite orders. In this sense, the Southern Song illustrates that a defeated state may still achieve long-term institutional influence by embedding elites within durable symbolic frameworks.

At the same time, several limitations must be acknowledged. First, the reconstruction of elite networks relies on historical sources and the CBDB, which, despite their richness, cannot capture all informal or latent ties among elites. This may bias the network structure toward formalized relationships. Second, causal inference is inevitably constrained in historical research. The cross-case comparisons employed here control for war preparation, but cannot fully eliminate other confounding conditions, such as regional variation in military strategy or resource distribution. Third, the very strength of ideological cohesion may also constitute a liability. As network theory warns, over-embeddedness can reduce innovation and adaptability. In the Southern Song, the strength of Confucian orthodoxy may have enhanced loyalty but limited strategic flexibility in confronting a militarily superior foe. These caveats do not undermine the findings, but they suggest that ideological cohesion entails both resilience and rigidity.

The study also opens several avenues for future research. Comparative work across regions could test whether similar mechanisms of ideological cohesion operated in other historical settings, such as the Joseon dynasty in Korea, Tokugawa Japan, or post-Reformation European monarchies, as well as much more modern and contemporary cases. Temporal comparisons could explore whether modern authoritarian regimes employ analogous strategies, embedding elites through ideological training programs, party schools, or digital propaganda. Methodologically, future work could apply longitudinal network models or structural equation modeling to track how ideological penetration functions as a latent variable shaping elite loyalty over time. Finally, the argument invites dialogue with constructivist approaches in international relations and political theory: just as states embed elites through symbolic orders, they embed themselves in global hierarchies through shared norms and institutions. Understanding ideology as an organizational technology thus connects authoritarian state building to wider debates on the ideational foundations of political order.

In closing, this paper argues that authoritarian states cannot be understood solely through the lens of coercion, material interests, or institutional incentives. The durability of authoritarian rule rests equally on the symbolic infrastructures that bind elites into cohesive networks. The Southern Song case demonstrates that purges may silence dissent, but they do not integrate elites. Only when ideology becomes institutionalized as a shared epistemic order does cohesion emerge that is capable of sustaining loyalty in the face of crisis. In this sense, the lesson of the Southern Song is paradoxical: although the dynasty fell, it achieved something deeper than military victory—it forged an enduring ideological framework that reconstituted elite identity and reshaped the long-term trajectory of Chinese state building. The broader implication is that the authoritarian state is not merely a machine of repression or extraction; it is also a producer of meaning. By embedding elites in symbolic structures, it secures not just obedience, but belonging, and thereby makes possible the transformation of fragile coalitions into resilient political orders.

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Appendix

A Notation and Assumptions (A1)

Population, time, and mechanism. Discrete time $t = 0, 1, 2, \dots$. A unit mass of elites $i \in [0, 1]$ and a ruler. Within a historical episode the governance mechanism is fixed as $m \in \{P, I\}$, where P denotes purges and I denotes ideology. Let $x_t \in [0, 1]$ denote the share of elites embedded in the regime-aligned (cohesive) network at time t .

Heterogeneity. Ideological compliance cost $\kappa_i \sim F$, purge exposure $\xi_i \sim G$, with continuous, strictly increasing CDFs F, G and densities f, g .

Parameters (all nonnegative unless noted). $\theta > 0$ (identity/legitimacy payoff), $\gamma > 0$ (structural network return), c (outside loss), $\tilde{c}$ (status-quo inertia for staying embedded), δ (late-joiner discount), $p \in [0, 1]$ (baseline purge risk), π (associative risk), $D > 0$ (purge damage), $\bar{c}$ (strategic isolation cost).

Individual utilities and threshold probabilities. *Ideology ($m = I$):*

$$U_i^I(e=1 | x) = \theta + \gamma x - \kappa_i, \quad U_i^I(e=0 | x) = -c,$$

with entry threshold $\kappa_i \leq \theta + \gamma x - c - \delta$ and exit threshold $\kappa_i \leq \theta + \gamma x - c + \tilde{c}$. Hence

$$\alpha_I(x) = F(\theta + \gamma x - c - \delta), \quad \beta_I(x) = 1 - F(\theta + \gamma x - c + \tilde{c}),$$

and $\alpha'_I(x) = f(\theta + \gamma x - c - \delta)\gamma > 0$, $\beta'_I(x) = -f(\theta + \gamma x - c + \tilde{c})\gamma < 0$.

Purges ($m = P$):

$$U_i^P(k=1 | x) = \gamma x - (p + \pi x)D - \xi_i, \quad U_i^P(k=0 | x) = -\bar{c},$$

with keep threshold $\xi_i \leq \phi(x) \equiv \gamma x - (p + \pi x)D - \bar{c}$ and

$$\alpha_P(x) = G(\phi(x)), \quad \beta_P(x) = 1 - \alpha_P(x),$$

and $\alpha'_P(x) = g(\phi(x))(\gamma - \pi D)$, $\beta'_P(x) = -\alpha'_P(x)$.

Law of motion, steady state, and stability. Aggregate embeddedness evolves as

$$x_{t+1} = x_t + (1 - x_t)\alpha_m(x_t) - x_t\beta_m(x_t), \quad m \in \{I, P\}. \quad (11)$$

Let $H(x) \equiv (1-x)\alpha(x) - x\beta(x)$. A steady state x^* satisfies $H(x^*) = 0$. Local stability obtains when

$$H'(x^*) = -\alpha(x^*) - \beta(x^*) + (1-x^*)\alpha'(x^*) - x^*\beta'(x^*) < 0.$$

Whenever a threshold argument lies outside $[0, 1]$, we clip α, β to $[0, 1]$; boundary steady states $x^* \in \{0, 1\}$ then arise.

B From Micro to Macro & Local Stability (A2)

A2.0 Deriving the birth–death law of motion

Finite- N bookkeeping. Let total elites be N , with $K_t = Nx_t$ embedded at t . Outsiders: $N - K_t$; each enters with prob. $\alpha(x_t)$, so $B_t \sim \text{Binom}(N - K_t, \alpha(x_t))$. Insiders: K_t ; each exits with prob. $\beta(x_t)$, so $D_t \sim \text{Binom}(K_t, \beta(x_t))$. Then

$$K_{t+1} = K_t + B_t - D_t.$$

Taking conditional expectations given x_t and dividing by N yields

$$\mathbb{E}[x_{t+1} | x_t] = x_t + (1 - x_t)\alpha(x_t) - x_t\beta(x_t),$$

which is (11) used in the main text. The finite- N stochastic process $\{K_t\}$ is a birth–death Markov chain with

$$\Pr(K_{t+1}=K_t+1 | K_t) = \frac{N-K_t}{N}\alpha\left(\frac{K_t}{N}\right), \quad \Pr(K_{t+1}=K_t-1 | K_t) = \frac{K_t}{N}\beta\left(\frac{K_t}{N}\right).$$

Continuous-time intuition. With transition intensities $\alpha(x), \beta(x)$, $\dot{x} = (1-x)\alpha(x) - x\beta(x)$; Euler discretization with unit step yields (11).

Existence and local stability (general F, G)

Lemma 1 (Existence). *H is continuous on $[0, 1]$, with $H(0) = \alpha(0) \geq 0$ and $H(1) = -\beta(1) \leq 0$. By the intermediate value theorem there exists at least one $x^* \in [0, 1]$ such that $H(x^*) = 0$.*

Proposition 3 (Local stability criterion). *A steady state x^* of (11) is locally stable in discrete time iff $|1 + H'(x^*)| < 1$ (equivalently, $-2 < H'(x^*) < 0$).*

Sketch. Consider the map $F(x) = x + H(x)$. Linearizing around x^* gives $x_{t+1} - x^* \approx F'(x^*)(x_t - x^*) = (1 + H'(x^*))(x_t - x^*)$. By the Banach contraction principle, local stability holds iff $|F'(x^*)| < 1$, that is $|1 + H'(x^*)| < 1$. $\square$

Mechanism-level implications. Under I , $\alpha'_I(x) > 0$ and $\beta'_I(x) < 0$ make high- x regions more stable, supporting a high- x^* (self-reinforcement). Under P , when $\pi D > \gamma$, $\alpha'_P(x) < 0$ and $\beta'_P(x) > 0$ make high- x regions fragile (self-undermining), pushing dynamics toward low embeddedness.

C Comparative Statics (A3)

For a stable x^* with $H(x^*; \psi) = 0$,

$$\frac{\partial x^*}{\partial \psi} = -\frac{H_\psi(x^*)}{H'(x^*)}, \quad H_\psi(x) = (1-x)\alpha_\psi(x) - x\beta_\psi(x).$$

Signs under mild regularity:

Ideology ($m = I$).

$$\frac{\partial x^*}{\partial \theta} > 0, \quad \frac{\partial x^*}{\partial \gamma} > 0, \quad \frac{\partial x^*}{\partial c} < 0, \quad \frac{\partial x^*}{\partial \bar{c}} > 0, \quad \frac{\partial x^*}{\partial \delta} < 0.$$

Purges ($m = P$).

$$\frac{\partial x^*}{\partial p} < 0, \quad \frac{\partial x^*}{\partial \pi} < 0, \quad \frac{\partial x^*}{\partial D} < 0, \quad \frac{\partial x^*}{\partial \gamma} > 0.$$

When πD is sufficiently large relative to γ , overall dynamics still trend to low embeddedness.

Behavioral link to wartime outcomes. Let $L = h(x)$ with $h' > 0$. Then

$$\frac{\partial L}{\partial \psi} = h'(x^*) \cdot \frac{\partial x^*}{\partial \psi}.$$

Thus parameters that raise x^* (e.g., θ, γ) increase L ; purge severity parameters lower it.

D Uniform-[0, 1] Special Case (A4)

Assume $\kappa, \xi \sim \text{Uniform}[0, 1]$ and all thresholds lie in $(0, 1)$ (interior case). Then $F(z) = G(z) = z$ and $f = g = 1$.

Ideology ($m = I$). Let $A \equiv \theta - c - \delta$ and $B \equiv 1 - \theta + c + \delta - \bar{c}$ ($A + B = 1 - \bar{c}$). Then

$$\alpha_I(x) = A + \gamma x, \quad \beta_I(x) = B - \gamma x.$$

The interior steady state solves $(1-x)(A + \gamma x) = x(B - \gamma x)$, yielding

$$x_I^* = \frac{A}{1 - \bar{c} - \gamma} = \frac{\theta - c - \delta}{1 - \bar{c} - \gamma}, \quad (12)$$

which is locally stable iff

$$\gamma + \bar{c} < 1. \quad (13)$$

Purges ($m = P$). Write $\phi(x) = A_P + sx$, where $A_P \equiv -pD - \bar{c}$ and $s \equiv \gamma - \pi D$. Then

$$\alpha_P(x) = A_P + sx, \quad \beta_P(x) = 1 - \alpha_P(x).$$

The interior steady state solves $x^* = \alpha_P(x^*)$:

$$x_P^* = \frac{A_P}{1-s} = \frac{-pD - \bar{c}}{1 - \gamma + \pi D}, \quad (14)$$

which is locally stable iff

$$|s| < 1 \quad \Leftrightarrow \quad |\gamma - \pi D| < 1. \quad (15)$$

If thresholds clip outside $[0, 1]$, α, β are truncated to $[0, 1]$ and the steady state collapses to the boundary $x^* \in \{0, 1\}$.

E Parameter–Measure Crosswalk (A6)

Table 6: Mapping Model Parameters to Empirical Measures

Parameter	Theoretical meaning	Empirical proxy and measurement (Song case)
θ (ideological institutionalization)	Identity/legitimacy payoff; increases entry and reduces exit in the ideological mechanism	City-level <i>Jinshi/Scholar</i> stock or density (Neo-Confucian penetration). Used as the key explanatory variable in the wartime regressions; constructed from biographical records and aggregated to the city.
γ (network return)	Composite payoff from reputational sanction, relational surveillance, and social capital—rises with embeddedness x	Reported separately (no aggregation): network density, clustering coefficient, average path length, modularity, degree centralization, and the presence/strength of core-periphery structure. The ideology-dominant network is expected to exhibit higher density and clustering, shorter paths, and lower modularity relative to purge-dominant networks.
c (outside loss)	Opportunity/reputational penalty for staying outside the regime-aligned network	Not estimated directly; discussed qualitatively (e.g., exclusion from offices/rituals). Inference is via observed lower exit behavior when cohesion is higher.
$\tilde{c}$ (status-quo inertia)	State-dependence that reduces exit among incumbents	Not measured as a standalone variable; treated conceptually (role appropriateness, tenure stickiness) and discussed in mechanism interpretation.
δ (late-joiner discount)	Trust/promotion penalty for late ideological entrants; lowers entry	Not measured as a standalone variable; discussed qualitatively as institutional friction for late adopters.
p, π, D (purge severity and associativity)	Baseline mis-targeting (p), guilt-by-association intensity (π), punishment magnitude (D); together shape $\alpha'_P(x)$ and $\beta'_P(x)$	Purge episodes and documentary evidence of associative sanctions; used to contrast network structure in purge-dominant vs. ideology-dominant periods. Expected empirical signature: no sustained cohesion gains under purges; fragmentation persists or worsens.
$\bar{c}$ (isolation cost)	Opportunity loss from strategic isolation under purges	Discussed qualitatively (missed appointments/patronage); not entered as a separate regressor.
x (embeddedness)	Meso-level state variable linking micro choices to macro structure	Observed via the set of SNA metrics listed above (reported individually). The ideology-dominant network is expected to rank highest in cohesion across those metrics.
L (wartime loyalty/resistance)	$h(x)$ with $h' > 0$: coordinated resistance increases with embeddedness	City-level resistance duration (days to fall) as the dependent variable; controls include log taxes and log clan counts, plus a Southern Song indicator and, where specified, interactions.