Factions in Nondemocracies: Theory and Evidence from the Chinese Communist Party

Patrick Francois, Francesco Trebbi, and Kairong Xiao[*]

December 18, 2020

Abstract

This paper investigates, theoretically and empirically, factional arrangements within the Chinese Communist Party (CCP), the governing political party of the People's Republic of China. Using detailed biographical information of political elites in the Central Committee and provincial governments, we present a set of new empirical regularities within the CCP, including systematic patterns of cross-factional balancing at different levels of the political hierarchy and substantial faction premia in promotions. We propose and estimate an organizational economic model to characterize factional politics within single-party nondemocratic regimes and its economic implications.

JEL Classification codes: P3, P48.

1 Introduction

This paper presents a theoretical and empirical analysis of the internal organization of China's political linchpin: the Chinese Communist Party (CCP). As the regime party of the People's Republic of China (PRC), the CCP is, de jure and de facto, the be-all and end-all of political activity in the most populous country and plays a crucial role in steering the second-largest economy in the world today (Bai, Hsieh, and Song, 2016). This motivates the interest of political economists in the CCP and its factions.

The opaque and often informal nature of elite interaction within a country lacking competitive elections and with a rich history of informal politics raises formidable obstacles to a rigorous politico-economic analysis. The CCP remains today *"a secretive, selective organization of about 65 million members who have positions of influence in all sectors of Chinese society..."* (Nathan and Gilley, 2003 p.7). Operations of the Politburo and the highest echelons of the CCP have been often described as opaque at best (Pye, 1980; Dittmer, 1995; Shih, 2008). Within this context, intra-elite competition is extremely hard to assess. The economic literature on the internal organization at the highest levels of the Chinese government has been traditionally limited,[1] although with several recent exceptions (e.g. Li, Roland, and Xie, 2018; Chu, Fisman, Tan, and Wang, 2020; Fisman, Shi, Wang, and Wu, 2020). Political scientists focused on China studies have been more attentive, but also often more descriptive in their analysis, at least until of late.[2]

Scholars since Nathan (1973) have emphasized how the faction – intended as a patron-client cluster of mutually linked officials – represents the correct unit of analysis of elite politics in China. Despite the fact that the CCP officially rejects factional elite politics[3], evidence supporting this interpretation has steadily accumulated (Pye, 1981; Dittmer and Wu, 1995; Nathan and Gilley, 2003; Shih, 2004; Li, 2012; Li, 2013; Shih, 2016; Meyer et al. 2016). This paper follows this line of inquiry, but with special attention paid to individual incentives, supplying an economic model where powerful factions arise endogenously from a combination of talented individuals and cohesive social ties. This framework captures the political tradition in China, where the government landscape is shaped by the gradual progression of individual politicians, rather than by sweeping electoral shifts as in Western democracies.

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[1] The study of the political economy of China has several important exceptions, but often not precisely focused on national elite competition. Persico, Pueblita, and Silverman (2011) in their analysis of factional politics focus on the CCP, among their various case studies. Less relatedly, work such as Li and Zhou (2005) and Jia, Kudamatsu, and Seim (2015) focuses on the role of personal connections in promotion of provincial leaders. Work by Lau, Qian, and Roland (2000) models the process of reform under Deng Xiaoping and the reform era.

[2] Descriptive discussion most pertinent to this paper includes Li (2012, 2013). Several quantitative exceptions are discussed in Shih (2016) with respect to scholarship in East Asian studies and political science, while less recent examples include Huang (2000), Shih (2004, 2007); Shih, Adolph and Liu (2012).

[3] BBC, Monday January 5, 2015: "An editorial in Monday's flagship newspaper, The People's Daily, says cliques are akin to parasites and are 'harmful for both the country and the people.'" http://www.bbc.com/news/blogs-china-blog-30685782

This paper has three goals. First, to provide the reader with novel stylized facts aimed at disciplining our understanding of the internal dynamics of the CCP in the last forty years. Second, to develop a tractable economic framework able to match and interpret these facts in a structural econometric sense. Third, to use the model in a series of policy counterfactuals relevant to the dramatic transformation of China in the past as well as its direction in the future. To further validate this approach, we also provide out-of-sample fit evidence of the model's ability to fit recent changes in Chinese politics (e.g. with respect to the 2017 19th Party Congress). These changes are not irrelevant for economists, granted China's growing geopolitical role and its substantial economic weight in international trade and global production.

In our model, a hierarchy of party positions is populated by politicians with different abilities and affiliations with different social groups. In this sense, the party hierarchy incorporates both meritocratic elements and factional forces, as suggested for instance by Jia et al. (2015). Different groups are characterized by different degrees of cohesion, determining how much members of the same group care about each other. When a politician retires, candidates from the level immediately below in the CCP pyramid compete for promotion and politicians in other levels offer support to different candidates. In equilibrium, politicians from more cohesive groups behave in a more cooperative manner by exerting costly effort to support each other's promotion, which helps members to rise faster in the ranks. The ascendance of co-factional members to important positions, in turn, reinforces that faction's advantage, as more powerful cadres can exert greater influence in the promotion process. In this sense, cohesive social groups are more likely to develop into powerful political factions.

The positive feedback loop between the power of a faction and future promotions is dampened, however, by competition from politicians from other factions, who are wary of the dominance of one faction in each leadership node of the hierarchy. Specifically, once a politician is promoted to a leadership node, he or she will decide how much public goods to supply jointly with another politician who shares a comparable control of the position (as we will discuss, this diarchic structure is a pervasive feature of the Chinese state). Local monopoly by politicians from the same faction leads to an under-supply of public goods and a higher extraction of private benefits, which hurts economic performance. This economic mechanism has received deserved attention in the literature on corruption (see Shleifer and Vishny, 1993, Li, Roland, and Xie, 2018) and within our framework ties the individual career profiles of each politician to the interactions among the different factions. In fact, to avoid losses from local monopolies, politicians from other groups exert extra effort to prevent the dominance of one faction at each node in the government, inducing an endogenous form of checks and balances among groups. Factional checks and balances thus have aggregate economic consequences by affecting the prevalence of local collusion and the selection of capable politicians.

Using a large biographical database of political elites in the Central Committee and provincial governments, we document a set of new empirical regularities within the CCP which anchors our model. We start with four prominent factions and groups within the CCP in recent history, including CYLC (the Communist Youth League of China, related to General Secretary Hu Jintao), Shanghai Gang (affiliated most prominently with Jiang Zemin and bolstered by the special status of Shanghai in Chinese politics), Princelings (sons and daughters of prominent party officials and revolutionary veterans under Mao), and Military (politicians with a military background). A priori, we do not take a stance on which groups are true factions, which are not. Instead, we examine whether these groups display features that our theoretical notion of factions should possess, including the ability to deliver resources to their members and checks and balances with other factions. A formal test is then proposed based on the structurally estimated faction cohesion parameter.

We present several empirical findings. In the data, only CYLC and Shanghai Gang display the characteristics of true factions. We find that affiliation to these groups, on average, increases one's chance of promotion comparing to unaffiliated politicians. Furthermore, the benefit of being a faction member is time-varying: when a faction member reaches higher levels of the party hierarchy, other faction members enjoy additional premia in promotions. The existence of precisely estimated faction premia points in the direction of factions being both appropriately identified within our analysis and of operative relevance within the party.

Consistently with our model, we also find systematic patterns of factional balancing at different levels of the CCP hierarchy. One faction rarely controls both of the top two positions in a node in the hierarchy. For instance, in the provincial government the top two positions are Provincial Party Secretary and Provincial Governor. We find that if the Party Secretary is from one faction, the Governor is exceptionally unlikely to be from the same faction.

To uncover deep parameters that generate these promotion patterns and cross-faction matching in different levels of governments, we estimate our model structurally. Based on our model, whether a political group functions as a faction depends on its cohesion, which we can estimate with precision from the data. We find that, consistently with the informal narratives (e.g., Li (2002)) and our reduced-form estimates, CYLC and Shanghai Gang, exhibit substantial positive group cohesion. Importantly, we also reject at standard confidence levels the hypothesis that the Princeling group (to which both Xi Jinping and the disgraced former Governor Bo Xilai are said to belong) and the Military group act as unified factions in our sample period. In addition to providing a formal test of whether certain political groups raise to the level of cohesion of political factions, our structural estimates also reveal the distribution of power along the party hierarchy. We find that the supreme leader accounts for 16.5 percent of the influence in the selection process of the Central Committee members, while a Politburo Standing Committee member accounts

for 8 percent. Collectively, the eight highest-ranked leaders account for 72.5 percent of the total support and the rank and file accounts for the remaining 27.5 percent. The substantial influence of the supreme leader and Politburo Standing Committee members is consistent with the top-down selection process in China. Nevertheless, the supreme leader is far from having absolute control, suggesting that elite politics in China is consistent with a "collective leadership" system that emerged after Deng Xiaoping, at least for the period up to the 18th Party Congress in 2017. Our model is further validated via an assessment of out-of-sample performance when applied to Central Committee data of the Fall of 2017, in the aftermath of the 19th Party Congress of the CCP.

Finally, the paper presents several counterfactual simulations relevant to evaluating alternative politico-economic scenarios related to the dramatic transformations of the CCP in the past seventy years and the ongoing institutional change under President Xi Jinping. A vector autoregression analysis of the data since the founding of PRC shows that shocks to the internal organizations of the CCP significantly predict the subsequent economic performance of the regime. Our counterfactual analysis sheds light on the underlying parameters that brought about these changes. We simulate three possible institutional changes within the CCP: (i) the effects of heightened factional politics; (ii) the effect of an increase in the influence of the supreme leader; which has been posited to be occurring under the premiership of Xi Jinping, (iii) the effect of a reduction in the private benefits of supplying public goods by local politicians, which is a consequence of the corruption crackdown. A structural application like the one proposed in the paper allows for the quantitative evaluation of these scenarios. We assess it through three politico-economic measures: (a) Efficiency, measured through the implied economic performance resulting from the abilities of the politicians occupying each level of the pyramid and their incentives to provide public goods, (b) Malapportionment, measuring how the shares of political groups at the highest levels of the party hierarchy differ from overall shares within the CCP; (c) Instability, measuring how stable the shares of political groups at the highest levels of the party hierarchy are over time.

We find that heightened factional politics are not necessarily detrimental to the politico-economic performance of the regime, as the estimated strength of checks and balances among factions is sufficient to avoid the prevalence of a dominant faction and hence stifling promotion of low ability members of that group. Unambiguously, under our parameter estimates, greater influence of the supreme leader makes the regime less economically efficient because factional checks and balances are destroyed by winner-take-all competition. Finally, a reduction in the private benefits of supplying public goods paradoxically reduces economic efficiency, as politicians supply fewer public goods, a finding also supported by a recent analysis of the role of "special deals" (Bai et al. 2019). Scaled by Chinese GDP in 2019, the counterfactual effects we report

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are sizable and economically significant.

Given China's rise to world power status over the last thirty years, the current scarcity of formal and rigorous analyses of its internal political structure is perplexing and represents a large gap in our understanding of single-party nondemocracies governing billions of people. Our paper contributes to the politico-economic literature on Chinese elite politics and attempts to provide a robust framework to understand its central organization. Political observers and popular media often use attributes such as college, hometown, or family background to group similar politicians into CCP "factions". This leads to a plethora of putative "factions", such as Tsinghua Clique, Shaanxi Clique, and Princelings. An ongoing debate in the literature is which of these groups may be relevant political units in China and which not (Shih, Adolph, and Liu, 2012; Jia et al., 2015, Fisman et al., 2020).[4] While we also focus on systematic biographical information, we remain wary of potential mismeasurement in the identification of factional ties, as is likely for factional affiliation based purely on place of birth or shared career paths. An important reason for this wariness is evident in our statistical analysis. Based on a minimal set of factions that are well established in the extant discussion of Chinese elite politics, we find that politicians working in the same department or party branches are not necessarily from the same faction. Instead, if they have a similar ranking, they are actually more likely to belong to different factions. Simply sharing part of their career paths may not be informative of factional affiliation for CCP elite officials. Interestingly, this is also consistent with complementary evidence exploiting hometown ties of politicians in the Politburo (Fisman et al. 2020). In addition to documenting reduced-form regularities displayed by factions, we also provide a formal structure and tests of whether certain political groups raise to the level of cohesion of political factions. To the best of the authors' knowledge, this is the first of its kind in the literature.

This paper also speaks to the literature on the internal organization of elites in nondemocratic regimes. This is a vast area of research and Egorov and Sonin (2020), Newson and Trebbi (2018), and Gelbach et al. (2016) offer theoretical and empirical reviews. Among many, relevant instances include Li, Roland and Xie (2018) who offer a detailed analysis of the Chinese case complementary to ours, focusing specifically on rent-seeking behavior within the hierarchy, and Francois et al. (2015, 2016) addressing the internal organization of elites in African dictatorships.

Most related to our specific focus on factions is Persico et al. (2011), who present a theoretical model of endogenous factional growth in a hybrid democracy with competitive elections and link it qualitatively to evidence from factional local politics in Mexico within the Institutional Revolutionary Party.[5] In Persico et al. (2011), promotions of members from the same faction

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[4]Shih (2008, p.66) discusses issues of measurement with the premise that "*Despite the centrality of factions in Chinese politics, they are extremely difficult to observe in a systematic manner, especially in such an opaque political system.*"

[5]See also Belloni and Beller (1978). Persico et al. (2011) also point to the relevance of factional politics well

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are bounded together, depending on the outcome of local elections. In contrast, we allow each individual faction member to have his/her own career path and different faction groups to exhibit different degrees of cohesion. This generalization allows to accommodate a whole spectrum of informal ties, from loosely connected social groups to highly cohesive factions.

Dewan and Squintani (2015) model endogenous faction formation (an issue we address in our setting as well, when characterizing the decision of party members to join a faction). The authors develop a model where incentives for faction formation are ideological rather than economic (as in our setting and in Persico et al. 2011) and show how within their framework factions may serve welfare-enhancing purposes, limiting extremists within the party by tying them to moderate faction leaders. Factions are also shown to facilitate information sharing and party effectiveness in their model. In our model, powerful political factions also arise stochastically in the equilibrium, driven by a confluence of factors including the group cohesion, the pool of talents in the faction, and the presence of other powerful factions.

2 Institutional Background: the CCP

This section presents a brief institutional overview of the internal organization of the CCP in the reform era. It is in no way exhaustive, but only of assistance to the reader unfamiliar with Chinese politics in framing the analysis that follows.[6]

In 2019 the Chinese Communist Party, with its more than 90 million members, is one of the largest political parties worldwide and one of the most enduring (founded in 1921). The CCP organization is strongly hierarchical in nature and the party reflects one-to-one the organization of the Chinese state, as typical in the architecture of Leninist regimes.

The top of the CCP hierarchy is shared by the General Secretary of the CCP and the second ranked member of the CCP, which respectively assume the roles of President and Premier of the State Council of the PRC. Both leaders belong in turn to the Politburo Standing Committee (SC), formed by the other 5 members and which represents the set of the highest ranked politicians in China. The SC is an expression of the 25-member Politburo (PB), the executive body of the Central Committee of the Chinese Communist Party. The Central Committee (CC) is de jure the highest political body in the CCP and currently consists of 205 full members and a set of 171 Alternate Central Committee (AC) members in junior standing relative to the full

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beyond Mexico's camarillas or the CCP, with references to studies of factionalism within the Japanese legislature (Cox et al., 1999, 2000) and the Italian parliament (Zuckerman, 1975; Kato and Mershon, 2006; Ceron, 2015; and Laver and Giannetti 2004). Factions in Australian politics are discussed in McAllister (1991). The US urban party machine factional structure, such as in the case of Tammany Hall, are subject of an entire and even earlier literature. See Myers (1917).

[6]See also Chapter 1 in Nathan and Gilley (2003) for a less brief overview. For a comprehensive discussion of elite politics in China see references in Shih (2016).

members (and without voting rights). All members of the CC and AC are ranked hierarchically. The CC and AC are elected during National Congresses of the CCP and the interim plenary sessions fill retirements or deaths, granting promotions (and occasionally administers demotions). Typically, CC members include ministerial-level officials and provincial ranking officials, including Provincial Party Secretaries (the highest CCP post in a Province) and Governors (the second ranked). It is important to notice that Provinces tend to display a political architecture that mimics the national government and the national party structure. Provincial leaders operate in the context of local party committees and local party congresses are held typically every five years. The CCP maintains a pyramidal structure, branching all the way down to the village level and the Village Party Branch Secretary.

While not all layers of the Chinese political hierarchy present nodes mapping into a diarchic structure, most do, typically separating party roles and administrative roles. Examples of diarchic arrangements include the presidency and premiership as the two highest ranking members of the Politburo Standing Committee; the PRC Presidency (President and Vice President); the State Council (Premier and Executive Vice Premier); and the top dyads at the provincial level (Provincial Party Secretary and Governor).[7] We will occasionally refer to such pairs of positions as position 1 and 2.

The opportunity of entering the ranks of the CCP is closely guarded and party membership typically guarantees access and career opportunities beyond those available to common citizens.[8] For this reason, an elaborate recruitment process typically operates through the selection of successful university students and through family and work connections. Evidence that social ties to powerful leaders matter for an individual's political career has been steadily accumulated in the literature. However, to what extent these ties glue a group of politicians into a cohesive political faction is less clear. Here we consider a few putative "factions" based on the existing literature and the account of political observers. A priori, we do not take a stance on which groups are true factions, which are not. Instead, we will let the data to speak for themselves.

Membership of the Communist Youth League of China (CYLC), an ancillary organization to the CCP responsible for the youth (members are typically between 4 and 28 years of age), has traditionally operated as an entry point in the CCP. As discussed in Li (2012, 2013), individuals with a background in the CYLC are often referred to as members of the *Tuanpai* (i.e. Youth League [faction]) and tend to originate, although by no means exclusively, from the less prosper-

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[7]See Li (2014) for a discussion and examples. Other instances include the CMC (chairman and executive vice chairman), the CCP Secretariat, the NPC and CPPCC (chairman and executive vice chairman), the Supreme People's Court. Assuming the presence of such dyads across the whole hierarchy should be simply read as allowing for the presence of a close substitute in the party hierarchy for any member.

[8]The Organization Department of the CCP Central Committee on June 30th, 2016 in an official release indicated that 22 million Chinese residents had applied in 2015 and less than 4.5 percent of the applications were accepted. http://news.xinhuanet.com/english/2016-06/30/c_135478976.htm

ous regions.[9] Li (2012) associates with the CYLC "populist" policies close to the rural poor and recent migrants to cities, as opposed to the policies preferred by more "elitist" groups comprised by CCP cadres close to former General Secretary Jiang Zemin and a group of party officials connected to the Shanghai municipal administration. Indeed, the economic and political role of Shanghai cannot be emphasized enough in CCP internal interactions, to the point that the term *Shanghai Bang* (Gang) has often been employed to identify the patronage cluster close to Jiang and to the economic interests of the coastal provinces (Li, 2002). Some observers also point at the anomaly of the exceptionally rapid careers of sons and daughters of prominent party officials and revolutionary veterans under Mao, often referred to as "Princelings". Finally, politicians with a military background also have a large presence in the Central Committee, at least historically. The above four groups are by no means exhaustive. In principle, we can consider more groups defined by shared social background, such as Tsinghua Clique, Shaanxi Clique, and so on. Nevertheless, we would like to examine the empirical regularities of factional politics based on these four prominent groups in the recent history: CYCL, Shanghai Gang, Princelings, and the Military. Then, we will build a structural model where powerful factions emerge stochastically over time.

3 Data

Our first source is a biographical database of Central Committee members developed by Shih, Shan, and Liu (2008), and further updated by Lu and Ma (2015). This database contains all the Central Committee members from the first Party Congress in 1921 to the eighteenth Party Congress in 2012, covering a total number of 1,968 politicians. We complement this data using China Vitae, an online biographical database that provides more than 5,000 biographies of Chinese political elites since the 1950s. As Chinese politics has probably experienced a structural transition from strongman rule to factional politics around the time of the symbolic death of Mao and the downfall of the Gang of Four in 1976. For example, Nathan (2016) observed that: "*Deng built a system of tacit norms by which senior leaders were limited to two terms in office, members of the Politburo Standing Committee divided leadership roles among themselves, and the senior leader made decisions in consultation with other leaders and retired elders.*" We focus our empirical analysis on the post-Mao era (11th to 18th Central Committees).

Following the literature on Chinese politics (Bo, 2008; Li, 2013a; Li, 2013b), we construct four affiliation indicators for the full sample of politicians: CYLC, Shanghai Gang, but also Military and Princeling status. A politician is classified as from the CYLC if he/she has held provincial and

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[9]Prominent members include current Premier Li Keqiang and former General Secretary and President of the PRC Hu Jintao.

national level positions in CYLC. A politician is classified as from the Shanghai Gang if he/she has held official positions in the Shanghai municipal party apparatus, municipal government, municipal People's Congress, and municipal People's Political Consultative Conference. This again underlies the exceptionality of the Shanghai political machine. A politician is classified as from the Military if he/she served as military personnel in the Revolutionary Era (1921-1949), or has participated in the volunteer armies to Korea or Vietnam, or served as military personnel for more than half of its career after the founding of People's Republic of China. The restriction on the minimum time of military experience is to rule out civilian officials who work as the party secretary of a military region for a short period of time (e.g. Hu Jintao as the First Secretary of Guizhou Military District from 1985 to 1988), or civilian officials who chair the Central Military Commission (e.g. Jiang Zemin as the chairman of the Central Military Commission from 1990 to 2005). A politician is classified as a Princeling if he/she is from a prominent political family, the so-called "red aristocracy" (prominent examples include General Secretary Xi Jinping and disgraced former Governor of Liaoning Bo Xilai). These affiliations are not mutually exclusive (for example, Xi Jinping is both a Princeling and an affiliated of the Shanghai Gang according to our definition).

Table 1 provides the demographics and the factional affiliation of our sample by the level of the Central Committees. Some factions appear to occupy a disproportional share of seats in the highest levels of the party hierarchy. For instance, the fraction of politicians who have a CYCL background increases from 4 percent in the AC to 29 percent in the top-two leadership positions. Similarly, the fraction of politicians are affiliated with Shanghai Gang increases from 3 percent in the AC to 25 percent in the top-two leadership positions. In contrast, politicians who have a Military background appear to distribute more uniformly across the party hierarchy. In terms of demographics, the CC members are predominantly male, in their mid-50s and mostly Han. Over the past 60 years, more members hold college or even post-graduate degrees. However, only 10 percent of them studied or worked abroad. More than 10 percent of them have worked as personal secretaries (*Mishu*) of prominent politicians, illustrating the importance of personal ties in Chinese politics.

4 CCP Factional Politics: Reduced Form Results

This section presents a set of facts on factional politics in China. These stylized facts are going to inform and motivate the theoretical and structural analysis that follows.

4.1 Faction-specific premia

A crucial feature of any theoretical model of factional politics is the ability of factions to deliver resources to their members. This seems a necessary condition that any factional definition should satisfy, a conceptual underpinning that we must be able to verify in the CCP data in order to justify our approach.

We do this in what is possibly the starkest way: estimating premia in factional seat assignment and promotion rates of cofactionals of the country leader (i.e. the PRC President and General Secretary of the CCP). Again, we are not aware of any systematic analysis of this type for the CYLC, Shanghai Gang, and the other groups that we consider. The regression model is the following:

$$\text{Promotion}_{i,t} = \sum_f \beta_f \text{Faction}_{i,f} + \gamma X_{i,t} + \epsilon_{i,t},$$

where $\text{Promotion}_{i,t}$ is a dummy variable which equals 1 if a politician i is promoted from Congress t to $t+1$, and 0 otherwise; $\text{Faction}_{i,f}$ is a dummy variable which equals 1 if i is affiliated with faction f, and 0 otherwise; $X_{i,t}$ is a set of control variables including demographics, time fixed effects, and hierarchy level fixed effects. The sample includes all members of the 11th to the 18th Central Committees (Politburo Standing Committee members are excluded from the promotion regression). Promotion equals 1 if a Central Committee member moves up in the rank defined by the four levels of Central Committee (1 SC, 2 PB, 3 CC, and 4 AC). β_f is defined as "factional premium".

Table 2 shows the regression results. As is clear from these reduced-form regressions, a CYLC (respectively, a Shanghai Gang) politician has substantially a higher likelihood of promotions. On average CYLC and Shanghai Gang members exhibit promotion premia of 10 percent relative to the unclassified politicians. In contrast, the more controversial groups, Princelings and Military, exhibit no clear premia in promotions. Columns 2 and 3 separate the samples into AC and CC. We find that factional premia are higher at higher levels of the hierarchy.

One may worry that factional premia may be generated by higher average ability of faction members, rather than by support from the faction. To address this selection concern, we consider the heterogeneity of the factional premia over time by interacting a politician's affiliation with the party general secretary's factional affiliation and share of seats in the Politburo Standing Committee (SC). The regression model becomes the following:

$$\text{Promotion}_{i,t} = \sum_f (\beta_{0f} + \beta_{1f}\text{Leader Faction}_{t,f} + \beta_{2f}\text{SC Share}_{t,f}) \times \text{Faction}_{i,f} + \gamma X_{i,t} + \epsilon_{i,t} \quad (1)$$

where now $\text{Leader Faction}_{t,f}$ is a dummy variable which equals 1 if the supreme leader in Congress t is affiliated with faction f, and 0 otherwise; $\text{PBSC Share}_{t,f}$ is the share of Politburo Standing

Committee seats occupied by faction f in Congress t; $X_{i,t}$ is again a set of control variables for politician i including demographics, time fixed effects, and level fixed effects.

Table 3 presents the results. First, the table shows that having a cofactional leader adds 28.6 percentage points to the CYLC premium and 10.8 to the Shanghai Gang premium, thus inducing a substantial, highly significant, leadership premium to the rate at which members of a faction are promoted relative to periods when other factions are in power. Figure 1 provides a visualization of the leadership premia in promotion rates. These estimates are not trivial, yet quite far from winner-take-all levels.

Second, we find that having a 10 percentage points increase in the share of seats in the SC adds 5.2 percentage points to the CYLC premium and 6.3 percentage points to the Shanghai Gang premium. The estimates for Princelings and the Military are mixed, with insignificant or sometimes opposite signs. To a first approximation, the precise time-series co-variation of factional premia with leadership identity appears difficult to reconcile with an alternative view of faction members simply happening to have (on average) higher innate ability and support our assumption of CYLC and Shanghai Gang as a plausible candidate for the study of factions.

4.2   Factional balancing

Useful to the understanding of factional dynamics within the CCP is the study of the peculiar factional balancing pattern which one observes by sampling the diarchic nodes pervading the Chinese institutional pyramid. These are pairs of positions of similar rank and operating in close institutional proximity to each other.

Table 4 shows the raw frequency of the factional composition of virtually all top-two leadership posts from 1992 to 2014 including the Politburo Standing Committee (two highest-ranking members), PRC presidency (President and Vice President), the State Council (Premier and Executive Vice Premier), Central Military Committee (Chairman and Executive Vice Chairman), CCP Secretariat (two highest-ranking secretaries), NPC (Chairman and Executive Vice Chairman), CPPCC (Chairman and Executive Vice Chairman), the Supreme People's Court (President and Executive Vice President), and 31 provincial and municipal units (Secretary and Governor).[10].

Each observation is a pair of positions in a node. We tabulate all the possible faction combinations in a 5×5 matrix, and the first panel reports the empirical frequency in the data. The columns and rows indicate the faction of the No.1 and No.2 politicians in each leadership node. For instance, the first element of Table 4 indicates that a CYLC-CYLC pair accounts for 2.20 percent of the positions in our sample. In the second panel, we produce the counterfactual

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[10]Shanghai Municipality is excluded in the regression sample of Shanghai Gang.

frequency under random matching using the marginal distribution of each faction. Specifically, the first element indicates that a CYLC-CYLC pair should accounts for 4.12 percent of the observations if we were to match No.1 politicians and No.2 politicians randomly. The third panel presents the ratio between the empirical frequency and the counterfactual frequency under random assignment. We find a striking pattern: same-faction pairs appear to be much rarer in the data compared to the randomly assigned benchmark. In contrast, there is excess probability for cross-faction mixing pairs. A simple chi-square test sharply rejects a lack of association in the pairs.

Table 5 reports formal statistical tests. We ask: given the factional affiliation of a politician sitting in one of the top two leadership positions of a national or provincial organ, what is the likelihood that the other position will be held by a cofactional member? It turns out it is extremely low. The regression model is the following:

$$\text{Faction1}_{k,t} = \alpha_f + \beta_f \text{Faction2}_{k,t} + \epsilon_{k,t} \tag{2}$$

where the dependent variable $\text{Faction1}_{k,t}$ (and respectively, $\text{Faction2}_{k,t}$) is a dummy variable which equals 1 if the No.1 official (respectively, No.2) of node k from that faction and 0 otherwise. β_f/α_f is defined as the "same-faction discount".

We conduct the same regression for each faction or group separately. We find that a CYLC member in No.2 predicts a significantly lower probability of a CYCL member in No.1. The economic magnitude is also significant. The presence of a CYLC in No.2 reduces the probability of a CYLC in No.1 by 10-20 percent. We find similar significant results for the Shanghai Gang with similar economic magnitude. Interestingly, the evidence for Princelings and the Military is much weaker, in line with further evidence below showing their lack of behavior as organized factions within the Party. To the best of our knowledge, these facts on systematic cross-matching within Chinese elite politics are new.

An ancillary implication of this evidence is that methodologies imputing factional affiliation based solely on shared professional paths may be problematic, as discussed in the Introduction. Most individuals sharing a leadership node do not belong to the same faction, and are systematically more likely to belong to different ones.[11]

5   Model

The set of regularities presented in Section 4 paints an impressionistic picture of the top levels of the Chinese political system and it documents a series of outcomes. Although there are

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[11]In Internet Appendix, we show that a remarkable factional balance seems to be present in the administration of punishment in President Xi Jinping's anti-corruption campaign.

regularities in these outcomes, they are not themselves the true drivers of the system or of change in it. More fundamental causes are their determinants. This section takes an explicit stance on what these deep determinants might be, by positing them in a formal model. In the next section we shall estimate the deep parameters of that model. Our aim is to get at the deep drivers of the regularities that we observe through the system; a particularly important feature at the current politico-economic juncture in China.

5.1   The hierarchy of positions

There is an L-level hierarchy of leadership positions, ordered from the bottom, 1, to the highest level L, Each level, ℓ, of the hierarchy has an $M_\ell/2$ leadership nodes. Each leadership node has a pair of leadership positions. The hierarchy is broken up into regions, each of which nests a higher number of smaller regions below it. Level L, the top level, has one node and hence two positions; $M_L = 2$. It is the paramount leadership node for the country as a whole (currently, President Xi Jinping and Premier Li Keqiang). Level $L - 1$, the second layer in the hierarchy, has $M_{L-1} > M_L$ positions divided up into $M_{L-1}/2$ nodes, and so on, with the number of positions strictly increasing down to level 1. The nodes at the lowest level are "entry" positions, corresponding to the first step in a political life that we model.

5.2   Social groups and political factions

Individuals are born into different social groups indexed by f at the entry level. An informal social contract enforces a quid-pro-quo relationship among members of that social group. To represent this, we assume that an individual cares about their own group members' welfare when making decisions. The "strength" of a social contract is represented by a single parameter capturing the intensity of this concern. Let $\theta_f \in [0,1]$ denote how much a member of group f cares about other group members' utilities, so that a higher θ implies a more cohesive group. If $\theta = 0$, f is equivalent to a loose social group, whose members share the same social background, but do not weigh each other's interest. If $\theta = 1$, f is a perfectly cohesive group, whose members act in full cooperation with other members.

Define $\Theta_{F \times F}$ as a diagonal matrix where the f's element in the diagonal is the cohesion of group f, and F is the total number of social groups. Define $D_{N \times F}$ as the affiliation matrix of politicians where $d_{i,f} = 1$ if individual i belongs to social group, f, and 0 otherwise. Then we can derive the cohesion matrix $C_{N \times N} = D'\Theta D$, where $c_{i,j}$ measures how much individual i and j care about each other through the affiliation to various social groups. If social groups are mutually exclusive, then $c_{i,j} = \theta_f$ if individuals i and j belong to the same social group f, and $c_{i,j} = 0$ if individuals i and j belong to different social groups.

Political factions are clusters of individuals in the high levels of the party hierarchy who belong to the same cohesive social group. A cluster of politicians who belong to a loosely connected social groups is not a faction because they do not behave in a cohesive manner. Cohesive social groups that are not present in high levels of the party hierarchy are not political factions either because of a lack of political power.

5.3   Economic performance

Each position of the hierarchy is occupied by a politician i, who is characterized by innate ability, a_i, an affiliation vector, d_i, and tenure in the current office, τ_i. While politicians are in office, they supply public goods, from which they are able to extract personal benefits (Shleifer and Vishny, 1993). Specifically, the local government, represented by the two leaders, i and $-i$, at the node, are joint monopolists of public good provision. Define $v(q)$ as the private benefit that a leader can extract per unit of public good supplied, $q = q_i + q_{-i}$ are the total public goods produced by politician i and $-i$. The per unit private benefit of supplying public goods is declining in the total quantity supplied, $v' < 0, v'' = 0$. Notice that the private benefit v is a function of the level of the position such that positions at higher levels are assumed to generate larger private benefits. The provision of local public goods depends on the factional composition of the local government. Local politicians who do not belong to the same faction act as Cournot competitors. In contrast, since co-factional members care about each other's utility to a degree c, local politicians who belong to the same faction will take partial account of the decline in a cofactional's marginal benefit when they raise public good. That is, once in office, i will maximize:

$$\max_{q_i} v(q)q_i + c_{i,-i}v(q)q_{-i}. \tag{3}$$

In short, their mutual concern allows cofactional politicians to collude in raising their own respective welfare by reducing public good provision, and hence local economic performance. The greater their care for cofactionals, the closer they come to acting as a joint monopolist at their node. A monopoly is achieved at $c_{i,-i} = 1$.

Local economic performance, e, is assumed to be increasing in the total amount of public goods provided and the politician's innate ability, a_i, which is a constant, exogenous characteristic of i known to every other politician. We posit the following linear additive relationship in determining economic performance, which can be derived by taking the log of a Cobb-Douglas production function: $e_{i,-i} \equiv q_i + q_{-i} + \alpha (a_i + a_{-i})$, where α is the weight of ability in the provision of public goods.

5.4 Promotions and support decisions

Politicians face a term limit. If a politician is not promoted to the next level within the term limit, then he or she has to retire. A term is defined by a National Congress (i.e. five years). We assume that the term limit at each post is two, which is consistent with the fact that 94.5 percent of the Central Committee members stay at the same level for no more than two Congresses.[12]

Upon a politician's retirement, his or her position opens up for replacement. A politician's position also opens up when promoted to a position above, freeing the current spot. This triggers a chain of promotions all the way down to an entry-level position filled with a politician who just starts his/her political life in the party pyramid. At the entry level, $\ell = 1$, young politicians are born into one social group determined by an exogenous discrete distribution, Φ, that reflects the share of politicians in each social group in the population. We assume that a politician can only be promoted once during each National Congress (i.e. every five years), which is consistent with the fact that most of the promotions involve a one-step change in the level.[13]

When an opening arises at level ℓ, the set of eligible candidates, $\mathcal{A}$, is drawn from level $\ell-1$. Politicians decide how much support to lend to each of the candidates contesting the position. Following much of the discussion on CCP internal organization, preferences of politicians over whom to promote are driven by both factional interests and local economic performance.[14]

In terms of factional interests, politicians internalize the utility gain arising to a co-factional when he/she receives a promotion. Assume, for simplicity, that ascending one step up the promotion ladder gives rise to a utility gain of $\Delta > 0$. Hence, if a cofactional is promoted, a politician gets an additional benefit $\Delta\theta$.

Notice that the utility gain Δ can be a function of the level of the position. Promotions to higher levels generate larger utility gains. In terms of local economic performance, party members care about the expected economic performance of the specific locality where a candidate i would be promoted, $e_{i,-i}$, when paired with politician $-i$.

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[12]See Internet Appendix Table 1.

[13]See Internet Appendix Table 1.

[14]There is some debate in the literature over the importance of local performance, its interaction with connections, and the relative importance of positions in the dyad. Li and Zhou (2005) find that, for provincial leaders, promotion largely depends on their ability to boost economic growth. In a review of the early literature, Brandt et al. (2014) confirm a tournament-like competition among county and provincial leaders focused on growing local economies. Shih et al. (2012) in contrast contend that political connections far outweighed economic performance in importance. Such findings are somewhat squared by Jia et al. (2015), who find that meritocracy exists only among connected leaders. Lorentzen and Lu (2018) emphasize the importance of hierarchy level in affecting the tournament. They interpret the evidence as mixed on the effect of merit (i.e. local GDP growth) for officials at or above the provincial level, but supportive of meritocracy at lower levels. Consistent with this, Landry et al. (2018) report a positive correlation at county levels, but not at the prefecture. Within leadership dyads, Chen and Kung (2019) find strong effects of GDP growth for promotion of governors, but not for party secretaries. Sheng (2020) finds evidence for meritocratic promotion of provincial governors only during Jiang Zemin's era (1990-2002).

We assume the cost of providing support by politician j to candidate i is quadratic and the marginal benefit of providing support is proportional to the sum of economic performance and extra utility gain. The support given by politician j to candidate i is determined by solving the following:

$$\max_{s_{i,-i,j}} (e_{i,-i} + \Delta c_{i,j}) s_{i,-i,j} - \sum_{i=1}^{I} \frac{1}{2} s_{i,-i,j}^2.$$

We have that:

Lemma 1: *The optimal amount of support given by politician j to candidate i contesting a position next to $-i$ is increasing to the cohesion between j and i, but is decreasing to the cohesion between i and $-i$.*

Proof: See Internet Appendix II.

This lemma implies that, holding ability a_i constant, members lend greater support to a cofactional candidate i than candidates from other factions because they directly gain from their cofactional's promotion: So, a candidate with more cofactionals (and especially at higher levels) will, *ceteris paribus*, receive more overall support in promotions due to this direct effect.

In addition, the intensity of factional support depends on the co-node politician at the opening, because of the indirect effect on economic performance e. If the other position is controlled by a rival faction to i's group ($c_{i,-i} = 0$), politician j will support i more strongly than in the case where the other position is controlled by the same faction as i's ($c_{i,-i} > 0$):

This result implies that, if a faction already controls a position in a leadership node, then candidates from this faction will face additional opposition in contesting the other position, because politicians across the board will be wary of the detrimental effect that colluding local politicians will have on economic performance. This emerges from the need to mitigate the local monopoly power and a shared interest in keeping public good provision at high levels across all factions.

A relevant implication of this result is that a more cohesive faction (i.e. with higher θ) will face stronger opposition from rivals when it wants to take complete control of a leadership pair. This derives from rival factions knowing that members from a more cohesive faction will collude more, will restrict public goods provision more, and will lower economic performance more. Then, it follows that, although a cohesive faction can help their own candidates get promoted, through a larger direct benefit of having a member moving to a higher node, it is actually more difficult for such a faction to take complete control of any leadership node because other factions will support alternative candidates more strongly. This implicit system of checks and balances, emerging from the endogenous support decisions of individual politicians, makes it difficult for a single faction to obtain complete control of the party hierarchy. In contrast, a completely incohesive faction (with $\theta = 0$) will not be resisted by any rival faction, because whoever this candidate's cofactional is,

no collusion arises and only the candidate's ability will determine his/her promotion.

Factional balancing, the idea that factions balance each other at the various positions in the hierarchy, preventing competitors from gaining control is endogenously determined here, and our model offers an intuitive microfoundation for it. In Chinese elite politics, Li (2002) and Dittmer (1995) discuss the presence of factional balancing forces, without offering a formalization, but discussing supporting anecdotal evidence. Balancing is also present in other nondemocratic systems, for example, among ethnic groups in African governments (Francois et al., 2015), between reformers and conservatives in Iran (Mehdi, 2002) and North Korea (Newson and Trebbi, 2018).

We allow both top-down support from senior members and bottom-up support from junior members, which reflects the formal promotion procedure of CCP.[15] The total support to politician i contesting the position paired with $-i$ is given by: $s_{i,-i} = \sum_j w_j s_{i,-i,j}$, where the role of weights w_j is to allow for the per-unit effect of the support of a more senior party member to be higher than that of a more junior member (hence one should think of w_j as growing with ℓ). We normalize weights to satisfy $\sum_j w_j = 1$ and we allow candidate i to garner support across all members within the party. Define $\mathcal{A}$ as the set of the candidates, the probability of a candidate i winning a promotion to the position paired with $-i$ is given by:

$$p_{i,-i} = \frac{\exp(s_{i,-i})}{\sum_{h \in \mathcal{A}} \exp(s_{h,-i})}. \tag{4}$$

5.5 Equilibrium

The model features a stochastic Markov perfect equilibrium with the current distribution of factions and abilities in the party hierarchy as the state variable. Given the current state, politicians optimally decide their support to candidates in promotions based on the candidate's ability faction affiliation, their own faction affiliations, and the contested positions. The state variable then evolves as promotion outcomes are realized. The candidates, once being promoted, optimally decide the supply of public goods in their local jurisdiction.

Although social groups exist exogenously in the population, powerful political factions emerge endogenously at the higher echelons of the party hierarchy by a combination of talented individuals and cohesive social ties. For instance, if a charismatic politician is born into a cohesive social group, then this politician can move up the ladder quickly because of the combination of ability and support by the social group. Once occupying a high office, this politician can in turn help other members in this group to ascend. With enough politicians occupying important offices, a powerful political faction then emerges.

A faction does not last forever. If powerful faction members retire without being replaced by new members of the same caliber, the faction will gradually lose power. The fluctuation of

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[15]See Appendix I for an overview of the formal promotion procedure of CCP.

faction power also depends on the distribution of support weights along the party hierarchy. If the support weight is evenly distributed among politicians in the hierarchy, then the randomness of a particular promotion is largely averaged out. In contrast, if all the decision power is concentrated in the supreme leader, then the fluctuation of faction power may become more unpredictable as the contest for the supreme leader can affect all the other contests.

It is worth noting that we treat the cohesion of social groups as constant over time in the baseline model. Time-varying cohesions can introduce another source of fluctuations in faction power that are orthogonal to those introduced by the stochastic promotion process.

5.6   Efficiency, malapportionment, and instability

Given equilibrium promotion probabilities, the dynamics of the party hierarchy can be fully specified. In the following, we introduce three measures to evaluate the dynamics of the regime.

The first measure is economic efficiency, which is defined as aggregate economic output generated by each position in the hierarchy. Economic efficiency depends on the abilities of the politicians occupying each level of the pyramid and their incentives to provide public goods. These conditions change over time, so we indicate local output for politician i given conditions at t as $e_{i,t}$. We weight the local output by the economic importance of the position, V_ℓ, which is assumed to be proportional to the private benefit of this position. We divide the local output by 2 because the local output $e_{i,t}$ is jointly produced by a pair of local leaders. The total output at time t is therefore:

$$\text{Efficiency}_t = \frac{1}{2} \sum_i e_{i,t} V_\ell \tag{5}$$

The second measure is malapportionment, which is defined as the sum of absolute differences between the faction shares in the Congress and the faction shares in the population then divided by 2:

$$\text{Malapportionment}_t = \frac{1}{2} \sum_f |n_{f,t} - \phi_f| \tag{6}$$

where $n_{f,t}$ is the share of faction f in Congress t and $\phi_{f,t}$ is the share of faction f in the population. This definition follows the Loosemore-Hanby index used in the political science literature on proportionality of political systems (Loosemore and Hanby, 1971). Malapportionment measures how the shares of political groups at the highest levels of the party hierarchy differ from overall shares within the CCP. When the malapportionment is 0, the faction composition in the higher level of the party hierarchy mirrors the composition in the population. The maximum possible value of malapportionment is 1, which would occur when one faction gets all the seats but the share of this faction in the population goes to zero.

The third measure is instability, which is defined as the sum of absolute differences between

faction shares in Congress $t + 1$ and t then divided by 2:

$$\text{Instability}_t = \frac{1}{2} \sum_f |n_{f,t+1} - n_{f,t}| \tag{7}$$

where $n_{f,t}$ is the share of faction f in Congress t. Instability measures how stable the shares of political groups at the highest levels of the party hierarchy are over time. When instability is 0, there is no change in the faction composition between t and $t + 1$. The maximum possible value of instability is 1 which would occur if all the seats of the Congress shift from one faction to a different faction in two consecutive Congresses.

6   Estimation

This section describes our estimation methodology. We first parameterize the model. Then, we describe a simulated method of moments (SMM) estimator. Finally, we describe the data moments that we use to estimate the model.

6.1   Parameterization

The equilibrium dynamics of the model are determined by the support that each politician receives. We parameterize the model in the following way. We assume the private benefit per unit of public good is a linear function of the level of the position and the total public good supplied, $v = \nu_0 + \nu_1 \ell - q$. We assume promotion utility gains to be linear functions of the level of the position, $\Delta = \delta_0 + \delta_1 \ell$. We assume that support from the supreme leader and Politburo Standing Committee members provide additive weight in promotion contests, $w_j = \omega_0 + \omega_1 1_{j,[\text{PBSC}]} + \omega_2 1_{j,[\text{Leader}]}.$[16] Note that the intercept of the support weights, ω_0, is determined by the following equation, $\omega_0 N_0 + \omega_1 N_1 + \omega_2 = 1$, where N_0 is the total number of politicians in the Central Committee and N_1 is the number of politicians in the Politburo Standing Committee excluding the supreme leader.

In our baseline estimation, we use four groups: CYLC, Shanghai, Princelings, and Military. We normalize the faction cohesion of the unclassified politicians to 0. This framework can include more groups.

To operationalize the model, we draw ability a_i from a standard normal distribution. We normalize the weight on ability, α, to 1 because the promotion probability only depends on the ratio of Δ and v over α.

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[16]In principle, we can allow the support weights to be any arbitrage function of the levels and positions. However, we do not have enough power from the data to identify the level-specific support weights. Therefore, we assume a linear function for all the other levels and give an additional weight on the supreme leader.

The entry probabilities of these groups (defining the empirical distribution Φ) are calibrated to match the share of these groups in the whole party hierarchy, which are CYLC 4.5 percent, Shanghai 3.5 percent, Princelings 3.5 percent, Military 23.9 percent in our sample period.

Given the parameterization, we can derive the following expression of support received by politician i contesting a position next to $-i$:[17]

$$s_{i,-i} = \sum_j \left(\omega_0 + \omega_1 1_{j,[\text{PBSC}]} + \omega_2 1_{j,[\text{Leader}]} \right) c_{i,j} \left(\delta_0 + \delta_1 \ell \right) + \frac{2 \left(\nu_0 + \nu_1 \ell \right)}{c_{i,-i} + 3} + \left(a_i + a_{-i} \right).$$

There are ten parameters to be estimated, including four faction cohesion parameters $(\theta_1, \theta_2, \theta_3, \theta_4,$ for CYLC, Shanghai, Princelings, Military), two support weight parameters (ω_1, ω_2), two private benefit parameters (ν_0, ν_1) for v_ℓ, and two utility gain parameters, (δ_0, δ_1) for Δ_ℓ.

6.2 Estimator

We use x to define the composition of party hierarchy, which is the state variable in our model. When an opening occurs, we can calculate the promotion probability of each candidate given the model parameters and the faction affiliations of the candidates. After a chain of promotion, the state variable transits from x to x'.

We start with an arbitrary initial composition of the party hierarchy. For a given set of parameters, Θ, we simulate T Congresses histories for S times. The paths of the state variable are defined as $\tilde{X}_s = \{\tilde{x}_t\}_{t=1,\ldots,T}$. We calculate the moments in the simulated data for each simulation, $m\left(\tilde{X}_s|\Theta\right)$, and take the average of the moments across simulations, $\hat{m}\left(\tilde{X}|\Theta\right) = \frac{1}{S}\sum_s m\left(\tilde{X}_s|\Theta\right)$.

Our Simulated Method of Moments (SMM) estimator chooses a set of parameters, Θ, to minimize the distance between the model simulated moments, $\hat{m}\left(\tilde{X}|\Theta\right)$, and the empirical moments, $m(X)$.

$$\hat{\Theta} = \arg\min_{\Theta} ||\hat{m}\left(\tilde{X}|\Theta\right) - m(X)||_W,$$

where W is the weighting matrix employed in the weighted distance $||.||_W$.[18]

6.3 Moments

Table 6 lists the empirical moments targeted by the estimator.

The first set of moments relates to factional premia, which are estimated in Table 2 and 3. Specifically, "Faction premia: CC/AC ratios" are defined as the ratio between promotion prob-

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[17]The derivation is in Appendix II.

[18]The details of the simulation procedure can be found in Appendix III.

ability for a faction member in CC and a faction member in AC, normalized by the equivalent ratio for the unclassified politicians, $\frac{p_f(\ell=4)}{p_f(\ell=5)} \left(\frac{p_0(\ell=4)}{p_0(\ell=5)} \right)^{-1}$. The corresponding promotion probabilities are estimated in Table 2. "Faction premia: leader" are defined in equation (1) as the coefficients of the interaction between the faction of the candidate and the faction of the supreme leader, β_{f1}. "Faction premia: SC share" are defined in equation (1) as the coefficients of the interaction between the faction of the candidate and the share of seats in the Politburo Standing Committee, β_{f2}. "Faction premia: intercept" are defined in equation (1) as the coefficients of the faction of the candidate, β_{f0}.

The second set of moments relates to the same-faction pair discounts, which are constructed as the ratio between the predicted probability of the No.1 politician being a member of faction f conditional on the No.2 politician being from the same faction over the predicted probability of the No.1 politician being a member of faction f conditional on the No.2 politician being from a different faction, $\frac{\Pr(\text{Faction1}=f|\text{Faction2}=f)}{\Pr(\text{Faction1}\neq f|\text{Faction2}=f)}$. The corresponding probabilities are estimated using the estimates in Table 5.

The last empirical moment is the R-squared's explained by faction or ability related characteristics, which are estimated in Table 3.

7 SMM Results

This section presents the estimates of the model and in-sample model fit assessments. Notice that our model is stochastic because of the random realizations of the abilities of new politicians born into each group and the promotion contests. For each set of parameters, Θ, we simulate $S = 100$ simulations. Each simulation consists of a path of $T = 20$ National Congresses. Our estimation identifies the set of parameters, Θ, which minimizes the distance between the model moments, $\hat{m}\left(\tilde{X}|\Theta \right)$, and the moments in the data, $m(X)$.

7.1 Parameter estimates

Table 7 presents the estimated parameters. The estimate reveals that the cohesions of CYLC and Shanghai Gang are significantly larger than 0. We estimate $\theta_1 = 0.82$ for CYCL and $\theta_2 = 0.85$ for the Shanghai Gang, which both imply that cofactional members have a strong incentive to support their own candidates. These results confirm the scholarly observation that the CYLC and Shanghai Gang appear to be cohesive factions (Bo, 2008). Notice, however, that even for the CYLC and Shanghai Gang, the cohesion parameters are still below 1: although faction members care about each other, they also do not coordinate perfectly.

The cohesion parameter for Princelings, θ_3, is different. There is a heated debate among

scholars in elite China politics on whether the descendants of veteran party leaders of the CCP operate as a unified faction. Some argue that the number of Princelings has been rising steadily within the top ranks of the party, because many share the same family background and act in tandem. In contrast, others argue that Princelings may be simply endowed with a large network of connections to political power brokers, and they do not necessarily need to bond with each other to be promoted. One anecdotal observation supporting the latter hypothesis comes from the downfall of a prominent Princeling, Bo Xilai, exactly at the time when Xi Jinping, of equal rank as Bo at the time, ascended to the paramount leadership. Our model allows us to provide a formal statistical test. We find that the cohesion of the Princelings group is small. Statistically, θ_3 is indistinguishable from zero. The low estimate comes from the lack of coordination within the group. For instance, as Xi ascended to the paramount position in the 18th Congress as a member of a putative Princeling faction, other Princelings did not enjoy a higher premium in promotions. This finding alone prima facie violates one of the crucial features of factional politics – delivering resources to members of the faction once the faction leader is in power – and appears in stark contrast to what we have already observed for the broadly accepted factions, CYLC and Shanghai Gang, where we estimate θ_1, θ_2 well in excess of 0. The evidence suggests further that, within the CCP, members of the Military do not act as a cohesive faction, at least nothing like the more established factions, CYLC and Shanghai Gang.

It is worth noting that this structural test of factions is not driven mechanically by the ex post success of a certain group of politicians. For instance, Princelings are overall quite successful in their individual careers. However, they do not display characteristics of a cohesive faction because (1) the progression of a Princeling does not benefit other Princelings (2) other politicians do not attempt to prevent two Princelings from occupying the same leadership node, suggesting Princelings do not seem to act in tandem. As a result, the cohesion estimates of Princelings are quite low.

Our analysis also allows us to examine the influence of the supreme leader in promotions, ω_2. This parameter reveals that the support from the supreme leader accounts for 16.5 percent of total support, which is a statistically significant and substantial fraction. An SC member who is not the supreme leader accounts for 8 percent of the total support. Although the supreme leader has twice greater weight than an SC member, ω_2 is estimated far below 100 percent, implying that support from other top leaders also matters in the promotion. This result is consistent with Jia et al. (2015), who find that connections between provincial leaders to the top seven or nine party officials in the SC matters for their promotion. Collectively, the eight highest-ranking leaders account for 72.5 percent of total support, and the rest 338 members of the Central Committee account for 27.5 percent of the total support. The estimated distribution of power in the party hierarchy is consistent with a "collective leadership" system that emerged

after Deng Xiaoping and it is driven in our model by the pattern of correlation of promotions across levels and factions.

Finally, Table 7 allows us to examine the value of private benefits. We find the estimate is significantly positive, which implies that cofactionals have a strong incentive to collude if a faction controls both positions in a leadership node. This also implies that other factions will provide extra support to their candidates to contest the nodes to avoid dominance by one faction, a crucial feature in reconciling the stylized facts of section 4.

7.2   Untargeted moments and model dynamics

Given our estimates, we can examine how the model performs in matching a set of moments not targeted in the estimation. This is a first, important check aimed at probing the out-of-sample potential of the structural model. Table 8 shows the faction shares in each level of the Congress predicted in the model (upper panel). Consistently with the data in Table 1, our model successfully generates an increasing presence of CYLC and Shanghai members in the higher level of the positions. This result is remarkable because these moments are fairly removed from those targeted in our estimation. Instead, the match is driven by the endogenous support from cohesive factions. If we assume faction cohesions are all zero, then the progressive presence of CYLC and Shanghai members in the higher level of party hierarchy disappears, as shown in the bottom panel of Table 8.

Figure 2 provides a visual representation of the faction seat shares predicted in the model over time. The red, blue, yellow, green bars represent the seat shares of the CYLC, Shanghai Gang, Princelings, and Military, respectively. Our baseline model successfully matches several patterns in the data. First, powerful political factions emerges endogenously at the top levels of the party hierarchy from a combination of talented individuals born into this group and cohesive social ties. The power of a faction also fluctuates due to the stochastic component of promotion, retirement, and entry process.

Second, the seat shares of a faction at lower levels of the hierarchy are positively correlated with the seat shares of that same faction at higher levels. Importantly, this is only true for cohesive groups such as CYCL and Shanghai Gang. For non-cohesive groups, such as Princelings and the Military, the correlation is close to zero.

Third, although factions enjoy an advantage in promotions, no faction appears to dominate the party highest echelons constantly. Intuitively in our model, competition among cohesive factions is at the core of this finding, constantly acting against leadership nodes being controlled by the same faction. Resistance from all party members coalescing in avoiding local monopolies acts as a buffer against the rise of a single dominant faction.

8 Counterfactual analysis

Since the founding of the People's Republic of China in 1949, the internal organization of the CCP have experienced dramatic changes. The era of Mao featured strongman politics and centralized power while Deng's reforms established collective leadership and a system of checks and balances among factions. These structural changes in the political organization of the CCP appear to have had aggregate economic consequences. The upper panel of Figure 3 shows China's annual real GDP growth rate from 1956 to 2014. The tumultuous years in Mao's era witnessed a low average growth and substantial volatility, as the Great Leap Forward, the Culture Revolution and other political struggles continuously disrupted economic growth. In contrast, Deng's reforms brought about a period of sustained and rapid economic growth. As the first step to evaluate the economic implications of the CCP's internal organization, we estimate a VAR(1) system that relates economic performance to the instability and malapportionment of the CCP's Central Committee defined in section 5.6. Measures of internal organization of the CCP appear to have strong predictive power for subsequent economic performance, as shown in the impulse response functions in the middle and bottom panel of Figure 3. A one standard deviation increase in instability and malapportionment leads to a 0.4% and 0.6% decrease in GDP growth of the following year, respectively.

While the time series correlations from the VAR system provide suggestive evidence that the internal organization of CCP matters for the economic performance, they do not uncover the deep structural parameters that lead to these changes. To shed light on these, we use the estimated structural model to conduct a set of counterfactual analyses. We then evaluate the politico-economic performance of different regimes using the three measures defined in section 5.6: economic efficiency, malapportionment, and instability. This exercise not only helps us to understand the dramatic transformation of the CCP over the past 70 years, it also sheds light on the current preoccupation in policy circles and the media with the future evolution in the internal organization of the Chinese state.[19]

We start with the benchmark model estimated using data from the post-Mao era. The upper panel of Table 9 shows the estimates for the baseline model. 95 percent bootstrap confidence intervals are reported in the brackets below. Aggregate economic output is calibrated to match the 14.14 trillion GDP in 2019. The malapportionment of the Central Committee is 0.034, while the malapportionment of the Politburo is 0.195. These estimates are comparable to malapportionment in other countries. For the sake of comparison, Samuels and Snyder (2001) construct a sample of 78 countries and find the malapportionments of lower and upper chambers are 0.046 and 0.311, respectively. The instabilities are 0.027 and 0.119 for the Central Committee and the

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[19]For a recent discussion see Shih (2016), Wang and Zeng (2016), and Shirk (2018).

Politburo, respectively. Both malapportionment and instability are increasing with the level of the hierarchy because there are fewer available positions at higher levels and each position has greater importance.

Given this benchmark, we can explore a set of counterfactual exercises relevant to the study of Chinese political economy. The list of our counterfactual simulations includes: (1) heightened factional politics, (2) foregone collective leadership, and (3) restricted private benefits for party cadres. The counterfactuals are reported in the bottom panel of Table 9. The results are expressed as a percentage change from the baseline scenario per year. The counterfactuals are also assessed in their precision by constructing 95 percent bootstrap confidence intervals. As it can be shown in our analysis, most results, but by all means not all, present confidence intervals excluding zero effects. This is important information for the readers willing to assess which margins are activated by each exercise.

8.1 Heightened factional politics

Since Mao Zedong, factions have been viewed as detrimental to the unity of the Party. For instance, in 2015, the Politburo declared that *"banding together in gangs, forming cliques for private ends, or forming factions is not permitted within the party"*. Despite longstanding party prohibitions against factionalism, our evidence shows that factions are still a pervasive and integral aspect of Chinese politics. In this counterfactual exercise, we conduct a set of simulations to assess how factional politics may affect the dynamics of the Chinese regime.

First, we simulate the case in which faction cohesion parameters θ are all set to zero. This is the first-best benchmark in our model, because all promotions now become purely merit-based and the provision of public goods in all the hierarchy nodes is maximized. As a result, economic output increases by 6.88 percent compared with the baseline case, which is equivalent to $973 billion per year based on 2019 GDP. This result is also statistically precise, based on the 95 percent confidence interval. Furthermore, the malapportionment of the Politburo decreases by 40.86 percent. As a simple reference and with the caveat that institutional differences must be taken into account, such a change would move China from the 12th percentile to the 5th percentile of Samuels and Snyder (2001)'s sample of upper chambers. Similarly, the malapportionment of the Central Committee decreases by 3.52 percent. The absence of factional politics also reduces the instability of the faction shares: the instability of the Central Committee and the Politburo decreases by 0.71 percent and 13.91 percent per year, respectively.

Second, we consider the counterfactual in which one faction becomes perfectly cohesive. Specifically, we increase the cohesion parameter of faction 1 from the baseline value of 0.82 to 1. Now, economic output suffers a 3.38 percent yearly decrease compared to the baseline case, or $477 billion per year based on 2019 GDP. The reason is that factional considerations overtake

individual merit as the main driver of promotion decisions within the hierarchy, lowering the ability of politicians rising through the ranks. In addition, there is an under-provision of public goods at leadership nodes when two cofaction members are paired. Notice that anticipating more collusion, politicians from other factions increase their support to candidates from rival factions, which limits the effect of a perfect cohesive faction. The malapportionment of the Central Committee increases slightly by 0.03 percent, while the malapportionment of the Politburo increases by 6.24 percent. The result that faction cohesion has a larger effect on the Politburo is consistent with the idea that faction consideration becomes more important at higher levels of the party hierarchy. The instability of the Central Committee decreases slightly by 0.69 percent, while the instability of the Politburo increases by 1.35 percent.

Third, we consider a counterfactual scenario in which all factions become simultaneously more cohesive. Economic efficiency severely deteriorates by -4.84 percent, or $684 billion based on 2019 GDP, because factional considerations become more prevalent in the promotion decision and cofactionals are more likely to be paired. Heightened faction politics increases the malapportionment and instability of the Politburo by a statistically significant 10.32 percent and 3.09 percent, respectively, but the effects on the Central Committee are modest.

To summarize, this set of counterfactual analyses shows that factions play an important role in Chinese politics. However, heightened factional politics are not unambiguously detrimental to the politico-economic performance of the regime, as the estimated strength of checks and balances among factions is sufficient to avoid the prevalence of a dominant faction and hence stifling promotions of low ability members of that group.

8.2   Foregone collective leadership

We then explore a counterfactual on factional premia. Our model explicitly recognizes such premia (see section 4), but a wealth of anecdotal discussion in China scholarship (and the empirical evidence of section 4) suggests them to have been curtailed in the post-Mao era.

This peculiarity of the Chinese system under Deng Xiaoping, the emergence of so-called "collective leadership", has been frequently recognized in the literature. It is often indicated as the main structural break from the strongman political equilibria thought to have prevailed under Mao Zedong (Tsou, 1995; Fewsmith, 2001; Shambaugh, 2008).[20] In recent years, some scholars like Nathan (2016) suggest President Xi may be *"overturning Deng's system"*, as he *"has taken the chairmanship of the most important seven of the twenty-two leading small groups that guide policy in specific areas"* and *"tightened direct control over the military"*. However, other scholars like Li (2017) observe that *"the composition of the newly-formed Politburo Standing Committee*

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[20] *"During the Maoist era, factions were ideologically as well as personally defined, and remained fiercely loyal in what could become a winner-take-all game."* Dittmer (2004, p.18)

suggests that Xi compromised with competing factions".

Here, we ramp up the limited role played by leadership premia in factional representation in China and present a counterfactual of what would have happened under winner-take-all competition in which the support weight for the supreme leader is set to 100 percent. We find that economic output decreases by 11.19 percent per year, which is equivalent to $1,582 billion in 2019. The 95 percent confidence interval of this estimate ranges from -12.73 to -9.69 percent. Two related mechanisms result in the reduction in economic efficiency: (i) more pairs of the supreme leader's cofactionals appear at the same node within the hierarchy due to a lack of checks and balances from other factions, limiting public good provision and output; and (ii) the top leader is able to promote more of his/her faction members, who do not necessarily all have high ability. The first mechanism explains around 90 percent of the decline in economic performance based on our estimated parameters, suggesting that providing the right incentives to local leaders through checks and balances may matter more than selecting high-ability politicians.

Interestingly, an increase in leadership premia does not necessarily increase malapportionment. Instead, we find the Central Committee and the Politburo experience slight reductions in malapportionment of 1.67 percent and 3.53 percent, respectively. This result appears surprising, as cofactional members of the supreme leader occupy a disproportionate number of seats, which should increase malapportionment. However, as power concentrates in the supreme leader, other cohesive factions effectively lose their power to obtain disproportionate shares of seats, which lowers the overall malapportionment. The confidence intervals of these estimates are also tight.

The effect of an increase in leadership premium on instability is ambiguous because of two countervailing effects. On the one hand, promotions become predictably biased towards the supreme leader's faction, which tends to reduce instability. On the other hand, whenever the supreme leader retires and a new leader from a different faction takes control, the party hierarchy experiences dramatic shifts, which tend to increase instability.

8.3 Restricted private benefits

Finally, we conduct a counterfactual on the private benefits of providing public goods. We find that a 50% reduction in the private benefits lowers economic efficiency by 2.84 percent because politicians have lower incentives to provide public goods. Furthermore, a lower private benefit reduces the opposition from rival factions for cofactional pairs. As a result, more cofactional pairs emerge, which lower economic output and welfare further. Our results here are consistent with Chen and Zhong (2017) who document that visits by Provincial Committees of Discipline Inspection have significant negative effects on local new business entry. The discussion in Bai et al. (2019) concerning the role of rents within the Chinese economic system before 2012 also appears in line with these findings.

Notice, however, that our result captures only one possible channel of the anti-corruption campaign, that is, decreasing the private benefits of public good provision. In reality, the anti-corruption campaign could enhance the formal incentive mechanism for politicians, which may lead to a more public good provision in the long run.

8.4 An out-of-sample forecast for the 19th Party Congress

To conclude our quantitative exercise, we employ our model to forecast the 19th Party Congress in 2017. Although admittedly streamlined, to the best of our knowledge, this is probably one of the very few rigorous quantitative environments allowing for a predictive exercise of this kind.

Table 10 presents the actual and predicted factional composition in the 19th Party Congress. As can be seen, factional compositions are remarkably close. The root mean squared error of the baseline faction model is 0.519. Since there are four factions and five levels, the prediction error per faction-level combination is 0.516/20=0.026. The empirical performance with regard to the 19th Party Congress appears reassuring of the predictive validity of the model's specification and complements our results on untargeted moments.

9 Conclusion

This paper contributes to an emerging literature on the political economy of economic development by focusing on the elite organization in a nondemocracy. We specifically focus on modern China and on the internal organization of the Chinese Communist Party. The CCP, much like historical Leninist parties in Socialist countries, represents the linchpin of national politics and understanding its inner workings is central to any politico-economic analysis of the PRC.

We present an economic model of the internal organization of this single-party regime, where explicit factional dynamics within the party enrich a problem of career concerns of political cadres. The model offers a series of novel insights on the role of factions in these regimes in a microfounded setting.

The model is validated empirically employing a rich data set on the career profiles of top CCP members. In reduced form, a set of previously unexplored systematic empirical regularities in Chinese elite politics are probed and discussed. In our structural estimation, we explore important counterfactuals pertinent to the Chinese historical case and use the model to answer a series of questions relevant to the political economy of the CCP. We hope that this framework may also prove useful to the understanding of the latent institutional shifts occurring within the CCP in recent years.

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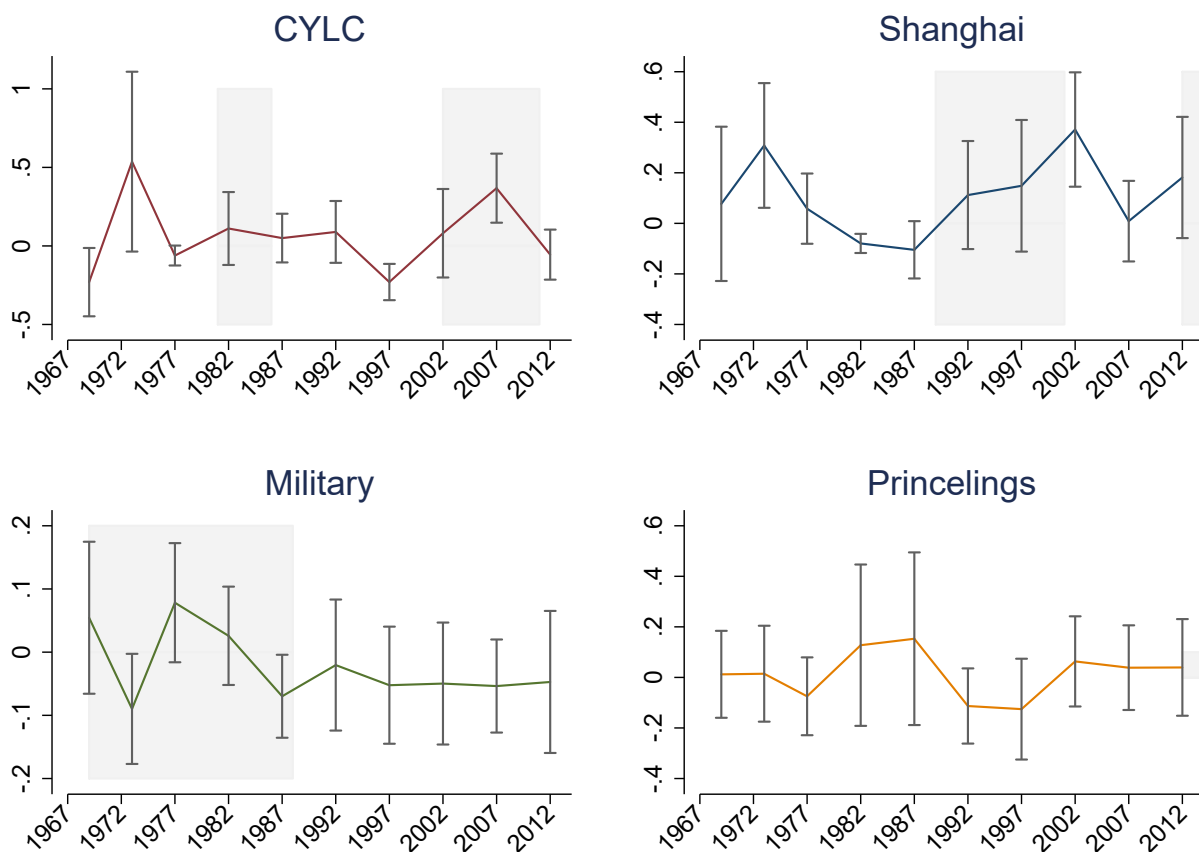
Figure 1: Leadership Premium in Promotion Rates of Each Faction
This graph shows the leadership premium in promotion rates of each faction in the Central Committee over time. The leadership premium in promotion rates is defined as the regression coefficients of promotion dummy on faction affiliation. The regression is repeated for each session of the Central Committee. The capped spikes indicate the 95 percent confidence intervals of the estimates. The shaded area indicates that the General Secretary of CCP is from the same faction.
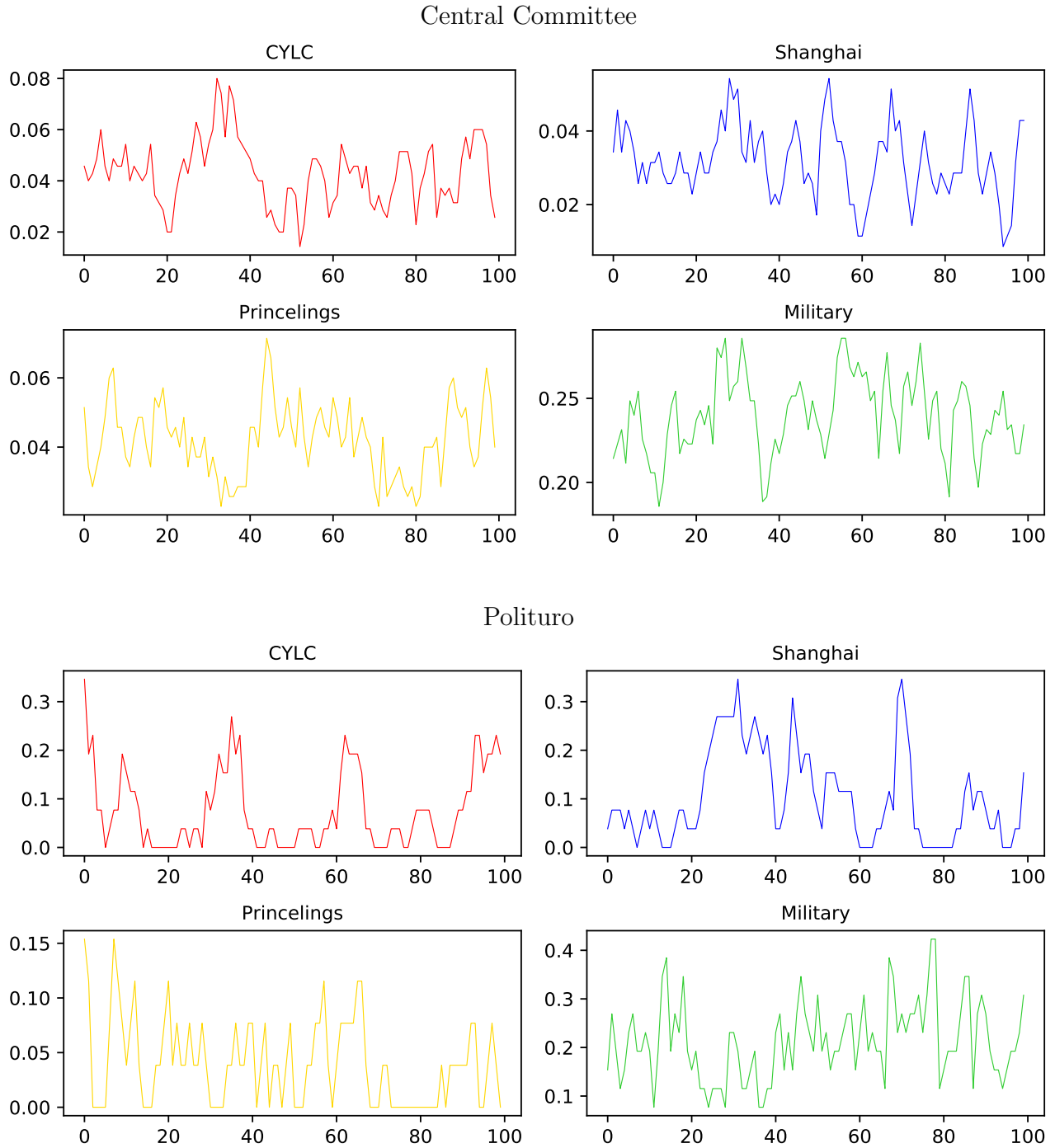
Figure 2: Simulated Path of Faction Shares

This graph shows a simulated path of faction seat shares in the Central Committee and the Politburo. The red, blue, yellow, and green lines represent the CYLC, Shanghai, Princelings, and Military, respectively. The upper panel represents the Central Committee (CC and AC) and the lower panel presents the Politburo (PB, SC, Top two leaders). The model is estimated using the 11th to 18th Central Committees.
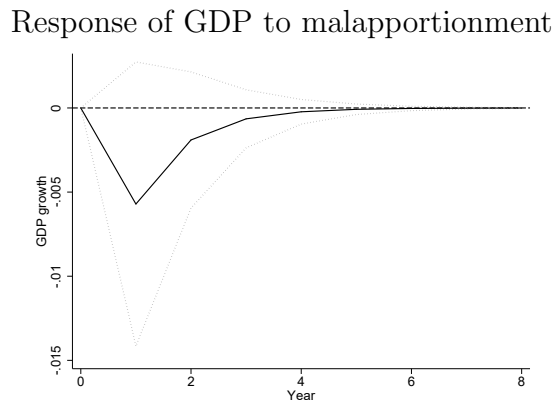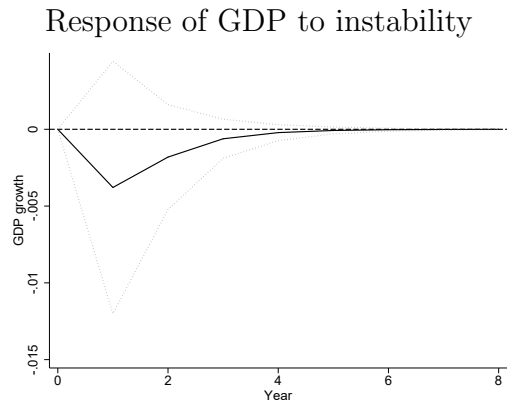
Figure 3: Political Organization and GDP Growth in China

The upper panel shows the annual GDP growth rate of China from 1956 to 2014. The two vertical lines indicate 1977 (Deng Xiaoping returned to power) and 1989 (Jiang Zemin became the General Secretary of the CCP), respectively. The middle and bottom panels show the impulse response functions of the GDP growth to a one standard deviation shock to instability and malapportionment of the Central Committee of the CCP, respectively. The dashed lines represent the 90% confidence intervals. The impulse response functions are estimated using a VAR(1) model of the GDP growth, instability, and malapportionment. The sample period is from 1956 to 2014.

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Table 1: Summary Statistics of Central Committee Members

This table shows the summary statistics of the members of the 8th to 18th Central Committees. We report the mean and the standard deviation below in parentheses. Gender equals 1 if a member is male, 0 otherwise. College equals 1 if a member has a college degree, 0 otherwise. GradSchool equals 1 if a member has a post-graduate degree, 0 otherwise. Abroad equals 1 if a member has studied or worked abroad, 0 otherwise. Mishu equals 1 if a member has been worked as a personal secretary of prominent politicians, 0 otherwise. EthnicMinor equals 1 if a member is an ethnic minority, 0 otherwise. Promotion equals 1 if a member is promoted in the next session of Central Committee, 0 otherwise. Retirement equals 1 if a member retires after the current session of Central Committee, 0 otherwise. CYLC/Shanghai/Military/Princelings equals 1 if a member is from CYLC/Shanghai/Military/Princelings faction, 0 otherwise.

	Top leader	PBSC	PB	CC	AC
CYLC	0.292	0.097	0.109	0.054	0.040
	(0.464)	(0.301)	(0.312)	(0.226)	(0.196)
Shanghai	0.250	0.161	0.130	0.046	0.034
	(0.442)	(0.374)	(0.338)	(0.210)	(0.181)
Military	0.250	0.129	0.283	0.282	0.180
	(0.442)	(0.341)	(0.452)	(0.450)	(0.385)
Princelings	0.208	0.097	0.109	0.044	0.029
	(0.415)	(0.301)	(0.312)	(0.205)	(0.167)
Male	1.000	1.000	0.942	0.949	0.875
	(0.000)	(0.000)	(0.235)	(0.220)	(0.331)
Age	64.750	64.935	62.920	59.276	52.839
	(9.143)	(4.082)	(7.061)	(5.907)	(6.330)
College	0.750	0.935	0.804	0.755	0.828
	(0.442)	(0.250)	(0.398)	(0.430)	(0.378)
GradSchool	0.167	0.097	0.152	0.191	0.346
	(0.381)	(0.301)	(0.360)	(0.393)	(0.476)
Abroad	0.417	0.129	0.181	0.088	0.128
	(0.504)	(0.341)	(0.387)	(0.283)	(0.335)
Mishu	0.000	0.097	0.101	0.066	0.040
	(0.000)	(0.301)	(0.303)	(0.249)	(0.196)
EthnicMinor	0.000	0.000	0.051	0.077	0.139
	(0.000)	(0.000)	(0.220)	(0.267)	(0.346)

Table 2: Faction Affiliation and Promotion

This table shows panel regressions of promotion on the faction affiliation. The sample includes all the members of the 11th to 18th Central Committees. Promotion is a dummy that equals 1 if a Central Committee member moves up in the levels of Central Committee, 0 otherwise. Control variables include gender, college degree, graduate degree, mishu dummy, ethnic minority, abroad experience dummy, age, age square, and age cube. Robust standard errors are reported in brackets. ***,**,* indicates 1 percent, 5 percent, and 10 percent significance level, respectively.

	(1) Promotion	(2) Promotion	(3) Promotion
CYLC	0.121***	0.171**	0.134***
	[0.0348]	[0.0770]	[0.0315]
Shanghai	0.0839**	0.0879	0.0542*
	[0.0347]	[0.0778]	[0.0318]
Princelings	0.0643*	0.0482	0.104***
	[0.0370]	[0.0853]	[0.0331]
Military	-0.0352*	-0.0525	-0.00566
	[0.0183]	[0.0395]	[0.0159]
Sample	All	AC	CC
Individual Attributes	Yes	Yes	Yes
Level F.E.	Yes	Yes	Yes
Year F.E.	Yes	Yes	Yes
Observations	2296	983	1193
Adj. R-squared	0.14	0.10	0.04

Table 3: Faction Affiliation, Supreme Leader Faction, and Promotion

This table shows panel regressions of promotion on the faction affiliation of Central Committee members interacting with the affiliation of the General Secretary. The sample includes all the members of the 11th to 18th Central Committees. Promotion is a dummy that equals 1 if a Central Committee member moves up in the levels of Central Committee, 0 otherwise. Control variables include gender, college degree, graduate degree, mishu dummy, ethnic minority, abroad experience dummy, age, age square, and age cube. Robust standard errors are reported in brackets. ***,**,* indicates 1 percent, 5 percent, and 10 percent significance level, respectively.

	(1) Promotion	(2) Promotion	(3) Promotion
CYLC*CYLC leader	0.252**	0.243**	0.286***
	[0.0987]	[0.0959]	[0.0977]
CYLC*CYLC SC share	0.636	0.556	0.516
	[0.538]	[0.523]	[0.530]
Shanghai*Shanghai leader	0.148**	0.129*	0.108
	[0.0708]	[0.0689]	[0.0702]
Shanghai*Shanghai SC share	0.666***	0.599***	0.634***
	[0.217]	[0.211]	[0.215]
Princelings*Princelings leader	0.0679	0.0667	0.0334
	[0.0895]	[0.0871]	[0.0888]
Princelings*Princelings SC share	-1.731**	-1.347**	-1.353**
	[0.676]	[0.658]	[0.671]
Military*Military leader	0.122*	0.0820	0.177*
	[0.0724]	[0.0705]	[0.0911]
Military*Military SC share	-0.0987	-0.0939	-0.244*
	[0.110]	[0.107]	[0.135]
Sample	All	All	All
Individual Attributes	Yes	Yes	Yes
Level F.E.	No	Yes	Yes
Year F.E.	No	No	Yes
Observations	2296	2296	2296
Adj. R-squared	0.10	0.15	0.15

Table 4: Frequency of Factional Mix

This table shows the frequency of the factional mix of the top 2 officials in the same political office. The provincial positions include 31 provincial and municipal units (Secretary and Governor). The national positions include Politburo Standing Committee (two highest-ranking members), PRC presidency (President and Vice President), the State Council (Premier and Executive Vice Premier), Central Military Committee (Chairman and Executive Vice Chairman), CCP Secretariat (two-highest ranking secretaries), NPC (Chairman and Executive Vice Chairman), CPPCC (Chairman and Executive Vice Chairman), the Supreme People's Court (President and Executive Vice President).

Empirical frequency

	CYLC	Shanghai	Princelings	Military	Others	Total
CYLC	2.20	1.29	3.49	1.03	14.23	22.25
Shanghai	2.46	0.00	1.16	0.65	1.16	5.43
Princelings	2.59	1.03	0.39	0.39	5.17	9.57
Military	0.91	0.00	0.00	0.00	0.91	1.81
Others	10.35	2.07	2.72	0.65	45.15	60.93
Total	18.50	4.40	7.76	2.72	66.62	100.00

Counterfactual frequency under a random matching

	CYLC	Shanghai	Princelings	Military	Others	Total
CYLC	4.12	.98	1.73	.61	14.82	22.25
Shanghai	1.00	.24	.42	.15	3.62	5.43
Princelings	1.77	.42	.74	.26	6.38	9.57
Military	.33	.08	.14	.05	1.21	1.81
Others	11.27	2.68	4.73	1.66	40.59	60.93
Total	18.50	4.40	7.76	2.72	66.62	100.00

Ratio between empirical frequency and counterfactual frequency

	CYLC	Shanghai	Princelings	Military	Others	Total
CYLC	.53	1.32	2.02	1.70	.96	22.25
Shanghai	2.45	.00	2.75	4.40	.32	5.43
Princelings	1.46	2.45	.53	1.50	.81	9.57
Military	2.72	.00	.00	.00	.75	1.81
Others	.92	.77	.58	.39	1.11	60.93
Total	18.50	4.40	7.76	2.72	66.62	100.00

Table 5: Factional Mix: Regression Evidence

This table shows panel regressions of the factional affiliation of the number 1 official on the number 2 official in the same political office. Variable CYLC1 (CYLC2) is a dummy which equals 1 if number 1 (2) official is from the CYLC faction. Shanghai1, Shanghai2, Princelings1 Princelings2, Military1, and Military2 are defined similarly. Standard errors are clustered at the year level. ***,**,* indicates 1 percent, 5 percent, and 10 percent significance level, respectively.

	(1)	(2)	(3)
	CYLC1	CYLC1	CYLC1
CYLC2	-0.132**	-0.0752	-0.388***
	[0.0534]	[0.0565]	[0.103]
Sample	All	Provincial	National
Postion F.E.	No	Yes	Yes
Observations	773	627	146
Adj. R-squared	0.014	0.003	0.124

	(1)	(2)	(3)
	Shanghai1	Shanghai1	Shanghai1
Shanghai2	-0.105***	-0.0314**	-0.471***
	[0.0317]	[0.0150]	[0.110]
Sample	All	Provincial	National
Postion F.E.	No	Yes	Yes
Observations	773	627	146
Adj. R-squared	0.006	-0.000	0.126

	(1)	(2)	(3)
	Princelings1	Princelings1	Princelings1
Princelings2	-0.0496	-0.0785***	-0.117
	[0.0500]	[0.0231]	[0.0988]
Sample	All	Provincial	National
Postion F.E.	No	Yes	Yes
Observations	773	627	146
Adj. R-squared	0.001	0.002	0.009

	(1)	(2)	(3)
	Military1	Military1	Military1
Military2	0.228*	-0.0289*	0.145
	[0.133]	[0.0166]	[0.186]
Sample	All	Provincial	National
Postion F.E.	No	Yes	Yes
Observations	773	627	146
Adj. R-squared	0.028	-0.001	0.009

Table 6: Moments for Structural Estimation

This table shows moments used in the SMM estimation. "Faction premia: leader" are defined as the coefficients of the interaction between the faction of the candidate and the faction of the supreme leader, which are estimated in Table 3. "Faction premia: SC share" are defined as the coefficients of the interaction between the faction of the candidate and the share of seats in the Politburo Standing Committee, which are estimated in Table 3. "Faction premia: intercept" are defined as the coefficients of the faction of the candidate, which are estimated in Table 3. "Faction premia: CC/AC ratio" is defined as the ratio between promotion probability for a faction member in CC and a faction member in AC, normalized by the same ratio for the unclassified politicians, which are estimated in Table 2. "Same-faction discounts" are constructed as the ratio between the predicted probability of the No.1 politician being a member of faction f conditional on the No.2 politician is from the same faction over the predicted probability of the No.1 politician being a member of faction f conditional on the No.2 politician is from a different faction using the estimates in Table 5. "Ability R-squared" is estimated in Table 3.

Moments	Actual	Simulated
Faction premia: leader, CYLC	0.286	0.090
Faction premia: leader, Shanghai	0.108	0.106
Faction premia: leader, Military	0.177	0.009
Faction premia: leader, Princelings	0.033	0.011
Faction premia: SC share, CYLC	0.516	0.351
Faction premia: SC share, Shanghai	0.634	0.420
Faction premia: SC share, Princelings	-1.353	0.038
Faction premia: SC share, Military	-0.244	0.037
Faction premia: CC/AC ratio, CYLC	3.232	3.545
Faction premia: CC/AC ratio, Shanghai	2.206	2.409
Same-faction discount: national, CYLC	0.776	0.527
Same-faction discount: national, Shanghai	0.829	0.501
Same-faction discount: provincial, CYLC	0.936	1.003
Same-faction discount: provincial, Shanghai	0.946	0.974
Ability R-squared, total	0.020	0.024

Table 7: Parameter Estimates

Symbol	Parameters	Value	S.E.
θ_1	Faction cohesion, CYLC	0.820	0.035
θ_2	Faction cohesion, Shanghai	0.850	0.039
θ_3	Faction cohesion, Princelings	0.000	0.040
θ_4	Faction cohesion, Military	0.038	0.047
ω_1	Support, SC members	0.080	0.007
ω_2	Support, top leader	0.165	0.003
δ_0	Utility gain, intercept	0.112	0.003
δ_1	Utility gain, slope	0.005	0.000
v_0	Private benefits, intercept	0.595	0.262
v_1	Private benefits, slope	13.360	4.350

Table 8: Faction Shares by Level of Hierarchy

Baseline faction model				
	CYLC	Shanghai	Princelings	Military
Top leader	0.233	0.117	0.029	0.183
SC	0.188	0.094	0.032	0.199
PB	0.099	0.056	0.038	0.227
CC	0.037	0.030	0.042	0.240
AC	0.037	0.029	0.043	0.234

Faction cohesion $= 0$				
	CYLC	Shanghai	Princelings	Military
Top leader	0.044	0.035	0.043	0.231
SC	0.044	0.035	0.042	0.231
PB	0.044	0.035	0.042	0.232
CC	0.045	0.035	0.042	0.232
AC	0.045	0.035	0.042	0.232

Table 9: Counterfactual Simulation

The upper panel shows the economic efficiency, malapportionment, and instability of the baseline scenario. The lower panel shows the percentage change in these measures from the baseline scenario to various counterfactual scenarios. Bootstrap 95 percent confidence intervals presented in brackets are constructed using 500 bootstrap samples.

Baseline	Efficiency	Malapportionment (CC)	Malapportionment (PB)	Instability (CC)	Instability (PB)
	14.140	0.034	0.195	0.027	0.119
	[14.066, 14.184]	[0.033, 0.034]	[0.192, 0.199]	[0.027, 0.028]	[0.118, 0.120]

Counterfactuals	% change from the baseline				
All cohesion=0	6.881	-3.523	-40.857	-0.713	-13.913
	[6.442, 7.305]	[-4.547, -2.252]	[-41.894, -39.633]	[-1.582, 0.335]	[-15.016, -12.827]
Faction 1 cohesion=1	-3.376	0.029	6.235	-0.689	1.352
	[-4.130, -2.681]	[-1.246, 1.248]	[3.667, 8.878]	[-1.874, 0.530]	[0.081, 2.561]
All cohesion=1	-4.838	0.542	10.321	-0.190	3.088
	[-5.563, -4.114]	[-0.866, 2.040]	[7.375, 13.536]	[-1.222, 0.974]	[1.734, 4.450]
Dominant leader premia	-11.189	-1.666	-3.525	0.925	-0.717
	[-12.732, -9.692]	[-2.825, -0.337]	[-6.967, -0.155]	[-0.098, 2.064]	[-2.152, 0.555]
Half private benefits	-2.840	-0.446	5.529	-0.306	2.430
	[-3.611, -2.186]	[-1.642, 0.947]	[2.743, 9.088]	[-1.372, 0.899]	[1.152, 3.704]

Table 10: Out-of-sample Forecasting of 19th Party Congress

This table shows the out-of-sample forecast of the composition of the 19th Party Congress. The upper panel shows the actual composition in the data. The lower panel shows the predicted composition.

Data				
	CYLC	Shanghai	Princelings	Military
Top leader	0.500	0.500	0.000	0.000
SC	0.000	0.400	0.000	0.000
PB	0.053	0.158	0.053	0.105
CC	0.101	0.067	0.011	0.191
AC	0.047	0.052	0.006	0.145

Predicted				
	CYLC	Shanghai	Princelings	Military
Top leader	0.500	0.500	0.000	0.000
SC	0.277	0.138	0.261	0.016
PB	0.263	0.138	0.088	0.119
CC	0.075	0.042	0.034	0.166
AC	0.034	0.025	0.041	0.213

Internet Appendix of Factions in Nondemocracies: Theory and Evidence from the Chinese Communist Party

Patrick Francois, Francesco Trebbi, and Kairong Xiao

December 18, 2020

This internet appendix provides (i) a decription of the formal procedure of promotion in the CCP; (ii) detailed derivation of the model; (iii) estimation details; (iv) additional figures and tables.

Appendix I: Formal Procedure of Promotion in the CCP

This appendix briefly describes the formal procedure of promotion based on the "Interim Regulations on Selection and Appointment of Party and Government Leading Cadres" of the Chinese Communist Party issued in 1995. A detailed account can be found in Bo (2004). There have been two subsequent updates to these formal regulations, issued in 2002 and 2014, but the main procedure has remained substantially the same over our period of analysis.

According to CCP regulations, the appointment process consists of four phases: (i) democratic recommendations; (ii) screening; (iii) deliberation; and (iv) discussions and decision.

In the first phase, the party committee of the same level of the opening or the organization department of a next higher level delimit a pool of potential candidates for the position.

Second, the organization department screens candidates by having private meetings with relevant individuals, conducting public opinion polls, and interview the short-listed candidates.

In the third phase, the list of candidates are vetted through a process of internal deliberation. The participants of the deliberation include the leaders of the party committee, the legislature, and the government at the same level of the opening.

In the fourth and final phase, the list of candidates is presented to the next higher-up party committee where the final selection decision is made for the post. The party committee of this level may also make suggestions regarding the selection.

Appendix II: Proofs and Derivation

Proof of Lemma 1

The optimal amount of support is directly derived from the F.O.C. of politician j. It is also straightforward to see that $\frac{\partial s_{i,-i,j}}{\partial c_{i,j}} = \Delta > 0$. We now show $\frac{\partial s_{i,-i,j}}{\partial c_{i,-i}} = \frac{\partial e_{i,-i}}{\partial c_{i,-i}} = \frac{\partial (q_i + q_{-i})}{\partial c_{i,-i}} < 0$.

Once in office, politician i's supply of the public good is determined by the following F.O.C.:

$$v'q_i + v + c_{i,-i}v'q_{-i} = 0.$$

Similarly, politician $-i$ in the same leadership note has the following F.O.C.:

$$v'q_{-i} + v + c_{i,-i}v'q_i = 0.$$

Sum up these two F.O.C.'s and define $Q = q_i + q_{-i}$:

$$v'Q + 2v + c_{i,-i}v'Q = 0.$$

Take derivative with respective to $c_{i,-i}$ and use $v' < 0$ and $v'' = 0$:

$$v'Q_c + 2v'Q_c + v'Q + c_{i,-i}v'Q_c = 0.$$

Rearrange the equation, we have

$$Q_c = \frac{\partial (q_i + q_{-i})}{\partial c_{i,-i}} = \frac{Q}{3 + c_{i,-i}} = -\frac{q_i + q_{-i}}{3 + c_{i,-i}} < 0.$$

Derivation of promotion probability

With the parameterized private benefit function, $v(q) = \nu_0 + \nu_1 \ell - q$, we can derive the explicit solution of the provision of the public good:

$$q_i = q_{-i} = \frac{\nu_0 + \nu_1 \ell}{c_{i,-i} + 3},$$

Local economic performance upon promotion of i next to $-i$ is:

$$e_{i,-i} = \frac{2\left(\nu_0 + \nu_1 \ell\right)}{c_{i,-i} + 3} + \alpha\left(a_i + a_{-i}\right).$$

With the parameterized utility gain , $\Delta(\ell) = \delta_0 + \delta_1 \ell$, the support of politician j for a candidate i from being considered for an opening where the incumbent co-node politician $-i$ is given by:

$$s_{i,-i,j} = c_{i,j}\left(\delta_0 + \delta_1 \ell\right) + \frac{2\left(\nu_0 + \nu_1 \ell\right)}{c_{i,-i} + 3} + \alpha\left(a_i + a_{-i}\right).$$

We sum up the support from all the politicians in the party hierarchy:

$$s_{i,-i} = \sum_j w_j s_{ij} = \sum_j w_j c_{i,j}\left(\delta_0 + \delta_1 \ell\right) + \frac{2\left(\nu_0 + \nu_1 \ell\right)}{c_{i,-i} + 3} + \alpha\left(a_i + a_{-i}\right),$$

where $\sum_j w_j$ is normalized to 1.

This proves the result. ∎

Appendix III: Details of Estimation Procedure

We provide here more details on our simulations and estimation. It proceeds through several steps:

1. We first create a party hierarchy with 6 levels, corresponding to the tiers TL, SC, PB, CC, AC, and an entry level. The numbers of politicians in each level are 2, 6, 18, 160, 160, and 200, respectively.

2. We start with an arbitrary initial hierarchy, simulate $N = 1000$ retirements so that it reaches the steady-state, $\tilde{x}_0$.

3. Starting with the steady-state composition, $\tilde{x}_0$, we simulate $T = 10$ Congresses for a given set of parameters, Θ. Each new Congress means that half of the politicians will be retired. We define the whole history of the T Congresses as $X_s = \{x_{s,1}, x_{s,2}, ..., x_{s,T}\}$

4. We repeat step 3 for $S = 100$ times and get S possible path, $\tilde{X} = \left\{ \tilde{X}_s \right\}_{s=1,...,S}$

5. We calculate the moments $\hat{m}\left(\tilde{X}|\Theta\right)$ from $\left\{\tilde{X}_s\right\}_{s=1,...,S}$ by estimating the regression models equation 1 and equation 2 in the simulated data. Specifically, for equation 1, we create a promotion dummy in the simulated data using two consecutive Congress, $\tilde{x}_{s,t}$ and $\tilde{x}_{s,t+1}$. Then we regress the promotion dummy on faction dummies and their interaction with top leader's faction and SC shares. For equation 2, we regress the faction dummy of No.1 politician on the faction dummy of No.2 politician in the simulated data, $\tilde{x}_{s,t}$.

6. We use the sum of squared errors in moments as the distance metric. Formally, for each moment, we calculate the moment error function $e(\tilde{X}, X|\Theta) \equiv \frac{\hat{m}\left(\tilde{X}|\Theta\right) - m(X)}{m(X)}$ as the percent difference in the vector of simulated model moments from the data moments. The SMM estimator is defined as $\hat{\Theta} = \arg\min_{\Theta} e(\tilde{X}, X|\Theta)^T W e(\tilde{X}, X|\Theta)$, where W is the weighting matrix. We use a two-step procedure where the identity matrix is used as the weighting matrix in the first step and the optimal weighting matrix is used in the second step.

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7. The variance-covariance matrix for the parameter estimates is given by:

$$\hat{\Omega} = \left(1 + \frac{1}{S}\right) \left[\frac{\partial e(\tilde{X}, X|\Theta)^T}{\partial \Theta} W \frac{\partial e(\tilde{X}, X|\Theta)}{\partial \Theta}\right]^{-1}$$

where $\frac{\partial e(\tilde{X}, X|\Theta)}{\partial \Theta}$ is the derivative of the vector of moments with respect to the parameter vector (so this is a $q \times p$ matrix for q moments and p parameters. We calculate the derivatives numerically.
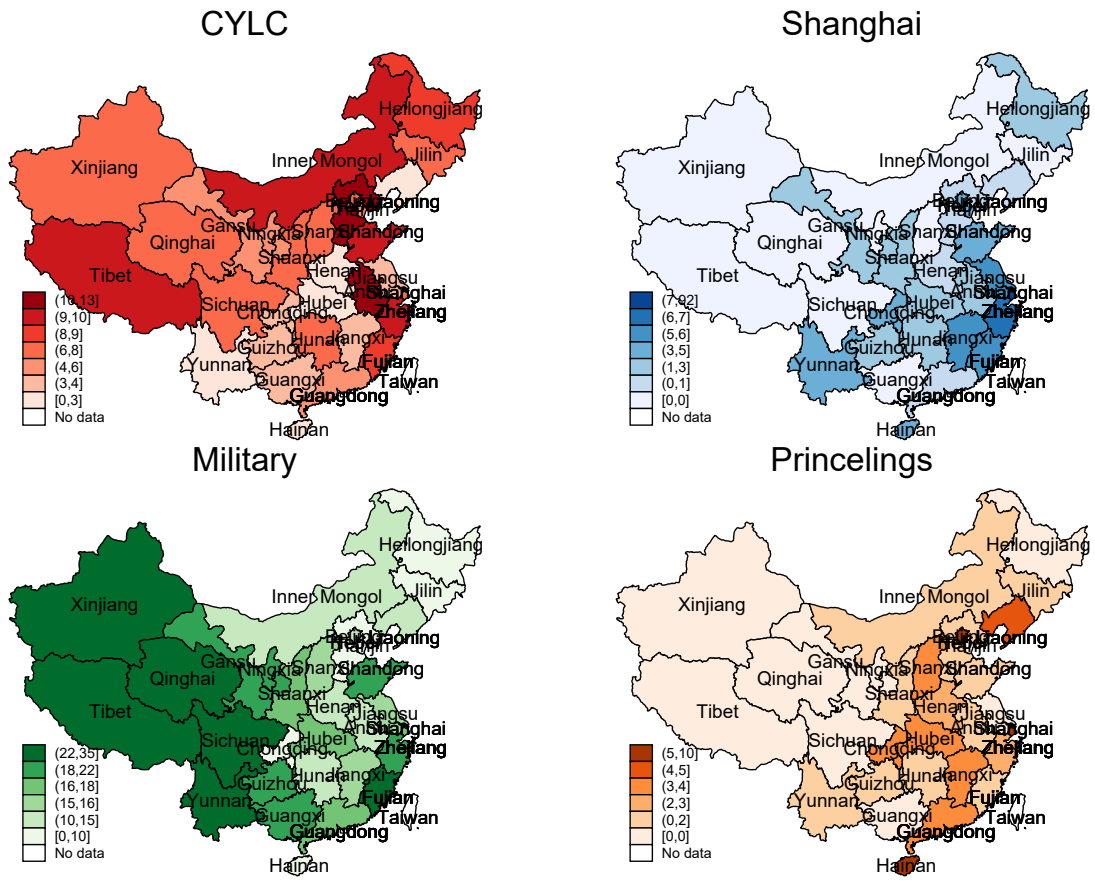
Figure 1: Geographic Distribution of Factions

This graph shows the geographic distribution of factions across provinces (municipalities) for 1956 to 2014. The color scale represents the average share of faction in a province (municipality).
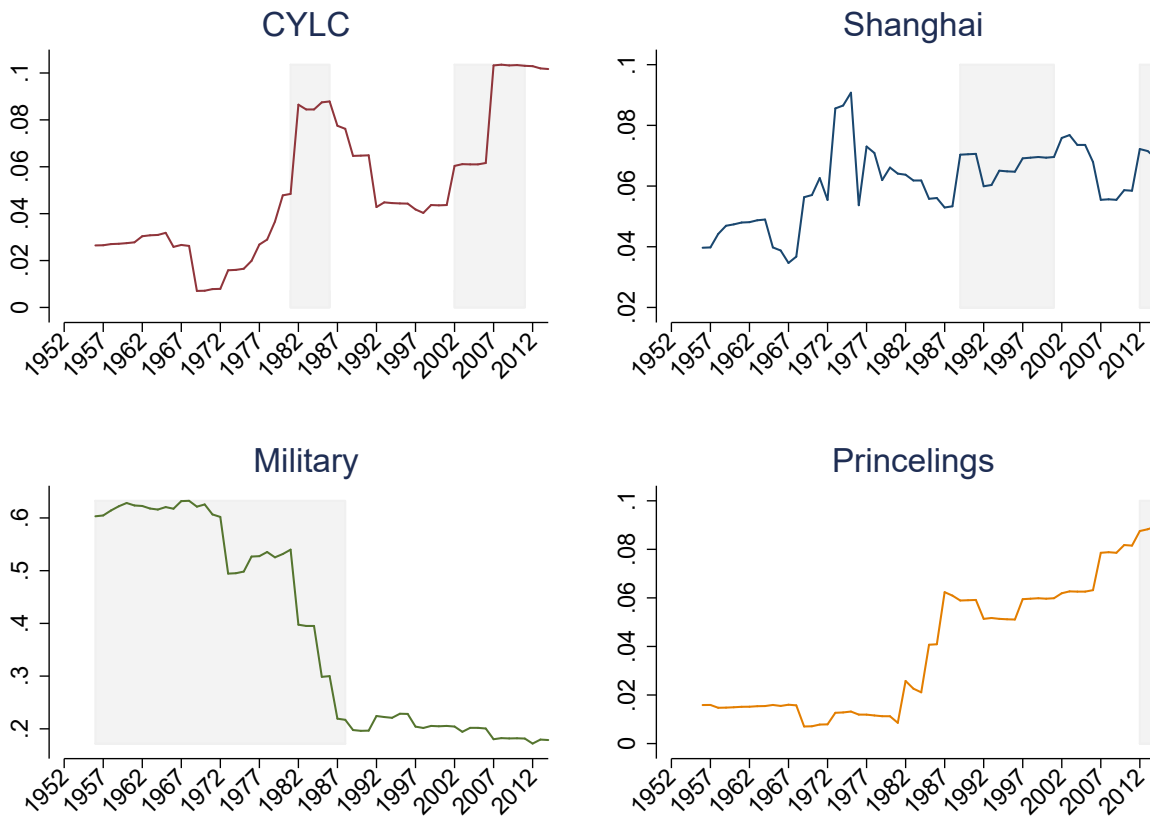
Figure 2: Leadership Premium in Power Score of Each Faction
This graph shows the share of the power score of each faction in the Central Committee over time. The power score is constructed following the scheme of Bo (2010). The shaded area indicates that the General Secretary of CCP is from the corresponding faction.

Table 1: Summary Statistics of Promotion, Retirement, and Term Length

This table shows the distribution of promotion, retirement, and term length in the Central Committee. The sample includes all the members in the 11th to 18th Central Committees. Column 1 presents the frequency of each group. Columns 2 and 3 are probability and cumulative probability, respectively.

Fraction of promotion and retirement			
	No.	Col %	Cum %
Retirement	1,188.0	50.7	50.7
No change	770.0	32.8	83.5
Promotion	365.0	15.6	99.1
Demotion	21.0	0.9	100.0

Change in level conditional on promotion			
	No.	Col %	Cum %
1	349.0	95.6	95.6
2	15.0	4.1	99.7
3	1.0	0.3	100.0

Term length			
	No.	Col %	Cum %
1	1,305.0	67.2	67.2
2	530.0	27.3	94.5
≥ 3	107.0	5.5	100.0

Table 2: Anticorruption and Factional Affiliation

This table shows the cross-sectional regression of a corruption dummy on the faction affiliation of an official. Corruption is defined as 1 if the official is investigated or prosecuted according to ChinaFile and the China's Central Commission for Discipline Inspection (CCDI) website, and 0 otherwise. The sample includes all the individuals covered by China Vitae who have not retired in the year of 2007, the year of 17th Party Congress. Robust standard errors are reported in brackets. ***,**,* indicates 1 percent, 5 percent, and 10 percent significance level, respectively.

	(1) Corruption	(2) Corruption	(3) Corruption
CYLC	0.0200	0.0131	0.0393*
	[0.0226]	[0.0220]	[0.0230]
Shanghai	-0.0249	-0.0190	-0.00983
	[0.0243]	[0.0236]	[0.0242]
Princelings	-0.0502	-0.0203	-0.0198
	[0.0341]	[0.0340]	[0.0343]
Military	0.169***	0.191***	0.215***
	[0.0278]	[0.0269]	[0.0271]
p-value (CYLC=Shanghai)	0.162	0.303	0.118
Individual Attributes	No	Yes	Yes
Level F.E.	No	No	Yes
Observations	2465	2465	2465
Adj. R-squared	0.0335	0.0784	0.0931