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FACTIONS IN NONDEMOCRACIES: THEORY AND EVIDENCE FROM THE CHINESE COMMUNIST PARTY

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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.

Patrick Francois - patrick.francois@ubc.ca
University of British Columbia

Francesco Trebbi - ftrebbi@berkeley.edu
University Of California Berkeley, National Bureau of Economic Research and CEPR

Kairong Xiao - kx2139@columbia.edu
Columbia University

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

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

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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.

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 second-largest economy and the most populous country in the world today.[1] 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).[2] 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,[3] 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.[4]

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. Factions have historically emerged within the CCP through close personal connections with prominent patrons (e.g. in the cases of former General Secretary Jiang Zemin and his successor, Hu Jintao) to mutually foster the career prospects of affili-

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[1] And plays a crucial role in steering economic activity in the country. See Bai, Hsieh, and Song (2016).

[2] At the time of writing. By 2016 the CCP membership has grown to 88.76 million.

[3] 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.

[4] 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).

ated cadres, and do not necessarily represent specific territorial or economic interest groups (Dittmer, 1995). Despite the fact that the CCP officially rejects factional elite politics[5], 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, Shih, and Lee 2016). This paper follows this line of inquiry, but with special attention paid to individual incentives, supplying an inherently economic model of behavior, where promotion dynamics throughout the party organization are microfounded and characterized. 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.

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.[6] Third, to use the model in a series of policy counterfactuals relevant to the fundamental structural changes. 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, Kudamatsu and Seim (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

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[5]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

[6]This paper offers one of the first empirical models of the political organization of the second-largest economy in the world.

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.

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 a minimal set of factions within the CCP, including links based on affiliation to the Communist Youth League of China (CYLC, related to General Secretary Hu Jintao) and to the so-called Shanghai Gang (affiliated most prominently with Jiang Zemin and bolstered by the special status of Shanghai in Chinese politics).

We present several empirical findings. A necessary condition for our model's coherence is that factions deliver advantages to their members. In the data, factional affiliation, 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.

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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 very unlikely to be from the same faction.

Political observers and popular media often use attributes such as college, hometown, or family background to group similar politicians into "factions". This leads to a plethora of putative "factions", such as Tsinghua Clique, Shaanxi Clique, and Princelings (a prominent set of cadres with family ties to CCP veterans). An ongoing debate in the literature is which of these groups may be relevant political units in China and which not. We show how our empirical approach is also helpful in this dimension. Specifically, we estimate our model structurally matching the promotion patterns between Party Congresses and cross-faction matching in different levels of governments. 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,[7] 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) act as a unified faction. 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 relative influence of the supreme leader vs. the rank and file in the selection process of the Central Committee members. We find that the supreme leader accounts for 16.5 percent of the influence, while a Politburo Standing Committee member accounts for 8 percent. The rank and file accounts for the remaining 27.5 percent. The substantial influence of the supreme leader is consistent with the top-down selection process in China. Nevertheless, this estimate is still far from absolute control, suggesting that elite politics in China was far from winner-take-all, 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 al-

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[7]See Li (2002).

ternative politico-economic scenarios related to ongoing institutional change under President Xi Jinping. 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; and (iii) the effect of a reduction in the private benefits of supplying public goods by local politicians. A structural application like the one proposed in the paper allows for the quantitative evaluation of these scenarios. We assess it through three 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 are sizable and economically significant.

Our paper contributes to the politico-economic literature on Chinese elite politics. Scholars such as Shih, Adolph, and Liu (2012), Jia et al. (2015), Fisman et al. (2020) have explored methodologies for the imputation of factional linkages based on place of birth, university ties, and shared career profiles.[8] 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

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[8]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.*"

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).

This paper also speaks to the literature on the internal organization of elites in nondemocratic regimes. This is a vast area of research and Newson and Trebbi (2018) and Gelbach et al. (2016) offer empirical and theoretical 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, Rainer, and Trebbi (2015, 2016) addressing the internal organization of elites in African dictatorships.

Most related to our specific focus on factions is Persico, Rodriguez-Pueblita, and Silverman (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.[9] In Persico et al. (2011), promotions of members from the same faction 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, Rodriguez-Pueblita and Silverman, 2011) and

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

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.[10]

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 figures of 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 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

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[10]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).

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).[11] 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.[12] For this reason, an elaborate recruitment process typically operates through the selection of successful university students and through family and work connections.

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 prosperous ("red") regions.[13] 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

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[11]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.

[12]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

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

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 (blue) provinces (Li, 2002).

Whether additional factional groups besides the CYLC and the Shanghai Gang may be present within the CCP is unclear and disputed even among scholars of Chinese elite politics. For instance, some observers 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". The analysis below will discuss this specific group of CCP members in detail.

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. China Vitae covers not only the Central Committee members but also subnational government leaders. Information provided by China Vitae includes gender, year of birth, place of birth, ethnicity, colleges attended, and career trajectory. Information in China Vitae comes from Chinese and English language web sites in China that are supported by or affiliated with the Chinese government. We combine these two data sources to construct our main estimation sample which covers all the Central Committee members and provincial leaders. Whenever there is an inconsistency between the two data sources (e.g. multiple politicians in the same position in the same year), we manually check with a third source, typically official websites affiliated with the Chinese government (e.g. www.xinhuanet.com; cpc.people.com.cn).

In addition to the main dataset, we also construct a list of the so-called "tigers,"[14] a

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[14]As opposed to low-level politicians, "flies", involved in petty corruption. Tigers directly hit by the

code name for high-ranking party members affected by President Xi Jinping's anti-corruption campaign using the public anti-corruption database of the Central Commission for Discipline Inspection and from ChinaFile. We merge the list of prosecuted officials to the universe of active politicians in this period in China Vitae database, i.e., individuals have not retired in the year of 2007, the year of 17th Party Congress. The final sample of anti-corruption campaign includes 2,465 individuals, among which 193 are prosecuted in the anti-corruption campaign.

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 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 four affiliations are not mutually exclusive (for example, Xi Jinping is both a Princeling and an affiliated of the Shanghai Gang according to our definition) and not all party members in our sample are affiliated. In fact, we allow politicians in our sample to also be unaffiliated.

Theoretically, one could consider CYLC, Shanghai Gang, Military, and Princelings alternative political factions. In Section 4 we show however than only two of these groups,

anti-corruption purge have included retired SC member Zhou Yongkang and retired PB member Xu Caihou.

CYLC and Shanghai Gang, truly exhibit the features of political factions within the CCP. Military is virtually a parallel structure with limited political control, while the Princelings as a group are extremely heterogeneous and appear to operate as a set of neutral and independently powerful actors (in fact, oftentimes in deep rivalry among themselves, such is the case of Bo Xilai and Xi Jinping). Formal statistical tests will also be developed and brought in as support of this assertion. To distinguish, we will refer to Princelings and Military as "groups" and CYLC and Shanghai Gang as "factions". The remaining politicians are deemed "neutral".

Table 1 provides the demographics and the factional affiliation of our sample by sessions of the Central Committees. 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. Conditioning on entering the Central Committee, around 20 percent of them are promoted to a higher level in the four levels of the Central Committee, and around 50 percent will retire in the next CC session. In terms of factional affiliation, CYLC, Shanghai Gang, and Princelings each account for around 5 percent to 10 percent of members. Military has experienced a downward trend, dropping from 56 percent in the 8th Central Committee to less than 20 percent in recent years. Post-Mao China witnesses a significant decline in the influence of the Military group, and a rise in factions such as CYLC and Shanghai Gang. This is consistent the observations by Nathan (2016): "*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.*" Given that 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, we will focus our empirical analysis on the post-Mao era (11th to 18th Central Committees).

Table 2 provides summary statistics on the promotion, retirement, and term length of the CC members in the sample of 11th to 18th Central Committees. Between two consecutive Congresses, around 50.7 percent of the Central Committee members retire, 32 percent stay at

the same level, and 15.6 percent are promoted to higher levels. Promotions are characterized by gradual progression in the party hierarchy. Conditional being promoted, 95.6 percent of the members go up by one level in the Central Committee. Jumps of more than one level are extremely rare. Term limits are well enforced. 94.5 percent of the members stay at the same level for one or two terms. Only 5.5 percent of the members stay longer than 2 terms.

Figure 1 describes the geographic distribution of members affiliated with each faction group. As is evident, the representation of the CYLC and the Shanghai Gang across provinces is fairly broad and not limited to a particular local area. On the other hand, individuals associated with Princelings and the Military group are distributed more unevenly: Princelings are more likely to hold positions in rich coastal areas – possibly due to their privileged status — while military members are more concentrated in poorer western provinces and places with strategic importance (e.g. Fujian, which neighbors Taiwan).

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 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; 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 3 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 neutral members. 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 relative to neutral cadres, 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 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; 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 4 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 2

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.

Third, we look at the allocation of valuable posts to factional members. In Figure 3 we plot the time series of the power score of each faction and group constructed following the scheme of Bo (2010) which sums up the share of seats in each level of the Central Committees weighted by seat value. We plot the shaded region as the period in which the General Secretary is from the corresponding faction. We find that the ascendancy of a faction member to the supreme leadership is associated with more faction members controlling powerful positions across the board.

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 than neutrals 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 5 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).[15].

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 5 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 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 and neutral-neutral pairs. A simple chi-square test sharply rejects a lack of association in the pairs.

Table 6 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

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

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.

Finally, a remarkable factional balance seems to be present in the administration of punishment in President Xi Jinping's anti-corruption campaign (initiated in 2012 and still ongoing). Table 7 shows the cross-sectional regression of a corruption dummy taking value 1 if the individual is officially caught in the anti-corruption campaign on his/her factional affiliation. We find that both CYLC[16] and Shanghai Gang appear represented in the purged sample and, importantly, both factions are represented in shares proportional to their overall representation in the upper echelons of the CCP, and not statistically significantly higher or lower. These results appear also completely consistent with a subsequent independent analysis of the anti-corruption campaign presented in Lu and Lorentzen (2016).

5   Model

The set of regularities presented in Section 4 is sufficient to paint an impressionistic picture of certain features of the Chinese political system. Yet it does not allow us to explore systematically how changes to the deep parameters driving these regularities may reverberate through the system, a particularly important feature at the current politico-economic juncture in China. This section presents the empirical model that we estimate.

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

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[16]Links to the CYLC were evident in official news releases by The People's Daily which explicitly singled out specific subsets of this faction, particularly "The Shanxi Gang", officials linked to Ling Jihua, a disgraced protégé of Hu Jintao. http://www.bbc.com/news/blogs-china-blog-30685782

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.

Each position is occupied by a politician i, who is characterized by innate ability, a_i, an affiliation to a social group, f_i, and tenure in the current office, τ_i. 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 as shown in Table 2.

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 95.6 percent of the promotions involve a one-step change in the level as shown in Table 2.

5.2   Factions

Factions are an informal social contract that enforces a quid-pro-quo relationship among members of that social group. To represent this, we assume that faction members care about their own cofactionals' welfare when making decisions. We model the "strength" of a faction by a single parameter capturing the intensity of this concern. Let $\theta_f \in [0, 1]$ denote how much a faction f member cares about a cofactional's utility, so that a higher θ implies a more cohesive faction. 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.

5.3 Promotions

When an opening arises at level ℓ, the set of eligible candidates, $\mathcal{A}$, is drawn from level $\ell - 1$. The candidate i, currently working at $\ell - 1$, who gets the highest support, subject to an idiosyncratic shock ϵ_i, will be promoted:

$$i^* = \arg \max_{i \in \mathcal{A}} \{s_i + \epsilon_i\},$$

where s_i is the (deterministic) total weighted support that politician i receives within the party. We allow both top-down support from senior members and bottom-up support from junior members, which reflects the formal promotion procedure of CCP.[17] Specifically, if s_{ij} is the support that politician i receives from politician j at level ℓ, total support is defined as:

$$s_i = \sum_j w_j s_{i,j}, \tag{3}$$

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.

ϵ_i is random noise, which captures idiosyncratic connection, opportunity, or luck. We assume i.i.d. shocks and that ϵ_i follows a Type I extreme value distribution. The probability of a candidate i winning a promotion contest is therefore given by

$$p_i = \frac{\exp(s_i)}{\sum_{h \in \mathcal{A}} \exp(s_h)}. \tag{4}$$

5.4 Support decisions

When an opening occurs, politicians decide how much support to lend to each of the candidates contesting the position. Following much of the discussion on CCP internal organization (e.g. Jia, et al. 2015), preferences of politicians are driven by both factional interests and local economic performance.

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

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 $\Delta\theta$.[18] Notice that the utility gain Δ can be a function of the level of the position. Promotions to higher levels generate larger utility gains, $\Delta_\ell \geq \Delta_{\ell-1}$. 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.

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:

$$\max_{s_{i,j}} \left(e_i + \Delta_\ell \theta_i 1_{[f_i=f_j]}\right) s_{i,j} - \sum_{i=1}^{I} \frac{1}{2} s_{i,j}^2.$$

We have that:

Lemma 1: *The optimal amount of support given by politician j to candidate i is*

$$s_{i,j} = e_i + \Delta_\ell \theta_i 1_{[f_i=f_j]}.$$

5.5 Economic performance

Local political leaders supply public goods, from which they are able to extract personal benefits (Shleifer and Vishny, 1993). Suppose politician i, producing q_i units of public goods, is paired with a politician $-i$, producing q_{-i} units. Local economic performance, e, is assumed to be increasing in the total amount of public goods provided. In addition, local economic performance is also increasing in the politician's innate ability, a_i, which is a constant, exogenous characteristic of i known to every j. We posit the following linear additive relationship in determining economic performance, which can be derived by taking the log

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[18]The baseline model assumes politicians cannot belong to two different groups, but we can easily extend the model to allow for overlapping groups. Specifically, define a vector F_i as the affiliation of politician i. If this politician belongs to group f, then f'th element of this vector, $F_i(f)$, equals 1. If this politician does not belong to this group, then $F_i(f)$ equals 0. Define Θ as a vector of the faction cohesion. Then the degree to which a politician i care about politician $-i$'s utility is given by $\sum_f \Theta(f)F_i(f)F_{-i}(f)$.

of a Cobb-Douglas production function:

$$e = (q_i + q_{-i}) + \alpha (a_i + a_{-i}),$$

where α is the weight of ability in the provision of public goods and $e_i = e_{-i} = e$.

The local government, represented by the two leaders, $i, -i$, at the node, is the only producer of public goods. The two members are therefore joint monopolists of public good provision, $q_i + q_{-i}$. Each leader is able to extract a private benefit from supplying the public good. The marginal private benefit of supplying public goods is declining in the total quantity supplied, $v_\ell - (q_i + q_{-i})$, where v_ℓ is the private benefit that a leader can extract from the first unit of public goods. Notice that the private benefit v_ℓ is a function of the level of the position. Positions at higher levels are assumed to generate larger private benefits, $v_\ell \geq v_{\ell-1}$.

It is now straightforward to see that local economic performance 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 θ, 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:

$$\max_{q_i} (v_\ell - (q_i + q_{-i})) q_i + \theta_i 1_{[f_i = f_{-i}]} (v_\ell - (q_i + q_{-i})) q_{-i}.$$

Or equivalently:

$$\max_{q_i} (v_\ell - (q_i + q_{-i})) \left(q_i + \theta_i 1_{[f_i = f_{-i}]} q_{-i}\right)$$

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 $\theta_i = 1$.

In summary, we have:

Lemma 2: *When paired, local politicians i and $-i$ produce public goods:*

$$q_i = q_{-i} = \frac{1}{\theta_i 1_{[f_i = f_{-i}]} + 3} v_\ell,$$

Each politician's utility is then:

$$u_i = u_{-i} = \frac{\theta_i 1_{[f_i = f_{-i}]} + 1}{\left(\theta_i 1_{[f_i = f_{-i}]} + 3\right)^2} v_\ell,$$

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

$$e \equiv q_i + q_{-i} + \alpha \left(a_i + a_{-i}\right) = \frac{2}{\theta_i 1_{[f_i = f_{-i}]} + 3} v_\ell + \alpha \left(a_i + a_{-i}\right).$$

Given the equilibrium economic performance conditional on promotion, the optimal support decisions and the promotion probabilities can be fully specified.

5.6 Optimal support

Using Lemmas 1 and 2, we are now able to fully characterize the support decision of all politicians to all candidates at any node.

Proposition: *The support of politician j from faction f_j for a candidate i from faction f_i being considered for an opening where the incumbent co-node politician is from faction f_{-i} is given by:*

$$s_{ij}\left(f_{-i}\right) = \theta_i 1_{[f_i = f_{-i}]} \Delta_\ell + \left(\frac{2}{\theta_i 1_{[f_i = f_{-i}]} + 3} - \frac{2}{3}\right) v_\ell + \alpha a_i$$

Notice that we drop the constant αa_{-i} because it is the same across all the candidates and it cancels out when computing promotion probabilities following (4). In addition, we subtract a constant term, $\frac{2}{3} v_\ell$, such that the support to a neutral politician is normalized to 0.

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:

$$s_{ij}\left(f_{-i}\right) - s_{kj}\left(f_{-i}\right) = \Delta_\ell \theta_i \text{ where } f_k \neq f_j = f_i.$$

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 $-i$ is controlled by a rival faction to i's group ($f_{-i} \neq f_i$), politician j will support i more strongly

than in the case the other position is controlled by the same faction as i's ($f'_{-i} = f_i$):

$$s_{ij}\left(f_{-i}\right) - s_{ij}\left(f'_{-i}\right) = \frac{2}{3} - \frac{2}{\theta_i + 3}v_\ell \geq 0 \text{ where } f_{-i} \neq f_i = f'_{-i}.$$

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 different from f_{-i}.

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 $\theta = 0$), or a neutral candidate who is unaffiliated, 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

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Korea (Newson and Trebbi, 2018).

Given the optimal support from politician j to candidate i, we can aggregate across all the politicians and solve the total support received by candidate i as

$$s_i = \sum_j w_j s_{ij} = b_f \theta_i \Delta_\ell + \left(\frac{2}{\theta_i 1_{[f_i = f_{-i}]} + 3} - \frac{2}{3} \right) v_\ell + \alpha a_i \tag{5}$$

where $b_f = \sum_\ell N_{f,\ell} w_\ell$ is the faction power score in a similar spirit as Bo (2010), $N_{f,\ell}$ is the number of politicians of faction f at level ℓ.[19]

Given the equilibrium support decisions and initial composition of the party hierarchy, promotion probabilities p_i are determined by equation (4).

5.7   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 the 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, $V_\ell = cv_\ell$. 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:

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

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

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[19]The detailed derivation can be found in Appendix II.

then divided by 2:

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

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 system (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:

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

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 the 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, per equation (5). We parameterize the model in the following way. We assume

promotion utility gains and private benefits to be linear functions of the level of the position, $\Delta_\ell = \delta_0 + \delta_1\ell$, $v_\ell = \nu_0 + \nu_1\ell$. We assume that support from the supreme leader and Politburo Standing Committee members provide additive weight in promotion contests, $w_j = \omega_0 + \omega_1 1_{j,[\text{PBSC}]} + \omega_2 1_{j,[\text{Leader}]}$.[20] 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 classify politicians into five groups: CYLC, Shanghai, Princelings, Military, and Neutral. We set the faction cohesion of the neutral group to 0 and estimate the cohesion of the remaining four 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_ℓ and v_ℓ over α.

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.

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

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[20]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.

variable are defined as $\tilde{X}_s = \{\tilde{x}_t\}_{t=1,\dots,T}$. 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 $||.||_W$.[21]

6.3 Moments

Table 8 lists the empirical moments targeted by the estimator.

The first set of moments relates to factional premia, which are estimated in Table 3 and 4. Specifically, "Faction premia: CC/AC ratios" are defined as the ratio between promotion probability for a faction member in CC and a faction member in AC, normalized by the equivalent ratio for neutrals, $\frac{p_f(\ell=4)}{p_f(\ell=5)}\left(\frac{p_0(\ell=4)}{p_0(\ell=5)}\right)^{-1}$. The corresponding promotion probabilities are estimated in Table 3. "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 6.

The last empirical moment is the R-squared's explained by faction or ability related characteristics, which are estimated in Table 4.

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

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, $m\left(X\right)$.

7.1 Parameter estimates

Table 9 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

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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.

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. Yet, once again, ω_2 is estimated far below 100 percent, implying that support from the rank and file also matters substantially within the hierarchy. In particular, we find that an SC member accounts for 8 percent of the total support. The rest of the central committee members collectively 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 9 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 10 shows the faction shares in each level of the Congress in the data (upper panel) and predicted in the model (middle panel). Consistently with the data, our model successfully generates an increasing presence of CYLC and Shanghai members in the higher level of the positions at the expense of the neutral members. 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 10.

Figure 4 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, the seat shares of a faction in 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 CYCL and Shanghai Gang. For non-cohesive groups, such as Princelings and the Military, the correlation is close to zero.

Second, 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

Within our econometric framework, we can evaluate the politico-economic performance of different regimes using three measures defined in section 5.7: economic efficiency, malapportionment, and instability. The upper panel of Table 11 shows the estimates for the baseline model. 95 percent bootstrap confidence intervals are reported in the brackets below. The 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 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 contemporary Chinese political economy. The motivation for these exercises comes from the current preoccupation in policy circles and the media with the evolution in the internal organization of the Chinese state.[22] 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 11. 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, the 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

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

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 the CYCL faction 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 in leadership nodes when two CYCL members are paired with each other. Notice that anticipating more collusion, politicians from other factions increase their support to non-CYCL candidates, which limits the effect of a perfect cohesive CYCL 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. We also simulate a counterfactual scenario in which the Shanghai Gang's cohesion is increased from the baseline value of 0.85 to 1, with similar results.

Third, we consider a counterfactual scenario in which all factions become simultaneously more cohesive. Specifically, we increase the cohesion parameter, θ, of CYLC, Shanghai, and Princelings to 1.[23] 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

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[23]We keep the cohesion of the Military the same as the baseline because this group has disproportionate number of members compared to factions.

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).[24] 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 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 the 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 goods 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 malapportion-

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[24]"*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)

ment. Instead, we find the Central Committee and the Politburo experience slight reduction 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 the 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 12 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.

In future research, we hope to extend our analysis to similarly complex nondemocratic environments –the example of Russia comes to mind– where our model of hierarchical party organization may be transposed.

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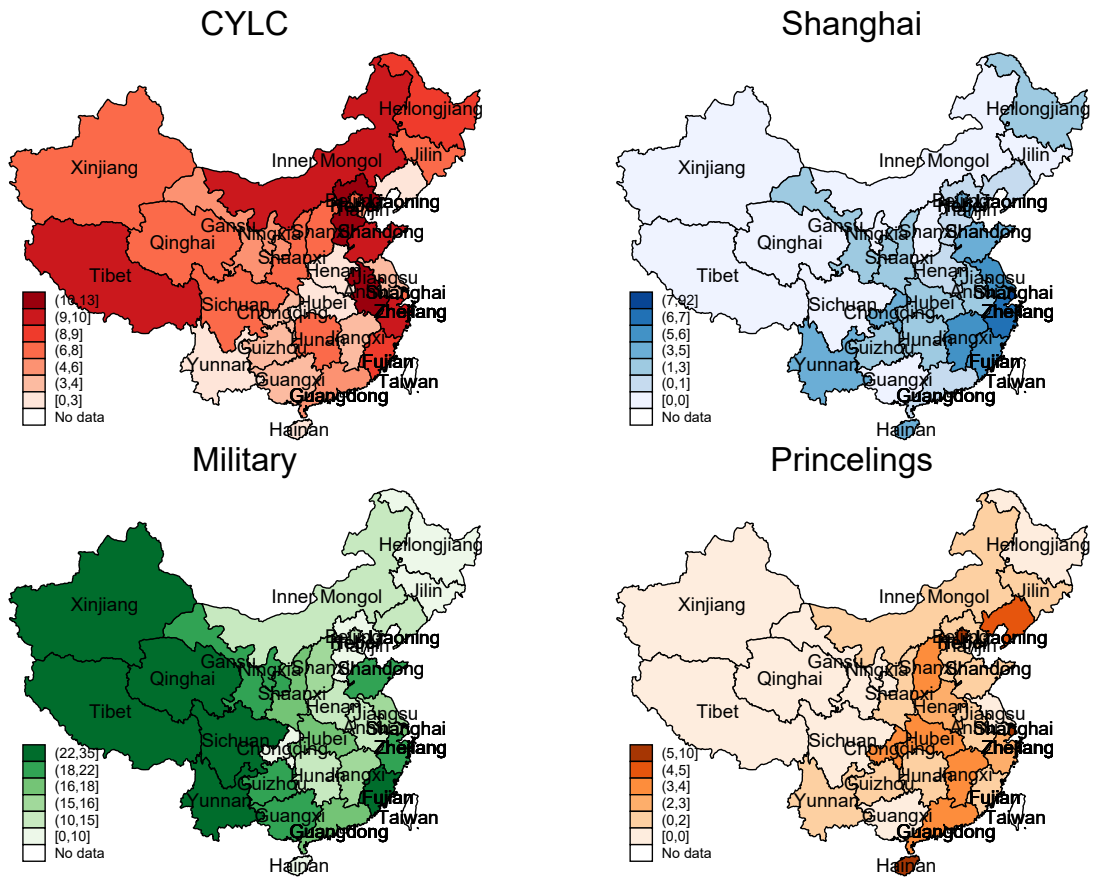
Figure 1: Geographic Distribution of Factions

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).
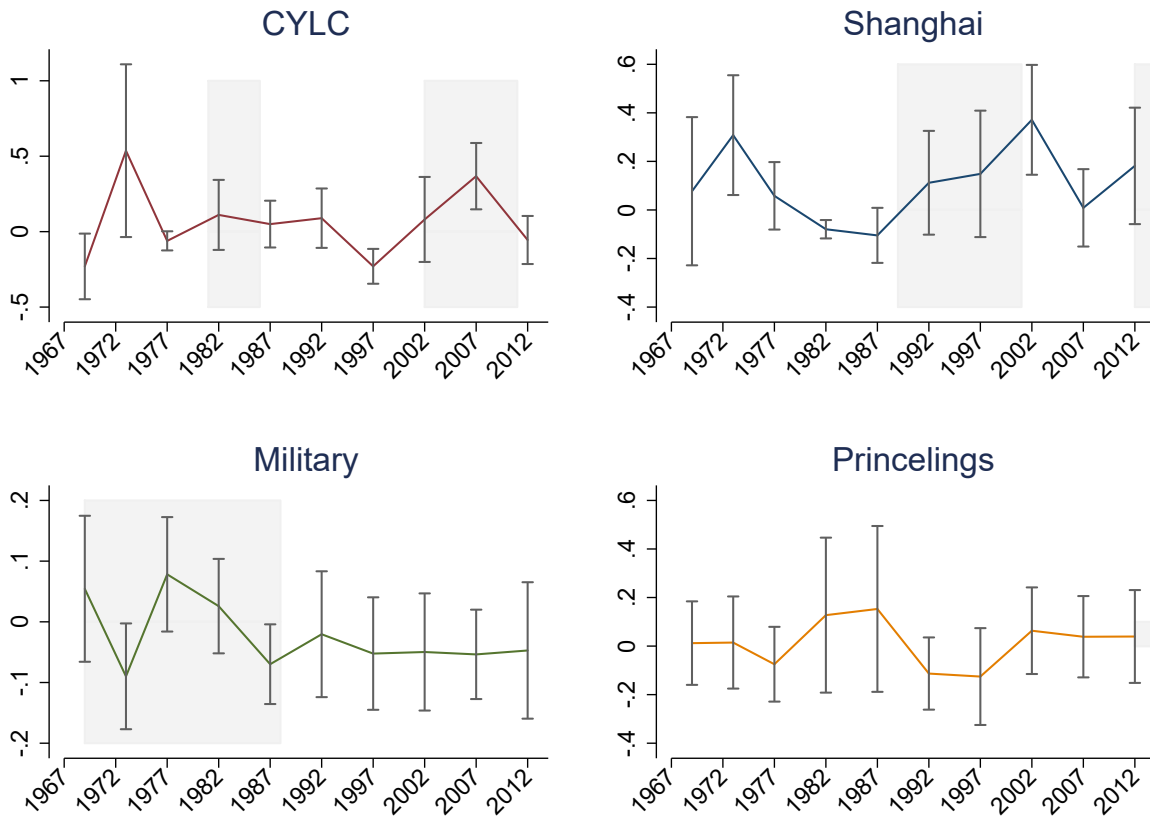
Figure 2: Leadership Premium in Promotion Rates of Each Faction

This graph shows the leadership premium in promotion rates of each faction over the neutral members 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.
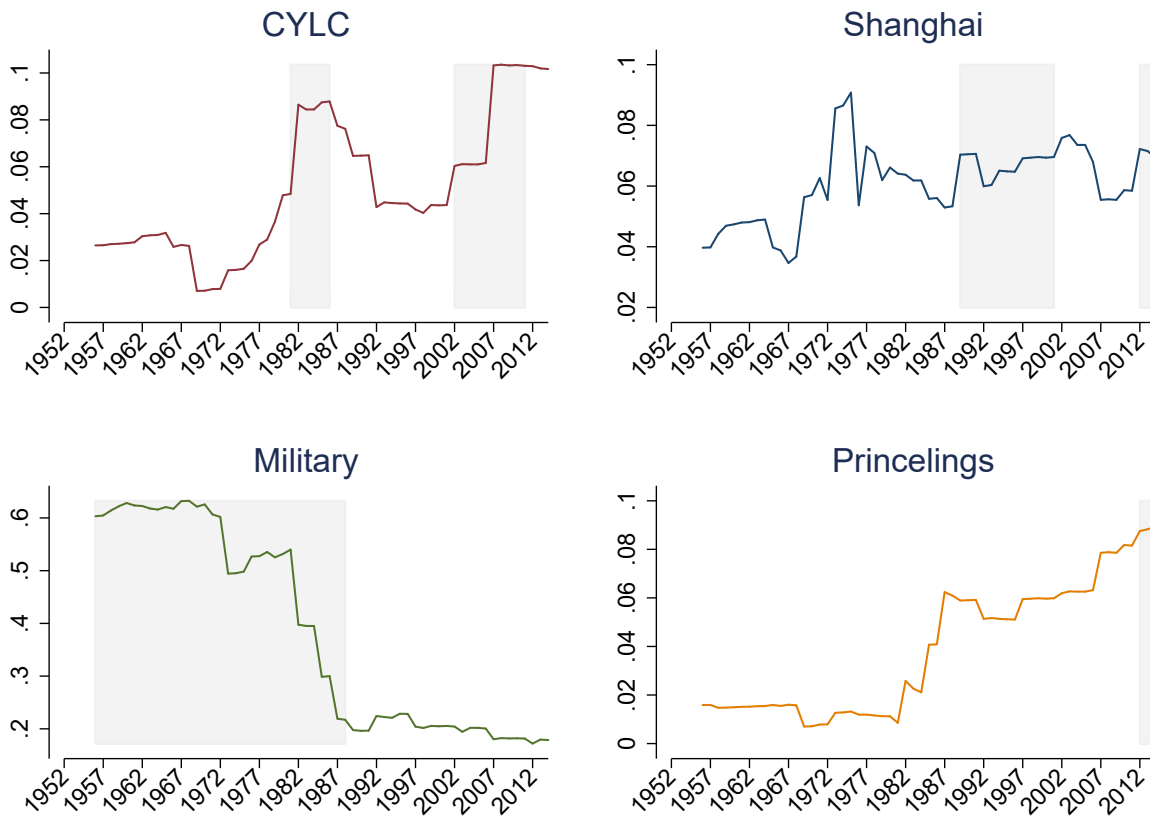
Figure 3: Leadership Premium in Power Score of Each Faction

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.
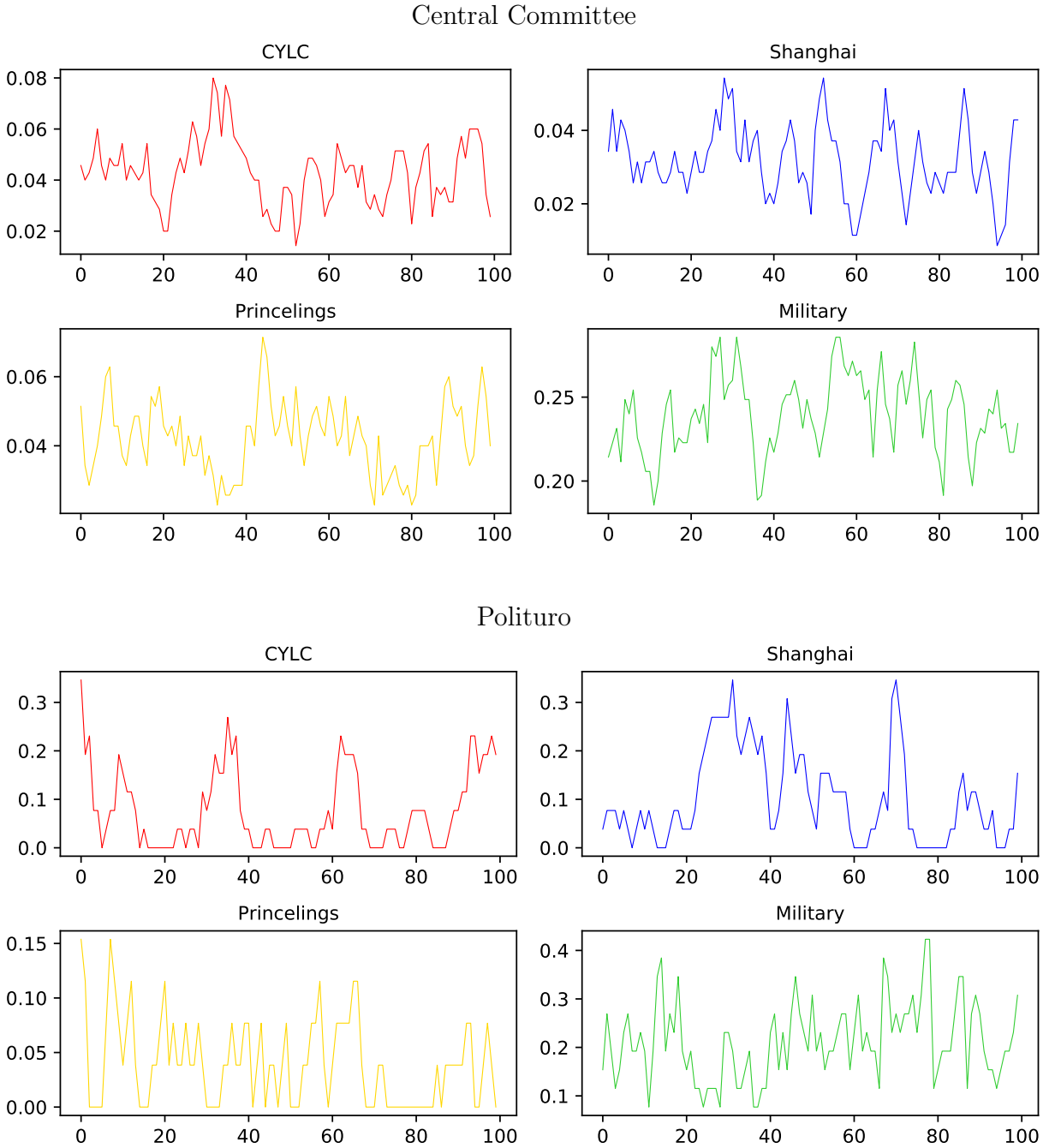
Figure 4: Simulated Path of Faction Shares

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.

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.

	8	9	10	11	12	13	14	15	16	17	18	Total
Gender	0.95	0.92	0.88	0.90	0.93	0.93	0.92	0.93	0.93	0.90	0.91	0.92
	(0.21)	(0.26)	(0.32)	(0.30)	(0.25)	(0.26)	(0.26)	(0.26)	(0.26)	(0.29)	(0.29)	(0.28)
Age	51.23	51.82	52.38	56.87	59.61	56.11	56.87	56.51	56.05	56.15	56.50	55.75
	(6.97)	(11.71)	(12.94)	(11.96)	(8.07)	(6.55)	(6.18)	(5.72)	(5.33)	(5.68)	(4.73)	(8.51)
College	0.40	0.33	0.36	0.38	0.58	0.79	0.88	0.95	0.98	0.87	0.87	0.69
	(0.49)	(0.47)	(0.48)	(0.49)	(0.49)	(0.41)	(0.32)	(0.22)	(0.15)	(0.34)	(0.34)	(0.46)
GradSchool	0.00	0.01	0.01	0.01	0.04	0.09	0.11	0.17	0.31	0.52	0.68	0.20
	(0.00)	(0.10)	(0.10)	(0.09)	(0.20)	(0.28)	(0.32)	(0.38)	(0.46)	(0.50)	(0.47)	(0.40)
Abroad	0.34	0.09	0.09	0.06	0.12	0.15	0.13	0.11	0.07	0.10	0.17	0.12
	(0.48)	(0.29)	(0.29)	(0.24)	(0.32)	(0.36)	(0.34)	(0.31)	(0.26)	(0.29)	(0.38)	(0.33)
Mishu	0.03	0.03	0.02	0.02	0.04	0.05	0.07	0.06	0.07	0.07	0.07	0.05
	(0.17)	(0.16)	(0.15)	(0.14)	(0.20)	(0.22)	(0.25)	(0.23)	(0.26)	(0.25)	(0.26)	(0.22)
EthnicMinor	0.07	0.07	0.08	0.08	0.09	0.11	0.10	0.11	0.10	0.11	0.10	0.09
	(0.25)	(0.25)	(0.26)	(0.27)	(0.29)	(0.32)	(0.31)	(0.31)	(0.30)	(0.31)	(0.30)	(0.29)
Promotion	0.21	0.11	0.10	0.07	0.14	0.14	0.18	0.19	0.16	0.21	0.00	0.13
	(0.41)	(0.32)	(0.30)	(0.25)	(0.34)	(0.35)	(0.38)	(0.39)	(0.36)	(0.41)	(0.00)	(0.34)
Retirement	0.51	0.26	0.42	0.62	0.62	0.40	0.45	0.48	0.47	0.48	0.00	0.42
	(0.50)	(0.44)	(0.49)	(0.49)	(0.49)	(0.49)	(0.50)	(0.50)	(0.50)	(0.50)	(0.00)	(0.49)
CYLC	0.03	0.01	0.02	0.03	0.08	0.05	0.03	0.02	0.05	0.07	0.09	0.05
	(0.18)	(0.10)	(0.12)	(0.17)	(0.26)	(0.22)	(0.16)	(0.15)	(0.22)	(0.26)	(0.29)	(0.21)
Shanghai	0.05	0.05	0.07	0.06	0.06	0.06	0.03	0.04	0.06	0.04	0.05	0.05
	(0.21)	(0.23)	(0.26)	(0.23)	(0.23)	(0.23)	(0.18)	(0.19)	(0.23)	(0.20)	(0.21)	(0.22)
Military	0.56	0.56	0.44	0.44	0.33	0.21	0.21	0.20	0.19	0.17	0.17	0.30
	(0.50)	(0.50)	(0.50)	(0.50)	(0.47)	(0.41)	(0.41)	(0.40)	(0.39)	(0.37)	(0.37)	(0.46)
Princelings	0.02	0.01	0.01	0.02	0.02	0.05	0.04	0.05	0.05	0.06	0.05	0.04
	(0.13)	(0.08)	(0.11)	(0.12)	(0.15)	(0.22)	(0.19)	(0.22)	(0.23)	(0.23)	(0.23)	(0.19)

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Table 2: 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 3: 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 4: 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 5: 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	Neutral	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
Neutral	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	Neutral	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
Neutral	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	Neutral	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
Neutral	.92	.77	.58	.39	1.11	60.93
Total	18.50	4.40	7.76	2.72	66.62	100.00

Table 6: 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) CYLC1	(2) CYLC1	(3) 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) Shanghai1	(2) Shanghai1	(3) 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) Princelings1	(2) Princelings1	(3) 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) Military1	(2) Military1	(3) 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

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Table 7: 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

Table 8: Moments for Structural Estimation

This table shows moments used in the SMM estimation. "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 neutrals, which are estimated in Table 3. "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 4. "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 4. "Faction premia: intercept" are defined as the coefficients of the faction of the candidate, which are estimated in Table 4. "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 6. "Ability R-squared" is estimated in Table 4.

Moments	Actual	Simulated
Faction premia: CC/AC ratio, CYLC	3.232	3.545
Faction premia: CC/AC ratio, Shanghai	2.206	2.409
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
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 9: Parameter Estimates

This table shows the estimated model parameters. The estimation sample includes all the members of the 11th to 18th Central Committees.

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 10: Faction Shares by Level of Hierarchy

This table shows faction shares at each level of the Party Congress. The upper panel is the average faction shares in the data. The middle panel is the average faction shares predicted by the baseline faction model. The bottom panel is the faction shares predicted by a model in which all the faction cohesions are set to zero. The estimation sample includes all the members of the 11th to 18th Central Committees.

Data					
	CYLC	Shanghai	Princelings	Military	Neutral
AC	0.035	0.018	0.029	0.181	0.724
CC	0.045	0.032	0.044	0.272	0.606
PB	0.097	0.075	0.112	0.251	0.432
SC	0.172	0.198	0.137	0.250	0.310
Top Leader	0.136	0.306	0.229	0.235	0.063

Baseline faction model					
	CYLC	Shanghai	Princelings	Military	Neutral
AC	0.037	0.029	0.043	0.234	0.658
CC	0.037	0.030	0.042	0.240	0.651
PB	0.099	0.056	0.038	0.227	0.580
SC	0.188	0.094	0.032	0.199	0.487
Top leader	0.233	0.117	0.029	0.183	0.437

Faction cohesion = 0					
	CYLC	Shanghai	Princelings	Military	Neutral
AC	0.045	0.035	0.042	0.232	0.646
CC	0.045	0.035	0.042	0.232	0.646
PB	0.044	0.035	0.042	0.232	0.646
SC	0.044	0.035	0.042	0.231	0.647
Top leader	0.044	0.035	0.043	0.231	0.646

Table 11: 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]
CYLC 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]
Shanghai cohesion=1	-1.122	-0.737	2.979	-0.191	0.189
	[-1.754, -0.570]	[-1.995, 0.709]	[0.455, 5.926]	[-1.098, 0.851]	[-0.972, 1.389]
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 12: 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	Neutral
AC	0.047	0.052	0.006	0.145	0.750
CC	0.101	0.067	0.011	0.191	0.629
PB	0.053	0.158	0.053	0.105	0.632
SC	0.000	0.400	0.000	0.000	0.600
Top leader	0.500	0.500	0.000	0.000	0.000

			Predicted		
	CYLC	Shanghai	Princelings	Military	Neutral
AC	0.034	0.025	0.041	0.213	0.687
CC	0.075	0.042	0.034	0.166	0.683
PB	0.263	0.138	0.088	0.119	0.392
SC	0.277	0.138	0.261	0.016	0.308
Top leader	0.500	0.500	0.000	0.000	0.000

Appendix I: Formal Procedure of Promotion in 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" issued in 1995. A detailed account can be found in Bo (2004). There are two subsequent updates issued in 2002 and 2014 but the main procedure remains the same. According to the regulations, the appointment process consists four steps: democratic recommendations, screening, deliberation, and discussions and decision. First, 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. Second, the organization department screens candidates by having private meetings with relevant individuals, conducting public opinion polls, and interview the candidates. Third, the list of candidates are vetted through a process of 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. Forth, the list of candidates is presented to the next higher-up party committee where the selection decision is made. The party committee of this level may make suggestions regarding the selection.

Appendix II: Promotion Probability Derivation

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

$$s_i = \sum_j w_j s_{ij} = \sum_j w_j \theta_i \mathbb{1}_{[f_i=f_j]} \Delta + \sum_j w_j \left(\frac{2}{\theta_i \mathbb{1}_{[f_i=f_{-i}]} + 3} - \frac{2}{3} \right) v + \sum_j w_j \alpha a_i$$

$$= \left(\sum_\ell n_{f,l} w_\ell \right) \theta_i \Delta + \left(\sum_\ell w_\ell \right) \left(\frac{2}{\theta_i \mathbb{1}_{[f_i=f_{-i}]} + 3} - \frac{2}{3} \right) v + \left(\sum_\ell w_\ell \right) \alpha a_i$$

We normalized the parameters using the total weight of support, $\sum_\ell w_\ell$, to 1. Therefore, we have

$$s_i = b_f \theta_i \Delta + \left(\frac{2}{\theta_i \mathbb{1}_{[f_i=f_{-i}]} + 3} - \frac{2}{3} \right) v + \alpha a_i$$

where $b_f = \sum_\ell N_{f,\ell} w_\ell$ is the faction power score proposed by Bo (2010), and $N_{f,\ell}$ is the number of politicians of faction f at level ℓ.

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Appendix III: Details of Estimation Procedure

1. We first create a party hierarchy with 6 levels, corresponding to 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.

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 will be a $q \times p$ matrix for q moments and p parameters. We calculate the derivatives numerically.