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. Our empirical analysis ranges from the end of the Deng Xiaoping era to the current Xi Jinping presidency and it covers the appointments of both national and provincial officials using detailed biographical information. We present a set of new empirical regularities within the CCP, including substantial leadership premia in the Politburo and Central Committee, intra-faction competition for promotions, and systematic patterns of cross-factional mixing at different levels of the political hierarchy. An organizational economic model suited to characterizing factional politics within single-party nondemocratic regimes rationalizes the data in-sample and displays excellent out-of-sample performance.
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.

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 economic literature on the internal organization at the highest levels of the Chinese government is limited.[2] Political scientists focused on China studies have been more attentive, but also often more qualitative and descriptive, at least until recently.[3]

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).[4] 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 CCP officially rejects factional elite politics[5], but 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. Since Nathan (1973), 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).

Existing literature often portrays a faction as a single fictional decision maker. While this "unitary action" assumption may be useful in some scenarios, such as formal political parties in Western parliamentary democracies, it is less so in the case of Chinese politics. Factions in China are rather informal and loosely organized groups of political entrepreneurs (Bo 2004;

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

[2]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.

[3]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).

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

[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

2008), linked by reciprocal social ties (*guanxi*). CCP factions display very limited policy differentiation (Dittmer, 1995). They also exhibit rich internal dynamics. For instance, the career trajectories of junior members appear to move in lockstep with the fortunes of their patrons, and competition often arises among members of equal seniority within a faction. Recently, for instance, Lungu (2017) describes how two powerful equal ranking members of the CYLC faction[6], Wang Yang and Li Yuanchao, competed for one position in the Politburo Standing Committee of the most recent 19th Central Committee. Episodes of within-faction internal competition are reported in Qiu (2005) and Li (2007).

To understand the internal dynamics in Chinese politics, we present a organizational economic model of factional interaction. While capturing cross-faction interaction and factional evolution, we pay special attention to individual incentives, supplying a career concerns model of individual promotion in the CCP hierarchy. In our model *"lower-level officials [...] join factions in order to secure promotions and other regime goods from powerful patrons"* (Shih, 2016, p.1) and 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.

In our model, factions operate within a given party hierarchy, contesting open positions. The seniority of a member within the faction is determined by his level in the party. A senior faction member can decide whether to give support to promotions of junior members within his jurisdiction. On one hand, a successful promotion of a cofactional enhances the faction's overall power, which can benefit the senior member. On the other hand, the ascendancy of a junior faction member may dilute the chance of promotion for the senior member himself, especially when the junior aspires to an equal rank as the senior. The trade-off faced by the senior member is between enhancing the faction's overall power and preserving his own career prospects. We show that when an opening occurs far down the hierarchy, the senior member is likely to support such promotion, as the concern of internal competition is minor. However, when an opening occurs at the same level of the senior member, he will ask the junior to wait until the senior himself is promoted. The faction seniority is preserved endogenously by the allocation of factional support and a junior member's ascendancy through the hierarchy is tethered to the rise of the relevant seniors above him.

In the unique (Markov Perfect) equilibrium that we characterize, the factional composition of each level of the hierarchy at every point in time determines the promotion opportunities at lower levels of the hierarchy, which ultimately affect the costs and benefits of joining factions. Unaffiliated (neutral) politicians emerge in equilibrium because, although they do not enjoy factional support, they are also not restricted in their capacity to contest openings higher up. This is a relevant theoretical result, as in the data a substantial share of politicians appear

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[6]We will provide information on this faction, and others, below.

neutral.

Using a large biographical database which covers more than 5,000 Chinese political elites, we document a set of new empirical regularities within the CCP which anchors our model. Absent hard and verifiable information, we rely on the extant discussion of Chinese elite politics to identify a minimal set of factions within the CCP. 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 affiliated cadres, and do not necessarily represent specific territorial or economic interest groups (Dittmer, 1995). As we discuss in Sections 2 and 3, this paper will lever only the most obvious factional links identified within the CCP, links based on affiliation to the Communist Youth League of China (CYLC, related to General Secretary Hu Jintao) or to the so-called Shanghai Gang (affiliated most prominently with Jiang Zemin and bolstered by the special status of Shanghai in Chinese politics).

A necessary condition for our model's coherence is that factions may deliver advantages to their members. In the data, we show systematic evidence that faction affiliation, on average, increases one's chance of promotion comparing to an unaffiliated politician. Furthermore, the benefit of being a faction member is time-varying: when a faction leader becomes the supreme leader of the party, faction members enjoy additional premia in promotion. The existence of precisely estimated leadership premia points in the direction of factions both being reasonably identified within our analysis and of operative relevance within the party.

In line with the organizational economics approach that we follow, we find empirical evidence that competition arises internally within a faction. Specifically, at each level of the party hierarchy, if there are more candidates from the same faction competing for the same openings, each individual faction member's chance of promotion is diluted. In contrast, the presence of faction members at other levels of the hierarchy has no such effects. These empirical results are not driven by time-varying promotion opportunities at each level of hierarchy or by changes in a faction's bargaining power.

Consistently with the model, we find systematic patterns of cross-factional mixing at different levels of the political hierarchy. Two politicians from the same faction in the same office and area rarely share positions with equivalent rank. 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. This pattern endogenously arises in our model, as a faction senior asks juniors who aspire to an equal position as the senior to bide their time until they are themselves promoted.

To further examine the quantitative relevance of our approach, we estimate our model structurally, obtaining estimates of the primitive parameters (such as leadership premia and parameters governing the contest functions for promotion), and formally test our mechanism against alternatives, including ones based on pure seniority or meritocracy. We show

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how the estimated leadership premia in the CCP are quantitatively substantial, but quite far from winner-take-all levels, and show that intra-faction competition among members operates as a de facto endogenous dampening mechanism in slowing down factional growth. Our model generates an excellent in-sample fit in matching empirical moments in terms of factional composition, promotion rates, and effects of changes in the factional identity of the top leadership in China. In an out-of-sample exercise, our model predicted very closely the factional arrangements in Politburo promotions for the most recent (19th) Party Congress of October 2017. In our preferred specification, an out-of-sample prediction made in October 2016 matched the empirically realized factional arrangement almost exactly.[7] We predicted Shanghai Gang, Neutral, and CYLC promotion shares of 24%, 66%, 9%, respectively, versus realized shares of 25%, 65%, 10%. We believe this, at the very least, rules out gross mispecifications in our analysis.

The paper includes several counterfactuals, important to assess the politico-economic equilibria of China. We model possible institutional changes within the CCP, including the effect of increased leadership premia, which may indicate a break away from the *"collective leadership"* design envisioned by Deng. We also study the role of the identity of the top leadership, specifically, General Secretary Xi Jinping's factional affiliation.

A final empirical contribution is a formal test whether certain political groups constitute political factions. 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). It is an ongoing debate in the literature whether some of these groups are relevant political units, yet no formal statistical tests on the identity of factions have been proposed. We show how our structural approach allows us to fill this void. Importantly, we reject at standard confidence levels the hypothesis that the often mentioned Princeling group (to which both Xi Jinping and the disgraced former governor Bo Xilai are said to belong) is a faction.

Our paper contributes to the politico-economic literature on Chinese elite politics. Scholars such as Shih, Shan, and Liu (2010), Shih, Adolph, and Liu (2012), Jia et al. (2015) 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 factions which are well established in the extant discussion of Chinese elite politics,

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[7]www.nber.org/papers/w22775

[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."*

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we find that politicians working in the same department or party branches are not necessarily from the same faction. Instead, if they have similar ranking, they are actually more likely to belong to different factions. Thus, simply sharing part of their career paths may not be informative of factional affiliation for CCP elite officials. In fact, our evidence shows it may mislead completely.[9] The statistical analysis of these systematic factional distributions in top CCP positions is new to the literature.

Besides the politico-economic literature on Chinese elite politics mentioned above, this paper speaks to the literature on the internal organization of autocratic regimes. Francois, Rainer, and Trebbi (2015, 2016) discuss at length the importance of its connection to the expanding literature on the political economy of development. Most related to our work (and one of the first rigorous analyses of factional politics within the economic literature) is Persico, Rodriguez-Pueblita, and Silverman (2011), who present a theoretical model of endogenous factional growth in a democracy with competitive elections and link it qualitatively to evidence from factional local politics in Mexico within the Institutional Revolutionary Party.[10] 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 its own career path, which gives rise to a richer set of predictions on the internal dynamics of 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 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.

The remainder of this paper is organized as follows. In Section 2 we provide a brief institutional overview of the CCP. In Section 3 we discuss our data, operationalize factions, and provide a descriptive analysis of our samples. Section 4 produces a set of stylized facts, some novel, useful to frame and guide the theoretical analysis. In Section 5 we discuss our theoretical setup and Section 6 develops our estimator. Our main empirical results are reported in Section 7. Section 8 presents our counterfactual exercises. Section 9 concludes.

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[9]Fisman et al. (2017) shows that using hometown and college ties may also lead to mismeasurement since leaders may want to avoid the appearance of favoritism. In fact, hometown and college ties with leaders are associated with lower promotion probability.

[10]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).

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.[11]

In 2016 the Chinese Communist Party, with its 88.8 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 (PBSC), formed by the other 5 members and which represents the set of the highest ranked politicians in China. The PBSC 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 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).[12] We will occasionally refer

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[11]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).

[12]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

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.[13] 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.[14] Li (2012) associates with the CYLC "populist" policies close to the rural poor and recent migrants to cities, as opposed to the policies preferred by more "elitist" groups comprised by CCP cadres close to former General Secretary Jiang Zemin and a group of party officials connected to the Shanghai municipal administration. Indeed, the economic and political role of Shanghai cannot be emphasized enough in CCP internal interactions, to the point that the term *Shanghai Bang* (Gang) has often been employed to identify the patronage cluster close to Jiang and to the economic interests of the coastal (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

We combine two biographical databases of Chinese politicians. The first data source is China Vitae, which collects biographical information on more than $4,494$ Chinese elites in government, politics, the military, education, business, and the media since 1992. 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.

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read as allowing for the presence of a close substitute in the party hierarchy for any member.

[13]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% of the applications were accepted. http://news.xinhuanet.com/english/2016-06/30/c_135478976.htm

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

Our second data source is a biographical database of CC members developed by Shih, Shan, and Liu (2008), and further updated by Lu and Ma (2015). This database contains all CC and AC members from the first Party Congress in 1921 to the eighteenth Party Congress in 2012. This data also provides biographical information and career trajectories similar to China Vitae. We focus our analysis on the period of 1956 to 2014, which starts from the first Party Congress since the founding of People's Republic of China (8th Party Congress in 1956) and ends with the most recent Central Committee (18th Party Congress in 2012), covering a total number of 1,853 individuals. Data for the 2017 nineteenth Party Congress is still being completed and only available at this time for the Politburo and higher levels.

We combine these two data sources to construct our estimation samples. Whenever there is 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). We also collect provincial population and GDP data from China Data Online. The anti-corruption data originates from ChinaFile and China's Central Commission for Discipline Inspection (CCDI) website.

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 for politicians in our sample to also be unaffiliated (neutral, indicated as N).

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, CYLC

and Shanghai Gang, truly exhibit the features of political factions within the CCP. 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 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, often times in deep rivalry among themselves, such is the case of Bo Xilai and Xi Jinping). While we will keep track of all types of affiliations in the analysis that follows, we emphasize here that our theoretical and empirical design will separate CYLC and Shanghai Gang faction members from all other political actors, including the military and Princelings, which we will deem "neutral". Because of the traditional coloring associated with these two established factions, we will also occasionally refer to the CYLC as the Red faction, R, and to the Shanghai Gang as the Blue faction, B.

Table 1 provides summary statistics of demographics and careers of $4,494$ elites who held important positions in government, politics, the military, education, business, and the media in China since 1992. The unit of observation is a position-individual pair. We classify the organizations into 12 categories: party apparatus, government, military, People's Congress, Chinese People's Political Consultative Conference (CPPCC), court, procuratorate, CYLC, business, media, education, and an unclassified category. The average duration of each position is about 4 years, and the age of starting each position varies from the early 30s (CYLC) to the late 50s (People's Congress). Individuals who hold these positions are predominately male, which reflects the large gender imbalance at the top levels of government and business in China.[15] Ethnicity is predominately Han, reflective of the ethnic composition in the Chinese population. The last four columns provide the frequency of the various affiliations in each type of organization. CYLC members tend to work in the party apparatus and media instead of the government system.[16] The Shanghai Gang is more evenly distributed across all types of organizations. Princelings are more likely to have experience in the military, but are less likely to work in the legal system (court and procuratorate), potentially due to the fact that the power of the judiciary is relatively muted in China.

We then turn our focus to a subset of elites, the members of Central Committees of the CCP. This is a group of around 400 people who comprise the CCP top leaders. Table 2 provides the demographics and the factional affiliation by sessions of the Central Committees. Similarly to the larger sample of elites, the CC members are predominantly male, in their mid-50s and mostly Han. Over the past 60 years, more members hold college or even postgraduate 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,

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[15]25.1% of CCP members were women in 2016.

[16]This is consistent with the anecdotal discussion of Hoffmann and Enright (2008) that CYLC leaders often have experience in non-economic fields, such as party organization and propaganda

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. The military has experienced a large downward trend, dropping from 56 percent in the 8th Central Committee to less than 20 percent in recent years.

4   CCP Factional Politics: Reduced Form Results

This section presents a set of facts on factional politics in China, the most important of which are novel, to the best of our knowledge. These stylized facts are going to inform and motivate the theoretical analysis that follows.

i) National Political Actors. We begin by arguing qualitatively that the factional affiliations we posit (CYLC and Shanghai Gang) share properties that make them bona fide large national players within the CCP and are not merely political actors representing local constituencies.

In Figure 1 and Table 3 we describe the geographic distribution of members affiliated with the CYLC and the Shanghai Gang in provincial roles. As is evident, the representation across provinces is fairly broad and not limited to a particular local area, despite a small positive correlation between the presence of Shanghai Gang and the average GDP per capita of the province. 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).

ii) Leadership 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 our 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 will 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 and Shanghai Gang.

Table 4 shows a panel regression of promotion and retirement dummies on the factional affiliation of Central Committee members interacted with the faction of the General Secretary. The sample includes all members of the 8th to the 18th Central Committees (Politburo Standing Committee members are excluded from the promotion regression). Promotion is

equal to 1 if a Central Committee member moves up in the rank defined by the four levels of Central Committee (1 PBSC, 2 PB, 3 CC, and 4 AC).

As is clear from the reduced form regressions, an R (respectively, a B) politician has substantially higher likelihood of promotion when an R (respectively, a B) leader is in power. On average CYLC and Shanghai Gang members exhibit promotion rates higher by 10 percentage points relative to neutral members (excluding military and Princelings), as reported in Appendix Table 3. However, this result masks substantial heterogeneity. While CYLC and Shanghai Gang members' promotion rates hover around 4 percentage points higher than neutrals in times where the leadership is not from an individual faction, having a cofactional leader adds 20.6 percentage points to CYLC and 19.3 to Shanghai Gang, inducing a substantial, highly significant, leadership premium to the speed at which leader's cofactionals are promoted. Figure 2 provides a visualization of the leadership premia in promotion rates.

We also perform an analysis looking at allocations of crucial posts to factional members. The dependent variables include: the share of official positions allocated to a faction constructed following the scheme of Bo (2010) and weighted by value (we will refer to it as "power score"); the share of seats of Alternate Central Committee members (AC); of the full Central Committee (CC); of the Politburo members (PB); and of the Politburo Standing Committee members (PBSC). These effects are reported in Table 5. Leadership premia are statistically significant, between 4 percentage points higher in terms of power score shares for the CYLC and around 2 percentage points for the Shanghai Gang. These estimates are not trivial, but quite far from winner-take-all levels. The leadership premia in the power score can be easily observed in the simple time series plots of Figure 3.

iii) Internal competition between faction members Given the total resources of a faction are often limited, competition among faction members may arise. Anecdotal evidence suggests faction members indeed compete internally for promotion.[17]

We formally test whether whether the chance of promotion of a faction member is affected

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[17]For instance, an article in the Diplomat notes that two members of the CYLC faction, Wang Yang and Li Yuanchao, competed for one position in the Politburo Standing Committee of the 19th Central Committee:" *In the case of Wang Yang, his main competitor is Li Yuanchao. Both are considered part of the Youth League faction, being allies of Hu Jintao. Both served on the Politburo starting in 2007. Both hold state positions (vice president and vice premier). As a former head of the organization department, Li Yuanchao should eventually reach the PSC and this is his last chance. On the other hand, Wang Yang could still remain second-ranked vice premier and reach the PSC in 2022, as vice premier. But it's possible that Li Yuanchao, who is 67, might be forced to retire or to remain on the Politburo in order to facilitate Wang's promotion*" (Lungu, 2017). As it turns out, Wang Yang managed to enter the Standing Committee but Li Yuanchao did not. Similar competition also arose when two high rank CYLC members, Li Keqiang and Li Yuanchao, competed to succeed Hu Jintao (Li, 2007). Another story is documented by Qiu (2005): when Li Keqiang was the head of the Department of School Affairs of the CYLC Central Committee, he faced fierce competition from the head of another department for promotions. Such bitter rivalry even led Li's competitor to worry that Li would use his power to seek revenge against him after Li was promoted to be first secretary of the CYLC.

by the share of cofactional members in the same level. We focus on the two well-established factions, CYLC and Shanghai Gang. The result is reported in Table 6. We find that a higher share of cofaction members reduces a politician's chance of promotion. This suggests that indeed there is intra-faction cannibalization in the promotion competition. We also include the overall faction share in the whole hierarchy as a control variable. Interestingly, the overall faction share has insignificant effects on the promotion, suggesting that intra-faction competition only occurs among politicians with similar ranking. The result is not driven by the time-varying promotion opportunities, as adding rank-year fixed effects in column 4 barely changes the result. The result is not driven by time-varying faction bargaining power, as adding year-faction fixed effects in column 5 does not change the result either. The above finding suggests that factions operate in a more complex way than the "unitary action" assumption would suggest and there is substantial internal competition among faction members. In a sense, a faction is a team of rivals. In some circumstances, faction members help each other, while in other situations they may compete with each other. A deeper understanding of the incentives of individual faction members seems to be a necessary step to understand how factions actually work.

iv) Cross-Factional Mix. Useful to the understanding of factional dynamics within the CCP is the study of the peculiar factional mix which we observe when sampling the diarchic nodes pervading Chinese institutional design. These are pairs of positions of similar rank and operating in close institutional proximity to each other. Table 7 shows the raw frequency of the factional composition of virtually all top two leadership posts in post-Deng China. Table 8 reports formal statistical tests. In particular, 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.

Table 8 shows panel regressions of the factional affiliation of the number 1 official on the number 2 official's affiliation at the same node. The variables $CYLC1$ and $Shanghai1$ (respectively, $CYLC2$ and $Shanghai2$) are dummies which equal 1 if the number 1 official (respectively, number 2) is from that faction and 0 otherwise. We will also refer to such factions through the abbreviations R, B. The sample period is from 1992 to 2014. Columns 1-4 include all positions, and Columns 5-6 break down to provincial and national level positions. The provincial positions include 31 provincial and municipal units (secretary and governor)[18]. The national positions include 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

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

People's Court (President and Executive Vice President).

Taking the top two leadership positions in any CCP (or PRC) organ, position 2 being filled by a R (respectively, a B) politician predicts negatively and significantly the likelihood of position 1 being filled by an R (respectively, a B) politician. The estimated negative coefficients indicate a statistically robust lower likelihood of same-faction pairs (R, R) or (B, B) relative to what would happen in case of pairings forming randomly between B, R, N. Interestingly, the evidence for Princelings is much weaker, in line with further evidence below showing their lack of behavior as an organized faction.

To the best of our knowledge these facts on systematic cross-matching within Chinese elite politics are new. An implication of this evidence is that methodologies imputing factional affiliation based solely on shared professional paths may be problematic, as discussed in the Introduction.

iv) Anti-Corruption Campaign. As in the allocation of rewards to cofactionals through leadership premia, we would also expect evidence of factional bias in the administration of punishment. We have limited systematic evidence in this respect, but it interestingly points in a direction consistent with the limited leadership premia discussed in point iii).

This novel evidence comes from the factional analysis of the CCP members hit by President Xi Jinping's anti-corruption campaign (initiated in 2012 and still ongoing as of 2017). A remarkable factional balance seems to be present in the administration of punishment, when looking at the detailed resumes of the so-called "tigers", a code name for high-ranking party members affected by the purge[19]. Table 9 shows that both CYLC[20] and Shanghai Gang appear represented in the purged sample[21] 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. The reader may however notice a lower, but not significant, representation of Shanghai Gang members, the faction most likely to be associated with Xi (if at all –see Section 8). These results appear also completely consistent with an independent analysis of the anti-corruption campaign presented in Lu and Lorentzen (2016).

v) Post-Deng era. Finally, we provide brief empirical justification for our focus on the post-Deng era. Mao Zedong and Deng Xiaoping have often been characterized as political

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[19]As opposed to low-level politicians, "flies", involved in petty corruption. Tigers directly hit by the anti-corruption purge have included retired PBSC member Zhou Yongkang and retired PB member Xu Caihou.

[20]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

[21]We build a corruption dummy indicator for whether a political/military official is listed in the public anticorruption database of the Central Commission for Discipline Inspection and from ChinaFile. Table 9 shows the cross-section regression of corruption dummy on faction affiliation of an official. The sample includes all individuals covered by China Vitae who have not retired by the year 2007, the year of 17th party Congress.

"strong men" by many observers, as their legendary careers in the revolutionary era won them ultimate control over the military. In contrast, subsequent leaders, Jiang Zemin, Hu Jintao, and Xi Jinping, appear categorically different: civilian officers who rose through the party hierarchy relying on their ability and connections. This structural break is evident in the data.

Underlying the symbolic retirement of Deng in 1989, we document structural changes in the whole spectrum of political elites. Figure 4 shows the share of power score by factions or groups in the Central Committees of the CCP. Post-Deng China witnesses a significant decline in the influence of the military group, and a rise in factions such as CYLC and Shanghai Gang. Figure 5 breaks down the power score by four constituencies of the Central Committee: state organs, party apparatus, military, and regional governments. The pre-Deng era was ridden with volatile shifts across constituencies, with the most salient example being the Cultural Revolution between 1966 and 1976, during which state organs and party apparatus were virtually paralyzed. In contrast, the post-Deng era witnessed the stabilization of power shares for each constituency. Despite the lack of political reform often alleged by outside observers, the above evidence suggests that Chinese politics evolved to a new phase in which political strongmen became replaced by factional politics after Deng[22]. This is the period we focus on.

5 Model

Having produced a series of statistical regularities pointing in the direction of a systematic role for factional affiliation in the CCP, we proceed with the construction of an economic model useful to understanding the incentive structure driving the data in the post-Deng era.

5.1 The Hierarchy of Positions

There is a L level hierarchy of leadership positions, ordered from the highest level 1, to the bottom, L. Each level, ℓ, of the hierarchy has a $M_\ell/2$ leadership nodes. Each leadership node has a pair of leadership positions. The two positions at each node are ordered (position 1 and position 2). The hierarchy is broken up into regions, each of which nests a higher number of smaller regions below it. Level 1, the top level, has one node and hence two positions; $M_1 = 2$. It is the paramount leadership node for the country as a whole (currently, President Xi Jinping and Premier Li Keqiang). Level 2, the second layer in the hierarchy, has $M_2 > M_1$ positions divided up into $M_2/2$, and so on, with the number of positions

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[22]Appendix Figure 3 shows additional evidence that age limits on Politburo members are strictly and systematically enforced in the post-Deng era, again another sign of a break toward institutional regularization.

strictly increasing down to level L. The nodes at the lowest level are the "entry" leadership positions, corresponding to the first step in a political life that we model.

Time is continuous. Each individual politician "dies" (or exogenously retires) with an instantaneous probability, δ, which also acts as the instantaneous discount rate. Upon a politician's demise, 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. We assume that the flow utility from being in office is increasing in the position within the hierarchy. Denote by u_ℓ the instantaneous utility generated at any position at level ℓ, with $\ell \in \{1, \dots, L\}$, so that $u(\ell) > u(\ell+1)$. Positions within a level are ranked, but the utility flow difference is negligible and ignored; each position at level ℓ identically generates flow utility of $u(\ell)$.[23]

5.2 Factions

There are two factions, denoted B (Blue) and R (Red), and the remaining individuals are neutrals, denoted N.[24] Factions exist to foster career prospects of affiliated cadres through a quid-pro-quo relationship. On the way up the hierarchy, a faction member receives support from senior faction members. In return, the faction member provides support to junior members for promotions. More faction members at higher levels enhances the overall faction power, which benefits all faction members. This characterization of a faction aims at capturing, in a stylized fashion, the essential patron-client nature of such an organization, as emphasized in Nathan (1973).

Factions are organized geographically (Li, 2013), in a way that mimics the allocation of power positions within the country. Faction members are designated by their region. A member at the top of the national government has a jurisdiction over the whole country, while a member at the top of a provincial government has a jurisdiction over the corresponding province but not other provinces. For example, if a faction member is a provincial leader in province P_1, he has jurisdiction over all the city- and village-level positions in province P_1, but he does not have jurisdiction over any city- or village-level positions in province P_2.

5.3 Promotions and Faction Support

When an opening arises in level ℓ, the set of eligible candidates for a faction is first drawn from the faction members immediately junior to the open position, $\ell+1$. If a faction has no members at the level $\ell+1$, then they can put forward a member from $\ell+2$, and so on if $\ell+2$ is also vacant. Such jumps are occasionally referred as "helicopter" careers in China. The ordering of positions at a node is not an impediment. A politician at position 2 in level

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[23]Formally: position 1 generates $\mu \to 0^+$ extra utility relative to a position 2 at all ℓ in the same node.

[24]The presence of more than two factions is easily incorporated. Here, we maintain this assumption only for expositional purposes and in line with the empirical analysis that follows.

$\ell + 1$ can be considered for promotion to position 1 in level ℓ equivalently to a politician at 1 in level $\ell + 1$.

When an opening arises, faction seniors who have jurisdiction over this position must decide which, if any, faction candidates will receive their support. For example, if there is an opening in province P_1, only faction seniors in the same province and in the national government will be consulted, while faction seniors in other provinces will not. Support decisions are made sequentially by relevant faction seniors, proceeding through the hierarchy from the position of the opening upwards. The decisions of higher ranked members supersede those of lower ones. This process continues up to the highest ranked member, each one being ratified (or overturned) by successive steps on the way up. At the top, the final irrevocable, decision of factional support is made. Note that faction seniors cannot choose who wins the promotion contest as the faction candidates compete with candidates from other factions.[25] However, a faction member not supported by his faction seniors cannot win promotion to the position provided there are other supported candidates, or Neutrals contesting. .[26]

Ceteris paribus, each faction member receives a small utility benefit when a member of their faction is supported for an opening. We denote this benefit by ϵ and assume that $\epsilon \to 0$. The faction's prestige is enhanced by promotions, and the members are accordingly pleased, but this is assumed to be of no material or career benefit to members per se; unlike the substantial benefits that arise when leadership falls to their faction (modeled below).[27] We assume that at each decision level, overturning the decision received from a level below in the faction imposes a cost $c > 0$, on the decision maker. This cost can (but need not) be small and always strictly exceeds ϵ; $c > \epsilon$. Intuitively, we model here the fact that it is always easier to rubber stamp a subordinate's decision and push it up the hierarchy than to submit a reversed one. Otherwise, decision making, per se, imposes no costs.

So, for an opening at level ℓ agents at lower levels, $\ell' > \ell$ of the hierarchy (including those eligible for the open position) have no input into the faction's support decision. We denote their input by $\emptyset$. The first input into the factional support decision arises for the co-node member at ℓ, if there is one at this node.[28] This agent's "decision" is a vector of choices from within the interval $[0, 1]$ applicable to each eligible candidate from the faction from the level below. So, for an opening at ℓ there are $I_{\ell+1}^t$ members of faction I eligible. If the co-node member is from faction I then he chooses an $I_{\ell+1}^t$ vector of values $\left(d_1^\ell, d_2^\ell, \dots d_{I_{\ell+1}^t}^\ell \right)$ where

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[25] In Appendix I, we provide a description of the formal selection and appointment of party and government leading CCP cadres that concurs with our setup.

[26] If a faction does not support a member, he could, in principle, quit the faction and contest positions as a neutral. We do not allow this, implicitly assuming that the costs of doing this are prohibitive – factions are like the mafia: able to severely punish people who do not fulfill commitments.

[27] We could alternatively assume that ϵ is realized only when a supported member is actually successful in a promotion contest. This alternative assumption has no consequence for the results.

[28] Note that the co-node member of the opening is senior than competing candidates.

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$d_i^\ell = x$ denotes "support promotion" i with probability x and $d_i^\ell = 0$ denotes a "request to stay" i, i.e. a request to bide one's time until the senior cofactional himself is promoted.[29] The further restriction is that the sum of the support allocations across all eligible members cannot exceed 1, though it can sum to less than 1. Denote this vector of choices by an agent at ℓ by $d_I^{\ell\ell} \equiv \left(d_1^\ell, d_2^\ell, ... d_{I_{\ell+1}^t}^\ell \right)$. The second factional input regarding an opening at ℓ in the faction's sequence of decisions falls to a faction member (if there is one) in the lowest position at level $\ell - 1$. This agent observes the decision handed up to him from the decision maker at level ℓ and similarly has an $I_{\ell+1}^t$ dimensional vector of support choices to make. Denote this decision by $d_I^{(\ell-1)\ell}$. If there is a faction member in the top position at the node, his decision occurs next and is denoted $d_I^{\overline{(\ell-1)\ell}}$. If there is no decision maker from the faction at a node opening, we shall denote the input at that node by $\emptyset$.

From now on, we compactly use the notation $d_I^{(\ell-j)\ell}$ to denote the decision inputted into the factional decision over the opening at ℓ by the faction members at level $\ell - j$. That is,

$$d_I^{(\ell-j)\ell} \equiv \begin{cases} \emptyset & \text{if } d_I^{\overline{(\ell-j)\ell}} = \emptyset, \text{ and } d_I^{\underline{(\ell-j)\ell}} = \emptyset \\ d_I^{\underline{(\ell-j)\ell}} & \text{if } d_I^{\overline{(\ell-j)\ell}} = \emptyset, \text{ and } d_I^{\underline{(\ell-j)\ell}} \neq \emptyset \\ d_I^{\overline{(\ell-j)\ell}} & \text{if } d_I^{\overline{(\ell-j)\ell}} \neq \emptyset \end{cases} \tag{1}$$

Thus, for an opening at ℓ the maximal set of inputs into factional decision making is the set of vectors from each of the L levels of the hierarchy ordered from lowest to highest:

$$\left\{ \emptyset, \emptyset, ... d_I^{\ell\ell}, d_I^{(\ell-1)\ell} ... d_I^{1\ell} \right\}.$$

The last listed vector of decisions corresponding to the highest ranked member in the faction, determines the faction's actual support action. This is denoted $d_I^{1\ell}$ for faction I in this example, and is in general the final non-null entry in this sequence. If this decision involves a probability distribution over multiple eligible candidates, the realized selection is then made by the faction according to that distribution. Thus, when the actual promotion contest takes place within the party (described in the next section), only a single eligible candidate is put forward to contest the opening by each faction.

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[29]Note that, in the event of there being no faction members eligible at level $\ell + 1$, all faction members would instead choose a vector of values over the eligible candidates that are drawn from level $\ell + 2$, $I_{\ell+2}^t$, if there are none at this level, then at $\ell + 3$ and so on. For simplicity, we do not reflect this possibility in the notation used for the analysis here as it has no substantive effect on the analysis. Moreover, it turns out that the factions are widespread enough in the data to ensure that the possibility of no faction members at levels 3 onward does not arise in the data, and therefore does not require such additional notation.

5.4 Paramount Leadership and Contests

Once factions have decided on their supported candidates, the party's internal machinery determines the contest for each position as follows. If both factions support a candidate, and at least one neutral stands, then the probability of winning promotion for a I faction candidate is given by the following contest function, $W(I)$:

$$
\begin{aligned}
W(I) &= \frac{i}{\beta + \rho + \eta}, \\
where\ i &= \beta,\ if\ I = B; \\
i &= \rho,\ if\ I = R; \\
i &= \eta,\ if\ I = N.
\end{aligned}
\tag{2}
$$

β, ρ, and η are parameters determining the strength of faction members in the contest function. Additionally, having the paramount leadership position in a faction helps a promotion win for the faction's supported candidate. Specifically, assume that if the paramount leader comes from faction B, we allow $\beta^l > \beta$, and if from faction R we allow $\rho^l > \rho$, thus incorporating leadership premia in the model.[30]

Note that neutrals here are treated tantamount to a disorganized faction. The overall likelihood of a position going to a neutral is unaffected by the number of neutrals contesting a position, provided there is at least one. Their total contest weight function is η. This treats neutrals symmetrically to factions and can be thought of as a proportional diluting of the neutral support in the same way a faction's support would be diluted were they to forward multiple candidates instead of one.

The contest function can be interpreted as an endogenous outcome of inter-faction bargaining in similar spirit as Francois, Rainer, and Trebbi (2015). Essentially our current model can be nested in a more general setting in which factions first bargain for the weights in the contest function, then each politician decides on its support in its jurisdiction. In the inter-faction bargaining stage, the equilibrium outcome would favor the faction holding the paramount leadership position, but the threat of revolt gives other factions some weights in the promotion contest. The bargaining power of each faction could potentially depend on the overall power of the faction, which can explain why faction members enjoy ϵ utility gain when they support their junior in the second stage.

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[30]We allow for the possibility of no factional advantage, which might be especially likely at low levels of the hierarchy where the reach of the paramount leader could be muted. Note that it is also the case that a neutral's ascension to the paramount position does not advantage neutrals down the hierarchy.

5.5 The State Variable

In principle, the support decisions made by all faction members, and hence each politician in the hierarchy's promotion probability at each point in time, will depend on both their faction identity and the distribution of faction members across all other positions in the hierarchy. Hence, the state variable of this system is the full distribution of positions by faction. Denote this by S^t at instant t. The state space is thus a $\sum_{\ell=1}^{L} M_\ell \ell$ dimensional space, with each dimension taking one of three values B, R, N. The state does not change if no position opens up. However, each time an opening happens at a level ℓ, then one individual will be promoted from $\ell+1$ to ℓ to fill the open position, creating an opening at $\ell+1$ leading to one promotion from $\ell+2$, and so on, until the bottom of the hierarchy L. Thus a single opening will lead to a cascade or, what we call, a "chain" of promotions. We assume that these chains occur immediately, and if at least one individual moving in a chain replaces an individual from a different faction, then S^t changes.

5.5.1 Promotions and Factional Distributions

The hierarchical structure of leadership positions needing to be filled within the CCP is taken as given and held constant over time. Thus promotions arise only to fill openings occasioned by a death or retirement, or to fill a vacancy caused by a promotion that was itself initiated by a death or retirement. As already explained, a single death can have many knock-on effects.

At level 1, the instantaneous probability of an opening arising at any position is δ. Since this is the highest level we observe, only death/retirement removes the top leader. However, the instantaneous probability of an opening arising at a post at level 2 comprises the death hazard δ, plus the probability that there was an opening at level 1 and the individual at that level 2 post ascended to level 1 to fill it. This probability of promotion can, in principle, depend on both the factional affiliation of the individual at the post at level 2 and the faction of the individual at the post partnering the opening at level 1. Similarly, the instantaneous probability of an opening at a post at level 3 is δ plus the probability that the individual at the post at level 3 ascended to an opening at level 2 in the hierarchy, and so on. In the estimation Section 6 that follows, these knock on promotions, or promotion chains, will be explicitly computed.

Let $\delta_{I\ell}(S^t)$ denote the instantaneous arrival rate of promotions for an I politician at level ℓ in state S^t. Let $p_{I\ell}^{J}(S^t)$ denote the probability that an I faction member at level ℓ is promoted to an opening paired with a J faction member at level $\ell-1$ in state S^t, for $I, J = B, R,$ or N. Let I_ℓ^t denote the number of positions held by faction I at level ℓ, at time t for $I = B, R,$ or N. Since openings are not left vacant $M_\ell \equiv R_\ell^t + B_\ell^t + N_\ell^t$. Since the instantaneous arrival rate of death is δ at any position, there are, in expectation, $I_\ell^t \delta$ deaths arriving at a position paired with an I at level ℓ each instant, and $M_\ell \delta$ at level ℓ in general at

each instant. Let $\delta^p_{I\ell}(S^t)$ denote the instantaneous arrival rate of a promotion for a politician sharing a node with an I politician in level ℓ in state S^t.

Consider first the simplest case, which is a promotion from level 2 to the top of the hierarchy $\ell = 1$. Since there are, in expectation, $I^t(1)\delta$ openings arriving for a position paired with an I due to a death, and since at level 1 there is no other way for an opening to arise, the instantaneous arrival of promotion for a I from level 2 is:[31]

$$
\begin{aligned}
&\delta_{I2}(S^t) \\
=\ &R^t_1\delta \times p^R_{I2}(S^t) + N^t_1\delta \times p^N_{I2}(S^t) + B^t_1\delta \times p^B_{I2}(S^t).
\end{aligned}
\tag{3}
$$

We can now similarly compute the arrival of promotions from level 3 to level 2. As already noted, these arise when either a politician at level 2 dies/retires, or is himself promoted to level 1, which in turn depends on a death/retirement at level 1, as specified in equation (3). Using these, we can compute the instantaneous arrival of promotions for an I from level 3 at t as depending on the probability of a position paired with an I being promoted or dying. The instantaneous death arrival of such an individual is δ, the probability of the paired partner being promoted is $\delta^p_{I2}(S^t)$ for each of the factions I at level 2 at time t, hence:

$$
\begin{aligned}
&\delta_{I3}(S^t) \\
=\ &R^t_2\left(\delta + \delta^p_{R2}(S^t)\right) \times p^R_{I3}(S^t) + N^t_2\left(\delta + \delta^p_{N2}(S^t)\right) \times p^N_{I3}(S^t) \\
&+ B^t_2\left(\delta + \delta^p_{B2}(S^t)\right) \times p^B_{I3}(S^t).
\end{aligned}
$$

Similarly, continuing down the hierarchy, we have for any level $\ell > 2$:

$$
\begin{aligned}
&\delta_{I\ell}(S^t) \\
=\ &R^t_{\ell-1}\left(\delta + \delta^p_{R\ell-1}(S^t)\right) \times p^R_{I\ell}(S^t) + N^t_{\ell-1}\left(\delta + \delta^p_{N\ell-1}(S^t)\right) \times p^N_{I\ell}(S^t) \\
&+ B^t_{\ell-1}\left(\delta + \delta^p_{B\ell-1}(S^t)\right) \times p^B_{I\ell}(S^t).
\end{aligned}
\tag{4}
$$

(4) explicitly shows that the arrival rate of I promotions at level ℓ depends not only on the distribution at level $\ell - 1$, i.e. on $B^t_{\ell-1}, R^t_{\ell-1}, N^t_{\ell-1}$, but also, through each of the $\delta^p_{I\ell-1}$, on $B^t_{\ell-2}, R^t_{\ell-2}, N^t_{\ell-2}$, and potentially via the faction member's decision strategies on other aspects of the hierarchy as well.

5.6 Markov Strategies

We take as given the entry decisions so that the factions are set.[32] Markov strategies at t are conditioned on the state at t, and payoff relevant actions of players preceding a decision

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[31]This expression uses the fact that in continuous time simultaneous hazards do not arrive. That is, we put zero weight on the probability of a death opening occurring at the same instant in two positions.

[32]We consider individual choices of faction entry subsequently.

maker's actions at t. The payoff relevant actions are decisions members of factions have made regarding factional support. Given the factional hierarchy sequence of decisions, the first decision arises for a faction member at the level of the opening.[33] With an opening at level ℓ a Markov strategy for the co-node member at level ℓ maps from the state S^t to the I_ℓ^t dimensional $d_I^{\ell\ell}$ vector of choices indicating "stay at that level" / "support promotion", (i.e. a number in the interval $[0,1]$) for all I_ℓ^t eligible co-faction members; with the additional restriction that the sum of these cannot exceed 1. Recall that the first superscript in this notation denotes the position of the agent, and the second the opening of the position that is being decided on.

Denote the *support strategy* of an I faction member at ℓ for an opening at ℓ by $\sigma_I^{\ell\ell}(S^t) \to d_I^{\ell\ell}$. The support strategy for a member at node $\ell-1$ maps from S^t and the observed decision of a faction member in the level below (if there is one) $d_I^{\ell\ell}$, to the same I_ℓ^t dimensional vector, and is denoted $\sigma_I^{(\ell-1)\ell}\left(S^t, d_I^{\ell\ell}\right) \to d_I^{(\ell-1)\ell}$. Similarly, the support strategy for a member at node $\ell-2$ maps from S^t and the decision of faction members in the levels below (if there are such) $d_I^{\ell\ell}, d_I^{(\ell-1)\ell}$ to the I_ℓ^t dimensional vector of binary choices, and is denoted $\sigma_I^{(\ell-2)\ell}\left(S, d_I^{\ell\ell}, d_I^{(\ell-1)\ell}\right) \to d_I^{(\ell-2)\ell}$. In general, for the jth removed factional decision maker, the Markov strategy is $\sigma_I^{(\ell-j)\ell}\left(S, d_I^{\ell\ell}, ... d_I^{(\ell-j+1)\ell}\right) \to d_I^{(\ell-j)\ell}$.[34]

Such Markov strategies are defined for all faction members at the level of the opening and above, and can be denoted for a faction member of I at level ℓ deciding on support at levels ℓ to $\ell+h$ by $\boldsymbol{\sigma^\ell} \equiv \sigma_I^{\ell\ell}, \sigma_I^{(\ell)\ell+1}...\sigma_I^{\ell(\ell+h)}$ where $\ell+h \equiv L$, and

$$
\begin{aligned}
\sigma_I^{\ell\ell}(S) &\to d_I^{\ell\ell}, \\
\sigma_I^{\ell(\ell+1)}\left(S, d_I^{(\ell+1)(\ell+1)}\right) &\to d_I^{\ell(\ell+1)}, \\
\sigma_I^{\ell(\ell+2)}\left(S, d_I^{(\ell+1)(\ell+2)}, d_I^{(\ell+2)(\ell+2)}\right) &\to d_I^{\ell(\ell+2)}, \\
&\vdots \\
\sigma_I^{\ell(\ell+h)}\left(S, d_I^{(\ell+1)(\ell+h)}, d_I^{(\ell+2)(\ell+h)}...d_I^{(\ell+h)(\ell+h)}\right) &\to d_I^{\ell(\ell+h)}.
\end{aligned}
$$

---

[33]Though there is an ordering of decisions within the faction inversely corresponding to seniority we assume that these are all undertaken instantaneously, so that the factional support decision for an opening at t arrives immediately.

[34]Note that the strategies do not condition a member's support on the support decisions of members of the other faction, which are assumed to be unobserved. Note also that the notation is slightly abused in the case of a decision maker from a faction at position 1 in level $\ell-j$ who is following on from a decision handed up from a co-faction member at position 2 in level $\ell-j$. In such a case, the decision maker's strategy maps from the decision of his nodal subordinate's decision $d_I^{\underline{(\ell-j)}\ell}$ and should be more correctly written as $\sigma_I^{(\ell-j)\ell}\left(S, d_I^{\ell\ell}, ... d_I^{\underline{(\ell-j)}\ell}\right) \to d_I^{(\ell-j)\ell}$, which again, for simplicity we do not bother explicitly stating in the text.

5.7 Definition of Equilibrium

We characterize a Markov Perfect Equilibrium. This is an equilibrium in which all players are playing best responses to strategies that satisfy the Markov restrictions, and these best responses are themselves Markov Strategies. In equilibrium, players maximize expected utility by choice of support strategy for any opening that may arise. For each player in faction I at level ℓ these strategies specify a support decision for all positions $\ell, \ell+1...L$, subordinate to the player. Define $\sigma^{(\ell+h)+}$ as the support decision sent up to the individual at ℓ concerning a position at $\ell+h$ by the immediate factional decision maker below ℓ; that is the decision sent up from below over which the member at ℓ must decide to ratify or overturn. ϵ is already defined as the utility gain of supporting a co-factional, c as the utility loss of overturning the support decision made by a co-faction member received from the level below. Individuals choose $\boldsymbol{\sigma}^{\boldsymbol{\ell}}$ to maximize net present value of expected discounted flow utility from political office. The value function can be written as:

$$V_I(\ell, S) \tag{5}$$
$$= u(\ell) +$$
$$\max_{\boldsymbol{\sigma}^{\boldsymbol{\ell}}} \left[\begin{array}{c} \sum_{h=1}^{L-\ell} \left(-c \times 1_{\left\{ \sigma^{(\ell+h)+} \neq \emptyset \& \sigma^{\ell(\ell+h)} \neq \sigma^{(\ell+h)+} \right\}} + \epsilon \times 1_{\left\{ \sigma^{\ell(\ell+h)} = 1 \right\}} \right) \\ + (1-\delta)dt \mathbb{E} \left[\delta_{I\ell} \left(S'\left(\boldsymbol{\sigma}^{\boldsymbol{\ell}}\right) \right) V_I \left(\ell-1, S'\left(\boldsymbol{\sigma}^{\boldsymbol{\ell}}\right) \right) + \left(1 - \delta_{I\ell} \left(S'\left(\boldsymbol{\sigma}^{\boldsymbol{\ell}}\right) \right) \right) V_I \left(\ell, S'\left(\boldsymbol{\sigma}^{\boldsymbol{\ell}}\right) \right) \right] \end{array} \right]$$

The value function is interpreted as follows. The agent discounts by the death probability over the interval dt, probability δ. A promotion, probability $\delta_{I\ell}(S)$, leads to a level transition. The expectations operator is taken over the state that will prevail after the interval, dt, S'. The state will potentially affect both promotions from a given ℓ and value functions at the level. The support strategy, $\boldsymbol{\sigma}^{\boldsymbol{\ell}}$ has no contemporaneous effect on $u(\ell)$ but can potentially affect the realization of the state, and so in turn can affect value functions via effects on promotions and future valuations.

PROPOSITION 1 : *The Unique, Symmetric, Markov Perfect Equilibrium features:*

(1) All members of both factions ratify the support decisions of co-faction subordinates below them in the hierarchy.

(2) For members making the first support decision within their faction for an opening there are two possibilities.

(2.a) The opening is paired with them at their node of the hierarchy. In this case, they ask any co-faction members below them to stay at their levels and wait for them to be promoted first.

(2.b) The opening is at a node below theirs. In this case they allocate factional support for the promotion of one (randomly selected) candidate from the set of eligible candidates within their faction for the open position.

(3) The leader always supports co-faction members in a promotion contest for a position at the top node.

A formal representation of the strategies is reported in Appendix. Proposition 1 shows that factions differentiate strongly in how they allocate support, depending on the location of their faction members. If a faction member is not present at the node to which a junior member is aspiring, then the senior faction member unanimously supports a junior member's contest for the position (if there are multiple juniors, they support one, allocating support randomly). However, senior faction members issue staying orders to subordinates from their own faction who wish to contest an opening at their own node. Moreover, faction members above them ratify this decision.

This pattern of equilibrium decisions leads to a faction effectively asking junior members to wait for his/her immediate superior to be promoted first, before allowing them to move up a level. This pattern of promotions, which tethers a junior's rise to the one of his immediate superior, is the unique Markov perfect equilibrium of the decentralized, hierarchical factional decision making. It is chosen independently by all faction members, as it maximizes each member's expected flow utility.

It is worth noting that the uniqueness of the symmetric equilibrium applies only because of the restriction to Markov strategies. It is, in principle possible to construct non-Markovian subgame perfect equilibria which may instead feature faction members conditioning their promotion support decisions on the previous support decisions of other agents within the hierarchy; specifically on whether agents supported them in the past. Such non-Markovian SGPE allow for agents within a faction to potentially make mutually improving side deals supported via, for example, trigger strategies. Though such strategies may be ongoing within sub-groups of factions, it is reasonable for the more formalized faction operations to have relatively simple (non history-dependent) rules. A factor making these mutual support contracts difficult to implement in practice, and favoring history independent Markov strategies at the level of the faction as a whole (as we have proceeded), is that promotion decisions are made behind the scenes and not subject to public deliberation or comment. Given this, the support decision of a superior is virtually unobservable to a particular candidate and, since the final outcome observed (success or failure at promotion) depends on more than the support decision of any one faction or member, it may be difficult to sustain these side deals.

The result in Proposition 1 generates a large amount of structure to the pattern of openings – implying that no two cofactional members will ever be paired at the same node. We have already verified in Section 4 that this is, in fact, a systematic feature of the data. Moreover, the prospects of promotion at any node depend not only on the distribution of openings at the level immediately above, but also on the distribution of openings further up the hierarchy, as these determine the chances that a politician immediately above will himself be promoted. Promotion chances at all levels are affected by the full distribution of positions

above. We can compute this explicitly using the recursive structure of the $\delta_{I\ell}(S)$ terms and our results on factional support.

When each faction supports one of their members for an open position, the explicit form of the $\delta_{I\ell}(S)$ using the contest function (2) is:

$$\delta_{I\ell} \equiv \frac{1}{I_\ell^t} \times \begin{cases} \frac{i}{i+k+k'} & if \ K_\ell^t, \ K_\ell^{\prime t} > 0, \\ \frac{i}{i+k} & if \ K_\ell^t > 0, \ K_\ell^{\prime t} = 0, \\ \frac{i}{i+k'} & if \ K_\ell^t = 0, \ K_\ell^{\prime t} > 0, \\ 1 & if \ K_\ell^t, \ K_\ell^{\prime t} = 0, \end{cases} \tag{6}$$

$$\begin{aligned} where \ \{I^t, i\} &= \{B^t, \beta\}, \{R^t, \rho\} \ or \ \{N^t, \eta\}; \\ \{K^t, k\} &\neq \{I^t, i\}, \{K^{\prime t}, k'\}; \\ \{K^{\prime t}, k'\} &\neq \{I^t, i\}. \end{aligned}$$

Since the proposition allows us to determine when a faction will support one of their members for vacant openings and not, we are now able to compute explicitly the instantaneous arrival rate of promotions at all levels based on the numbers of faction members present at each level.

PROPOSITION 2 *The instantaneous arrival rate of promotions at each level of the hierarchy is as follows.*

Let $\mathtt{I}_B^t = 1$, *iff* $B_\ell^t > 0$ *and* $\mathtt{I}_B^t = 0$, *otherwise;* $\mathtt{I}_R^t = 1$, *iff* $R_\ell^t > 0$ *and* $\mathtt{I}_R^t = 0$, *otherwise;* $\mathtt{I}_N^t = 1$, *iff* $N_\ell^t > 0$ *and* $\mathtt{I}_N^t = 0$, *otherwise.*

For an N member:

$$\delta_{N\ell} = \frac{\eta}{N_\ell^t} \left(R_{\ell-1}^t \frac{\delta + \delta_{R\ell-1}^p}{\mathtt{I}_B^t \beta + \eta} + N_{\ell-1}^t \frac{\delta + \delta_{N\ell-1}^p}{\mathtt{I}_B^t \beta + \mathtt{I}_R^t \rho + \eta} + B_{\ell-1}^t \frac{\delta + \delta_{B\ell-1}^{p^t}}{\mathtt{I}_R^t \rho + \eta} \right).$$

For a B member and R member, respectively:

$$\delta_{B\ell} = \frac{\beta}{B_\ell^t} \left(R_{\ell-1}^t \frac{\delta + \delta_{R\ell-1}^p}{\beta + \mathtt{I}_N^t \eta} + N_{\ell-1}^t \frac{\delta + \delta_{N\ell-1}^p}{\beta + \mathtt{I}_R^t \rho + \mathtt{I}_N^t \eta} \right),$$

$$\delta_{R\ell} = \frac{\rho}{R_\ell^t} \left(B_{\ell-1}^t \frac{\delta + \delta_{B\ell-1}^p}{\rho + \mathtt{I}_N^t \eta} + N_{\ell-1}^t \frac{\delta + \delta_{N\ell-1}^p}{\mathtt{I}_B^t \beta + \rho + \mathtt{I}_N^t \eta} \right).$$

For each one of these expressions we can see the negative dependence on the prevalence of one's own faction members.[35] Take for example the last expression for R. The greater the number of other R's at level ℓ at t, the more diluted is an R's support (i.e. the lower the probability that any given R member will be chosen by the faction as the one to be supported), as per R_ℓ^t in the denominator. Further, the more frequent the R's at level $\ell - 1$ the harder it is to get an opening for which an R at ℓ will be supported by his faction (e.g. at the extreme if $R_{\ell-1}^t = M_{\ell-1}^t$, then $\delta_{R\ell}^t = 0$). This is true for all levels of the hierarchy from the recursion of these equations.

The proposition highlights the possible down side of factional affiliation. Though factions have the potential to provide support for promotions such support is essentially decided by cofactional members sitting above one in the hierarchy, if there is one. The rise of a junior is tethered to, and thus depends upon, the rise of his cofactional seniors. If they do not rise, then, not only do they not generate the extra support that comes from the paramount leadership, they impose a delay on their own juniors, as factions ensure subordinates do not overtake seniors. If a junior aspires to a position with a similar rank to his factional senior, the junior will be asked to bide his time until the senior gets promoted. This theoretical feature will be useful to match slow-moving dynamics of factional evolution of the CCP hierarchy over time, consistently with data where factional representation changes slowly and political cohorts move up in lockstep. In addition, the proposition formalizes a natural "pecking order" in the factional structure, a feature that appears realistic in large organizations and is generated as an equilibrium outcome of decentralized individual decision making within the faction due to the career concerns of superiors. The Confucian ethos and the specific norms of guanxi remarked upon within CCP politics appear culturally consistent with this result.

5.8 Entry

Entry into the hierarchy of political positions occurs only at the lowest level, L. An entering politician at instant t decides which faction to join when starting his politician career, or to contest as a neutral, and bases this decision on the discounted expected utility he will receive via each one of the options. He maximizes his discounted expected utility stream:

$$V^t = \int_t^\infty e^{-\delta s} v^s ds$$

where v^τ is the instantaneous utility at τ. We formally consider this decision here. Recall that $u(\ell)$ denotes the politician per instant payoff to holding a position at level $\ell \in \{1, L\}$ in

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[35]Note that each statement of $\delta_{I\ell}$ in Proposition 2 ignores the effect of a faction's holding of the paramount leadership on promotion. Effectively $\delta_{I\ell}$ is stated for the case of an N in paramount leadership. In the Appendix we state the full set of $\delta_{I\ell}$ conditional upon paramount leadership affiliation.

the hierarchy. So that if a politician holds a position at ℓ at instant t then $v^t = u(\ell)$.[36] We have already defined the corresponding value function for a politician of type $I = B, R, N$ at level ℓ given state S in expression (5). By substituting for the equilibrium strategies $\boldsymbol{\sigma}^\ell$ these can be written simply as:

$$V_I(\ell, S) = u(\ell) + (1 - \delta)dt\mathbb{E}\left[\delta_{I\ell}(S') V_I(\ell - 1, S') + (1 - \delta_{I\ell}(S')) V_I(\ell, S')\right] \qquad (7)$$

The expectations operator appears in the expression because the value of being a type I politician at ℓ depends on the instantaneous probability of being promoted to the next level and getting $V_I(\ell - 1, S')$. Though this is known at the current state, via $\delta_{I\ell}$, the value of being at this higher level in turn depends on the evolution of the state, S', which is changing continuously in a stochastic manner due to deaths, openings, and promotions occurring through time via the contest function (2).

The entering politician at state S chooses the faction with the highest valuation at the entry level, L, i.e.:

$$\sup\{V_B(L, S), V_R(L, S), V_N(L, S)\}. \qquad (8)$$

After entry, since a politician is fixed in his faction from then on, his choices are simple. He will apply for all promotions to which he is eligible, and he will choose support decisions according to the Proposition above. We consider the more difficult problem of the initial entry decision (8) now.

5.9   Equilibrium Entry

Entering politicians will choose to enter the faction (or remain neutral) yielding the highest expected utility, which implies choosing the faction guaranteeing in expectation the fastest progression through the hierarchy. The most immediately relevant information for the agent will be the arrival of promotions if he/she registers as a I politician from level L to $L-1$, but one cannot specify, a priori, the relative weight an entering politician puts on the chances of being promoted at higher levels of the hierarchy compared to lower levels. Perhaps politicians care little about regional promotions, that occur early in their career, but greatly about promotions from the province to the central government. Conversely, politicians may put substantial value on their immediate entry prospects. Note that, indirectly at least, the relative performance of factions at higher levels already enters into a politician's evaluation of promotion at the lowest level, L, since openings immediately above depend negatively on the frequency of cofactional politicians all the way up the hierarchy; as discussed above after Proposition 2. At any point in time this valuation will depend on the full distribution of positions higher than the politician, that is on S^t, the high-dimensionality state space of the

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[36]Since c is never realized on equilibrium paths it is ignored, as is ϵ which though realized is arbitrarily small.

system. Without mapping the full form of expected hierarchy evolution, it is not possible to compute value functions explicitly. However, it is possible to establish a sufficient condition under which optimal entry ensures that along any time path all factional types and neutrals will be observed in equilibrium:

PROPOSITION 3 *With M_ℓ large enough for all ℓ, any equilibrium necessarily involves politicians in factions B, R, and N.*

Intuitively, with sufficiently many openings at all levels of the hierarchy, the value of entering via a faction (or as a neutral) that is not already present will eventually outweigh even the largest parametric disadvantages of that faction (or being a neutral). That is, for example, even if $\beta \ll \rho$ (so ceteris paribus it is better to enter as an R than a B), if there are sufficiently many positions in the hierarchy, a large number of R members and Proposition 1 will imply that the expected promotion rate will be faster if entering as a (rare) B member over entering as (one of the many) R. Thus, though we are not able to fully characterize optimal entry in an equilibrium, the sufficient condition of the proposition ensures that *any* equilibrium distribution of positions that we do observe will feature both factions and neutrals.

5.10 From Model to Data

Openings in the hierarchy occur at any point in time via the functions in Proposition 2. Other than through the effect of time on the changing distribution of factions across the hierarchy S^t, which the model explicitly accounts for, the process leading to openings occurs independently of time (conditional on S^t)[37].

Treating openings this way amounts to assuming that openings are independent events caused by exogenous factors, each triggering a chain of knock on effects. This assumption may be violated at the time of Chinese Communist Party Congresses, when there appears to be a large number of shuffles at different levels of the hierarchy observed in a way that seems simultaneous, not sequential. Indeed, for the most part, the data is observed at low frequency, i.e. at each CCP Congress $T, T + 1, ...$ This implies that the promotion chains that our model postulates are not fully observable, so simulation methods will be necessary to link two subsequent S^T, S^{T+1}.

To operationalize the model in our specific empirical setting, we will assume that the simultaneity observed in exits and promotions reflects a particular structure, as follows. First, we purge all individuals from all positions that we observe leaving the data in between snapshots $T, T + 1, ...$ That is, all individuals who are no longer present between times T and $T + 1$ are assumed to have retired at some point between two Congresses.

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[37]In what follows below we will dispense with the time index t for the empirical analysis.

Second, openings are filled through a sequence of promotion chains. Each chain starts with the highest ranked exit in the sample and selects politicians to fill in the knock-on openings sequentially. This continues until all the exits and promotions between S^T and S^{T+1} are accounted for and all positions have been filled. Because there are many sets of promotion chains that can rationalize the observed openings in the data, Section 6 shows how simulation methods can be used to transparently address this issue in practice. In addition, it is difficult to observe the explicit dyadic structure for many positions in the data. Therefore, we draw at random a paired politician from the set of potential matches at the level at which the promotion occurs.

6 Maximum Simulated Likelihood Estimation

This Section describes our estimation methodology. Define Y the observed data on career outcomes (i.e. promotions, exits, etc.) between two Congresses T and $T + 1$ and X the observed data on the hierarchy plus a set of individual characteristics (i.e. X includes factions and position within the hierarchy/level S^T, plus individual covariates).

We define $\mathtt{k}$ as a set of promotion chains, so that $\mathtt{k} = \{\mathtt{k}(1), \mathtt{k}(2), ...\}$, where each chain $\mathtt{k}(c)$ of politicians (say, s^0, s, s', and s'') is simply a set of politicians each belonging to different, but adjacent hierarchical levels ℓ, whose promotions were triggered by the exit of the highest ranking one of the chain (e.g. when s^0 dies or retires at $\ell = 1$, s is promoted from $\ell = 2$ to $\ell = 1$, then s' replaces s at level $\ell = 2$, and then s'' replaces s' at $\ell = 3$).

A chain starts from an opening at level $\ell - 1$ and involves promotions from ℓ all the way down to L.[38]

We impose that each politician promoted in the data belongs to exactly one chain and that each change between S^T and S^{T+1} is part of at least one chain $\mathtt{k}(c)$. (A politician promoted by two levels between T and $T + 1$ will need to belong to two separate promotion chains.) Let $C = \#(\mathtt{k})$ be the number of promotion chains in set $\mathtt{k}$.

The unconditional likelihood of observing Y given X is:

$$ f(Y|X) = \mathbb{E}_{\mathtt{k}}\left[f(Y|X, \mathtt{k})\right]. $$

Define $Y_{\mathtt{k}(c)}$ as the set of career outcomes pertinent to the individuals involved in promotion chain number c of $\mathtt{k}$. Because the structure of the political hierarchy will change once a promotion chain is realized (i.e. the interim $\mathbf{S}$ will change), positions within the hierarchy/level and factional affiliations at all levels $X_{\mathtt{k}(c)}$ need to be modified after each chain $\mathtt{k}(c)$ is realized.

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[38]Plus a new entry at the lowest level, which we do not model, as per our discussion of Proposition 3. The entry choice is not necessary for estimation and all parameters are identified without its addition.

The conditional likelihood upon the realization of a set of promotion chains $\mathbf{k}$ happening over time is given by:

$$f(Y|X,\mathbf{k}) = \prod_{c=1}^{C} f(Y_{\mathbf{k}(c)}|X_{\mathbf{k}(c)}, \mathbf{k}).$$

The likelihood contribution $f(Y_{\mathbf{k}(c)}|X_{\mathbf{k}(c)}, \mathbf{k})$ of a chain $\mathbf{k}(c)$ of promotions initiated at $\ell - 1$ involves computing the conditional promotion probabilities of all individuals involved in $\mathbf{k}(c)$ at the various levels, down to L. A promotion from level ℓ to level $\ell - 1$ to be paired to a politician $K = R, B, N$ is a random event distributed over a discrete support formed of M_ℓ points (individual politicians), B_ℓ of which occur with probability $p_{B\ell}^K$, R_ℓ occur with probability $p_{R\ell}^K$, and N_ℓ occur with probability $p_{N\ell}^K$. (We omit state indexes as they are unnecessary here.)

Given the independence of the promotion events across levels, the construction of this likelihood is straightforward. Let I^ℓ be the faction of the individual belonging to $\mathbf{k}(c)$ at level ℓ and $J^{\ell-1}$ be the faction of the individual with which s/he is paired when promoted to level $\ell - 1$:

$$f(Y_{\mathbf{k}(c)}|X_{\mathbf{k}(c)}, \mathbf{k}) = \delta \prod_{l=\ell}^{L} p_{I^l}^{J^{l-1}}(l).$$

Going back to the example above of a chain of politicians $s^0, s, s',$ and s'' belonging to factions N, R, and B respectively, and assuming they all happen to get paired with N-type politicians, the likelihood contribution of this chain is:

$$f(Y_{\mathbf{k}(c)}|X_{\mathbf{k}(c)}, \mathbf{k}) = \delta \times p_N^N(2) \times p_R^N(3) \times p_B^N(4)$$

where each probability $p_{I^\ell}^{J^{\ell-1}}(\ell)$ is computed based on $X_{\mathbf{k}(c)}$, ordered from the top promotion to the level L promotion, as imposed by the sequential nature of the promotions comprised in each chain.

The Maximum Simulated Likelihood (MSL), for given number of simulated sets of promotion chains R_K,[39] is:

$$f(Y|X) = \frac{1}{R_K} \sum_{r=1}^{R_K} \prod_{c=1}^{C} f(Y_{\mathbf{k}_r(c)}|X_{\mathbf{k}_r(c)}, \mathbf{k}_r).$$

This is the estimator that we employ.

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[39]We employ 100 simulated chains sets for each CCP National Party Congress.

7   CCP Factional Politics: Structural Results

This section presents MSL estimates of the model and sample fit assessments. The sample includes all the members of the 14th-18th Central Committees in the post-Deng era. The simulation procedure in Section 6 was first implemented in a series of Monte Carlo simulations and successfully probed for: i) identification of the structural parameters; ii) sensitivity to misspecification in the number of factions; and iii) sensitivity to misspecification in the contest function we use[40].

We begin our analysis with the most parametrically parsimonious model possible, one where we normalize $\eta = 1$ and the two faction parameters $\{\beta, \rho\}$ are estimated on top of a single leadership premium λ, defined as $\lambda = \beta^l/\beta = \rho^l/\rho$. The MSL results for this model are reported in Column 1 of Table 10. The estimated contest function parameters are 0.045 and 0.029 for CYLC and Shanghai Gang respectively, which are close to the average share of seats in the Central Committee. The estimated leadership premium λ is 2.553, implying that a faction candidate is more than twice as likely to be promoted when the paramount leader is from the same faction. The magnitude of the leadership premium is consistent with the reduced form evidence in Table 4. All parameters driving the promotion process across factions are precisely estimated.

Because it may seem restrictive to assume a common contest function across all levels of the CCP top echelons (which include heterogeneous layers in both size and jurisdiction, such as the top CCP positions and the PBSC, PB, CC, AC), Column 2 in Table 10 allows for level-specific parameters $\{\beta_k, \rho_k\}_{k=H,L}$ for the PB and higher versus CC and lower. The parameter estimates show that faction affiliation helps significantly more at higher levels than that at lower levels within the CCP: the estimated contest function parameters reach 0.162 and 0.193 at the PB and higher for CYLC and Shanghai Gang relative to CC and AC levels of 0.041 and 0.022.

One may also wonder whether the leadership premium differs across factions. Column 3 of Table 10 explores this possibility by allowing for faction-specific leadership premia $\{\lambda_R, \lambda_B\}$. The parameter estimates show that two factions have very similar premia (both are between 2 and 3). The improvement of log-likelihood is negligible, indicating that the two factions operate in a similar fashion. This result is also consistent with the reduced-form evidence in Table 4.

Column 4 in Table 10 combines both level-specific parameters $\{\beta_k, \rho_k\}_{k=H,L}$ and faction-specific leadership premia $\{\lambda_R, \lambda_B\}$. We conduct Likelihood Ratio (LR) tests for model 1, 2 and 3 against model 4 (numbering indicates the Column of reference). LR tests reject model 1 and 3, which impose a constant contest function across levels, against model 4, but do not reject model 2, which imposes a constant leadership premium across factions. In the following analysis, we will thus use the more parsimonious model 2 as our benchmark and

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[40]All simulation results are available upon request.

refer to it as the baseline faction model.

Figure 6 provides a visual representation of the factions' seat shares by level as predicted by the model. The five bars represent the five levels of the Central Committee (the top two CCP positions, PBSC, PB, CC, and AC). The blue, white, and red parts represent the seat shares of the Shanghai Gang, Neutral, and CYLC respectively. The left panel is the data, while the right are the predictions of our baseline faction model. Our baseline faction model successfully replicates the distribution of factions across different levels of the hierarchy: faction members are relatively scarce in the lower levels, but become increasingly concentrated in the higher ones. This is related to the increasing contest function parameters estimated above, which imply an increasing advantage of factional affiliation as one progresses up the hierarchy. Notice that our model also captures the inertia of the factional composition of the various levels over time evident in the data thanks to the slow percolation of factional members up the hierarchy. The intuition is that promotions and retirements occur gradually over time. It takes time for a faction leader to grow his inner circle from the bottom of the hierarchy up. Interestingly, such dynamics can function as checks and balances on an incoming paramount leader. When a new leader first assumes power, he is likely to be surrounded by members from rival factions. There is also anecdotal evidence in line with this finding: Jiang himself once described his first few years as the General Secretary "*as standing on the brink of a deep ravine, or walking on thin ice*"[41]. Bo (2004) also suggests that the Shanghai Gang continued to exert strong influence in the first term of Hu Jintao. This finding is particularly useful in understanding the upcoming second term of General Secretary Xi, expected by many observers to gain greater clout relative to his first term in office[42].

Our faction model also provides insights for the dynamics of power transition between factions. Figure 7 plots the aggregate share of promotions of each faction over time[43]. The share of promotions is defined as the ratio between the number of promotions for a faction and the total number of promotions. Again, the fit of the model is good. Figure 7 points also to a more subtle implication of our model: there are no discontinuous drops in the share of promotions of the paramount leader's faction right after he retires. When Jiang Zemin retired after the 15th Party Congress, a large share of the Shanghai Gang continued to be promoted to the 16th Central Committee. The pattern was repeated at Hu Jintao's transition to Xi Jinping at the 18th Party Congress. We will show below that the same holds true for the 19th Congress Politburo. In reality there is uncertainty over the precise point at which the influence of the incoming paramount leader eclipses that of the departing incumbent and this influences promotion rates. Scholars have suggested that Deng retained considerable influence well after formal retirement in 1989; Jiang maintained informal and

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[41]See Kuhn (2005).

[42]The 19th Congress occurred between October 18th and 25th, 2017.

[43]A more detailed breakdown by level of the Central Committee can be found in Table 11.

formal military oversight after stepping down as General Secretary. A retiring paramount leader may continue to shape the composition of the next Central Committee. Such intricate dynamics are captured by our simulation approach that draws different paramount leader transition dates across multiple simulations, smoothing out sharp discontinuities around the official power transition date.

7.1 Adding Individual Covariates

So far we have assumed that faction members are selected to challenge a post randomly within a faction and level (modulo stay orders, of course). We can easily add individual characteristics, Z, to the within-faction selection process as well. Consider each row of the matrix Z_s to be a vector of characteristics for politician s. Define $q_{I,s}(\ell)$ as the probability that s of faction I is selected as the candidate of this faction at level ℓ, also define $\mathcal{A}_I(\ell)$ as the set of the members of faction I at level ℓ. We assume a within-faction selection probability of the logistic form[44]:

$$q_{I,s}(\ell) \equiv \frac{\exp(\gamma Z_s)}{\sum_{s' \in \mathcal{A}_I(\ell)} \exp(\gamma Z_{s'})}.$$

Therefore, the probability of winning promotion can be rewritten as $q_{I,s}(\ell) \times W(I)$. Notice that our baseline faction model is nested in this formula by setting coefficients of individual characteristics, γ, to 0. In this case we get back our random within-faction selection probability, $q_{I,s}(\ell) \equiv \frac{1}{I(\ell)}$. We refer to the above model as the faction model with individual characteristics.

The parameter estimates are reported in the Column 4 of Table 12. Comparing with the baseline faction model in Column 1, we see a reasonable improvement in model fit measured by log-likelihood. At the same time, however, we observe little change in the estimates of the parameters for the contest function and the leadership premium, suggesting that these parameters are indeed more related to the technology of factions than to individual covariates omitted in the baseline model. Examining the estimated coefficients of individual characteristics, we find that being a Princeling or a male increases the probability of promotion, while having a graduate degree or being an ethnic minority hurts. The effect of age is non-linear: it has a positive effect at first, but eventually negatively affects promotion chances, in line with previously observed hard age limits enforced within the CCP.

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[44]Since our data only includes the top 5 levels of the party hierarchy (President/Premier, PBSC, PB, CC, AC), individual characteristics of the potential candidates eligible for promotion to AC are not always observable to us. As a result, we assume within-faction selection is random below the AC level.

7.2 Alternative Models

Given our main specifications, we are equipped for both in-sample and out-of-sample fit analysis of our structural model. It is useful in this respect also to present some alternative benchmarks to which we can compare our model's performance. First, we can use as the simplest alternative a model based on random promotion. This is done by setting:

$$p_\ell \equiv \frac{1}{M_\ell}.$$

Second, we implement a pure seniority-based promotion mechanism, setting for politician s:

$$p_{s\ell} \equiv \frac{\varphi(age_s)}{M_\ell},$$

with $\varphi(.)$ a (third order) polynomial in age[45].

Figure 8 provides the scatter plots of model predicted shares of promotions by Party Congress and by level of the CCP against the data[46]. Our models (baseline faction and faction with individual characteristics) handily outperform both the random and the seniority models: the predicted shares by the faction models line up with the data nicely along the 45 degree line, whereas the shares predicted by random and pure seniority-based promotion models appear completely flat. This result is independent of which Party Congress we consider. More concretely, with only five structural parameters our baseline faction model reduces the mean squared errors of the predicted shares of promotion by more than 80 percent comparing to the random model, and more than 70 comparing to the seniority model. The right panel of Table 12 conducts formal specification tests. The Vuong statistics reject the random and the pure seniority-based promotion models against the faction model with individual characteristics[47].

What about political meritocracy? Because the CCP promotion model is by many referred to as a strictly meritocratic mechanism (Li and Zhou, 2005; Bell, 2015) and there is substantial debate as to whether systematic assessment of cadres based on economic performance plays a role in the CCP, we test our model against this third "purely meritocratic" mechanism. First, in order to find a suitable measure of performance, we need to restrict our analysis of promotions to provincial leaders in the Central Committee. We associate these prominent provincial CCP cadres with the economic performance (in terms of real GDP

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[45]For the seniority and random model, we calibrate the probability of entering AC using the average share of each faction in the Central Committee.

[46]We combine level 1, 2 and 3 because there are two few observations in the first two levels.

[47]The pure seniority-based model outperforms the baseline faction model in terms of log-likelihood. However, this is driven by the fact that only 10% of the politicians have factional affiliation. After we include individual characteristics in the factional model, the pure seniority-based model is easily rejected by the Vuong test.

growth over their tenure) of their Province of service – precisely as in Li and Zhou (2005) and Jia et al. (2015) – and use this as a (admittedly rough) proxy for overall performance. Graphical evidence of the performance of our model is reported in Figure 9[48]. In the appropriate subset of promotions (i.e. those for which performance metrics are available), our model performs better than the purely meritocratic model in terms of sum of mean squared errors, which is reduced by 35 percent.

We further examine the out-of-sample fit of our model. Specifically, we re-estimate the model using only the 14th-17th Central Committees and predict the shares of promotion of each faction at 18th Central Committee. We compare the model predicted share of promotion with the actual data in the scatter plot in Figure 10. Our faction model again outperforms random and seniority-based models in terms of out-of-sample fit. The reduction in mean squared errors is 77 percent and 69 percent comparing our baseline faction model to the random model and seniority model respectively, reassuring us of its robustness.

8 Counterfactuals and Model Analysis

Within our econometric framework we can explore a set of counterfactual exercises and present an additional quantitative analysis of several questions relevant to the study of Chinese political economy.

8.1 Forgoing Collective Leadership

We begin by exploring an historical counterfactual on leadership premia in the post-Deng era. Our model explicitly recognizes such premia, but a wealth of anecdotal discussion in Chinese politics (and the empirical evidence of Section 4) suggests them to have been curtailed in the post-Deng era. This peculiarity of the post-Deng Chinese system, 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[49] and the paramount leadership of Deng Xiaoping (Tsou, 1995; Fewsmith, 2001; Shambaugh, 2008). This exercise is also useful in perspective of the present, latent changes in Chinese politics. 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*".

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[48]In this scatter plot, we do not break down the share of promotion by level because of the small number of observations in the subset of provincial leaders.

[49]"*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)

Here, we will ramp up the limited role played by leadership premia in factional representation in China and present a counterfactual of what would have happened under heightened winner-take-all type factional competition. We run the model with twice as high a leadership premium λ.

Results are reported in Figure 10. A more detailed breakdown by level can be found in the third panel of Table 11. The counterfactual is implemented by simulating for each Congress T the share of promotion of each faction to the following Congress $T + 1$. Under the Jiang Zemin (Shanghai Gang) presidency, openings in the Politburo and the Central Committee are filled with more of the top leader's cofactionals. Under the CYLC leadership of Hu Jintao, numbers would have been comparable, swinging in the opposite direction with more *tuanpai* members promoted. The magnitude of the increase in the shares of promotions, however, is less than the increase in the leadership premium. The dampening effect emerges from the nature of intra-factional competition, and the factions requiring members to respect factional seniority in promotion, as per Proposition 1. As members of a faction become crowded at a certain level ℓ, junior members from the same faction are more likely to be required by their cofactionals to hold off on ascending to that level until incumbents superior to them have moved upwards. Indeed, as shown in Table 11, the dampening effect is stronger in higher levels of the hierarchy where faction members are more concentrated (Figure 6). Therefore, individual incentives in intra-faction competition counterweigh the capacity of the paramount leader to grow his own faction without bound.

8.2   Li Keqiang Presidency

A second counterfactual we perform involves the choice of leadership ratified by the 2012 18th Party Congress. This is the event that brought Xi Jinping to the PRC Presidency. Nathan and Gilley (2003) present compelling documentary evidence that already ten years before the formal power transition to Xi Jinping and Li Keqiang, the current PRC Premier, belonged to a select few with potential accreditation to the paramount post. Bo Xilai was also part of this highly selected group.

It is possible for us to study a counterfactual Li presidency. Figure 11 reports the aggregate share of promotion, and a more detailed breakdown by level can be found in the fourth panel of Table 11. Interestingly, given the estimated leadership premia, the promotion at PB level would have had a very limited increase in CYLC representation (Li's faction). More radical shifts would have been recorded in the promotion at the CC and AC though. Again this is a result of the slow percolation of factional representation induced by our model, compounded with the already high CYLC representation at the upper levels of the CCP at the end of Hu's last term in office.

8.3 Are Princelings a Faction?

The reader will notice that the analysis above posits factional affiliation of president Xi Jinping as a member of Shanghai Gang. This is in itself a matter of debate among scholars interested in Chinese elite politics. For instance, Li (2013) in his bi-factional representation of the Chinese top tiers defines Xi as a Princeling associated with Jiang's camp (Shanghai Gang). In fact, Xi spent only seven months in any official role in Shanghai, but Jiang's substantial influence on Xi has been noted by many. Other researchers have pointed to President Xi as the leader of a new faction of his own, mostly with roots in Shaanxi, where Xi was born, and in Zhejiang Province, where he served as Party Secretary from 2002 to 2007[50]. Our model allows a formal statistical analysis of some of these questions.

We begin by investigating whether our postulate of the Princelings not behaving as a unified faction is warranted by the data. To assess this formally we implement Vuong specification tests between our baseline model and one where Princeling status is coded as membership in faction P, with a specific parameter π regulating an expanded contest function of the type (2):

$$W(P) = \frac{\pi}{\beta + \pi + \rho + \eta}.$$

We also specify a faction-specific leadership premium, $\lambda_p = \pi^l/\pi$, which regulates the differential promotion probability when the paramount leader is from the Princelings (e.g. Xi in the 18th Party Congress).

Results are reported in Table 13. The Vuong test indicates that the model where Princelings are considered to be neutrals is preferred over one where Princelings are treated as a separate faction. More importantly, the estimated leadership premium within the model imposing Princelings as a faction, λ_p, is estimated to be less than 1. This means that if we posit that Xi ascended to the paramount position as a member of a Princeling faction, other Princelings did not appear to enjoy a higher premium in promotions. This finding prima facie violates one of the crucial features of factional politics – delivering resources to members of the faction once the faction leader is in power – and appears in stark contrast to what we have already observed for the broadly accepted factions, CYLC and Shanghai Gang, where we estimate λ well in excess of 1. In brief, the evidence rejects the hypothesis that Princelings operate as a unified faction.

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[50]Some recurring affiliated politicians include current PBSC member and anti-corruption czar Wang Qishan, and potential PBSC future members such as Li Zhanshu, director of the CC General Office, and Politburo member Zhao Leji. Shih (2016) estimates, based on shared career experience, that less than 6 percent of current CC members have past ties with President Xi. This should however not be confused with a truly factional organization of the President's inner circle for which hard evidence is not available.

8.4 Is President Xi Jinping Affiliated to the Shanghai Gang?

Our structural approach also allows us to undertake formal tests for the analysis of factional affiliation of the top leadership. The case of Xi Jinping is emblematic because of both his strong ties to the CCP elite through family connections and his repeated rejection of intra-party factional politics (e.g. "cabals and cliques" mentioned in official transcripts on People's Daily, May 3rd, 2016[51]).

To this goal, we re-estimate the model assuming that Xi is an unaffiliated neutral, and compare the alternative model against our baseline specification where Xi is a Shanghai Gang member. Results are reported in Table 13. The Vuong test shows that Xi is slightly more likely to be a Shanghai Gang member, although the statistical evidence is inconclusive. Our tests do not have enough power in this specific instance. Fortunately, such ambiguity is likely to be resolved after the 19th Party Congress data collection is completed.

8.5 An Out-of-sample Forecast for the 2017 19th Party Congress

To conclude our quantitative exercises we employ our model to forecast the 19th Party Congress in 2017. Although admittedly speculative, to the best of our knowledge this is probably one of the very few rigorous quantitative environments allowing for an exercise of this kind. The model incorporates individual characteristics in this analysis to obtain more accurate forecasts[52].

The top panel of Table 14 shows that share of promotions by level of the Central Committee. Under the assumption that Xi is in fact a Shanghai Gang member, the Shanghai faction is expected to enjoy a higher share of promotions in the Politburo than the CYLC faction due to leadership premia. In contrast, promotions at lower levels are expected to be more comparable between the two factions due to the dampening effects stemming from stay orders.

Since there is still unresolved ambiguity regarding Xi's factional affiliation, we also conduct a forecast assuming Xi is a neutral in the bottom panel of Table 14. In this case, the Shanghai Gang would appear to lose its advantage in promotion for all the levels of the Central Committee.

Using complete biographical information for the 19th Congress Politburo we can assess the precision in these forecasts at this political level. The predicted $(B; N; R)$ promotion shares allocated by the model under the assumption of Xi as a Shanghai member are $(0.24; 0.66; 0.10)$. Under the assumption of Xi as a neutral, the model predicted shares are $(0.14; 0.76; 0.10)$. The empirically observed promotion shares are $(0.25; 0.65; 0.10)$ under the

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[51]Available at http://en.people.cn/n3/2016/0503/c90000-9052676.html

[52]For individuals who newly enter AC at the 19th Party Congress whose characteristics are not readily available, we randomly draw the characteristics from the sample of the new entries of 18th Party Congress.

first scenario and $(0.21; 0.69; 0.10)$ under the second. Such predictions were run in advance of the 19th Congress and presented a year earlier, in October 2016.[53] An analysis of our forecasting performance for the CC and AC levels in the 19th Congress will be possible as soon as complete data is made available on China Vitae. For now, the empirical performance on the 19th Politburo, jointly with our previous, more standard out-of-sample exercises, appears reassuring of the validity of the model's specification.

9   Conclusions

This paper contributes to an emerging literature on the political economy of economic development by focusing on 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 political economic analysis of the PRC.

We present an economic model of 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 fully microfounded setting. Alternative modeling choices are also discussed.

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. The extent of the 2012-2016 anti-corruption purge in shaping Chinese factional politics is also analyzed. 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 under General Secretary Xi.

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 transposable.

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[53]Please refer to the NBER working paper version of this article, available at www.nber.org/wp22775.

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Appendix I

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.

In our model, faction seniors of the same level of the opening have the first input in deciding the candidate pool. This is consistent with the formal party regulation that party leaders at the same level of opening has significant influence in the process of democratic recommendations, screening, and deliberation, which essentially pins down the list of the candidates. Notice that in our model the faction seniors at the same level of the opening do not make the final decision on which candidate is chosen. The final decision is modeled as a contest function which is outside of the control of any individual faction senior. This is also the case in reality. We further allow faction seniors at next higher level to overturn faction support decisions downstream, following the principle of "one-level down" control in CCP.

Appendix II

Equilibrium strategies in Proposition 1.

Formally for each faction I at any opening $\ell \neq 1$:

$$\sigma_I^{\ell\ell}\left(S^t\right) = \{0,0....0\} \equiv d_I^{\ell\ell}$$

$$\sigma_I^{(\ell-1)\ell}\left(S^t, d_I^{\ell\ell}\right) = \begin{cases} d_I^{\ell\ell} & \text{if } I_\ell^t > 0 \\ \{1/I_{\ell+1}^t, 1/I_{\ell+1}^t, ..., 1/I_{\ell+1}^t\} & \text{else} \end{cases}$$

$$\sigma_I^{(\ell-2)\ell}\left(S^t, d_I^{(\ell-1)\ell}, d_I^{\ell\ell}\right) = \begin{cases} d_I^{(\ell-1)\ell} & \text{if } I_{\ell-1}^t > 0 \\ d_I^{\ell\ell} & \text{else if } I_\ell^t > 0 \\ \{1/I_{\ell+1}^t, 1/I_{\ell+1}^t, ..., 1/I_{\ell+1}^t\} & \text{else} \end{cases} \quad (9)$$

$$\vdots$$

$$\sigma_I^{(\ell-h)\ell}\left(S^t, d_I^{(\ell-h+1)\ell}...., d_I^{(\ell-1)\ell}, d_I^{\ell\ell}\right) = \begin{cases} d_I^{(\ell-h+1)\ell} & \text{if } I_{\ell-h+1}^t > 0 \\ d_I^{(\ell-h+2)\ell} & \text{else if } I_{\ell-h+2}^t > 0 \\ ... & ... \\ \{1/I_{\ell+1}^t, 1/I_{\ell+1}^t, ..., 1/I_{\ell+1}^t\}. & \text{else} \end{cases}$$

For an opening at $\ell = 1$:

$$\sigma_I^{11}\left(S^t\right) = \{1/I_2^t, 1/I_2^t, ..., 1/I_2^t\} \equiv d_I^{11}$$

Proof of Proposition 1:

Consider a faction member at level ℓ when an opening arises somewhere in the hierarchy over which he can exercise a support decision. Define S as the current state variable. Define S' as the new state variable after the promotion has been made for the opening, which occurs in interval dt. The value function of a faction I member at level ℓ given S has already been defined, $V_I(\ell, S)$. Recall that $\boldsymbol{\sigma^\ell}$ is the set of support decisions of the faction member at level ℓ. $V_I(\ell, S)$ can be written as:

$$\begin{aligned} &V_I(\ell, S) \\ =\ & u(\ell) + \\ &\max_{\boldsymbol{\sigma^\ell}} \left[\begin{array}{l} \sum_{h=1}^{L-\ell}\left(-c \times \mathbb{1}_{\left\{\sigma^{\ell(\ell+h)+} \neq \emptyset \text{ and } \sigma^{\ell(\ell+h)} \neq \sigma^{(\ell+h)+}\right\}} + \epsilon \times \mathbb{1}_{\left\{\sigma^{\ell(\ell+h)}=1\right\}}\right) \\ +(1-\delta)dt\mathbb{E}\left[\delta_{I\ell}\left(S'\left(\boldsymbol{\sigma^\ell}\right)\right) V_I\left(\ell-1, S'\left(\boldsymbol{\sigma^\ell}\right)\right) + \left(1-\delta_{I\ell}\left(S'\left(\boldsymbol{\sigma^\ell}\right)\right)\right) V_I\left(\ell, S'\left(\boldsymbol{\sigma^\ell}\right)\right)\right] \end{array} \right] \end{aligned}$$

Step 1. We first show that it is always a dominant strategy for any faction member at level 1 to support the promotion of a co-faction member at 2 to level 1. Consider then the value function for an individual at level 1 which now becomes:

$$V_I(1, S) = u(1) +$$

$$\max_{\sigma^\ell} \left[\begin{array}{c} \sum_{h=1}^{L-\ell} \left(-c \times \mathbb{1}_{\left\{ \sigma^{(\ell+h)+} \neq \emptyset \text{ and } \sigma^{\ell(\ell+h)} \neq \sigma^{(\ell+h)+} \right\}} + \epsilon \times \mathbb{1}_{\left\{ \sigma^{\ell(\ell+h)} = 1 \right\}} \right) \\ + (1-\delta)dt \mathbb{E}\left[V_I\left(1, S'\left(\boldsymbol{\sigma^\ell}\right)\right) \right] \end{array} \right]$$

Since an individual at 1 no longer has promotion prospects, $\delta_{I1} \equiv 0$, and further, for an opening at level 1 there are no subordinates that make decisions on factional support, the first indicator function $\mathbb{1}_{\left\{ \sigma^{(\ell+h)+} \neq \emptyset \text{ and } \sigma^{\ell(\ell+h)} \neq \sigma^{(\ell+h)+} \right\}} \equiv 0$. By direct inspection, the value function will be maximized by supporting a co-faction candidate at 2, since this yields an ϵ utility gain via the second indicator function, $\mathbb{1}_{\left\{ \sigma^{\ell(\ell+h)} = 1 \right\}}$. Moreover, this makes the value function independent of the state: $V_I(1, S) \equiv V_I(1, S'), \forall S, S'$. Since we focus on symmetric equilibria, support is allocated equally over all co-faction members: $\sigma_I^{11}(S^t) = \{1/I_2^t, 1/I_2^t, \ldots, 1/I_2^t\}$.

Step 2. Given that a leader immediately supports co-faction members at level 2, in a promotion race to level 1, irrespective of S, it then follows that, under the Markov restriction, for all values of S, a faction member at level 2 will choose $\boldsymbol{\sigma^\ell}$ for levels strictly below his own by paying attention only to the term $\mathbb{1}_{\left\{ \sigma^{(\ell+h)+} \neq \emptyset \text{ and } \sigma^{\ell(\ell+h)} \neq \sigma^{(\ell+h)+} \right\}}$. Promotions to levels strictly below a member's level do not affect the probability of promotion at the member's level and therefore cannot affect his valuation; $V_I(\ell, S) \equiv V_I\left(1, S'\left(\boldsymbol{\sigma^\ell}\right)\right)$, provided that S is identical to S' at all levels $k \geq \ell$. This is true for all levels. To see why note that the distribution of co-faction members at $\ell + k$ cannot affect value functions at level ℓ or above. Adding an additional co-faction member at any $\ell + k$ has no effect if co-faction members are already present since the faction can only promote a single member for any opening. If the faction has no members at $\ell + k$, then the faction would have turned to the highest $\ell + jth$, where $j > k$, level at which there is a faction member to put forward a candidate. This will now not be necessary with a member promoted to $\ell + k$ but it is, in either case, irrelevant for an individual at ℓ, since it affects neither his promotion probability at present, or the set of potential candidates he will compete with for promotion from his own faction in future. Intuitively, only co-faction members at one's level (via direct competition) and above (potentially via support decisions) can affect promotion decisions from one's own level. When a support decision does not affect a faction member's own probability of promotion, i.e., when it concerns promotion to level 3 or below for a member at 2, his optimal decision depends only on the indicator functions specified in the value function. He will ratify the decision of his immediate subordinate, that is $\sigma^{\ell(\ell+h)} = \sigma^{(\ell+h)+}$. This is clearly optimal if the immediate candidate below supported at least one candidate from the faction since this also maximizes $\mathbb{1}_{\left\{ \sigma^{\ell(\ell+h)} = 1 \right\}}$. If the support decision of the immediate candidate below involves supporting none for the open position then ratifying this decision is again optimal since $c > \epsilon$. Note again, that this is true independent of S. Since he knows support will

be given for his subsequent promotion opportunity, from Step 1 above, he avoids costs c by ratifying subordinate decisions.

The same follows at all levels of the hierarchy. Namely, members at any level ℓ when considering factional support for openings at level $\ell+1$ and below, find it a dominant strategy to ratify the decisions of the subordinate immediately below them in the hierarchy, irrespective of S. That is

$$\sigma_I^{(\ell-h)\ell}\left(S^t, d_I^{(\ell-h+1)\ell}....,d_I^{(\ell-1)\ell}, d_I^{\ell\ell}\right) = d_I^{(\ell-h+k)\ell}$$

for the smallest k at which $I_{l-h+k} > 0$.

Step 3. Consider again the case considered in step 2, but now suppose that the decision maker is the first faction member superior to the opening position. That is a member at $\ell - k$ deciding on support for some position strictly below, denote it level ℓ, for which there are no other co-faction members in positions ℓ to $\ell - k$. Since this member's support decision does not affect his own probability of promotion from his current level, for the same reason as in step 2 above, he only affects his utility by changing the probability of a co-faction member's promotion. So he thus chooses $\boldsymbol{\sigma^\ell}$ to support any candidate rising to a position strictly below $\ell - k$ in order to maximize $\mathbb{1}_{\left\{\sigma^{\ell(\ell+h)}=1\right\}}$. In the symmetric case this is set to: $\sigma_I^{(\ell-k)\ell}\left(S^t, \cdot\right) = \left\{1/I_{\ell+1}^t, 1/I_{\ell+1}^t, ..., 1/I_{\ell+1}^t\right\}$, where it again follows that he will choose the unique probability weights over his co-factional subordinate candidates that sum to 1.

Step 4. Now consider openings at a member's own node for non-leaders: i.e., $\sigma_I^{\ell\ell}\left(S^t\right)$ at $\ell \neq 1$. We now establish that such members will issue a stay order to a co-faction member for an opening at a position at his own node, asking them to wait until he himself is promoted.

Consider the decision by a faction-I politician in node ℓ of whether to support a co-factional's promotion to his node. If he chooses to support some co-factional from level $\ell+1$ then we know from step 2 above that the faction members superior to him will ratify his decision. This implies that, with factional support, via the promotion contest function (6) there is a strictly positive probability that a co-faction member will ascend to node ℓ. Let I_ℓ^* denote the total number of faction I members that would be present at level ℓ after this promotion. Then, using equation (4) and (6), the promotion hazard parameter for this I politician at ℓ (if the other faction K also issues a stay order to co-faction members that could ascend to their level before their own promotion) will become:

$$\delta_{I\ell} = \frac{i}{I_\ell^*}\left(J_{\ell-1}\frac{\left(\delta + \delta_{J\ell-1}^p\right)}{i+\eta} + N_{\ell-1}\frac{\left(\delta + \delta_{N\ell-1}^p\right)}{j+i+\eta}\right),$$

with $j = \beta$ and $i = \rho$, or vice versa. If instead, the politician asks a co-faction member to wait, i.e., $\sigma_I^{\ell\ell}\left(S^t\right) = \{0, 0....0\}$ it then again follows from step 2 above that, necessarily, either a member of the other faction (or a neutral) ascends to the opening at node ℓ. His promotion

hazard then becomes:

$$\delta_{I\ell} = \frac{i}{I_{\ell}^* - 1}\left(J_{\ell-1}\frac{\left(\delta + \delta_{J\ell-1}^p\right)}{i + \eta} + N_{\ell-1}\frac{\left(\delta + \delta_{N\ell-1}^p\right)}{j + i + \eta}\right).$$

The latter expression is strictly greater and thus maximizes the instantaneous arrival of promotion rates. Since there are no costs to taking such a decision since no subordinate decisions exist for a decision maker at the node of the opening, then $\mathbb{1}_{\left\{\sigma_j \neq \emptyset \text{ and } \sigma_j \neq \sigma_j^+\right\}} \equiv 0$ and $\sigma_I^{\ell\ell}(S) = \{0, 0....0\}$ is optimal.

If the other faction does support its members when openings arise, the relevant expressions become, respectively:

$$\delta_{I\ell} = \frac{i}{I_{\ell}^*}\left(J_{\ell-1}\frac{\left(\delta + \delta_{J\ell-1}^p\right)}{j + i + \eta} + N_{\ell-1}\frac{\left(\delta + \delta_{N\ell-1}^p\right)}{j + i + \eta}\right),$$

$$\delta_{I\ell} = \frac{i}{I_{\ell}^* - 1}\left(J_{\ell-1}\frac{\left(\delta + \delta_{J\ell-1}^p\right)}{j + i + \eta} + N_{\ell-1}\frac{\left(\delta + \delta_{N\ell-1}^p\right)}{j + i + \eta}\right).$$

And the latter hazard is clearly higher again so that $\sigma_I^{\ell\ell}(S^t) = \{0, 0....0\}$ is optimal.

To summarize: We have established from step 2 above that all members ratify support decisions of subordinates for openings below their current position, if such subordinates exist. That is $\sigma_I^{(\ell-h)\ell}\left(S^t, d_I^{(\ell-h+1)\ell}....., d_I^{(\ell-1)\ell}, d_I^{\ell\ell}\right) = d_I^{(\ell-k+1)\ell}$if there exists some $k \in [1, h]$ such that $I_{\ell-k+1}^t > 0$. We have established from step 3 above that when there are no subordinates between a member and an opening strictly below the member's level, he supports all candidates symmetrically. That is: $\sigma_I^{(\ell-h)\ell}(\emptyset, \emptyset, .., \emptyset, \emptyset) = \left\{1/I_{\ell+1}^t, 1/I_{\ell+1}^t, ..., 1/I_{\ell+1}^t\right\}$. Step 4 establishes that all members issue stay orders to their own node from within the faction. That is: $\sigma_I^{\ell\ell}(S^t) = \{0, 0....0\}$. These steps thus correspond to the strategies listed in the statement of the proposition. Since these have been shown to be dominant strategies under the Markov restriction, that is they are optimal irrespective of S and irrespective of the strategies followed by other players, it then necessarily follows that these strategies are also best responses to each other, and hence constitute a Markov Perfect Equilibrium. Moreover these strategies are symmetric, and though there also exist non-symmetric Markov strategies that are not strictly dominated, these are the unique symmetric strategies satisfying these criteria. Since these are dominant strategies, and they are the unique symmetric strategies that are dominant, they also constitute the Unique Symmetric Markov Perfect Equilibrium.∎

Proof of Proposition 2. We drop time superscripts and suppress state notation from now on unless it is confusing to do so. Let us define the indicator functions $\mathbf{I}_B = 1$, iff $B_\ell > 0$ and

$\mathtt{I}_B = 0$, otherwise; $\mathtt{I}_N = 1$, iff $N_\ell > 0$ and $\mathtt{I}_N = 0$, otherwise; $\mathtt{I}_R = 1$, iff $R_\ell > 0$ and $\mathtt{I}_R = 0$, otherwise.

Start with a neutral (N), who is at level ℓ in the hierarchy. $\delta_{I\ell-1}$ is determined from the hierarchy above:

$$\delta_{N\ell} = R_{\ell-1} \left(\delta + \delta^p_{R\ell-1}\right) p^R_{N\ell}$$
$$+ N_{\ell-1} \left(\delta + \delta^p_{N\ell-1}\right) p^N_{N\ell}$$
$$+ B_{\ell-1} \left(\delta + \delta^p_{B\ell-1}\right) p^B_{N\ell}.$$

Consider further that, differently from (6) where $p^R_{N\ell} = \eta/(\mathtt{I}_B\beta + \eta + \mathtt{I}_R\rho)$, now $p^R_{N\ell} = \eta/(\mathtt{I}_B\beta + \eta)$ because in Proposition 1 it has been shown that faction R will ask any member from the set of faction members $R_{\ell-1}$ rising to level ℓ and partnering an R already there to wait. For a similar reason, it holds that $p^B_{N\ell} = \eta/(\mathtt{I}_R\rho + \eta)$.

We then have:

$$\delta_{N\ell}$$
$$= \frac{\eta}{N_\ell} \left(R_{\ell-1}\frac{\left(\delta + \delta^p_{R\ell-1}\right)}{\mathtt{I}_B\beta + \eta} + N_{\ell-1}\frac{\left(\delta + \delta^p_{N\ell-1}\right)}{\mathtt{I}_B\beta + \mathtt{I}_R\rho + \eta} + B_{\ell-1}\frac{\left(\delta + \delta^p_{B\ell-1}\right)}{\mathtt{I}_R\rho + \eta} \right).$$

Similarly, for a faction B member this is given by:

$$\delta_{B\ell} = R_{\ell-1} \left(\delta + \delta^p_{R\ell-1}\right) p^R_{B\ell}$$
$$+ N_{\ell-1} \left(\delta + \delta^p_{N\ell-1}\right) p^N_{B\ell}$$
$$+ B_{\ell-1} \left(\delta + \delta^p_{B\ell-1}\right) p^B_{B\ell}$$
$$= \frac{\beta}{B_\ell} \left(R_{\ell-1}\frac{\left(\delta + \delta^p_{R\ell-1}\right)}{\beta + \mathtt{I}_N\eta} + N_{\ell-1}\frac{\left(\delta + \delta^p_{N\ell-1}\right)}{\beta + \mathtt{I}_R\rho + \mathtt{I}_N\eta} \right), \tag{10}$$

where the last line uses the fact that optimal factional actions from Proposition 1 imply $p^B_{B\ell} = 0$, while $p^R_{B\ell} = \beta/(\beta + \mathtt{I}_N\eta)$ and $p^N_{B\ell} = \beta/(\beta + \mathtt{I}_R\rho + \mathtt{I}_N\eta)$.

Finally, for a faction R member this is:

$$\delta_{R\ell} = R_{\ell-1} \left(\delta + \delta^p_{R\ell-1}\right) p^R_{R\ell}$$
$$+ N_{\ell-1} \left(\delta + \delta^p_{N\ell-1}\right) p^N_{R\ell}$$
$$+ B_{\ell-1} \left(\delta + \delta^p_{B\ell-1}\right) p^B_{R\ell}$$
$$= \frac{\rho}{R_\ell} \left(B_{\ell-1}\frac{\left(\delta + \delta^p_{B\ell-1}\right)}{\rho + \mathtt{I}_N\eta} + N_{\ell-1}\frac{\left(\delta + \delta^p_{N\ell-1}\right)}{\mathtt{I}_B\beta + \rho + \mathtt{I}_N\eta} \right), \tag{11}$$

where the last line uses the fact that optimal factional actions from Proposition 1 imply $p_{R\ell}^R = 0$, while $p_{R\ell}^B = \rho/\left(\rho + \mathtt{I}_N \eta\right)$ and $p_{R\ell}^N = \rho/\left(\rho + \mathtt{I}_B \beta + \mathtt{I}_N \eta\right)$. $\blacksquare$

Full Listing of $\delta_I(\ell)$ conditional on paramount leadership
For an N. If an N is paramount leader:

$$\delta_{N\ell} \;=\; \frac{\eta}{N_\ell}\left(R_{\ell-1}\frac{\left(\delta + \delta_{R\ell-1}^p\right)}{\mathtt{I}_B \beta + \eta} + N_{\ell-1}\frac{\left(\delta + \delta_{N\ell-1}^p\right)}{\mathtt{I}_B \beta + \mathtt{I}_R \rho + \eta} + B_{\ell-1}\frac{\left(\delta + \delta_{B\ell-1}^p\right)}{\mathtt{I}_R \rho + \eta}\right).$$

If an R is paramount leader:

$$\delta_{N\ell} \;=\; \frac{\eta}{N_\ell}\left(R_{\ell-1}\frac{\left(\delta + \delta_{R\ell-1}^p\right)}{\mathtt{I}_B \beta + \eta} + N_{\ell-1}\frac{\left(\delta + \delta_{N\ell-1}^p\right)}{\mathtt{I}_B \beta + \mathtt{I}_R \rho^l + \eta} + B_{\ell-1}\frac{\left(\delta + \delta_{B\ell-1}^p\right)}{\mathtt{I}_R \rho^l + \eta}\right).$$

If a B is paramount leader:

$$\delta_{N\ell} \;=\; \frac{\eta}{N_\ell}\left(R_{\ell-1}\frac{\left(\delta + \delta_{R\ell-1}^p\right)}{\mathtt{I}_B \beta^l + \eta} + N_{\ell-1}\frac{\left(\delta + \delta_{N\ell-1}^p\right)}{\mathtt{I}_B \beta^l + \mathtt{I}_R \rho + \eta} + B_{\ell-1}\frac{\left(\delta + \delta_{B\ell-1}^p\right)}{\mathtt{I}_R \rho + \eta}\right).$$

where $\mathtt{I}_B = 1$, iff $B_\ell > 0$ and $\mathtt{I}_B = 0$, otherwise; $\mathtt{I}_R = 1$, iff $R_\ell > 0$ and $\mathtt{I}_R = 0$, otherwise.

For faction B member. If an N is paramount leader:

$$\delta_{B\ell} = \frac{\beta}{B_\ell}\left(R_{\ell-1}\frac{\left(\delta + \delta_{R\ell-1}^p\right)}{\beta + \mathtt{I}_N \eta} + N_{\ell-1}\frac{\left(\delta + \delta_{N\ell-1}^p\right)}{\beta + \mathtt{I}_R \rho + \mathtt{I}_N \eta}\right),$$

If an R is paramount leader:

$$\delta_{B\ell} = \frac{\beta}{B_\ell}\left(R_{\ell-1}\frac{\left(\delta + \delta_{R\ell-1}^p\right)}{\beta + \mathtt{I}_N \eta} + N_{\ell-1}\frac{\left(\delta + \delta_{N\ell-1}^p\right)}{\beta + \mathtt{I}_R \rho^l + \mathtt{I}_N \eta}\right),$$

If a B is paramount leader:

$$\delta_{B\ell} = \frac{\beta}{B_\ell}\left(R_{\ell-1}\frac{\left(\delta + \delta_{R\ell-1}^p\right)}{\beta^l + \mathtt{I}_N \eta} + N_{\ell-1}\frac{\left(\delta + \delta_{N\ell-1}^p\right)}{\beta^l + \mathtt{I}_R \rho + \mathtt{I}_N \eta}\right),$$

where $\mathtt{I}_N = 1$, iff $N_\ell > 0$ and $\mathtt{I}_N = 0$, otherwise; $\mathtt{I}_R = 1$, iff $R_\ell > 0$ and $\mathtt{I}_R = 0$, otherwise.

For a faction R member. If an N is paramount leader:

$$\delta_{R\ell} = \frac{\rho}{R_\ell}\left(B_{\ell-1}\frac{\left(\delta + \delta_{B\ell-1}^p\right)}{\rho + \mathtt{I}_N \eta} + N_{\ell-1}\frac{\left(\delta + \delta_{N\ell-1}^p\right)}{\mathtt{I}_B \beta + \rho + \mathtt{I}_N \eta}\right),$$

If an R is paramount leader:

$$\delta_{R\ell} = \frac{\rho}{R_\ell}\left(B_{\ell-1}\frac{\left(\delta + \delta^p_{B\ell-1}\right)}{\rho^l + \mathrm{I}_N\eta} + N_{\ell-1}\frac{\left(\delta + \delta^p_{N\ell-1}\right)}{\mathrm{I}_B\beta + \rho^l + \mathrm{I}_N\eta}\right),$$

If a B is paramount leader:

$$\delta_{R\ell} = \frac{\rho}{R_\ell}\left(B_{\ell-1}\frac{\left(\delta + \delta^p_{B\ell-1}\right)}{\rho + \mathrm{I}_N\eta} + N_{\ell-1}\frac{\left(\delta + \delta^p_{N\ell-1}\right)}{\mathrm{I}_B\beta^l + \rho + \mathrm{I}_N\eta}\right),$$

where $\mathrm{I}_N = 1$, *iff* $N_\ell > 0$ *and* $\mathrm{I}_N = 0$, *otherwise;* $\mathrm{I}_B = 1$, *iff* $B_\ell > 0$ *and* $\mathrm{I}_B = 0$, *otherwise.*

∎

Proof of Proposition 3.

Since flow payoffs are higher the higher the politician is in the hierarchy, i.e. $u_{\ell-1} > u_\ell$ $\forall \ell$, then it is immediate by inspection of expression (7) that increasing the rate of promotion raises valuations, $\frac{dV_I(\ell,S)}{d\delta_{I\ell}} > 0$ $\forall \ell$. This implies that $\delta_{I\ell} > \delta_{J\ell}$ ensures $V_I(\ell, S) > V_J(\ell, S)$.

The proof proceeds by establishing sufficient conditions for three parts. (i) The existence of neutrals given factions exist; (ii). The existence of a single faction given neutrals exist; (iii) The existence of a second faction, given neutrals and a first faction already exist.

In each part, a sufficient condition is provided for $\delta_{I\ell} > \delta_{J\neq I\ell}$ and $\delta_{K\neq I\ell}$ at a single level, ℓ. The sufficient condition established in each case is thus required to hold at all ℓ in order to ensure that an entering politician prefers entry as a type I.

Part (i). We establish a sufficient condition for there to be neutrals, i.e. $\exists \ell : N_\ell \neq 0$. Suppose, on the contrary, that $N_\ell = 0 \ \forall \ \ell$; there exist no N members in the hierarchy. Necessarily, due to Proposition 1, without N's, all nodes will be filled by both a B and an R.

Assume, without loss of generality, that the paramount leadership position is held by a B. Consider level ℓ in the hierarchy. Necessarily the promotion hazard for an N at level ℓ, if one were to exist, would be given by:

$$\delta_{N\ell} = \eta\left(R_{\ell-1}\frac{\left(\delta + \delta^p_{R\ell-1}\right)}{\mathrm{I}_B\beta^l + \eta} + B_{\ell-1}\frac{\left(\delta + \delta^p_{B\ell-1}\right)}{\mathrm{I}_R\rho + \eta}\right).$$

Due to optimal faction decisions at each node, it must be the case that $R_{\ell-1} = B_{\ell-1} = M_{\ell-1}/2$ and $\mathrm{I}_B = \mathrm{I}_R = 1$. The relationship between $\delta^p_{R\ell-1}$ and $\delta^p_{B\ell-1}$ is ambiguous. So consider both cases separately. First, assume that $\delta^p_{R\ell-1} \leq \delta^p_{B\ell-1}$, which will imply, due to the symmetry

of the posited hierarchy, that $\delta_{R\ell}^p \leq \delta_{B\ell}^p$ too. Then, substituting for $\mathtt{I}_B, \mathtt{I}_R, R_{\ell-1}$ and $B_{\ell-1}$ yields:

$$\delta_{N\ell} = \eta \left(M_{\ell-1}/2 \times \frac{\left(\delta + \delta_{R\ell-1}^p\right)}{\beta^l + \eta} + M_{\ell-1}/2 \times \frac{\left(\delta + \delta_{B\ell-1}^p\right)}{\rho + \eta} \right).$$

Since $\delta_{R\ell-1}^p \leq \delta_{B\ell-1}^p$ then:

$$\delta_{N\ell} \geq \eta M_{\ell-1}/2 \times \left(\delta + \delta_{R\ell-1}^p\right) \left(\frac{1}{\beta^l + \eta} + \frac{1}{\rho + \eta} \right),$$

and assuming, for now, that $\beta^l > \rho$ implies:

$$\delta_{N\ell} \geq \eta M_{\ell-1} \times \left(\delta + \delta_{R\ell-1}^p\right) \left(\frac{1}{\beta^l + \eta} \right). \tag{12}$$

Now consider $\delta_{B\ell}$:

$$\delta_{B\ell} = \frac{2\beta^l}{M_\ell} \left(M_{\ell-1}/2 \times \frac{\left(\delta + \delta_{R\ell-1}^p\right)}{\beta^l} \right)$$

$$= \frac{1}{M_\ell} \left(M_{\ell-1} \times \left(\delta + \delta_{R\ell-1}^p\right) \right).$$

Then $\delta_{N\ell} > \delta_{B\ell}$ if:

$$\eta M_{\ell-1} \times \left(\delta + \delta_{R\ell-1}^p\right) \left(\frac{1}{\beta^L + \eta} \right) > \frac{1}{M_\ell} \left(M_\ell \left(\delta + \delta_{R\ell-1}^p\right) \right),$$

which rearranges to:

$$\frac{\eta}{\beta^l + \eta} > \frac{1}{M_\ell}. \tag{13}$$

Now consider $\delta_{R\ell}$:

$$\delta_{R\ell} = \frac{2\rho}{M_\ell} \left(M_{\ell-1}/2 \times \frac{\left(\delta + \delta_{B\ell-1}^p\right)}{\rho} \right)$$

$$= \frac{1}{M_\ell} \left(M_{\ell-1} \times \left(\delta + \delta_{B\ell-1}^p\right) \right).$$

Since, by supposition, $\delta_{R\ell-1}^p \leq \delta_{B\ell-1}^p$ it is possible to define $Z \geq 1$ such that $\frac{\delta + \delta_{B\ell}^p}{\delta + \delta_{R\ell}^p} \equiv Z$. Note that Z is invariant with respect to M_ℓ. To see why, note that with a symmetric hierarchy in

which each node is filled by a B and R pair we have: $\delta^p_{R\ell} = \delta_{B\ell}$ and $\delta^p_{B\ell} = \delta_{R\ell}$. Thus, using equations (10) and (11) and the fact that in such a hierarchy $R_\ell = B_\ell = M_\ell/2$, we have

$$\delta_{R\ell} = \left(M_{\ell-1} \times \frac{(\delta + \delta_{R\ell-1})}{M_\ell} \right)$$

and

$$\delta_{B\ell} = \left(M_{\ell-1} \times \frac{(\delta + \delta_{B\ell-1})}{M_\ell} \right).$$

So the ratio $\frac{\delta^p_{B\ell}}{\delta^p_{R\ell}} = \frac{\delta_{R\ell}}{\delta_{B\ell}} = \frac{M_{\ell-1} \times \frac{(\delta + \delta_{R\ell-1})}{M_\ell}}{M_{\ell-1} \times \frac{(\delta + \delta_{B\ell-1})}{M_\ell}} = \frac{\delta + \delta_{R\ell-1}}{\delta + \delta_{B\ell-1}}$, which is clearly independent of M_ℓ. Using the notation Z we then have:

$$\delta_{R\ell} = \frac{1}{M_\ell} \left(M_{\ell-1} \times \left(\delta + \delta^p_{R\ell-1} \right) Z \right).$$

Then $\delta_{N\ell} > \delta_{R\ell}$ if:

$$\eta M_{\ell-1} \times \left(\delta + \delta^p_{R\ell-1} \right) \left(\frac{1}{\beta^L + \eta} \right) > \frac{1}{M_\ell} \left(M_{\ell-1} \left(\delta + \delta^p_{R\ell-1} \right) Z \right),$$

which rearranges to:

$$\frac{\eta}{\beta^l + \eta} > \frac{Z}{M_\ell}. \tag{14}$$

which again holds for M_ℓ large enough at all ℓ. So for sufficiently large M_ℓ, neutrals will be the preferred entering type, thus contradicting the maintained assumption that neutrals are not in the hierarchy. Assuming, alternatively, that $\beta^l \leq \rho$, instead of using the inequality in (12) we now have:

$$\delta_{N\ell} \geq \eta M_{\ell-1} \times \left(\delta + \delta^p_{R\ell-1} \right) \left(\frac{1}{\rho + \eta} \right),$$

which, by following the same procedure as above, yields the analog to (13) as a sufficient condition for $\delta_{N\ell} > \delta_{B\ell}$, namely:

$$\frac{\eta}{\rho + \eta} > \frac{1}{M_\ell}. \tag{15}$$

This again holds for sufficiently high M_ℓ, and again will also hold for sufficiently high M_ℓ for the R entrants subject to the scaling by factor Z. Again, entering politicians will choose to be neutral.

Now suppose the alternative relationship between $\delta^p_{R\ell-1}$ and $\delta^p_{B\ell-1}$, that is: $\delta^p_{R\ell-1} > \delta^p_{B\ell-1}$, and again first posit that $\beta^l > \rho$. Then using these two inequalities and substituting for

$\mathbb{I}_B, \mathbb{I}_R, R_{\ell-1}$ and $B_{\ell-1}$ exactly as we did above. Equation (12) now yields:

$$\delta_{N\ell} = \eta \left(M_{\ell-1}/2 \times \frac{\left(\delta + \delta_{R\ell-1}^p\right)}{\beta^l + \eta} + M_{\ell-1}/2 \times \frac{\left(\delta + \delta_{B\ell-1}^p\right)}{\rho + \eta} \right)$$

$$> \eta M_{\ell-1}/2 \times \left(\delta + \delta_{B\ell-1}^p\right) \left(\frac{1}{\beta^l + \eta} + \frac{1}{\rho + \eta} \right)$$

$$> \eta M_{\ell-1} \times \left(\delta + \delta_{B\ell-1}^p\right) \left(\frac{1}{\beta^l + \eta} \right).$$

Now $\delta_{R\ell}$ is given by:

$$\delta_{R\ell} = \frac{2\rho}{M_\ell} \left(M_{\ell-1}/2 \times \frac{\left(\delta + \delta_{B\ell-1}^p\right)}{\rho} \right)$$

$$= \frac{1}{M_\ell} \left(M_{\ell-1} \times \left(\delta + \delta_{B\ell-1}^p\right) \right).$$

Then $\delta_{N\ell} > \delta_{R\ell}$ if:

$$\eta M_{\ell-1} \times \left(\delta + \delta_{B\ell-1}^p\right) \left(\frac{1}{\beta^L + \eta} \right) > \frac{1}{M_\ell} \left(M_{\ell-1} \left(\delta + \delta_{B\ell-1}^p\right) \right).$$

A sufficient condition for this is:

$$\frac{\eta}{\beta^l + \eta} > \frac{1}{M_\ell}.$$

This again holds for M_ℓ high enough.

Now $\delta_{B\ell}$ is given by:

$$\delta_{B\ell} = \frac{2\beta}{M_\ell} \left(M_{\ell-1}/2 \times \frac{\left(\delta + \delta_{R\ell-1}^p\right)}{\beta} \right)$$

$$= \frac{1}{M_\ell} \left(M_{\ell-1} \times \left(\delta + \delta_{R\ell-1}^p\right) \right).$$

Since, by supposition it is now the case that, $\delta_{B\ell-1}^p \le \delta_{R\ell-1}^p$ it is possible to define $K \ge 1$ such that $\frac{\delta + \delta_{R\ell}^p}{\delta + \delta_{B\ell}^p} \equiv K$. Similarly to the above, K is invariant with respect to M_ℓ. Substituting for K we have:

$$\delta_{B\ell} = \frac{1}{M_\ell} \left(M_{\ell-1} \times \left(\delta + \delta_{B\ell-1}^p\right) K \right).$$

Then $\delta_{N\ell} > \delta_{B\ell}$ if:

$$\eta M_{\ell-1} \times \left(\delta + \delta_{B\ell-1}^p\right) \left(\frac{1}{\beta^L + \eta} \right) > \frac{1}{M_\ell} \left(M_{\ell-1} \left(\delta + \delta_{B\ell-1}^p\right) K \right).$$

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A sufficient condition for this is:
$$\frac{\eta}{\beta^l + \eta} > \frac{K}{M_\ell}.$$
This again holds for M_ℓ high enough. So new entrants will prefer to enter as neutrals over either faction for M_ℓ large enough.

The analogous procedure under the alternative assumption $\beta^l \leq \rho$ yields a sufficient condition exactly as in (15):
$$\frac{\eta}{\rho + \eta} > \frac{1}{M_\ell}.$$

Part (ii). We now establish a sufficient condition for there to exist at least a single faction. Suppose that all positions in the hierarchy are held by a neutral. Consider an entrant choosing to also be a neutral. He would then have:

$$\delta_{N\ell} = \frac{N_{\ell-1}}{M_\ell} \left(\delta + \delta_{N\ell-1}^p \right).$$

But by entering as a B member the entrant would have:

$$\delta_{B\ell} = \beta N_{\ell-1} \left(\frac{\delta + \delta_{N\ell-1}^p}{\beta + \eta} \right).$$

These rearrange to imply that $\delta_{B\ell} > \delta_{N\ell}$ provided that $M_\ell > \frac{\beta+\eta}{\beta}$. The analogous sufficient condition for an R entrant is $M_\ell > \frac{\rho+\eta}{\rho}$. This proves part (ii).

Part (iii). We establish a sufficient condition for two factions to exist. We proceed as above, by demonstrating a contradiction. If there is only one faction present, without loss of generality let it be B, and the other politicians are N, for sufficiently high M_ℓ, $\delta_{R\ell} > \delta_{B\ell}$ or $\delta_{N\ell}$, so that an entering politician will choose to enter as an R.

As previously, with only N and B in the hierarchy we have:

$$\delta_{N\ell} = \frac{\eta}{M_\ell - B_\ell} \left(N_{\ell-1} \frac{\left(\delta + \delta_{N\ell-1}^p \right)}{\beta + \eta} + B_{\ell-1} \frac{\left(\delta + \delta_{B\ell-1}^p \right)}{\eta} \right), \tag{16}$$

$$\delta_{B\ell} = \frac{\beta}{B_\ell} \left(N_{\ell-1} \frac{\left(\delta + \delta_{N\ell-1}^p \right)}{\beta + \eta} \right).$$

Either $\delta_{N\ell} > \delta_{B\ell}$, so that a new entrant would prefer to enter as an N over a B, or the converse, in which case he would choose to enter as a B over an N. Suppose first that $\delta_{N\ell} > \delta_{B\ell}$ and consider the promotion hazard for a single entering R:

$$\delta_{R\ell} = \rho \left(B_{\ell-1} \frac{\left(\delta + \delta_{B\ell-1}^p \right)}{\rho + \eta} + N_{\ell-1} \frac{\left(\delta + \delta_{N\ell-1}^p \right)}{\rho + \beta + \eta} \right).$$

If $\delta_{N\ell} > \delta_{B\ell}$ for an increase in M_ℓ, then necessarily the term $M_\ell - B_\ell$ in expression (16) increases with M_ℓ, since an extra politician would enter as an N instead of a B. But since $\delta_{R\ell}$ above is independent of M_ℓ, there exists an M_ℓ sufficiently large so that $\delta_{R\ell} > \delta_{N\ell}$, and an entering politician would instead choose to be an R over being an N, contradicting the posited non-existence of R members in equilibrium.

Alternatively, suppose that $\delta_{N\ell} \leq \delta_{B\ell}$, then, for an increase in M_ℓ necessarily the term $M_\ell - N_\ell$ increases, as a politician would choose to enter as a B over being an N. Now consider the promotion hazard for a B:

$$\delta_{B\ell} = \frac{\beta}{M_\ell - N_\ell}\left(N_{\ell-1}\frac{\left(\delta + \delta^p_{N\ell-1}\right)}{\beta + \eta}\right).$$

Again, since $\delta_{R\ell}$ is independent of M_ℓ, there exists an M_ℓ great enough so that $\delta_{R\ell} > \delta_{B\ell}$, which implies that a new entrant will choose to enter as an R member, again contradicting the posited non-existence of R members. ∎
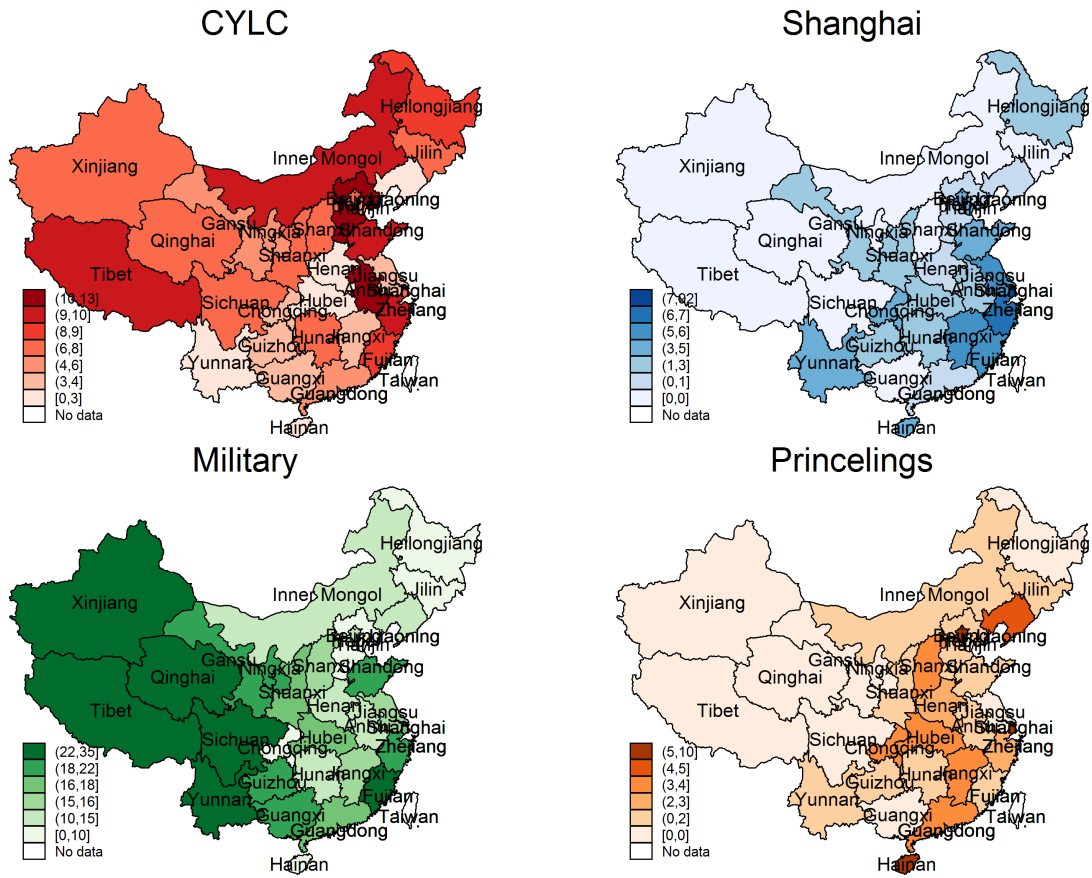
Figure 1: Geographic Distribution of Factions or Groups (1956-2014)

This graph shows the geographic distribution of factions or groups across provinces (municipalities) over the period of 1956 to 2014. The color scale represents the average share of faction or group in a province (municipality).
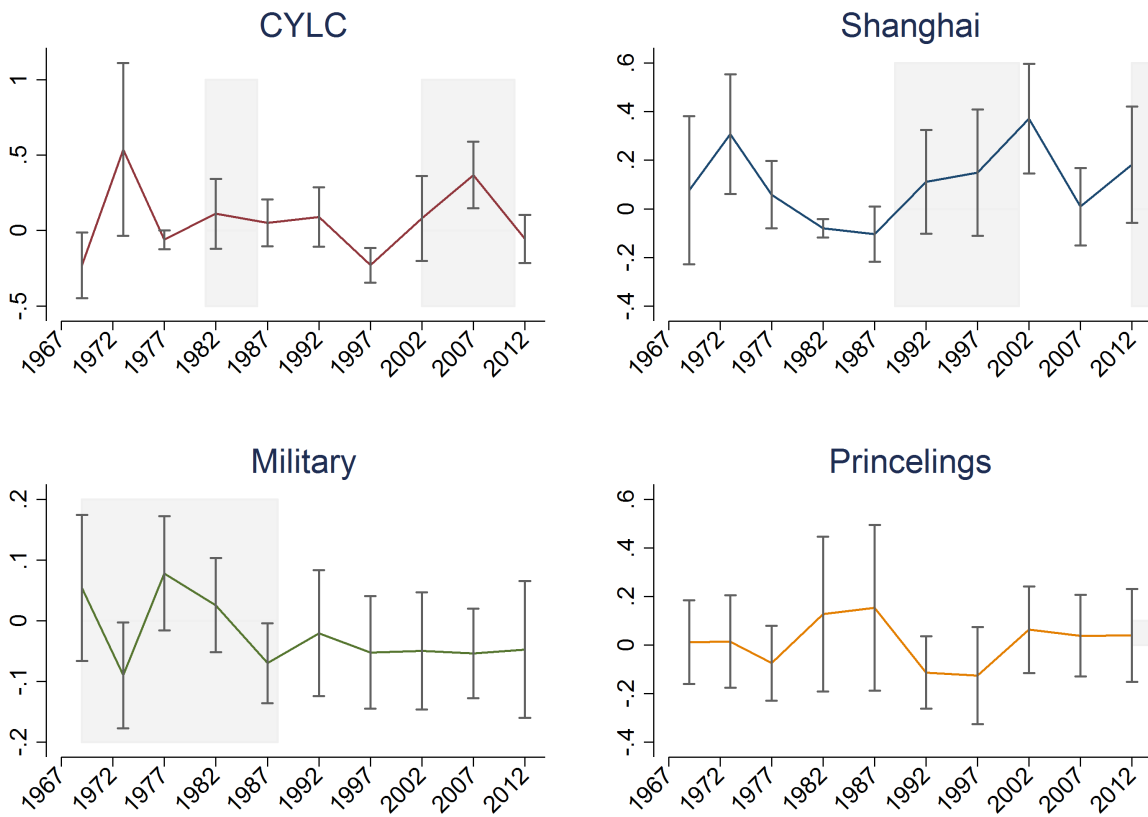
Figure 2: Leadership Premium in Promotion Rates of Each Faction or Group
This graph shows the leadership premium in promotion rates of each faction over the rest of members in the Central Committee over time. The leadership premium in promotion rates is defined as the regression coefficients of promotion dummy on faction or group affiliation. The regression is repeated for each session of Central Committee. The capped spikes indicate the standard errors of the estimates. The shaded area indicates that the General Secretary of CCP is from the same faction or group.
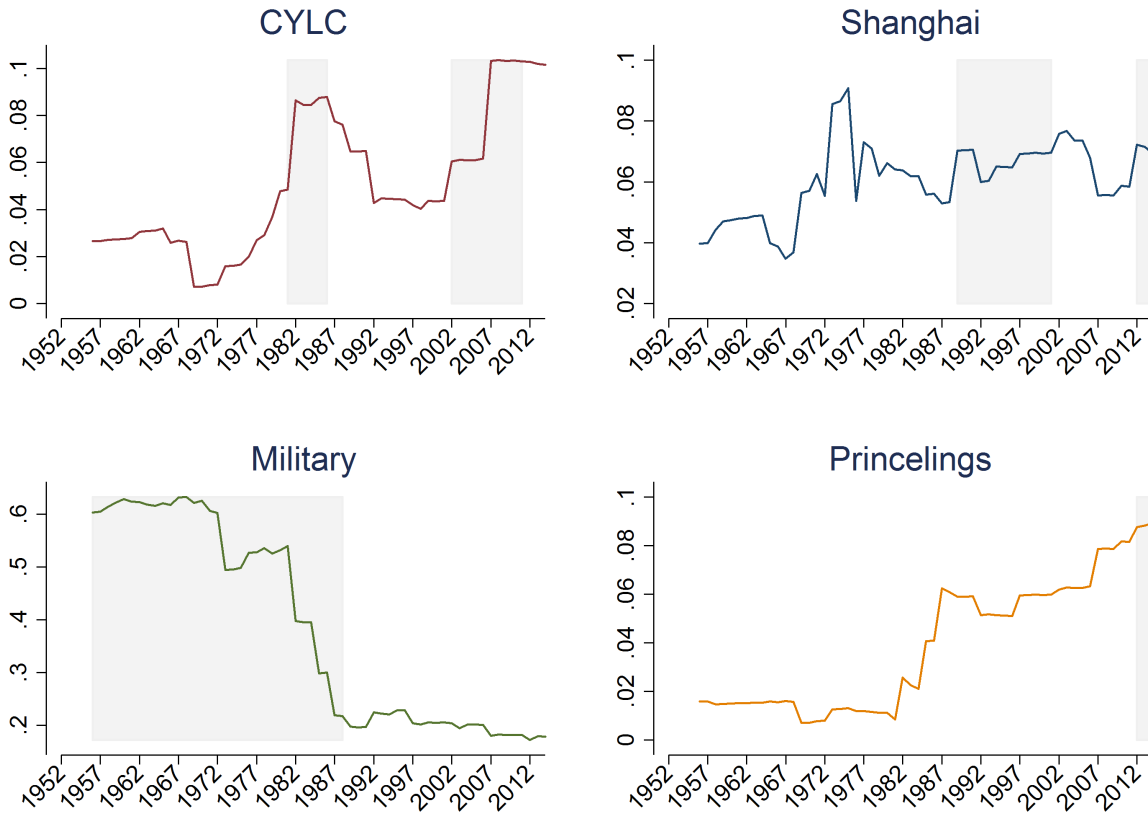
Figure 3: Leadership Premium in Power Score of Each Faction or Group

This graph shows the share of power score of each faction or group 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 same faction or group.
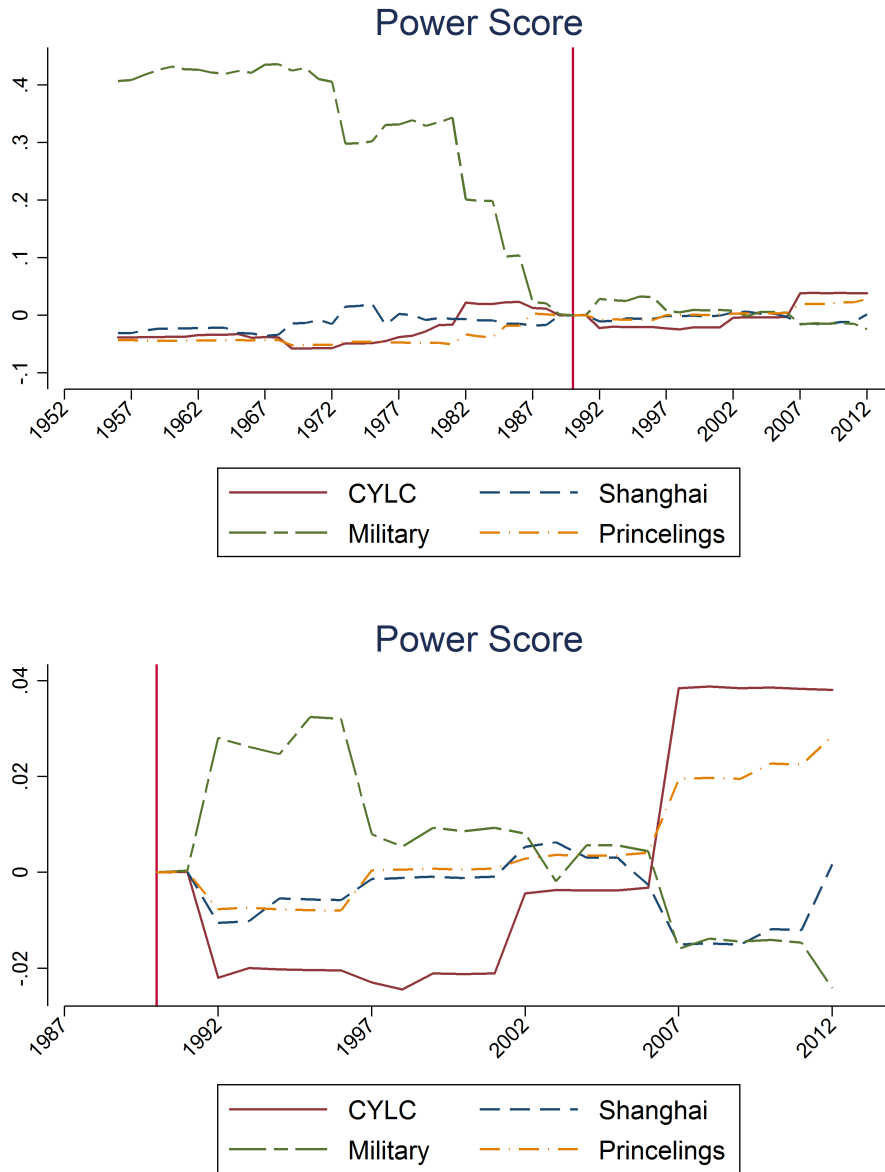
Figure 4: Power Score of Each Faction or Group in the Central Committee

This graph shows the share of power score of each faction or group in the Central Committee over time. The power score is constructed following the scheme of Bo (2010). The vertical line indicates the year of 1990, the first time when a civilian, Jiang Zemin, took over the Central Military Committee. The power score is normalized to zero in 1990. The upper panel shows the whole sample period from 1956 to 2012, the lower panel shows the post-Deng period from 1990 to 2012.

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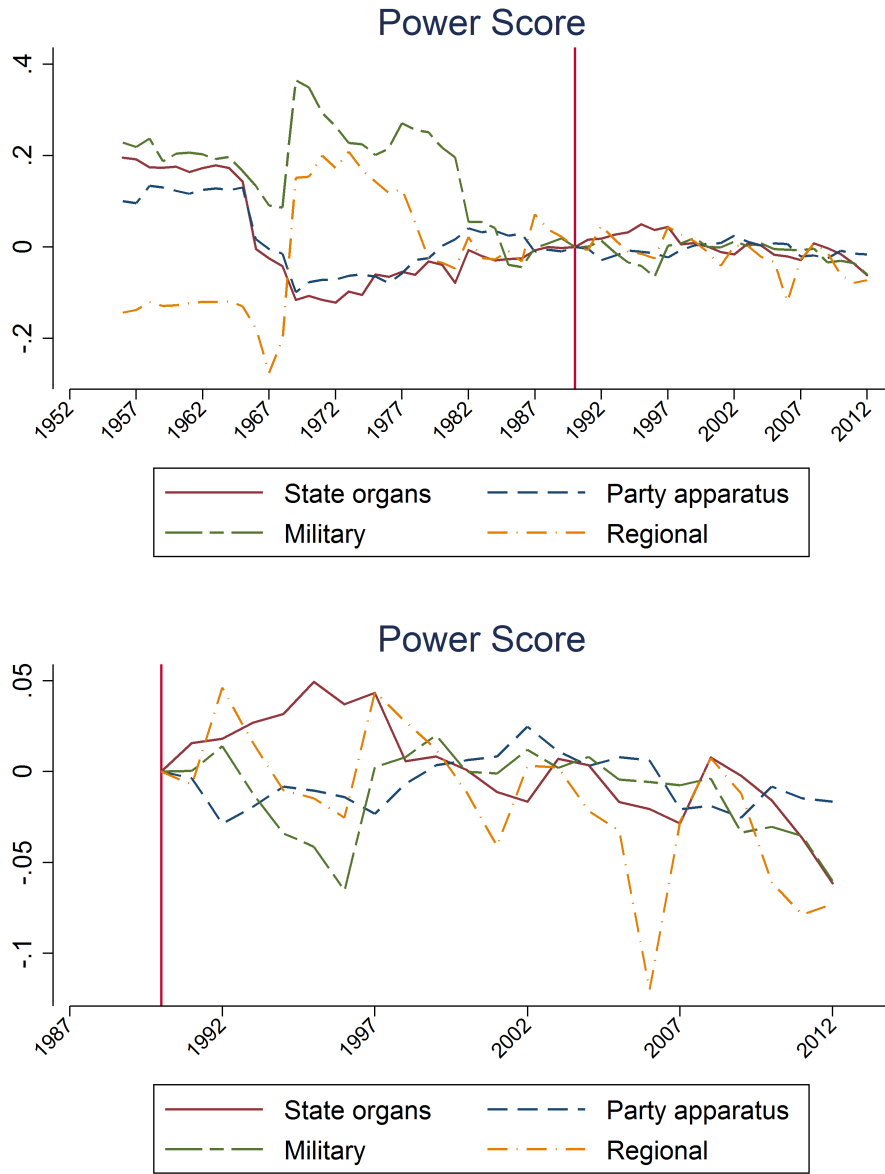
Figure 5: Power Score of Each Constituency in the Central Committee

This graph shows the share of power score for each constituency in the Central Committee over time. The power score is constructed following the scheme of Bo (2010). The vertical line indicates the year of 1990, the first time when a civilian, Jiang Zemin, took over the Central Military Committee. The power score is normalized to zero in 1990. The upper panel shows the whole sample period from 1956 to 2012, the lower panel shows the post-Deng period from 1990 to 2012.
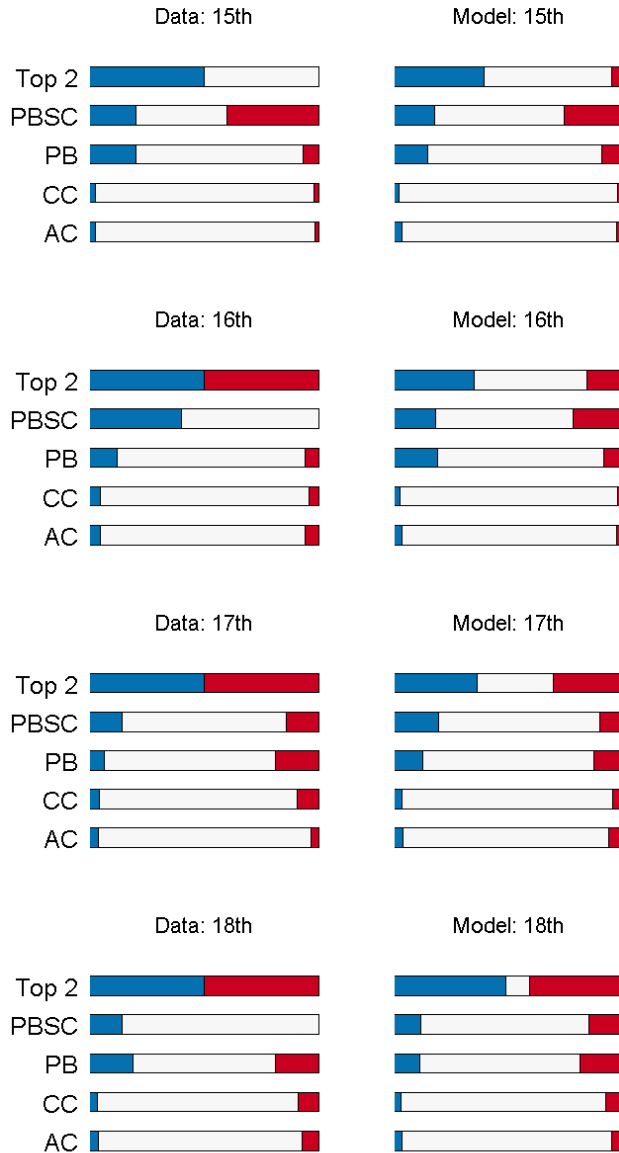
Figure 6: Seat Shares at Each Level of the Central Committee

This graph shows seat shares at each level of the Central Committee predicted by the baseline faction model and in the data. Each of the five bars represents the top two CCP positions, PBSC, PB, CC, and AC, from the top down, respectively. The blue/white/red bar represents the Shanghai Gang/Neutral/CYCL. The model is estimated using the 14th to 18th Central Committees and the results are averaged over 100 simulations for each Party Congress.
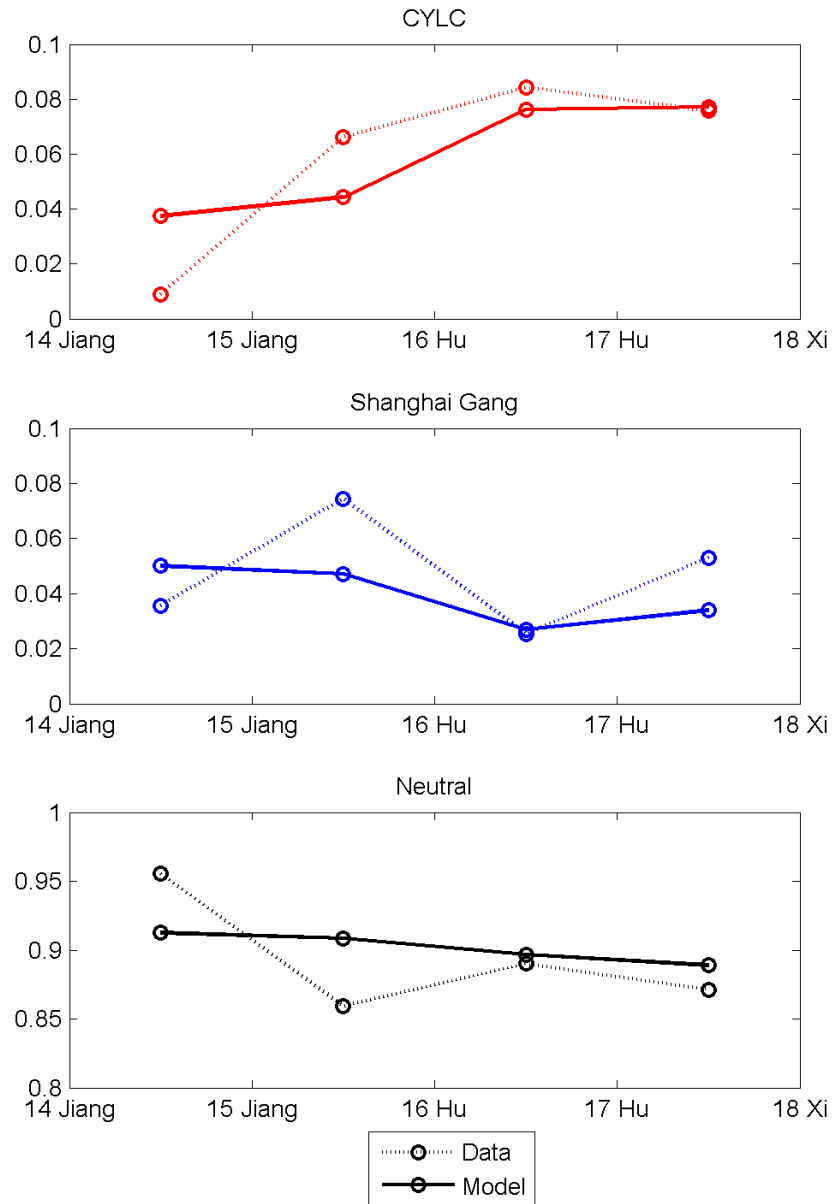
Figure 7: Aggregate Share of Promotions over Time

This graph shows the time series plot of the share of promotions of each faction over time. The share of promotions is defined as the ratio between the number of promotions of a faction and the total number of promotions to this level. The share of promotions is predicted by the baseline faction model estimated using the 14th to 18th Central Committees and the results are averaged over 100 simulations for each Party Congress.
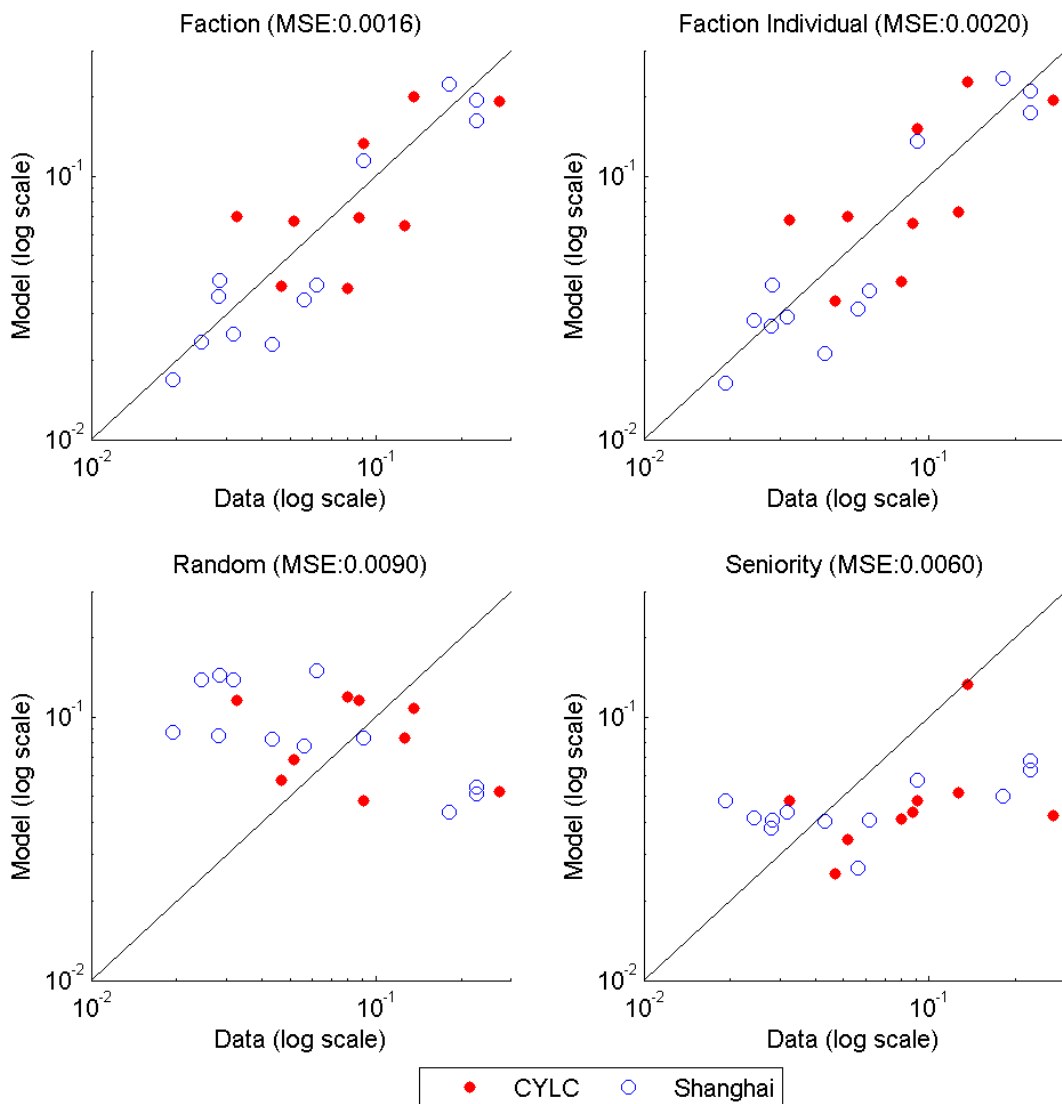
Figure 8: Aggregate Share of Promotions over Time

This graph shows the scatter plot of the model predicted share of promotions of each faction against the data. The share of promotions is defined as the ratio between the number of promotions of a faction and the total number of promotions to this level. The blue/red dot represents Shanghai Gang/CYLC. Each dot is a share of a faction at a given level of a given Party Congress. The estimation sample includes the 14th to 18th Central Committees and the results are averaged over 100 simulations for each Party Congress.

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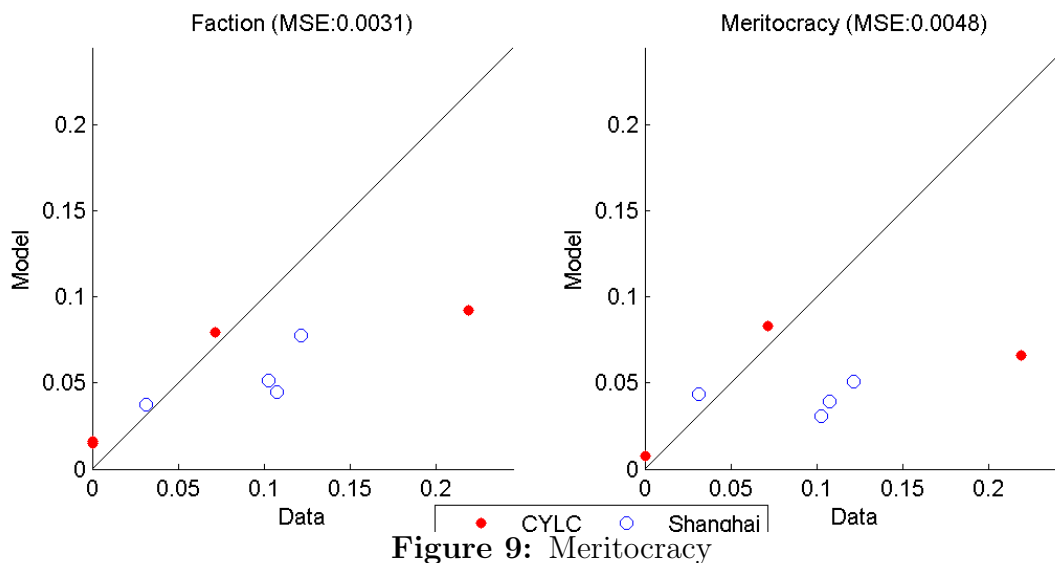
Figure 9: Meritocracy

This graph shows the scatter plot of the model predicted share of promotions of each faction against the data. The share of promotions is defined as the ratio between the number of promotions of a faction and the total number of promotions. The blue/red dot represents Shanghai Gang/CYLC. Each dot is a share of a faction at a given level of a given Party Congress. The estimation sample includes the 14th to 18th Central Committees and the results are averaged over 100 simulations for each Party Congress.
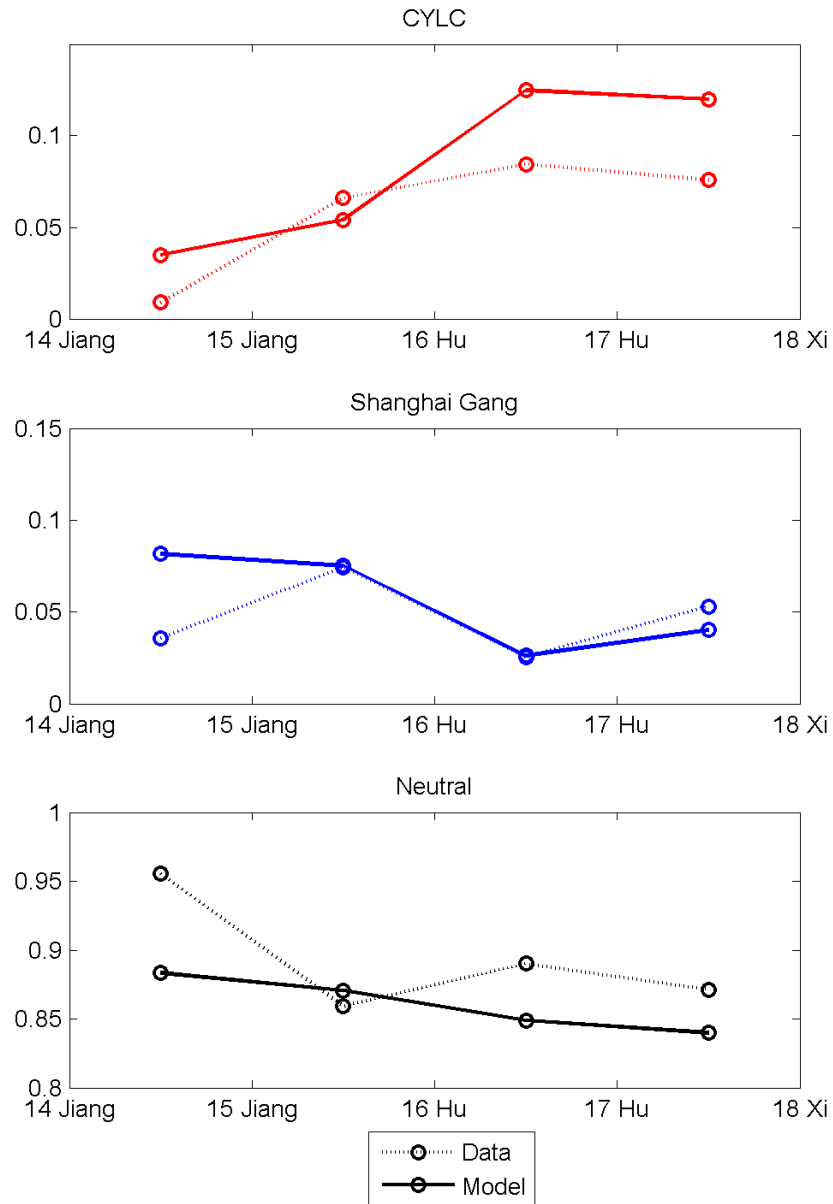
Figure 10: Aggregate Share of Promotions over Time (Leadership Premium × 2)
These graphs show the time series plot of the share of promotions of each faction over time. The share of promotions is defined as the ratio between the number of promotions of a faction and the total number of promotions to this level. The counterfactual simulations are conducted by doubling the leadership premium of the baseline faction model and the results are averaged over 100 simulations for each Party Congress.
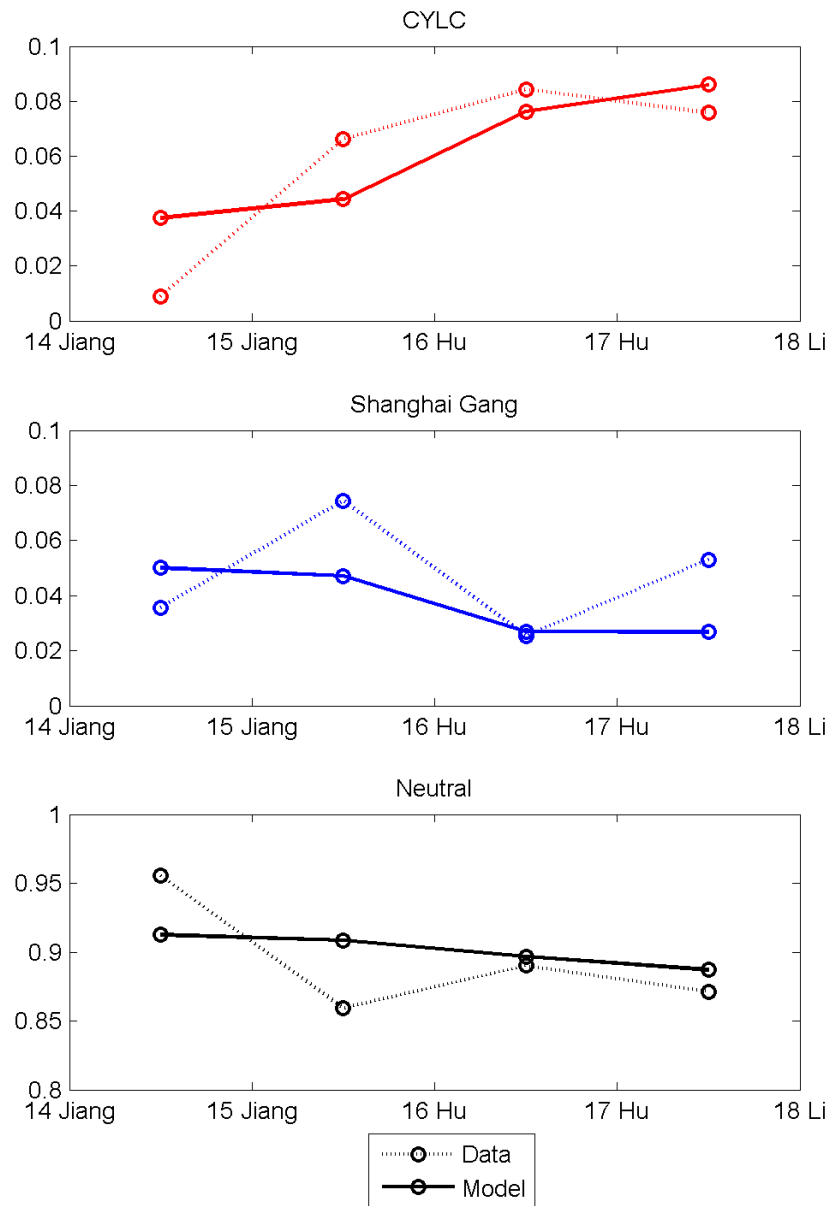
Figure 11: Aggregate Share of Promotions over Time (Li Keqiang Presidency)
These graphs show the time series plot of the share of promotions of each faction over time. The share of promotions is defined as the ratio between the number of promotions of a faction and the total number of promotions to this level. The counterfactual simulations are conducted by assuming Li Keqiang became the president in the 18th Party Congress and the results are averaged over 100 simulations for each Party Congress.

Table 1: Summary Statistics of Elites in China

This table shows summary statistics of demographics and career paths of 4,494 elites who hold import positions in government, the military, education, business, and media in China since 1992. The unit of observation is position-individual pair. We report means and standard deviation, in parentheses below. Duration is the length of tenure in the position. Age is the age when an individual first started the job. Gender equals 1 if an individual is male, 0 otherwise. Ethnicity equals 1 if a member is from an ethnic minority, 0 otherwise. CYLC/Shanghai/Military/Princelings equals 1 if an individual is from CYLC/Shanghai/Military/Princelings faction/group, 0 otherwise. The data source for this table is China Vitae.

	Business	CPPCC	Congress	Court	Education	Gover	Media	Others	PLA	Party	Procu	Total
Duration	4.35	5.52	5.35	4.45	3.18	4.19	4.68	4.13	4.10	4.27	5.17	4.24
	(4.59)	(3.49)	(3.31)	(3.97)	(3.97)	(13.94)	(4.46)	(4.36)	(3.90)	(3.02)	(3.36)	(7.02)
Age	42.93	59.83	56.44	36.74	34.12	46.88	40.89	39.92	43.92	47.09	46.54	45.05
	(13.68)	(9.93)	(8.95)	(8.20)	(12.50)	(9.84)	(11.62)	(13.65)	(14.89)	(10.73)	(11.68)	(13.04)
Gender	0.94	0.91	0.90	0.98	0.92	0.93	0.98	0.90	0.99	0.93	0.91	0.93
	(0.25)	(0.28)	(0.31)	(0.13)	(0.27)	(0.25)	(0.15)	(0.30)	(0.10)	(0.25)	(0.28)	(0.25)
EthnicMinor	0.04	0.12	0.13	0.22	0.03	0.05	0.07	0.08	0.02	0.10	0.07	0.07
	(0.21)	(0.33)	(0.34)	(0.42)	(0.17)	(0.22)	(0.25)	(0.27)	(0.15)	(0.30)	(0.25)	(0.26)
CYLC	0.04	0.07	0.08	0.07	0.05	0.08	0.11	0.06	0.01	0.19	0.13	0.10
	(0.19)	(0.25)	(0.27)	(0.25)	(0.22)	(0.27)	(0.32)	(0.24)	(0.12)	(0.39)	(0.34)	(0.29)
Shanghai	0.04	0.04	0.03	0.02	0.04	0.03	0.03	0.03	0.01	0.04	0.09	0.03
	(0.19)	(0.20)	(0.18)	(0.15)	(0.18)	(0.16)	(0.17)	(0.17)	(0.12)	(0.20)	(0.28)	(0.18)
Military	0.01	0.02	0.04	0.00	0.02	0.01	0.02	0.03	0.91	0.05	0.00	0.09
	(0.10)	(0.13)	(0.21)	(0.00)	(0.14)	(0.09)	(0.12)	(0.17)	(0.28)	(0.22)	(0.00)	(0.28)
Princelings	0.02	0.02	0.02	0.00	0.02	0.05	0.04	0.03	0.06	0.04	0.00	0.04
	(0.15)	(0.15)	(0.14)	(0.00)	(0.15)	(0.21)	(0.19)	(0.18)	(0.24)	(0.20)	(0.00)	(0.19)

Table 2: Summary Statistics of Central Committee Members

This table shows summary statistics of the members of the 8th -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 to 1 if a member will be promoted in the next session of Central Committee, 0 otherwise. Retirement equals to 1 if a member will retire 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/group, 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)

Table 3: Geographical Distribution of Factions and Groups

This table shows the cross-section regressions of the share of each faction in provinces (municipalities) on the average provincial (municipal) GDP per capita over the period of 1956-2014. The share of a faction in a province is defined as the ratio of the number of faction members who have worked in this province (municipality) over the total number of Central Committee members who have worked in the same place during their careers. Robust standard errors are reported in the bracket. ***,**,* indicates 1 percent, 5 percent, and 10 percent significance level respectively.

	(1)	(2)	(3)	(4)
	Shanghai	CYLC	Military	Princelings
GDP per capita	0.644**	-0.652	-2.141***	1.517***
	[0.265]	[0.623]	[0.741]	[0.319]
Constant	1.705***	7.309***	19.97***	0.693*
	[0.533]	[0.915]	[1.875]	[0.374]
Observations	30	31	31	31
Adjusted R^2	0.040	0.011	0.053	0.396

Table 4: Leadership Premia in Promotion and Retirement

This table shows panel regressions of promotion and retirement indicators on the faction or group affiliation of Central Committee members interacting with the affiliation of the General Secretary. The sample includes all the members of the 8th to 18th Central Committees. Promotion is a dummy which equals to 1 if a Central Committee member moves up in the rank defined by the four levels of Central Committee (1 PBSC, 2 PB, 3 CC, and 4 AC), 0 otherwise. Retirement is a dummy which equals to 1 if a Central Committee member retires from the 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) | (2) | (3) | (4) |
	Promotion	Promotion	Retirement	Retirement
CYLC	0.0396	0.0283	-0.126***	-0.114**
	[0.0437]	[0.0444]	[0.0443]	[0.0442]
CYLC*CYLC Secretary	0.193**	0.224**	-0.0878	-0.121
	[0.0928]	[0.0947]	[0.0858]	[0.0872]
Shanghai	0.0180	0.0259	-0.0728	-0.0907*
	[0.0375]	[0.0374]	[0.0508]	[0.0514]
Shanghai*Shanghai Secretary	0.192***	0.178**	0.00873	0.0660
	[0.0692]	[0.0702]	[0.0733]	[0.0757]
Princelings	0.0207	0.0272	-0.115**	-0.110**
	[0.0453]	[0.0452]	[0.0498]	[0.0493]
Princelings*Princelings Secretary	0.0660	0.0390	-0.0617	-0.0617
	[0.0994]	[0.101]	[0.118]	[0.121]
Military	-0.0417**	-0.0497**	0.0246	0.0142
	[0.0204]	[0.0212]	[0.0284]	[0.0290]
Military*Military Secretary	0.0388*	0.0659**	-0.0946***	-0.0390
	[0.0224]	[0.0283]	[0.0327]	[0.0394]
p-value (equal leadership premia)	1.00	0.69	0.39	0.11
Individual Attributes	Yes	Yes	Yes	Yes
Year F.E.	No	Yes	No	Yes
Observations	3045	3045	3045	3045
Adj. R-squared	0.07	0.07	0.14	0.16

Table 5: Leadership Premia in Power Scores and Seat Shares

This table shows regressions of the power scores and seat shares of each faction or group on the affiliation of the General Secretary. The dependent variables are the power score (Power score), the share of Alternate Central Committee members (AC seats), the share of full Central Committee members (CC seats), the share of Politburo members (PB seats), and the share of Politburo Standing Committee members (PBSC seats). The independent variable Secretary is a dummy which equals to 1 if the General Secretary is from the same faction, 0 otherwise. The top left panel (column 1-5) reports the results for the CYLC faction. The top right panel (column 6-10) reports the results for the Shanghai faction. The bottom left panel (column 1-5) reports the results for the Military group, the bottom right panel (column 6-10) reports the results for the Princeling group. The sample period is from 1956 to 2014. Newey-West standard errors with 5 lags are reported in brackets. ***,**,* indicates 1 percent, 5 percent, and 10 percent significance level respectively.

	CYLC				
	(1)	(2)	(3)	(4)	(5)
	Power Score	AC Seats	CC Seats	PB Seats	PBSC Seats
CYLC Secretary	0.0420***	0.0233**	0.0338***	0.0849***	0.174***
	[0.00894]	[0.00978]	[0.0105]	[0.0299]	[0.0404]
Observations	59	59	59	59	59
Adj. R-squared	0.391	0.212	0.272	0.206	0.385
	Shanghai Gang				
	(1)	(2)	(3)	(4)	(5)
	Power Score	AC Seats	CC Seats	PB Seats	PBSC Seats
Shanghai Secretary	0.00751	0.00615	-0.00940	0.0793***	0.163**
	[0.00491]	[0.00742]	[0.00615]	[0.0270]	[0.0731]
Observations	59	59	59	59	59
Adj. R-squared	0.0746	0.0204	0.0792	0.308	0.243

Table 6: Intra-faction Competition in Promotion

This table shows panel regressions of promotion indicator on the faction share at the same level of a politician and the overall faction share in the Central Committee. The sample includes all the members of the 8th to 18th Central Committees. Promotion is a dummy which equals to 1 if a Central Committee member moves up in the rank defined by the four levels of Central Committee (1 PBSC, 2 PB, 3 CC, and 4 AC), 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	(4) Promotion	(5) Promotion
Faction Share	-0.319***	-0.319***	-0.345***	-0.338***	-0.327***
	[0.123]	[0.123]	[0.124]	[0.120]	[0.123]
Overall Faction Share	0.382	0.382	-0.129	0.0198	
	[0.437]	[0.437]	[0.960]	[1.019]	
Individual Attributes	Yes	Yes	Yes	Yes	Yes
Level F.E.	Yes	Yes	Yes	No	Yes
Faction F.E.	No	Yes	Yes	Yes	No
Year F.E.	No	No	Yes	No	No
Level*Year F.E.	No	No	No	Yes	No
Faction*Year F.E.	No	No	No	No	Yes
Observations	1383	1383	1383	1383	1383
Adj. R-squared	0.178	0.178	0.179	0.182	0.186

Table 7: Frequency of Factional Mix

This table shows 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).

All	CYLC	Neutral	Shanghai	Total
CYLC	2.27	16.62	3.90	22.80
Neutral	11.96	51.01	2.52	65.49
Shanghai	5.29	5.29	1.13	11.71
Total	19.52	72.92	7.56	100.00

Provincial	CYLC	Neutral	Shanghai	Total
CYLC	2.16	15.59	1.70	19.44
Neutral	13.89	58.80	2.31	75.00
Shanghai	1.54	2.62	1.39	5.56
Total	17.59	77.01	5.40	100.00

National	CYLC	Neutral	Shanghai	Total
CYLC	2.74	21.23	13.70	37.67
Neutral	3.42	16.44	3.42	23.29
Shanghai	21.92	17.12	0.00	39.04
Total	28.08	54.79	17.12	100.00

Table 8: Factional Mix

This table shows panel regressions of the factional affiliation of the number 1 official on the number 2 official in the same political office. The top/middle/bottom panel shows results for CYLC/Shanghai/Princelings respectively. Variable CYLC1 (CYLC2) is a dummy which equals to 1 if number 1 (2) official is from the CYLC faction. Shanghai1, Shanghai2, Princelings1 and Princelings2 and defined similarly. Column 1-4 include all positions, and Column 5-6 break down to provincial and national level positions. Standard errors are clustered at both position unit and year level. ***,**,* indicates 1 percent, 5 percent, and 10 percent significance level respectively.

CYLC						
	(1)	(2)	(3)	(4)	(5)	(6)
	All	All	All	All	Provincial	National
CYLC2	-0.139**	-0.185***	-0.189**	-0.245***	-0.136*	-0.499**
	[0.0568]	[0.0594]	[0.0755]	[0.0723]	[0.0693]	[0.143]
Year F.E.	No	Yes	No	Yes	Yes	Yes
Position F.E.	No	No	Yes	Yes	Yes	Yes
Observations	794	794	794	794	648	145
Adj. R-squared	0.0160	0.0701	0.193	0.254	0.242	0.180
Shanghai Gang						
	(1)	(2)	(3)	(4)	(5)	(6)
	All	All	All	All	Provincial	National
Shanghai2	-0.105***	-0.132***	-0.353*	-0.378**	-0.0319	-0.802*
	[0.0319]	[0.0346]	[0.180]	[0.175]	[0.0466]	[0.341]
Year F.E.	No	No	No	No	No	No
Position F.E.	No	No	No	No	No	No
Observations	773	773	773	773	627	145
Adj. R-squared	0.00577	0.0115	0.382	0.392	0.187	0.278
Princelings						
	(1)	(2)	(3)	(4)	(5)	(6)
	All	All	All	All	Provincial	National
Princelings2	-0.0535	-0.0595	-0.132**	-0.134**	-0.155*	-0.0411
	[0.0505]	[0.0523]	[0.0571]	[0.0545]	[0.0806]	[0.114]
Year F.E.	No	Yes	No	Yes	Yes	Yes
Position F.E.	No	No	Yes	Yes	Yes	Yes
Observations	794	794	794	794	648	145
Adj. R-squared	0.000975	0.0201	0.133	0.154	0.202	0.227

Table 9: Anticorruption and Factional Affiliation

This table shows the cross-sectional regression of a corruption dummy on the faction or group 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 10: Parameter Estimates of the Faction Model

This table shows the parameter estimates of the faction model for different specifications. The sample includes all the members of the 14th to 18th Central Committees. Standard errors are reported in brackets. ***,**,* indicates 1 percent, 5 percent, and 10 percent significance level respectively. The bottom panel shows log-likelihood, log-likelihood ratio, and p-value of the log-likelihood ratio tests for each specification against model (4) as the alternative hypothesis. The estimator employs 100 simulations for each Party Congress.

	(1)		(2)		(3)		(4)
ρ	0.045***	ρ_H	0.162**	ρ	0.042***	ρ_H	0.153**
	[0.008]		[0.063]		[0.009]		[0.062]
β	0.029***	β_H	0.193***	β	0.033***	β_H	0.241**
	[0.006]		[0.068]		[0.010]		[0.103]
λ	2.553***	ρ_L	0.041***	λ_R	2.791***	ρ_L	0.037***
	[0.511]		[0.007]		[0.720]		[0.008]
			0.022***	λ_B	2.178***	β_L	0.027***
			[0.005]		[0.758]		[0.009]
			2.526***			λ_R	2.898***
			[0.514]				[0.761]
						λ_B	1.956***
							[0.699]
L.	-2766		-2747		-2766		-2746
L.R.	-19.305		-0.378		-19.142		
p-value	0.000		0.385		0.000		

Table 11: Share of promotion of Each Faction by Level of the Central Committee

This table shows the share of promotions of each faction by level of the Central Committee in the data and predicted by the different models. The share of promotions is defined as the ratio between the number of promotions of a faction and the total number of promotions to this level. The sample includes all the members of the 14th to 18th Central Committees. The first panel shows the share of promotions of each faction in the data. The second panel shows the prediction by the baseline faction model. The third panel shows the counterfactual prediction in which the leadership premium is doubled comparing to the baseline faction model. The last panel shows the counterfactual prediction in which Li Keqiang becomes President in the 18th Party Congress.

	Data			Faction Baseline			Leadership Premia×2			Li Keqiang Pesidency		
	B	N	R	B	N	R	B	N	R	B	N	R
					14th							
PB	18.18	81.82	0.00	22.41	68.25	9.33	33.76	59.30	6.95	22.41	68.25	9.33
CC	2.80	96.26	0.93	3.48	93.19	3.33	6.09	90.59	3.32	3.48	93.19	3.33
AC	2.83	96.23	0.94	4.01	92.65	3.34	6.60	90.24	3.16	4.01	92.65	3.34
					15th							
PB	2.80	96.26	0.93	3.48	93.19	3.33	6.09	90.59	3.32	3.48	93.19	3.33
CC	22.73	68.18	9.09	19.42	67.28	13.30	32.43	53.14	14.43	19.42	67.28	13.30
AC	6.19	85.84	7.96	3.85	92.40	3.75	5.60	89.51	4.89	3.85	92.40	3.75
					16th							
PB	2.83	96.23	0.94	4.01	92.65	3.34	6.60	90.24	3.16	4.01	92.65	3.34
CC	6.19	85.84	7.96	3.85	92.40	3.75	5.60	89.51	4.89	3.85	92.40	3.75
AC	2.44	94.31	3.25	2.34	90.61	7.05	2.27	86.57	11.16	2.34	90.61	7.05
					17th							
PB	22.73	68.18	9.09	19.42	67.28	13.30	32.43	53.14	14.43	19.42	67.28	13.30
CC	1.94	85.44	12.62	1.68	91.83	6.49	1.81	86.49	11.70	1.68	91.83	6.49
AC	3.17	88.10	8.73	2.53	90.52	6.95	3.02	86.51	10.47	1.90	90.46	7.64
					18th							

Table 12: Parameter Estimates of Alternative Models

This table shows the parameter estimates of four alternative models of CCP promotion dynamics. The sample includes all the members of the 14th to 18th Central Committees. The probability of entry for seniority and random model is calibrated using the mean faction shares in the sample. Standard errors are reported in brackets. ***,**,* indicates 1 percent, 5 percent, and 10 percent significance level respectively. The estimator employs 100 simulations for each Party Congress. The bottom panel shows log-likelihood, log-likelihood ratio, p-value of the log-likelihood ratio tests, Vuong test statistics, and the p-value of the Vuong tests for each model against the model "faction with individual characteristic" column as the alternative hypothesis.

	(1) Random		(2) Seniority		(3) Faction Baseline		(4) Faction with Indi. Char.
ρ_{entry}	0.043*** [0.007]	ρ_{entry}	0.043*** [0.007]	ρ_H	0.162** [0.063]	ρ_H	0.174** [0.069]
β_{entry}	0.043*** [0.009]	β_{entry}	0.043*** [0.009]	β_H	0.193*** [0.068]	β_H	0.201*** [0.072]
		Age	0.464*** [0.105]	ρ_L	0.041*** [0.007]	ρ_L	0.043*** [0.008]
		Age^2	-1.213*** [0.127]	β_L	0.022*** [0.005]	β_L	0.023*** [0.005]
		Age^3	-0.428*** [0.050]	λ	2.526*** [0.514]	λ	2.390*** [0.531]
						$Princeling$	0.413** [0.202]
						$Military$	0.129 [0.122]
						$College$	-0.152 [0.164]
						$Graduate$	-0.222* [0.119]
						$Minority$	-0.813*** [0.208]
						$Gender$	0.926*** [0.237]
						Age	0.361*** [0.109]
						Age^2	-1.201*** [0.136]
						Age^3	-0.421*** [0.055]
L.	-2763		-2660		-2747		-2617
L.R.	-146.195		-42.852		-129.976		
p-value	0.000		0.000		0.000		
Vuong	-13.429		-7.026		-12.504		
p-value	0.000		0.000		0.000		

Table 13: Tests on Princelings' Faction Identity and Xi's Faction Affiliation

This table shows the parameter estimates of three models of CCP promotion dynamics. The sample includes all the members of the 14th to 18th Central Committees. Standard errors are reported in brackets. The estimator employs 100 simulations for each Party Congress. ***,**,* indicates 1 percent, 5 percent, and 10 percent significance level respectively. The bottom panel shows log-likelihood, Vuong test statistics, and the p-value of the Vuong tests for each model against the baseline faction model as the alternative hypothesis.

	(1) Princelings as a Faction		(2) Xi as Neutral		(3) Faction Baseline
ρ_H	0.178** [0.074]	ρ_H	0.164** [0.064]	ρ_H	0.162** [0.063]
β_H	0.153** [0.067]	β_H	0.195*** [0.069]	β_H	0.193*** [0.068]
π_H	0.364*** [0.124]	ρ_L	0.044*** [0.008]	ρ_L	0.041*** [0.007]
ρ_L	0.050*** [0.009]	β_L	0.027*** [0.006]	β_L	0.022*** [0.005]
β_L	0.027*** [0.006]	λ	2.150*** [0.437]	λ	2.526*** [0.514]
π_L	0.059*** [0.010]				
λ	1.876*** [0.394]				
λ_p	0.564 [0.358]				
L.	-2866		-2748		-2747
L.R.	-119.524		-0.788		
p-value	0.000		0.000		
Vuong	-15.850		-0.197		
p-value	0.000		0.422		

Table 14: Out-of-sample Forecast of 19th Central Committee

This table shows the aggregate share of promotions of each faction at each level of the Central Committee in the 19th Central Committee predicted by the faction model with individual characteristics. The share of promotions is defined as the ratio between the number of promotions of a faction and the total number of promotions to this level. The sample used to estimate the parameters includes all the members of the 14th to 18th Central Committees. The forecast employs 100 simulations for this Party Congress.

	Xi as Shanghai Gang			Xi has Neutral		
	B	N	R	B	N	R
PB	24.18	66.37	9.45	14.12	75.53	10.35
CC	3.84	92.72	3.44	2.20	94.03	3.77
AC	4.35	91.52	4.13	2.28	93.77	3.95