The Promotion Club

Shuo Chen, Xinyu Fan, and Zhitao Zhu

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Abstract How can principals in an organization incentivize efforts while maintaining personnel flexibility? We show that a "promotion club" solves a large part of the problem: Principal selects, from n agents, m top-performing agents into a club, and then promote one from within a club based fully on principal's idiosyncratic preference ("mindset"). Intuitively, m=1 indicates a tournament, and m=n, cronyism. We show that a proper (m>1) promotion club outperforms tournament in efforts when the homogenous agents are many. Under heterogeneous agents, it may still outperform tournament due to intra-crony competition. We use promotion data of Chinese governments at different levels to validate the model and test its predictions. Our theory and empirical evidence helps to explain how an organization with centralized personnel control manages to incentivize subordinates while maintaining high degrees of discretionary power at the top.

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1. Introduction

Tournament is one of the most popular high-powered incentive schemes used in real world practices, across different organizations (Lazaer and Rosen 1981, Bull Schotter and Weigelt 1987, Main O'Reilly III and Wade 1993, Maskin Qian and Xu 2000, Li and Zhou 2005, Xu 2011, Boudreau Lakhani and Menietti 2016, Ekinci Kauhanen and Waldman 2018, Khan Khwaja and Olken 2019). It is particularly useful in governments and other non-for-profit organizations, where wage incentives are often weak to incentivize efforts: the payroll in these organizations are usually fixed, or at least rigid to change. Instead, it is the prestige and office-holding benefits associated with the promotion (Wang and Zheng, 2018) that drives agents to work hard. However, tournament has its own drawback: since the principal commits to promote the best-performing agent, she may not be able to select her preferred agent as future cronies. When loyalty concerns are significant, the principal should be cautious in committing to tournament as the promotion criteria. This echoes the classical competence-loyalty tradeoff (e.g. Burkart Panunzi and Shleifer 2003, Egorov and Sonin 2011, Galasso and Nannicini 2011, Buisseret and Prato 2016, Zakharov 2016, Xi 2019), where principal seeks competence/effort for development, but loyalty for survival. There is no tradeoff when a competent subordinate happens to be loyal. However, an able and ambitious subordinate may pose serious threats to existing leadership. As a compromise, the principal often has to settle with a loyal servant who is only mediocre in competence. Such phenomena are pervasive both in corporate and political context.

It is clear that in the presence of loyalty-competence tradeoff, the principal may think twice before adopting tournament, which delivers only efforts at the cost of survival concerns. On the other hand, a serious incentive problem is embedded on incentive schemes that aim to recruit cronies or connected agents. For the subordinates, the problem centers around why they shall exert efforts, knowing that cronies are preferred at the end of the day. For the boss, the problem lies in how to incentivize subordinates while being flexible to recruit cronies. This paper intends to tackle these two questions by proposing a simple tournament-like incentive scheme, and show, both theoretically and empirically, that it solves a large part of the effort-discretion tradeoff, and is indeed adopted in real world practices.

The incentive scheme we propose is called the Promotion Club: The principal (she) selects, from \( n \) agents (he, them), \( m \) top-performing ones into a club, and then promote one from within a club based fully on principal’s idiosyncratic preferences. The preferences, which we refer to
as “mindsets”, can be any effort-independent features such as ideology, moral codes, races, religions, etc. Mindsets are private information before the formation of the club, but are known within the club. Therefore agents are ex ante homogenous in mindsets, to the principal. The size of the club represents the degree of discretionary power that principal possesses in personnel decisions. Clearly, \( m = 1 \) corresponds to standard tournament; while \( m = n \), cronyism. Larger club size benefits the principal since there are more candidates to choose from. Therefore it is (weakly) more likely to select a like-minded agent as future crony. We first show that effort features an inverted-U shape with respect to club size, when the size is not too small. As the club enlarges for a given agent population, the benefit of being included in the club (and enjoys a positive promotion probability) overweighs the cost of effort at the beginning, but such benefit deteriorates as the club size continues to grow and the promotion probability becomes insufficient to compensate the cost of effort. We show that promotion club strictly outperforms tournament when the pool of agents are large (\( n>4 \)).

Since the principal values both efforts and personnel flexibility, the inverted-U shaped effort curve mitigates the effort-discretion tradeoff when the curve is upward-sloping: increasing the club size both incentivizes effort and provides higher flexibility of personnel decisions. However, this also means a discretion-concerned principal necessarily selects a club size larger than the level that maximizes effort: she only stops expanding the club when the marginal benefit of personnel flexibility equals the marginal cost of effort distortion, and there is no distortion when the effort curve trends upwards. We thus show that in equilibrium, the promotion club is always (weakly) oversized.

We next validate the model and test the predictions, employing data from China. Though the model also applies to corporations with top-down personnel control, a centralized bureaucracy such as China merits detailed data during a long time horizon. To start with, we solidify the existence of club-based promotion pattern using China’s county level data from 2001 to 2016. The empirical analysis suggests that jumping into the top five in performance measure (in other words, into the club) can significantly increase the promotion likelihood by 4.1 percentage points, which occupies 9.76% of the mean value of promotion likelihood in our sample (=0.420). In addition, increasing the rank of fiscal revenue growth from within, or outside the club cannot significantly influence promotion likelihood, which reveals the impact of discretion power. We therefore establish the existence of a club-based promotion pattern in reality.
The model predicts that the promotion club size is larger (smaller) at higher (lower) administrative levels. In the context of China’s governance structure, we examine the promotions of county, prefecture and province level party secretaries, in order to analyze the change of club size along the hierarchy. We show that the promotion club size at prefecture level is 7, which is statistically significant, and is greater than the county club size of 5. Furthermore, the club size at provincial level is a marginally significant 8, which suggests that discretionary power plays a major role higher up the hierarchy. Our empirical evidence are consistent with model predictions, echoing with other existing findings in China’s content in the literature (See e.g. Opper Nee and Brehm 2015, Landry et. al 2017, Lu et. al 2018, Chen and Kung 2019).

The model predicts that regions with higher economic importance tend to have smaller club sizes, while regions with higher data volatility (thus harder to measure performances) tend to have larger club sizes. For the former, we find that the regions with higher GDP per capita growth indeed have smaller club sizes. For the latter, we investigate areas with higher variance of fiscal revenue growth rate or larger data manipulation, which are used to proxy data measurability, and find that higher-variance or larger-manipulation areas tend to have larger club sizes. Both findings are consistent with model predictions. The model also predicts that regions have enlarged club sizes, measured by ranks of fiscal revenue, during non-economic campaigns. The intuition is that the importance of personnel flexibility is greater when the ruling objective goes beyond economic development. We investigate the periods where the superior governments launch environmental or social stability campaigns, and show that the club sizes are indeed enlarged.

In the model, agents’ mindset are private information when the principal selects the club size, thus making the agents *ex ante* homogenous. However, in the real world, the principal and the agents’ mindsets are often, at least partially, observable. In particular, it is more likely for an agent to be connected to, and then regarded as a preferred choice, if he shares the same hometown, schools, or working experiences with the principal. To analyze the impact of publicly known crony candidates (“crony” for short hereafter), we extend the model to assume the existence of publicly known cronies, who are lexicographically preferred to regular agents. We show that two equilibria exist in this scenario. When cronies occupy a small share of the agent population, a *shirk* equilibrium exists where the club size is large and agents shirk compared with homogenous agent case. The crony agents shirk because they know they are in need. The non-cronies shirk because they are less preferred even if they make it to the club.
Consequently, club size is enlarged when survival concerns are significant, in order to ensure sufficient probability of crony inclusion. On the other hand, when cronies occupy a large share among agent population, a work equilibrium exists where the club size is small, but only the cronies work hard. Surprisingly, we show that such a crony-ful environment may induce higher total effort than in a same-population tournament, due to intra-crony competition. Taking the extended model to data, we investigate the impact of the interaction between the tenure year and whether an official is connected. Based on the extended model, we predict a non-monotonic relationship between connected official’s efforts with respect to tenure years, which is then verified using county level data in China. We also show that as the shares of crony increase, more fiscal revenue is procured.

The paper stands in the intersection of three important strands of literature. First, the paper speaks to the classical competence-loyalty tradeoff (Burkart Panunzi and Shleifer 2003, Egorov and Sonin 2011, Galasso and Nannicini 2011, Buisseret and Prato 2016, Zakharov 2016, Xi 2019), and the abundant empirical evidences that support the importance of connection in political survival (Cai and Treisman 2006, Opper and Brehm 2007, Shih et. al 2012). While many existing works rightfully point out the distortion of such tradeoff, this paper highlight a potential alleviation of it, namely the design of a promotion club. Among them, the paper that is closest to ours is Jia et. al (2015), which suggests that connections and performance are complements because recruiting junior top-performers foster loyalty for the senior. While we echo Jia et. al (2015) in the critical importance of recruiting loyal top-performers, our focus is on incentives, i.e., how to ensure the top-performers to be loyal, and how to ensure loyalists to perform. Also, the scope of investigation in Jia et. al (2015) remains in provincial officials in China. This paper, in the meantime, investigates political turnovers in county, prefectural and provincial levels along the bureaucratic hierarchy.

Second, the paper speaks to the theoretical and empirical investigations of the use of tournament in organizations. Led by Lazaer and Rosen (1981), and Rosen (1986), the literature acknowledges the theoretical importance of tournament as a high-powered incentive scheme. This paper adds to the discussion by suggesting a variation of tournament which accommodates both working incentives and personnel flexibility. It is also widely argued that political regimes tend to adopt tournaments to incentivize their officials (Li and Zhou 2005, Chen et. al 2005, Zhou 2007, Xu 2011). However, in the context of China, where a significant body of empirical evidences are centered, there seems to be mixed evidence about whether tournament is adopted (e.g. Li and Zhou 2005, Tao et. al 2010, Yao and Zhang 2013, Chen and Zhu 2018). This paper,
with its empirical investigations in particular, intends to reconcile the mixed evidences, by arguing that the promotion club pattern exists and explains why performance can be significant for promotion in some cases (Bo 1996, Maskin et al. 2000, Li and Zhou 2005, Chen et al. 2005) but not in others (Shih et al. 2012, Tao 2010, Yao and Zhang 2013, Wu et al. 2014).

Third, the paper echoes the discussion of adopting different incentive schemes in different environment, for instance: Maskin, Qian, and Xu (2000) in M-form and U-form organization comparisons; Shleifer (1995), Besley and Coate (1995) on yardstick competition; and Holmstrom and Milgrom (1991) on multi-task projects; Alesina and Tabellini (2007) on politicians and bureaucrats task assignments. While the existing literature mainly focus on the information structure in incentive scheme design, this paper takes a different stance to explore the interplay between working incentives and personnel flexibilities.

2. Model

Consider one principal (she), and n agents (he, them). Principal selects m top-performing agents into a club, then promote one of them. Promotion carries a reward W, which can be monetary reward, social prestige, or office-holding rents.

Agents exert costly effort $a_i$, at convex cost, $c(a_i)$. Performance $X_i$ is a noisy realization of effort, where $X_i = a_i + \epsilon_i$, $\epsilon_i \sim N(0, \sigma^2)$, i.i.d. $^2$

The principal has private “mindset", $\eta_0$, which is completely unknown to agents. Examples of mindsets include ideology, religious beliefs, cultural traditions, and moral codes. Likewise, agents have private mindsets $\eta_i$, which only reveal to principal after the agents are selected to the club. The principal intends to select the most like-minded agent from the club for promotion. We assume that agents are ex ante homogenous. That is, agents don’t know if they are preferred when they exert efforts. For each of them, the inclusion to the club means equal probabilities to be selected for promotion.$^3$ An example of such is where $\eta_0, \eta_i$ follow an improper uniform distribution, and the principal minimizes the squared distance with the agents within the club, $\mathbb{E}(\min_{i \in M}(\eta_0 - \eta_i)^2)$

$^2$ Effort sometimes transforms into competence. This is especially consistent with the experience of civil servants: no specific expertise is required. The more you get to know your constituency, the more local information you collect and the better governor you become.

$^3$ We assume in the model that efforts and mindsets are independent. In reality, they might be correlated based on the context (e.g. a region-related effort may reveal the mindset of the principal, and induces more efforts from religious agent intrinsically). But there is no systematic correlation between the two, which justifies our assumption.
The game proceeds as follows. First, the principal announces and commits to a club size $m$. Next, agents simultaneously exert effort, the top $m$-performing agents get into the club, and the principal selects one of them to be promoted.$^4$

For given $n$ and $W$, the principal’s problem is as follows. She values both efforts and gains from personnel discretion and selects an optimal club size subject to the agents’ incentive constraints:

$$\max_m \alpha \mathbb{E}\left( \sum_{i \in N} X_i \right) + \beta S(m) - W$$

s.t.

$$a_i^* \in \arg\max_a p_i(\text{club}) \frac{W}{m} - c(a_i)$$

where $p_i(\text{club}) = p_i(i \text{ beats } (n - m) \text{ others in } X_i)$

We assume $S$ is increasing and concave in $m$, e.g., $S(m) = \mathbb{E}(\min_{i \in M}(\eta - \eta_0)^2)$. We assume a fixed $W$ to reflect wage rigidity, especially in public offices.

For an agent, he selects an effort level under given $m$:

$$\max_{a_i} p_i(\text{club}) \frac{W}{m} - c(a_i)$$

The key trade-off facing the agents, as the club size grows, is between the easier efforts to get into the club, and the fact that shirking may achieve the same outcome. In the meantime, the principal considers how to incentivize high levels of total efforts, while maintaining sufficient flexibilities in personnel decisions, for survival concerns.

3. Analysis

We start from the agent’s effort choice under a fixed club size, and then proceeds to the principal’s choice of such size. For an agent, when the size of the club increases, the incentives of exerting efforts have two counter-balancing forces. On the one hand, it is easier to get into the club, which incentivizes working. On the other hand, once in the club, the agent faces lower

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$^4$ Alternatively, a club-based promotion scheme can be that the principal selects $m$ agents based on signals of mindset similarities, and then conduct a contest within the club. While this practice bears theoretical interests, it hardly applies to the environment we consider here, since the principal cares about the working incentives of the whole population. For example, if the agents are the mayors of $n$ cities within a province, it is almost impossible for a provincial leader to first select $m$ like-minded candidates, and forgo the performance of other cities. It is, however, a feasible strategy when agents do not have compulsory tasks, which makes the $(n-m)$ excluded agents dispensable. Such examples are seen in power transitions in imperialism, where several princes are shortlisted for selection before one of them is declared heir to the throne.
probability to be selected, which discourages working. Weighing the two, we have the following proposition.

PROPOSITION 1. Effort features an inverted-U shape with respect to the size of the club, \( m \), for \( n \geq 5 \). Effort decreases with size for \( n \leq 4 \).

PROOF. See Appendix.

Proposition 1 states that, when the agent population is large, promotion club outperforms tournament for incentives purposes. However, when \( n \leq 4 \), tournament is optimal. More importantly, denote the optimal size for effort as \( m_{\text{club}} \). Proposition 1 suggests that before the club expands to \( m_{\text{club}} \), the principal can effectively incentivize efforts and increase personnel discretion at the same time.

However, the principal does not stop at \( m_{\text{club}} \). Under a given \( W \), the principal solves the following problem:

\[
\max_m \alpha \left( \sum_{i \in N} x_i (a^*) \right) + \beta S(m) \\
\Rightarrow \max_m \alpha n a^*(m) + \beta S(m)
\]

Intuitively, equilibrium is reached when the marginal benefit of personnel flexibility equals the marginal cost of incentive distortion. Thus we have the following proposition:

PROPOSITION 2. In equilibrium, \( m^* \geq m_{\text{club}} \), which leads to (weakly) sub-optimal efforts.

PROOF. See Appendix.

Proposition 2 shows that although promotion club alleviates effort-discretion tradeoff, it does not mitigate the problem. The principal always tends to oversize the club, which results in effort distortion. Proposition 2 also helps to establish useful comparative statics for empirical investigations. We summarize the comparative statics with testable predictions as follows.

First, as \( \alpha \) increases, or \( \beta \) decreases, \( m \) decreases. \( \alpha \) measures the importance of local economic performance to the principal, while \( \beta \), the importance of survival concerns. If we further assume that in a hierarchical organization, principals at higher administrative levels usually have stronger survival concerns, such result leads to two predictions on bureaucratic promotions in political regimes:

PREDICTION 1. Club size is smaller in regions that are economically more important.
PREDICTION 2. Club size at county level is smaller than that at prefecture level, which is smaller than that at provincial level.

Second, as $\sigma$ increases, $a^*$ decreases, $m$ increases. $\sigma$ proxies the measurability of tasks. When the task is clear to measure; e.g. GDP growth or fiscal revenue growth, the promotion scheme turns to be more meritocratic. Otherwise it is more idiosyncratic. Based on such analysis, we predict a larger club size in areas where output is harder to measure. This echoes the rationale of efficiency distortion in a multi-task model (Holmstrom and Milgrom, 1991). In the meantime, when principals launch non-economic) campaign movements such as environmental protection, poverty eradication, anti-corruption, etc., it is usually a strong signal of a shift of governance focus. Consequently, the evaluation based on economic performance ranking should be granted greater flexibility to accommodate non-economic needs, thus a larger club size during the campaigns.

PREDICTION 3. Club size is smaller in areas where output is easier to measure.

PREDICTION 4. Club size is larger during non-economic campaigns.

4. An application to China

4.1 Background

The personnel control in China has always been top-down and highly centralized (Xu 2011). The officials in the county levels are appointed by municipal leaders, who are then appointed by provincial ones. The provincial leaders are further appointed by the central government (Lieberthal 1995). In the reform era, systematic evaluations are gradually institutionalized. In 1979, it was proposed that the evaluation (thus promotions and demotions) should be based on four indicators: 1. Virtue: the moral standards and political stances; 2. Competence: education level and management capabilities; 3. Diligence: whether the officials work tirelessly to serve the people; and, 4. Performance (See, On the evaluation of cadres, by the Publicity Department of the CPC Central Committee). Apparently, (economic) performance was easily measurable
and thus became the most important criterion of cadre selection. Since then, there were follow-up policies and documents specifying the implementation of selecting cadres by the economic performances in the regions of their rule. Not surprisingly, such mechanism greatly incentivizes efforts for economic development.

In the meantime, the system was designed to accommodate the need of loyal and obedient subordinate, a feature that is sometimes equally, if not more, important for the superior officials. Among the four criteria above, virtue and diligence are highly unobservable and depends heavily on the idiosyncratic preference from the superiors. In addition, there is no explicit rules of implementation regarding these two criteria. We believe the design of such flexible and objective measures serves for personnel manipulations towards loyalists. And the combination of these two categories of measure constitutes the institutional foundation to facilitate the superior officers in balancing subordinate efforts and personnel discretions. In particular, such institutional design provides a good environment to test whether a club-based promotion pattern is adopted, as suggested in the model.

Understanding such balance further helps us to un-puzzle the mixed empirical evidence on whether efforts, or performance-based tournaments, increase promotion probabilities. To reiterate, the superior officer faces the balance between economic development and personnel discretion, and selects a more meritocratic, tournament-like scheme when the importance of economic development overweighs personnel discretion. However, when political survival concerns dominate, the selection process is biased towards personal discretion. The intuition reconciles the findings in the literature concerning the evidences found at different levels of the political hierarchy. At county levels or municipal levels, where economic development is believed to be the main driving forces for economic development (Yao and Zhang 2015), many empirical evidences agree that better economic performances lead to better promotion opportunities (Chen and Zhu 2018). At provincial levels, where political struggles are more severe, we expect to see mixed evidences, as they are in the literature (e.g. Li and Zhou 2005 vs. Tao et. al 2010). In particular, if one considers the differences between governors/mayors and corresponding party secretaries, our theory predicts economic performance more likely to

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5 For instance, in the development index in Jiangsu province, economic development accounts for 40%, living standards for 30%, social development for 20%, and environmental protection for 10% (The First Bureau of the Publicity Department, 2006, pp.176-184).

6 For instance, in a report in 1994, the Central committee believes “the understanding of politics for high-level cadres, especially those above provincial level offices, matters for the fate of the Party and the nation.” However, for grass-root officials, the evaluation focuses more on “the achievements to develop the local economy, society and party organizations. (General Office of the CPC Central Committee, 2009)
be a positive signal for the former, but not the latter. This is consistent with the empirical finding of Choi (2012) at provincial levels, and Yao and Zhang (2013) at prefectural levels.

To summarize, the meritocratic political selection (measured by the size of the club) is determined by the weights between economic development and personnel discretion. In regions where economic development is more important, or at lower administrative levels, the superior officer tends to adopt a more meritocratic system, which leads to smaller club sizes. Conversely, if political survival concerns are dominant in the regions, or at higher administrative levels, officer calls for more flexibilities in personnel control to recruit loyal cronies, which leads to larger club sizes.

To provide some flavors of the promotion pattern, below we summarize the ranked performances of members of the 19th Central Committee members, when they were serving in the local governments. The upper row suggests a weak correlation between performance in the cohort and the inclusion in the Committee, while the comparison across rows suggests outstanding performance matters more at local levels.

![Graphs showing local performance ranks of central committee members](image)

**Figure 1: Local Performance Rank of Central Committee Members**

Note: This figure presents the 19th central committee members and the ranks are measured based on their moving average of fiscal revenue growth when they were serving at the local governments.

### 4.2 Data and Variables
The institutional background of China renders it a good candidate for our empirical investigation. Specifically, we mainly focus on the political selection of China’s county level party secretaries, in which local economic performance plays a significant role. The empirical application is based on the dataset of 9451 county level party secretaries from 2965 counties from 2001 to 2016.\(^7\)

To map the theory to China’s county level data, a core element is to define promotion. We employ the \textit{de facto} power change induced by political turnover to define promotion, which is consistent with the mainstream approach in existing literature (Li and Zhou, 2005; Chen et al., 2005; Jia et al., 2015; Yao and Zhang, 2015). To be specific, a county secretary is regarded as promoted if he either receives a position at provincial level, or becomes a core member at prefectural level. The latter includes deputy secretary, mayor, deputy mayor, standing committee member, secretary-general, as well as director of Peoples’ Congress or chairman of People's Political Consultative Conference.\(^8\) Based on such a definition, around 39\% of party secretaries experienced promotion in our sample.\(^9\) We briefly summarize the political turnover and promotion of party secretaries in our sample in Figure 2, which suggests that turnover is more frequent around the year of party congress.

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\(^7\) Actually, our dataset covers China’s county level administration divisions including counties, districts, county level cities, autonomous counties, banners as well as autonomous banners. For convenience and with a little abuse, we call all of them “counties” in this paper.

\(^8\) More detailed definitions of promotion are presented in Table A1. In addition, \textit{de jure} definition of promotion according to \textit{Civil Servant Law of the People’s Republic of China} is also employed as for the purpose of robustness checks and the results are reported in Figure A4.

\(^9\) Such percentage coincides with those at prefecture as well as provincial level: 26\% for provincial leaders in Jia et al. (2015) and 39\% for prefecture leaders in Yao and Zhang (2015). In addition, we also summarize other secretaries’ personal characteristics in Figure A1, which are regarded as important factors affecting officials’ political turnover.
Another core element lies in the measurement of the club. In this paper we argue economic performance serves as the base of club formation, and local officials are required to achieve sufficient economic performance to enter it. Since relative performance measure may mitigate the moral hazard problem (Lazear and Rosen, 1981; Gibbons and Murphy, 1990; Kumbhakar and Hjalmarsson, 1998; Jenter and Kanaan, 2006), we further argue that the club size corresponds to some performance rank among competitors. To measure economic performance, we look at fiscal revenue growth, which has been proved as a crucial indicator in China’s political selection system (Ong, 2012; Chen and Kung, 2016; Landry et al., 2017). Fiscal revenue growth is calculated as the moving average since the first year when the secretary took office in order to capture the tenure-based cadre evaluation in China. What remains opaque is which rank matters for club entering, or in other words, how large is the club size. It consists of our first empirical exercise in the next section.

Before proceeding to the empirical analysis, we introduce some control variables, which includes party secretaries’ personal characteristics such as age, education year, as well as tenure year, and counties’ socioeconomic characteristics such as population density, relative economic size (measured by the revenue share in the prefecture), as well as economic structures
(measured by the ratio of agriculture output to GDP and the ratio of manufactural output to GDP). The summary statistics of these variables are presented in Table 1.

Table 1: Summary Statistics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Observation</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promotion dummy</td>
<td>24,017</td>
<td>0.420</td>
<td>0.494</td>
<td>A</td>
</tr>
<tr>
<td>Moving average fiscal revenue growth rate</td>
<td>30,284</td>
<td>0.156</td>
<td>0.164</td>
<td>B</td>
</tr>
<tr>
<td>Age</td>
<td>25,762</td>
<td>47.079</td>
<td>4.096</td>
<td>A</td>
</tr>
<tr>
<td>Education year</td>
<td>22,546</td>
<td>16.850</td>
<td>2.572</td>
<td>A</td>
</tr>
<tr>
<td>Tenure</td>
<td>32,846</td>
<td>2.558</td>
<td>1.623</td>
<td>A</td>
</tr>
<tr>
<td>Population density</td>
<td>35,077</td>
<td>0.073</td>
<td>2.348</td>
<td>B</td>
</tr>
<tr>
<td>Fiscal revenue share within prefecture</td>
<td>34,840</td>
<td>0.152</td>
<td>0.133</td>
<td>B</td>
</tr>
<tr>
<td>Agricultural output (log)</td>
<td>35,044</td>
<td>10.393</td>
<td>1.194</td>
<td>B</td>
</tr>
<tr>
<td>Manufacture output (log)</td>
<td>34,944</td>
<td>11.009</td>
<td>1.661</td>
<td>B</td>
</tr>
<tr>
<td>Dummy for provincial per capita GDP growth rate</td>
<td>32,783</td>
<td>0.524</td>
<td>0.499</td>
<td>C</td>
</tr>
<tr>
<td>Dummy for within-prefecture fiscal revenue growth rate volatility</td>
<td>32,337</td>
<td>0.559</td>
<td>0.496</td>
<td>B</td>
</tr>
<tr>
<td>Dummy for gap between official and estimated &quot;true&quot; GDP</td>
<td>34,146</td>
<td>0.497</td>
<td>0.500</td>
<td>D</td>
</tr>
<tr>
<td>Environmental Visiting</td>
<td>11,239</td>
<td>0.117</td>
<td>0.458</td>
<td>E</td>
</tr>
<tr>
<td>Strike</td>
<td>14,150</td>
<td>0.102</td>
<td>0.391</td>
<td>F</td>
</tr>
<tr>
<td>Connection dummy</td>
<td>21,436</td>
<td>0.041</td>
<td>0.197</td>
<td>A</td>
</tr>
<tr>
<td>Crony share within prefecture</td>
<td>30,339</td>
<td>0.037</td>
<td>0.133</td>
<td>A</td>
</tr>
</tbody>
</table>

Note:
A: collected by authors;
C: China Statistical Yearbook (Zhongguo Tongji Nianjian), compiled by National Bureau of Statistics;
D: Chen, Qiao and Zhu (2019);
E: Wang, Cao and Chen, forthcoming;

4.3 Econometric Specification and Empirical Results

Following Jia et al. (2015), we use a linear probability model to examine the relationship between club size and promotion. The econometric specification is as follows:

\[
P_{ct} = \alpha + \beta \sum_{i=1}^{10} R_i + \gamma X_{ct}' + \rho Z_{ct}' + \delta_c + \eta_t + \xi_{pt} + \varepsilon_{ct} \quad (1)
\]

where \( c \) and \( t \) indicate county and year, respectively, and \( p \) indicated the prefecture the county is governed by. The dependent variable \( P_{ct} \) is a dummy variable which equal to 1 if the party secretary of this county achieved promotion at the end of his tenure, and 0 otherwise. The main
independent variables are a series of $R_i$s, where $R_i$ equals to 1 if the moving average fiscal revenue growth of county $c$ in year $t$ locates in the top $i$-th rank within the prefecture, and 0 otherwise.\textsuperscript{10} We interpret the positive significance of the coefficient of $R_i$ as an indicator of the existence of promotion club and $i$ as the club size.

In addition, $X'_{ct}$ represents personal characteristics and $Z'_{ct}$ represents socioeconomic characteristics, detailed in Section 4.2. We also control county fixed effects $\delta_c$, capturing all time-invariant county level factors, and year fixed effects $\eta_t$, capturing the economic shocks affecting all counties in a given year. We also consider prefecture level time-invariant factors and allow their effects to evolve by year, which is captured by $\xi_{pt}$. The standard errors are clustered at prefectural level to address the heteroskedasticity and serial correlation of the error term within each prefecture.

4.3.1 Existence of Promotion Clubs

We first solidify the existence of club-based promotions. The baseline result is reported in Figure 3, where the green dots indicate coefficients and the blue dashed lines represent 95% confidence intervals. We find positive and significant results for $i$ equal to 5, which not only empirically justify the existence of promotion club, but also reveals that the possible club size is 5. In terms of magnitude, the coefficient of $R_5$ equals to 0.041 with standard error 0.017.\textsuperscript{11} It means that jumping into the top five (in other words, into the club) significantly increases the promotion likelihood by 4.1 percentage points, which occupies 9.76\% of the mean value of promotion likelihood in our sample (=0.420). In other words, with strong promotion incentive, China’s county level party secretaries are competing with one another to pursue high fiscal revenue growth (top five within the prefecture) in order to achieve the membership in the promotion club. However, within the club, increasing the rank of fiscal revenue growth cannot significantly influence promotion likelihood, which paves the way for discretion power in political selection.\textsuperscript{12}

\textsuperscript{10} We would report results focusing on the first 10 ranks and treat all the following ranks as reference groups, except for Figure 4 and 10, where the club size is larger than 10, and thus we focus on the first 15 ranks there.
\textsuperscript{11} The corresponding $p$ value is 0.019.
\textsuperscript{12} The baseline result, along with results from Figure 5 and 6, are also reported in Table A4.
Figure 3: The Promotion Club

Note: The horizontal axis corresponds to $R_i$s and the vertical axis corresponds to $\beta$. The econometric specification follows equation (1), which controls officials’ personal characteristics (including age, education year and tenure), counties’ socioeconomic characteristics (including population density, fiscal revenue share within prefecture, logged agricultural output and logged manufacture output), county fixed effects, year fixed effects and prefecture-year fixed effects. The club sizes are indicated by red boxes. The ranks after (including) 11 are used as reference groups. See Table A4 for the exact numbers of these point estimates.

Several more exercises are conducted to justify the robustness of our baseline finding. First, as Proposition 1 indicates, promotion club is an efficient mechanism especially when agent population size is large enough (> 4). We focus on such subsamples where there are at least five counties governed by the same prefecture, and report the results in Figure A2. We find similar patterns that the top five consists of the promotion club.

Second, due to the existence of missing values, our rank variables may suffer from measurement errors. To deal with such a potential bias, we calculate the number of counties within each prefecture as if no missing values exist as well as the counterpart in our sample where missing values exist. The ratio of these two numbers is regarded as an indicator of the extent of measurement error. We employ the subsample where measurement error is relatively mild (the ratio smaller than 0.5) to repeat the baseline exercise and report the results in Figure

---

13 For example, it’s possible that within a prefecture, the information of some county, which in reality ranks 1st, is missed, and as a result, all other counties are coded 1 rank higher than the actual one.
A2. It shows similar patterns that jumping into top five can increase promotion likelihood significantly.

The third concern arises from favoritism: what if the principal treats some agent with favorable policies for economic performances, and then adopt relative performance evaluations to “fairly” select her preferred agent? To rule out the case, we control the connections between principal and agent (proxied by a dummy indicating whether the county party secretary shares the same hometown with the prefecture party secretary), and potential favoritism (proxied by fiscal transfer), and show empirical support to the validity of our results in Figure A2.

The final concern is related to that the large number of independent variables may lead to spurious correlations due to chance. The argument suggests that some coefficients will be significant regardless of its economic meanings, as the number of independent variables increase. To rule out such possibility, we preserve the regression format but falsify the contents of the variables. Specifically, we randomize the promotion status as well as performance ranks and then compare the resulting significances. The randomization is conducted for 1,000 times, and we report the results in Figure A3: in more than 95% of the cases, coefficients remain insignificant. Thus we have more confidence that the baseline result is not an outcome by chance.

4.3.2 Features of Promotion Clubs

Having validated the model, we now proceed to its predictions. Prediction 1 of the model suggests that club size would be larger (smaller) in economically less (more) important regions. In the context of China, our empirical strategy is as follows: the economic significance is proxied by provincial per capita GDP growth rates. We apply this differentiation and conduct empirical analysis for counties which are located in provinces whose per capita GDP growth rates are lower than the median level, versus those that are not. Figure 4 reports the results. We find that the club size is 5 for economically important regions and 11 for others. The results not only confirm the role of promotion club in different cases, but also verify our first prediction that economic significance is inversely correlated with club size.

---

14 Figure 4 reports results by using all ranks after (including) 11 as the reference, and thus no significant results are indicated in the economically less important regions, where the club size is 11. Such positive and significant result can be revealed by reducing the size of reference group and including more ranks into comparison (e.g. using all ranks after (including) 16 as the reference).
Figure 4: Club Size in terms of Economic Significance

Note: the horizontal axis corresponds to $R_i$s and the vertical axis corresponds to $\beta$. The econometric specification follows equation (1), which controls officials’ personal characteristics (including age, education year and tenure), counties’ socioeconomic characteristics (including population density, fiscal revenue share within prefecture, agricultural output (log) and manufacture output (log)), county fixed effects, year fixed effects and prefecture-year fixed effects. The club sizes are indicated by red boxes. The economically more important regions include counties in provinces whose per capita GDP growth rates are no lower than the median level, and the economically less important regions contain counties in provinces whose per capita GDP growth rates are lower than the median level. The ranks after (including) 11 are used as reference groups.

Prediction 2 of the model suggests that club size should be larger at prefectural level, than at county level, and should be even larger at provincial level. To test the prediction, we employ prefectural and provincial level data. Similar to the information of county party secretary, the data of prefectural and provincial party secretaries are also collected by ourselves through similar channels. We report the results in Figure 5 and 6: club size enlarges higher up in the hierarchy. Moreover, at provincial level, the promotion club effect is only mildly significant ($p=0.083$).

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16 Our finding here is consistent with the general pattern in Yang and Zhen (2013), who finds that the top ten prefecture party secretaries within their province in terms of GDP growth enjoy higher promotion chances than others. The subtle difference in the rank threshold (rank 8 here and rank 10 in Yang and Zhen (2013)) can be attributed to the different construction approaches for performance rank: on one hand, Yang and Zhen (2013)
We have two remarks comparing our results to the literature, especially the seminal provincial evidence from Li and Zhou (2005). First, we extend the provincial analysis to prefecture and county level, which complements to the existing literature that economic performance matters for promotion, but there is a distinction that one should be cautious to interpret the positive impact of economic performance on promotion probability simply as “tournament”. As shown in this paper, the promotion club preserves the meritocratic feature of a standard tournament, with added personnel flexibility. Second, compared with results from county as well as prefecture levels, the provincial result is only weakly significant (p=0.083), which can be justified by the increased political survival concerns as well as highly weighted non-economic tasks, including environmental protection or social stability,\textsuperscript{17} at higher offices.

![Figure 5: Promotion Club at Prefectural Level](image)

Note: the horizontal axis corresponds to $R_i$ and the vertical axis corresponds to $\beta$. The econometric specification follows equation (1), which controls officials’ personal characteristics (including age, education year and tenure), counties’ socioeconomic characteristics (including population density, fiscal revenue share within prefecture, agricultural output (log) and manufacture output (log)), county fixed effects, year fixed effects and prefecture-year fixed effects. The club sizes are indicated by red boxes. The ranks after (including) 11 are used as reference groups. See Table A4 for the exact numbers of these point estimates.

\textsuperscript{17} For example, in 2013 the party secretary of Xinjiang Uygur Autonomous Region, Chunxian Zhang, said that antiterrorism and stabilization-sustaining dominate all other tasks(http://news.ifeng.com/mainland/detail_2013_07/02/27007922_0.shtml).
Figure 6: Promotion Club at Provincial Level

Note: the horizontal axis corresponds to $R_i$ and the vertical axis corresponds to $\beta$. The econometric specification follows equation (1), which controls officials’ personal characteristics (including age, education year and tenure), counties’ socioeconomic characteristics (including population density, fiscal revenue share within prefecture, agricultural output (log) and manufacture output (log)), county fixed effects, year fixed effects and prefecture-year fixed effects. The club sizes are indicated by red boxes. The ranks after (including) 11 are used as reference groups. See Table A4 for the exact numbers of these point estimates.

The third prediction emphasizes a large club size when the output is harder to measure. We utilize both a direct and an indirect proxy for task measurability. In terms of the direct proxy, we follow Chen et al. (2019) to calculate the GDP manipulation in each county and year, which is based on Henderson et al. (2012)’s approach using satellite night to filter out the manipulation part from official GDP data. The ratio of manipulation to official GDP is used to proxy the difficulty of output measurement: the higher the ratio, the more difficult for principals to measure agents’ actual outputs. We take average of the ratios within each prefecture and divide prefectures into two groups according to the median value of the average ratios. The empirical results based on counties governed by these two groups of prefectures are reported in Figure 7, which shows that the club size for low data manipulation group is higher than that for high data manipulation group, thus confirms our theoretical prediction.
Figure 7: Club Size in terms of Data Manipulation

Note: the horizontal axis corresponds to $R_i$s and the vertical axis corresponds to $\beta$. The econometric specification follows equation (1), which controls officials’ personal characteristics (including age, education year and tenure), counties’ socioeconomic characteristics (including population density, fiscal revenue share within prefecture, agricultural output (log) and manufacture output (log)), county fixed effects, year fixed effects and prefecture-year fixed effects. The club sizes are indicated by red boxes. The data manipulation is measured by the gap between official GDP and estimated “true” GDP, where is later is estimated by following Henderson et al. (2012)’s approach which utilizes satellite night to filter out the manipulation part from official GDP data. The large data manipulation regions include counties in prefectures where the average gaps are no lower than the median value, and the small data manipulation regions contain counties in prefectures where the average gaps are lower than the median value. The ranks after (including) 11 are used as reference groups.

In terms of the indirect proxy, we borrow the idea from Serrato et al. (2017), and use the coefficient of variation (COV, standard deviation divided by mean) of fiscal revenue growth within each prefecture to proxy whether the output is easy to measure or not: higher the COV, more difficult for principals to accurately judge the actual performance of their agents, and thus less meritocracy is employed in the process of political selection. We similarly divide the prefectures into two groups according to whether each within-prefecture (across-county) COV is greater than their median values or not. The regression exercise is conducted for counties in each prefecture group and the corresponding results are reported in Figure 8. The theoretical prediction is again verified as the empirical evidence indicates the club size is positively related with the level of volatility, although the size difference is smaller.

\[^{18}\text{In this paper, the authors use the standard deviation of migration of measure the noisiness of One Child Policy performance.}\]
Figure 8: Club Size in terms of Data Volatility

Note: the horizontal axis corresponds to $R_i$ and the vertical axis corresponds to $\beta$. The econometric specification follows equation (1), which controls officials’ personal characteristics (including age, education year and tenure), counties’ socioeconomic characteristics (including population density, fiscal revenue share within prefecture, agricultural output (log) and manufacture output (log)), county fixed effects, year fixed effects and prefecture-year fixed effects. The club sizes are indicated by red boxes. The data volatility is measured by the coefficient of variation (COV, standard deviation divided by mean) of fiscal revenue growth among counties within each prefecture. The high data volatility regions include counties in prefectures where COV is no smaller than the median value, and the low data volatility regions contain counties in prefectures where COV is smaller than the median value. The ranks after (including) 11 are used as reference groups.

Relatedly, the fourth prediction focuses on the role of campaigns in club size determination. In particular, when there are non-economic campaigns, the principal tends to leave more discretions on campaign-related issues, thus enlarges the club size. Empirically, we restrict our attention to two kinds of campaigns: environmental protection and social stability maintaining. For the former, we utilize whether there is visiting of provincial or central leaders to a prefecture in some year for environmental issues to capture environmental campaigns, and try to compare counties in prefectures experiencing no environmental visiting with counties in prefectures experiencing at least one environmental visiting. The results are reported in Figure 9, which suggests that club size indeed enlarges when there are environmental campaigns.
Figure 9: Club Size in terms of Environmental Campaign

Note: the horizontal axis corresponds to $R_1$s and the vertical axis corresponds to $\beta$. The econometric specification follows equation (1), which controls officials’ personal characteristics (including age, education year and tenure), counties’ socioeconomic characteristics (including population density, fiscal revenue share within prefecture, agricultural output (log) and manufacture output (log)), county fixed effects, year fixed effects and prefecture-year fixed effects. The club sizes are indicated by red boxes. The environmental campaign is measured by the visiting of provincial or central leaders for environmental issues. “No Environmental Visiting” indicates there is no provincial or central leaders visiting the prefecture at some year for environmental issues, and “Environmental Visiting” indication there are at least one such case. The visiting data (2003-2009) is borrowed from Wang, Cao and Chen (forthcoming). The ranks after (including) 11 are used as reference groups.

For the latter, we employ whether a strike takes place in a prefecture for some year to proxy a stability maintaining campaign, and compare counties in prefectures without strikes with counties in prefectures experiencing strikes. We report the results in Figure 10, which confirms that when the pressure and importance of sustaining stability increase, the club size in terms of economic performance also increases.

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19 Here we focus on the period of 2003-2009, not only due to the data availability, but also because economic performance dominates other indicators in terms political selection in this period, and thus environmental visiting here or strikes later can appropriately serve as moderators.
Figure 10: Club Size in terms of Strike Campaign

Note: the horizontal axis corresponds to $R_1s$ and the vertical axis corresponds to $\beta$. The econometric specification follows equation (1), which controls officials’ personal characteristics (including age, education year and tenure), counties’ socioeconomic characteristics (including population density, fiscal revenue share within prefecture, agricultural output (log) and manufacture output (log)), county fixed effects, year fixed effects and prefecture-year fixed effects. The club sizes are indicated by red boxes. The “Strike Campaign” is measured whether there occur strikes or not. “No Strikes” indicates cases where no strikes happen in some prefecture for some year, and “Strikes” indicates there is at least one strike. The strike data (2003-2009) comes from China Labor Bulletin (https://clb.org.hk/). The ranks after (including) 11 are used as reference groups.

5. Extension: Publicly Known Cronies

5.1 Extended Model

In the previous section, we show that with homogeneous agents, promotion club outperforms tournament when agent population is large, but the principal tends to oversize the club. However, in reality, agents are often heterogeneous by some observable traits or connections to the principal, thus differ in their potentials of becoming cronies. The observable traits may be shared hometown, school alumni, colleagues, etc. In this section, while maintaining most parts of the model unchanged, we further assume that some of the agents are publicly known as *connected* to the principal. And the principal selects agents in a lexicographic manner: once in the club, connected agents are always preferred to non-
connected ones. Among the connected, we assume equal probabilities of selection, to echo previous setup. To slightly abuse the notion, we refer to the connected agents as *cronies*, and the non-connected ones *non-cronies*.

For simplicity, we consider two extreme scenarios. In the first one, there is only one publicly known crony among $n$ agents. The insight speaks to the cases where cronies occupy a minority of population. In the second scenario, there is only one non-crony among $n$ agents. This speaks to the cases where a majority of population are cronies, i.e. a crony-ful environment, as we call it in the analysis that follows.

When the size of the club is fixed, which may due to the costs of confusion if alternating rules too frequently, replacing a non-crony with a crony necessarily increases working incentives of the added crony (compared to the non-crony colleagues) in a proper-sized club ($m>1$), because cronies always enjoy privileges in intra-club selections. Meanwhile, in face of the existence of cronies, non-cronies’ incentive to work has sharply declined if the principal select a proper promotion club ($m>1$), because their probability of promotion is zero when they are in the club with the crony.

In a longer time horizon, when the size of the club is endogenous, a large club size can be selected to ensure crony inclusion, if survival concerns are significant. In the meantime, the crony may shirk compared to in an $n$-agent tournament, since he understands the reluctance of non-cronies to work, and the willingness of principal to enlarge the club. As a result, adoption of a proper promotion club distorts efforts for all agents, when cronies are few.

PROPOSITION 3. When there is only one crony among the agents, the principal selects the optimal club size, $m^* > 1$, if at least one of the following holds:

1. $\beta > \bar{\beta}$
2. $n > \bar{n}$

PROOF. See Appendix.

COROLLARY 1. When there is only one crony, the crony shirks, and the non-cronies shirk more, compared to their effort in an $n$-agent tournament.

PROOF. See Appendix.

As the proposition shows, when cronies are few, they can almost force the principal to enlarge the club in order to capture them. Mapping into the data for Chinese bureaucracy, if a
connected official lands among non-connected colleagues, there are two counter-balancing forces: 1. At first, club sizes are rigid at the previous level, and the connected official gets to adapt to the local environment. We expect the crony’s effort grows; 2. After a period of time, club sizes start to adjust, and the connected official start to shirk, as argued in Corollary 1. Therefore we have the following prediction:

PREDICTION 5. When a connected official lands among non-connected colleagues, efforts of the connected official first increase then decrease.

Next, we analyze the case where cronies are many. When there is only one non-crony agent in the population, cronies compete with each other. In particular, when the club size is more than two, the non-crony stops working completely: even if he makes it to the club, he is dominated by at least one other crony. Consequently, the principal’s problem is essentially the same as in the homogenous case with (n-1) agents. If we consider total efforts as a proxy of the public goods the bureaucracy provides, combining with the fact that promotion club outperforms the tournament when agent population is large, it is possible that the effort gains from promotion club may compensate the loss from one agent’s complete slack. As a result, promotion club in a crony-ful environment may produces higher total efforts, thus better total public good provision.

PROPOSITION 4. With quadratic cost, promotion club generates more total efforts than an n-agent tournament when $n > 5$

PROOF. To be added.

An immediate testable prediction on Chinese bureaucracy follows.

PREDICTION 6. In an area with many connected officials, total public good provisions may be higher than an average area with few connected officials. But the public good provisions under the rule of non-connected are lower than an average area. And inequality within the area is higher.

5.2 Further Evidence
To empirically test Prediction 5, we first construct measures for efforts as well as political connection. On one hand, we use the performance rank to proxy officials’ efforts; on the other hand, we follow existing literature to measure political connection: we regard a county party secretary is a crony if he/she shares the same hometown (same prefecture) with his/her direct superior, the prefecture party secretary (Meyer et al., 2016), and the county party secretary is at least three years younger than the prefecture party secretary to avoid potential competitive relationship between them (Jia et al., 2015). Then, the above measures are applied to the following econometric specification:

$$\text{Rank}_{ct} = \alpha + \beta_1 \text{Connection}_{ct} \times \text{Tenure}_{ct}^2 + \beta_2 \text{Connection}_{ct} \times \text{Tenure}_{ct} + \beta_3 \text{Connection}_{ct} + \beta_4 \text{Tenure}_{ct}^2 + \beta_5 \text{Tenure}_{ct} + \gamma X'_{ct} + \rho Z'_{ct} + \delta_c + \eta_t + \xi_{pt} + \epsilon_{ct}$$

(2)

The specification shares the same structure with specification (1) except that the dependent variable is replaced by $\text{Rank}_{ct}$ and the main interest of independent variables are replaced by $\text{Connection}_{ct}$, $\text{Tenure}_{ct}$ and their interaction terms. $\text{Rank}_{ct}$ refers to the performance rank, $\text{Connection}_{ct}$ refers to whether there is a political connection, and $\text{Tenure}_{ct}$ refers to the accumulative year since the county party secretary took office.

We investigate the interaction of $\text{Connection}_{ct}$ with $\text{Tenure}_{ct}$ and its squared term, to explore the effort dynamics of connected officials: For a connected official who just lands on a new position, he takes advantage of a not-yet-adjusted club size to increase his effort, in order to increase the probability of club inclusion. However, as time goes by, the superior officer starts to enlarge the club size, and as the extended model suggests, and the crony should decrease his efforts accordingly. Consequently, we predict a non-monotonic relationship between connected official’s efforts with respect to tenure years, or in other words, we expect negative $\beta_1$ and positive $\beta_2$. Table 2 reports the corresponding results for both absolute and normalized performance rank and verified this prediction.

<table>
<thead>
<tr>
<th>Dependent Variable: Fiscal Revenue Growth Rank</th>
<th>Absolute Rank</th>
<th>Normalized Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>Connection dummy $\times$ Tenure squared</td>
<td>-0.073**</td>
<td>-0.011***</td>
</tr>
<tr>
<td>(1)</td>
<td>-0.090***</td>
<td>-0.013***</td>
</tr>
</tbody>
</table>

---

20 We normalize the rank to [0,1] with the highest rank as 1 and the lowest rank as 0. Such exercise is motivated by the concern that different number of counties under each prefecture may reflect different extents of competition, which means different levels of difficulty to move one rank higher in different prefectures (Lv and Landry, 2014). We normalize the rank to the scope of [0,1] to ensure the comparability of one unit of rank moving among various prefectures.
For the impact of crony competition on aggregated local performance (Prediction 6), we continue to use the measure of political connections as before but aggregate them to the prefecture level. A variable called “Crony Share” is constructed as the ratio of the number of cronies to the total number of counties within each prefecture and will be used to test the relationship between the “Crony Share” and the prefectures’ performance rank. Specifically, we apply the following econometric specification:

\[ \text{Rank}_{pt} = \alpha + \beta \text{Crony Share}_{pt} + \gamma X'_{pt} + \rho Z'_{pt} + \delta_p + \eta_t + \xi_{st} + \epsilon_{pt} \] (3)

which is also similar to specification (1) but the dependent variable is replaced by performance rank, the independent variable is replaced by crony share, and subscription \( c \) (indicating county) and \( p \) (indicating prefecture) are replaced by subscription \( p \) (indicating prefecture) and \( s \) (indicating province) respectively. Table 3 reports the results based on the prefecture-year panel dataset and shows that as the shares of crony increase, i.e., in a more crony-ful environment, more fiscal revenue is procured.

<table>
<thead>
<tr>
<th>Personal Characteristics</th>
<th>Yes</th>
<th>Yes</th>
<th>Yes</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socioeconomic Characteristics</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>County FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Prefecture-Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Table 3: Crony Share and Aggregate (Prefectural) Performance

<table>
<thead>
<tr>
<th>Dependent Variable: Fiscal</th>
<th>Absolute Rank</th>
<th>Normalized Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.030)</td>
<td>(0.032)</td>
<td>(0.004)</td>
</tr>
<tr>
<td>Connection dummy × Tenure</td>
<td>0.308</td>
<td>0.336</td>
</tr>
<tr>
<td>(0.220)</td>
<td>(0.243)</td>
<td>(0.028)</td>
</tr>
<tr>
<td>Connection dummy</td>
<td>-0.151</td>
<td>-0.112</td>
</tr>
<tr>
<td>(0.399)</td>
<td>(0.520)</td>
<td>(0.052)</td>
</tr>
<tr>
<td>Tenure squared</td>
<td>-0.028**</td>
<td>-0.035**</td>
</tr>
<tr>
<td>(0.012)</td>
<td>(0.016)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Tenure</td>
<td>0.218***</td>
<td>0.266***</td>
</tr>
<tr>
<td>(0.075)</td>
<td>(0.101)</td>
<td>(0.007)</td>
</tr>
</tbody>
</table>

Note: Standard errors in parentheses are clustered at provincial level, * p < 0.10, ** p < 0.05, *** p < 0.01. The constant term is included but not reported. Personal characteristics include party secretaries’ age, education year and tenure; socioeconomic characteristics include population density, fiscal share in the prefecture, agriculture output (log), as well as manufacture output (log). The connection dummy equals to 1 if the county party secretary is connected with prefecture party secretary, where the “connected” is defined as sharing the same hometown (prefecture level) and the age difference is larger than 3 years (county secretary is younger), and equals to 0 otherwise. The tenure is the accumulative year since the county party secretary took office.
<table>
<thead>
<tr>
<th>Revenue Growth Rank</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crony share</td>
<td>1.268*</td>
<td>1.223**</td>
<td>0.099*</td>
<td>0.097*</td>
</tr>
<tr>
<td></td>
<td>(0.533)</td>
<td>(0.568)</td>
<td>(0.048)</td>
<td>(0.050)</td>
</tr>
<tr>
<td>Personal Characteristics</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Socioeconomic Characteristics</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>County FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Province-Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observation</td>
<td>4284</td>
<td>4277</td>
<td>4283</td>
<td>4277</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.355</td>
<td>0.377</td>
<td>0.231</td>
<td>0.262</td>
</tr>
</tbody>
</table>

Note: Standard errors in parentheses are clustered at provincial level, * p < 0.10, ** p < 0.05, *** p < 0.01. The constant term is included but not reported. Personal characteristics include party secretaries’ age, education year and tenure; socioeconomic characteristics include population density, fiscal share in the prefecture, agriculture output (log), as well as manufacture output (log). The crony share is the share of connected county secretaries with each prefecture.

6. Discussions and Conclusion

We propose and empirically validate a tournament-like incentive scheme called the "promotion club": Principal selects, from \( n \) agents, \( m \) top-performing ones into a club, and then promote one from within a club based fully on principal's idiosyncratic preference ("mindset"). We show that a proper (\( m > 1 \)) promotion club often helps to incentivize agents’ efforts while maintaining some discretionary power in personnel control, and employ political turnover data in China to validate the model and to test the model predictions. In the model, we make several simplifying assumptions to make the economic insights clear. One of them is to assume the distribution of mindsets is an improper uniform distribution. One could relax the assumption to allow a random distribution function, where agents with mindsets closer to the distribution mean should have higher working incentives. Another key assumption is that the principal can commit to a certain club size. Though the superior officer in a bureaucracy has no commitment power in reality, the dynamic nature of principal-agent interaction helps to, at least partially, solve the problem: suppose the principal announces a club size and then selects someone outside of the club, the agents would no longer believe in the promotion club scheme. As a result, the agents have strong incentives to shirk, which is undesirable for the principal in the long run. Moreover, we abstract from the real-life practice of announcing the club size to focus on the incentive concerns, by simply allowing the principal to suggest a number. In reality, vague conversations of future visions are often provided, which strengthens the possibility of discretions. However, subordinates may infer the degree of selection from such noisy signals. One may add a noisy announcing stage of club size, but the main insight of the model remains. We also abstract from the details on how principal manages to discover the agents’ mindsets,
as we abstract from the explicit form of personnel discretion gains, both for highlighting the tradeoff (and the alleviation using promotion clubs).

We validate the model and test the predictions, employing data from China. We first solidify the existence of club-based promotion pattern using China’s county level data from 2001 to 2016. The empirical analysis tells that jumping into the top five in performance measure (in other words, into the club) can significantly increase the promotion likelihood by 4.1 percentage points, which occupies 9.76% of the mean value of promotion likelihood in our sample (=0.420). Further model predictions also receive empirical supports: club size expands with administrative levels (from county to prefecture to province); club size shrinks in regions with higher economic importance (measured by GDP per capita growth), while expands in regions with higher data volatility (thus harder to measure performances, measured by variance of fiscal revenue growth rate as well as data manipulation); club sizes would be enlarged during non-economic campaigns (measured by environmental or social stability campaigns). By taking publicly known cronies into account, we find a non-monotonic relationship between connected official’s efforts with respect to tenure years, and we also show that as the shares of crony increase, more fiscal revenue is procured.

Our last remark concerns the modelling of performance. In the paper, performance consists of a single task. It is easy to extend to a multi-task setup, bearing similar insights as Holmstrom and Milgrom (1991). In fact, the empirical results that the club size enlarges in regions with environment-related visiting from superior officers, and in regions with more strikes, have implied a multi-tasked scenario: in a standard multi-task environment, agents turn to over-effort in measurable tasks, and under-effort in non-measurable ones. However, in political campaigns, some specific tasks (e.g. environmental protection, social stability, etc.) are quantified and thus closely connected with short-term evaluations. Consequently, an economic-based evaluation gives room to campaign discretions, which leads to the enlarged club sizes.
Reference


Lu, Fengming, Xiao Ma, and Xufeng Zhu, Who wins approval from medium-level elites: A survey experiment on elite selection in China, 2018, working paper


Wang, Fang, Yiming Cao, Shuo Chen, Pollution Control in China: Prefecture Level Evidence, China Economic Quarterly, forthcoming

Xi, Tianyang. "All the emperor's men? Conflicts and power-sharing in imperial China." Comparative Political Studies 52.8 (2019): 1099-1130.


Appendix

Figure A1: Personal Characteristics

Note: the vertical axis indicates percentage. For education, level 1-7 indicate secondary school degree, high school degree, college degree, bachelor degree, master degree, PhD degree, and post-doctor degree respectively.
Figure A2: Robustness Checks

Note: the horizontal axis corresponds to $R_i$s and the vertical axis corresponds to $\beta$. The econometric specification follows equation (1), which controls officials’ personal characteristics (including age, education year and tenure), counties’ socioeconomic characteristics (including population density, fiscal revenue share within prefecture, agricultural output (log) and manufacture output (log)), county fixed effects, year fixed effects and prefecture-year fixed effects. The club sizes are indicated by red boxes. The political connection is a dummy which equals to 1 if the county party secretary is connected with prefecture party secretary, where the “connected” is defined as sharing the same hometown (prefecture level) and the age difference is larger than 3 years (county secretary is younger), and equals to 0 otherwise. The ranks after (including) 11 are used as reference groups.
Figure A3: Randomization

Note: In the left figure, we randomly assign the promotion status among party secretaries according to its actual distribution in our sample; in the right figure, we randomly assign performance ranks among party secretaries within each prefecture. We do the randomization and then run regression following specification (1) for 1,000 times. The bars in the figure report the percentage of all 1,000 randomization where we can get significant results with $t \geq 1.96$ for each rank.
Figure A4: *de jure* Promotion

Note: the horizontal axis corresponds to $R_i$s and the vertical axis corresponds to $\beta$. The econometric specification follows equation (1), which controls officials’ personal characteristics (including age, education year and tenure), counties’ socioeconomic characteristics (including population density, fiscal revenue share within prefecture, agricultural output (log) and manufacture output (log)), county fixed effects, year fixed effects and prefecture-year fixed effects. The club sizes are indicated by red boxes. The *de jure* promotion is defined as the actual promotion plus the following cases: the county party secretary attains Director of prefectural party committee agencies and governmental agencies, Vice Chairman of the Standing Committee of Prefectural People’s Congress, Vice Chairman of Prefectural People’s Political Consultative Conference, Chief Justice of Intermediate People's Court, Chief Procurator of Intermediate People's Procuratorate, at the end of his/her term. The ranks after (including) 11 are used as reference groups.
Figure A5: County and Prefecture Results with Only the First 10 Ranks

Note: the horizontal axis corresponds to \( R_i \) and the vertical axis corresponds to \( \beta \). The econometric specification follows equation (1), which controls officials’ personal characteristics (including age, education year and tenure), counties’ socioeconomic characteristics (including population density, fiscal revenue share within prefecture, agricultural output (log) and manufacture output (log)), county fixed effects, year fixed effects and prefecture-year fixed effects. The club sizes are indicated by red boxes. The ranks after (including) 16 are used as reference groups. This figure replicates Figure 3 and 5 but drops all observations with ranks after 16.\(^{21}\)

\(^{21}\) We do not report the corresponding results for provincial level, because in such a restricted subsample, there is no enough freedom for us to conduct estimation and statistical inference.
Figure A6: Heterogenous Results with Only the First 10 Ranks

Note: the horizontal axis corresponds to $R_i$s and the vertical axis corresponds to $\beta$. The econometric specification follows equation (1), which controls officials’ personal characteristics (including age, education year and tenure), counties’ socioeconomic characteristics (including population density, fiscal revenue share within prefecture, agricultural output (log) and manufacture output (log)), county fixed effects, year fixed effects and prefecture-year fixed effects. The club sizes are indicated by red boxes. The ranks after (including) 11 are used as reference groups. This figure replicates Figure 4, 7, 8, 9 and 10 but drops all observations with ranks after 11.
Table A1: Prefecture and Province Level Summary Statistics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Observation</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Data Source</th>
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<tr>
<td><strong>Prefecture Level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Promotion dummy</td>
<td>5,526</td>
<td>0.240</td>
<td>0.427</td>
<td>A</td>
</tr>
<tr>
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<td>5,167</td>
<td>0.153</td>
<td>0.128</td>
<td>B</td>
</tr>
<tr>
<td>Age</td>
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<td>51.691</td>
<td>3.892</td>
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<tr>
<td>Education year</td>
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<td>2.646</td>
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<td>Tenure</td>
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<td>2.639</td>
<td>1.611</td>
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<tr>
<td>Population density</td>
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<td>0.042</td>
<td>0.218</td>
<td>B</td>
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<tr>
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<td>5,512</td>
<td>0.083</td>
<td>0.099</td>
<td>B</td>
</tr>
<tr>
<td>Agricultural output (log)</td>
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<td>3.280</td>
<td>1.050</td>
<td>B</td>
</tr>
<tr>
<td>Manufacture output (log)</td>
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<td>4.482</td>
<td>1.413</td>
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<td><strong>Province Level</strong></td>
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<td>Moving average fiscal revenue growth rate</td>
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<td>Population density</td>
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<td>0.028</td>
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</tr>
<tr>
<td>Agricultural output (log)</td>
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<tr>
<td>Manufacture output (log)</td>
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Note:
A: collected by authors;
Table A2: Promotion Definition

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<tr>
<th>Secretary Level</th>
<th>Positions</th>
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<tbody>
<tr>
<td>County party secretary</td>
<td>Provincial or national level position</td>
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<tr>
<td></td>
<td>Deputy Secretary, Secretary-General, and Member of the Standing Committee of Prefectural Party Committee</td>
</tr>
<tr>
<td></td>
<td>Mayor, Vice Mayor, Acting Mayor, Assistant Mayor, and Secretary-General of Prefectural Government</td>
</tr>
<tr>
<td></td>
<td>Director of Prefectural Party Committee General Office, Minister of Prefectural Party Committee Organization Department, Minister of Prefectural Party Committee Propaganda Department, Minister of Prefectural Party Committee United Front Work Department, Secretary of Prefectural Discipline Inspection Commission, Secretary of Prefectural Politics and Law Committee</td>
</tr>
<tr>
<td></td>
<td>Chairman of the Standing Committee of Prefectural People’s Congress, Chairman of Prefectural People’s Political Consultative Conference</td>
</tr>
<tr>
<td>Prefecture party secretary</td>
<td>National level position</td>
</tr>
<tr>
<td></td>
<td>Deputy Secretary, Secretary-General, and Member of the Standing Committee of Provincial Party Committee</td>
</tr>
<tr>
<td></td>
<td>Governor, Vice Governor, Acting Governor, Assistant Governor, and Secretary-General of Provincial Government</td>
</tr>
<tr>
<td></td>
<td>Director of Provincial Party Committee General Office, Minister of Provincial Party Committee Organization Department, Minister of Provincial Party Committee Propaganda Department, Minister of Provincial Party Committee United Front Work Department, Secretary of Provincial Discipline Inspection Commission, Secretary of Provincial Politics and Law Committee</td>
</tr>
<tr>
<td></td>
<td>Chairman of the Standing Committee of Provincial People’s Congress, Chairman of Provincial People’s Political Consultative Conference</td>
</tr>
<tr>
<td>Province party secretary</td>
<td>Vice Premier, State Councilor of Central Government</td>
</tr>
<tr>
<td></td>
<td>Secretary of Central Party Committee Secretariat, Minister of Central Party Committee Organization Department, Minister of Central Party Committee Propaganda Department, Minister of...</td>
</tr>
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</table>
Central Party Committee United Front Work Department,
Secretary of Central Discipline Inspection Commission, Secretary
of Central Politics and Law Committee
Chairman of the Standing Committee of National People’s
Congress, Chairman of National People’s Political Consultative
Conference
Table A3: Performance and Promotion

<table>
<thead>
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<th>Panel A</th>
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<tr>
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<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
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<td>0.007***</td>
<td>0.007***</td>
<td>0.006**</td>
</tr>
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<td></td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Socioeconomic Characteristics</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>County FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Prefecture -Year FE</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observation</td>
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<td>17547</td>
<td>17376</td>
<td>16660</td>
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<td>0.526</td>
<td>0.527</td>
<td>0.666</td>
</tr>
<tr>
<td>Panel B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Normalized performance rank</strong></td>
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<td>(6)</td>
<td>(7)</td>
<td>(8)</td>
</tr>
<tr>
<td>Normalized performance rank</td>
<td>0.032**</td>
<td>0.034**</td>
<td>0.040**</td>
<td>0.037**</td>
</tr>
<tr>
<td></td>
<td>(0.015)</td>
<td>(0.016)</td>
<td>(0.016)</td>
<td>(0.018)</td>
</tr>
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<td>Personal Characteristics</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Socioeconomic Characteristics</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Prefecture FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Prefecture -Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observation</td>
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<td>17350</td>
<td>17314</td>
<td>16660</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.451</td>
<td>0.527</td>
<td>0.527</td>
<td>0.666</td>
</tr>
</tbody>
</table>

Note: Standard errors in parentheses are clustered at prefecture level, * p < 0.10, ** p < 0.05, *** p < 0.01. The constant term is included but not reported. Personal characteristics include party secretaries’ age, education year and tenure; socioeconomic characteristics include population density, fiscal share in the prefecture, agriculture output (log), as well as manufacture output (log). The performance rank is constructed based on the moving average fiscal revenue growth rate: the values of the absolute rank increases with the rank of the moving average fiscal revenue growth rate within the prefecture, with 1 indicating the lowest; we normalize the absolute rank in the range of [0,1] to get the normalized performance rank.
Table A4: Promotion Club

Dependent Variable: Promotion Dummy

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>County Level</td>
<td>Prefecture Level</td>
<td>Province Level</td>
</tr>
<tr>
<td>1st rank</td>
<td>0.008</td>
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<td>-0.240</td>
</tr>
<tr>
<td></td>
<td>(0.014)</td>
<td>(0.034)</td>
<td>(0.174)</td>
</tr>
<tr>
<td>2nd rank</td>
<td>-0.000</td>
<td>-0.011</td>
<td>0.071</td>
</tr>
<tr>
<td></td>
<td>(0.013)</td>
<td>(0.023)</td>
<td>(0.083)</td>
</tr>
<tr>
<td>3rd rank</td>
<td>0.010</td>
<td>0.006</td>
<td>0.045</td>
</tr>
<tr>
<td></td>
<td>(0.015)</td>
<td>(0.032)</td>
<td>(0.096)</td>
</tr>
<tr>
<td>4th rank</td>
<td>-0.023</td>
<td>0.029</td>
<td>-0.128</td>
</tr>
<tr>
<td></td>
<td>(0.017)</td>
<td>(0.023)</td>
<td>(0.116)</td>
</tr>
<tr>
<td>5th rank</td>
<td><strong>0.041</strong></td>
<td>0.009</td>
<td>0.022</td>
</tr>
<tr>
<td></td>
<td>(0.017)</td>
<td>(0.028)</td>
<td>(0.084)</td>
</tr>
<tr>
<td>6th rank</td>
<td>0.013</td>
<td>-0.008</td>
<td>0.125</td>
</tr>
<tr>
<td></td>
<td>(0.018)</td>
<td>(0.023)</td>
<td>(0.099)</td>
</tr>
<tr>
<td>7th rank</td>
<td>0.007</td>
<td>-0.024</td>
<td>-0.049</td>
</tr>
<tr>
<td></td>
<td>(0.022)</td>
<td>(0.026)</td>
<td>(0.116)</td>
</tr>
<tr>
<td>8th rank</td>
<td>-0.005</td>
<td><strong>0.053</strong></td>
<td>-0.042</td>
</tr>
<tr>
<td></td>
<td>(0.023)</td>
<td>(0.025)</td>
<td>(0.063)</td>
</tr>
<tr>
<td>9th rank</td>
<td>-0.010</td>
<td>0.005</td>
<td><strong>0.084</strong></td>
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<tr>
<td></td>
<td>(0.027)</td>
<td>(0.031)</td>
<td>(0.047)</td>
</tr>
<tr>
<td>10th rank</td>
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<td>-0.024</td>
<td>-0.062</td>
</tr>
<tr>
<td></td>
<td>(0.024)</td>
<td>(0.028)</td>
<td>(0.055)</td>
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</table>

Personal Characteristics: Yes Yes Yes
Socioeconomic Characteristics: Yes Yes Yes
County FE: Yes
Prefecture FE: Yes
Province FE: Yes
Year FE: Yes
Prefecture - Year FE: Yes
Province - Year FE: Yes
Province specific nonlinear year trend: Yes
Observation: 16660 4858 495
R-squared: 0.666 0.497 0.923

Note: Standard errors in parentheses are clustered at prefecture level in column (1) and at province level in column (2) and (3). * p < 0.10, ** p < 0.05, *** p < 0.01. The constant term is included but not reported. Personal characteristics include party secretaries’ age, education year and tenure; socioeconomic characteristics include population density, fiscal share in the prefecture, agriculture output (log), as well as manufacture output (log). The performance rank is constructed based on the moving average fiscal revenue growth rate. Province specific nonlinear year trend contains the interactions of province dummies with year (to the power of 1 to 5). The ranks after (including) 11 are used as reference groups.
Additional Appendix: Omitted proofs

Proof of Proposition 1.

Proof. The investigation of the monotonicity of the effort curve takes three steps.

Step 1. FOC. FOC for the agent is:

\[
\left[ \frac{W}{m} \sum_{k=1}^{m} \left( \binom{n-1}{n-k} \Pi_{\#=n-k} \Phi(a_i - a_j) \Pi_{\#=k-1} (1 - \Phi(a_i - a_j)) \right) \right] = c' (a_i)
\]

We look for symmetric equilibrium, where \(a_i^* = a_j^*, \Phi (a_i^* - a_j^*) = \Phi (0) = \frac{1}{2}\). To simplify it,

\[
\frac{W \phi (0)}{2^{n-2}} \left[ \frac{1}{m} \sum_{k=1}^{m} \left( \binom{n-1}{n-k} (n-2k+1) \right) \right] = c' (a^*)
\]

\[
\Rightarrow \frac{W \phi (0)}{2^{n-2}} \left[ \frac{1}{m} \sum_{k=1}^{m} \left( \binom{n-1}{k-1} (n-2k+1) \right) \right] = c' (a^*)
\]

Step 2. Monotonicity of \(\Delta (m)\).

Denote \(\Delta (m) = \frac{1}{m} \sum_{k=1}^{m} \left( \binom{n-1}{k-1} (n-2k+1) \right)\), then:

\[
\Delta (m) - \Delta (m+1) = \frac{1}{m} \sum_{k=1}^{m} \left( \binom{n-1}{k-1} (n-2k+1) \right) - \frac{1}{m+1} \sum_{k=1}^{m+1} \left( \binom{n-1}{k-1} (n-2k+1) \right)
\]

\[
\Rightarrow = \frac{1}{m(m+1)} \left[ (m+1) \sum_{k=1}^{m} \left( \binom{n-1}{k-1} (n-2k+1) \right) - m \sum_{k=1}^{m} \left( \binom{n-1}{k-1} (n-2k+1) \right) \right]
\]

\[
\Rightarrow = \frac{1}{m(m+1)} \left[ \sum_{k=1}^{m} \left( \binom{n-1}{k-1} (n-2k+1) \right) - m \left( \binom{n-1}{m} (n-2m-1) \right) \right]
\]

Step 3. Monotonicity of \(g (k)\).

Denote \(g (k) = \binom{n-1}{k-1} (n-2k+1)\), then, for \(n \geq 2\):

\[
g (k) - g (k+1) = \binom{n-1}{k-1} (n-2k+1) - \binom{n-1}{k} (n-2k-1)
\]

\[
= \binom{n-1}{k-1} (n-2k+1 - \frac{n-k}{k} (n-2k-1))
\]
\[
g(k) - g(k + 1) = \frac{(n - 1)}{k - 1} \left( (n - 2k)k + k - (n - k)(n - 2k - 1) \right)
\]
\[
= \frac{(n - 1)}{k - 1} \left( n - (n - 2k)^2 \right)
\]

Therefore, \(g(k = m - 1) > g(m)\) if and only if \(\frac{n - \sqrt{n}}{2} + 1 < m < \frac{n + \sqrt{n}}{2} + 1\). Since \(n \geq 2\), \(1 \leq k < n\), \(g\) decreases in \(k\) when \(n \leq 4\). \(g\) first increases, then decreases, and then increases in \(k\) again, when \(n \geq 5\). It is easy to show that, at its minimal, \(g < 0\). And \(g(n) < 0\).

Back to \(\Delta(m) - \Delta(m + 1)\), it essentially compares the average value of first \(m\) terms of \(\left( \frac{n - 1}{k - 1} \right)(n - 2k + 1)\) and the value of \(\left( \frac{n - 1}{k - 1} \right)(n - 2k + 1)\) at \(k = m + 1\). Consequently, \(\Delta(m)\) first increases and then decreases, thus the hump shape when \(n \geq 5\).

\[\Box\]

**Proof of Proposition 2.**

*Proof.* Denote the optimal club size for effort as \(m_{\text{club}}\). Then \(s(m_{\text{club}}) < s(m_{\text{club}} + 1)\), while \(a(m_{\text{club}}) > a(m_{\text{club}} + 1)\). It is then easy to see that \(m_{\text{club}} < m^*\) if \(\beta \left[ s(m_{\text{club}} + 1) - s(m_{\text{club}}) \right] > an \left[ a(m_{\text{club}}) - a(m_{\text{club}} + 1) \right]\), and \(m_{\text{club}} = m^*\) otherwise.

\[\Box\]

**Proof of Proposition 3.**

*Proof.* The first part of the proposition is straightforward. When \(\beta\) is sufficiently large, i.e., the weight of survival concerns are significant, the principal biases towards large club size. To see the second part, we only need to compare the principal’s choice between a tournament, and the club where \(m = 2\). When the total agent population gets larger, increasing the club size from one to two does not distort working incentives of the non-cronies, while the benefit of discretionary power remains. Therefore for sufficiently large population, \(m = 2\) is a better choice than \(m = 1\).

\[\Box\]
Proof of Corollary 1.

Proof. The crony shirks because he knows he has better chances to be promoted, once in
the club. The non-cronies shirk more because they know that, even if they make it to the
club, they have no chances to be promoted, should another crony be in the club. We use a
3-agent case for illustration here. It is easy to extend to n-agent case.

Denote the crony agent as $c_m$ and $nc_m$. Suppose $m = 2$. For the connected agent 1: \(\max_{a_i} p(\text{club}) W - c(a_i)\),
$p(\text{club}) = 1 - \Phi(a_j - a_1) \Phi(a_i - a_1)$. FOC gives: \(2W\Phi(a_{nc,2} - a_{c,2}) \phi(a_{nc,2} - a_{c,2}) = c'(a_{c,2})\)

For the non-connected agent $i$: \(\max_{a_i} p(1\ ranks\ bottom) \frac{W}{2} - c(a_i)\), $p(1\ ranks\ bottom) = \Phi(a_j - a_1) \Phi(a_i - a_1)$. FOC gives: \(\frac{W}{2} \phi(a_{nc,2} - a_{c,2}) \Phi(a_{nc,2} - a_{c,2}) = c'(a_{nc,2})\)

Lastly the pdf of noise is symmetric, $\phi(a_{nc} - a_{c}) = \phi(a_{c} - a_{nc})$, we have $a_{c,2} > a_{nc,2}$.

Now suppose $m = 1$, which is a standard tournament. Base on previous results, \(\frac{(n-1) \Phi(0)}{2^{n-m-1}} = c'(a^*)\), plug in $n = 3, m = 1$ to get: $W \phi(0) = c'(a^*)$.

Notice that $\Phi(a_{nc,2} - a_{c,2}) < \Phi(0) = \frac{1}{2}$, and $\phi(a_{nc,2} - a_{c,2}) < \phi(0)$ (distribution is symmetric), we have the proposition.

\[\square\]

Proof of Proposition 4.

Proof. Without loss of generality assume the quadratic cost to be $c(a) = \frac{1}{2}a^2$. Recall the FOC: \(W \phi(0) \left[ \frac{1}{m} \sum_{k=1}^{m} \left( \binom{n-1}{k-1} (n - 2k + 1) \right) \right] = c'(a^*)\). In a tournament, $a^* = \frac{W \phi(0)}{2^{n-2}} (n - 1)$, total effort $e_{\text{Tournament}} = na^* = \frac{W \phi(0)}{2^{n-2}} (n - 1) n$.

In a crony-ful environment, when $n$ is large, the optimal club size coincides with the size with optimal effort. This is because a crony is selected anyway. When $n > 5$, we know that a two-agent club is better than tournament, in terms of individual effort. In this case, if we compare the total effort between a two-agent club and the tournament, we have:

\[
e_{2\text{-agent\ club}} = (n - 1) \frac{W \phi(0)}{2^{n-2}} \left[ \frac{1}{2} \sum_{k=1}^{2} \left( \binom{n-1}{k-1} (n - 2k + 1) \right) \right] = (n - 1) \frac{W \phi(0)}{2^{n-2}} \left[ \frac{1}{2} (n - 1) (n - 2) \right]
\]
Therefore, $e_{2-agent\ club - e_{Tournament}} = \frac{W\phi(0)}{2^{n-1}} [(n - 1) (n - 2) - 2n] = \frac{W\phi(0)}{2^{n-1}} (n^2 - 5n + 2) > 0$, when $n \geq 5$, thus completes the proof.