Incentivizing Corruption: An Unintended Consequence of Bureaucratic Promotions in China

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Abstract

Conventional wisdom holds that in non-democracies, a strong central state can reward and punish local administrations through a merit-based promotion system, which should restrain corruption. But much evidence shows that rampant corruption coexists with powerful central governments. This study resolves this puzzle by incorporating bribes in a tournament model. Our model predicts that when bribes are more important than performance in superiors' total gain, or if there is a lack of serious punishments for wrong-doing, or an increase in promotion gain, promotion can incentivize corruption. Using a fuzzy regression discontinuity design exploiting exogenous variations in officials' likelihood of promotion from a mandatory age cutoff for bureaucratic promotion in China, combined with a unique biographical database of prefecture party secretaries and novel measures of corruption, we find that promotions encourage corruption in China. Moreover, prefecture party secretaries are more corrupt if their provincial superiors are connected to central factions, suggesting that upper-level factionalism is one of the disincentives that breaks down lower-level meritocracy.

Keywords: corruption, promotion, bribe, meritocracy, factionalism.

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1 Introduction

Conventional wisdom holds that a powerful central state in non-democracies reward and punish local administrations through a merit-based promotion system (Shleifer and Vishny 1993; Frye and Shleifer 1997; Blanchard and Shleifer 2001; Li and Zhou 2005). This system creates yardstick competitions for promotion based on precincts' economic performance, which should incentivize officials to restrain corruption because corruption harms economic performance.[1] However, anecdotal evidence around the world paints a different picture regarding promotion and corruption. In fact, massive corruption is deeply entrenched in countries with a powerful central government (e.g., Fujimori's Peru, Suharto's Indonesia, and post-Mao China) despite that those countries all have delicate promotion systems in place to build their bureaucracies (e.g., McMillan and Zoido 2004; Zhu 2008). If the promotion systems in those countries are indeed merit-based, why should we observe such rampant corruption?

Classic theory of merit-based promotion fails to capture the positive relationship between corruption and promotion in non-democracies since it assumes a benevolent superior who promotes better-performed subordinates who can foster local economic growth(e.g., Blanchard and Shleifer 2001). This assumption, however, does not always hold. In the real world, especially in non-democracies, decisions on lower-level promotions often rest with *self-interested superiors (i.e., mid-level officials)* who take on bribes. Without bribes, promotion curbs corruption to boost performance for promotion. With bribing opportunities, in contrast, lower-level officials can be incentivized to corrupt in order to pay bribes for promotion. That is, we would observe higher levels of corruption if an official is in a promotion scheme than if she's not. Incentivized corruption is possible when superiors' stake in subordinates' performance is small, when bribing is not seriously punished, or when there's a substantial gain on the upper level job. In this paper, We first formalize these arguments using a promotion tournament model with bribing opportunities to capture the positive relationship between corruption and promotion as well as specifying the conditions under

[1] Although corruption could be efficiency enhancing under weak market institutions (e.g., Lui 1985), scholars find that the first-best equilibrium is no corruption (Fisman and Svensson 2007).

which incentivized corruptions are possible (detailed in Online Appendix A).

We then apply our theory to the context of Chinese bureaucracy. Chinese government is currently the largest hierarchical bureaucracy in the world, with over 50 million employees at the local level in 2009. Although the Chinese government has been acclaimed for being a "helping hand" behind China's economic success (Frye and Shleifer 1997), its upper-level administration (i.e., provincial level and higher) is notorious for elite struggles and factionalism (Nathan 1973; Shih, Adolph and Liu 2012). With factionalism, the superior's own political career depends more on the survival of upper-level leaders rather than on subordinates' performance (Nathan 1973; Quinlivan 1999). Moreover, at least before Xi Jinping's presidency, Chinese government has been criticized for the lack of serious punishments for government wrongdoings (Manion 2004). The recent corruption scandals in China also reveal tremendous corruption potential on upper level jobs. For example, the former Chairwomen of the People's Political Consultative Conference in Heilongjiang, Han Guizhi, confessed to receive bribes amounts to more than 9.5 million RMB ($\approx$ 1.5 million USD) (Chen, Jin and Xu 2019). Due to factional politics, lack of punishment for corruption, and lucrative corruption potentials at upper level jobs, Chinese bureaucracy is hardly merit-based and incentivized corruption is very likely as predicted by our model.

To test our hypothesis, we construct a unique and comprehensive biographical database that consists of 903 prefecture party secretaries (the de facto prefecture leaders) from 2000 to 2010.[2] Using a novel measure of corruption, the area of land sold through negotiation,[3] we identify a causal effect of promotions in incentivizing corruption using a fuzzy regression discontinuity design based on an implicit age limit for promoting public officials. The age limit mandates that officials whose ages are below the cutoff when they start their posts as prefecture party secretaries are more likely to be in a promotion regime while those above the age cutoff are more likely to be in a non-promotion regime. According to our theory, those who are below the age cutoff have

[2]We exclude party secretaries after 2010 because on October 18, 2010 Vice-President Xi Jinping was given a new job as the vice-chairman of China's Central Military Commission, a position for leaders-in-waiting.It is well-known that cadre promotions in Xi's era have experienced some chaos, especially during the power transition (e.g., Shirk 2018).

[3]The negotiated land sales are between local officials and land developers in each prefecture. This type of land transaction is widely known for back door deals and grey incomes for the local officials (Chen and Kung 2018).

stronger promotion incentives to corrupt than those whose ages are above the cutoff. Indeed, we find that corruption levels are higher for otherwise identical officials with stronger promotion incentives. we also find that promotion incentives have a negative but insignificant effect on officials' performance as measured by their precincts' GDP – one of the most important criteria for evaluating Chinese local leaders' performance. These findings support our argument and cast doubts on the conventional wisdom that cadre promotions in China are merit-based, at least at the prefecture level.

Our theory suggests that factionalism can erode merit-based promotion since it makes superiors' stake in subordinates' performance small[4]. If this is the case, promotion should incentivize more corruption among lower-level officials who report to superiors with connections to central factions than those who report to unconnected superiors. To test this mechanism, we use an indicator for superiors' political connection to test whether these connections increase the effect of promotions on corruption. we find that promotions are associated with higher levels of corruption when prefecture party secretaries report to politically-connected provincial leaders.

This paper identifies a new source of corruption in non-democracies: promotion incentives in bureaucracies. As Gibbons and Waldman (1999) point out, wage and promotion are the two most important incentive mechanisms for agency control inside hierarchical organizations. While the literature on bureaucratic corruption largely focuses on wages, monitoring, and decentralization (Aidt 2003; Olken 2007; Fan, Lin and Treisman 2009), we know less about how promotions influence bureaucratic corruption.[5] Our study fills this gap by highlighting the conditions under which promotions encourage/discourage bureaucratic corruption.

The literature of political selection in dictatorships mainly focus on the tradeoff between competence and loyalty (e.g., Egorov and Sonin 2011; Zakharov 2016). Previous studies of politi-

[4]Our theory predicts that as long as the superior's stake in subordinates' performance is smaller than that in bribes, promotion should incentivize corruption. Factionalism is just one plausible mechanism to satisfy this condition. Other factors may meet this condition as well but those are difficult to observe and test empirically

[5]Literature on Weberian meritocracy addresses the relationship between promotion and corruption (Evans, Haggard and Kaufman 1993; Rauch and Evans 2000) and argues that internal promotions sustain a stable, closed bureaucracy and secure careers for bureaucrats to pursue long-term rewards rather than short-term corrupt gains. Promotion incentive itself is not their focus.

cal selection in China also link promotions to officials' economic performance and factional ties (Nathan 1973; Maskin, Qian and Xu 2000; Shih, Adolph and Liu 2012; Meyer, Shih and Lee 2016; Landry, Lü and Duan 2018). This paper adds to this literature by exploring *the role of corruption* in political selection. Our theory predicts that officials may collect corruption revenues to bribe their way to higher-level offices (i.e., office buying) and we find systematic evidence to support this argument. In addition, our theory links factional politics with bureaucratic meritocracy by showing that upper-level factionalism can compromise lower-level meritocracy and lead to widespread corruption.

This paper provides a plausible explanation for why factionalism is often related to corruption. Factions are vertically organized patron-client networks linked by personal connections (Dittmer 1995; Nathan 1973); and factional patrons provide office positions to clients in exchange for political supports (Wedeman 2004). Factional selection of prefecture-level officials may be bribery-based in China insofar as prefecture-level officials may have to bribe provincial-level superiors to join the superiors' factions to obtain promotion. Bribe exchange is highly secret and exclusive, but it can be facilitated by equally secret and exclusive factional networks. As our theory suggests, promotions in this circumstance incentivize prefecture-level officials to raise corruption revenue to bribe superiors. This prediction is supported by the evidence that promotion incentives of prefecture-level officials causally affect corruption behaviors.[6] Our finding that promotions are associated with higher levels of corruption when prefecture party secretaries report to politically-connected provincial leaders is also consistent with this bribe-based factional selection argument. Thus, our theory explains why dictatorships, especially personalist dictatorships, are often victims of rampant corruption if they emphasize loyalty more than competence in political selection.

This paper also contributes to a large body of literature on corruption in China (e.g., Guo 2008; Lü 2000; Manion 2004; White 1996; Chen, Jin and Xu 2019). In particular, several descriptive studies have suggested a link between promotion and corruption in China. For example, Sun

[6]If lower-level factions are formed purely through loyalty ties such as families, friends, and relatives, then promotions should not causally influence corruption, though there might be a spurious correlation between promotion and corruption because faction patrons may tolerate lower-level clients' corruption as long as they provide political support to the faction.

(2004) documents the office-selling phenomenon in Chinese bureaucracy (i.e., selling government positions to bribing individuals) and argues that "promotion while engaging in corruption" stems from the Chinese Communist Party's (CCP) inability to screen out corrupt candidates. Guo (2008) finds that a high proportion of corrupt public officials were promoted between the time when a public official commits fraud for the first time and the time when his corruption is discovered. He attributes this phenomenon to the CCP's ineffective performance evaluation and audition. Unlike previous studies, our theory and findings suggest that promotion and corruption go hand-in-hand not only because the lack of effective screening, but also because promotions *incentivize* bureaucratic corruption.

The outline of the paper is the following. Section 2 develops a theory of promotion-incentivized corruption. Section 3 fits the model to the Chinese context. Section 4 describes measures and empirical strategies. Section 5 presents the data. And the empirical results are presented in Section 6. Section 7 concludes.

2 The Theory of Promotion-Incentivized Corruption

Corruption is the abuse of public office for private gains (Rose-Ackerman 1999). This paper focuses on bureaucratic corruption, which means government officials exploit administrative power to further personal interests through bribery, embezzlement, extortion, and fraud. Corruption is harmful to the economy as it misallocates resources, lowers investment, distorts the market, and deters firm entry (e.g., Fisman and Svensson 2007).

The literature on institution and corruption mainly emphasizes two factors that potentially restrain corruption: 1) government accountability; and 2) state strength in regulating local administrations. The government accountability argument holds in democracies, where party competition, elections, information transparency, and freedom of speech enable citizens and interests group to hold public officials accountable for unethical behaviors (Ferraz and Finan 2008; Olken 2007). In the absence of democratic institutions, however, scholars argue that state strength facilitates central leaders' ability to control lower-level officials, which, in turn, could reduce corruption (Blanchard

and Shleifer 2001; Frye and Shleifer 1997; Shleifer and Vishny 1993).

The state strength argument relies on a crucial assumption that there exists a benevolent superior (e.g., a central leadership) who makes promotion decisions solely based on subordinates' performance (Blanchard and Shleifer 2001). As corruption undermines performance, a merit-based promotion tournament would regulate subordinates' behaviors (Li and Zhou 2005; Maskin, Qian and Xu 2000; Qian and Xu 1993). This argument is theoretically compelling but assumes a benevolent superior. Our theory relaxes this assumption to explain how corruption can prevail in non-democracies with strong central states.

In the real world, especially in non-democracies, superiors who control promotions are often not benevolent or pro-growth. First, regime leaders could be corrupt too. Famous corruption cases such as Indonesia's Suharto, Philippine's Marcos, and more recently China's Zhou Yongkang and Xu Caihou suggest that a county's central leadership is not immune to corruption. Second, insecure regime leaders may promote loyal but incompetent followers for survival, even at a cost of lower economic growth (Egorov and Sonin 2011; Zakharov 2016). Third, even if a regime leader is benevolent, only in rare cases is she directly responsible for evaluating and promoting local officials. The regime leader needs to delegate power to mid-level officials — the immediate superiors to local officials — to manage promotions. Since those immediate "superiors" are self-interested, they may take bribes.

Allowing bribes in the promotion tournament, we argue that promotions, under some circumstances, incentivize corruption instead of curbing it. In a hierarchical administration, superiors may benefit from subordinates' performance, i.e., superiors' career advancements, political achievements, or some monetary rewards may rely on how well subordinates perform in their precincts. For example, a technocrat may rely on subordinates' economic performance as a signal of her own competence for promotion. However, many factors could reduce superiors' reliance on subordinates' performance. For instance, a faction-connected superior may be promoted on the basis of loyalty payment (i.e., bribes) or political support instead of economic performance. When superiors have a low stake in lower-level performance, subordinates respond by care less about

performance and focus on bribe payment.

If the superiors benefit less from lower-level officials' performance, they will focus on soliciting bribes, especially when the risk of bribe-taking is low since institutional checks, media watchdogs, and free speech are largely absent in non-democracies. Furthermore, when the upper level job has great potentials for grey income, subordinates may also have a strong incentive to bribe to promotion. Under these circumstances, promotions incentivize subordinates' corruption.

A Formal Model

Let's consider a single period tournament model with bribery. For simplicity, we assume that subordinates' alternative choice of jobs generates zero utility. Thus, any subordinate should participate in the tournament as long as she gains a positive utility from it.

Subordinates are hired into the lower level position. They compete on the lower level for one period and the winner will be promoted to the upper level position. Subordinates' performance outcomes are denoted as $y_i = \theta - c_i + \epsilon_i$, where c_i denotes subordinates' corruption levels.

Let w denote the wage. Without promotion, subordinate i simply chooses c_i to maximize her expected utility and the optimal corruption, c^*_{np}, solves the following

$$0 = g'(c^*_{np})\phi(c^*_{np}) + g(c^*_{np})\phi'(c^*_{np}), \tag{1}$$

With promotion, subordinates are not only competing on performance ground but also on bribes. Without lose of generality, we assume that β share of subordinates' corruption revenue will be used to pay for bribes and α share of subordinates' performance outcome will go to the superior. Note that represents how important subordinates' performance is to the superior's payoffs. These payoffs can be monetary gains as well as political gains. In a bureaucracy where promotions rely on factionalism or nepotism rather than performance, α can be treated as going to zero. Also, suppose the bribing behavior will be caught with probability $(1 - p)$. The superior's expected

income is therefore

$$E(income) = \sum_i E(Y_i) = \sum_i [p\beta c_i + \alpha(\theta - c_i)], i = 1, 2, \tag{2}$$

where Y_i denotes subordinate i's gross tribute of bribe and performance outcome, i.e., $Y_i = p\beta c_i + \alpha y_i(c_i)$.

Let w denote the wage for non-promoted individuals and R denote the additional wage that a subordinate can obtain upon promotion. The wage rate can be considered fixed to the job levels, which is the same as the wage in the non-promotion regime. The wage spread R represents all the additional earning potentials (legal or illegal) in the upper level position such as wage increment, benefits, political achievement, and/or corrupt gains. Similar to the non-promotion regime, subordinates can obtain corruption gains with probability $\phi(c_i)$.Thus, the expected payoff to a subordinate participating in the tournament is $w + E(R) + g[(1-\beta)c_i]\phi(c_i)$.

Given the posted wage w and spread R, the corruption pair (c_1^*, c_2^*) maximizes subordinate i's expected payoff. That is, c_{bp}^* must solve

$$(1 - \frac{p\beta}{\alpha})R \cdot \int_{\epsilon_j} f(\epsilon_j)^2 d\epsilon_j = (1-\beta)g'[(1-\beta)c_{bp}^*]\phi(c_{bp}^*) + g[(1-\beta)c_{bp}^*]\phi'(c_{bp}^*). \tag{3}$$

As shown in Appendix A, When performance is relatively less important than bribe to the superior's total gain, i.e., $1 - \frac{p\beta}{\alpha} < 0$, the corruption level is higher in the bribing tournament, i.e., $c_{bp}^* > c_{np}^*$ (Proposition 1). We summarize the model's implications in the following hypotheses:

H1:In a non-democratic environment, if mid-level officials' relative stake in lower-level performance is sufficiently low, the corruption level under promotion is higher than than without promotion, i.e., promotion incentivizes corruption.

Factionalism and Promotion-Incentivized Corruption

As discussed above, if mid-level officials' relative stake in lower-level performance is sufficiently low such that $p\beta/\alpha > 1$, promotion incentivizes corruption. Several factors affects α. For

example, a superior may have little incentive for further promotion because she can reap sufficient monetary revenues from her current position. Thus, her gains from subordinates' performance are relatively unimportant, which can result in a small α (and thus a large $p\beta/\alpha$). More importantly, superiors may care little about lower level performance if their own career advancements depend on faction ties instead of subordinates' performance.

Factionalism is common in non-democracies. As Haber (2006) points out, authoritarian leaders are inherently insecure. They must rely on a ruling coalition to take power and govern the people. Since there is no independent third-party to enforce a "power-sharing" agreement between the leaders and the ruling coalition, they are prone to coups d'ètat or elite-splitting (Svolik 2012). Authoritarian leaders have developed various techniques to minimize the probability of displacement (Quinlivan 1999). An important technique is to select loyalists to their power circle for politic support. Mid-level officials – the superiors of local officials – are central leaders' immediate targets for political support. Thus, when those mid-level officials' own career advancement is faction-based instead of performance-based, they care less about lower-level officials' performance (i.e.,α is small). This logic suggests that a superior with a factional connection to a higher-level superior is more likely to incentivize lower-level corruption (Corollary 1).

In addition, top factional leaders may protect corrupt mid-level officials as long as they provide political support. Such protection reduces the probability of being caught in bribe-taking $1-p$. As a result, bribes from lower-level officials become even more attractive to those mid-level officials (Proposition 2).

Given this logic, we expect subordinates to be more corrupt if they have a politically connected superior. This argument entails the following testable implication:

H2: The effect of promotion on corruption increases conditional on superiors' factional connections.

Note that factionalism is not the only disincentive that breaks down merit-based promotions, nor is it the only mechanism that reduces α – the superior's stake in subordinates' performance. Thus, the relationship between promotions and corruption is not *deterministic* conditional on po-

litical connections. That is, without political connections, we shall still observe a positive effect of promotions on corruption if other disincentives work.[7]

3 Promotion and Corruption in the Chinese Context

In this section, we contextualize the theoretical framework with promotion and corruption practices in China. China's multilevel government is well-suited to examine the promotion-incentivized corruption theory. The Chinese government incorporates nearly fifty thousand townships nested in counties/districts (2862), cities/prefectures (333), and provinces/municipalities (34) under the central government. This multilevel hierarchy consists of fifteen administrative ranks (there are multiple ranks at each level) with about 53.9 million local officials. Few personnel decisions are made directly by the central leadership. Decisions on official promotions rest with mid-level authorities whose power is not sufficiently constrained by the central government (Ren and Du 2008; Whiting 2004), which creates opportunities for office buying and selling.

China's economic reform in the late 1970s further changed mid-level officials' (i.e., superiors) incentives for moving up the administrative ladder. Before the reform, the highly centralized planning economy along with the nomenklatura appointment system forced officials to obey the rules set by the central government, because most of the resources were allocated top-down through a planning system. The economic reform in the late 1970s marked a turning point. Although the central government still holds strong or even stronger personnel power through the nomenklatura system (Edin 2003), economic power is decentralized, along with most of the material resources (Zhan 2009). The localized monetary incentives create many opportunities for misconducts by mid-level and lower-level officials (Gong 2006; White 1996). Economic decentralization not only allows lower-level officials to obtain corruption revenues from local economies but also reduces their superiors' (mid-level officials) stake in merit-based promotions because bribes from lower levels become more attractive. In addition, given the hierarchical structure of Chinese bureaucracy, one rung higher in the hierarchy entails significantly more power and resources. This makes

[7] We examine factionalism because those are measurable, whereas other disincentives such as the probability of being caught bribing, the noises in the performance evaluation, or the wage spread are hard to observe.

the upper level jobs very lucrative and creates strong promotion incentives.

On the other hand, the punishment for wrongdoing in the Chinese bureaucracy is weak, at least before Xi Jinping's presidency. As Manion (2004) demonstrates, anti-corruption efforts in mainland China were superficial because of the "unclear authority and responsibility of anti-corruption agencies that are tangled with party and government bodies at each level, the political-economic institutions that provide incentives for corrupt practices, and the fundamental misconstruction of rule of law and trivialization of civil liberties". Bureaucratic control of corruption was so ineffective that Manion (2004) calls in the system "corruption by design".

In addition, factionalism has always been paramount in Chinese politics, especially at upper levels. As Dittmer (1995) point out, factionalism was especially salient when Mao Zedong was in command, and it remained salient under Deng Xiaoping despite attempts to minimize its impact. Recently, scholars find that factionalism is still one of the key determinants of political selection for Chinese officials at the provincial and above levels (Landry, Lü and Duan 2018; Meyer, Shih and Lee 2016; Shih, Adolph and Liu 2012). The importance of factionalism for provincial officials' promotion further reduces those officials' interests in promoting lower-level performance.

Self-interested, powerful mid-level officials and a decentralized economy combined with insufficient punishment, large corruption potentials upon promotion, and factional politics at the upper level together create distortions in the promotion race among lower-level officials. In the following section, we use a fuzzy Regression Discontinuity Design to document the promotion-incentivized corruption in China.

4 Measures and Empirical Strategies

Land Sale as a Measure of Corruption

The key measure of corruption is the area of land sold through negotiation in each prefecture. This measure captures corruption conducted by local leaders. Due to the legacy of Communism, land in China belongs to the local governments. The current land regulations stipulate that land-sale

income should be managed as local budgetary revenue, which is very difficult for local officials to embezzle after transactions end. However, local officials have opportunities to solicit illegal gains during the process of land transactions.

Land sales in China are well known for the "dual market" model (Xu, Yeh and Wu 2009): sales by bidding, auction, and quotation versus sales through negotiation. Bidding, auction, and quotation are transparent, open-market transactions so that soliciting illegal payments is difficult. However, during negotiated sales, local officials and developers discuss the quantity, price, and other details of transactions in private. Given the secret nature of negotiations, local officials have plenty of opportunity to seek personal gains (Xu, Yeh and Wu 2009; Chen and Kung 2016, 2018). Although the Central Government keeps tightening its hand on land sales through negotiation, the regulations are unsuccessful, and negotiation sales are still a common practice among local governments. For example, data from the Ministry of Land and Resource (2006) reveals that the area of land sold through negotiation constitutes of more than 70 percent of the total area in land transactions in 2003 and 2004, but revenues from this type of sales are less than 50 percent of total land revenues.

It is commonly recognized among scholars that land sales by negotiation generate rents and create opportunities for corruption (Xu, Yeh and Wu 2009). The CCP People's Procuratorate Daily News also noted that "among all the land transaction methods, negotiation is the one with the greatest opportunity for corruption." There are numerous land-related corruption cases. For example, in the notorious "Mu Ma Corruption Case" in Shenyang City, Liaoning Province, Mu Suixin, the then vice party secretary, and Ma Xiangdong, the then vice mayor, could give any amount of land for free to whomever they wanted. For just one case, they freely transferred 350 million RMB (Roughly 59 Million USD) worth of land to Liu Yong, a businessman and land developer in Shenyang. In return, Liu gave Mu and Ma kickbacks.

Chen and Kung (2016) provide evidence that land revenue may be used by local leaders to bribe their way to promotions. They find that land revenue has an additional effect for local leaders with political connections in securing promotions. And this additional effect decreases for local

officials who served in the regions where corruption crackdown on higher-level officials occurred. Chen and Kung (2018) further find that provincial party secretaries who provided discounted land to firms linked to members of CCP Politburo are more likely to be promoted to positions of national leadership in China.

This evidence suggests that the area of land sale through negotiation is a good proxy for local corruption. More importantly, this measure directly measures corruption by local leaders instead of street-level bureaucrats, because land transactions are highly centralized and have to be formally approved by the People's Government in each prefecture.[8] That is, prefecture leaders – party secretaries and mayors – hold the final responsibility for land sale approvals, as illustrated in the "Mu Ma" corruption case.[9]

A Fuzzy RD Design for the Main Effect

Our theory predicts that, promotions should incentivize local officials' corruption in China (H1). To establish this causal link, we are interested in estimating β in the following equation:

$$C_{ij} = \mu + \beta P_{ij} + f(Age_i) + X_i\Delta + M_j\Psi + \epsilon_{ij}, \tag{4}$$

where C_{ij} denotes the level of corruption during official i's term in prefecture j. P_{ij} denotes the official's promotion status after she finished her term in prefecture j. X_i is a set of baseline individual characteristics. M_j is a set of prefecture-level characteristics. Estimating equation (1) using OLS yields inconsistent estimates of β because unobserved individual and prefecture characteristics could affect both promotion and corruption. A prefectural party secretary's promotion is shaped by individual characteristics, the performance of the prefecture she is governing, and the prospects of the official, each of which may not be entirely captured in X_i and M_j and might also affect C_{ij}. For example, an official's charisma might affect her chance of promotion and corruption behaviors at the same time. Given that it is not possible to fully control for such factors, the

[8] Notice of the Ministry of Land and Resources on Issuing the Rules on the Assignment of State-owned Land Use Right by Bidding, Auction and Quotation (for Trial Implementation) and the Rules on the Assignment of State-owned Land Use Right by Agreement (For Trial Implementation), 2006.

[9] See Appendix B.1 for more details on this measure.

error term ϵ_{ij} will be correlated with the treatment P_{ij}, which in turn will bias the estimate of β. In addition, there may be reverse causality if corruption influences promotion instead of the other way around.

To address the potential endogeneity problem and omitted variable biases, we implement a fuzzy Regression Discontinuity (fuzzy RD) Design that exploits an implicit age cutoff for promoting government officials.

In China, age is a major consideration in cadre appointments. The cadre rejuvenation program, promoted by Deng Xiaoping in the late 1970s, made age one of the most important criteria for cadre retirement (Manion 1993; Zhong 2003). According to this rule, officials at vice-provincial and below levels (e.g., prefecture, county) must retire from their positions when they reach age 60.[10] More importantly, there is a common unwritten rule that the maximum age for promotion to the vice-provincial level is 55.[11] In other words, prefecture-level officials older than 55 will not be promoted to the vice-provincial level and their appointments are terminal at prefecture-level by default. This age limit thus creates a "glass ceiling" effect for local officials (Kostka and Yu 2015). Table 1 shows the age ceilings for major promotions along the administrative ladder.[12]

Table 1: Age Ceilings for Major Promotions

Position	Ranking	Age Ceiling
Vice-Provincial Level (副部级)	9-10	55
Vice-Prefecture Level (副厅级)	13-14	45
Vice-County Level (副处级)	17-18	35

Source: Fujian Daily, Reproduced by China Econoour.cn

Since prefecture party secretaries' term length is 3.5 years on average,[13] if a party secretary is

[10] See also the Rule for the Retirement Ages of Party and Government Officials. Link: http://shebao.southmoney.com/yanglao/zhengce/201409/45277.html.

[11] How Much Does Age Affect Cadre Promotion? reproduced by Phoenix New Media, Link: http://wemedia.ifeng.com/40001457/wemedia.shtml. Another example is this article: "Chinese Cadres' Administrative Rankings, Retire Ages, and Promotion Age Limits", Link: http://wenku.baidu.com/view/847128df7f1922791688e874.html. In addition, the average age for vice-provincial officials is 54. See, for example, Cadre Promotion: Unbreakable Age Ceilings, 163.com. Link: http://data.163.com/14/0829/08/A4Q8LAG800014MTN.html

[12] Interpreting Public Servants' Promotions: Political Careers Terminate after 35 Years Old for Officials below County Level. Fujian Daily, Reproduced by China Economy.cn. Link: http://www.ce.cn/macro/more/201306/16/t20130616_24482807.shtml.

[13] Eaton and Kostka (2014) find that the average tenure length of prefecture party secretaries is about 3.7 years, but

older than 51.5 when she begins her term, she is less likely to be promoted after the term. This age cutoff imposes an exogenous variation on prefecture party secretaries' promotion *incentives* – officials below the 51.5 cutoff age are eligible for promotions whereas officials above the cutoff age are less or not likely to be promoted in future, which creates different incentives. we thus use 51.5 years old as a cutoff age to assign the treatment status. Officials younger than 51.5 belong to the treatment group – the group of officials with promotion incentives, whereas officials older than 51.5 belong to the control group – the group of officials who lack promotion incentives. we then use this age discontinuity as an instrument for actual promotions to predict corruption, which is a fuzzy regression discontinuity design:[14]

$$P_{ij} = \alpha + \rho Agedumour_i + f(Age_i) + X_i\Gamma + M_j\Theta + \eta_{ij}, \tag{5}$$

$$C_{ij} = \mu + \beta P_{ij} + f(Age_i) + X_i\Delta + M_j\Psi + \epsilon_{ij}, \tag{6}$$

where variable $Agedummy_i$ is an indicator that is equal to 1 if the party secretary i is younger than 51.5 at her first year on the post and 0 otherwise. The forcing variable Age_i denotes the age of party secretary i at her first year on the post. Because the treatment assignment is based on individual secretaries' age, we average the prefecture-year units by individual party secretaries' years in office. Thus, the unit of analysis is individual party secretaries. we use a linear form for the control function f.[15] By using this fuzzy RD setup, the second stage (equation 3) coefficient β will be a consistent estimator of the causal effect of promotion on corruption.[16]

their sample includes those secretaries who held a second term on the same position. Perhaps the most comprehensive data on prefecture party secretaries' tenure length is from Landry, Lü and Duan (2018). They collected all prefecture party secretaries from 1999 – 2007 and document an average length of 3.49 years. In our sample of 593 party secretaries who did not hold two terms on their position, the average length is 3.59 years.

[14]Another way to interpret this fuzzy RD design is that promotion is an expected-value (i.e., probabilistic) function instead of a deterministic function of age cutoff: there is no guarantee that an official will have a promotion if her age is below the cutoff, and in some cases, officials might still get a promotion if their ages are above the cutoff.

[15]we use a variety of specifications for the control function f, though our preferred specification uses the linear form given that the sample size is relatively small (648 observations) which might not be enough to fit polynomial specifications accurately. The linear function form makes sense in the context since the older a secretary is, the less likely she will be considered promotion in general.

[16]Note that consistency is a property of the estimator. we use consistency instead of unbiasedness as a criterion for estimation because it is relatively rare for an estimator to be unbiased and the property of unbiasedness does not imply that more information is better than less regarding estimation of parameters. The property of consistency improves on unbiasedness in both of these directions (Greene 2011).

In theory, with an RD design we would not have to include any other covariates. we include covariates X_i and $M_j$for two reasons. First, there may be potential factors that may compromise the validity of the fuzzy RD. If the fuzzy RD design is valid, the inclusion of these covariates should not affect the consistency of the estimator of β_1 (Lee and Lemieux 2010). Second, we could obtain more statistical power when we control for the covariates, in case that the measure of corruption might be noisy.[17]

Accessing Sorting and Weak Instrument Problems

The fuzzy regression discontinuity design relies on a critical assumption that the assignment to treatment is not *entirely* manipulable within a neighborhood of the cutoff point.[18] Unless officials can *precisely* sort themselves below or above the cutoff age when they start their posts, the RDD identifies an exogenous treatment effect.

In Chinese bureaucracy, it is almost impossible for officials to sort themselves around the cutoff age precisely. For example, as Lü and Landry (2014) find, slot constraints at the mid-level government unit are very common in cadre promotions. Anecdotal evidence suggests that lower-level officials often complained that mid-level officials do not want to retire so that there are no openings for them. Consider a 48-year-old official who is waiting for promotion to a prefecture party secretary post. If there is an opening, she shall be promoted before 51.5 years old. However, if there is no opening, she might be well beyond 51.5 before she becomes a party secretary. And whether she will get a promotion before or after 51.5 years old is not perfectly controlled by this individual. Thus, uncertainties along the promotion ladder make the 51.5 age cutoff a plausible randomization device.

In addition, we formally test the validity of this cutoff strategy. First, we investigate whether party secretaries can manipulate their ages precisely around the cutoff age using the density function test developed by McCrary (2008). If there is manipulation in officials' age, we should observe a discontinuity in the age distribution at the cutoff. The result shows that the density function of age

[17] we also estimate specifications without controls, the coefficients are similar and statistically significant. See Appendix Table B.7 for details.

[18] See Lee (2008)'s discussion on vote share as a randomization device for RD design.

does not have any significant discontinuity at the cutoff, indicating no evidence of manipulation (Figure 1).

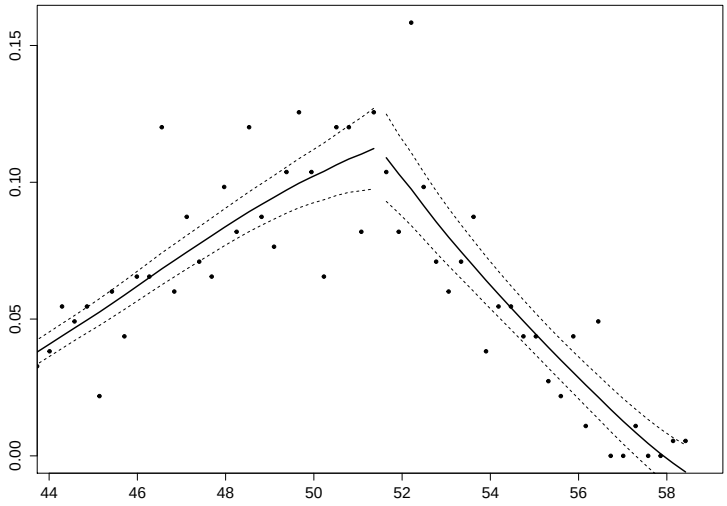

Figure 1: McCrary Sorting Test, P = 0.943

Second, we conduct a series of balance tests to see if the pre-treatment covariates at the cut-off point have any discontinuity (Lee and Lemieux 2010). The results show that youth league experience, office experience, ethnicity, education level, and gender are all similar between the treatment and control groups (Online Appendices: Figure B.3). In addition, the share of secondary industry, the percentage of construction land in the total area of the prefecture, local government budget, GDP per capita and population are also similar between the treatment and control groups (Online Appendices: Figure B.4). Statistical analyses found no significant differences in those covariates between two groups. These results further suggest that the assignment by cutoff age is as-if random.

Since the Fuzzy RD is basically an instrumental variable version of RD, we further conduct tests to address under-identification and weak instrument concerns. In the first-stage regression results, the Kleibergen–Paap under-identification LM test rejects its null hypotheses at $p = 0.01$ level, suggesting that the instrument – age dumour – is adequate to identify the equation. The Kleibergen–Paap Wald test for weak instruments has an F statistic that equals 9.1, slightly smaller than the rule-of-thumb value 10. However, the weak-instrument robust inference based on An-

derson–Rubin Wald test and Stock–Wright LM test reject their null hypothesis at $p = 0.01$ level, which suggests that the weak instrument problem is not likely a concern.

Mechanism Testing: Factionalism

Our model predicts that factionalism is one of the mechanisms that could break down merit-based promotions and encourages corruption among the subordinates (H2). To test this hypothesis, we interact provincial-level leaders (i.e.,superiors)' political connections over time with prefecture leader (i.e., subordinates)'s promotion. Since the provincial leader may change (as well as their political connections) during the prefecture leaders' reign, we use the original prefecture-year panel for this analysis. In addition, the effect of political connections cannot be causally identified since provincial-level officials' connections are not exogenous. Thus, we resort to a panel data model instead of the Fuzzy RD model. The specification is the following:

$$C_{jt} = \gamma_0 + \gamma_1 P_{ij} + \gamma_2 G_{gt} + \gamma_3 P_{ij} G_{gt} + X_i \Lambda + M_j \Sigma + \upsilon_{ijgt}, \tag{7}$$

where C_{jt} indicates the corruption level of prefecture j at year t, P_{ij} indicates official i's promotion status, G_{gt} is a dummy variable with value 1 indicating that the provincial leader is connected to central factions at time t, and 0 otherwise. The Panel Data estimate γ_3 is the coefficient of interest that reflects how promotion is associated with corruption conditional on mid-level official's political connection status. we expect γ_3 to be positive and statistically significant.

5 Data

We constructed an original panel dataset that links measures of local corruption with political appointments for all the prefecture party secretaries in China's 332 prefectures from 2000 to 2010. We focus on the prefecture level because the land sale data is only available at that level, and prefectures are the immediate subordinates to provinces where scholars have found salient faction-based promotions (Shih, Adolph and Liu 2012; Landry, Lü and Duan 2018). Because the variable of interest – promotion incentives – is assigned using party secretaries' age, we use individual sec-

retaries as the unit of analysis and take averages of the prefecture characteristics and the corruption measure during each party secretary's reign. Due to missing data on land sales for some random cities in random years, the averaged database contains 648 party secretaries. (See Table B.1 in the Online Appendices for summary statistics.)

Data on Corruption

The key measure of corruption, the area of land sold through negotiation in each prefecture, is obtained from the Land and Resource Statistical Yearbooks from 2000 to 2010. Additional measures of corruption are aggregated from the World Bank's Enterprise Survey (WBES) in 2005. See Online Appendix B.2 for more details regarding alternative corruption measures.

Data on Promotion

Prefecture party secretaries' career information was collected from several sources. First, we used local government websites and provincial yearbooks to identify the names of party secretaries. we then collected their bibliographies to identify their political appointments after leaving the current post. we collected a full sample of 903 party secretaries from 2000 to 2010 (a total of 3,270 secretary-year observations). we then coded a dummy variable, *Promotion*, which equals 1 if the official was promoted from the prefecture-level to vice-provincial or provincial level, and 0 otherwise. Note that those who were laterally moved and retired are coded into the non-promoted category. In total, about 33 percent of prefecture party secretaries were promoted to higher level positions.

The fuzzy RD design uses officials' age for treatment assignment. The variable, *Age*, indicates an official's age when starting the party secretary post. In our sample, the average age is 49.57. The instrumental variable for the fuzzy RD specification, *Age Cutoff Dummy*, is equal to 1 if the official is younger than 51.5 years when she took the post and 0 otherwise. In our sample, roughly 72 percent of party secretaries were below the cut-off age when they started their posts.

Data on Provincial Leaders' Faction Connections

The political connection status of provincial party secretaries – the immediate superiors of prefectural party secretaries – is coded based on the "Connected China" database,[19] following Keller (2016). This database is compiled by a team of journalists from a reputable and reliable news source and is publicly available. we code a provincial party secretary as having factional connections if he or she is associated with current or previous members of Politburo standing committee, the Princelings, or the Communist Youth League, following Shih, Adolph and Liu (2012) and Meyer, Shih and Lee (2016).

Other Control Variables

In our empirical specifications, we control for party secretaries' personal characteristics, such as gender, education, and ethnicity. One may question that factionalism at lower levels may confound promotion and corruption. Although the fuzzy regression discontinuity can solve confounding problem, we further include the Youth League membership and office secretary experience variables to control for potential political connections. It is well-known that past positions in the Youth League help an official's career advancement. A famous example is Hu Jintao, the former leader of China, who served the No.1 Secretary of the Central Youth League. Officials who took important Youth League positions are considered within the Youth League faction (Meyer, Shih and Lee 2016). In addition, serving as a secretary for a higher-level official or working closely with him significantly contribute to the lower-level official's career advancement (Meyer, Shih and Lee 2016). If officials are selected into a fast path for promotion due to political connections, they will be more likely to be placed to the party secretary post before 51.5. Controlling for these variables helps rule out such potential biases.

Prefecture-level covariates include local GDP per capita, the share of the second industry, FDI, population, and government budget. It is possible that prefectures with a fast-growing economy and industry will sell more land for development. Thus, we control for GDP per capita, the share

[19]Fathom Information Design and Thomson Reuters, 2013. Link: https://fathom.info/china/.

of the second industry, FDI, and population to account for local demands for land sales. The availability of land in a prefecture also constrains the amount of land that could be sold on the market. Thus, we include the variable Construction Land – the share of urban construction areas to the total area of a prefecture – to control for land resources in a prefecture. we obtain these variables from the Chinese Prefecture Statistical Yearbook.

6 Results

Promotion-Incentivized Corruption

We implement the Fuzzy RD using a 2SLS specification. To examine whether the particularly chosen bandwidths around the threshold affect the main results, we ran the linear 2SLS with individual and prefecture-level controls for different bandwidths. For example, the ± 3 year bandwidth includes officials who were older than 48.5 and younger than 54.5 years old. Robust standard errors are clustered at the prefecture level to account for serial correlation among secretaries holding the same prefecture office over time.

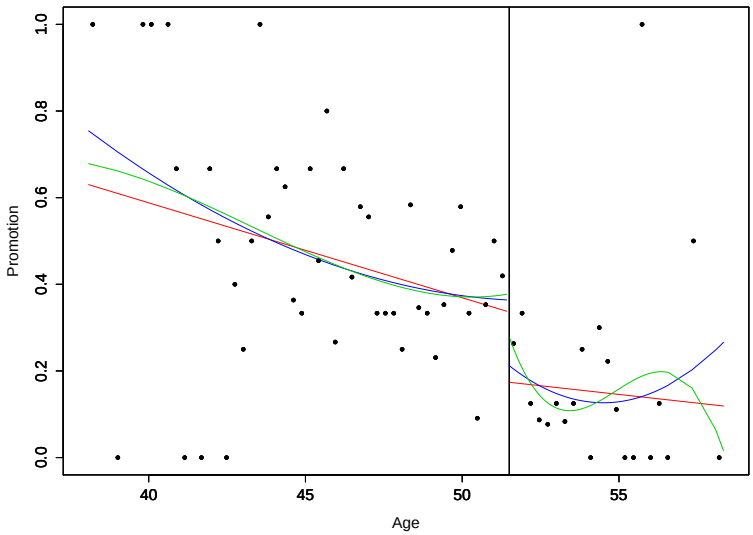

Figure 2: Promotion Probability at the 51.5 years age threshold

Figure 2 plots the effect of age cutoff on promotion with red, blue, and green lines indicating first-order, second-order, and third-order polynomials respectively. There is a clear discontinuity

around the 51.5 age cutoff. Table 2 shows the results from the Fuzzy RD specifications. The coefficients of the age dummy and promotion are consistent across model specifications. Panel 1 in Table 2 reports the first stage results. A party secretary under 51.5 years old will be 15.2 – 19.5 percent more likely to get a promotion. The effects are strongly significant and do not change as the sample size shrinks. These results further suggest that the age cutoff is a valid instrument for promotion incentives and is not subject to weak instrument problem.

Table 2: Linear 2SLS Results for Different Bandwidths

	(1)	(2)	(3)	(4)	(5)
	Full Sample	Optimal BW	±5 years	±4 years	±3 years
Panel 1: First Stage, Age Dumour on Promotion					
Age Dumour	0.167***	0.145**	0.152**	0.195***	0.186**
	(0.0555)	(0.0655)	(0.0676)	(0.0728)	(0.0815)
Age	-0.0194**	-0.0256**	-0.0232*	-0.00724	-0.0106
	(0.00863)	(0.0118)	(0.0134)	(0.0172)	(0.0247)
Indv. Ctrls.	Yes	Yes	Yes	Yes	Yes
Pref. Ctrls.	Yes	Yes	Yes	Yes	Yes
Constant	-0.691	-0.745	-0.989	-1.903*	-1.891
	(0.539)	(0.703)	(0.804)	(1.046)	(1.429)
Panel 2: Second Stage, Promotion on Land Sold Through Negotiation (Log)					
Promotion	2.379**	2.950*	2.968*	2.553*	1.581
	(1.179)	(1.774)	(1.778)	(1.404)	(1.460)
Age	0.0483	0.0831	0.0851	0.0484	-0.0442
	(0.0475)	(0.0890)	(0.0913)	(0.0712)	(0.0965)
Indv. Ctrls.	Yes	Yes	Yes	Yes	Yes
Pref. Ctrls.	Yes	Yes	Yes	Yes	Yes
Constant	-1.983	-1.576	-0.942	0.856	4.904*
	(1.568)	(2.085)	(2.193)	(2.323)	(2.802)
Observations	648	568	512	441	361

Robust standard errors in parentheses, clustered on city
*** p<0.01, ** p<0.05, * p<0.1

Panel 2 in Table 2 shows that an official with promotion incentives sell 5 to 10 times more land area through negotiation, and the effects are statistically signification in model specification using the full sample, and samples with bandwidth ± 5 years and ± 4 years. we also select an optimal bandwidth that minimizes mean-squared-error (MSE). The optimal bandwidth using Imbens' MSE method for bandwidth selection is 6.52 at each side of the cutoff age, which spans from 45 to 58 years old. The results from using the optimal bandwidth remain statistically significant.

Given that there are only 648 observations to fit fuzzy RD models, the results are quite impressive. These results suggest that promotion incentives have a positive effect on bureaucratic corruption as measured by land sales through negotiation. Although the results become insignificant when the bandwidth shrinks to ± 3 years, this is likely due to a loss of statistic power in 2SLS estimation given the largely reduced sample size. Nevertheless, even if the coefficients become insignificant in smaller samples, the signs remain positive.[20]

The above results are from the Fuzzy RD specification using a linear control function $f(Age)$. we also test specifications using quadratic and cubic control functions. The results are consistent with the above results, and the effects are statistically significant in all specifications with different functional forms (Online Appendix B.5).

Our results provide clear evidence that promotions incentivize bureaucratic corruption. This evidence is consistent with our theoretical argument and cannot be explained by other theories. For example, one might be concerned that it is the change of incentive structure from planned economy to market economy and the decentralization of economic power that made local officials corrupt. This argument is certainly true, but if it is the only cause of corruption, then local officials would be corrupt regardless of promotions. That is, promotions would not incentivize them to be more corrupt. Another concern is that a party secretary could have an increased supply of bribes if he has a high incentive for promotion because companies are more likely to bribe "promotable" officials. However, our empirical strategy mitigates this concern because the corruption measure – the area of land sales through negotiation – is determined by officials instead of companies. In other words, local officials are actively seeking corruption opportunities when they determine the amount of land area for negotiation sales.

we use alternative measures of corruption derived from the World Bank Enterprise Survey to further examine the relationship between promotion and corruption. Consistent with the above results, promotion is positively correlated with corruption as measured by the perceived obstacles

[20]The results are robust when we control for additional covariates (Online Appendix B.4). we also use a local linear regression method suggested by Skovron and Titiunik (2015) for the non-parametric estimation of regression discontinuity method. The results are similar to the parametric estimates. See Online Appendix B.6 for details.

from tax administrations and obstacles due to unstable economic and administration policies. The results are statistically significant even if the sample size is only 103. The results are reported and discussed in Online Appendix B.7. we also examine whether promotions increase officials' economic performance using measures of local economic development, and find insignificant results (Online Appendix B.8).

Mechanism: Superiors' Political Connections

One mechanism of promotion-incentivized corruption is that factionalism at mid- and upper-level administrations reduces the importance of merit-based promotion at lower levels so that mid-level officials are more likely to solicit lower-level officials' bribes in exchange for promotions. To test this mechanism, we fit Specification (4) using prefecture-year panel data. Robust standard errors are clustered at the provincial level to account for serial correlation among secretaries who report to same provincial leaders.[21]

Table 3: Effect of Promotion on Corruption Conditional on Mid-Level Factionalism

	(1) w/o Interaction	(2) w/ Interaction	(3) w/o Interaction	(4) w/ Interaction
Promotion x Connected		0.295**		0.275**
		(0.126)		(0.137)
Promotion	0.310***	0.174*	0.261***	0.135
	(0.0862)	(0.0996)	(0.0964)	(0.103)
Politically Connected Superior	0.575*	0.488	0.595*	0.510
	(0.337)	(0.357)	(0.343)	(0.366)
Local Characteristics	Yes	Yes	Yes	Yes
Politician Characteristics	No	No	Yes	Yes
Province Fixed Effect	Yes	Yes	Yes	Yes
Constant	-2.591	-2.407	-1.603	-1.402
	(1.997)	(1.993)	(2.296)	(2.312)
Observations	2,056	2,056	1,965	1,965
Number of Prefecture	277	277	276	276

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Column (1) in Table 3 reports the results from fitting a model without the interaction term. Provincial officials' political connection positively affects prefectural party secretaries' corruption

[21]The results are robust when clustering standard errors at the prefecture level.

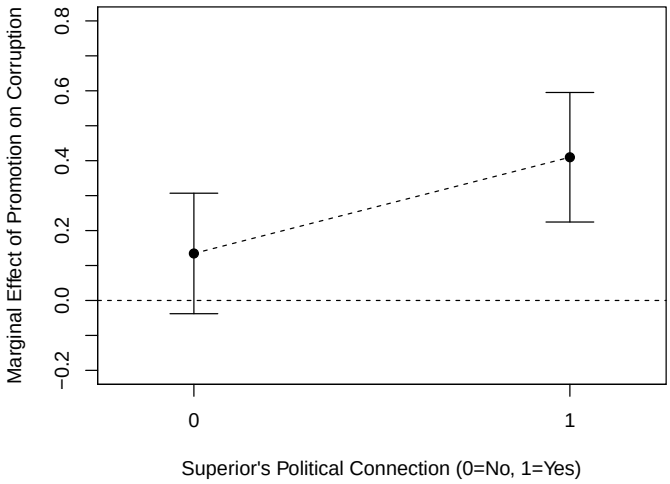

Figure 3: Marginal Effect of Promotion on Corruption Conditional on Superior's Political Connections

level. The model in Column (2) includes the interaction term, which is positive and statistically significant. In model (3) and model (4), we further include individual characteristics. In total, the effect of promotion on corruption conditional on superior's political connection is about 50 percentage point higher. Hypothesis testing of this linear additive effect is significant at the 0.01 level (based on Model 4). Figure 3 plots the marginal effect of promotion on corruption conditional on mid-level officials' political connection status (with 95% Confidence Interval). These results provide evidence for the factionalism mechanism and further support the promotion-incentivized corruption theory.

7 Conclusion

Bureaucratic corruption in developing countries has been widely condemned by both domestic and foreign observers. Numerous studies have explored the effects of wage, monitoring, or decentralization on corruption. In this article, we focus on the role of promotion in bureaucratic corruption in China. we argue that promotion may encourage corruption when punishments of wrongdoing are sufficiently low, observing performance is difficult, and/or mid-level officials' career advancements depend little on lower-level officials' performance, especially in the presence

of factionalism at upper levels of administration – a common situation in non-democratic regimes. The theory of promotion-incentivized corruption provides a new explanation for the existence of persistent and widespread corruption in developing countries. It especially explains why Chinese officials are so corrupt even if the promotion system is designed as merit-based. we apply a fuzzy RD design using the mandatory age cutoff for promotion on a unique dataset of Chinese prefecture party secretaries' career information to identify the causal impact of promotions on corruption and find that promotions causally increase corruption. we further find that the effect of promotion on corruption increases conditional on superiors' factional connections, which provides additional evidence to our argument. This finding also suggests that factionalism at upper levels have disastrous consequences on lower-level administration and society.

The theory developed in this paper highlights three disincentives that could lead to a corruption equilibrium: faction politics at upper levels, lack of serious punishment for wrong-doing, and difficulties in evaluating officials' performance. Accordingly, institutions on these aspects can be designed to control corruption and restore merit-based promotions. Thus, this paper has generalizable implications for combating corruption in non-democratic or partially democratic countries, especially in countries with single-party or dominant-party system in which government positions are tangled with hierarchical party organizations, such as North Korea, Russia, Syria, or even Iran.

This article also contributes to the debate on the nature of political selection in China and sheds light on the understanding of incentives of local politicians in non-democracies. My finding that the effect of promotion on corruption level increases conditional on mid-level officials' political connections is consistent with the factionalism argument. In addition, the evidence that promotion prospects do not encourage prefectural-level economic performance is consistent with the findings from the recent advancement of factionalism studies in China (Landry, Lü and Duan 2018; Shih, Adolph and Liu 2012; Meyer, Shih and Lee 2016). Because corruption data is not available at the county level, we am not able to examine whether promotions curb or encourage county government officials' corruption. It is possible that performance plays a more important role than bribes in county officials' career advancement, as suggested by Landry, Lü and Duan (2018). It is also

possible that the bribe-based promotion at prefecture level will trigger chain reactions of corruption at lower levels: to pay bribes for their career advancement, prefectural officials solicit bribes from lower-level officials, which encourages lower-level officials to be more corrupt and then bribe for promotion. The results from the WBES data that focuses on street-level corruption suggests the possibility of the latter. Further empirical studies along this line will be helpful.

Except for upper-level factionalism, other conditions may also reduce or reinforce promotion-based corruption. For example, monitoring and punishing mid-level officials who solicit bribes from lower-level can reduce promotion-based corruption. This is not only because mid-level officials' costs of encouraging bribe tournament increase, but also because lower-level officials' incentives to get promoted to mid-level decrease given the existence of punishment. In addition, as discussed in the theoretical part, noises in performance indicators may encourage promotion-based corruption. Empirical studies on these directions worth further exploring.

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Online Appendices

A Promotion and Corruption: A Formal Model

This section presents a formal model to illustrate our idea of promotion-incentivized corruption. We start with the baseline case and derive the corruption level without promotion. We then compare that to the equilibrium corruption in a promotion tournament with bribery and discuss the circumstances under which promotion incentivize corruption.

A.1 Non-promotion Regime

We first consider a case with no promotion. Assume two identical, risk-neutral subordinates working in lower level positions l. Subordinates report to a superior who is assumed away in this model as there is no promotion. Denote subordinate i's (where $i = 1\ or\ 2$) innate ability θ. Subordinate i's performance is given by $y_i = \theta - c_i + \epsilon_i$, where c_i captures the subordinate's corruption level and ϵ_i is a noise term that follows a normal distribution with mean 0 and variance σ^2. Without loss of generality, we assume that y_i represents the economic condition of the precinct/bureau governed by this subordinate. That is, a higher ability local leader will boost the economy but corruption negatively affects the local economy. Assume θ is sufficiently large such that the highest level of corruption c is always less than θ.

Let w_i denote wage to the subordinate. Without promotion, a subordinate's utility from wage and corruption is given by $u(w, c) = w + g(c)$, where the utility of corruption $g(\cdot)$ is twice continuously differentiable, strictly increasing and concave.

A subordinate's ability to extract corruption revenue is constrained by how likely he/she will be caught. Let $1 - \phi(c)$ be the probability of being caught, where $\phi(c) \in [0, 1]$, $\phi'(c) < 0$, and $\phi''(c) = 0$. This assumption means that the higher level of corruption this subordinate commits, the more likely she will be caught, and the probability of being caught increases with corruption at a constant rate.[1] For simplicity, we assume the subordinates keep all revenues if she is not caught, and she loses the corrupt gain $g(c)$ only if she is caught. The subordinate's expected utility function is

$$Eu(w, c) = w + g(c)\phi(c).$$

Without promotion, subordinate i simply chooses c_i to maximize her expected utility. That is

$$\max_{c_i \geq 0} \quad w + g(c_i)\phi(c_i), \tag{A.1}$$

The first-order condition is

$$0 = g'(c_i^*)\phi(c_i^*) + g(c_i^*)\phi'(c_i^*), \tag{A.2}$$

Since subordinates are identical, let $c_{np}^* = c_i^* = c_j^*$ that solves (A.2). That is, c_{np}^* is the optimal amount of corrupt in the non-promotion regime. Under this non-promotion regime, the superior gets nothing from the subordinates.

[1] We can also assume that the probability of being caught increases with corruption at an increasing rate, and the results will become a little more complicated. The main results hold for both decreasing rates and relatively small increasing rates.

A.2 Promotion Tournament with Bribery

Now, let's consider a single period tournament model with bribery. For simplicity, we assume that subordinates' alternative choice of jobs generates zero utility. Thus, any subordinate should participate in the tournament as long as she gains a positive utility from it.

Subordinates are hired into the lower level position. They compete on the lower level for one period and the winner will be promoted to the upper level position. Similar as in the non-promotion case, subordinates' performance outcomes are denoted as $y_i = \theta - c_i + \epsilon_i$, where c_i denotes subordinates' corruption levels.

Now, subordinates are not only competing on performance ground but also on bribes. Without lose of generality, we assume that β share of subordinates' corruption revenue will be used to pay for bribes and α share of subordinates' performance outcome will go to the superior. Note that represents how important subordinates' performance is to the superior's payoffs. These payoffs can be monetary gains as well as political gains. In a bureaucracy where promotions rely on factionalism or nepotism rather than performance, α can be treated as going to zero. Also, suppose the bribing behavior will be caught with probability $(1 - p)$. The superior's expected income is therefore

$$E(income) = \sum_i E(Y_i) = \sum_i [p\beta c_i + \alpha(\theta - c_i)], i = 1, 2, \tag{A.3}$$

where Y_i denotes subordinate i's gross tribute of bribe and performance outcome, i.e., $Y_i = p\beta c_i + \alpha y_i(c_i)$.

Let w denote the wage for non-promoted individuals and R denote the additional wage that a subordinate can obtain upon promotion. The wage rate can be considered fixed to the job levels, which is the same as the wage in the non-promotion regime. The wage spread R represents all the additional earning potentials (legal or illegal) in the upper level position such as wage increment, benefits, political achievement, and/or corrupt gains. Similar to the non-promotion regime, subordinates can obtain corruption gains with probability $\phi(c_i)$.Thus, the expected payoff to a subordinate participating in the tournament is $w + E(R) + g[(1 - \beta)c_i]\phi(c_i)$.

Given the posted wage w and spread R, the corruption pair (c_1^*, c_2^*) maximizes subordinate i's expected payoff. That is, c_i^* must solve

$$\max_{c_i \geq 0} \quad w + g[(1 - \beta)c_i]\phi(c_i) + R \cdot Prob\{Y_i(c_i) > Y_j(c_j^*)\}, \tag{A.4}$$

where $Y_i = p\beta c_i + \alpha(\theta - c_i + \epsilon_i)$. The first-order condition for (A.3) is

$$-R \cdot \frac{\partial Prob\{Y_i(c_i) > Y_j(c_j^*)\}}{\partial c_i} = (1 - \beta)g'[(1 - \beta)c_i]\phi(c_i) + g[(1 - \beta)c_i]\phi'(c_i), \tag{A.5}$$

That is, subordinate i choose c_i such that the marginal gain of corruption conditional on not being caught equals the marginal loss from corruption, which is the product of additional income from winning the tournament, R, and the marginal increase in the probability of winning.

By Bayes' rule,

$$Prob\{Y_i(c_i) > Y_j(c_j^*)\} = Prob\{\epsilon_i > (1 - \frac{p\beta}{\alpha})(c_i - c_j^*) + \epsilon_j\}$$
$$= \int_{\epsilon_j} Prob\{(1 - \frac{p\beta}{\alpha})(c_i - c_j^*) + \epsilon_j | \epsilon_j\} f(\epsilon_j) d\epsilon_j$$
$$= \int_{\epsilon_j} [1 - F[(1 - \frac{p\beta}{\alpha})(c_i - c_j^*) + \epsilon_j] f(\epsilon_j) d\epsilon_j.$$

The first-order condition for (A.4) becomes

$$(1 - \frac{p\beta}{\alpha}) R \cdot \int_{\epsilon_j} f[(1 - \frac{p\beta}{\alpha})(c_i - c_j^*) + \epsilon_j] f(\epsilon_j) d\epsilon_j$$
$$= (1 - \beta) g'[(1 - \beta)c_i]\phi(c_i) + g[(1 - \beta)c_i]\phi'(c_i). \quad \text{(A.6)}$$

In a symmetric Nash equilibrium (i.e. $c_i^* = c_j^* = c^*$), we have

$$(1 - \frac{p\beta}{\alpha}) R \cdot \int_{\epsilon_j} f(\epsilon_j)^2 d\epsilon_j = (1 - \beta) g'[(1 - \beta)c^*]\phi(c^*) + g[(1 - \beta)c^*]\phi'(c^*), \quad \text{(A.7)}$$

Since $g(c)$ is increasing and concave, $g(c^*)$ is positive and increasing in c_i^*, while $g'(c^*)$ is positive and decreasing in c^*. In addition, $\phi(c^*)$ is positive and decreasing in c^*, while $\phi'(c*)$ is a negative constant. Thus, the right hand side of the equation (A.7) decreases in c^*. Note that when there's no bribing opportunity ($\beta = 0$), subordinates solely compete on performance. Given that the RHSs of (A.2) and (A.7) decrease in c^*, the optimal corruption level under the promotion tournament should be lower than in the non-promotion case. That is, even with corruption, as long as the promotion is merit-based, promotion should curb corruption.

Now, let's see what happens when bribes are positive ($\beta > 0$). The following proposition compares the optimal corruption level in the non-promotion regime and that in the bribing tournament. Denote $c_{bp}^* = c_i^* = c_j^*$ the solution to (A.7).

PROPOSITION 1: *When performance is relatively less important than bribe to the superior's total gain, i.e.,* $1 - \frac{p\beta}{\alpha} < 0$*, the corruption level is higher in the bribing tournament, i.e.,* $c_{bp}^* > c_{np}^*$.

Proof. $\exists \hat{c}$ such that

$$0 = (1 - \beta) g'[(1 - \beta)\hat{c}]\phi(\hat{c}) + g[(1 - \beta)\hat{c}]\phi'(\hat{c}).$$

Since the RHS of (A.2) decreases in c^*, $\hat{c} > c_{np}^*$. When $1 - \frac{p\beta}{\alpha} < 0$, the LHS of (A.7) is negative and thus is smaller than zero. Therefore, $c_{bp}^* > \hat{c} > c_{np}^*$. *QED.*

The intuition behind Proposition 1 is straightforward. As we can see from (A.3), corruption decreases performance with a rate α and increases bribes with a rate $p\beta$. When corruption increases bribes faster than it decreases performance (i.e., $p\beta > \alpha$), promotion would incentivize corruption to pay more bribes.

Proposition 1 captures a positive relationship between promotion and corruption, which is not captured in merit-based promotion models. It implies that when the superior gains very little from

subordinates' performance, the promotion mechanism will lead to more corruption in order to increase superiors' bribe income. This prediction provides a plausible explanation for rampant corruption and faction-based promotions, not just in China but in many authoritarian countries that are entrenched by faction politics where promotions are based on political connection to factions not on performance.

A related implication from proposition 1 is on the strength of the faction connection. As we can show, stronger ties to the faction would further render subordinates' performance less useful in the superior's total gain, i.e., $p\beta/\alpha$ increases. Therefore, as the strength of faction connection increases, corruption increases. If $p\beta/\alpha > 1$, $c^*_{bp} > c^*_{np}$. We summarize the prediction in the following corollary.

COROLLARY 1: *The corruption level increases in the relative share of bribe over performance.*

Proof. As $p\beta/\alpha$ increases, the LHS of (A.7) decreases. Therefore c^*_{bp} increases. *QED.*

Another factor that may compromise merit-based promotion is the lack of punishment for wrong doings in most authoritarian countries. Our model captures this possibility in p, the likelihood that the bribing activity is not detected. Suppose $p > 0$.[2] We can see from (A.7) that the LHS decreases in p. Therefore, as p increases, the LHS of (A.7) decreases, and thus c^*_{bp} increases. We summarize this relationship in the following proposition.

PROPOSITION 2: *Suppose there is a positive probability that bribing behaviors are not detected, i.e., $p > 0$. When the probability of detecting bribing behaviors decreases, i.e., p increases, corruption increases.*

Proof. (see text.)

We can see from proposition 2 that when the probability of detecting bribery decreases, corruption increases. When $1 - \frac{p\beta}{\alpha} < 0$, the corruption level under the bribing tournament further increases and exceeds that in the non-promotion regime.

We now turn our focus on how the noise in the performance evaluation affects corruption as in many authoritarian countries performance evaluations are subject to data manipulations. For illustration purpose, suppose ϵ is normally distributed with variance σ^2, then

$$\int_{\epsilon_j} f(\epsilon_j)^2 d\epsilon_j = \frac{1}{2\sigma\sqrt{\pi}},$$

which decreases in σ.

PROPOSITION 3: *When performance is relatively more important than bribe to the superior's total gain, i.e., $1 - \frac{p\beta}{\alpha} > 0$, corruption increases in the variance of the performance evaluation (σ); when performance is relatively less important than bribe to the superior's total gain, i.e., $1 - \frac{p\beta}{\alpha} < 0$, corruption decreases in the variance of the performance evaluation (σ).*

Proof. When $1 - \frac{p\beta}{\alpha} > 0$, increases in σ leads to a decrease in the LHS of (A.7). Since the RHS of (A.7) decreases in c^*_{bp}, c^*_{bp} increases. On the other hand, when $1 - \frac{p\beta}{\alpha} < 0$, increases in σ leads

[2]If bribery is always detected, $p = 0, \beta = 0$, the RHS expression in (A.7) is the same as the RHS in (A.2) but the LHS of (A.7) is greater than the LHS of (A.2). Therefore, the corruption level in a non-bribery tournament is lower than that in the non-promotion regime, i.e., promotion curbs corruption.

to an increase in the LHS of (A.7). Since the RHS of (A.7) decreases in c^*_{bp}, c^*_{bp} decreases but is still larger than c^*_{np}. *QED.*

Proposition 3 implies that when performance is more important than bribe to the superior's total gain, less precise performance will lead to an increase in corruption. The intuition is that since performance indicators are not informative, subordinates should focus more on bribes, which is a sure thing. However, when bribes are more important to the superior's total gain, less precise performance will lead to a decrease in corruption, although the corruption level would still be higher than that in the non-promotion regime. That is, in a regime where bureaucratic promotions depend on faction politics, data manipulation can actually decrease corruption as it may ease off the corruption necessity to pay bribes.

In a similar fashion, the effect of the the promotion wage spread, R on corruption also depends on the relative importance of bribes and performance in the superior's total gain. We summarize the finding in the following proposition.

PROPOSITION 4: *When performance is relatively more important than bribe to the superior's total gain, i.e.,* $1 - \frac{p\beta}{\alpha} > 0$*, corruption decreases in the wage spread* R*; when performance is relatively less important than bribe to the superior's total gain, i.e.,* $1 - \frac{p\beta}{\alpha} < 0$*, corruption increases in the wage spread* R*.*

Proof. When $1 - \frac{p\beta}{\alpha} > 0$, increases in R leads to an increase in the LHS of (A.7). Since the RHS of (A.7) decreases in c^*_{bp}, c^*_{bp} decreases. On the other hand, when $1 - \frac{p\beta}{\alpha} < 0$, increases in R leads to a decrease in the LHS of (A.7). Since the RHS of (A.7) decreases in c^*_{bp}, c^*_{bp} increases and is larger than c^*_{np}. *QED.*

An important implication from proposition 4 is that when performance is more important than bribes to the superior's total gain as with merit-based promotions, increase the wage spread can curb corruption. However, when performance is less important than bribes to the superior's total gain as with faction-based promotion, increase the wage spread will incentivize corruption even more.

In summary, the above model specifies the circumstances under which promotions encourage bureaucratic corruption. In particular, it shows that when mid-level officials' stake in lower-level performance is sufficiently low or punishment for wrong-doing is not serious, promotions will incentivize lower-level corruption.

The wage spread, R, and the accuracy of the performance indicator, σ, have more nuanced effects on corruption. For example, as the wage spread increases, corruption increases even more when bribes are more important than performance in the superior's gain. The intuition is that the subordinates are incentivized even more to corrupt for bribes when they expect a higher return upon promotion. On the other hand, as the performance indicator becomes less accurate (i.e.,σ increases), subordinates are incentivized less to corrupt although the corruption level in the bribe tournament is still higher than in the non-promotion regime.

B Empirical Appendices

B.1 Land Sales as a Corruption Measure

As discussed in the main text, the key measure of corruption is the area of land sold through negotiation in each prefecture. This subsection explains land sales in China.

In China, most of the undeveloped land has collective ownership – owned by peasant collectives in suburban or rural areas. Chinese land use laws do not allow selling collective-owned land on the market. Land with collective ownership needs to be confiscated by local governments and then "changed" into state-owned land before selling on the market. Usually, local governments take land from peasant collectives with little compensations relative to its market value (Ong 2014). Under this property right arrangement, the land virtually belongs to local governments. The current land administration regulations stipulate that land sale revenues should be collected and recorded as local budgetary revenue, which is very difficult for local officials to embezzle after transactions end. However, local officials have opportunities to solicit illegal payments during the transaction process.

Land transactions in China are well known for its dual land market (Xu, Yeh and Wu 2009): land sales by bidding, auction and quotation, and land sales through negotiation. Land sale through negotiation is a legacy of China's planned economy. Due to common ownership of communism, land ownership cannot be sold in China, and the government can only sell the right of land use. In the early days of China's economic reform, it was very difficult to estimate the market values of land use rights, so that local governments had to negotiate prices with land developers. Since then, land sale through negotiation became a convention and a major means of land transactions. There was far more land sold through negotiation than through bidding, auction, and quotation. Moreover, the prices of land sold through negotiation were much lower than the prices sold by the latter means. In 1995, the Central Government had to enact a rule to regulate the minimum rates for land sales through negotiation.[3]

In 2002, the Central Government further enacted a regulation to restrict the types of land for negotiation sales.[4] This regulation made selling commercial-use land through negotiation illegal. However, negotiation sales were still very common in China despite this regulation. In 2004, the Ministry of Land and Resource issued a decree to set August 31, 2004, as the deadline for all prefectures to ban negotiation for the transaction of commercial-use land.[5] Although the Central Government kept tightening its hand on land sales through negotiation, these regulations seemed unsuccessful, and negotiation is still widely practiced among local governments. For example, data from the Ministry of Land and Resource (2006) reveals that the area of land sold through negotiation constitutes of more than 70 percent of the total area in land transactions in 2003 and 2004, but revenues from this type of sales are less than 50 percent of total land revenues. In 2007, the Central Government had to further revise the rule for the transaction of commercial-use land to enhance land regulation.[6]

[3]Rules on the Determination of Minimum Prices for the Use Rights of State-owned Land Transferred Through Agreements (1995).

[4]Provisions on the Assignment of State-owned Construction Land Use Right through Bid Invitation, Auction, and Quotation (2002).

[5]Decree No. 71, Notice on Continuing the Review of the Implementation of the Grant of Land Use Rights for Commercial Uses by Soliciting Auction Bids or Listing on a Land Exchange.

[6]Provisions on the Assignment of State-owned Construction Land Use Right through Bid Invitation, Auction, and

One may challenge the use of land sales as a corruption measure. The claim is that, if land sales through negotiation were corruption, the central government would have arrested officials who sold more land through negotiations. This claim does not hold for several reasons. First, arresting corrupt officials requires sound evidence or "the legal burden of proof". Suspicious activities like land sales through negotiation is not enough to convict corruption crimes. Nevertheless, numerous cases of corruption charges based on wrongdoings in land sales suggest that the Chinese government indeed pays attention to land sale corruption. Second, scholars have long argued that punishment for wrongdoing in Chinese bureaucracy is not very serious (e.g., Manion 2004; Sun 2004). Thus, it is also possible that the Chinese central government tentatively allows certain extent of corruption in land sales as "the grease of wheels" to "reward" local officials for loyalty or political supports. Moreover, as my theoretical model suggests, under a corruption equilibrium, mid-level officials encourage lower-level officials to collect corruption revenues to bribe for promotions. If those mid-level officials are also responsible for monitoring lower-level officials' corruption behavior – as they often are, they will certainly let lower-level officials get away with wrongdoing in land sales. For example, Chen and Kung (2018) find that provincial party secretaries who provided discounted land to firms linked to members of the CCP Politburo are more likely to be promoted to positions of national leadership.

B.2 Summary Statistics and Additional Corruption Measures

Table B.1 reports the summary statistics of the main data, including the averages of the prefecture characteristics and the corruption measure during each party secretary's tenure.

Table B.1: Summary Statistics for Individual-level Data

Statistic	N	Mean	St. Dev.	Min	Max
Individual Level:					
Promotion	648	0.33	0.47	0	1
Age	648	49.57	3.60	38.08	58.33
Age Cutoff Dummy	648	0.72	0.45	0	1
Youth	648	0.51	0.97	0	5
Office	648	0.49	0.50	0	1
Edu. Level	648	3.76	0.77	2	6
Female	648	0.03	0.17	0	1
Minority	648	0.06	0.23	0	1
prefecture Level:					
log(Negotiation)	648	4.73	1.41	−2.12	8.46
log(Transaction)	648	5.97	1.04	2.02	8.62
Second Industry (percent)	648	50.77	12.46	12.54	89.75
Construction Land	648	7.52	8.27	0.00	65.98
log(Budget)	648	11.67	1.35	7.96	15.94
log(GDP per Capita)	648	9.93	0.72	7.66	12.55
log(Population)	648	4.47	0.70	2.65	6.66

Additional measures of corruption are aggregated using the firm-level survey responses from

Quotation (2007 Revision).

the World Bank's Enterprise Survey (WBES) in 2005. Since the 2005 survey did not ask questions directly related to corruption, I use the following questions as proxies: 1) does your company have specialized staff to handle government relationships (for example, a government relation office)? 2) please indicate to what extent the following factors affect your company's operation and growth: tax Administration; and 3) unstable economic and administration policies. These questions reflect the levels of obstacles in firms' interactions with local government officials, which are reasonable proxies for local corruption, especially for those street-level officials who directly interact with firms.

The original WBES dataset includes 12,400 observations. The survey uses a uniform sampling methodology to generate a sample representative of the whole non-agricultural private economy. I aggregate the firm-level measures into the prefecture level, which generates 137 observations. These 137 prefectures are also a random sample that represents China's all 333 prefectures. I then match these corruption measures with the characteristics of prefectures and party secretaries. The unit of analysis is a prefecture governed by an individual party secretary. Due to missing data in prefecture and party secretary characteristics, the effective number of observations is 103. Table B.2 reports the summary statistics.

Table B.2: Summary Statistics for the 2005 World Bank Enterprise Survey Sample

Statistic	N	Mean	St. Dev.	Min	Max
Obstacle Adm.	103	0.91	0.33	0.05	1.68
Obstacle Tax.	103	0.74	0.29	0.04	1.52
Govt. Rlsp.	103	0.26	0.11	0.00	0.49
Promotion	103	0.51	0.50	0	1
log(Budget)	103	12.36	1.20	9.10	15.23
Second Industry (percent)	103	51.08	10.09	27.06	88.99
Youth	103	0.70	1.24	0	5
Office	103	0.52	0.50	0	1
Edu. Level	103	3.79	0.81	2	6
Female	103	0.01	0.10	0	1
Minority	103	0.05	0.22	0	1

Table B.3: Correlations among Corruption Measures

	Negotiation	Obstacle Tax	Obstacle Adm.	Govt. Rlsp.
Negotiation	1			
Obstacle Tax	0.0673	1		
Obstacle Adm.	0.0753	0.9	1	
Govt. Rlsp.	0.0594	0.5317	0.5376	1

Table B.3 reports the correlation matrix among the four measures of corruption. We can see that the area of land sale through negotiation is positively correlated with all three WBES measures. As discussed in the main text, land sales capture higher-level officials' corruption (esp. local party secretaries). On the contrary, the WBES measures capture street-level officials' corruption because it is not leaders but street-level officials in local bureaus who collect taxes and administration fees from firms. This difference may explain why the correlations are small.

B.3 Fuzzy RD Specification Tests

To verify whether the 51.5 cutoff age is a good treatment assignment device, I first present graphic evidence on the effect of age cut-off on promotions. Figure 2 in the main text plots the predicted probability of promotion using various control functions (linear, quadratic, and cubic). There are obvious discontinuities at the cutoff, with sharp drops in promotion probability for officials older than 51.5.

I conduct a McCrary sorting test using the optimal bandwidth of 6.52 based on Imbens' MSE method for bandwidth selection. The result is shown in Figure 1 in the main text. The p-value is 0.943, suggesting that there is no significant jump on the density function at the cutoff. These results further confirm that there is no statistically significant sorting of ages.

An important feature of RD design is that even when we have non-random selection into treatment (e.g. some cadres might be selected into the fast-path of promotion), we can identify impact estimates that share the same validity as those from a randomized experiment. Localized random treatment assignment can occur even in the presence of endogenous sorting, as long as agents do not have the ability to *sort precisely* around the threshold (Lee 2008; Lee and Lemieux 2010). If they could, the density of the age would be discontinuous. And this has testable implications, mainly that all pre-treatment characteristics should be indistinguishable around the age threshold.

Figure B.2 plots predicted values of individual characteristics using the same control functions as above. It shows that these characteristics – youth league experience, office experience, ethnicity, education level, and sex–are all similar between the treatments and controls. Although the cubic form of office experience has a little discrepancy at the cutoff on the fitted line, this is because the sample size is not enough to fit polynomial functions. Figure B.3 plots predicted values of city characteristics using the same control functions. The results are consistent with those of individual characteristics: the share of secondary industry, the share of construction land in the total area of the prefecture, government budget, GDP per capita and population are similar between the treatments and controls.

Table B.4 and B.5 examine whether individual and prefectural characteristics are indistinguishable for officials below and above 51.5 years old. As the coefficients of the age dummy suggest, there are no statistically significant differences between the two groups on all characteristics.

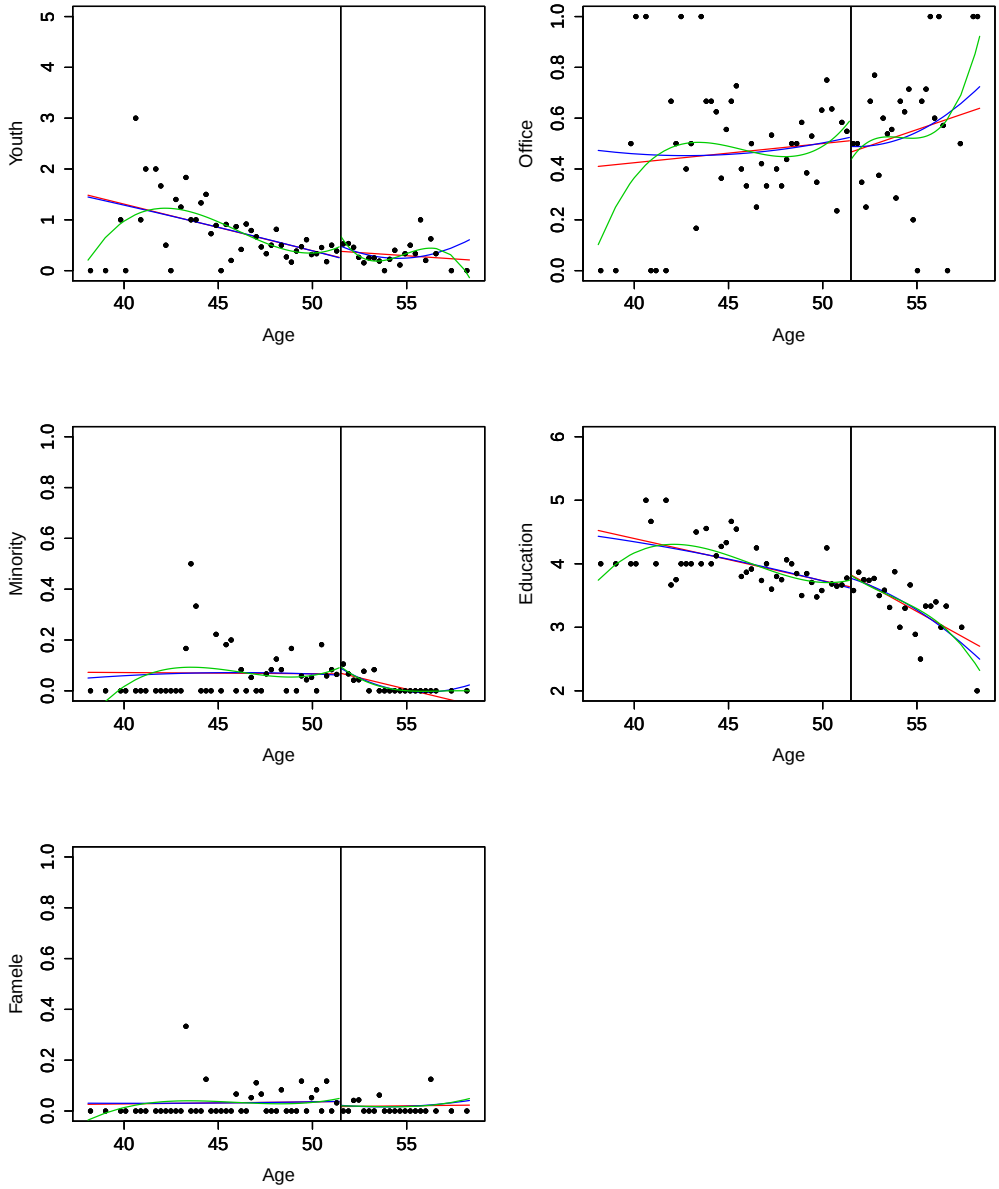

Figure B.1: Individual Characteristics at the 51.5 years old age threshold

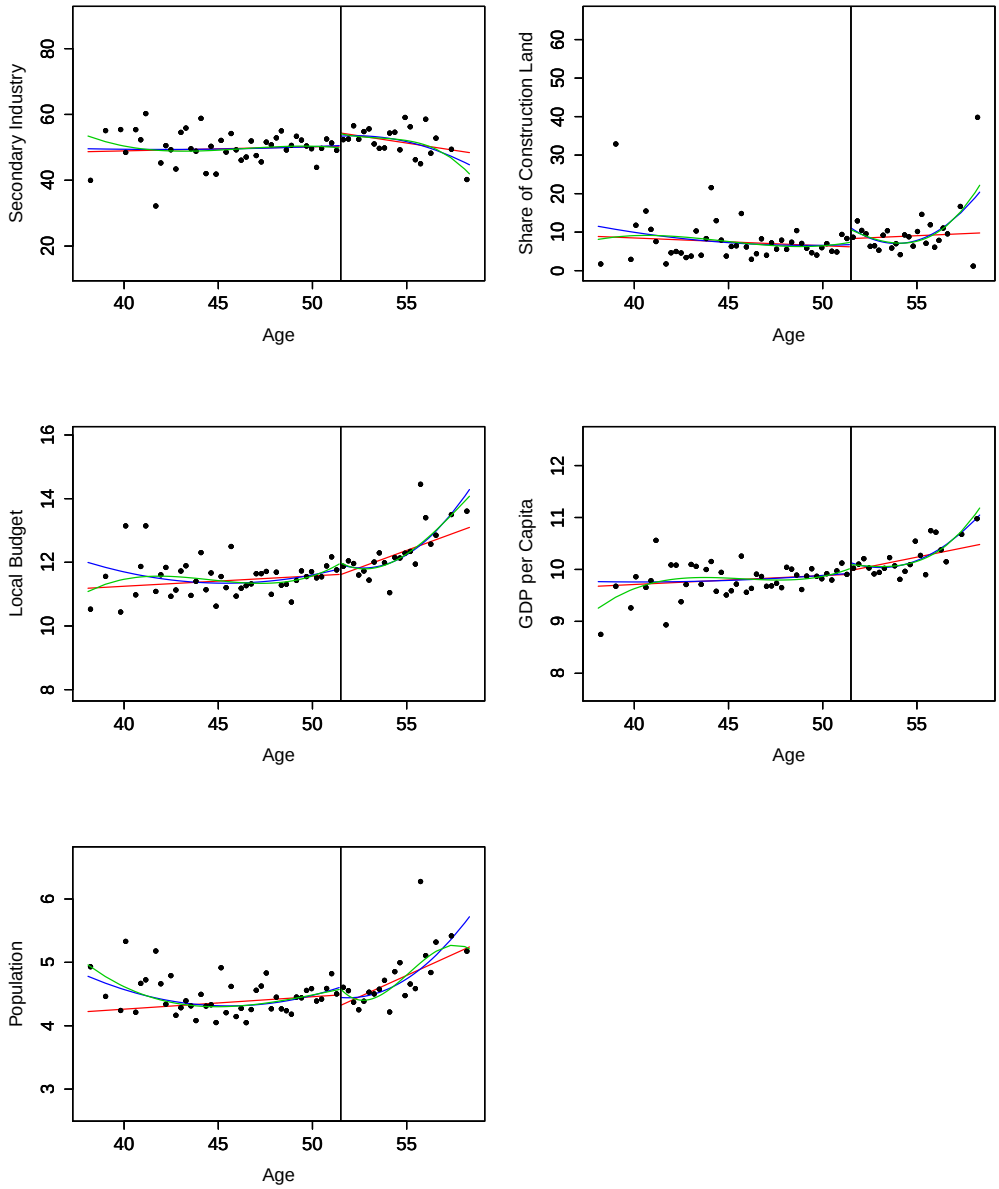

Figure B.2: Prefecture Characteristics at the 51.5 years old age threshold

Table B.4: Individual Characteristics between Two Groups

VARIABLES	(1) Office	(2) Youth	(3) Edu	(4) Female	(5) Minority
agedummy	0.0217	-0.193	-0.0552	0.0259	0.0117
	(0.0642)	(0.120)	(0.0930)	(0.0216)	(0.0294)
age	0.00604	-0.0884***	-0.0811***	0.00201	-0.00294
	(0.00888)	(0.0163)	(0.0125)	(0.00299)	(0.00406)
Indv. Ctrls.	Yes	Yes	Yes	Yes	Yes
Pref. Ctrls.	Yes	Yes	Yes	Yes	Yes
Constant	-0.147	4.194***	6.975***	-0.282	0.119
	(0.603)	(1.119)	(0.828)	(0.203)	(0.275)
Observations	648	648	648	648	648
R-squared	0.022	0.091	0.129	0.026	0.051

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table B.5: Prefectural Characteristics between Two Groups

VARIABLES	(1) Secondary Industry	(2) Budget (log)	(3) GDPPC (log)	(4) Pop (Log)	(5) Construct Land
agedummy	-1.320	-0.0337	0.0151	0.0442	-1.682*
	(1.353)	(0.0552)	(0.0369)	(0.0471)	(0.958)
age	-0.196	-0.00386	0.0100**	0.0136**	-0.223*
	(0.187)	(0.00764)	(0.00509)	(0.00650)	(0.133)
Indv. Ctrls.	Yes	Yes	Yes	Yes	Yes
Pref. Ctrls.	Yes	Yes	Yes	Yes	Yes
Constant	-24.68*	-5.269***	4.550***	4.013***	-5.237
	(12.66)	(0.474)	(0.296)	(0.413)	(9.007)
Observations	648	648	648	648	648
R-squared	0.299	0.900	0.845	0.728	0.199

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

B.4 Fuzzy RD with additional controls

Table B.6 reports results of Fuzzy RD models with additional controls: (1) the total amount of the land sold on the market, and (2) the year that an official leaves the party secretary post. The former controls for the extent to which a local government wants to sell land for government revenue, and the latter controls for the general trend of land sold through negotiation over the years. Note that I did not include these two variables in the main model because the total amount of land transaction may also capture local officials' corruption behavior (Chen and Kung 2018), and including the year variable might be problematic because the models are fitted using average values of variables during a secretary's tenure (several years). Thus, I only use these two variables for robustness checks. As the results show, when controlling for year, the effect of promotion potential on corruption remains unchanged and is statistically significant. When controlling for total land sales, the impact reduces about one third and is significant at the 0.1 level. This result is not surprising since the total area of land sales is strongly correlated with land sales through negotiation, and the former also capture local corruption.

Table B.6: Promotion on Corruption: Year and Land Transaction Controls

	(1)	(2)	(3)
First Stage: Age Dummy on Promotion			
Age Cutoff Dummy	0.164***	0.169***	0.165***
	(0.0557)	(0.0557)	(0.0560)
*Year	-0.0235***		-0.0233***
	(0.00734)		(0.00735)
*log(Transaction)		-0.0148	-0.0105
		(0.0247)	(0.0248)
Age	-0.0181**	-0.0193**	-0.0180**
	(0.00870)	(0.00867)	(0.00874)
Indv. Ctrls.	Yes	Yes	Yes
City. Ctrls.	Yes	Yes	Yes
Constant	46.30***	-0.730	45.91***
	(14.66)	(0.545)	(14.69)
Second Stage: Promotion on Negotiation (Log)			
Promotion	2.249**	1.525*	1.333*
	(1.112)	(0.879)	(0.754)
*Year	-0.174***		-0.214***
	(0.0381)		(0.0257)
*log(Transaction)		0.982***	1.019***
		(0.0748)	(0.0689)
Age	0.0555	0.0197	0.0275
	(0.0423)	(0.0352)	(0.0280)
Indv. Ctrls.	Yes	Yes	Yes
City. Ctrls.	Yes	Yes	Yes
Constant	346.2***	0.00743	427.1***
	(76.55)	(1.153)	(51.55)
Observations	648	648	648
r2_2	-0.0590	0.343	0.517

Robust standard errors in parentheses, clustered on city
*** p<0.01, ** p<0.05, * p<0.1

B.5 Results from Polynomials

Table B.7 reports the results of Fuzzy RD models with higher-degree polynomials of the forcing variable – Age. Column (1), (2), and (3) fits models with linear, quadratic and cubic functional forms respectively. In addition, in Column (4), (5), and (6), I include control variables. Consistent with the linear model, quadratic and cubic models in Panel 1 show that an official under 51.5 years old will be 15.7 percent - 19.6 percent more likely to be promoted. This effect is statistically significant under all model specifications. The robust results further support using the 51.5 age cut-off as a randomization device. Panel 2 presents the results from the second stage estimations. An official with promotion potential will sell 3.5 to 10 times more amount of land area through negotiation, and the effects are statistically significant in most of the specifications.

Table B.7: Promotion on Corruption: Polynomials

	(1)	(2)	(3)	(4)	(5)	(6)
	Linear	Quadratic	Cubic	Linear	Quadratic	Cubic
Panel 1: First Stage, Age Dummy on Promotion						
Age Dummy	0.157***	0.197***	0.196***	0.167***	0.153**	0.161**
	(0.0558)	(0.0621)	(0.0660)	(0.0555)	(0.0612)	(0.0651)
Age	-0.0198**	-0.155	-0.0557	-0.0194**	0.0261	-0.806
	(0.00807)	(0.112)	(1.427)	(0.00863)	(0.113)	(1.476)
Age Sq.		0.00142	-0.000623		-0.000479	0.0166
		(0.00117)	(0.0291)		(0.00116)	(0.0301)
Age Cub.			1.38e-05			-0.000116
			(0.000197)			(0.000203)
Indv. Ctrls.	No	No	No	Yes	Yes	Yes
Pref. Ctrls.	No	No	No	Yes	Yes	Yes
Constant	1.206***	4.396	2.784	-0.691	-1.764	11.64
	(0.430)	(2.676)	(23.17)	(0.539)	(2.747)	(23.96)
Panel 2: Second Stage, Promotion on Land Sold Through Negotiation (Log)						
Promotion	1.559	2.691**	2.709**	2.379**	2.732	2.845*
	(1.136)	(1.181)	(1.229)	(1.179)	(1.665)	(1.623)
Age	0.0617	-0.514	-0.820	0.0483	-0.139	-1.964
	(0.0439)	(0.438)	(5.422)	(0.0475)	(0.568)	(5.506)
Age Sq.		0.00625	0.0126		0.00204	0.0395
		(0.00446)	(0.112)		(0.00618)	(0.114)
Age Cub.			-4.30e-05			-0.000255
			(0.000760)			(0.000791)
Indv. Ctrls.	No	No	No	Yes	Yes	Yes
Pref. Ctrls.	No	No	No	Yes	Yes	Yes
Constant	1.168	13.88	18.80	-1.983	2.833	32.39
	(2.533)	(10.84)	(87.26)	(1.568)	(14.94)	(87.65)
Observations	689	689	689	648	648	648
r2_2	-0.0507	-0.395	-0.403	-0.197	-0.352	-0.405

Robust standard errors in parentheses, clustered on prefecture
*** p<0.01, ** p<0.05, * p<0.1

These results suggest that promotion potential has a positive effect on bureaucratic corruption as measured by land transactions that involve great corruption opportunities. Note that the negative R-squared statistics are not a problem because R-squared has no meaning in two-stage least square models.

B.6 Results from the Local Linear Regression (Non-parametric)

I also use a non-parametric method of regression discontinuity for robustness check, following Skovron and Titiunik (2015). In particular, I estimate a local linear regression of the party secretary's promotion at $t+1$ on the age at t, with weights computed by applying a kernel function on the distance of each observation's age to the cutoff age. These kernel-based estimators require bandwidth for implementation, with observations outside the bandwidth receiving zero weight. I follow common practice and select optimal bandwidth that minimizes mean-squared-error (MSE). The optimal bandwidth using Imbens' MSE method for bandwidth selection is 6.52 at each side of the cutoff age, which spans from 45 to 58 years old. Table B.4 reports the results from the Fuzzy Regression Discontinuity estimation using the 6.52 (year) optimal bandwidth. Based on this optimal bandwidth, the effective sample size reduces to 567, with 361 officials below the cutoff age, and 207 officials above the cutoff age.

Table B.8 shows that the first stage coefficient is -0.187 and is statistically significant. The magnitude is very close to the results from above parametric RD models. In the second stage, the coefficient is about 2.78, which is also similar to those from parametric models. The effect is statistically significant at a P-value of 0.05 level.

Table B.8: Results from Local Linear Regression

Optimal Bandwidth Restriction:

Cutoff c = 51.5	Left of Cutoff	Right of Cutoff
Number of obs	452	237
Eff. Number of obs	361	207
Order loc. poly. (p)	1	1
Order bias (q)	2	2
Bandwidth	6.525	6.525

Fuzzy RD Estimates:

		Coef.	Std.Err.	$P > \|z\|$	[95% Conf.	Interval]
First Stage:	DV: Promotion					
	IV: Age Cutoff	-0.192***	0.071	0.006	[-0.331,	-0.054]
Second Stage:	DV: Negotiation					
	IV: Promotion	2.779**	1.272	0.029	[0.286,	5.272]

B.7 Results from Additional Corruption Measures

I use alternative measures of corruption from the WBES dataset to further examine the relationship between promotion and corruption. Note that these measures mainly capture corruption conducted by street-level officials rather than prefecture leaders. In addition, the small sample size does not allow sophisticated causal identification strategies. Thus, the results from these measures should be interpreted with caution.

Table B.9 presents the results. Consistent with the results from the fuzzy RD specification, promotion is positively correlated with perceived obstacles from tax administration and obstacles from unstable economic and administration policies. And the results are statistically significant even if the sample size is only 103. Promotion is positively correlated with the Govt. Rlsp. variable – the percentage of firms that report having specialized staff to handle government relationships, but the relationship is not statistically significant. Perhaps this measure captures some firm features other than local corruption. For example, large firms, firms working closely with public sectors, and state-owned firms are more likely to have such specialized staffs.

In addition, the findings using street-level corruption measures may suggest a possible chain reaction of corruption on the promotion ladders: to bribe their way to promotion, local leaders solicit bribes from street-level officials, which incentivizes street-level corruption.

B.8 Promotion and Economic Development

A key insight from the merit-based promotion argument is that officials with promotion potentials will foster economic development in order to obtain promotions. Thus, promotion potentials will positively affect economic development. However, if the theory of promotion-incentivized corruption holds better for Chinese prefecture-level officials, we should observe that promotion incentives do not affect those officials' economic performance because their promotions are based

Table B.9: OLS Results, World Bank Enterprise Survey Corruption Measures

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Obstacle Tax.	Obstacle Tax.	Obstacle Adm.	Obstacle Adm.	Govt. Rlsp.	Govt. Rlsp.
Promotion	0.132**	0.137*	0.147**	0.140*	0.0206	0.0124
	(0.0539)	(0.0703)	(0.0605)	(0.0788)	(0.0200)	(0.0255)
log(Budget)		0.0374		0.0490		0.00754
		(0.0312)		(0.0346)		(0.0110)
Second Industry		-0.00551*		-0.00510		-0.000597
		(0.00311)		(0.00353)		(0.00101)
Youth		-0.0242		-0.00953		0.0138*
		(0.0230)		(0.0264)		(0.00789)
Office		-0.0349		-0.0858		-0.0224
		(0.0601)		(0.0684)		(0.0225)
Edu. Level		-0.0358		-0.0286		-0.0182
		(0.0363)		(0.0437)		(0.0144)
Female		-0.242**		-0.153		-0.0520
		(0.0989)		(0.110)		(0.0337)
Minority		0.0626		0.0250		0.0161
		(0.0733)		(0.113)		(0.0306)
Constant	0.680***	0.663*	0.839***	0.651	0.255***	0.262**
	(0.0353)	(0.357)	(0.0400)	(0.400)	(0.0156)	(0.131)
Observations	109	103	109	103	109	103
R-squared	0.053	0.136	0.052	0.125	0.010	0.086

Robust standard errors in parentheses
*** p¡0.01, ** p¡0.05, * p¡0.1

more on bribes than on performances. The effect could even be negative since there might be an indirect effect that promotions increase corruption that, in turn, hurts economic development.

The fuzzy RD specification developed above can be easily adapted to test this alternative hypothesis. Table B.10 presents the 2SLS results based on five measures of economic growth at the prefecture level. From the first stage, we can see that being younger than 51.5 increases the chance of promotion by 17 percent, which is consistent with the above findings. For the second stage, I use GDP in log value as a measure for development in Column (1). As Wallace (2016) suggested, GDP figures might be "man-made" and therefore unreliable, I then use electricity consumption (Column (2)), and industrial electricity consumption (Column (3)) as proxies for real GDP growth, the so-called "Keqiang index", following Wallace (2016). The results from these measures suggest that the effect of promotion on economic development is negative though it is statistically insignificant. The non-positive findings further cast doubt on the applicability of the merit-based promotion argument on Chinese prefecture-level officials.

Table B.10: The Effects of Promotion on Economic Development

	(1)	(2)	(3)
VARIABLES	GDP	Power Use	Ind.Power Use
First Stage: Age Dummy on Promotion			
Age Cutoff	0.160***	0.160***	0.160***
	(0.0546)	(0.0546)	(0.0546)
Age	-0.0162*	-0.0162*	-0.0162*
	(0.00848)	(0.00848)	(0.00848)
log(Population)	0.190***	0.190***	0.190***
	(0.0284)	(0.0284)	(0.0284)
Indv. Ctrls.	Yes	Yes	Yes
Constant	-0.0916	-0.0916	-0.0916
	(0.477)	(0.477)	(0.477)
Second Stage: Promotion on Development			
Promotion	-0.917	-0.802	-0.610
	(0.623)	(0.725)	(0.886)
Age	0.0190	0.0204	0.0346
	(0.0233)	(0.0276)	(0.0331)
log(Population)	1.355***	1.167***	1.147***
	(0.139)	(0.161)	(0.188)
Indv. Ctrls.	Yes	Yes	Yes
Constant	-2.138**	5.691***	4.531***
	(0.857)	(0.972)	(1.198)
Observations	654	654	654
r2_2	0.428	0.298	0.275

Robust standard errors in parentheses, clustered on prefectures.
*** p<0.01, ** p<0.05, * p<0.1

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