Public Investment As Downward Benefit Distribution: Theory and Evidence from China's Public–Private Partnership Programs

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March 23, 2023

Abstract

Although previous studies have documented the political cycle of public investment in various countries, we still know little about its distributional consequences. We address this question by analyzing an emerging form of public infrastructure investment in China: public–private partnership (PPP). We argue that mayors use infrastructure investment to distribute benefits, thereby securing local compliance and support. Our empirical analysis draws on a unique dataset that matches PPP contracts with Chinese mayors who served from 2010 to 2017. We demonstrate a salient tenure effect: mayors decrease public investment over time during their tenure. Moreover, the tenure effect is more salient among mayors who lack local work experience. Contract-level evidence shows that mayors disproportionately allocate more investment to local firms, especially local state-owned enterprises, to garner local support. We show that the downward tenure effect is mainly driven by officials' survival concerns rather than promotion incentives.

Keywords: public–private partnership, tenure effect, downward benefit distribution, China

JEL codes: H41, H74, R11

*We acknowledge financial support from the National Natural Science Foundation of China (No.72173025), Innovative Research Groups Project of the National Natural Science Foundation of China (72121002), and the Gaofeng Program for Theoretical Economics (I), sponsored by the School of Economics at Fudan University. We thank Liting Pan, Yujia Tang, and Philona Turhon for research assistance. We are especially grateful to Xiaoguang Chen, Ruixue Jia, Songrui Liu, and Peng Peng for comments. Remaining errors are ours.

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1 Introduction

Investment in public infrastructure is crucial to economic development and the welfare of citizens around the world. However, the allocation of infrastructure investment is never immune to political intervention. In electoral democracies, politicians usually expand public expenditure before elections to enhance the prospects of reelection, a phenomenon known as the *political business cycle* (Nordhaus, 1975; Rogoff, 1990). Such cyclic patterns in public policy also appear in countries without competitive elections. In single-party regimes, political leaders strategically allocate public resources over time, not over reelection concerns but for career advancement in the political hierarchy. For example, Vietnamese officials use tax breaks to pander to political patrons at the upper levels of the government hierarchy (Jensen and Malesky, 2018). In China, county-level leaders strategically invest more in white-elephant infrastructure projects in the third and fourth years of public office because they have better promotion prospects during those years (Guo, 2009).

While the political budget cycle in nondemocracies is widely documented, a puzzle remains regarding the distributive consequences of officials' strategic decision-making. In addition to political leaders themselves, who benefits from the strategic allocation of public investment? What do officials gain by distributing investment disproportionately to certain groups?

We address these questions by analyzing the political cycle of public investment and its distributive impact in China, a single-party regime where political selections are directly managed by a *nomenklatura* system, in which upper-level party committees make decisions about the appointments and demotions of their subordinates (Manion, 1985; Li and Zhou, 2005; Landry, Lü and Duan, 2018). Our core argument is that even appointed leaders need to dispense benefits to local political and economic elites in their jurisdictions. Specifically, local leaders use large-scale infrastructure contracts to co-opt lower-level bureaucrats, state-owned enterprise (SOE) managers, and local private entrepreneurs in exchange for their compliance, cooperation, and support. Given the omnipresent uncertainties and fierce political competition in authoritarian politics (Svolik, 2012), cooperation and support from below are indispensable for political leaders as they navigate challenges and try to ensure their own political survival. By allocating benefits to local elites, officials

build factions and mobilize local allies, thereby fending off attacks from competitors and rival factions (Shih, 2008; Zhang and Liu, 2019). In addition, by doling out benefits to local elites, political leaders can cultivate patronage networks and elicit cooperation and support from local elites, since they have to rely on the latter to carry out policy mandates, especially in a context of economic and administrative decentralization in which different segments of bureaucrats and social elites have discretionary power over resources (Xu, 2011; Hillman, 2014). Moreover, officials distribute perks and benefits to local elites to simply buy their obedience and diminish their opposition to their leadership (Gorlizki and Khlevniuk, 2020; O'Brien, Li and Liu, 2020).

To concretize this idea, we propose a theoretical framework for understanding a mayor's sequential decisions about public investment over the entire tenure. We argue that a mayor needs to distribute benefits downward to local elites through public investment in exchange for their compliance, cooperation, and support. The mayor benefits from the investment over the tenure, usually at a discount rate. Intuitively, the marginal benefits of public investment for the mayor decrease over time since there is less remaining time in the tenure to enjoy the benefits. As a result, a mayor has stronger incentives to invest more in public projects during the earlier years of the tenure. Under a general setting, our model then predicts a downward *tenure effect* in public investment: the size of public investment decreases over time toward the end of a mayor's tenure. We further analyze the relevant variants of the baseline model that are connected to our empirical analysis.

To test these theoretical arguments, we empirically analyze the tenure effect of Chinese mayors on an emerging form of infrastructure investment in China—namely, public–private partnership (PPP). As a cooperative investment arrangement in which local governments partner with firms, PPP has become a prevalent financial tool for large-scale infrastructure, gradually replacing local government financing vehicles in public investment. PPP projects provide an ideal case for examining distributive politics for two reasons. The first is the considerable size of such projects. PPP projects include various types of public infrastructure, such as highways, subways, dams, and bridges. By the end of 2017, the total size of PPP projects had reached 10.8 trillion RMB (ap-

proximately 1.5 trillion USD), and these projects appear in all of the provincial units in China.[1] Second, China's PPP projects have a diverse nature in terms of contract partners. In contrast to the international standard of PPP models, Chinese PPP projects use hybrid partnerships between governments and social capital, the latter including both private firms and SOEs. Such diverse partner structures allow us to examine the distributive politics of these massive infrastructure projects.

In this study, we focus on how the tenure of mayors, who are the chief executives in charge of local economic and infrastructure development, affects the size of PPP investment in China. To estimate this tenure effect, we merge a city-level official database with an original database of all 7,332 PPP contracts signed by a local government from 2010 to 2017. We form the PPP database by scraping the official website of the Ministry of Finance (MOF). The city-year panel data analysis confirms a salient tenure effect in PPP investment: mayors invest more in PPP projects during their early years in office and reduce PPP investment by about 27%–34% per additional year in office. The result is robust to additional controls, alternative model specifications, alternative measures, and subsample analyses. We also examine the heterogeneity of this tenure effect, further demonstrating the distributive nature of infrastructure investment. We focus on how the endowment of officials affects the demand for benefit distribution. In support of the substitutable endowment hypothesis, we show that the negative tenure effect is more salient among mayors who do not have local work experience than among their peers with local experience in the city. This is because the latter are endowed with local elite networks based on their local experience.

Beyond documenting the effect of political cycles on PPP investment, we analyze the distributional consequence of the tenure effect from a contractual perspective. Specifically, we focus on the types of firms that partner with city governments in PPP projects. We find that these PPP-based infrastructure contracts mainly serve as a channel to co-opt local elites. Drawing on detailed contract-level information, we show that mayors allocate more valuable PPP contracts to local firms, particularly local SOEs. Our estimates show that PPP contract value increases by approximately 14% if local SOE investment increases by one standard deviation.

[1] http://www.cpppf.org/content/details_38_1108.html.

Lastly, we analyze how PPP investment benefits the officials themselves. In support of the survival concern mechanism, we find that PPP investment during the early years does prevent mayors from being dismissed as a result of corruption crackdowns. Consistent with the downward tenure effect, the estimated dismissal-prevention effect of PPP investment declines over the mayor's tenure. Lastly, we exclude an alternative explanation: promotion incentives. Our estimation shows that PPP investment does not increase the promotion chances of mayors, neither through a direct nor an indirect fiscal channel.

In summary, our study contributes to three streams of literature. First, this study enriches the comparative understanding of political tenure. In this vein, the existing literature has extensively studied the effect of term length on public budgets in electoral democracies, showing that incumbent politicians, based on the length of their tenure, resort to different economic and fiscal strategies to either be reelected (Rogoff and Sibert, 1988; Kayser, 2005; Alt and Lassen, 2006) or distribute patronage benefits to their clients (Pepinsky, 2007; Blaydes, 2010). Researchers have documented a link between budget expenditure patterns and politicians' tenure that is tightly related to their political careers in the former Soviet Union and China, where is in the absence of electoral accountability (Bunce, 1980; Guo, 2009; Vortherms, 2019). Contributing to the literature on the tenure effect in nondemocracies, our study unveils the distributional consequences of the political tenure effect. Related to our study, Chen and Zhang (2021) recently show that Chinese mayors provide favorable tax policies to large firms, particularly foreign firms, to enhance their prospects of career advancement. Our study instead focuses on an alternative type of career concern: the survival pressure to maintain political power.

This study also pertains to scholarship on business–government relations in two ways. We first contribute to a growing empirical literature that analyzes contractual relationships between firms and political leaders in government procurement (e.g., Goldman, Rocholl and So, 2013), land sales (e.g., Chen and Kung, 2019), and subsidies (e.g., Li, 2022). We further analyze large-scale infrastructure contracts, showing that local SOEs enjoy preferential treatment in these PPP projects. Our findings are consistent with the growing literature on how political incentives have led to a resur-

gence of SOEs in China (Lardy, 2019; Fang et al., 2022). Moreover, we show that PPP contracts serve as a venue for local officials to gain local compliance and support, which is consistent with the collusive nature of local business–government relations noted in earlier literature (Jia and Nie, 2017).

Lastly, our research complements the literature on distributive politics in nondemocracies. Studies show that officials use public resources to distribute benefits to lower-level bureaucrats by various means, including non-state-sector development, public-sector employment, fiscal expenditures, and transfers. These preferential benefits consolidate patrons' local power bases (Lü and Liu, 2019; Li and Zhang, 2018; Zhang and Liu, 2019) and facilitate policy coordination and implementation (Hillman, 2014; Jiang and Zhang, 2020). Our study advances this stream of literature by showing that lucrative infrastructure contracts also serve as a device for officials to distribute benefits. In this vein, Hong and Park (2016) present another case in which the authoritarian government in South Korea (1971–1988) gained electoral advantages through the construction of industrial complexes because its supporters received economic benefits from these industrial projects. Our study shows that such strategic allocation of public investment also exists in a single-party regime without elections. Contrary to the voter-seeking mechanism, we show that the co-optation target is mainly local elites rather than regular voters.

2 Theoretical Framework

Here, we propose a theoretical framework for understanding a mayor's sequential decisions about PPP investment over his or her entire tenure. We argue that a mayor needs to distribute benefits downward to local elites through PPP investment in exchange for their cooperation and support. The mayor benefits from investment over time, usually at a discounted rate. Importantly, the marginal benefit of investment to the mayor decreases over time, as one has less remaining time in the tenure to enjoy the benefits. As a result, the mayor is incentivized to invest more in PPP projects during the earlier years of the tenure. Our model then predicts a *tenure effect* in a mayor's

public investment decision-making: that is, a mayor will decrease the size of public investment over time toward the end of the tenure.

In section 2.1, we propose a baseline model that formalizes the above argument and demonstrates the *tenure effect*. Section 2.2 explores some extensions of the baseline model that are linked to our empirical investigation.

2.1 Baseline Model

Suppose a mayor assumes a tenure of T years. For $t = 1, 2, \cdots, T$, let K_t be the capital stock at the beginning of year t and I_t be the amount of PPP investment chosen by the mayor in that year. The law of the motion of capital stock is standard; that is,

$$K_{t+1} = K_t + I_t, \tag{1}$$

and the initial capital stock K_1 is exogenously given. For simplicity, we abstain from capital depreciation. The mayor's cost of investing I is $C(I)$, which is strictly convex and increasing, satisfying the Inada conditions—that is, $\lim_{I\to 0} C'(I) = 0$ and $\lim_{I\to\infty} C'(I) = \infty$, e.g., $C(I) = \frac{\alpha}{2} I^2$. In year $t \leq T$, the mayor's instantaneous utility function is $u(K_t + I_t)$. We assume $u' > 0$, $u'' \leq 0$, and $u''' \geq 0$ (e.g., $u(x) = \ln x$ or $u(x) = x$). When $t > T$, we assume the mayor's instantaneous utility turns to 0; that is, the mayor no longer benefits from PPP investment after the end of the tenure.

Given K_t at the beginning of year t, the mayor needs to choose a sequence of PPP investments $\mathbf{I}_t = (I_\tau)_{\tau=t}^{T}$ to maximize the aggregate payoff from year t until the end of one's tenure; that is,

$$U_t(K_t) = \max_{\mathbf{I}_t} \sum_{\tau=t}^{T} \delta^{\tau-t} \left[u(K_\tau + I_\tau) - C(I_\tau) \right], \quad \text{s.t. (1)}, \tag{2}$$

where $\delta \in (0, 1)$ is a constant time discount factor. $U_t(K_t)$ is the value function—that is, the maximum aggregate payoff the mayor can achieve by following an optimal investment rule from

year t until the end of the tenure. The Bellman equation of this dynamic programming (DP) problem is

$$U_t(K_t) = \max_{I_t} \{u(K_t + I_t) - C(I_t) + \delta U_{t+1}(K_{t+1})\} \quad \text{s.t. (1).} \tag{3}$$

We have $U_{T+1}(K_{T+1}) = 0$, as the mayor no longer benefits from PPP investment after his or her tenure. Substituting constraint (1) into objective function (3), we have the following first-order condition:

$$C'(I_t) = u'(K_t + I_t) + \delta U'_{t+1}(K_{t+1}). \tag{4}$$

The left-hand side of (4) is the marginal cost of investment I_t. The right-hand side is its marginal benefit to the mayor, which is the sum of the current-period marginal benefit $u'(K_t + I_t)$ and the discounted future marginal benefit $\delta U'_{t+1}(K_{t+1})$. Therefore, when making investment I_t in year t, a mayor takes into account not only the current-period benefit but also benefits in future periods. We denote the optimal investment in year t by I_t^*.

Second, applying the envelope theorem to the value function $U_t(K_t)$ in (3) gives

$$U'_t(K_t) = u'(K_t + I_t^*) + \delta U'_{t+1}(K_{t+1}). \tag{5}$$

The results of (4) and (5) characterize the sequence of optimal investment decisions by a mayor over the entire tenure, which are formally summarized as follows.

Proposition 1 *A mayor's optimal PPP investment sequence* $\mathbf{I}^* = (I_t^*)_{t=1}^T$ *is such that given* K_t *at the beginning of year* $t \leq T$*, the optimal investment* I_t^* *satisfies*

$$C'(I_t^*) = U'_t(K_t) = \sum_{\tau=t}^{T} \delta^{\tau-t} u'(K_\tau + I_\tau^*). \tag{6}$$

Proof. Proofs are given in Appendix A. ■

As shown in (6), $U'_t(K_t)$ is equal to the sum of all discounted marginal benefits of future periods, which decreases in t. It then follows that the marginal benefit of PPP investment for the mayor decreases over time. Therefore, the mayor will invest less in PPP projects when he or she

gets closer to the end of her tenure. This tenure effect in PPP investment is summarized as follows.

Proposition 2 (Tenure Effect) *The sequence of optimal PPP investment* $\mathbf{I}^* = (I_t^*)_{t=1}^T$ *decreases over time during a mayor's tenure; that is,*

$$I_t^* > I_{t+1}^*.$$

Proposition 2 then states the *tenure effect* in which the sequence of a mayor's optimal PPP investment decreases over time toward the end of the tenure. The result is intuitive, as a mayor will benefit from an investment during the remaining years of the tenure. Therefore, the marginal benefit of an investment in an early year is greater than that of a latter year *ceteris paribus*. As a result, a mayor's optimal PPP investment decreases over time during the tenure.

2.2 Downward Benefit Distribution and Tenure Effect in Context

Next, we investigate several variants of the baseline model that are linked to the empirical investigation of the tenure effect in context. First, when a mayor has alternative political endowments that are substitutable for the compliance and support of local elites, we expect the mayor to have weaker incentives for PPP investment, and the tenure effect is weaker. Section 2.2.1 investigates the effect of a substitutable endowment—existing local connections—on the tenure effect. Second, we examine the distributional consequence implied by our theory. Specifically, we show a preferential allocation of PPP projects to local firms. Section 2.2.2 studies the effects of local favoritism on the optimal allocation of PPP investment by a mayor. Finally, Section 2.2.3 studies how a mayor's sequential decisions about PPP investment might change under anticorruption campaigns, where he or she faces tremendous career uncertainty. Throughout our discussion in this section, we adopt a simple quadratic cost function, e.g., $C(I) = \alpha I^2/2$, where $\alpha > 0$ is a measure of technology.

2.2.1 Substitutable Endowments

We first examine how endowment affects the compliance and support of local elites. In this study, we focus on a form of political endowment: local connections established by officials throughout their careers. According to Persson and Zhuravskaya (2016), officials who develop careers in a locality can develop an extensive network with local elites. In the context of our study, since PPP investment serves as a means to garner local support, mayors with local connections through years of experience in certain localities have weaker incentive to spend on public investment. In other words, local connections dampen a mayor's incentives for PPP investment such that locally promoted mayors have weaker incentives to woo local elites through PPP investment when assuming office.

We introduce E as an initial endowment that is substitutable for PPP capital. Specifically, the instantaneous utility function now becomes $u\left(E + K_t + I_t\right)$, noting that E enters the utility function as a perfect substitute for PPP accumulated capital. Corollary 1 shows that the presence of substitutable endowments might dampen a mayor's incentive to make public investments—hence, the tenure effect.

Corollary 1 *Consider a mayor with substitutable endowment E. With increasing E, the optimal PPP investment I_t^* decreases, and the tenure effect becomes smaller. Specifically,*

$$-1 < \frac{\partial I_t^*}{\partial E} < 0 \textit{ and } \frac{\partial \left(I_t^* - I_{t+1}^*\right)}{\partial E} > 0.$$

The intuition here is that, with a smaller amount of alternative endowment E, a mayor relies more heavily on PPP investment to gain the compliance and support of local elites. Our empirical analysis focuses on connections with local political and economic elites. As scholars of authoritarian politics have argued, local experience offsets a leader's demand for downward benefit distribution. Political leaders who have worked in a city for many years might have enhanced their power by colluding with local elites before assuming office. Therefore, they do not necessarily need to distribute benefits once they take office. By contrast, mayors who transfer from other

regions lack local connections or knowledge and therefore have stronger incentives to distribute benefits to local elites during their early years in office.

Corollary 1 suggests that mayors without local experience have stronger incentives to invest in PPP projects. The empirical results in Table 3 support our theoretical predictions about the substitution effects of alternative political endowments.

2.2.2 Local Favoritism

Next, we examine the distributional consequences of the tenure effect. In the context of PPP investment, a mayor can partner with firms in various locations and with different ownership structures. Under our central argument of downward benefit allocation, a mayor's preferential partners in PPP projects are local firms, especially local SOEs.

In the spatial dimension, political leaders prefer distributing contracts to local firms over nonlocal firms for several reasons. Compared with nonlocal firm owners, the owners of local firms are local economic elites who develop strong politics–business networks during the years they conduct business in a certain locality. Allocating benefits to them helps officials cultivate patronage networks, which are crucial for political survival. First, developing local patronage networks serves as a protection mechanism that can fend off attacks from political rivals and competitors (Shih, 2008; Zhang and Liu, 2019). Moreover, local elite networks grease the policy implementation process, helping officials carry out policy mandates (Zhang and Liu, 2019; Knoke, 1993). That said, it is more beneficial for political leaders who seek local elite networks to distribute benefits to local firms.

While local firms are the main target of co-optation, distributing benefits to SOEs is more beneficial to non-SOEs in the eyes of political leaders who are concerned about political survival. First, local SOE managers are de facto subordinates to political leaders, whose support matters more than that of private entrepreneurs in cadre evaluation. Although provincial party leaders decide on the promotion of mayors, an important step in cadre evaluation is called "democratic evaluation," in which the organizational department solicits opinions about mayors from their local subordi-

nates. Although opposition from below is not a determinant of political careers, it might incur a reputation cost that is harmful to the political survival of a mayor. In China and the former Soviet Union, local economic elites, among other grassroots-level bureaucrats, can orchestrate collective actions against their supervisors when their demands are overlooked (Gorlizki and Khlevniuk, 2020; O'Brien, Li and Liu, 2020). Second, SOEs are more mobilizable than private firms in advancing political leaders' policy agendas. While private entrepreneurs have their own pecuniary interests, SOE managers as subordinates can ruthlessly carry out their patrons' policies, even at the cost of firm performance or profits (Boycko, Shleifer and Vishny, 1996; Krueger, 1990).

To examine this distributional effect, we extend the baseline model to allow two different types of firms: local and nonlocal firms. Specifically, let I_t and $\hat{I}_t$ (K_t and $\hat{K}_t$) represent, respectively, investment (accumulated capital) by local and nonlocal firms in year t. The instantaneous utility function is

$$u\left(K_t, \hat{K}_t, I_t, \hat{I}_t\right) = (K_t + I_t) + \left(\hat{K}_t + \hat{I}_t - \frac{\rho}{2}\hat{I}_t^2\right). \tag{7}$$

Note that we assume a mayor benefits less from investment by nonlocal firms (e.g., $\rho > 0$). The law of motion of capital stock remains the same as before (i.e., (1)). I_t^* and $\hat{I}_t^*$ denote the optimal allocation of the investment of local and nonlocal firms, respectively. We obtain the following result:

Corollary 2 *Consider the allocation of PPP investment between local and nonlocal firms. Under a positive technology shock (e.g., a smaller α), both the total PPP investment $I_t^* + \hat{I}_t^*$ and the share of local firm investment $I_t^*/(I_t^* + \hat{I}_t^*)$ will increase.*

Corollary 2 states that when the cost of investment decreases (e.g., smaller α), a mayor increases not only the total PPP investment but also the share of local firms. This result is driven by the assumption that a mayor, who wants to woo local elites through distribution, benefits more from investment by local firms. The same argument also applies to firms with different ownership structures (SOEs and private firms) when we assume that mayors benefit less from private firms than SOEs. Table 4 presents the empirical results for local favoritism and the distributive

consequences of the tenure effect.

2.2.3 Career Risks and Survival Concerns

In this section, we analyze the political incentives of officials that yield the abovementioned distributional pattern. We argue that officials distribute benefits to their subordinates to main elite coherence, thereby enhancing their political survival. We test this political survival mechanism using the case of a recent anticorruption campaign that has brought tremendous career risks to government officials at nearly all levels. Career risks can have two differentiated implications for a mayor's decisions about PPP investment. On the one hand, a mayor can obtain more career security through the support and cooperation of local elites, which encourages downward benefit distribution through PPP investments. On the other hand, PPP investment creates the opportunity for corruption and therefore increases a mayor's possibility of being caught and punished overtime during the campaign, which will dampen the incentives for PPP investment.

We modify the baseline model to incorporate the above consideration of PPP investment during an anticorruption campaign. Specifically, we assume that a mayor's probability of being dismissed is $\Pr(X \leq 0)$, where X is a random variable that measures a mayor's performance. The mayor can reduce that dismissal probability with the support and cooperation of local elites via PPP investment. We assume it affects the probability in an additive way (e.g., $\Pr(X + K_t + I_t \leq 0)$). The probability of survival in year t is thus $\Pr(X + K_t + I_t > 0)$. In an environment with high political risks, the survival probability in year t is adjusted by η^t with $\eta \in (0, 1]$. That is, survival probability becomes smaller over time during an anticorruption campaign.

If a mayor is dismissed, his or her utility becomes 0; otherwise, he or she obtains a utility normalized to u_0. The mayor's instantaneous expected utility in year t is hence

$$\eta^t \mathbb{E}u(K_t, I_t) = \eta^t \Pr(X + K_t + I_t > 0) u_0. \tag{8}$$

Intuitively, η^{-1} measures the intensity of an anticorruption campaign. The smaller η is, the more

intensive the anticorruption campaign. When η takes the maximum value of 1, we return to the baseline case of no anticorruption campaign. We simplify our analysis by assuming that a mayor maximizes the aggregate expected payoff as in (2), with (8) being the instantaneous utility. For simplicity, we assume X follows a uniform distribution on $[-M, M]$, where M is the maximum possible value of PPP capital accumulated.

Corollary 3 *Consider PPP investment under an anticorruption campaign, with the instantaneous expected utility of (8). (1) If* $\eta^{-1} > \frac{2(1-\delta^{T-1})}{1-\delta^{T}}$*, then the optimal investment* I_t^* *drops faster with the increasing intensity of the anticorruption campaign—that is,* $I_t^* - I_{t+1}^*$ *is increasing in* η*. (2) For a given investment, the dismissal probability is increasing over time, ceteris paribus.*

Corollary 3 shows the intuitive result that when the intensity of an anticorruption campaign increases, a mayor's optimal investment in PPP projects will drop faster over time. It also shows that during a corruption crackdown, a mayor's probability of being dismissed increases over time with the same level of PPP investment. The empirical findings regarding survival concern in Table 5 and for sequential PPP investment during an anticorruption campaign in Table C.11 support the theoretical implication.

3 PPP in China

In China, PPP serves as a cooperative arrangement between government and nongovernment actors for public goods provision. With its rapid economic development and urbanization, China is among the countries that have widely used PPP as a financial approach to public investment. China has experienced rapid urbanization, moving about 671 million people from rural areas to cities since the start of the reform era. Rapid urbanization requires various public infrastructures. To reduce the pressures of fiscal shortfalls and government debt, multiple levels of government have actively used PPPs to finance public investment (Tan and Zhao, 2019; Zhao, Su and Li, 2018). In the 1980s, the Chinese government began to develop PPP projects, particularly using the build–operate–transfer (BOT) model, to fund the construction of power plants. To overcome

the financial shortfalls of infrastructure construction, the Chinese government has expanded PPP investment since 2004, when the MOF allowed the building of roads and water and sewage facilities using partnership models such as transfer–operate–transfer (TOT) and build-own–operate (BOO). In 2013, the Chinese government granted permission to use PPPs to finance multiple types of infrastructure, including energy, transportation, affordable housing, and environmental projects.

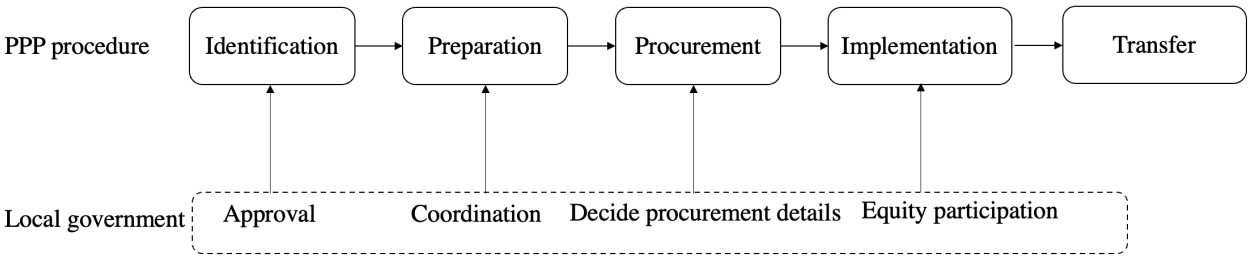
In this ongoing effort to promote the PPP model in public investment, the MOF established the China Public–Private Partnership Center (CPPPC) as the official agency to monitor project progress.[2] We scraped the information on all PPP contracts disclosed on the CPPPC website and constructed a Chinese Public–Private Partnership Contract Database (CPPPCD) containing all 7,332 prefectural PPP contracts from 2010 to 2017, with the date, contract value, location, type of contract, and related shareholder information. Figure B.1 shows an example of a contract page.[3]

According to the MOF, launching a PPP project consists of five steps (see Figure 1). The first step is the identification stage, when a firm or government agency can initiate a PPP project. The local finance department and its affiliated PPP office must conduct a value-of-money (VoM) test and a fiscal burden test to evaluate long-term profitability and fiscal feasibility. After completing these evaluations, the local government—specifically, the PPP-leading group chaired by a vice mayor—approves the project. Once approved, the project moves to the perpetration stage. At this stage, the local government selects a consultant firm to draft the implementation plan. The municipal government also assigns an agency for project implementation. The procurement stage follows the preparation stage. In this stage, local governments must specify the procurement details, including the bidding method and bidders' requirements. Once the PPP contract is signed, the project moves to the implementation stage, in which the local government and its collaboration partners contribute money based on the shares of equity. Lastly, the completed PPP project is transferred to the owners specified in the contract. In summary, throughout the entire PPP launching process, the local government is involved in every step, influencing approval, deciding the contract details, and contributing to the PPP contracts.

[2] https://www.cpppc.org/

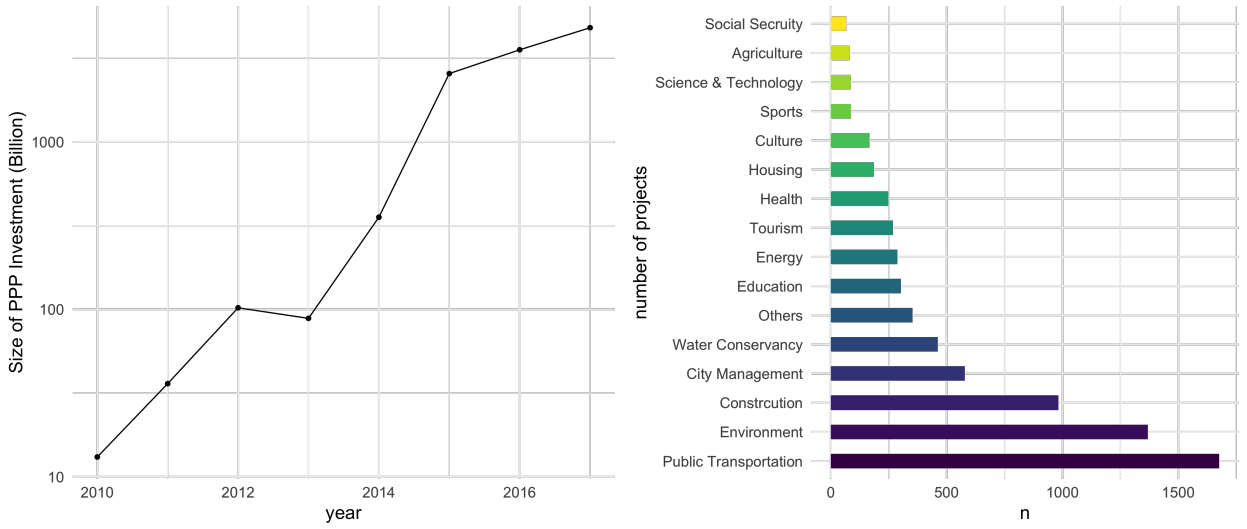
[3] The last time we crawled the data was on 10/30/2019.

Figure 1: PPP Program Procedure



We choose 2010–2017 as the time frame for empirical analysis because the MOF began disclosing PPP contracts in 2010, and city-official data are available through 2017. During the study period, city-level PPP expanded rapidly, by 190% per year (see the time trend in the left panel of Figure 2. These PPP projects are sizable, with an average value of 1.5 billion RMB (231 million USD), covering various types of public infrastructure (right panel of Figure 2). Public transportation—including roads, trains, and train and bus stations—is the most common type, followed by environmental projects and major city construction, such as government office buildings and plazas. Figure B.2 shows the spatial variation. PPP projects are widespread in all 31 provincial units that launched PPP projects during the study period.

Figure 2: Time Trend and Types of PPP Investment



4 Tenure Effect on PPP Investment

4.1 Main Result

To estimate the tenure effect on PPP investment, we construct a panel of 287 cities between 2010 and 2017.[4] To document the dynamics of PPP investment, we aggregate the PPP contract data to the city level by computing the gross value of PPP contracts signed by a city government in a specific year as the outcome variable. We then match the CPPPCD database with two other data sources. First, we obtain biographical and career experience information about Chinese prefectural political leaders from the official dataset of Peking University's China Center for Economic Research developed by Yao and Xi (2019), which contains career information about prefectural political leaders.

In this study, we focus on mayors, who are the chief executives in charge of economic affairs under the dual leadership system of China's local governments. As PPP projects are usually large-scale infrastructure projects that matter for economic growth and employment, mayors have a strong influence on these projects. According to the internal PPP evaluation document from Jilin City (Figure B.3), the municipal government must convene a meeting to approve the launch of new PPP projects. Also, the final contracts need to be approved by the municipal government. In addition to granting direct approval, mayors can also influence PPP projects through personnel management. Mayors, as the heads of municipal governments, can decide the promotion of the head of the finance bureau, the agency in charge of the day-to-day execution of PPP projects. In summary, city mayors can affect PPP projects, especially in terms of approving the launch of new projects and determining their contract value.

In our main specification, we include five individual-level variables of mayors: (1) a binary measure of gender that is coded as 1 if the leader is female, (2) a binary measure of ethnicity (ethnic minority = 1, Han = 0), (3) a continuous measure of age, (4) years of education, and (5) a binary measure of patronage connections coded as 1 if a prefectural leader is promoted to the

[4] We do not include ethnic minority cities where regime stability rather than economic development is a top priority for local government (Landry, Lü and Duan, 2018).

current post by the incumbent provincial party secretary (Jiang, 2018). In our sample, mayors on average serve 2.61 years in office, which is shorter than the five-year formal tenure length.[5] Figure B.4 shows the distribution of tenure length. The average age is 51. About 11% have local work experience, and 34% have patronage connections with provincial party secretaries.

In addition to individual-level data, we collect city-level socioeconomic data from China's City Statistical Yearbooks. In our baseline specification, we include three city-level covariates, including logged population, logged GDP per capita, and logged fiscal revenue. Table 1 shows the summary statistics of all of the variables used in the baseline specification.

Table 1: Summary Statistics

Statistic	N	Mean	St. Dev.	Min	Max
Value of PPP Investment (logged)	2,234	0.81	17.62	−13.82	25.70
Tenure	2,227	2.61	1.53	1	12
Age	2,227	50.95	3.59	35	61
Female	2,227	0.07	0.25	0	1
Ethnicity	2,222	0.08	0.27	0	1
Education	2,234	17.46	2.89	12	21
Patronage Connection	2,227	0.34	0.47	0	1
Local Experience	2,234	0.11	0.31	0	1
Revenue	2,223	13.78	1.00	10.87	17.32
Expenditure	2,223	14.65	0.68	11.71	17.64
GDP per capita (logged)	2,231	10.48	0.63	4.60	13.06
Population (logged)	2,234	5.85	0.68	2.97	7.24

We use prefecture-year panel data from 2010 to 2017 to estimate the effect of a mayor's tenure on city-level PPP investment, employing a two-way fixed-effects model to exclude city- and year-specific unobservables. The model is specified as follows:

$$PPP_{i(j)t} = \beta_1 Tenure_{jt} + \beta_4 X_{it} + \beta_5 Z_{jt} + \lambda_i + \gamma_t + \epsilon_{ijt},$$

where $PPP_{i(j)t}$ is the logged value of gross PPP investment in city i in year t. Our key independent

[5] In China, officials are rotated by the CPC to avoid local collusion, leading to the variation in political tenure.

variable of interest is $Tenure_{jt}$, which is measured by the number of years mayor j works in a city. For example, the tenure of a mayor in office from 2013 through 2015 would be 1, 2, and 3 in 2013, 2014, and 2015, respectively. X_{it} denotes city-level time-variant controls that include logged population, GDP per capita, and fiscal revenue. Z_{jt} denotes individual-level covariates, including a mayor's gender, ethnicity, years of education, age, and patronage connections. λ_i and γ_t are city- and year-fixed effects, respectively. Standard errors are clustered at the city level.

Table 2 presents the results. We begin the analysis by including the key independent variable and city- and year-fixed effects (column 1). Then, we gradually add city- and individual-level covariates to exclude the city- and individual-specific unobservables in columns 2 and 3. In column 4, we show the full model that controls for all covariates and fixed effects. In the full model, the estimates of a mayor's tenure are negative and statistically significant at the 5% level. Aside from statistical significance, the magnitude of the tenure effect is sizable. Our estimate shows that PPP investment decreases by 27% to 34% with one additional year in office. Given that the average tenure length is 2.61 years, our estimation suggests that on average mayors distribute 55% less PPP investment in the year they leave office than when they enter office. In summary, our main results provide strong support for our claim that a mayor's optimal investment in PPP projects decreases over time.[6]

4.2 Robustness Checks

We conducted several sets of robustness checks. None of them challenges our key findings regarding the mayor's tenure effect.

Ability of Mayor. While our baseline specification controls for a set of individual covariates, it fails to consider an important omitted variable: a mayor's ability. Highly capable mayors might make different public investment decisions than their less capable peers. For example, highly

[6]Indeed, PPP projects such as infrastructure investment are more like "pork" to local elites as opposed to other types of investment used for boosting the local economy. We demonstrate its distinctive effect by comparing it with the tenure effect on city-level fixed-asset investments, a measure that documents the gross amount of investment in buildings, land, machinery, equipment, and infrastructure. In contrast to the negative tenure effect on PPP investment, Table C.1 shows that the overall fixed-asset investment increases during the tenure of mayors.

Table 2: Effect of Mayors' Tenure on PPP Investment

	Logged Amount of PPP Investment			
	(1)	(2)	(3)	(4)
Tenure	-0.270^{*}	-0.295^{**}	-0.349^{**}	-0.341^{**}
	(0.142)	(0.141)	(0.151)	(0.156)
GDP per capita		2.973^{**}	3.021^{**}	3.225^{**}
		(1.493)	(1.493)	(1.517)
Population		6.212	6.204	6.138
		(5.536)	(5.599)	(5.606)
Revenue		1.242	1.233	1.180
		(1.372)	(1.376)	(1.375)
Age			−0.728	−0.806
			(1.091)	(1.089)
Age squared			0.008	0.009
			(0.011)	(0.011)
Female				−0.001
				(1.013)
Ethnic minority				1.397
				(1.118)
Education				−0.040
				(0.083)
Patronage Connections				0.120
				(0.493)
City FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
N	2,227	2,224	2,224	2,219
Adjusted R^2	0.731	0.731	0.731	0.731

Note: FE represents fixed effects. Dependent variables are logged values of PPP investment. Standard errors are clustered at the city level. *p<0.1, **p<0.05, ***p<0.01.

capable mayors are able to distribute more resources at the beginning of their tenure, either to co-opt local elites or advance their political careers. In other words, the tenure effect might be convoluted according to the ability of mayors. We address this concern by including an individual fixed effect by excluding individual-level, time-invariant confounding factors such as a mayor's ability. Appendix Table C.2 shows the result. The estimates of a mayor's tenure range from -0.51 to -0.60 and are all statistically significant at the 5% level. The result of a three-way fixed-effects model reduces our concern about omitted-variable bias.

Alternative Measure of Tenure. We address concerns about the measure of a mayor's tenure. In the baseline specification, we use a continuous measure as the key independent variable. However, tenure is right-skewed. To address the concern that our baseline findings are driven by outliers, we use a truncated measure of tenure, coding it as 10 if a mayor stays in office for 10 years or more. Appendix Table C.3 in the Appendix shows the result. The coefficients on a mayor's tenure are negative and statistically significant across different specifications. This result provides additional support for the robustness of our key finding regarding the tenure effect.

Effect of Party Secretaries. We also account for the tenure effect of the city party secretary. While mayors are primarily in charge of economic development and public investment, city party secretaries have veto power in public policy decision-making. To account for their effect on PPP investment, we control for time-variant covariates, including the age, age squared, and years in office of party secretaries. Table C.4 shows the result. Controlling for party secretaries' incentive effect, the tenure effect of mayors is still significant across various specifications.

Flexible Estimation Strategy. In the baseline specification, we model the effect of a mayor's tenure on PPP investment as a linear relationship. However, mayors are likely to have a stronger incentive to invest in PPP projects at specific times in their careers. For example, Guo (2009) shows an inverse U-shaped relationship between a county party secretary's tenure and fiscal revenue. We adopt two approaches to address concerns about nonlinearity. We test whether the relationship between a mayor's tenure and PPP investment follows a quadratic trend. We estimate the model by including both tenure and its square with other baseline covariates and fixed effects. Table

C.5 shows the results. Estimates of both tenure and its square are not statistically significant at the 5% level, suggesting no quadratic relationship between our key independent variable and the outcome variables. In addition to the parametric approach, we adopt a flexible estimation strategy that replaces the continuous measure of a mayor's term used in the baseline specification with a set of year-dummy variables. This flexible estimation yields estimates for each year of a mayor's tenure. Figure B.5 shows the point estimates of each year dummy and the corresponding confidence intervals. Compared with the first year, estimates for the second year and above are all negative and statistically significant at the 5% level. Overall, the point estimates of years follow a slightly downward trend, confirming our theoretical argument regarding the negative tenure effect on public investment.

Binary Measure of Outcome. Another concern is the measure of the dependent variable. In the main result, we use a continuous measure of PPP investment as the dependent variable. We are also interested in the tenure effect of mayors on PPP investment decision-making. We use a binary measure of PPP investment, coding it as 1 if a city invests in PPP projects in a specific year and 0 otherwise. Table C.6 shows the results of a linear probability model that uses a binary measure of PPP investment as a dependent variable, using the same specification as in Table 2. Consistent with our baseline result, Table C.6 shows a significant and negative effect of a mayor's tenure on PPP investment decision-making. Again, the result confirms the validity of our theoretical prediction.

Subsample Analysis. We address concerns about the political rank of mayors. In China, 15 prefectures, known as vice-provincial-level cities, have an administrative rank superior to that of other prefectural cities. Mayors of these cities, who have a higher rank than the mayors of other cities, might have distinct incentives. For example, Landry, Lü and Duan (2018) showed that political selection at higher levels of government values patronage connections more than economic performance. These different selection incentives might affect mayors at different levels of government. To address this concern, we conduct a subsample analysis by estimating the effect of a mayor's tenure on PPP investment in the subsample of non vice-provincial cities. Table C.7 shows that the tenure effect is significant in this subsample.

Time Frame. Finally, we check whether our result is sensitive to the choice of time frame. After the new national leadership assumed office in late 2012, China accelerated PPP investment, and most PPP projects were deployed afterward. We verify that our result holds between 2013 and 2017. Table C.8 shows the results. Consistent with our baseline findings, the estimates for tenure are negative and significant. This further strengthens the robustness of our key findings.

4.3 Effect Heterogeneity on Substitutable Endowments

We now examine heterogeneity in the tenure effect by focusing on *local experience*. As our model predicts the substitution effect of local experience and the tenure effect, mayors with local experience are less incentivized than those without it to invest more during their early years of tenure. We examine this conjecture by conducting an interaction analysis. We regress the amount of PPP investment (columns 1 and 2) and binary outcome of PPP investment decisions (columns 3 and 4) on a mayor's tenure, local experience, and the interaction term, as well as all baseline controls and fixed effects. Table 3 shows the results. The coefficients of a mayor's tenure remain negative, suggesting a sizable tenure effect on PPP investment among mayors lacking local experience. The regression model yields positive and significant estimates of the interaction term that are comparable to the coefficient on a mayor's tenure. The result suggests that local experience largely offsets the downward tenure effect on PPP investment, as shown by the positive estimate of the interaction term. Similar results are also found for PPP investment decisions. Mayors without local experience are less likely to approve any PPP investments when staying one additional year in office while their peers with local experience are more likely to do so (column 4). The results for local endowment provide evidence in support of Corollary 1, confirming that PPP investment is mainly used to garner local support and develop local elite networks.

Table 3: Local versus Non-local Mayors

	Investment Value		Investment Dummy	
	(1)	(2)	(3)	(4)
Mayor's Tenure	−0.370**	−0.435***	−0.010**	−0.012***
	(0.151)	(0.162)	(0.004)	(0.005)
Local Experience	−3.970***	−4.084***	−0.112***	−0.114***
	(1.392)	(1.411)	(0.039)	(0.040)
Mayor's Tenure*Local Experience	1.057***	1.017***	0.029***	0.028***
	(0.390)	(0.388)	(0.011)	(0.011)
City FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Baseline Controls	Y	N	Y	N
N	2,227	2,219	2,227	2,219
Adjusted R^2	0.731	0.731	0.716	0.716

Note: FE represents fixed effects. Dependent variables are logged amounts of PPP investment (columns 1–2) and PPP investment dummy (columns 3–4). Controls are age, age squared, female, ethnic minority, years of education, patronage connections, GDP (logged), population (logged), and revenue (logged). Standard errors are clustered at the city level. *p<0.1, **p<0.05, ***p<0.01.

5 Distributive Consequence of the Tenure Effect

Here, we provide empirical evidence for the distributive implication of the tenure effect, as discussed in section 2. We first empirically test Corollary 2, which suggests that mayors preferentially allocate PPP contracts to local firms. In the subnational context of China, political leaders are incentivized to maintain close relationships with local firms, which are major economic actors who not only maintain employment and tax revenues to burnish the administrative performance of local cadres (Zuo, 2015) but also generate rent-seeking opportunities for local officials colluding with local businessmen. Mayors can subcontract profitable infrastructure projects with local firms to appease local political and business elites.

We empirically examine this implication by analyzing the shareholder structure of 3,425 PPP contracts.[7] We expect that mayors who intend to distribute benefits to local elites will be more likely to allocate lucrative contracts to local firms in their jurisdictions. We match our PPP contract

[7]Only contracts that are in the implementation phase release ownership information.

database with the equity nature and location of each firm obtained from one of the largest corporate information databases in China, Tianyancha.com, and compute the shares of various types of firms that contract with local governments in PPP projects (Figure B.6). According to MOF regulations, both SOEs and private firms are eligible to be contractors for PPP projects.[8] Our data show that SOEs are widespread, appearing as partners in about 68% of all PPP contracts. Aside from the equity nature, we analyze the firm's location. We find that local corporations appear in about 70% of PPP projects.

Before presenting contract-level evidence, we first conduct a premise check, showing that the downward tenure effect is driven by average contract value rather than contract volume. In other words, mayors approve projects with higher average value during their early years of tenure (Table C.9). This check reassures us that the tenure effect mainly manifests in the average contract value.

Based on Corollary 2, we expect that mayors will tend to distribute more valuable contracts to local firms. Table 4 shows the results. We regress the size of PPP investment on the logged investment of local firms in column 1, which shows a positive correlation between local firm shares and contract value. A 1% increase in local firm investment is associated with about a 1.3% increase in contract value. Moreover, we focus on the equity type of firms and divide firms into SOEs and non-SOEs. Specifically, we examine whether mayors allocate higher-value contracts to SOEs. We find that SOE investment is positively correlated with contract value, suggesting an SOE premium in PPP investment. In column 3, we regress contract value on the interaction of local and SOE investment. The interaction term is also statistically significant, suggesting a larger premium for local SOEs. In columns 4 and 5, we regress contract value on local SOEs and local non-SOEs. The results are in line with the interaction specification: contract value increases with larger input from local SOEs. Overall, we show that local firms, particularly local SOEs, obtain more valuable contracts when doing PPP projects. This finding suggests that PPP projects serve as a form of "pork" to buy the support of local political and economic elites. The co-opting target in public investment is primarily locals rather than nonlocals, insiders rather than outsiders (non-SOEs). In particular,

[8]The direct translation of PPP in China is "government and social capital partnership." Social capital refers to corporations with different ownership structures.

local SOE leaders are de facto officials because they are appointed by local party committees or government authorities and thus are constituents of local bureaucracy whose interests concern the mayor. In other words, large investment projects such as PPPs can render lucrative opportunities to these local elites.[9] Overall, we show that mayors co-opt local firms, particularly local SOEs, using valuable PPP contracts. This pattern of local favoritism accords with our central claim that mayors use public investment to buy off local economic elites in their jurisdictions. [10]

Table 4: Contract-level Analysis

	Contract Value				
	(1)	(2)	(3)	(4)	(5)
Local Investment	0.013***		0.004		
	(0.003)		(0.003)		
SOE Investment		0.016***	−0.010		
		(0.002)	(0.007)		
Local SOE Investment				0.015***	
				(0.003)	
Local Non SOE Investment					0.001
					(0.003)
Local Investment*SOE Investment			0.001***		
			(0.0003)		
City FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
N	3,052	3,052	3,052	3,052	3,052
Adjusted R^2	0.147	0.154	0.161	0.149	0.137

Note: FE represents fixed effects. Dependent variables are logged values of PPP contracts. Controls are age, age squared, female, ethnic minority, years of education, patronage connections, GDP (logged), population (logged), and revenue (logged). Standard errors are clustered at the city level. *p<0.1, **p<0.05, ***p<0.01.

[9] It is worth noting that many local SOEs have their own business networks involving a large number of non-SOE business partners. Hence, although local SOEs are more likely to be the direct targets of PPP investment, they can further share part of the interests to their favored non-SOE firms embedded in the business network. See Bai, Hsieh and Song (2019).

[10] It is likely that officials contract more with local SOEs for public welfare purposes. Although we do not have firm-level employment information, we examine this question using city panel data. Table C.10 shows that PPP investment is not correlated with city employment. Interestingly, the estimation of local SOE investment is negative, but statistically insignificant.

6 Survival Concern

Beyond showing the distributional consequences of the tenure effect, we further demonstrate the incentives of officials under such a distributive pattern. According to our theoretical argument, officials distribute benefits to their subordinates to maintain elite coherence and avoid losing political power. We test this political survival mechanism using the case of the ongoing anticorruption campaign in China. From 2012 to 2017, over 1.5 million officials were swept out of office because of corruption (Gan and Choi, 2018). Because of its scale and intensity, this campaign has been viewed as an unprecedented political risk for public officials, thus affecting their decision-making and productivity (Jiang and Zhang, 2020; Manion, 2016; Wang, Zhang and Zhou, 2020; Li and Manion, 2022). Facing such tremendous career risks, mayors might adjust their decisions about PPP investment in two ways. If a chilling effect dominates, mayors might reduce their PPP investment because such deals with firms might be the target of the anticorruption effort. By contrast, as we propose in this study, PPP investment can serve as a co-opting mechanism for officials to buy off local elites, thereby preventing them from betraying political leaders in such corruption crackdowns. If this co-optation mechanism dominates, we expect that officials who invest in more lucrative PPP projects are less likely to be dismissed from public office.

Table 5: Effect of PPP Investment on Corruption Dismissal

	Dismissal							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Gross Investment	−0.0009***				−0.0014***			
	(0.0003)				(0.0005)			
Local Investment		−0.0002				−0.0011**		
		(0.0003)				(0.0005)		
SOE Investment			0.0002				−0.0008	
			(0.0003)				(0.0006)	
Local SOE Investment				−0.0002				−0.0011**
				(0.0003)				(0.0005)
Term					0.0068***	0.0044**	0.0047**	0.0044**
					(0.0020)	(0.0022)	(0.0021)	(0.0021)
Gross Investment*Term					0.0002*			
					(0.0001)			
Local Investment*Term						0.0004*		
						(0.0002)		
SOE Investment*Term							0.0004	
							(0.0003)	
Local SOE Investment*Term								0.0004*
								(0.0002)
Baseline Controls	N	Y	Y	Y	Y	Y	Y	Y
City and Year FE	Y	Y	Y	Y	Y	Y	Y	Y
N	2,219	2,219	2,219	2,219	2,219	2,219	2,219	2,219
Adjusted R^2	0.0123	0.0070	0.0071	0.0071	0.0194	0.0153	0.0157	0.0154

Note: FE represents fixed effects. The dependent variable is a binary measure of corruption dismissal. Baseline controls are age, age squared, female, ethnic minority, years of education, patronage connections, GDP (logged), population (logged), and revenue (logged). Standard errors are clustered at the city level.

To empirically distinguish these two effects, we develop a proxy for political survival by focusing on whether a mayor survives the corruption crackdown. We construct a binary measure of the effect of official dismissal—coded as 1 if a mayor is dismissed in the next year and 0 otherwise—on PPP investment, using the baseline specification. Table 5 shows the results. Column 1 shows the correlation between gross PPP investment and official dismissal. The result supports the survival concern explanation: mayors who have more PPP investment are less likely to be dismissed from public office. Since our contract-level analysis shows that PPP projects are disproportionately allocated to certain firms, we also examine the effect of different types of PPP investment on promotion. To do so, we regress dismissal on various types of PPP investment, including those with local firms, SOEs, and local SOEs. The estimates of all of these PPP investments are not statistically significant. In columns 5–8, we examine the time element of PPP investment in relation to official dismissal by interacting different types of investment with a mayor's tenure. The interaction specifications yield negative estimates for the main terms, including gross investment, local investment, and local SOE investment, suggesting that large investment during the first year of office strongly prevents the dismissal of officials. Moreover, the models yield positive and marginally significant estimates for the interactions between a mayor's term and (1) gross investment, (2) local investment, and (3) local SOE investment. That is, the dismissal-prevention effect of PPP investment is weakened over time during a mayor's tenure. In addition to the outcome-based analysis, we also conduct a marginal-effect analysis by estimating how the downward tenure effect varies when mayors are exposed to higher career risk, which is measured by the number of purged officials in their jurisdictions. Table C.11 shows the results: local political leaders are more likely to invest more during their early years in office when their status is perilous because of increased corruption crackdowns in their jurisdiction. Taken together, these findings further support our theoretical argument that PPP investment mainly serves as a benefit-distribution mechanism to woo the support of local economic elites, which is crucial for the survival of political leaders.

7 Alternative Explanation: Promotion Concern

In addition to the survival concern of officials, an alternative explanation is that officials distribute benefits in their jurisdiction for *career advancement*. Research shows that the prospect of career advancement incentivizes public officials in China to advance economic development, extract fiscal extraction, and focus on public goods provision (e.g., Li and Zhou, 2005; Xu, 2011). In the context of this study, mayors with strong promotion incentives might invest in more PPP projects to signal their competence. If promotion incentives dominate, PPP investment will at least increase during the first few years of tenure (which could decrease and form an inverse-U relationship), based on the existing literature Guo (2009). The downward tenure effect in the main analysis does not support the promotion incentive mechanism. Nevertheless, we further examine this alternative explanation. In support of the promotion incentive, an ex post observation is that mayors who invest more in PPP projects are granted promotion after their time in mayoral positions. Following common practice, we empirically test this conjecture by examining the effect of PPP investment on political turnover (Li and Zhou, 2005; Landry, Lü and Duan, 2018). We first construct a binary measure of a mayor's political turnover, coding it as 1 if the official is promoted in the next year and 0 otherwise. We regress political turnover on PPP investment, controlling for city- and year-fixed effects. Column 1 in Table 6 presents the results, showing that PPP investment is not correlated with a mayor's career advancement. Using the same specification as in the analysis of survival concerns, columns 2–4 show the results when regressing the promotion measure on the logged amount of PPP investment contracted with (1) local firms, (2) SOEs, and (3) local SOEs. We do not observe any positive correlations between these specific types of investment on a mayor's promotion outcome. We also examine the time element of PPP investment by interacting the mayor's term and various forms of PPP investments in columns 5–8. Again, no model yields significant estimates for the investment-term interactions, suggesting that the effect of PPP investment on promotion does not vary across the time span of a mayor's term.[11]

[11] We also examine the promotion-concern explanation by analyzing whether officials show greater competence by advancing PPP investment. Following Lü and Landry (2014), we estimate the marginal effect of competition on PPP investment. We gauge the level of competition by counting the number of cities in a province. Figure B.7 shows the

In addition to its direct effect on promotion, investment in PPP projects might also indirectly affect the career outcomes of mayors through the revenue channel. PPP investment, especially projects assigned to local firms, can serve as a channel for governments to boost local revenues. We empirically examine this indirect channel in Table 7. In columns 1–4, we regress the logged fiscal revenue on the gross value of PPP investment and the logged value of PPP projects with local firms, SOEs, and local SOEs, controlling for individual-level covariates, mayor's term, and the revenue–expenditure ratio, which measures the demand for additional revenue sources. We show that different types of PPP investment are positively correlated with fiscal revenue. Moving a step forward, we examine the effect of fiscal revenue on promotion (column 5). The coefficient of fiscal revenue is negative but not significant, suggesting no correlation between fiscal performance and the promotion of mayors during the study period. In summary, PPP investment does boost fiscal revenue, providing suggestive evidence for our argument that officials use public investment to enhance local compliance in policy implementation.The positive effect of PPP investment on revenue can be interpreted as the enhancement of compliance, which is also in line with our theory of garnering local support. However, we do not find strong evidence that such investment serves as a means to boost the promotion prospects of mayors.

marginal effect analysis of mayors' tenure in provinces with different numbers of cities. Clearly, the slope is flat, and its confidence interval crosses zero, suggesting that the level of competition does not affect this decision.

Table 6: Effect of PPP Investment on Promotion

	Promotion							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Gross Investment	−0.0003				0.0011			
	(0.0009)				(0.0012)			
Local Investment		−0.0003				0.0015		
		(0.0012)				(0.0016)		
SOE Investment			0.0003				0.0024	
			(0.0012)				(0.0017)	
Local SOE Investment				−0.0004				0.0013
				(0.0012)				(0.0016)
Term					0.0821***	0.0861***	0.0862***	0.0858***
					(0.0085)	(0.0099)	(0.0096)	(0.0099)
Gross Investment*Term					−0.0003			
					(0.0004)			
Local Investment*Term						−0.0006		
						(0.0006)		
SOE Investment*Term							−0.0007	
							(0.0006)	
Local SOE Investment*Term								−0.0005
								(0.0005)
Baseline Controls	N	Y	Y	Y	Y	Y	Y	Y
City and Year FE	Y	Y	Y	Y	Y	Y	Y	Y
N	2,219	2,219	2,219	2,219	2,219	2,219	2,219	2,219
Adjusted R^2	0.0590	0.0590	0.0590	0.0590	0.1332	0.1332	0.1336	0.1332

Note: FE represents fixed effects. The dependent variable is a binary measure of promotion. Baseline controls are age, age squared, female, ethnic minority, years of education, patronage connections, GDP (logged), population (logged), and revenue (logged). Standard errors are clustered at the city level. *p<0.1, **p<0.05, ***p<0.01.

Table 7: Indirect Channel for Promotion Incentives

	Revenue				Promotion
	(1)	(2)	(3)	(4)	(5)
Gross Investment	0.001**				
	(0.0004)				
Local Investment		0.002***			
		(0.001)			
SOE Investment			0.002***		
			(0.001)		
Local SOE Investment				0.002***	
				(0.001)	
Revenue-Expenditure Ratio	−0.104***	−0.102***	−0.103***	−0.102***	
	(0.013)	(0.013)	(0.013)	(0.013)	
Revenue					−0.0001
					(0.048)
City FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Individual Controls	Y	Y	Y	Y	Y
N	2,211	2,211	2,211	2,211	2,222
Adjusted R^2	0.999	0.999	0.999	0.999	0.059

Note: FE represents fixed effects. The dependent variable is logged fiscal revenue in columns 1–4 and a binary measure of promotion in column 5. Individual controls are age, age squared, female, ethnic minority, and patronage connections. Standard errors are clustered at the city level. *p<0.1, **p<0.05, ***p<0.01.

Conclusion

Using a novel dataset of PPP projects, we document a dynamic effect of political tenure on public investment in China. Our findings show that mayors invest more during their early years in office. Moreover, the tenure effect is more salient when mayors are not promoted locally. Exploring the incentives for this distributional decision-making, we show that mayors woo local elites to keep their political office secure from dismissal. Contract-level evidence shows that mayors allocate more valuable contracts to local firms, particularly local SOEs, to co-opt local elites.

It should be noted that our findings derive from a context in which political elites are typically not subject to checks and balances in doling out resources. Future research can analyze whether the tenure–investment association identified in our work can apply to other emerging democracies with weak instutions. Moreover, our analysis does not directly consider the efficiency implications for PPP investment driven by city mayors. Lacking systematic contract-execution information, the optimal size and contract design for PPP investment are unclear, given the endowment conditions and development status of a city. On the one hand, our findings suggest that PPP investment, like other government-sponsored investment projects, is not immune to the political calculus, possibly at the expense of economic efficiency, as suggested by earlier scholarship (e.g., Robinson and Torvik, 2005). On the other hand, it is also likely that the preferential allocation to local SOEs involves welfare considerations (e.g., Aharoni, 2018). More effort can be devoted to assessing the efficiency and welfare implication associated with such investment projects and to considering whether there are schemes that can improve them.

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Appendices

A Omitted Proofs

Proof of Proposition 1. We solve the DP problem by backward induction. In the last year T, first, as $U_{T+1}(K_{T+1}) = 0$, it follows from (4) that the optimal investment I_T^* solves $C'(I_T) = u'(K_T + I_T)$. Second, it follows directly from (5) that $U_T'(K_T) = u'(K_T + I_T^*)$, which confirms (6). Next, we suppose the induction hypothesis of (4) and (6) are true in year $t, t+1, \cdots, T$. In year $t-1$, the first-order condition (4) gives $C'\left(I_{t-1}^*\right) = u'\left(K_{t-1} + I_{t-1}^*\right) + \delta U_t'(K_t)$, and the envelope theorem from (5) gives

$$\begin{aligned} U_{t-1}'(K_{t-1}) &= u'\left(K_{t-1} + I_{t-1}^*\right) + \delta U_t'(K_t) \\ &= u'\left(K_{t-1} + I_{t-1}^*\right) + \delta \sum_{\tau=t}^{T} \delta^{\tau-t} u'(K_\tau + I_\tau^*) = \sum_{\tau=t-1}^{T} \delta^{\tau-(t-1)} u'(K_\tau + I_\tau^*). \end{aligned}$$

We then prove the results. ■

Proof of Proposition 2. Given a sequence of optimal investment $\mathbf{I}^*$, from (6), we have

$$\begin{aligned} C'(I_t^*) - C'\left(I_{t+1}^*\right) &= \sum_{\tau=t}^{T} \delta^{\tau-t} u'(K_\tau + I_\tau^*) - \sum_{\tau=t+1}^{T} \delta^{\tau-t-1} u'(K_\tau + I_\tau^*) \\ &= u'(K_t + I_t^*) + (\delta - 1) \sum_{\tau=t+1}^{T} \delta^{\tau-t-1} u'(K_\tau + I_\tau^*) \geq \delta^{T-t} u'(K_t + I_t^*) > 0, \end{aligned}$$

where the first inequality is from the fact that $I_\tau^* \geq 0$ and $u'' \leq 0$, and the second equality is from the fact that $u' > 0$. As $C(I)$ is strictly convex, it follows that $I_t^* > I_{t+1}^*$. ■

Proof of Corollary 1. In the last period T, the first-order condition is $F_T = u'(E + K_T + I_T) - C'(I_T) = 0$. Applying the implicit function theorem gives

$$\frac{\partial I_T^*}{\partial E} = -\frac{\partial F_T / \partial E}{\partial F_T / \partial I_T} = -\frac{u''(E + K_T + I_T^*)}{u''(E + K_T + I_T^*) - C''(I_T^*)}.$$

It is clear that $-1 < \partial I_T^* / \partial E < 0$, and therefore, $U_T'(K_T) = u'(E + K_T + I_T^*)$ is decreasing in E as $E + I_T^*$ is increasing in E. As an inductive hypothesis, we assume that $-1 < \partial I_\tau^* / \partial E < 0$ is true for any period $t+1, \cdots, T$. In period t, we then have the first-order condition $F_t = u'(E + K_t + I_t) + \delta U_{t+1}'(E + K_{t+1}) - C'(I_t) = 0$, and

$$\frac{\partial I_t^*}{\partial E} = -\frac{\partial F_t / \partial E}{\partial F_t / \partial I_t} = -\frac{u''(E + K_t + I_t^*) + \delta U_{t+1}''(E + K_{t+1})}{u''(E + K_t + I_t^*) + \delta U_{t+1}''(E + K_{t+1}) - C''(I_t^*)}, \tag{9}$$

where $U_{t+1}^{''} < 0$ is implied by the inductive hypothesis. It then follows that $-1 < \partial I_t^* / \partial E < 0$ as well, and again $U_t' (K_t) = \sum_{\tau=t}^{T} \delta^{\tau-t} u' (E + K_\tau + I_\tau^*) < 0$.

For the second part, to prove $\partial \left(I_t^* - I_{t+1}^* \right) / \partial E > 0$, from (9), it is equivalent to prove $\left(\frac{\partial I_t^*}{\partial E} \right)^{-1} < \left(\frac{\partial I_{t+1}^*}{\partial E} \right)^{-1}$, which is equivalent to

$$\frac{C'' (I_t^*)}{u'' (E + K_t + I_t^*) + \delta U_{t+1}^{''} (E + K_{t+1})} < \frac{C'' \left(I_{t+1}^* \right)}{u'' \left(E + K_{t+1} + I_{t+1}^* \right) + \delta U_{t+2}^{''} (E + K_{t+2})}.$$

Under our assumption of the quadratic cost function (e.g., $C (I) = \alpha I^2 / 2$), it reduces to proving

$$U_{t+1}^{''} (E + K_{t+1}) = u'' \left(E + K_{t+1} + I_{t+1}^* \right) + \delta U_{t+2}^{''} (E + K_{t+2}) > u'' (E + K_t + I_t^*) + \delta U_{t+1}^{''} (E + K_{t+1}).$$

What we need to show is just that $u'' (E + K_t + I_t^*) + (\delta - 1) U_{t+1}^{''} (E + K_{t+1}) < 0$. We have

$$\begin{aligned} & u'' (E + K_t + I_t) + (\delta - 1) \sum_{\tau=t+1}^{T} \delta^{\tau-t-1} u'' (E + K_\tau + I_\tau^*) \\ & \leq u'' (E + K_t + I_t) + (\delta - 1) \sum_{\tau=t+1}^{T} \delta^{\tau-t-1} u'' (E + K_t + I_t^*) \\ & = \delta^{T-t} u'' (E + K_t + I_t) < 0, \end{aligned}$$

where the inequality is from the assumption $u''' \geq 0$ and that $\delta \in (0, 1)$. ■

Proof of Corollary 2. To prove the result, we first need to derive the optimal investment rule in this case. The Bellman equation of the DP problem is

$$\begin{array}{rl} U_t \left(K_t, \hat{K}_t \right) = & \max_{I_t, \hat{I}_t} \left\{ u \left(K_t, \hat{K}_t, I_t, \hat{I}_t \right) - C \left(I_t, \hat{I}_t \right) + \delta U_{t+1} \left(K_{t+1}, \hat{K}_{t+1} \right) \right\} \\ s.t. & K_{t+1} = K_t + I_t, \ \hat{K}_{t+1} = \hat{K}_t + \hat{I}_t. \end{array}$$

Similar to (4), we have the following first-order conditions:

$$1 + \delta \frac{\partial U_{t+1}}{\partial K_{t+1}} - \alpha I_t = 0 \text{ and } 1 - \rho \hat{I}_t + \delta \frac{\partial U_{t+1}}{\partial \hat{K}_{t+1}} - \alpha \hat{I}_t = 0. \tag{10}$$

Applying the envelope theorem gives

$$\frac{\partial U_t}{\partial K_t} = 1 + \delta \frac{\partial U_{t+1}}{\partial K_{t+1}}, \text{ and } \frac{\partial U_t}{\partial \hat{K}_t} = 1 + \delta \frac{\partial U_{t+1}}{\partial \hat{K}_{t+1}}. \tag{11}$$

As in Proposition 1, we solve this problem by backward induction. In year T, the first-order condition (10) gives $1 - \alpha I_T = 0$ and $1 - (\alpha + \rho) \hat{I}_T = 0$, and the envelope theorem result (11) gives $\partial U_T / \partial K_T = \partial U_T / \partial \hat{K}_T = 1$. It is easy to verify that the following inductive hypothesis is

true:

$$\frac{\partial U_t}{\partial K_t} = \frac{\partial U_t}{\partial \hat{K}_t} = \sum_{\tau=t}^{T} \delta^{\tau-t} = \frac{1-\delta^{\tau-t+1}}{1-\delta}.$$

Substituting back, the first-order conditions (10) become

$$\alpha I_t^* = (\alpha+\rho)\,\hat{I}_t^* = 1 + \frac{1-\delta^{\tau-t+1}}{1-\delta}.$$

It is clear that both I_t^* and $\hat{I}_t^*$ are decreasing in α, and

$$\frac{I_t^*}{I_t^* + \hat{I}_t^*} = \frac{\alpha+\rho}{2\alpha+\rho}$$

is also decreasing in α. Therefore, both $I_t^* + \hat{I}_t^*$ and $I_t^*/(I_t^* + \hat{I}_t^*)$ become larger when α decreases. ■

Proof of Corollary 3. The quadratic cost function is $C(I) = \alpha I^2/2$. Given our assumption of uniform distribution, the instantaneous expected utility (8) in year t is

$$\eta^t \mathbb{E}u(K_t, I_t) = \eta^t \frac{M + K_t + I_t}{2M} u_0.$$

The optimal investment rule is characterized by (6), which gives

$$C'(I_t^*) = \alpha I_t^* = \sum_{\tau=t}^{T} \delta^{\tau-t} \left(\frac{u_0}{2M}\eta^t\right).$$

For result (1), the partial derivative of I_t^* with respect to η gives

$$\alpha \frac{\partial I_t^*}{\partial \eta} = \sum_{\tau=t}^{T} \delta^{\tau-t} \left(\frac{u_0}{2M} t\eta^{t-1}\right) = \frac{1-\delta^{T+1-t}}{1-\delta} \left(\frac{u_0}{2M} t\eta^{t-1}\right).$$

It then follows that

$$\frac{\partial\left(I_t^* - I_{t+1}^*\right)}{\partial \eta} \propto t\eta^{t-1}\left(1-\delta^{T+1-t}\right) - (t+1)\,\eta^t\left(1-\delta^{T-t}\right) = \frac{\eta^{t-1}}{1-\delta^{T-t}} \left(\frac{1-\delta^{T+1-t}}{1-\delta^{T-t}} \frac{t}{t+1} - \eta\right).$$

Note that $\frac{1-\delta^{T+1-t}}{1-\delta^{T-t}} \frac{t}{t+1}$ is strictly increasing in t. Therefore,

$$\text{if } \frac{1-\delta^T}{2\left(1-\delta^{T-1}\right)} > \eta, \text{ then } \frac{\partial\left(I_t^* - I_{t+1}^*\right)}{\partial \eta} > 0 \text{ for all } t = 1, \cdots, T.$$

Result (2) is self-evident. ■

B Figures

Figure B.1: PPP Contract Website

Figure B.2: Spatial Distribution of PPP Investment across Chinese Cities

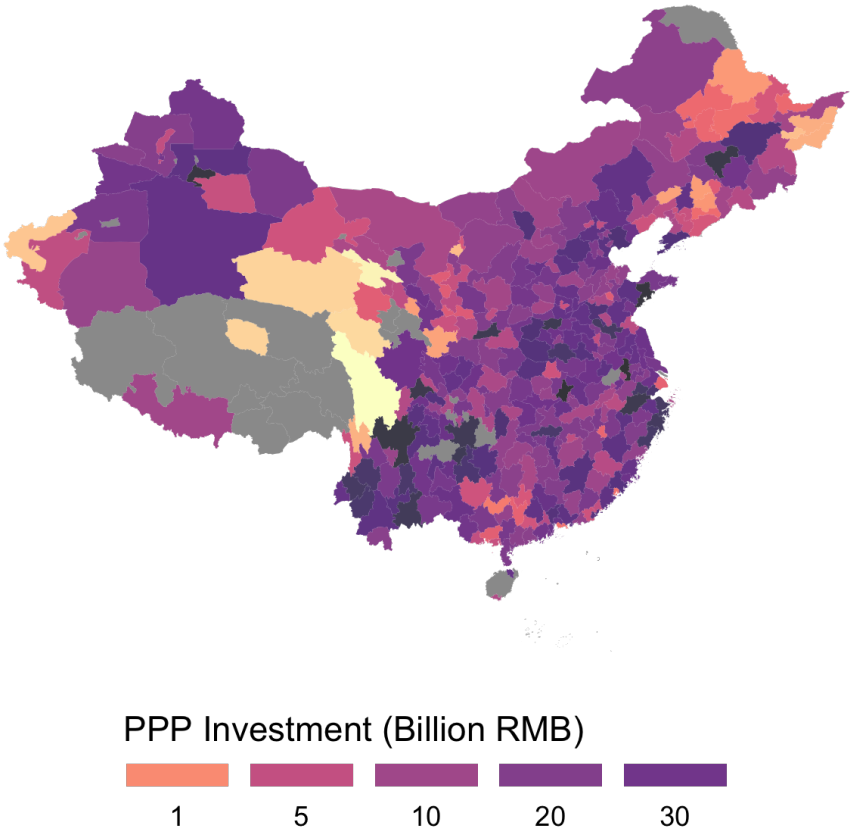


Figure B.3: PPP Process in Jilin City

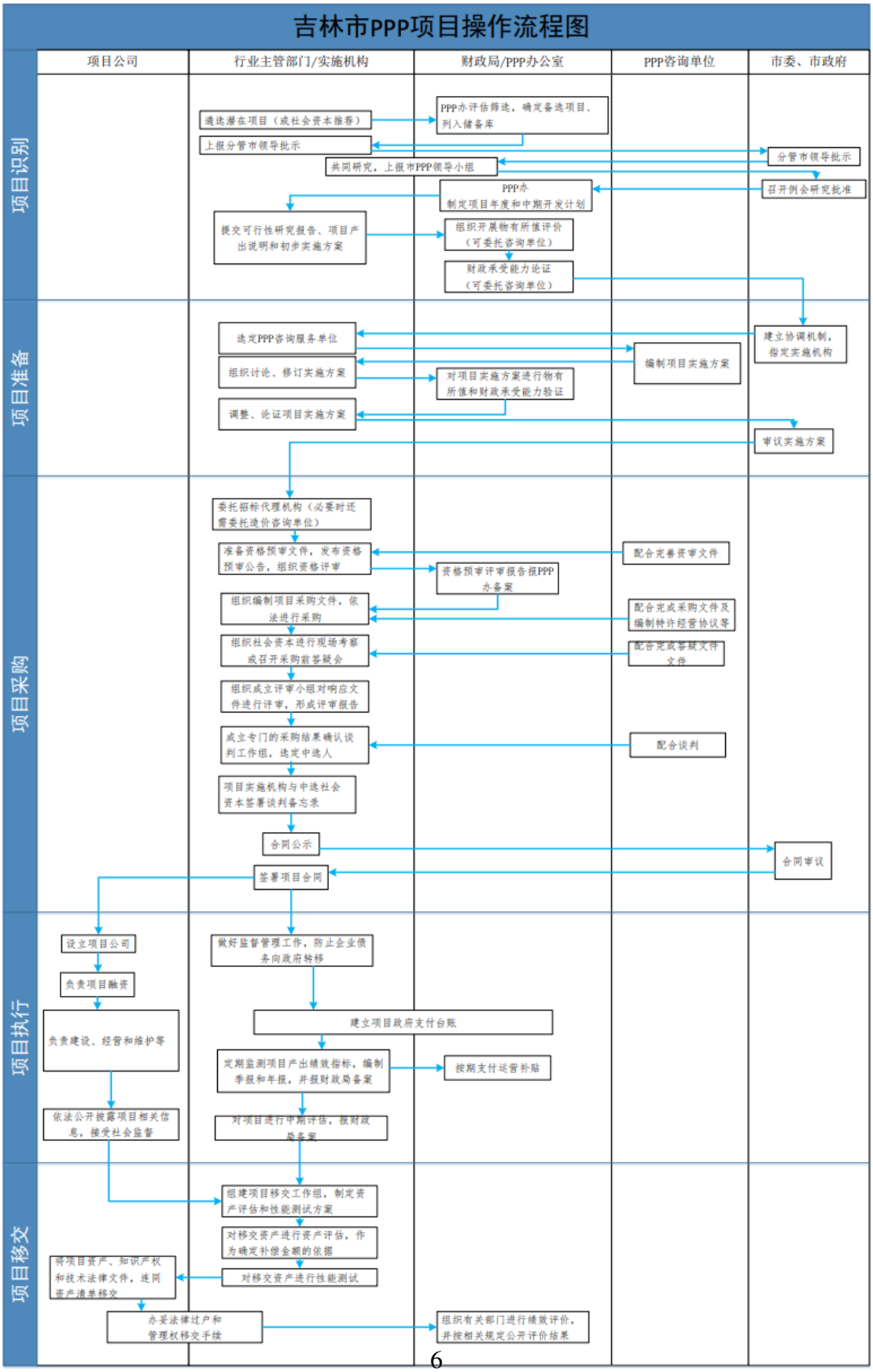
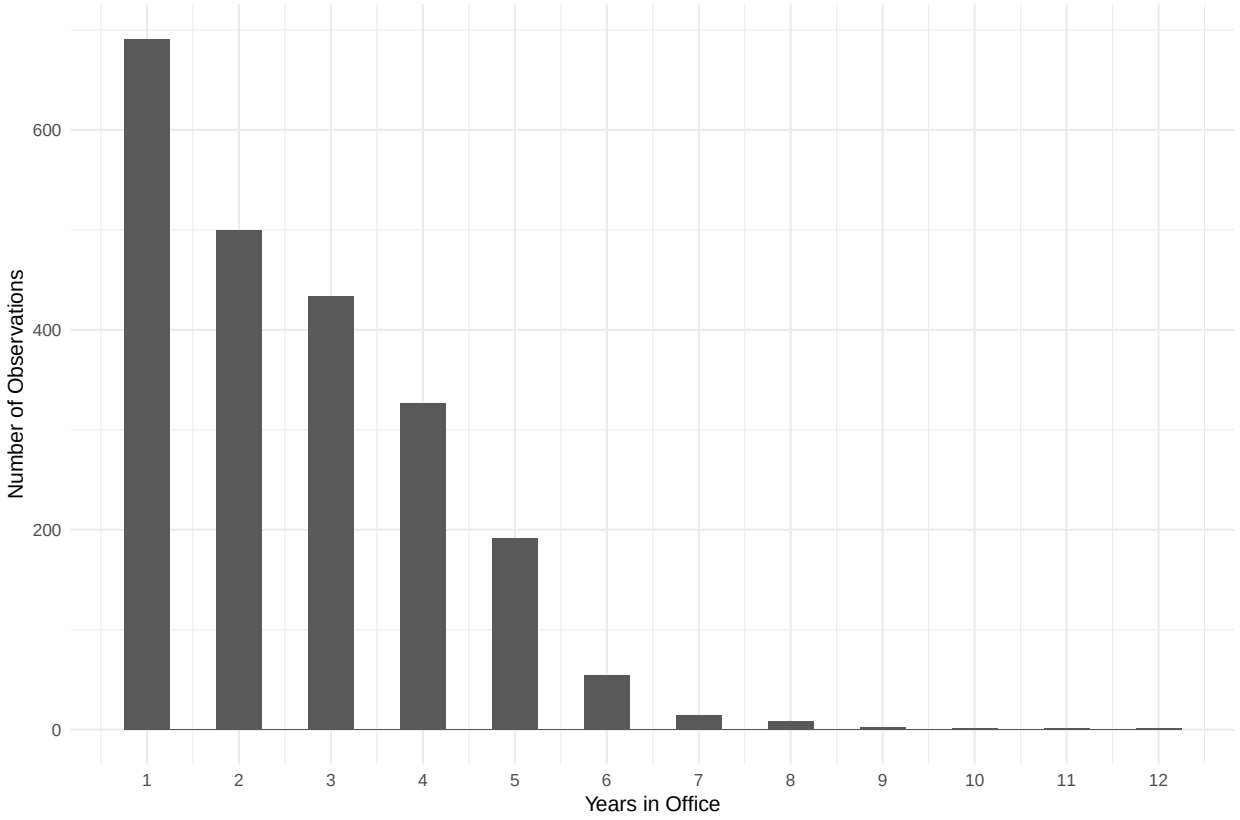


Figure B.4: Tenure of Mayors (2010–2017)



Note: here, we collapse the panel data at the term level to compute mayors' tenure.

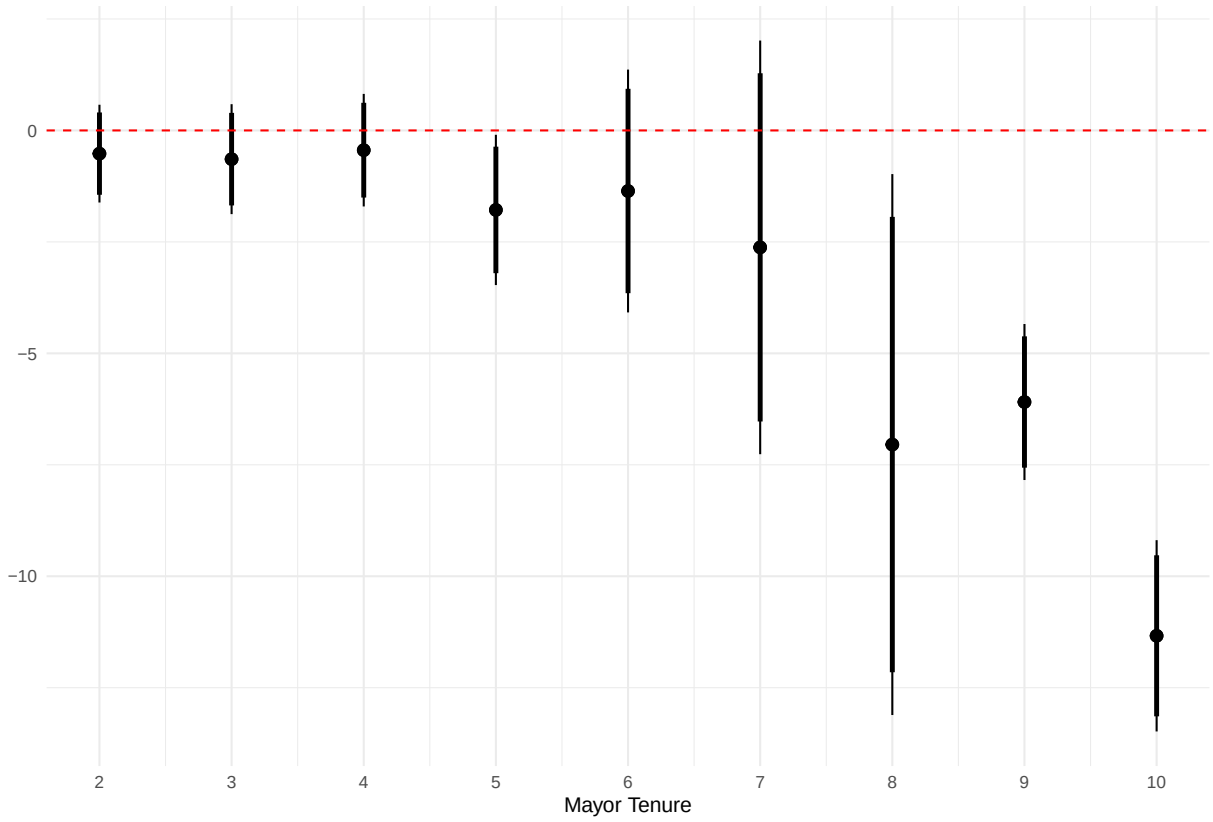


Figure B.5: Flexible Estimate

Figure B.6: SOEs, Local, and Local SOE Shares in PPP Projects

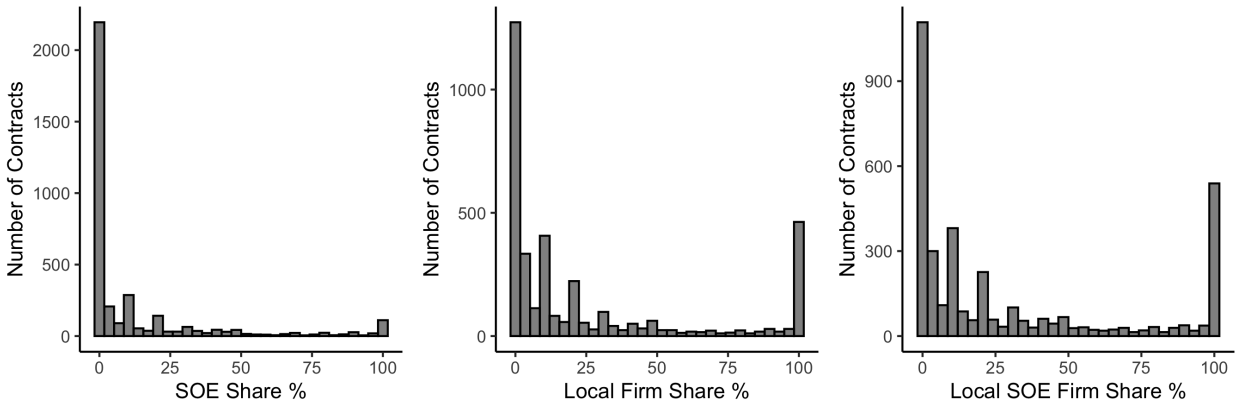
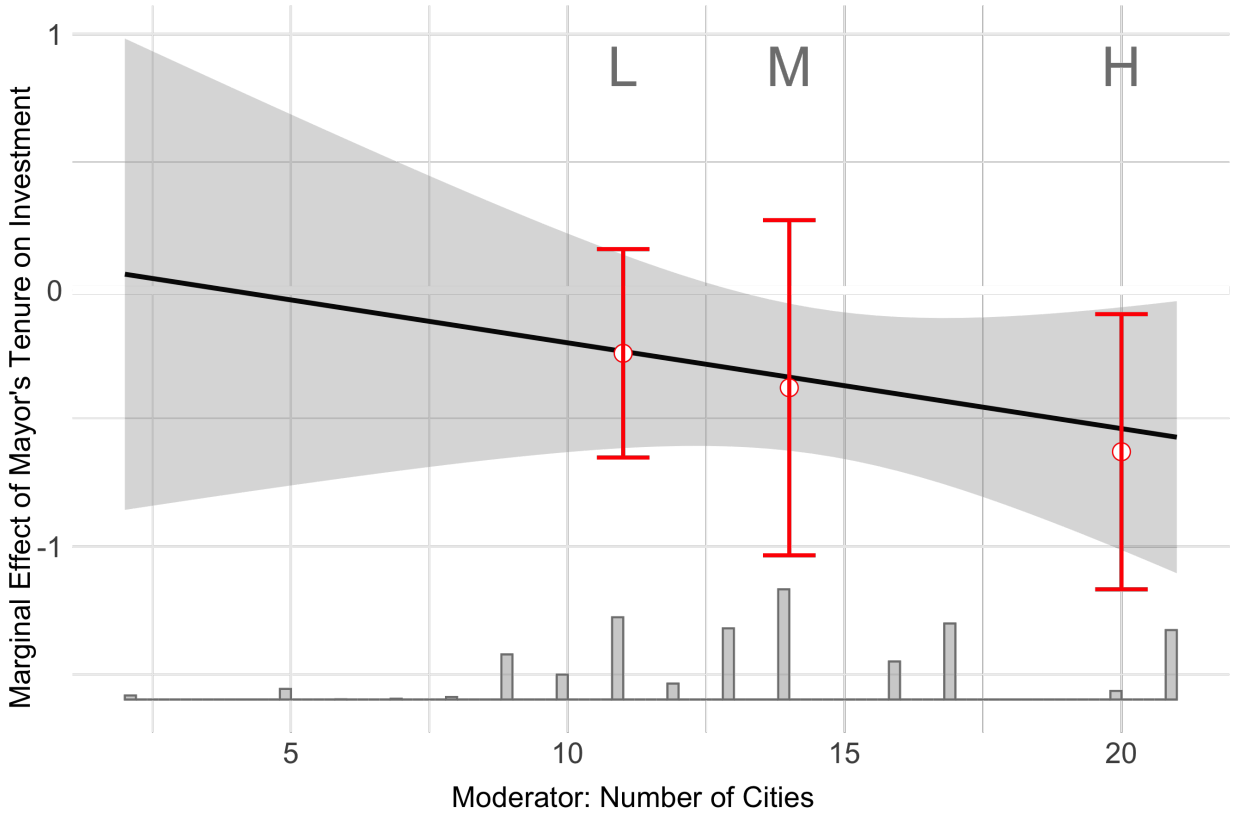


Figure B.7: Marginal Effect of Competition



C Tables

Table C.1: Effect of Mayors' Tenure on Fixed-asset Investment

	Amount of Fixed-Asset Investment			
	(1)	(2)	(3)	(4)
Tenure	0.013***	0.008**	0.010**	0.011***
	(0.004)	(0.003)	(0.004)	(0.004)
GDP per capita		0.042	0.040	0.043
		(0.095)	(0.095)	(0.095)
Population		0.665**	0.657**	0.660**
		(0.267)	(0.265)	(0.269)
Revenue		0.642***	0.642***	0.637***
		(0.096)	(0.096)	(0.095)
Age			0.034	0.030
			(0.037)	(0.038)
Age squared			−0.0004	−0.0003
			(0.0004)	(0.0004)
Female				0.035
				(0.046)
Ethnic Minority				0.015
				(0.050)
Education				0.004
				(0.003)
Patronage Connections				0.016
				(0.015)
City FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
N	1,937	1,934	1,934	1,929
Adjusted R^2	0.926	0.943	0.943	0.943

Note: FE represents fixed effects. Dependent variables are logged values of fixed asset investment. Individual controls are age, age squared, female, ethnic minority, years of education, and patronage connections. City controls are GDP (logged), population (logged), and revenue (logged). Standard errors are clustered at the city level. *p<0.1, **p<0.05, ***p<0.01.

Table C.2: Accounting for Individual Fixed Effects

	Investment Value		
	(1)	(2)	(3)
Mayor's Tenure	-0.513^{**}	-0.603^{**}	-0.597^{**}
	(0.225)	(0.248)	(0.248)
Individual FE	Y	Y	Y
Year FE	Y	Y	Y
City Controls	N	N	Y
Individual Controls	N	Y	Y
N	2,222	2,217	2,214
Adjusted R^2	0.715	0.715	0.714

Note: FE represents fixed effects. Dependent variables are logged values of PPP investment. Individual controls are age, age squared, female, ethnic minority, years of education, and patronage connections. City controls are GDP (logged), population (logged), and revenue (logged). Standard errors are clustered at the city level. $^{*}p<0.1$, $^{**}p<0.05$, $^{***}p<0.01$.

Table C.3: Truncated Measure of Mayors' Tenure

	Amount of Investment (Logged)			
	(1)	(2)	(3)	(4)
Mayor's Tenure	-0.265^{*}	-0.302^{*}	-0.290^{**}	-0.335^{**}
	(0.142)	(0.157)	(0.141)	(0.156)
Individual Controls	N	Y	N	Y
City controls	N	N	Y	Y
City FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
N	2,227	2,222	2,224	2,219
Adjusted R^2	0.731	0.730	0.731	0.731

Note: FE represents fixed effects. Dependent variables are logged values of PPP investment. Controls are age, age squared, female, ethnic minority, years of education, patronage connections, GDP (logged), population (logged), and revenue (logged). Standard errors are clustered at the city level. *p<0.1, **p<0.05, ***p<0.01.

Table C.4: Effect of Party Secretary on PPP Investment

	Investment (Logged)		
	(1)	(2)	(3)
Mayor's Tenure	−0.402**	−0.365**	−0.411**
	(0.164)	(0.152)	(0.162)
Party secretary's tenure	0.209		0.184
	(0.144)		(0.149)
Party secretary's age		−1.999	−1.846
		(1.940)	(1.962)
Party secretary's age,squared		0.019	0.018
		(0.018)	(0.019)
Baseline controls	Y	Y	Y
City FE	Y	Y	Y
Year FE	Y	Y	Y
N	2,214	2,214	2,214
Adjusted R^2	0.730	0.730	0.730

Note: FE represents fixed effects. Dependent variables are logged values of PPP investment. Individual controls are age, age squared, female, ethnic minority, years of education, and patronage connections. City controls are GDP (logged), population (logged), and revenue (logged). Standard errors are clustered at the city level. *p<0.1, **p<0.05, ***p<0.01.

Table C.5: Quadratic Specification

	Amount of Investment			
	(1)	(2)	(3)	(4)
Mayor's Tenure	0.346	0.333	0.338	0.317
	(0.389)	(0.386)	(0.390)	(0.385)
Mayor's Tenure squared	−0.095*	−0.097*	−0.099*	−0.100*
	(0.055)	(0.055)	(0.054)	(0.055)
GDP per capita		3.014**		3.266**
		(1.492)		(1.515)
Population		6.146		6.065
		(5.412)		(5.479)
Revenue		1.214		1.150
		(1.369)		(1.372)
Age			−0.821	−0.894
			(1.071)	(1.081)
Age squared			0.009	0.010
			(0.011)	(0.011)
Female			−0.016	−0.025
			(1.009)	(1.018)
Ethnic Minority			1.217	1.396
			(1.169)	(1.119)
Education			−0.035	−0.039
			(0.084)	(0.083)
Patronage Connections			0.224	0.185
			(0.501)	(0.491)
City FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
N	2,227	2,224	2,222	2,219
Adjusted R^2	0.731	0.732	0.730	0.731

Note: FE represents fixed effects. Dependent variables are logged values of PPP investment. Individual controls are age, age squared, female, ethnic minority, and patronage connections. City controls are GDP (logged), population (logged), and revenue (logged). Standard errors are clustered at the city level. *p<0.1, **p<0.05, ***p<0.01.

Table C.6: Binary Outcome

	Investment Dummy			
	(1)	(2)	(3)	(4)
Mayor's Tenure	-0.007^{*}	-0.008^{**}	-0.010^{**}	-0.010^{**}
	(0.004)	(0.004)	(0.004)	(0.004)
GDP per capita		0.074^{*}	0.075^{*}	0.082^{**}
		(0.041)	(0.041)	(0.041)
Population		0.140	0.139	0.137
		(0.156)	(0.158)	(0.158)
Revenue		0.018	0.017	0.016
		(0.038)	(0.039)	(0.039)
Age			-0.021	-0.024
			(0.031)	(0.031)
Age squared			0.0002	0.0003
			(0.0003)	(0.0003)
Female				-0.0002
				(0.029)
Ethnic Minority				0.043
				(0.032)
Education				-0.001
				(0.002)
Patronage Connections				0.004
				(0.014)
City FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
N	2,227	2,224	2,224	2,219
Adjusted R^2	0.716	0.716	0.716	0.715

Note: FE represents fixed effects. Dependent variables are logged values of PPP investment. Individual controls are age, age squared, female, ethnic minority, and patronage connections. City controls are GDP (logged), population (logged), and revenue (logged). Standard errors are clustered at the city level. *p<0.1, **p<0.05, ***p<0.01.

Table C.7: Vice Provincial–level City

	Amount of Investment		Investment Dummy	
	(1)	(2)	(3)	(4)
Mayor's Tenure	-0.353^{**}	-0.803^{***}	-0.011^{**}	-0.023^{***}
	(0.166)	(0.267)	(0.005)	(0.008)
Baseline and Party Secretary Controls	Y	Y	Y	Y
City FE	Y	N	Y	N
Individual FE	N	Y	N	Y
Year FE	Y	Y	Y	Y
N	2,095	2,095	2,095	2,095
Adjusted R^2	0.731	0.718	0.716	0.699

Note: FE represents fixed effects. Dependent variables are logged values of PPP investment. Controls are age, age squared, female, ethnic minority, GDP (logged), population (logged), and revenue (logged). Standard errors are clustered at the city level. *p<0.1, **p<0.05, ***p<0.01.

Table C.8: Xi Administration Analysis

	Amount of Investment	Investment Dummy
	(1)	(2)
Mayor's Tenure	-0.486^{**}	-0.014^{**}
	(0.223)	(0.006)
Baseline and Party Secretary Controls	Y	Y
City FE	Y	Y
Year FE	Y	Y
N	1,659	1,659
Adjusted R^2	0.663	0.642

Note: FE represents fixed effects. Dependent variables are logged values of PPP investment. Individual controls are age, age squared, female, ethnic minority, and years of education. City controls are GDP (logged), population (logged), and revenue (logged). Standard errors are clustered at the city level. *p<0.1, **p<0.05, ***p<0.01.

Table C.9: Contract Volume and Value

	Number of Contracts	Average Contract Value
	(1)	(2)
Tenure	−0.013	−0.245**
	(0.010)	(0.112)
GDP per capita	0.060	−0.674
	(0.078)	(0.782)
Population	−0.001	0.007
	(0.001)	(0.008)
Revenue	−0.013	0.009
	(0.064)	(0.717)
Age	0.031	1.001
	(0.074)	(0.805)
Age squared	0.001	−0.031
	(0.005)	(0.059)
Female	−0.002	0.090
	(0.029)	(0.353)
Ethnic Minority	0.303**	2.146**
	(0.134)	(1.054)
Education	0.686*	4.148
	(0.411)	(3.921)
Patronage Connections	0.326***	0.642
	(0.103)	(0.969)
City FE	Y	Y
Year FE	Y	Y
N	2,219	2,219
Adjusted R^2	0.746	0.718

Note: FE represents fixed effects. Dependent variables are logged values of fixed asset investment. Individual controls are age, age squared, female, ethnic minority, years of education, and patronage connections. City controls are GDP (logged), population (logged), and revenue (logged). Standard errors are clustered at the city level. *p<0.1, **p<0.05, ***p<0.01.

Table C.10: Effect of PPP Investment on Employment

	Employment			
	(1)	(2)	(3)	(4)
Gross Investment	0.0001			
	(0.0004)			
Local Investment		0.0002		
		(0.0006)		
SOE Investment			−0.0003	
			(0.0006)	
Local SOE Investment				0.0002
				(0.0006)
Baseline Controls	Y	Y	Y	Y
City and Year FE	Y	Y	Y	Y
N	2,208	2,208	2,208	2,208
Adjusted R^2	0.9578	0.9578	0.9578	0.9578

Note: FE represents fixed effects. Dependent variables are logged employment. Controls are age, age squared, female, ethnic minority, years of education, patronage connections, GDP (logged), population (logged), and revenue (logged). Standard errors are clustered at the city level. *p<0.1, **p<0.05, ***p<0.01.

C.1 Marginal Effect Analysis

To empirically examine this speculation, we use data on purged officials from China's Corruption Investigations Dataset, developed by Wang (2020). We find that 504 bureau-level government officials were dismissed from office from 2012 to 2017. In the regression analysis, we use a continuous measure of political purges, $Purge_{i,t-1}$, counting the number of bureau-level officials who work in city i and are dismissed in year $t-1$. The lagged term *corruption crackdowns* guarantees that purges happened before the decision regarding PPP allocation. We estimate the interactive effect of $Purge_{it-1}$ and a mayor's tenure using the baseline specification.

Table C.11 shows the results. We regress the value of PPP investment on the number of purges in columns 1–2. The models yield insignificant estimates for *Purge*, suggesting that corruption crackdowns do not directly affect city-level PPP investment decisions. Column 3 presents the results of the interaction analysis. The estimates of the interaction term *Mayor Tenure* $*$ *Corruption* range from -0.66, with statistical significance at the 5% level. The negative coefficients on the interaction term suggest that the mayor's tenure effect is more salient—that is, PPP investment dropped faster in areas where more officials were dismissed for corruption. We also show a consistent finding using a binary measure of PPP investment in Columns 4 to 6. Overall, the results show that local political leaders are more likely to invest more during their early years in office, when their status is perilous because of increased corruption crackdowns in their jurisdiction.

Table C.11: Marginal Effects of Corruption Crackdowns, 2013–2017

	Amount of Investment			Investument Dummy		
	(1)	(2)	(3)	(4)	(5)	(6)
Mayor's Tenure			−0.295			−0.008
			(0.227)			(0.006)
Purge,t-1	0.175	0.095	1.627	0.003	−0.0002	0.041
	(0.784)	(0.792)	(1.021)	(0.023)	(0.023)	(0.030)
Mayor's Tenure*Purge,t-1			−0.665**			−0.018**
			(0.272)			(0.008)
Controls	N	Y	Y	N	Y	Y
City FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
N	1,674	1,664	1,664	1,674	1,664	1,664
Adjusted R^2	0.665	0.663	0.664	0.644	0.642	0.643

Note: FE represents fixed effects. Dependent variables are logged values of PPP investment. Controls are age, age squared, female, ethnic minority, years of education, patronage connections, GDP (logged), population (logged), and revenue (logged). Standard errors are clustered at the city level. *p<0.1, **p<0.05, ***p<0.01.