Crony Capitalism, the Party-State, and Political Boundaries of Corruption

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Abstract

What is the connection between crony capitalism, corruption, and the state apparatus in an autocracy? How much does corruption help the economy and when does it undermine state power? We investigate those questions by building a model that, instead of looking at the state as a black box, analyzes the link between various positions in the hierarchy of an autocratic state. The model is inspired by the party-state in China where crony capitalism and corruption play a central role in the economy. We show how the state's distortionary role in the economy encourages corruption between local officials and businesses, and how this corruption creates vertical corruption chains in the party-state hierarchy that threaten loss of political control by the Center over the hierarchy. We show the trade-off between the incentive effects of corruption and the danger of loss of control, leading *de facto* to define boundaries of corruption. The response by the Center to too high corruption depends on the power distribution within the Center and the *de facto* dependence of central leaders on support by provincial officials. Our results are consistent with recent developments in China.

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1 Introduction

The coexistence of inefficient economic institutions and very high economic growth in China in recent decades has been a puzzle to economists (e.g., Brandt and Rawski, 2008; Xu, 2011; Qian, 2017).[1] Bai et al. (2014) argue that corruption between officials and businesses has been a big part of China's growth miracle, as corruption protects productive cronies from the inefficiency of economic institutions, while damages of classic crony capitalism are alleviated by certain "Chinese characteristics," such as competition between local governments.

Further questions about crony capitalism and corruption have been raised in light of the anti-corruption campaign launched by Xi Jinping since 2012. The Central Commission for Discipline Inspection (CCDI) of the Chinese Communist Party (CCP) reported in 2017 that by then more than 1.5 million officials had been disciplined under the Party rules and 58 thousands officials had been charged with crimes – a "sincere" effort to crack down on corruption, according to the empirical research by Lu and Lorentzen (2016). If corruption between firms and officials was so instrumental in promoting economic growth, how could the CCP leaders be so determined to carry out such a serious crackdown, given that the CCP rule's legitimacy relies crucially on economic growth (e.g., Zhao, 2009)? Moreover, why did the Center not carry out similar campaigns in earlier years, before 2012?

Besides the pervasive official–business cronyism, the anti-corruption campaign has also exposed the widespread vertical collusive corruption among officials along the personnel hierarchy of the party-state, including buying and selling of positions. Pei (2016) thoroughly analyzes this type of corruption in China since the 1990s. Lu and Lorentzen (2016) document how all probed officials form a large network of patron–client relationships. The CCDI report (2017) also stated publicly that purging the "systematic, landslide-like" collusive corruption among officials in Shanxi Province exemplifies the spirit of the anti-corruption campaign. Using data on corruption indictments collected by Lu and Lorentzen (2016), Table 1 shows a vertical correlation between corruption indictments at higher levels (provincial party secretary and governors) and lower ranks

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[1]China's economic development has been impressive since the market economy was introduced 40 years ago, but economic institutions in China are still widely considered inefficient. For example, barriers to entry and mobility abound, protection of private property rights is weak, and commitment to policies is fragile at best – the World Bank's "starting a business" indicator measuring institutional friendliness to the private economy ranks China barely above Iraq and Ethiopia. The front matter of Brandt and Rawski (2008) summarizes the puzzle as "China's remarkable mixture of high-speed growth and deeply flawed institutions."

across provinces.

Table 1: Vertical chains: Correlation between higher and lower rank corruption

	(1)	(2)	(3)	(4)	(5)
	Rank 3–4 (provincial secretary or governor) indictments				
Rank 5–6 indictments	0.078*** (0.016)			0.071*** (0.021)	0.050*** (0.024)
Rank 7–8 indictments		0.191*** (0.054)			0.096 (0.060)
Rank 5–8 indictments			0.067*** (0.013)		
Number of cities				−0.001 (0.031)	0.002 (0.030)
Number of counties				0.004 (0.007)	0.005 (0.007)
Constant	0.925* (0.478)	1.923*** (0.395)	0.874* (0.453)	0.809 (0.627)	0.668 (0.615)
N	31	31	31	30	30

A larger rank number denotes a lower level in the hierarchy; cross-province regression; data from Lu and Lorentzen (2016); standard errors in parentheses; *, $p < 0.1$; **, $p < 0.05$; ***, $p < 0.01$.

Fundamental questions are raised about China's institutions as well as the role of corruption: What is the institutional reason behind the pervasive corruption, e.g., how do crony capitalism and the party-state shape the boundaries of corruption? What is the Center's trade-off between tolerating and cracking down on corruption, i.e. how much corruption would be tolerated, and under what conditions would the Center crack down? What role does each ladder of the party-state hierarchy play? Are there any institutional solutions to corruption in China, and, if so, what are they?

To answer these questions, we build a highly stylized model of corruption and its role within the hierarchy of the Chinese party-state system. The model has three building blocks.

The first block focuses on crony capitalism, in the spirit of Bai et al. (2014), where distortionary regulation drives businesses and local officials to collude to circumvent regulations and to seek rents, respectively, given a level of corruption tolerated by the Party Center. The mechanism corresponds to a large body of empirical literature (e.g., Sheng et al., 2011; Fisman and Wang, 2015). We show that higher tolerance of corruption leads to higher economic output but also higher rents for local officials.

The second block depicts how the rents flow through the hierarchy of the party-state, where provincial officials capitalize on their political power, including by selling positions to local officials. We show that the official–business corruption finances vertical inter-official corruption. Provincial officials can reap almost all rents from local officials. Moreover, a certain degree of corruption has to be tolerated to retain local officials in the party-state. These results resonate with the scholarly consensus in sociology and political science (e.g., Zhou, 2013; Pei, 2016).

The final block delineates the Party Center's trade-off in determining tolerance of corruption. On the one hand, higher tolerance of corruption leads to higher economic growth in ordinary times. On the other hand, corruption undermines the Center's ability to respond to exceptional situations, i.e., crises, a fundamental attribute of state power (see, e.g., political philosophers Schmitt, 1921 and 1985, originally 1922 and Agamben, 2005). This has been well recognized by the highest leaders of the Party. The Center's crisis management ability depends crucially on its ability to mobilize provincial resources and to lead with a coordinated response (e.g., Xi Jinping, 2014; 2017a; 2018).[2] This ability is jeopardized by tolerance of corruption, because the more rents created by crony capitalism that eventually flow to provincial officials the more the latter have an incentive to resist resource mobilization during crises, which can threaten the political survival of officials at the Center. This trade-off between growth and threat of loss of control is consistent with the understanding of China scholars (e.g., Kuhn, 1990; Zhou, 2008; Zhou, 2012). Our model shows that, under general conditions,

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[2]For example, Xi (2014, 2017a) has emphasized repeatedly that always preparing for crises is "a significant principle" in the party-state rule, guaranteeing state security is among "the top priorities" for the power of the Party, and "responding to significant challenges" and "defend against significant risks" are among the Party's primary objectives. Xi (2018) stated recently: "The international context is extremely complex, our surroundings are complicated and sensitive, and the job to reform, develop, and stabilize our country is difficult and complicated. Facing all these, we must be capable of preparing for, responding to, and solving crises, and we must be capable of managing crises with good preparation and transform crises into opportunities with strategic initiatives." Xi (2014) has also stated clearly that responding to crises requires "centralized decision making" and "coordinated action" throughout the party-state.

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the Center's optimal corruption tolerance is to fully secure crisis management ability while promoting the economy as much as possible. Any perceived serious risk of crisis would thus push the Center to crack down on corruption.

We investigate extensions of the model in two sections. In a first one, we assume that collusive cover-up along the vertical corruption chain may prevent the Center from cracking down. We show that there exists a dilemma of corruption detection: to limit corruption, the detection intensity has to be sufficiently high to discipline officials lower in the hierarchy; if the corruption is already rampant, however, the detection intensity should not be too high; otherwise it would encourage officials to invest too much in cover-up.

In a second extension, to better understand the role of the party-state hierarchy, we analyze collective decision making within the Party's Center and examine the relationship between members of the Politburo Standing Committee (PSC) and their provincial protégés. We show that it is the combination of 1) the reciprocal accountability between the Center and provincial officials, first analyzed by Shirk (1993), and 2) the lack of it between the provincial and local officials, facilitated by the 1984–1995 cadre management reform (*People's Daily,* 1984; Burns, 1987, 1994; Central Committee of the Party, 1995; Pei, 2016, p. 35), that leads to substantial rents being captured at the provincial level, threatening the power of the Center. In this extension, we also show how corruption within the Center would corrupt the Center's *de facto* personnel power over officials at the lower level, and why power centralization within the Center complements anti-corruption campaigns, as observed in recent Chinese politics (e.g., Li, 2016; Fewsmith, 2018; McGregor et al., 2018).

All the analyses show that, given the current institutions in China, where the state has great economic power and where there is no reciprocal accountability between the local and provincial levels, pervasive corruption in ordinary times is inevitable, leading to regular initiations of anti-corruption campaigns in anticipation of a looming crisis.

Section 2 presents the basic model. Section 3 analyzes the cover-up extension. Section 4 analyzes collective decision-making inside the Center under reciprocal accountability, and the corruption and power distribution within the Center. Section 5 concludes.

2 The Basic Model

We analyze the interaction between business firms and the party-state. When examining interactions inside the party-state, we model the behavior of three levels of players: local officials (e.g., the municipality and county levels), provincial officials (e.g., officials in the Central Committee), and the Party's Center (the Politburo Standing Committee, PSC). We start from the interaction between businesses and local officials, and then move to the interaction between local officials and provincial officials, taking the former interaction as given. We then move to the interaction between provincial officials and the Center, taking all the former interactions as given. In this section, we model the Center as one agent, but in a later section we focus on the distribution of power within the Center, which turns out to be important in understanding decisions on fighting corruption.

2.1 Cronyism between Businesses and Local Officials

Assume a continuum of firms with a mass of 1, each with a potential productivity of 1. Because of existing economic distortions (e.g., red tape, institutional weaknesses, and lack of access to credit), assume that only an exogenously given share $\alpha \in (0, 1)$ of potential productivity will be realized. Each firm has an opportunity to give an exogenously given bribe b to the local official, in exchange for an increase in the realized productivity from α to $\alpha\beta$, where exogenous parameter $\beta > 1$ denotes the economic power of the local official and also his ability to boost economic performance. We allow for the possibility that $\alpha\beta > 1$, as local officials may give the business firm privileges that they would not enjoy without cronyism (e.g., barriers to entry for other firms, privileged access to government contracts, discounts on utility prices, tax breaks, ...). A reason why b can be seen as exogenous to the firm is that it can be interpreted as the highest level of bribes tolerated by the Center, and, since there is an infinite number of firms, they can bid up the price of bribes up to its maximum tolerated level b. We assume that $b \leq \alpha(\beta - 1)$, so that all firms want to pay a bribe.

Given these assumptions, the local official is assumed to choose the share of businesses, $\theta \in (0, 1]$, from which to accept the bribe so as to maximize his bribe earnings, θb, net of a convex cost of breaking the rules

$$\max_{\theta \in (0,1]} \quad U_L(\theta; b, c) = \theta b - \frac{c}{2}\theta^2, \tag{1}$$

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where $c > 0$ is a cost parameter that can be interpreted as the cost to local officials of breaking the rules and closing a deal. This cost can be related to the costs of evading punishment from the law but also to the efforts deployed by the official to help the crony business firms.

The first-order condition is

$$b - c\theta = 0, \tag{2}$$

while the second-order condition, $-c < 0$, holds trivially. Therefore, in equilibrium with an interior solution, the share of businesses that become cronies is

$$\theta = \frac{b}{c}, \tag{3}$$

which is increasing in b and decreasing in c. Local economic output is then given by

$$y = (1 - \theta)\alpha + \theta\alpha\beta = (1 + (\beta - 1)\theta)\alpha, \tag{4}$$

which is increasing in β, α, and θ, or just

$$y = \left(1 + (\beta - 1)\frac{b}{c}\right)\alpha, \tag{5}$$

which is decreasing in c. In equilibrium, the local official's net earning is then

$$I_L(b, c) \equiv U_L^* = \frac{b}{c} \cdot b - \frac{c}{2} \cdot \left(\frac{b}{c}\right)^2 = \frac{b^2}{2c}, \tag{6}$$

which is increasing in b and decreasing in c. We can thus formulate the following proposition:

Proposition 1. *Output y and rents of local officials I_L increase with the level of corruption (b and θ) and decrease with the cost intensity of corruption c.*

This result is in line with Bai et al. (2014) on the complementarity between crony capitalism and economic growth in China. The benefits of reductions in distortions is shared between firms and local officials who can use their power to accept bribes. The crony firms benefit from their privileged relation with local officials, in contrast to firms that do not get to pay bribes. Note that we assume homogeneity of firm productivity instead of heterogeneity as in Bai et al. (2014). Adding productivity heterogeneity would not add much qualitatively to the fundamental result about the complementarity

between the level of corruption and rents of local officials and output. This is because the status quo (absence of bribes) implies an inefficiently low level of output given the existing distortions in the economy, and, therefore, corruption has an effect of "greasing the wheels." Note, however, that, given the corruption tolerance (b) and cost (c), the existing level of distortions (α) does not affect the equilibrium scope of corruption (θ) and rents of local officials (I_L), even though it does affect the equilibrium output (y).

This block of the model illustrates how crony capitalism works in China and creates official–business corruption. To understand the full effects of corruption, we need to consider the interactions inside the party-state. The bribes received by local officials can be used to bribe provincial officials, e.g., to obtain promotion, and thus create a vertical chain of corruption that may eventually lead to loss of control of the Center over the party-state.

2.2 Collusive Corruption between Local and Provincial Officials

We now consider the relation between the local official and the provincial official, who is his direct superior in the party-state hierarchy, and has the power to remove him from his post. We assume that if the local official is removed, he will lose his opportunity to extract bribes from business firms and receives instead a reservation payoff, r_L, which is assumed to be exogenous. It can be related to possibilities of getting jobs in the private sector, e.g., the higher the development of the private sector, the higher the reservation payoff. The local official is assumed to have a chance to give a political gift, g, to the provincial official, in the hope of not being removed. If he is not removed, he will be able to use bribes received from business firms to finance this gift, and enjoy the residual amount for his own private consumption. We assume, for simplicity, that there is no commitment problem in the local–provincial interaction.

Because the provincial official has the power to remove the local official, he can thus demand a gift up to $g = b^2/2c - r_L$. If kept in office, the local official enjoys $I_L(b,c) - g = b^2/2c - g$. If $g = b^2/2c - r_L$, the provincial official will enjoy $R_P = b^2/2c - r_L$ and the local official $R_L = r_L$. In that case, if $I_L(b,c) = b^2/2c \geq r_L$, the rents of the local official and the provincial official and their sum are, respectively,

$$R_L = r_L, \qquad R_P = \frac{b^2}{2c} - r_L, \qquad R_L + R_P = \frac{b^2}{2c}; \qquad (7)$$

if on the other hand, $\frac{b^2}{2c} < r_L$, the local official will prefer to quit his position and gets r_L, while the provincial official gets 0.

Therefore, to keep the local official in the party-state system, the level of bribes needs to be above a lower bound, i.e.,

$$b \geq \sqrt{2cr_L} \equiv \underline{b}. \tag{8}$$

We then have the following proposition:

Proposition 2. *To keep local officials in the party-system, the corruption tolerance b must be above $\underline{b}$. This lower bound increases with c and r_L.*

Higher outside options that arise with the introduction of the market economy increase the lower bound on corruption. Some minimum corruption between business firms and local officials is thus necessary to maintain the party-state alive. In equilibrium, compared to other members in the party-state system, officials at a lower rank are living a modest life, since most of their rent would be reaped by their supervisors via *political* rent seeking. This is consistent with observations from China: personnel power of the direct supervisor in the party-state hierarchy generates huge rents, as discussed by sociologists and political scientists, e.g., Zhou (2013) and Pei (2016). Also note that if r_L is correlated with the general economic situation, then we know that the Center's tolerance for corruption would be procyclical.

We also have the following corollary:

Corollary 1. *Rents of provincial officials R_p increase as b increases and c decreases.*

The intuition is as follows: corruption rents of local officials are captured by provincial officials because of their power to remove local officials; rents go up through the vertical corruption chain along the personnel hierarchy; therefore, higher tolerance of corruption, i.e., higher b and lower c, feeds the provincial official, leading to a higher R_P. This corollary will be instrumental in examining the Center's decisions.

2.3 Crisis Management and the Center's Decisions

In contrast to the provincial officials, the Center has the ultimate responsibility over actions at the national level. In particular, the Center must react to crises that may occur unexpectedly, and corruption inside the party-state may prevent the Center from responding appropriately to crises. We assume that the Center cares for economic

growth, i.e. wants to maximize output, but also wants to be able to respond to unexpected crises that may occur, such as earthquakes or natural catastrophes, a large-scale epidemic, a war, internal revolts, economic crisis, etc. Both objectives stem from the same goal, which is to stay in power and perpetuate the power of incumbent communist leaders. Higher growth leads to more popularity and therefore stronger incumbent power, whereas bad responses to crises may jeopardize the incumbent's position.

Assume that crises that challenge the survival of the party-state can occur randomly. Denote random variable, $\gamma \in [0, \bar{\gamma}] \subseteq [0, 1]$, as the severity of occurring crises, where the Center will need to mobilize resources and expropriate share γ of the rents appropriated by provincial and local officials. The highest possible severity is denoted by $\bar{\gamma}$. Denote the cumulative distributive function and probability density function of γ as $F(\cdot)$ and $f(\cdot)$, respectively.

Call L_L and L_P the losses for respectively the local and the provincial official if the Center cannot successfully manage the crisis. The net payoff in case of a crisis without successful response is $R_i - L_i$ for the official $i = L, P$. This will also be the payoff if officials refuse to surrender the resources they received through corruption. If instead they decide to submit and surrender resources, their payoff will be $R_i - \gamma R_i$. When $\gamma > 0$, each official at level $i = L, P$, would like to resist orders of resource mobilization from the Center, if and only if

$$R_i - L_i > R_i - \gamma R_i, \quad \text{i.e.,} \quad \gamma > \frac{L_i}{R_i}. \tag{9}$$

For simplicity, assume $L_L = 0$, so that local officials always want to resist, as long as $\gamma > 0$. Then, there will be joint resistance of local and provincial officials if and only if the provincial official wants to resist, i.e., if and only if

$$\gamma > \frac{L_P}{R_P} = \frac{L_P}{\frac{b^2}{2c} - r_L} \equiv \hat{\gamma}, \tag{10}$$

where $\hat{\gamma}$ denotes the critical level of γ above which the officials will resist resource mobilization by the Center. Corruption can thus threaten crisis response by the Center due to resistance from the corrupt party-state machine, because higher tolerance of corruption (higher b or lower c) will increase the provincial officials' rents (R_P), as stated in Corollary 1, lowering critical level ($\hat{\gamma}$) and making crisis management more likely to fail. In other words, corruption creates incentive misalignment between the Center and the provincial official when a crisis happens. This incentive misalignment

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is widely considered as one of the primary problems that corruption can cause (e.g., Pei, 2016) and has been recognized by the highest leaders of the Party (e.g., Xi, 2015, 2016).[3]

Now consider the Center's decision to regulate corruption by choosing b, leaving c exogenous. Assume that the Center is risk-neutral and benefits from economic output when crises are successfully managed ($\gamma \in [0, \hat{\gamma}]$) and gets a "downfall payoff," D, if a crisis leads the Center to lose control. The Center's program is then

$$\max_b \; F(\hat{\gamma}) \cdot y + (1 - F(\hat{\gamma})) \cdot D, \quad \text{i.e.,} \quad \max_b \; F(\hat{\gamma}) \cdot (y - D), \quad \text{s.t.} \tag{11}$$

$$b \geq \sqrt{2cr_L}, \quad \hat{\gamma} = \frac{L_P}{\frac{b^2}{2c} - r_L}, \quad y = \left(1 + (\beta - 1)\frac{b}{c}\right)\alpha. \tag{12}$$

As we can see, for the Center, there is a fundamental trade-off between regime stability and economic performance. A higher b will lead to a higher output level y but with a higher probability of loss of control when challenged by a large crisis $(1 - F(\hat{\gamma}))$. We can then formulate the following proposition:

Proposition 3. *Given a sufficiently low downfall payoff ($D < \alpha$), a sufficient condition for the optimal choice of corruption tolerance to involve zero loss of control, i.e. $\hat{\gamma}^* = \bar{\gamma}$ and $F(\hat{\gamma}^*) = 1$, is that the elasticity of $F(\gamma)$ with respect to γ, $\frac{\gamma \cdot f(\gamma)}{F(\gamma)} > \frac{1}{2}$ for any $\gamma \in (0, \bar{\gamma})$. The optimal choice of corruption tolerance chosen by the Center is then $b^* = \sqrt{2c\left(\frac{L_P}{\bar{\gamma}} + r_L\right)}$.*

Proof. Note first that if $\hat{\gamma} \geq \bar{\gamma}$, i.e., if $b \in \left(\sqrt{2cr_L}, \sqrt{2c\left(\frac{L_P}{\bar{\gamma}} + r_L\right)}\right]$, regime stability is never compromised and b reaches a local maximum at $b = \sqrt{2c\left(\frac{L_P}{\bar{\gamma}} + r_L\right)}$. If, however, $\hat{\gamma} \in (0, \bar{\gamma})$, i.e., $b > \sqrt{2c\left(\frac{L_P}{\bar{\gamma}} + r_L\right)}$, then there is a non zero probability of regime breakdown. If the objective function is decreasing in b when $b > \sqrt{2c\left(\frac{L_P}{\bar{\gamma}} + r_L\right)}$, then we can conclude that $b^* = \sqrt{2c\left(\frac{L_P}{\bar{\gamma}} + r_L\right)}$.

Now consider the first-order derivative of the objective function with respect to b

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[3]For example, Xi (2015, 2016) warned repeatedly that high-level officials in the Party must not violate the central directives, cultivate "independent kingdoms," or act independently.

when $b > \sqrt{2c\left(\frac{L_P}{\bar{\gamma}} + r_L\right)}$, which, after some algebra, is

$$\frac{\beta - 1}{c} \cdot \alpha \cdot F(\hat{\gamma}) - \frac{L_P}{\left(\frac{b^2}{2c} - r_L\right)^2} \cdot \frac{b}{c} \cdot f(\hat{\gamma}) \cdot (y - D). \tag{13}$$

It will be negative, given $\hat{\gamma} = \frac{L_P}{\frac{b^2}{2c} - r_L}$ and $y = \left(1 + (\beta - 1)\frac{b}{c}\right)\alpha$, if

$$(\beta - 1) \cdot \alpha \cdot F(\hat{\gamma}) - \frac{\hat{\gamma}}{\frac{b^2}{2c} - r_L} \cdot b \cdot f(\hat{\gamma}) \cdot \left(\left(1 + (\beta - 1)\frac{b}{c}\right)\alpha - D\right) < 0, \tag{14}$$

which, when $D < \alpha$, is equivalent to

$$\frac{\hat{\gamma} \cdot f(\hat{\gamma})}{F(\hat{\gamma})} > \frac{(\beta - 1) \cdot \alpha \cdot \frac{b^2}{2c} - (\beta - 1) \cdot \alpha \cdot r_L}{(\beta - 1) \cdot \alpha \cdot \frac{b^2}{c} + \alpha b - bD}. \tag{15}$$

Now, when $D < \alpha$,

$$\frac{(\beta - 1) \cdot \alpha \cdot \frac{b^2}{2c} - (\beta - 1) \cdot \alpha \cdot r_L}{(\beta - 1) \cdot \alpha \cdot \frac{b^2}{c} + \alpha b - bD} < \frac{(\beta - 1) \cdot \alpha \cdot \frac{b^2}{2c}}{(\beta - 1) \cdot \alpha \cdot \frac{b^2}{c}} = \frac{1}{2}. \tag{16}$$

Therefore, we can conclude that given $D < \alpha$, if $\frac{\gamma \cdot f(\gamma)}{F(\gamma)} > \frac{1}{2}$ for any $\gamma \in (0, \bar{\gamma})$, then the government's objective function is decreasing in b when $b > \sqrt{2c\left(\frac{L_P}{\bar{\gamma}} + r_L\right)}$. Then $b^* = \sqrt{2c\left(\frac{L_P}{\bar{\gamma}} + r_L\right)}$ and the rest of the results follow. $\qquad\square$

The intuition of Proposition 3 is as follows. As illustrated in Figure 1, higher corruption tolerance raises economic output, while lower tolerance increases the Center's control in crises until the Center will never lose control in any crisis. Therefore, on the one hand, when the tolerance is so low that that full security is reached, the Center can always raise the tolerance to gain more economic output without sacrificing any security. On the other hand, the elasticity condition means that the right tail of the crisis risk distribution is not extremely thin, which is consistent with empirical evidence on crises and the general approach to model them in risk management (e.g., Taleb, 2007).[4] This condition suggests that, when corruption tolerance is still too high to secure control in

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[4]The probability distribution of a random variable, X, is often considered to be fat-tailed if $\mathbf{P}[X > x] \sim x^{-\eta}$ when x is large, where $\eta > 0$ is the tail index (e.g., Cooke et al., 2014, p. 2). The elasticity, $\frac{xf(x)}{F(x)}$, would then converge to η. If we followed this convention, Proposition 3 would require $\eta > \frac{1}{2}$.
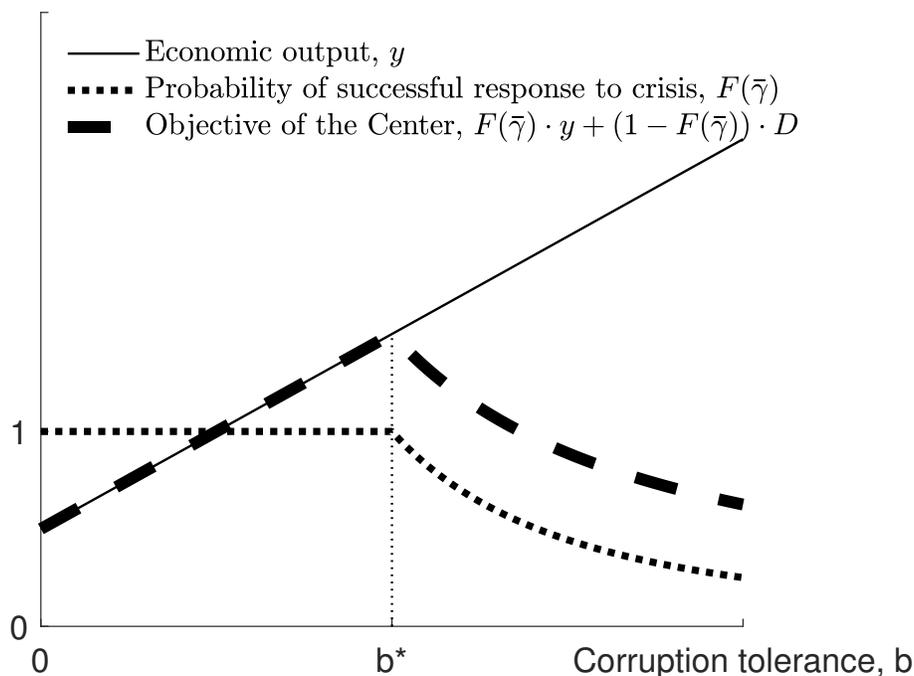
Figure 1: Optimal choice of corruption tolerance when the right tail of the crisis risk distribution is not extremely thin

all possible crises, a lower tolerance would lead to a smaller output loss compared to the larger gain in regime stability. Therefore, the optimal solution for the Center is to set the corruption tolerance at such a level that crisis management ability remains always fully secured while output is maximized as much as possible.

The solution in Proposition 3 follows a lexicographic order: stability comes first, and output is maximized under the condition that full stability be secured. It is important to note that this lexicographic preference is *endogenous* in our model, rather than *exogenous.* Proposition 3 thus provides a micro-foundation of the Party's "repeatedly emphasized" principle in developing the Chinese economy – "[social and political] stability overrides everything, and we must not relax the People's democratic dictatorship," as coined by Deng Xiaoping in December 1990 (Deng, 1993, p. 364). It also explains Xi (2014)'s obsession for "security" – "[we] must insist on a holistic view on national security, acknowledging the people's security as our mission, political security the fundamental, economic security the basic, military, cultural, and social security the safeguard, and international security the support, paving a path to national security with Chinese characteristics."

A corollary of Proposition 3 suggests that a higher crisis risk will push the Center

to crack down on corruption:

Corollary 2. *Corruption tolerance b^* is decreasing in the crisis risk, represented by the greatest possible crisis severity $\bar{\gamma}$.*

The corollary is consistent with the Party narratives since 2012. For example, in his report to the 19th National Congress of the Party, Xi (2017b) stated: "confronting the crucial tests of enormous risks faced by the Party ... we cracked down on corruption, wiping out significant hidden hazards from the inside of the party-state ...." Taken at face value, this quote suggests that the risk faced by the Party was a primary motivation behind Xi's anti-corruption campaign.

3   Cover-up and Corruption Investigations

The model so far assumes that the Center chooses a level of corruption tolerance and is able to enforce this optimal b^*. What about the possibility of cover-up by local and particularly provincial officials? In this section, we allow for the possibility of cover-up by local and provincial officials and explicitly model investigation of corruption by the Center.

Consider the following timing:

1. The Center announces its optimal level of corruption tolerance b^*.

2. The provincial official chooses to implement a level of corruption $\hat{b} \in \{b^*, B\}$ within the province, where B can be large. The Center is assumed not to observe $\hat{b}$.

3. The Center chooses an investigation density d searching in the province for evidence of $\hat{b} = B$. If evidence is found, the Center indicts and replaces the official and reruns steps 1 and 2 with the new official and $b = b^*$. The punished official gets a payoff of 0 payoff as punishment. If the investigation finds no evidence of $\hat{b} = B$, the level $\hat{b}$ chosen by the provincial official is implemented.

One may argue that the Center may have some information about the level of corruption given all the information gathered by the Center on the economy and what is going on in the provinces. There is, however, a difference between having soft information and hard evidence about corruption, which is what this section is about.

The investigation goes as follows. The Center first investigates the two officials (the local official and the provincial official) independently. If $\hat{b} = b^*$, no evidence of $\hat{b} = B$ can of course be found. If $\hat{b} = B$, the provincial official can a) choose to cover himself and the local official up, at a cost, C, so that neither of the officials will be caught, and no evidence of $\hat{b} = B$ is assumed to be found; b) choose no cover-up. In the latter case each official will be caught independently with probability $1 - \sqrt{1-d}$. Once one of them is caught, we assume that evidence will be found of $\hat{b} = B$, because the Center can offer an infinitesimal level of leniency to make one official testify against the other, thereby getting evidence of $\hat{b} = B$. This is a minimalistic way of modeling the information-sharing feature of corruption between officials. Detection of $\hat{b} = B$ then happens with probability $d \in [0, 1]$, where d measures the detection intensity. If neither of them is caught, the investigation will not find any evidence of $\hat{b} = B$. This happens with probability $1 - d$.

After steps 1–3, the crisis severity γ, realizes. For simplicity, we assume $F(0) = 0$, i.e., some crisis, big or small, always happens. If $\hat{b} = B$, the Center will have no chance to respond because of the loss of control due to too much corruption, thus getting the downfall payoff D. The provincial official will then get $\frac{B^2}{2c} - r_L - L_P$. If, however, $\hat{b} = b^*$, then the Center can try to respond, and the officials can try to resist, just as in the previous section. In this case, the provincial official will get $\max\left\{ \frac{b^{*2}}{2c} - r_L - L_P, (1 - \gamma)\left(\frac{b^{*2}}{2c} - r_L\right)\right\}$.

We now analyze this setting. Given the optimal corruption tolerance derived in Proposition 3, i.e., $b^* \equiv \sqrt{2c\left(\frac{L_P}{\bar{\gamma}} + r_L\right)}$, how should the Center set the detection intensity to induce either $\hat{b} = b^*$, or no cover-up when $\hat{b} = B$, so that it will never lose control during crises? The answer is given in Proposition 4.

Proposition 4. *Under the condition of Proposition 3, if the cover-up is sufficiently costly, i.e., $C \geq \frac{B^2}{2c} - r_L - L_P - (1 - \mu_\gamma)\left(\frac{b^{*2}}{2c} - r_L\right) \equiv \bar{C}$, where μ_γ is the mean of γ, then the Center can induce the provincial official to choose $\hat{b} = b^* \equiv \sqrt{2c\left(\frac{L_P}{\bar{\gamma}} + r_L\right)}$ via a sufficiently high detection rate, i.e., $d \geq \frac{\bar{C}}{\frac{B^2}{2c} - r_L - L_P}$. Otherwise, if $C < \bar{C}$, to guarantee control during crises, the Center should not detect too intensively, i.e., $d \leq \frac{C}{\frac{B^2}{2c} - r_L - L_P}$.*

Proof. If $\hat{b} = b^* \equiv \sqrt{2c\left(\frac{L_P}{\bar{\gamma}} + r_L\right)}$, the crisis response will always succeed, and the

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provincial official can expect to get

$$\int_0^{\bar{\gamma}} (1 - \gamma) \left(\frac{b^{*2}}{2c} - r_L \right) dF(\gamma) = (1 - \mu_\gamma) \left(\frac{b^{*2}}{2c} - r_L \right); \tag{17}$$

if $\hat{b} = B$, without cover-up, he can expect to get $(1 - d) \left(\frac{B^2}{2c} - r_L - L_P \right)$; if $\hat{b} = B$, with cover-up, he can expect to get $\left(\frac{B^2}{2c} - r_L - L_P \right) - C$.

Therefore, he will choose $\hat{b} = b$ if and only if

$$(1 - \mu_\gamma) \left(\frac{b^{*2}}{2c} - r_L \right) \geq \max \left\{ (1 - d) \left(\frac{B^2}{2c} - r_L - L_P \right), \left(\frac{B^2}{2c} - r_L - L_P \right) - C \right\}, \tag{18}$$

i.e.,

$$d \geq 1 - \frac{(1 - \mu_\gamma) \left(\frac{b^{*2}}{2c} - r_L \right)}{\frac{B^2}{2c} - r_L - L_P} \text{ and } C \geq \frac{B^2}{2c} - r_L - L_P - (1 - \mu_\gamma) \left(\frac{b^{*2}}{2c} - r_L \right). \tag{19}$$

If these two conditions cannot be satisfied, the provincial official will choose $\hat{b} = B$, and then he will choose not to cover up, if and only if $\left(\frac{B^2}{2c} - r_L - L_P \right) - C \leq (1 - d) \left(\frac{B^2}{2c} - r_L - L_P \right)$, i.e., $d \leq \frac{C}{\frac{B^2}{2c} - r_L - L_P}$. The result then follows. $\square$

Proposition 4 exhibits the dilemma of corruption detection. On the one hand, when corruption is already high, the detection intensity chosen by the Center cannot be too large, since this would encourage the provincial official to cover up the corruption, in which case the Center would not be able to detect the true level of corruption and respond to crises. On the other hand, to induce a limited level of corruption by officials, the detection intensity needs to be sufficiently high.

4 Decision Making inside the Center

4.1 Reciprocal Accountability

In the analysis above, higher corruption tolerance weakens the Center's crisis management ability because the rents flow along the hierarchy of the party-state and are captured by the provincial officials. A natural question then emerges: why can the Center, higher up in the hierarchy, not use its power to discipline non-compliant provincial

officials into surrendering their rents?

The key to that question is reciprocal accountability between the central leaders and provincial officials. As documented by Shirk (1993), not only do the central leaders hold provincial officials accountable through the party hierarchy, but provincial officials also hold the central leaders accountable, because, in political struggles inside the Center, each leader counts on his support base among provincial leaders. This is not surprising, given that 1) provincial officials occupy about half of the Central Committee of the Party, which elects the Politburo and its Standing Committee, 2) central leaders are at the very top of the party hierarchy so they have no higher authority to appeal to, other than their direct subordinates, i.e., the provincial officials.[5]

To understand the role of reciprocal accountability, we now open up the collective decision making process inside the Party Center, i.e., the Politburo, its Standing Committee, and retired leaders who are still influential. We start from the hypothetical case in which provincial officials do not hold central leaders accountable, and compare it with the more realistic case in which they do hold them accountable.

Take first the situation of absence of reciprocal accountability. We assume that each central leader has his *de jure* power, $p_i > 0$, which is determined by the official ranking in the Party, and we denote $P \equiv \sum_i p_i$. We assume that the Center enjoys an exogenous rent, R, and that each leader's share of the rent is determined, hypothetically, only by $\frac{p_i}{P}$. Given that decisions at the Center are assumed to be taken by unanimity, would each leader inside the Center be willing to remove an non-compliant provincial official, bringing in his rent, $\frac{b^2}{2c} - r_L$, to share among the leaders at some removal cost, k?

Each central leader would support the removal, if and only if the payoff from doing so is higher than the status quo payoff, i.e.,

$$\frac{p_i}{P}\left(\frac{b^2}{2c} - r_L - k + R\right) > \frac{p_i}{P}R. \tag{20}$$

This condition will always hold, as long as the removal cost is not too high, i.e., $k < \frac{b^2}{2c} - r_L$. Therefore, all leaders in the Center would always support disciplining any non-compliant provincial official, and most rents created by crony capitalism would eventually flow to the Center.

Assume now reciprocal accountability between provincial officials and central lead-

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[5]Shirk (1993) documents how provincial officials can wield power over central leaders. For example, Deng Xiaoping withdrew his proposal to promote Zhu Rongji to the PSC after he met strong resistance from the Central Committee.

ers. More specifically, we now assume that each central leader i has $m_i > 0$ provincial officials as his protégés, where we denote the total number of provinces as $M \equiv \sum_i m_i$. His *de facto* power in the Center is then $p_i + m_i$, and his share of the central rent is then $\frac{p_i + m_i}{P + M}$. This central leader will then block disciplining one of his own protégés, if and only if

$$\frac{p_i + m_i - 1}{M + P} \left(\frac{b^2}{2c} - r_L - k + R \right) \leq \frac{p_i + m_i}{M + P} R. \tag{21}$$

Comparing this condition with Condition (20), without reciprocal accountability, each central leader cares only about his *de jure* power, and disciplining provincial officials will not affect that power, i.e., $\frac{p_i}{P}$ appears on both sides of Condition (20); when reciprocal accountability does exist, each leader depends additionally on his provincial support, so removing one of his protégés will weaken his *de facto* power, decreasing his share of the Center's rents from $\frac{p_i + m_i}{M + P}$, which appears on the right-hand side of Condition (21), to $\frac{p_i + m_i - 1}{M + P}$, which appears on the left-hand side. Therefore, with reciprocal accountability, the leader has an incentive to protect his protégés.

To see this point even more clearly, Condition (21) is equivalent to

$$R \geq (p_i + m_i - 1) \left(\frac{b^2}{2c} - r_L - k \right) \equiv \bar{R}. \tag{22}$$

This condition can hold, even if the removal cost is not too high, i.e., $k < \frac{b^2}{2c} - r_L$, a condition under which the removal would have always happened if reciprocal accountability did not exist. We then have the following result:

Proposition 5. *Without reciprocal accountability, central leaders will always discipline non-compliant provincial officials. With reciprocal accountability, each central leader will protect his protégés, if and only if the Center's rent is sufficiently large, i.e., $R \geq \bar{R}$, where $\bar{R}$ is increasing in the leader's de jure power p_i, his de facto power $p_i + m_i$, and each provincial official's rents to surrender $\frac{b^2}{2c} - r_L$, and is decreasing in the Center's cost to remove each provincial official k.*

This proposition implies that the weaker the leader is inside the Center, the more actively he would protect his own protégés. This implication is consistent with the fact that Zhou Yongkang, who was the lowest in the official ranking of the Politburo Standing Committee, actively protected Bo Xilai, who had gained enormous popularity across the country as the Party secretary of Chongqing.[6]

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[6]Zhou Qiang (2015), the Chief Justice and President of the Supreme People's Court, wrote publicly

The analysis above explains how reciprocal accountability between the Center and provincial officials prevents the Center from using personnel power to reap rents from provincial officials. It also illustrates why provincial officials can reap rents from local officials. Announced in *People's Daily* (1984), the 1984 cadre management reform "replaced the two-level down principle with one-level down," granting provincial and local officials personnel authority over their immediate subordinate (Burns, 1987, p. 49). After some back-and-forth over 1985–1994 (e.g., Burns, 1994 on the 1990 adjustment), "the full institutionalization of this far-reaching reform" was settled by the Central Committee in 1995, as observed by Pei (2016, p. 35). Each level of the party organization along the hierarchy then behaved like the hypothetical case we discussed where the subordinates cannot hold their supervisors accountable, so the supervisors can force the subordinates to surrender their rents, and the rents are eventually reaped along the party hierarchy up to the provincial level. The combination of 1) eciprocal accountability between the Center and provincial officials and 2) the lack of it below the provincial level in the hierarchy then causes most rents created by crony capitalism to be captured at the provincial level, while threatening the Center's power.

4.2 A Corrupt Center

So far we have analyzed corruption below the top of the hierarchy, assuming that central leaders are clean. This assumption can be challenged, especially in light of the indictment of Zhou Yongkang, a member of the Politburo Standing Committee between 2007 and 2012, who protected corrupt officials in exchange for a great amount of wealth. How would corruption in the Center affect the disciplining ability of the Center, and its interaction with provincial officials?

Assume that the central leader i receives a bribe, $e > 0$, from each of his protégés, that is not shared with other leaders. Disciplining one of his protégés will, however, force him to submit this protégé's bribe and share it within the Center given the pressure from other central leaders. The leader will then protect the protégé if and only if

$$\frac{p_i + m_i - 1}{M + P}\left(\frac{b^2}{2c} - r_L - k + R\right) + (m_i - 1)e \le \frac{p_i + m_i}{M + P}R + m_i e. \tag{23}$$

This condition differs from Condition (21) only in the appearance of the bribe that is not shared, i.e., $(m_i - 1)e$ and $m_i e$, respectively, on each side.

that Zhou Yongkang and Bo Xilai engaged in "political activities beyond the Party organization."

This condition can be rewritten in the following way:

$$R \geq (p_i + m_i - 1)\Big(\frac{b^2}{2c} - r_L - k\Big) - (M + P)e \equiv \bar{R}_{\text{Corrupt Center}}. \qquad (24)$$

Comparing Condition (24) with the condition without corruption, i.e., Condition (22),

$$R \geq (p_i + m_i - 1)\Big(\frac{b^2}{2c} - r_L - k\Big) \equiv \bar{R}_{\text{Uncorrupt Center}}, \qquad (25)$$

we can formulate the following proposition.

Proposition 6. $\bar{R}_{Corrupt\ Center} < \bar{R}_{Uncorrupt\ Center}$. *Therefore, corruption in the Center make it more difficult for the Center to discipline non-compliant provincial officials.*

The basic intuition is that the central leader has to sacrifice his private gain of bribes during removal of his protégés, which makes the removal less attractive to him.

Given that the Party Center's decision making usually requires consensus (e.g., Shirk, 1993; Huang, 2000; Vogel, 2005; Xie and Xie, 2017), corruption in the Center can greatly damage the disciplining ability of the Center, because one corrupt leader can almost on his own block disciplining measures towards his protégés. This is consistent with the observation that it needed only one corrupt Zhou Yongkang to paralyze the Politburo Standing Committee away from any serious disciplining measures against officials.

One corollary of the proposition concerns the case an extremely corrupt Center, i.e., when e is sufficiently large:

Corollary 3. *If* $e \geq \bar{e}$ *where* $\bar{e} \equiv \frac{(\max_i\{p_i+m_i\}-1)\left(\frac{b^2}{2c}-r_L-k\right)}{M+P}$, *then* $R \geq \bar{R}_{Corrupt\ Center}$ *will always hold and the central leaders will always protect their own protégés.*

This result comes from the fact that the extreme corruption in the Center implies $\bar{R}_{\text{Corrupt Center}} \leq 0$ for any central leader. In this case, given the consensus requirement for personnel disciplining, the Center will lose all of its *de facto* personnel power. To summarize, absolute corruption in the Center corrupts its power absolutely.

4.3   Power Distribution within the Center

Besides the anti-corruption campaign, the most prominent development in Chinese politics since 2012 has been the streamlining of the Center in two directions. First, the

number of members of the Politburo Standing Committee has decreased from nine un-
der Hu Jintao (2002–2012) to seven in Xi's era (since 2012). Second, Xi has successfully
carried out a series of institutional reforms within the Center to consolidate his own
power (e.g., Li, 2016). Due to this streamlining, the Center's power has become much
less fragmented. How would the power distribution within the Center shape the bound-
aries of corruption, and why did Xi carry out the two major projects – one to streamline
the Center, the other to crack down on corruption – at the same time?

The answer lies in how the power distribution within the Center would affect its
ability to respond to crises. To see this point, consider the following situation: facing a
crisis of severity γ, the Center has a short time window to decide whether to expropriate
the γ-share of the rents from all provincial and local officials, to manage the crisis. If
every central leader agrees, then the plan will be implemented, but whether the crisis
management response will succeed will still depend on whether provincial and local
officials cooperate. Also, for simplicity, we assume that the *de facto* power is equally
shared among all central leaders, i.e., each leader gets $\frac{1}{N}$ of the central rents, where
$N \geq 1$ is the number of central leaders.

Note that when the crisis is severe, i.e., $\gamma > \hat{\gamma}$, even if the Center agreed upon
the response plan, the provincial and local officials will resist it so that the crisis is
not manageable. When the crisis is manageable, i.e., $0 < \gamma \leq \hat{\gamma}$, the crisis response
plan, if carried out, will succeed. If some leader does not agree, however, then no crisis
management response will be carried out.

We assume each leader will receive a downfall payoff, D, if the provincial and local
officials resist the crisis response, or if the response plan is not carried out. Therefore,
when the crisis is manageable, each central leader will support the crisis response plan
if and only if

$$\frac{R(b)}{N} > D, \quad \text{i.e.,} \quad N < \frac{R(b)}{D}, \tag{26}$$

where $R(b)$ is the Center's rent to share, which is increasing in the economic output
and thus the corruption tolerance, b. This condition then imposes another constraint
about power distribution on successful responses to crises:

Lemma 1. *Even if a crisis is manageable, i.e., $0 < \gamma \leq \hat{\gamma}$, it will not be managed
unless the Center is sufficiently streamlined, i.e., $N < \frac{R(b)}{D}$.*

This result implies that streamlining the Center is crucial for the Center to main-
tain its crisis management ability. This result is then instrumental in analyzing how

power distribution within the Center can affect the Center's decision to crack down on corruption. Allowing for a strictly positive possibility that no crisis happens, i.e., $F(0) > 0$, each leader in the Center considers

$$\max_b \left(F(0) + \left(F(\hat{\gamma}(b)) - F(0) \right) \cdot \mathbf{1}_{N < \frac{R(b)}{D}} \right) \cdot \left(\frac{R(b)}{N} - D \right), \text{ s.t.} \tag{27}$$

$$b \in [\sqrt{2cr_L}, B], \quad \hat{\gamma}(b) \equiv \frac{L_P}{\frac{b^2}{2c} - r_L}, \quad R(b) \equiv My = M \left(1 + (\beta - 1) \frac{b}{c} \right) \alpha, \tag{28}$$

where the objective function is the expected additional payoff from survival, $B > \sqrt{2c \left(\frac{L_P}{\bar{\gamma}} + r_L \right)}$ is the exogenous upper limit of corruption, and M is the total number of provinces. We then have the following proposition:

Proposition 7. *Assume the crisis risk is sufficiently fat-tailed, i.e., $\frac{\gamma f(\gamma)}{F(\gamma)} > \frac{N}{2M}$ for any $\gamma \in [0, \bar{\gamma})$. If the Center is sufficiently streamlined, i.e., if $N < \frac{R(b^*)}{D}$, the Center will limit corruption, i.e., $b = b^*$, and will survive any crisis, with $b^* = \sqrt{2c \left(\frac{L_P}{\bar{\gamma}} + r_L \right)}$; otherwise, i.e., if $N \geq \frac{R(b^*)}{D}$, the Center will tolerate corruption as much as possible, i.e., $b = \min\{\tilde{b}, B\} \geq b^*$, and will not survive any crisis, with $\tilde{b}$ satisfying $R(\tilde{b}) = ND$.*

Proof. The central leader compares two scenarios. The first one involves $N \geq \frac{R(b)}{D}$ so that the Center will not agree on any plan to respond to any manageable crisis and, therefore, will not survive any crisis. The objective function then becomes $F(0) \cdot \left(\frac{R(b)}{N} - D \right)$, which is increasing in b, so the best choice in this scenario is to tolerate corruption as much as possible, i.e., $b = \min\{\tilde{b}, B\}$, and the objective function writes $F(0) \cdot \left(\min\{D, \frac{R(B)}{N}\} - D \right)$.

The second scenario involves $N < \frac{R(b)}{D}$ so that the Center will carry out a plan to respond to any manageable crisis. The objective function then becomes $F(\hat{\gamma}(b))\left(\frac{R(b)}{N} - D \right) = F(\hat{\gamma}(b))\left(\frac{M}{N}y - D \right)$. As in the proof of Proposition 3, the fat-tail property is sufficient to derive the best choice in this scenario to be $b = b^*$. The Center would then survive any crisis, and the objective function writes $\frac{R(b^*)}{N} - D$.

The central leader will then prefer the second scenario and choose $b = b^*$, if and only if $F(0) \cdot \left(\min\{D, \frac{R(B)}{N}\} - D \right) < \frac{R(b^*)}{N} - D$ and $N < \frac{R(b^*)}{D}$ hold simultaneously. Because $b^* < B$ and $R(b)$ is increasing in b, the conditions degenerate into simply $N < \frac{R(b^*)}{D}$.[7]

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[7]When $D \leq \frac{R(B)}{N}$, the conditions degenerate into simply $N < \frac{R(b^*)}{D}$ and $N \leq \frac{R(B)}{D}$, which are just $N < \frac{R(b^*)}{D}$, since $b^* < B$ and $R(b)$ is increasing in b; when $D > \frac{R(B)}{N}$, the conditions degenerate into

Therefore, the central leader will choose $b = b^*$ if and only if $N < \frac{R(b^*)}{D}$. The rest of the result then follows. □

The proof follows the idea that limits to corruption are useful to help the Center to respond to crises only when the Center can agree on a response plan, which happens only when the Center is sufficiently streamlined. This proposition emphasizes the complementarity between a fragmented Center and runaway corruption, while streamlining the Center and cracking down on corruption complement each other. In the extreme case when cracking down on corruption would greatly hurt the economy, i.e., if $\frac{R(b^*)}{D} \leq 2$, i.e., $R(b^*) \leq 2D$, only a one-man dictatorship, i.e., $N = 1$, would make the crackdown beneficial.

That said, which combination, i.e., a fragmented Center and outrageous corruption, or a streamlined Center and limited corruption, would be chosen by the paramount leader, if he has the ability to choose? His program is

$$\max_{b,\, N} \left(F(0) + \big(F(\hat{\gamma}(b)) - F(0) \big) \cdot \mathbf{1}_{N < \frac{R(b)}{D}} \right) \cdot \left(\frac{R(b)}{N} - D \right), \quad \text{s.t.} \tag{29}$$

$$b \in [\sqrt{2cr_L}, B], \quad N \in [1, \bar{N}], \quad \hat{\gamma}(b) \equiv \frac{L_P}{\frac{b^2}{2c} - r_L}, \quad R(b) \equiv M\left(1 + (\beta - 1)\frac{b}{c} \right)\alpha, \tag{30}$$

where $\bar{N}$ is an exogenous upper limit of the size of the Center. We then have the following result:

Proposition 8. *Assume the crisis risk is sufficiently fat-tailed, i.e., $\frac{\gamma f(\gamma)}{F(\gamma)} > \frac{\bar{N}}{2M}$ for any $\gamma \in [0, \bar{\gamma})$. If the downfall payoff is sufficiently low, i.e., $D < R(b^*)$, then the paramount leader should choose one-man dictatorship, i.e., $N = 1$, and then crack down on corruption, i.e., $b = b^*$, where $b^* = \sqrt{2c\left(\frac{L_P}{\bar{\gamma}} + r_L\right)}$.*

Proof. As in the proof of Proposition 7, the paramount leader compares two scenarios. The first is when $N < \frac{R(b^*)}{D}$ and $b = b^*$, where the objective function would be equal to $\frac{R(b^*)}{N} - D > 0$. The best choice in this scenario is to set N as small as possible. The second is when $N \geq \frac{R(b^*)}{D}$ and $b = \min\{\tilde{b}, B\}$, where the objective function would be equal to $F(0) \cdot \left(\min\{D, \frac{R(B)}{N}\} - D \right) \leq 0$. Therefore, as long as $N = 1$ can make the first scenario possible, i.e., as long as $\frac{R(b^*)}{D} > 1$, i.e., $R(b^*) > D$, the paramount leader will always set $N = 1$ and $b = b^*$. □

$D > \frac{R(B)}{N}$, $F(0) \cdot \left(\frac{R(B)}{N} - D \right) < \frac{R(b^*)}{N} - D$, and $N < \frac{R(b^*)}{D}$, which are $R(B) < ND < R(b^*)$, which cannot hold as $b^* < B$ and $R(b)$ is increasing in b.

This result implies that the paramount leader will try to consolidate power within the Center, and if he can do so, he will then crack down on corruption at the same time. This result is driven by two effects: first, reducing the number of leaders at the Center helps to react better to an occurring crisis, second, rents to the Center are maximized when there is only one leader at the Center. Proposition 8 is consistent with Xi's strategy since the beginning of his first term. At that time Hu Jintao stepped down from the Central Military Commission of the Party, creating a rare window for Xi to consolidate his power, which he has been doing consistently, up to the point that recent developments have clearly suggested he will break the post-1989 norm that one should not serve as the paramount leader for more than ten years (e.g., Fewsmith, 2018; McGregor et al., 2018).[8] The recent anti-corruption campaign has clearly helped him in this operation of power consolidation.

5   Conclusion

Crony capitalism and corruption in China's party-state system have played a key role in the promotion of economic growth. Crony business firms benefited from their privileged relations with local officials, which helped them expand, thereby fostering economic growth in their region, simultaneously feeding corruption inside the party-state system. We built the first model analyzing the interactions between cronyism and corruption at the different ladders of the hierarchy in the party-state system.

Leaders of the CCP face a fundamental trade-off in relation to cronyism and corruption. On one hand, tolerance of some corruption helps to foster growth at the local level, which helps stabilize the political power of the incumbents. On the other hand, a too high level of corruption tolerance will undermine the power of the Center to mobilize resources to face crises that occur regularly, as too greedy local and provincial officials will resist such resource mobilization.

Provincial officials play a key role in this corruption process. On one hand, they are able to use their hierarchical power to extract rents from local officials. On the other hand, they also have power over members of the Politburo Standing Committee (PSC) via a system of reciprocal accountability where PSC members, though hierarchically above provincial officials, need their active support to get elected and to push their

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[8]The 19th Politburo Standing Committee does not include any apparent successor to Xi, and the *2018 Amendment to the Constitution of the People's Republic of China* has abolished the term limit for the Presidency of China.

agenda inside the PSC. Reciprocal accountability can thus undermine the Center's power to crack down on provincial officials. We find that this is especially the case if there is too much fragmentation of power inside the PSC.

Our analysis shows that corruption is a key ingredient of officials' incentives to help generate economic growth. Because of its corrosive power, regular anti-corruption campaigns are inevitable. Our model has shown how consolidation of power inside the PSC may work to prevent paralysis of decision-making in the fight against corruption.

Our research also highlights the need to better understand cronyism and corruption in autocracies. Their economic and political effects certainly vary according to the type of autocratic institutions that prevail. Our analysis of the Chinese case is only a first step in that direction.

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