EROSION OF STATE POWER, CORRUPTION CONTROL AND FISCAL CAPACITY[*]

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We model how corruption erodes state power, that is, the state's ability to keep its apparatus under control in crises. Under a general assumption about fat-tailed risk of crisis, we show that given strong fiscal capacity, the head of the state will control local corruption at such a level that its power is secured; given weaker capacity, the state will over-tolerate corruption to retain officials, risking control in crises; moreover, a state may be trapped with too weak fiscal capacity, rampant corruption, and the state losing control in any real crisis, while having little incentive to invest in fiscal capacity. By developing historical narratives, we show that these theoretical results are consistent with experience from the Roman Empire, New Kingdom of Egypt, Ming China and many other powerful states in history.

Corruption is an important and pervasive phenomenon that gets much attention in political and economic research (Shleifer and Vishny, 1993, p. 599; Kreike and Jordan, 2004). Economic analysis emphasises mostly the efficiency implications of corruption.[1] Political scientists have investigated how corruption affects the functioning of the political system and how it damages people's support for corrupt regimes.[2] Relatively little formal analysis has been devoted to how

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[1] For corruption's effects in 'greasing the wheels' of the economy but more often in distorting resource allocation, preventing creative destruction and increasing agency costs, see, for example, Leff (1964), Tullock (1967), Krueger (1974), Rose-Ackerman (1978), Lui (1985), Laffont and Tirole (1991), Shleifer and Vishny (1993), Mauro (1995), Acemoğlu and Verdier (1998; 2000), Tanzi and Davoodi (1998), Guriev (2004), Méndez and Sepúlveda (2006), Olken (2006), Bertrand *et al.* (2007), Fisman and Svensson (2007), Cai *et al.* (2011), Aghion *et al.* (2016), Colonnelli and Prem (2017) and Allen *et al.* (2018). See also surveys by Bardhan (1997), Tanzi (1998), Rose-Ackerman (1999; 2007), Wei (1999), Jain (2001), Aidt (2003; 2009), Svensson (2005), Olken and Pande (2012) and Rose-Ackerman and Palifka (2016).

[2] For the effects of corruption in politics, see, for example, Merton (1968), Huntington (1968), Waterbury (1973; 1976) and Heidenheimer *et al.* (1989). For the damaging impact of corruption on regime support and legitimacy, see, for example, Banfield (1967), Etzioni-Halevy (1983), Della Porta (2000), Seligson (2002), Anderson and Tverdova (2003), Chang and Chu (2006), Gilley (2006), Morris and Klesner (2010) and Rothstein (2011). Guriev and Treisman (2018) show how in recent decades, instead of using mass repression, autocrats have increasingly been manipulating information to convince the public about their competence and win genuine popularity despite prevailing corruption in the state apparatus.

corruption erodes the power, authority, or control of the chain of command within the state apparatus.[3]

The literature on state capacity has, on the other hand, created interest in understanding the functioning of the state apparatus better.[4] It has focused on the capacity of the state to extract revenue and support markets, and on the incentives to invest in such capacity. Little attention has been paid to how corruption may lead to decay, and even collapse of state authority, and how this process can depend on the other dimensions of state capacity.

At the intersection of these two lines of research, we attempt in this paper to investigate three interconnected questions. First, how does corruption erode state power? Second, how can this erosion shape the control of local corruption by the head of the state apparatus? Finally, how can this mechanism be influenced by fiscal capacity, one of the most important economic dimensions of state capacity?

We build an applied theoretical model where the head of the state, i.e., the Centre, is endowed with a certain level of fiscal capacity to maintain the state apparatus on a daily basis, i.e., to retain a local official who represents the lower-level members of the apparatus. We analyse how corrupt the Centre would allow the local official to become. Our notion of corruption is primarily about the exchange of bribes and the building of crony relationships between a local official and firms or members of the population in the official's jurisdiction.[5] Our concept of state power, authority, and control relates to the Centre's success in securing the obedience of the local official in times of *crisis,* which we define as those exceptional times when the Centre needs urgent support from within the apparatus to implement well-coordinated responses. The crises that are the most relevant are (1) political—wars, secession, revolts, or revolutions—because they may threaten the survival of the incumbent or the regime itself (Tilly, 1990), (2) economic crises with a high risk of contagion, and (3) important natural catastrophes which can inflict severe damages to society. We focus on this concept of state power because political philosophers and real-world practitioners of power have viewed the ability to respond to exceptional situations, i.e., crises, as a fundamental attribute of state power (e.g., Hobbes, 1651; Schmitt, 1921; 1922; Lincoln, 1953; Agamben, 2003).

In this model, we show that when local corruption creates local vested interests and a crisis striking the Centre presents the local official with an opportunity to secure these interests, corruption can push the local official to defy the Centre's orders during the crisis. Thereby everyday corruption can break the chain of command along the state hierarchy in critical times. Answering the first question above, in this sense corruption can erode state power.

Answering the second question above, we show that under a general condition of fat-tailed risk of crisis, when the Centre considers whether to tolerate less local corruption, its concern over the erosion of state power will dominate at the margin any economic sacrifice if there is, be it the Centre's share of the generated corruption rents, or sometimes economic performance as well. Therefore, as long as the Centre's fiscal capacity can maintain the state apparatus on a daily basis, the Centre should follow an *endogenous lexicographic rule* when choosing its corruption

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[3] Rose-Ackerman and Palifka (2016, p. 28) summarise the causes and consequences of corruption studied in the literature and erosion of state power is not mentioned.

[4] For example, see Acemoğlu (2005), Besley and Persson (2008; 2009; 2010), Acemoğlu *et al.* (2011; 2015), Dincecco and Prado (2012), Padró i Miquel and Yared (2012), Dal Bó *et al.* (2013), Gennaioli and Voth (2015), Muralidharan *et al.* (2016) and the survey by Cingolani (2013).

[5] For examples of the coverage of this type of corruption over clientelism, the administrative, police, military, judicial and political realms, and state capture, see Ezrow and Frantz (2013, pp. 257–73). We also discuss in Online Appendix A the applicability of our model to other types of corruption, such as diversion of funds or embezzlement.

tolerance: first, corruption must not exceed a critical threshold so that control is always secured in any possible crisis; second, given that the first condition is satisfied, the Centre can tolerate corruption to a certain degree, raising its rents and possibly economic performance as much as possible.

Answering the third question above, we further show that whether the endogenous lexicographic rule is feasible critically depends on the Centre's fiscal capacity. When the capacity is not sufficiently strong, the Centre has to over-tolerate corruption to retain its subordinates, risking its control in crises. If the capacity is so weak that the over-tolerated corruption implies that the Centre will be losing control in any real crisis, any marginal increase in fiscal capacity will not help the Centre regain its power. It is thus possible for the Centre to have little incentive at the margin to invest in fiscal capacity.

Guided by these theoretical results, we develop historical narratives on corruption, state power and fiscal capacity. Consistent with our model, we first find that the state's ability to react in times of crisis has repeatedly been eroded by corruption throughout history, as in the Roman Empire and many other powerful empires, precisely because corruption creates an incentive misalignment along the state hierarchy. As predicted by the endogenous lexicographic rule, we further find that in the history of the New Kingdom of Egypt and many other states, corruption was both pervasive and controlled at the same time, so that potential loss of control was pre-empted; in particular, rising concerns of a potential crisis could push the head of the state to crack down on corruption. Finally, we find that during the decline of the Ming China and a few other historical empires, the retention problem created by weak fiscal capacity caused over-tolerance of corruption, and there existed a trap of weak fiscal capacity, rampant corruption and the Centre losing political control in any real crisis, all as predicted by the role of fiscal capacity in our model.

Our results help clarify the relationship between corruption and a weak state: does corruption indicate or make a weak state? Our results imply that it is important to distinguish between a *fiscally* weak state and a *politically* weak state. In our model, a fiscally weak state has to over-tolerate corruption; at the same time, corruption may be largely present in a fiscally strong state too, but it does so subject to such control that the state remains politically strong. Therefore, on the one hand, corruption does not necessarily indicate a *fiscally* weak state; on the other hand, despite its corrosive nature, corruption makes the state *politically* weak only when the state is *fiscally* weak. Relatedly, Ma and Rubin (2019) developed a model for absolutist regimes where weak fiscal capacity and rampant corruption could emerge in equilibrium as a solution to the commitment problem created by the ruler's absolute power. We emphasise instead that the ruler's absolute power can be compromised in crises by everyday corruption, whereas the ruler's ability to restrain this effect is constrained by their fiscal capacity; in the extreme, too weak fiscal capacity will lead to too much corruption and a total loss of absolute power in any real crisis, which may in turn make the too weak fiscal capacity persistent.

The paper is organised as follows. Section 1 introduces and discusses the setup of the model. Section 2 analyses the model and derives the theoretical results. Section 3 discusses the relevance of the theoretical results to history. Section 4 concludes.

1. Setup of the Model

The model is a sequential game. Figure 1 presents its setup. There are two players: the Centre, representing the highest level of the state apparatus, and a local official, representing all officials at lower levels of the hierarchy.
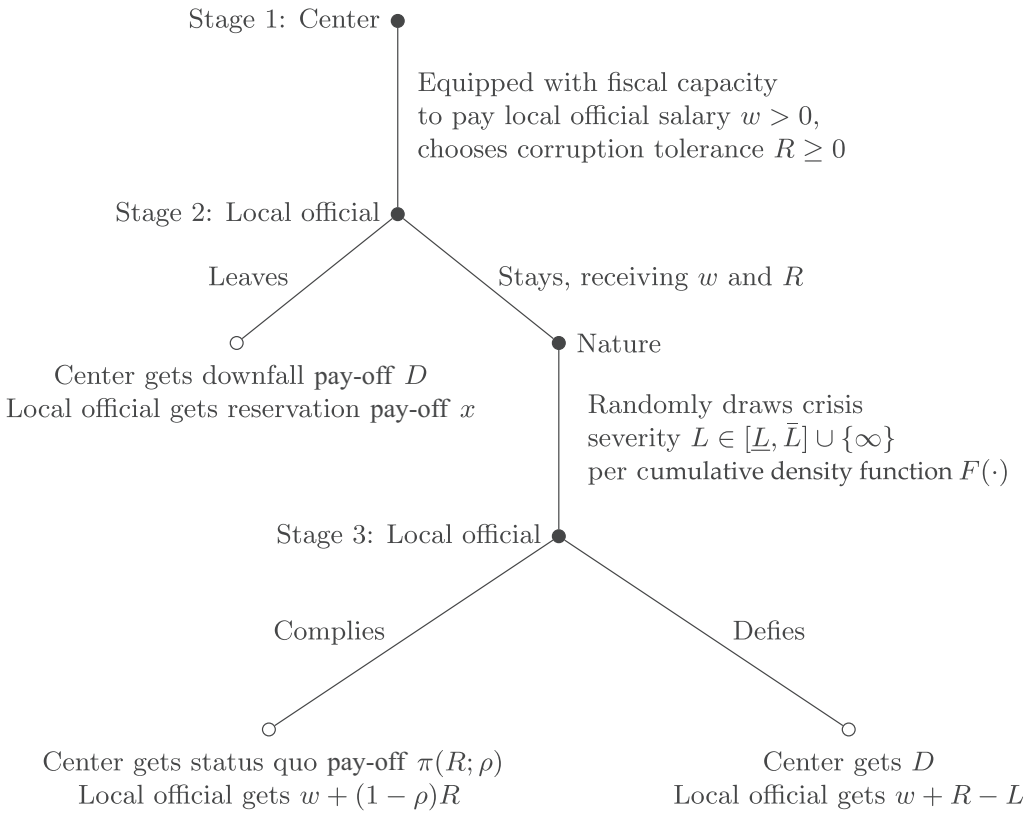
Stage 1: Center ●

Equipped with fiscal capacity
to pay local official salary $w > 0$,
chooses corruption tolerance $R \geq 0$

Stage 2: Local official ●

Leaves   Stays, receiving w and R

○

Center gets downfall pay-off D
Local official gets reservation pay-off x

● Nature

Randomly draws crisis
severity $L \in [\underline{L}, \bar{L}] \cup \{\infty\}$
per cumulative density function $F(\cdot)$

Stage 3: Local official ●

Complies   Defies

○   ○

Center gets status quo pay-off $\pi(R; \rho)$ Center gets D
Local official gets $w + (1 - \rho)R$ Local official gets $w + R - L$

Fig. 1. *Setup of the Game.*

At Stage 1, the Centre chooses the level of rents $R \geq 0$ that it allows the local official to obtain through corruption in their jurisdiction. Besides this corruption tolerance, the Centre is equipped with some fiscal capacity to pay an exogenous salary $w > 0$ to the local official.

At Stage 2, the local official chooses to leave or stay in the state hierarchy, and we assume that they will stay if indifferent. If they choose to leave, the state apparatus will be short of staff and the Centre will face its downfall. The game will then end, with the Centre getting an exogenous pay-off D for its downfall, while the local official gets an exogenous reservation pay-off x.

If the local official chooses to stay, they will receive the salary $w > 0$ and also obtain the corruption rents. Nature will then randomly draw a crisis severity level L from an exogenous distribution. The crisis of this severity will then strike the Centre and the game will move into Stage 3.

At Stage 3, the local official chooses whether to comply with the orders from the Centre and help survive the crisis. We assume that they will defy if indifferent. If they do comply, the game will end with the status quo being maintained, in which the local official is assumed to share an exogenous share $\rho \in (0, 1)$ of their obtained rents, ρR in total, with the Centre. The eventual pay-off of the local official is then $w + (1 - \rho)R$. The Centre is assumed to get a status quo pay-off $\pi(R; \rho)$.

If the local official chooses to defy, the status quo will end and the local official will no longer have to share their rents with the Centre. The realisation of crisis severity L enters here as the loss that the local official suffers in this scenario. The eventual pay-off of the local official is then $w + R - L$. As the Centre has lost control of the state apparatus, we assume that the Centre eventually gets the downfall pay-off D.

We assume that the players maximise their own expected pay-offs. We also assume complete, perfect, and symmetric information. Therefore, we use backward induction when solving the model.

Before analysing the model, we make a few remarks about the setup and interpretation of the model, along with three additional assumptions that help maintain realistic outcomes:

1.1. *Crisis and Its Severity*

First, the crisis severity L can be interpreted as the punishment that the Centre can impose on the local official for their potential defiance, or as the collateral damage that the Centre's downfall may inflict on the official. This is consistent with the idea that, when a crisis strikes the Centre, the Centre's ability to force the local official to comply and help survive the status quo is weakened; the more severe the crisis, the weaker this expected ability.[6]

Note that a smaller L in the model proxies a more severe crisis. Denoting L's cumulative distribution function and probability density as $F(\cdot)$ and $f(\cdot)$, respectively, we further specify the distribution of L as follows:

ASSUMPTION 1 (DISTRIBUTION OF CRISIS SEVERITY). *When $L \leq \underline{L}$, $F(L) = 0$; when $\underline{L} < L < \bar{L}$, $F(L) \in (0, p)$ is differentiable and $f(L) > 0$ everywhere; when $\bar{L} \leq L < \infty$, $F(L) = p \in (0, 1)$; when $L = \infty$, $F(L) = 1$.*

In other words, with probability $1 - p$, no real crisis will strike and the Centre will be infinitely capable of forcing the local official to obey and maintain the status quo; with probability p, however, a real crisis may occur; the most severe crisis possible is denoted by $\underline{L} \in (0, \infty)$, whereas the least severe crisis possible is denoted by $\bar{L} \in (\underline{L}, \infty)$.

In the current setup, the distribution of L is exogenous to existing corruption. We show in Subsection 2.1 that our result is robust when the distribution of L is endogenous to the level of corruption R. In Online Appendix A, we extend the model by introducing, in case of defiance, an additional loss to the local official that is dependent on R and we discuss the implications.[7] In the current setup, the crisis also does not affect the local official's salary or corruption rents. We show in Subsection 2.1 that our result is robust when allowing for such effects.

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[6] In particular, as any punishment would be conditional on the Centre's survival (e.g., Egorov and Sonin, 2011), the Centre's enforcing ability is weakened in expectation during crises. This idea can also be micro-founded by the Rubinstein (1982) protocol where a crisis makes the Centre become less patient, lose bargaining power and, therefore, become weaker in forcing the local official to obey orders.

[7] We keep the distribution of L exogenous in the current setup also because, first, the crisis severity in reality always has an exogenous component and, second, the exogeneity highlights in our model the essence of power: power fundamentally means that the person at the lower level of the hierarchy will comply with the higher level, *whatever* the situation may be. This *arbitrariness* of the situation is exactly captured by the exogeneity of L.

1.2. *Rent-sharing Arrangement*

Second, the rent-sharing arrangement ρ in the status quo is assumed to be exogenous. We can interpret a higher ρ as either more obligations or effort that maintenance of the status quo would require from the local official, or a more corrupt or dominant Centre in the status quo central–local relationship. In Online Appendix C, we analyse how ρ affects the Centre's calculation and explore how the Centre would choose ρ if it had the choice.

1.3. *Status Quo Pay-off*

Third, the dependence of the Centre's status quo pay-off $\pi(R; \rho)$ on the prevalence of corruption R can come from various sources. First of all, the Centre can value the performance of the economy because, for example, better economic performance can generate greater tax revenues or stronger popular support, and there are arguments for both corruption 'greasing' and 'sanding the wheels' of the economy (e.g., Leff, 1964; Shleifer and Vishny, 1993). Moreover, the Centre can also value the rents ρR that it reaps from the local official. Given that the reaped rents ρR also depend on ρ, the status quo pay-off also depends on the rent-sharing arrangement ρ, which is a parameter in $\pi(R; \rho)$. To preserve generality, we assume $\pi(R; \rho)$ to be continuous and differentiable in R and ρ but leave the signs of the first-order derivatives $\pi_R(R; \rho)$ and $\pi_\rho(R; \rho)$ unspecified.[8] All results in the main text do not depend on these signs.

1.4. *Downfall Pay-off*

Fourth, we make two additional assumptions to make sure that the Centre's downfall pay-off is sufficiently low:

ASSUMPTION 2. $D < \inf_{R \geq 0} \pi(R; \rho)$.

This assumption narrows our focus to the scenarios in which the Centre always prefers the status quo to downfall, which is reasonable. Assumption 2 itself does not imply that the Centre will always prevent the eventuality of a downfall. This is because the Centre's status quo pay-off and survival probability could move in opposite directions when the corruption tolerance R changes, depending on the properties of the other parts of the model, i.e., $\pi(R; \rho)$, x, w and $F(\cdot)$. It is thus a priori unclear whether the Centre will prefer the status quo to be totally or only partially secured.

ASSUMPTION 3. $D < (\inf_{R \geq 0} \pi(R; \rho) - (1 - p) \cdot \sup_{R \geq 0} \pi(R; \rho))/p$.

Assumption 3 further narrows our focus to the cases in which the Centre always prefers the status quo to any situation where it will lose control in any real crisis, which is also reasonable. Assumption 3 does so because it is equivalent to $\inf_{R \geq 0} \pi(R; \rho) > p \cdot D + (1 - p) \cdot \sup_{R \geq 0} \pi(R; \rho)$, where the left-hand side is the minimum that the status quo can provide, whereas the right-hand side is the maximum that the Centre can expect if it will lose control in any real

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[8] If the Centre's rent-seeking motive dominates its concern for economic performance, or if corruption is 'greasing' the wheels' of the economy so much, higher corruption tolerance will raise the status quo pay-off.

crisis. Like Assumption 2, this assumption itself does not imply that the Centre will prefer the status quo to be totally or partially secured.

1.5. *Fiscal Capacity*

Finally, the Centre's fiscal capacity is modelled as its ability to pay and retain the local official without allowing them to take bribes. It is measured by the difference between the local official's reservation pay-off x and salary w, i.e., $x - w \in (-\infty, \infty)$; the higher this difference, the weaker the capacity. In Subsection 2.4, we analyse the Centre's incentive to invest in fiscal capacity. In Online Appendix E, we endogenise the salary w by defining fiscal capacity as a budget, subject to which the Centre chooses the salary while the rest of which can be saved to serve as an additional, conditional incentive to enforce the local official's compliance during crises; all main results remain robust.[9]

2. Analysis of the Model

2.1. *Stage 3*

At this stage, having received the salary w and corruption rents R and learned the realisation of the crisis severity L, the local official will defy if and only if

$$w + (1 - \rho)R \leq w + R - L.$$

This is equivalent to ρR being sufficiently big, or the crisis being sufficiently severe:

$$L \leq \rho R \equiv \hat{L}(R),$$

where $\hat{L}(R)$ is the critical threshold of the crisis severity at which the local official will switch between complying and defying.

A higher corruption tolerance R will thus raise the critical threshold $\hat{L}(R)$ because it increases the vested interests ρR for the local official to secure during any crisis. Given the distribution of L, this higher threshold suggests a higher likelihood $F(\hat{L}(R))$ of the local official's eventual defiance and a lower probability $1 - F(\hat{L}(R))$ for the Centre to eventually keep control in the potential crisis. This is the corrosive effect of corruption on state power:

PROPOSITION 1 (CORROSIVE CORRUPTION). *There exist $\underline{R} \equiv \underline{L}/\rho$ and $\bar{R} \equiv \bar{L}/\rho$ such that when $0 \leq R \leq \underline{R}$, $1 - F(\hat{L}(R)) = 1$; when $\underline{R} \leq R \leq \bar{R}$, $1 - F(\hat{L}(R))$ continuously, strictly decreases from 1 to $1 - p$ as R increases from $\underline{R}$ to $\bar{R}$; when $\bar{R} \leq R < \infty$, $1 - F(\hat{L}(R)) = 1 - p$.*

The proposition directly follows $\hat{L}(R) = \rho R$ and Assumption 1. The threshold $\underline{R}$ is the corruption level at which the Centre just secures perfect control in any crisis, while the threshold $\bar{R}$ is the corruption level at which the Centre just loses control in any real crisis. If corruption is limited ($R \in [0, \underline{R}]$), then the Centre will never lose control in any crisis; if corruption is over-tolerated ($R \in [\underline{R}, \bar{R}]$), the Centre starts to risk its crisis control and higher corruption will erode crisis control; if corruption is sufficiently over-tolerated ($R \in [\bar{R}, \infty)$), the Centre will

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[9] One can argue that the level of corruption R can affect the Centre's fiscal capacity through economic performance, which can be captured by $\pi(R; \rho)$. How this effect would complicate the Centre's decision in Stage 1 would depend on the micro-foundation of $\pi(R; \rho)$. As we have kept $\pi(R; \rho)$ in the reduced form, we keep fiscal capacity exogenous to R.

lose control in any real crisis and the status quo can be maintained only when no real crisis strikes.

2.1.1. *Remarks*

Although derived from a simple setting, Proposition 1 is robust to alternative settings. First, instead of rent-sharing, the status quo could require the local official to submit a fixed fee. In this setting, the probability that the local official will defy would still weakly increase with the corruption rents.[10]

Second, one can argue that corruption can shift the distribution of crisis severity in the wrong direction by creating more social discontent, or through other channels generating similar effects. In that case, the corruption rents would further decrease the probability of crisis control, but from an additional channel, and would not modify the thrust of our result.

Third, one can imagine that as the crisis shocks the regime, a more severe crisis could lower the local official's rents or affect their salary. In that case, as long as the post-crisis and pre-crisis rents are positively correlated given the crisis severity, the corrosive effect of corruption will still hold.[11]

Finally, one can argue that during the collapse of the status quo the local official might lose a share of the corruption rents. As shown in Online Appendix A, the corrosive effect of corruption will hold, as long as this share is not too large. Online Appendix A further provides justifications for this condition.

2.2. *Stage 2*

Understanding their own Stage-3 decision as analysed, the local official has to decide at Stage 2 whether to stay in the state hierarchy. They will stay if and only if

$$x \leq w + \mathbf{E}_L[\max\{(1 - \rho)R, R - L\}] = w + R - \mathbf{E}_L[\min\{\rho R, L\}].$$

If we denote the expected rents the local official will eventually gain after Stage 3 by $X(R) \equiv R - \mathbf{E}_L[\min\{\rho R, L\}]$, this condition is equivalent to

$$X(R) \geq x - w,$$

which means that the local official will stay if their expected rents cover the gap between their reservation pay-off and salary.

The expected rents $X(R)$ has the following property:

LEMMA 1 (LOCAL OFFICIAL'S EXPECTED RENTS). *$X(R)$ strictly and continuously increase from 0 to ∞ as R increases from 0 to ∞.*

PROOF. By the definition of $X(R)$ and Assumption 1, we have that when $R \in [0, \underline{R}]$, $X(R) = (1 - \rho)R$; when $R \in (\underline{R}, \bar{R})$, $X(R) = R - \int_{\underline{L}}^{\rho R} L \, dF(L) - \rho R(1 - F(\rho R))$ and $X'(R) = 1 - \rho(1 - F(\rho R)) > 0$; when $R \in [\bar{R}, \infty)$, $X(R) = (1 - (1 - p)\rho)R - p \cdot \int_{\underline{L}}^{\bar{L}} L \, dF(L)$. The result then follows the fact that $\rho \in (0, 1)$. □

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[10] The defiance condition would become $w + R - \min\{M, R\} \leq w + R - L$, where M is the fixed fee. Then the focal probability would be $F(\min\{M, R\})$, which weakly increases with R.

[11] To see this point, suppose that the salary is $w(L)$, a function of the crisis severity L, and the post-crisis rents are $R'(R, L)$, a function of the pre-crisis rents R and the crisis severity L. The defiance condition would become $w(L) + (1 - \rho)R'(R, L) \leq w(L) + R'(R, L) - L$, i.e., $R'(R, L) \geq L/\rho$. Therefore, if $R'(R, L)$ is increasing in R, then the local official will defy only when R is sufficiently high.

This result is intuitive in the sense that the higher the rents R that the local official will have obtained before Stage 3, the higher the local official's expected rents $X(R)$ after Stage 3. We can then characterise Stage 2 as follows:

LEMMA 2 (SCENARIOS DEPENDING ON FISCAL CAPACITY). *The model has two scenarios:*

(1) *when $x - w \leq 0$, the local official will always stay in the state apparatus at Stage 2 regardless of the Centre's choice of $R \in [0, \infty)$;*
(2) *when $x - w > 0$, the local official will stay if and only if $R \geq r$, where $r > 0$ uniquely solves $X(r) = x - w$ and increases with $x - w$.*

This lemma suggests that in Scenario 1, when the Centre's fiscal capacity is sufficiently strong $(x - w \leq 0)$, no gap between the reservation pay-off and salary needs to be covered. The local official will thus always stay. In Scenario 2 when the Centre's fiscal capacity is not as strong $(x - w > 0)$, the Centre will face a problem to retain the local official and its choice of corruption tolerance R will have to be sufficiently high $(R \geq r)$.

2.3. *Stage 1, Scenario 1 (No Retention Problem)*

All the analysis above suggests that the Centre's choice of corruption tolerance R creates central–local incentive misalignment in crises at Stage 3 and decides whether the expected rents $X(R)$ at Stage 2 can cover the gap between the local official's salary and reservation pay-off. To understand the Centre's choice of R, given Lemma 2, we first analyse Stage 1 in Scenario 1. By muting the retention problem at Stage 2, this scenario helps us to isolate the Centre's concern about crisis control. After that we turn to Scenario 2, bringing the retention problem back and investigating the implications of a weaker fiscal capacity.

In Scenario 1, the local official will always stay regardless of the Centre's choice of R. The Centre's programme is then

$$\max_{R} \quad (1 - S(R)) \cdot D + S(R) \cdot \pi(R; \rho) = D + S(R) \cdot (\pi(R; \rho) - D), \quad \text{subject to} \quad R \geq 0,$$

where the Centre's political stability $S(R)$, i.e., the probability that it will survive at the end of the game, is

$$S(R) = 1 - F(\hat{L}(R)), \text{ in which } \hat{L}(R) = \rho R.$$

This programme suggests that, given Assumption 2 $(\pi(R; \rho) > D)$ and a sufficiently strong fiscal capacity $(x - w \leq 0)$, the Centre can face a trade-off: a higher R will lead to loss of control in some crises and, therefore, a lower political stability $S(R)$, but it can grant a higher status quo pay-off $\pi(R; \rho)$ whenever $\pi_R(R; \rho) > 0$. This trade-off, if it exists, is truly political–economic, as one side of the trade-off is political: making sure that the local official will comply with the Centre, whatever the severity of the crisis would be; the other side is economic: it is about the pay-off under the status quo.

We now derive the main result about the trade-off—a sufficient condition about the risk distribution under which the political side will dominate the economic side—and the Centre will thus choose a corruption tolerance that does not pose any risk to power at all:

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PROPOSITION 2 (NO RETENTION PROBLEM). *If $x - w \leq 0$, and if, for any $L \in (\underline{L}, \bar{L})$,*

$$\frac{L \cdot f(L)}{1 - F(L)} \equiv \epsilon > \bar{\epsilon} \equiv \max_{R \in [\underline{R}, \bar{R}]} \frac{\pi_R(R; \rho) \cdot R}{\pi(R; \rho) - D},$$

then the Centre's optimal choice $R^* \in \arg\max_{R \in [0, \underline{R}]} \pi(R; \rho)$, which implies $R^* \leq \underline{R}$ and $S(R^*) = 1$.

PROOF. First, by Assumptions 2 and 3 and Proposition 1, the Centre must prefer any $R \in [0, \underline{R}]$ to any $R \in (\bar{R}, \infty)$, because the former would secure perfect crisis control and the latter would make the Centre lose any crisis control. Second, by $\hat{L}(R) = \rho R$, the Centre's expected pay-off will be strictly decreasing over $R \in (\underline{R}, \bar{R})$, if and only if the marginal gain from additional security brought by a slightly lower corruption tolerance dominates the marginal sacrifice, if there is any, in the status quo pay-off, i.e., $-S'(R) \cdot (\pi(R; \rho) - D) > S(R) \cdot \pi_R(R; \rho)$. By $S(R) = 1 - F(\hat{L}(R))$, $\hat{L}(R) = \rho R$, and Assumption 2, this condition is equivalent to

$$\frac{f(\hat{L}(R)) \cdot \hat{L}(R)}{1 - F(\hat{L}(R))} > \frac{\pi_R(R; \rho) \cdot R}{\pi(R; \rho) - D}.$$

By $\epsilon > \bar{\epsilon}$, this condition holds. Therefore, the Centre's expected pay-off is strictly decreasing over $R \in (\underline{R}, \bar{R})$. Therefore, the optimal choice $R^* \in [0, \underline{R}]$ must hold. The proposition then follows. □

The key step in the proof is to recognise that when the crisis risk distribution is sufficiently fat-tailed or thick-ended ($\epsilon > \bar{\epsilon}$), a severe crisis is sufficiently likely at the margin, so the gain from any additional control by lowering the corruption tolerance will always dominate the marginal sacrifice, if there is any, in the status quo pay-off. The Centre will thus follow an *endogenous lexicographic rule* when choosing the corruption tolerance: perfect crisis control first, the status quo pay-off second.

2.3.1. *Remarks*
Several remarks can be made about the endogenous lexicographic rule. First, it is *lexicographic,* as it specifies that the Centre foremost maximises control in crises; given that perfect control is secured, the Centre then adjusts the corruption tolerance to maximise the status quo pay-off.

Second, it is a decision *rule,* not a *preference* between power and the economic pay-off in the status quo. In our model, there is only one thing that matters in the Centre's preference, which is the pay-off. Power, control, and authority only have instrumental value because they can increase the Centre's expected pay-off.

Third, it is *endogenous*, different from the assumption of 'power first' as an *axiom* for political agents and organisations (e.g., Downs, 1957; Roemer, 1985; Svolik, 2009). Instead, we provide a consequentialist justification for this assumption.

Fourth, the key condition for the endogenous lexicographic rule is the fat-tailed condition $\epsilon > \bar{\epsilon}$. Indeed, we show in Online Appendix B that unsecured control can be optimal if the risk of crisis is instead sufficiently thin-tailed; it is because the marginal sacrifice in the status quo pay-off, if there is, will dominate the marginal gain of better control in crises.

Finally, the fat-tailed condition $\epsilon \equiv L \cdot f(L)/(1 - F(L)) > \bar{\epsilon}$ is hardly controversial and arguably general. It suggests that the Centre's perceived probability of extremely bad situations does not decrease too quickly. This is consistent with the notion that 'crises are difficult to learn about because they are by definition infrequent, low-probability events' (Taylor, 2009, p. 1243),

often described by practitioners of power as 'black swans' (e.g., *People's Daily*, 2019); it is also consistent with the common approach to modelling crises in the literature across disciplines.[12] Therefore, one can argue that, under sufficiently strong fiscal capacity where retention is not of great concern, the endogenous lexicographic rule is quite general.

2.3.2. *Comparative statics*

We now turn to comparative statics of Proposition 2. There are two important exogenous parameters in Proposition 2: the greatest possible severity of the crisis $\underline{L}$ and the rent-sharing arrangement ρ.

COROLLARY 1 (ADDITIONAL CRISIS RISK). *Following Proposition 2, R^* is weakly increasing in $\underline{L}$.*

PROOF. Proposition 2 implies $R^* \in \arg\max_{R \in [0, \underline{R}]} \pi(R; \rho)$, where the upper bound of the range $\underline{R} = \underline{L}/\rho$ is strictly increasing in $\underline{L}$. The corollary then follows.   □

Corollary 1 predicts that when additional risk of crisis arises (lower $\underline{L}$), the Centre may crack down on corruption (lower R^*). We will discuss the relevance of this prediction in Subsection 3.2.

However, the comparative statics with respect to the rent-sharing arrangement ρ is generally ambiguous. This is because we have not specified the way that ρ comes into the status quo pay-off $\pi(R; \rho)$. That said, the rent-sharing arrangement has a paradoxical role in the model: the Centre's weakness in a crisis comes precisely from the rents that it would obtain under the status quo. In Online Appendix C, we discuss the paradoxical role, derive a clear-cut result of comparative statics given more restrictions on $\pi(R; \rho)$ and explore the Centre's choice of the rent-sharing arrangement.

2.4. *Stage 1, Scenario 2 (Weaker Fiscal Capacity)*

Scenario 2 helps us investigate whether fiscal capacity could play a role in breaking Proposition 2, given that the weaker fiscal capacity in this scenario makes retaining the local official a real challenge for the Centre. In this scenario, by Lemma 2, the Centre's programme is

$$\max_{R} \quad (1 - S(R)) \cdot D + S(R) \cdot \pi(R; \rho), \quad \text{subject to} \quad R \geq 0,$$

where

$$S(R) = \mathbf{1}_{R \geq r} \cdot \left(1 - F(\hat{L}(R))\right), \; \hat{L}(R) = \rho R, \text{ and } r > 0 \text{ uniquely solves } X(r) = x - w.$$

To solve the programme, first note that if the Centre's choice of R cannot retain the local official, the Centre will face certain downfall. Second, by Assumption 2, the Centre will prefer any status quo to downfall. Third, if the local official does stay at Stage 2, the Centre can definitely maintain the status quo at the end of Stage 3 if no real crisis strikes, which will happen with

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[12] For examples, see Resnick (2007), Taleb (2007), Bremmer and Keat (2009), Taylor (2009), Weitzman (2009; 2011), Barro and Jin (2011), Pindyck (2011), Cooke *et al.* (2014) and Ackerman (2017). The fat-tailed condition is also consistent with the etymology of the word *crisis*—it comes from the Greek word κρίσις, which means *decision,* and describes 'a state of affairs in which a decisive change for . . . worse is imminent' (*Oxford English Dictionary*, 1989). The measure we use for the tail fatness or end thickness, i.e., $\epsilon \equiv L \cdot f(L)/(1 - F(L))$, is asymptotically equivalent to the tail index in the literature (e.g., Cooke *et al.*, 2014, p. 2) and can apply to the finite case (e.g., Aban *et al.*, 2006). For example, suppose L follows a uniform distribution between $\underline{L}$ and $\bar{L}$. The condition $\epsilon > \bar{\epsilon}$ is thus equivalent to $\underline{L}/(\bar{L} - \underline{L}) > \bar{\epsilon}$, which means the distribution of the crisis severity is sufficiently heavy at the more severe end, consistent with the notion of catastrophic risk.

probability $1 - p > 0$. Therefore, the Centre will prefer to retain the local official as long as it is feasible.

It is indeed feasible, by Lemma 2, because the Centre can always choose $R \geq r$. The Centre's programme is thus reduced to

$$\max_{R} \quad (1 - S(R)) \cdot D + S(R) \cdot \pi(R; \rho), \quad \text{s.t.} \quad R \geq r,$$

where

$$S(R) = 1 - F(\hat{L}(R)), \text{ in which } \hat{L}(R) = \rho R.$$

The Centre's optimal corruption tolerance then depends on its fiscal capacity:

PROPOSITION 3 (RETENTION PROBLEM LIKELY). *If $x - w > 0$, and if, for any $L \in (\underline{L}, \bar{L})$, $\epsilon > \bar{\epsilon}$, then the Centre's optimal choice R^* follows:*

- *when $0 < x - w < X(\underline{R})$, $R^* \in \arg\max_{R \in [r, \underline{R}]} \pi(R; \rho)$, which implies $S(R^*) = 1$;*
- *when $X(\underline{R}) \leq x - w < X(\bar{r})$, $R^* = r$, which implies $S(R^*) = 1 - F(\rho R^*) \in (1 - p, 1)$;*
- *when $x - w \geq X(\bar{r})$, $R^* \in \arg\max_{R \geq \max\{r, \bar{R}\}} \pi(R; \rho)$, which implies $S(R^*) = 1 - p$,*

where $\bar{r} \equiv \bar{R}$, if $\pi(\bar{R}; \rho) \geq \sup_{R > \bar{R}} \pi(R; \rho)$; if otherwise, $\bar{r} \in (\underline{R}, \bar{R})$ uniquely solves $F(\rho \bar{r}) \cdot D + (1 - F(\rho \bar{r})) \cdot \pi(\bar{r}; \rho) = pD + (1 - p) \cdot \sup_{R > \bar{R}} \pi(R; \rho)$.

We leave the proof of Proposition 3 to Appendix A and only discuss the intuition here. The fat-tailed risk of crisis, as in Proposition 2, still makes the Centre care about crisis control before the status quo pay-off. When the state is still fiscally sound ($x - w < X(\underline{R})$), some choice of the corruption tolerance that would secure perfect control can still secure retention, so the Centre will still adopt the lexicographical rule in Proposition 2, only modifying it by first securing retention and crisis control simultaneously ($R^* \in \arg\max_{R \in [r, \underline{R}]} \pi(R; \rho)$).

Given a medium fiscal capacity ($X(\underline{R}) \leq x - w < X(\bar{r})$), however, any choice of the corruption tolerance that would secure perfect control would not allow retention, so the Centre has to over-tolerate corruption, risking but still maximising crisis control, i.e., choosing the corruption tolerance that is just sufficient to retain the official ($R^* = r$).

When the fiscal capacity is too weak, ($x - w \geq X(\bar{r})$), to retain the local official, the Centre has to over-tolerate corruption so much that it will lose control in any real crisis. The Centre will then simply maximise the status quo pay-off while making sure retention is achieved ($R^* \in \arg\max_{R \geq \max\{r, \bar{R}\}} \pi(R; \rho)$).

2.4.1. *Incentive of fiscal capacity investment*

As Proposition 3 implies that the retention problem given weak fiscal capacity may prevent the Centre from securing perfect control in a crisis, will the Centre always have a strictly positive incentive to invest in fiscal capacity? Denoting the Centre's expected pay-off given their optimal choice of corruption tolerance R^* as V, the answer is as follows:

COROLLARY 2 (WEAK-CAPACITY TRAP). *Following Proposition 3,*

- *if $X(\underline{R}) \leq x - w < X(\bar{r})$, then $dS(R^*)/d(w - x) > 0$ and $dV/d(w - x) > 0$;*
- *if $x - w \geq X(\bar{r})$, then $dS(R^*)/d(w - x) = 0$; further, if $R^* > r$, then $dV/d(w - x) = 0$.*

We leave the proof of Corollary 2 to Appendix B and only discuss the intuition here. Given a medium fiscal capacity ($X(\underline{R}) \leq x - w < X(\bar{r})$), strengthening fiscal capacity will allow the Centre to tolerate a lower level of corruption for retention and, therefore, strengthen the Centre's crisis control ($dS(R^*)/d(w-x) > 0$). Given the fat-tailed risk of a crisis, this will make the Centre better off overall ($dV/d(w-x) > 0$). The incentive for the Centre to invest in fiscal capacity will thus be strictly positive.

If the fiscal capacity is too weak ($x - w \geq X(\bar{r})$), instead, the Centre will lose control in any real crisis. Given that any marginal increase in fiscal capacity would not substantially strengthen the Centre's crisis control, there is not any political incentive for fiscal capacity investment ($dS(R^*)/d(w-x) = 0$); as the Centre has been maximising only the status quo pay-off, if doing so has led to so much corruption that the retention constraint is not even binding ($R^* > r$), then there will not be any economic incentive for fiscal capacity investment either. Therefore, the Centre's total incentive to invest in fiscal capacity will be exactly zero ($dV/d(w-x) = 0$).

Corollary 2 predicts that the Centre with a too weak fiscal capacity will not have any political incentive to invest in fiscal capacity, and lays out the condition under which there will not be any economic or overall incentive either. Whereas fiscally intermediate states would generally try to improve their fiscal capacity, a trap of too weak fiscal capacity and low political stability may appear. We will discuss the relevance of these implications in historical examples in Subsection 3.3.

3. Relevance of the Theory in History

On the relevance of the model in the contemporary world, we discuss in Online Appendix D how Corollary 1 above and Corollary S1 in Online Appendix C can help understand the observed correlation between personalistic rule and corruption; with recent cross-country panel-data we show in Li *et al.* (2019b) that corruption and political stability are correlated only when fiscal capacity is at an intermediate level, consistent with the implications of Propositions 2 and 3. In this section, we focus on the relevance of the model in history instead. When doing so, we discuss three sets of historical examples, corresponding to the three sets of theoretical results— the corrosive effect of corruption (Proposition 1), corruption controlled for perfect crisis control (Proposition 2 and Corollary 1) and the role of fiscal capacity (Proposition 3 and Corollary 2).

3.1. *Corrosive Effect of Corruption*

Proposition 1 predicts that corruption has such a corrosive effect that it will compromise the Centre's authority over the state apparatus when it is urgently needed. It also outlines the mechanism for this effect: corruption creates vested interests for officials to secure despite the Centre's call for service. A prominent example that is consistent with this prediction and the mechanism can be found in the decline of the Roman Empire.

3.1.1. *Roman Empire*

Citing Ammianus (c. 391), Jones (1964), Rougé (1966) and MacMullen (1988, p. 182) examine why in the mid-350s the Isaurians around southwestern Anatolia 'were well established as a quite uncontrollable force' threatening the empire. This was because when Roman officials were ordered to clean up the threat, these officials 'were busy raking together their spoils from the subject population under them' (MacMullen, 1988, p. 182). Defying the emperor's will to

attack the Isaurians, 'no one [official did] say [the Isaurians] nay', the officials 'were not very aggressive', and they tried instead to secure their own interests (MacMullen, 1988, p. 182). In one infamous case, as told by Zosimus (c. 518) and Martindale (1980, pp. 127–8), and cited by MacMullen (1988, p. 183), 'the military Count Arbazacius, [who was] dispatched to the aid of villas and villages' but 'wanting wealth and the pleasures of wealth', even 'shook down' the Isaurian leaders for a 'part of their plunder [and] relaxed his military efforts', earning him the nickname 'Harpazacius'—'the grabber'—from his contemporaries. To secure their own interests, officials also frequently went further to fight against each other, i.e., 'behind their own walls' (MacMullen, 1988, p. 182).

The corrosive effect of corruption was quite common within the Roman regular army on other frontiers. For example, MacMullen (1988) notices Ammianus's (c. 391) record about a similar situation on the Persian frontier in 356. According to Ammianus (c. 391) and MacMullen (1988, p. 175), all the 'lust for plunder' generated likewise lack of 'discipline, energy, and courage' inside the regular Roman army.

This erosion of central authority was highlighted at the Battle of Adrianople in 378 between the Eastern Roman Emperor Valens and the Gothic rebels: as pointed out by MacMullen (1988, p. 185), 'what . . . appears most striking is the contrast between the supposed great forces available to Valens and his sorry performance in bringing them to bear'. Consequently, Valens was killed at Adrianople, 'marked among the most inauspicious of the Roman Calendar' (Gibbon, 1781, p. 613), and the defeat 'set in motion the chain of events that would lead, nearly a century later, to the fall of the Western Roman Empire' (Barbero, 2008, p. 1). Both the mechanism and the consequences of the corrosive effect of corruption are consistent with Proposition 1.

3.1.2. *Other examples*

The same effect was commonplace among other historical empires. For example, in the Mamluk Sultanate of Egypt, senior Mamluks employed their junior protégés to seek rents from the civilian population, accumulating such great fortunes that their loyalty towards the Sultan was replaced by economic calculus (Petry, 1998, p. 468; Fukuyama, 2011, p. 209). As a result, the Mamluks often intentionally delayed answering the Sultan's call for service and helped challengers supplant the Sultan (Petry, 1998, p. 468). The same causality from rent-seeking, creation of vested interests, to disloyalty applied to the relationship between the Janissaries and the sultan in the Ottoman Empire (Itzkowitz, 1972, pp. 89–92; Finer, 1997c, p. 1208; Fukuyama, 2011, pp. 223–7). On late Valois France, Finer (1997c, p. 1309) argues that the rent-seeking behaviour by the permanent civil service contributed to the 'collapse' of 'the entire edifice' of the king's power and its inability to respond to wars and resurgences. On British India, Pavarala (2004, pp. 293, 295) observes that the trade interests of the East India Company were developed along with 'the so-called "Indian fortunes" made by East India Company officials', accompanied by 'the struggle that marked most of the eighteenth century between the state [Centre in London] and the Company for control over India'. All these examples are consistent with Proposition 1.

3.2. *Corruption Control and Political Stability*

Despite the corrosive effect in Proposition 1, given the general fat-tailed condition for the risk of crisis, Proposition 2 predicts that whenever feasible, the Centre will keep corruption checked to secure its crisis control. Indeed, as MacMullen (2015, pp. 10–11) once remarked, '[a]lthough corruption has been pervasive in all times of history and even in the most powerful empires, more

than often it has been under control and has not led to disastrous consequences comparable to the case of the Roman Empire'. A fitting example can be found in the history of the New Kingdom of Egypt, i.e., the eighteenth–twentieth Dynasties of Egypt (sixteenth–eleventh centuries BC).

3.2.1. *New Kingdom of Egypt*

Given its dictatorial state and command economy, corruption was pervasive in the New Kingdom (Finer, 1997a, p. 199). '[T]he courts were frequently prejudiced or corruptible' (Finer, 1997a, p. 199), and in well-documented cases the local officials' cumulation of vested interests through corruption could be 'long-continued ... for ten years' when private contractors 'conspired with the clerks, administrators, and peasant-farmers' (Wilson, 1956, pp. 279–80). Finer (1997a, pp. 202–3, 208–9) observes that it was 'inherent' to the New Kingdom's institution that corruption of this kind 'dislocated the "plan"', thereby depriving the central authority of access to certain important resources when needed, such as grains, ores, timbers, chariots, and corvées. All these observations are consistent with the corrosive effect of corruption depicted in Proposition 1.

It was thus remarkable that, despite being 'a monument of ... corruption', the New Kingdom 'did endure, stably, for four centuries' (Finer, 1997a, p. 199). Only the Han Empire in the Chinese history was comparable to 'virtually all these 370 years' when the New Kingdom 'was governed stably and well', and '[n]either Persia nor Rome nor Byzantium could show such stability over so long a period' (Finer, 1997a, p. 179). In particular, despite the fact that 'the peasantry were all ... in a servile condition' (Finer, 1997a, p. 205), '[t]here were no civil disturbances ... or revolts ... that could not be handled by the police' until the end of the twentieth dynasty (Finer, 1997a, pp. 198, 205). Even when Pharaoh Akhenaten was implementing his extremely unpopular religious revolution (1350s–1330s BC), 'his rule was effective, the army obedient, ... without resistance of any kind as far as our information goes' (Finer, 1997a, p. 181). Even more remarkable was that this impressive stability was achieved despite the 'infinite complexity' of the 'tightly knit' Egyptian administration, where 'a failure in one sector of the system [would weaken] another, and in turn another' (Finer, 1997a, pp. 202, 207). Therefore, '[t]he system [would fall] apart' with 'a multiplication of ... petty acts' (Finer, 1997a, pp. 202, 207). This likely made the risk of crisis fat-tailed, satisfying the key condition of Proposition 2. Consistent with Proposition 2, the corrosive effect of corruption was thus kept well under control.

The control was secured by recurrent crackdowns on corruption (e.g., Wilson, 1956, pp. 237–9, 241; Finer, 1997a, pp. 184, 202; Van Dijk, 2003, pp. 284–5). A famous one was implemented by Horemheb, the last pharaoh of the eighteenth dynasty. During his actual reign (1323–1295 BC), 'a series of police regulations' were 'directed against specific malpractices' and 'administrative corruption', because 'soldiers and officials had been lawlessly using their power to enrich themselves at the expense of common people' (Wilson, 1956, p. 237). The campaign was indeed intense: '[t]he punishments meted out [were] very harsh ... out of all proportion to the offenses', and the 'very harsh and reactionary enactment [was] designed to check the deplorable dishonesty of government people' (Wilson, 1956, pp. 238–9). Horemheb also conducted a 'reorganization of the administrative machinery' and 'put into the courts of law individuals of a reactionary type ... in order to control future abuses' (Wilson, 1956, p. 237).[13]

The circumstances of the crackdown further revealed the motives behind it. Since the reign of Akhenaten, the Hittites had risen and become a constant threat in the north (Wilson, 1956, p. 241; Van Dijk, 2003, pp. 270, 282–3, 287, 289), while military confrontations just before Horemheb's

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[13] For another example, see Wilson (1956, p. 241) on the anti-corruption campaign during the reign of Seti I (1290–1279 BC), the second pharaoh of the nineteenth dynasty.

reign 'failed to establish a new balance of power' (Van Dijk, 2003, p. 282). The disastrous Egyptian defeat at Amqa (c. 1325 BC) still fresh (Van Dijk, 2003, p. 283), Horemheb started his reign on the back foot, 'preoccupied with the military situation in Egypt's northern territories' (Van Dijk, 2003, pp. 286, see also 284–5; Wilson, 1956, p. 239). The internal situation did not help, either: 'Akhenaten's reforms had left the country . . . in . . . an extremely negative . . . state' (Van Dijk, 2003, p. 282); from the end of Akhenaten's reign to the beginning of Horemheb's reign, Egpyt saw 'chaos . . . in the palace', 'indecision', 'dynastic confusion' (Van Dijk, 2003, p. 282; Finer, 1997a, p. 179), and 'the word of the king no longer had the same effectiveness in maintaining order' (Wilson, 1956, p. 242). What made things worse was that Horemheb 'was of non-royal blood' and his 'path to the throne had been beset with difficulties' with a few political enemies (Van Dijk, 2003, pp. 284–5). All these internal and external factors must have made Horemheb feel deeply about the rising risk of potential crises, which is the condition of Corollary 1.

As predicted by Corollary 1, the rising risk brought about the urgent need to 'restore order and confidence within Egypt' through the anti-corruption campaign (Wilson, 1956, p. 236).[14] As Wilson (1956, pp. 236, 242) comments, the 'energetic measures' and 'much harsher . . . punishment than . . . earlier enactments' were implemented because 'Egypt had lost in security [and] self-confidence' and 'had become nervously tense . . . and exacting'. The outcome of the campaign was also consistent with the prediction of Proposition 2 and Corollary 1: Horemheb's reign 'appears to have been relatively uneventful' (Van Dijk, 2003, p. 284), laying the foundation for what followed—when he died childless, the aged, non-royal prince regent succeeded as Rameses I and soon after his son succeeded as Seti I (Van Dijk, 2003, p. 286), with which began the Ramesside period (nineteenth–twentieth dynasties), 'a new era which would bring back Egypt's imperial glory' (Wilson, 1956, p. 240). Both Rameses I and Seti I 'stepped into the kingship without undue trouble' (Wilson, 1956, p. 239), and 'the Ramessid pharaohs considered Horemheb as the true founder of the dynasty' (Van Dijk, 2003, p. 286).

3.2.2. *Other examples*

Besides the New Kingdom of Egypt, examples of historical states surviving despite pervasive corruption can be found in the history of the British Empire, India, Russia, and China (Shlapentokh, 2013; MacMullen, 2015, p. 11), consistent with Proposition 2.

Furthermore, several episodes in the history of Russia and the Soviet Union are particularly relevant to Corollary 1's prediction that an additional risk of crisis can push the Centre to crack down on corruption. In the imperial era, when the Tsar was under pressure during the Russo–Japanese War, the state 'drastically increased the punishment for bribing' (Shlapentokh, 2013, p. 151), consistent with Corollary 1. Under the Soviet rule, during Brezhnev's era, 'irregularities', including corruption, 'in the Central Asian republics [were] clearly widespread' so that they had 'seriously eroded Moscow's ability to enforce directives' and created 'de facto autonomy' (Critchlow, 1988, pp. 143–4), consistent with Proposition 1. Not much was done about the problem under Brezhnev, but when Moscow faced increasing economic, social, and demographic challenges in the post-Brezhnev era (Staples, 1993), Yuri Andropov started cracking down on corruption in the central Asian republics as 'a bid . . . to recapture maverick party and state organs

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[14] Given the state's dominance in the Egyptian economy (Finer, 1997a, p. 199), one may argue that the Centre's status quo pay-off was likely to be increasing in corruption in the case. This would further make the predicted impact of a lower $\underline{L}$ on R^* in Corollary 1 strictly negative.

in the republics from partial control' (Critchlow, 1988, p. 142), consistent with Corollary 1.[15] Consistent with Proposition 2 and Corollary 1, all these anti-corruption measures were able to bring stability, however temporarily, back to the state.

Other more recent examples can be found in the recurrent anti-corruption campaigns in the contemporary history of China. In a well-known speech shortly after the start of the most recent campaign since 2012, Xi Jinping asserted that 'the gravest danger that challenges the Party comes from corruption within the Party', precisely because 'when power seeks rents, people within the system hook up with people outside, group by vested interests, and challenge the leadership of the Party' (Xi, 2014). Since then he has pushed the narrative that 'the major risks in the political, ideological, economic, scientific and technological, social, international-relation, and party-building realms' faced by the party was one of the primary motives behind the campaign (e.g., Xi, 2017; *People's Daily*, 2019). Taken at face value, the assertion and narrative are consistent with Proposition 1 and Corollary 1, respectively.[16] For earlier periods, Jiang and Xu (2015) recognise that between 1988 and 2014 '[a]nticorruption enforcement [was] tightened in years when there were significant economic/political events that have, or could have instigated considerable popular unrest'. They also provide time-series evidence that higher intensity of anti-corruption enforcement was correlated with lower economic growth and higher inflation in the previous year, which they interpret as signs of greater social pressure and higher risk of political instability. All these observations are consistent with Corollary 1.[17]

3.3. *Role of Fiscal Capacity*

Although Proposition 2 implies that the state power should be fully shielded from the corrosive effect of corruption, in 'a handful of examples in human history' corruption was 'as consequential as in the case of the Roman Empire' (MacMullen, 2015, p. 10). As suggested by Proposition 3, one prominent reason for the Centre to deviate from the lexicographic rule and over-tolerate corruption is the retention problem created by weak fiscal capacity. The mechanism was at work in the decline of the Ming dynasty in the Chinese history.

3.3.1. *Ming China*

During the fifteenth–seventeenth centuries, as 'more and more illegalities . . . came to be taken for granted, . . . gross corruption . . . became endemic [and] prevalent' among civil and military officials in the Ming dynasty (Finer, 1997b, pp. 842, 847). The problem was so severe that when Grand Secretariat Zhang Juzheng tried to reform the administrative system in the 1570s, he 'made himself a personal enemy of an entire empire' (Huang, 1981, p. 71). As a result, facing the Manchurian threat and domestic rebellions, the state 'could not mobilize [its] resources . . . fast enough', and the Ming armies 'were beaten . . . again and again' and 'failed to crush' the enemies (Finer, 1997b, p. 845). The corrosive effect of corruption in Proposition 1 was not under the proper control that is implied by Proposition 2.

Consistent with Proposition 3, corruption in this period was connived at to solve the retention problem of the state. As Finer (1997b, p. 841) points out, a primary reason for the over-tolerance

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[15] In Brezhnev's Soviet Union, corruption 'in many cases . . . [was] necessary for even the meagre levels of growth enjoyed by the state economy' (Clark, 1993, p. 278), making the comparative statics in Corollary 1 hold strictly.

[16] For more theoretical and empirical analyses on the motivations behind Xi's anti-corruption campaign, see for example Francois *et al.* (2016), Lu and Lorentzen (2018), Xi *et al.* (2018) and Li *et al.* (2019a).

[17] If we understand the Chinese economy as in Bai *et al.* (2014; 2020) and Li *et al.* (2019a), where corruption 'greases the wheels', the comparative statics in Corollary 1 will again hold strictly.

of corruption was that 'mandarins were grossly underpaid'. '[B]ecause emoluments for the bureaucracy authorised by the dynasty were fixed at very low levels' (Huang, 1981, p. 3), '[o]fficials made ends meet and tried to meet the debt' accumulated in the course of the civil service exam 'by accepting extra payments which were outside the law' (Finer, 1997b, p. 842). On the instrumental role of corruption in solving the retention problem, Finer (1997b, p. 842) argues that '[n]ot to have [corruption over-tolerated] would have rocked the entire civil service, and the civil service was the government . . . if the system worked poorly, without corruption it could not have worked at all'.

Consistent with Proposition 3, again, the origin of the retention problem was the state's weak fiscal capacity at that time. Huang (1974) documents the difficulties in the fiscal arrangement in detail; Finer (1997b, p. 842) states that 'the fiscal service [was] seriously flawed'; Finer (1997b, p. 844) further shows that the fiscal 'difficulties were intensified by the dynasty's misunderstanding of currency'. Eventually, the low taxation 'led directly to the extra-legal and illegal fees and surtaxes merging into plain corruption' (Finer, 1997b, p. 842).

It is also noticeable that 'the administration of the empire got by [and] "satisficed"' because the Ming dynasty 'was . . . very lucky'—'[f]or over 250 years they faced few foreign threats' (Finer, 1997b, pp. 845, 853); once the Manchurian pressure mounted, it quickly 'succumbed . . . between . . . its Manchu enemies [and] peasant and bandit revolts' (Finer, 1997b, p. 845). Therefore, the Ming state must have been in the realm of the too weak fiscal capacity in Proposition 3, where the Centre would fail once a real crisis strikes. Not only that, according to Huang (2006, pp. 76–8, 87, 144, 147), the Centre was indeed aware of the difficulties that the response to a real crisis would impose on the 'thoroughly decrepit army' and 'the inelastic and cumbersome fiscal system' (Finer, 1997b, p. 853).

Despite this awareness, in general, 'officials . . . did not live on their regular pay' (Huang, 1981, p. 3), 'the so-called pay and salaries were no more than pocket money for their recipients' (Huang, 1974, p. 275), and it was a 'custom' that 'central government officials relied for their living expenses on the "gifts" of provincial officials' (Huang, 1974; 1981, p. 3); 'the tax burden . . . was light and indeed on a number of occasions was actually reduced' (Finer, 1997b, p. 853); at the same time, 'the economy was flourishing, particularly in the sixteenth century' (Finer, 1997b, p. 853). All these observations hint that the Centre must have been managing the empire, including its personnel, corruption, taxation and economy, in a way that the retention constraint and the likely loss of crisis control in any real crisis were of great concern only *overall,* not so much *at the margin.*

For this scenario, Corollary 2 predicts not only little political incentive but also little overall incentive for the Centre to invest in fiscal capacity. This is consistent with the lack of initiative in the Ming state to improve its 'seriously flawed' fiscal arrangement: it 'persisted in . . . for well over 200 years' (Finer, 1997b, pp. 842–3) and had 'remained a strait-jacket until the mid-sixteenth century, after which some piecemeal alterations were made', but most parts 'went without any substantial revision' (Finer, 1997b, p. 843). The censorial department 'did indeed report on the maladministration in the fiscal services . . . but . . . the most that happened was the disgrace of an offending individual, not the reform of an ineffective institution' (Finer, 1997b, p. 848). The Ming state was thus trapped with its too weak fiscal capacity, eventually caught in 'the financial crisis at the end of the dynasty which contributed so much to its downfall' (Finer, 1997b, p. 845).

3.3.2. *Other examples*

Supported by the data from Ch'ü (1962), Finer (1997c, pp. 1157–9) describes the same mechanism from weak fiscal capacity to over-tolerance of corruption through the retention problem during the decay of the Qing dynasty starting from the late eighteenth century, leading to the royal court's failure to respond to invasions and rebellions. Will (2004, pp. 30–1) points out that this mechanism can date back to even the Song dynasty (960–1279). Beyond China, Finer (1997b, p. 736) documents that in the Mamluk Sultanate of Egypt, the 'growth of bribery and corruption was to supplement the state revenue which had now become insufficient' to support the state, especially when the pressure from the Ottoman Empire was rising. In turn, basing himself on the account by Rycaut (1668), Finer (1997c, p. 1208) shows that the fiscal difficulty–corruption channel manifested itself again during the decline of the Ottoman Empire. All these declines of great empires are consistent with Proposition 3. Not only that, in all the cases, fiscal difficulties and pervasive corruption 'further enfeebled the kingship', i.e., weakened the control of the Centre; this would start a 'vicious circle' leading to even greater fiscal difficulties, more pervasive corruption, and eventually 'worse . . . dilapidation and dismemberment' of the state (Finer, 1997a, p. 209), consistent with Corollary 2 on the possible trap of weak fiscal capacity, rampant corruption, and the Centre's loss of political control in any real crisis.

4. Conclusion

In this paper we focus on the corrosive effect of corruption on power within the state apparatus. We build a model to analyse its implications and the role of fiscal capacity in the Centre's dealing with the erosion.

We demonstrate that when deciding how much corruption to tolerate at the lower level in the hierarchy, if the risk of crisis is fat-tailed, then the Centre's concern about too much corruption threatening its control over the state apparatus during crises will dominate any other economic concerns. The Centre should thus follow an endogenous lexicographic rule, choosing a corruption tolerance that will secure perfect control in crises first.

This lexicographic rule is, however, not always feasible, and weak fiscal capacity can be a major reason behind the over-tolerance of corruption. Created by too weak capacity, a total loss of control in any real crisis could in turn make the Centre have little incentive at the margin to invest in fiscal capacity. Historical narratives from ancient to modern history are developed and consistent with all the theoretical results.

Our analysis displays a close relationship between the *economic* dimension of state capacity in *normal times*, for example, the state's ability to extract revenue from the population, reap rents from its affiliates and properly pay these affiliates, and the *political* dimension of state capacity during *states of exception*, which requires absolute compliance of the state apparatus to respond to crises. Corruption is at the core of this relationship. We hope that our effort could open new avenues to understand the evolution of corruption and different dimensions of state capacity over time and across space.

Appendix A. Proof of Proposition 3

PROOF. First, consider the case in which $0 < r < \underline{R}$. By the proof of Proposition 2, $R = \underline{R}$ dominates any $R \in (\underline{R}, \bar{R}]$ because the objective function is strictly decreasing in this range. By Assumption 3, $R = \underline{R}$, which would guarantee crisis control, dominates any $R \geq \bar{R}$, which would

induce a total loss of crisis control. Therefore, the Centre will choose $R^* \in \arg \max_{R \in [r, \underline{R}]} \pi(R; \rho)$, so $S(R^*) = 1$.

Second, consider the case in which $r \in [\underline{R}, \bar{R})$. By the proof of Proposition 2, again, $R = r$ dominates any $R \in (r, \bar{R}]$ because the objective function is strictly decreasing in this range. The Centre will then choose $R = r$ instead of any $R \geq \bar{R}$, if and only if $F(\rho r) \cdot D + (1 - F(\rho r)) \cdot \pi(r; \rho) \geq pD + (1 - p) \cdot \sup_{R > \bar{R}} \pi(R; \rho)$.

Now examine this condition. Its right-hand side is a constant; the left-hand side is strictly decreasing for $r \in [\underline{R}, \bar{R})$, and it is equal to $\pi(\underline{R}; \rho)$ at $r = \underline{R}$, and $pD + (1 - p)\pi(\bar{R}; \rho)$ at $r = \bar{R}$, respectively; also, by Assumption 3, we have $\pi(\underline{R}; \rho) > pD + (1 - p) \cdot \sup_{R > \bar{R}} \pi(R; \rho)$. Therefore, if $\pi(\bar{R}; \rho) \geq \sup_{R > \bar{R}} \pi(R; \rho)$, the condition will hold for any $r \in [\underline{R}, \bar{R})$, and the Centre will choose $R^* = r \in [\underline{R}, \bar{R})$, implying $S(R^*) = 1 - F(\rho r)$. If $\pi(\bar{R}; \rho) < \sup_{R > \bar{R}} \pi(R; \rho)$, instead, then there exists a unique $\bar{r} \in (\underline{R}, \bar{R})$ such that $F(\rho \bar{r}) \cdot D + (1 - F(\rho \bar{r})) \cdot \pi(\bar{r}; \rho) = pD + (1 - p) \cdot \sup_{R > \bar{R}} \pi(R; \rho)$; the Centre will thus choose $R^* = r$ and induce $S(R^*) = 1 - F(\rho r)$, if $r \in [\underline{R}, \bar{r}]$, and $R^* \in \arg \max_{R \geq \bar{R}} \pi(R; \rho)$ and induce $S(R^*) = 1 - p$, if $r \in (\bar{r}, \bar{R})$, respectively.

Finally, consider the case in which $r \geq \bar{R}$. When $R \geq r$, the objective function becomes $pD + (1 - p)\pi(R; \rho)$. The Centre will then choose $R^* \in \arg \max_{R \geq r} \pi(R; \rho)$. Given that $r \geq \bar{R}$, $S^*(R) = 1 - p$.

The proposition then follows by collecting the three cases, regrouping the last two cases by $R^* = r$ and $R^* \in \arg \max_{R \geq \max\{r, \bar{R}\}} \pi(R; \rho)$, and recalling Lemma 2 that $r > 0$ uniquely solves $X(r) = x - w$ and Lemma 1 that $X(r)$ is strictly increasing. $\qquad \square$

Appendix B. Proof of Corollary 2

PROOF. If $X(\underline{R}) \leq x - w < X(\bar{r})$, then $S(R^*) = S(r)$, where $S'(r) < 0$, and $V = S(r) \cdot \pi(r, \rho) + (1 - S(r)) \cdot D$. By Lemma 1, we have $X'(r) > 0$; by Lemma 2, we have $dr/d(w - x) = -1/X'(r) < 0$; by $\epsilon > \bar{\epsilon}$ and the proofs of Propositions 2 and 3, $dV/dr < 0$. Therefore, $dS(R^*)/d(w - x) = dS(r)/d(w - x) = S'(r) \cdot dr/d(w - x) > 0$ and $dV/d(w - x) = (dV/dr) \cdot (dr/d(w - x)) > 0$.

If $x - w \geq X(\bar{r})$ instead, then $S(R^*) = 1 - p$, so $dS(R^*)/d(w - x) = 0$. Also, in this case $V = (1 - p) \cdot \max_{R \geq \max\{r, \bar{R}\}} \pi(R, \rho) + pD$. Therefore, if $R^* > r$, then V will not depend on r or $w - x$, i.e., $dV/d(w - x) = 0$. $\qquad \square$

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Additional Supporting Information may be found in the online version of this article:

Online Appendix

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