Supporting Information

When State Building Backfires: Elite Coordination and Popular Grievance in Rebellion

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Appendix

A. Mathematical Proofs Referenced in Text

In this section, we provide proofs of the propositions referenced in the text. Because this is a global game — the expressions of relative benefits both exhibit two-sided limit dominance and strategic complementarity — the cutpoint equilibrium that we derive in this section is unique (Morris and Shin 2003).

A.1 Proof of Proposition 1

Consider the elites' payoff function in Equation 2.3. For high enough θ_i (i.e., $\theta_i > \mu$), the elite sides with the government, regardless of what he expects either the local peasantry or other elites to do. Conversely, for low enough θ_i (i.e., $\theta_i < -\pi$), the elite chooses to defect even if he believes that he will be punished for his actions and that he will face no local peacekeeping cost. For moderate levels of θ_i, an elite's best response depends on the expected actions of peasants and elites in other districts ($Pr(v_i = 1|\theta_i, \omega_i)$ and $Pr(h \leq k|\theta_i, \omega_i)$).

Turning attention to the peasants, all peasants rebel if the expected probability of elite repression, $Pr(e = 1|s_i, \omega_i)$, is sufficiently low and choose not to rebel otherwise. Equation 2.2 implies that a peasant village is indifferent between rebelling and not when:

$$Pr(e_i = 1|s_i, \omega_i) = \frac{\beta - \omega_i}{\tau}. \quad \text{(A1)}$$

By the assumption that $\omega_L < \omega_H$, this expression is smaller when $\omega_i = \omega_H$, indicating that peasants need greater assurance that elites will not repress before they decide to rebel. Peasants form beliefs about the likelihood that elites side with the government based on observing ω_i and their signal s_i. Given the signal-generating process for s_i, observing a higher s_i implies a higher level of local elite loyalty on average, and thus a higher likelihood that elites choose to side with the government. If s_i is high enough, given opportunity costs ω_i, peasants choose not to rebel as the threat of repression is too great. If s_i is low enough given ω_i, the expected probability of elite reprisal is low enough that peasants decide to rebel. This implies a cutpoint strategy where peasants rebel only if s_i is low enough given ω_i. Let $\bar{s}(\omega_i) \in \{\bar{s}_H, \bar{s}_L\}$ represent the cutpoint signals for those with high and low opportunity costs respectively, where $\bar{s}_H < \bar{s}_L$ by expression A1.

Given the signal-generating process, upon seeing s_i, the peasants' strategy is to treat $\theta_i \sim Unif[s_i - \sigma, s_i + \sigma]$. If $s_i - \sigma > \mu$, the peasants know that the elite will side with the government with certainty and do not rebel. By contrast, if $s_i + \sigma < -\pi$, the peasantry knows that the local elite will defect and thus decide to rebel. For middle values, the cutpoint strategy implies that the peasantry rebels only if $s_i \leq \bar{s}(\omega_i)$. The peasants' strategy as a function of s_i and θ_i is therefore:

$$v_i = \begin{cases} 0 & \text{if } s_i > \mu + \sigma \text{ or if } s_i \in [-\pi - \sigma, \mu + \sigma] \text{ and } s_i > \bar{s}(\omega_i) \\ 1 & \text{if } s_i < -\pi - \sigma \text{ or if } s_i \in [-\pi - \sigma, \mu + \sigma] \text{ and } s_i \leq \bar{s}(\omega_i). \end{cases} \quad \text{(A2)}$$

For elites with especially high and low values of θ_i, the unique best response is to side with the government or defect respectively, regardless of what peasants and other elites are expected to do. For elites with $\theta_i \in [-\pi, \mu]$, the best response depends on the anticipated actions of others. Given the cutpoint strategy employed by peasants, where peasants rebel given sufficiently low signal s_i, and the signal-generating process for s_i, the expression $\mu Pr(v_i = 1|\theta_i, \omega_i)$ is declining in θ_i. In addition, given the correlation of elite loyalties across society, observing a high level of θ_i implies higher elite loyalty on average in other regions. If θ_i is sufficiently high, the elite believes that all other elites will side with the government and none will defect ($h = 0$). If θ_i is sufficiently low, the elite believes that no elites will side with the government ($h = 1$). In between, the expression $\pi Pr(h \leq k|\theta_i, \omega_i))$ is increasing in θ_i: more elites are expected to remain loyal, so fewer defect.

Turning attention to peasant conditions ω_i, we can see that, for $\theta_i \in [-\pi, \mu]$, the elite's best response depends on peasants' incentives to rebel. Though ω_i does does not enter elite preferences directly, it influences the propensity of peasants to rebel ($\bar{s}_H < \bar{s}_L$) and thus the expected cost of repression in the district. Because repression is costly, this implies a cutpoint strategy for elites as well, where an elite sides with the government if his loyalty θ_i is sufficiently high relative to the observed ω_i. We call these cutpoint signals $\bar{\theta}(\omega_i) \in \{\bar{\theta}_L, \bar{\theta}_H\}$. For elites, this threshold level rises when $\omega_i = \omega_L$, as siding with the government implies greater risk. The best response of elites is thus:

$$e_i = \begin{cases} 1 & \text{if } \theta_i > \mu \text{ or if } \theta_i \in [-\pi, \mu] \text{ and } \theta_i \geq \bar{\theta}(\omega_i) \\ 0 & \text{if } \theta < -\pi \text{ or if } \theta_i \in [-\pi, \mu] \text{ and } \theta_i < \bar{\theta}(\omega_i). \end{cases} \quad \text{(A3)}$$

A.2 Proof of Proposition 2

We solve for the peasant and elite cutpoints, beginning with the peasants' problem.

A peasant is indifferent between rebelling and not when equation A1 is satisfied, given ω_i. Conditional on the local elite's strategy in expression A3 and the posterior belief of peasants that $\theta_i \sim Unif[s_i - \sigma, s_i + \sigma]$, the subjective probability that the local elite sides with the government given s_i and ω_i is:

$$P(e_i = 1 | s_i, \omega_i) = \begin{cases} 1 & \text{if } s_i > \mu + \sigma \\ \dfrac{s_i + \sigma - \bar{\theta}(\omega_i)}{2\sigma} & \text{if } s_i \in [-\pi - \sigma, \mu + \sigma] \\ 0 & \text{if } s_i < -\pi - \sigma. \end{cases} \tag{A4}$$

We concentrate on the interior case, noting that peasants' unique best response is to always rebel when $s_i < -\pi - \sigma$ and to never rebel when $s_i > \mu + \sigma$, regardless of ω_i. In other cases, a peasant is indifferent between rebelling and not when:

$$\frac{\bar{s}(\omega_i) + \sigma - \bar{\theta}(\omega_i)}{2\sigma} = \frac{\beta - \omega_i}{\tau} \tag{A5}$$

solving for the cutpoint signal given ω_i yields:

$$\bar{s}(\omega_i) = \frac{2\sigma(\beta - \omega_i)}{\tau} - \sigma + \bar{\theta}(\omega_i), \tag{A6}$$

which depends on ω_i directly and indirectly (i.e., through $\bar{\theta}(\omega_i)$).

We use expression A6 to solve for the cutpoint strategy of elites as a function of parameters of the model. Again, we focus on interior solutions, noting that elites always side with the government when $\theta_i > \mu$ and never side with the government when $\theta_i < -\pi$. An elite at the cutpoint is indifferent between defecting and not when:

$$\bar{\theta}(\omega_i) - \mu Pr(v_i = 1 | \bar{\theta}(\omega_i), \omega_i) = -\pi Pr(h \leq k | \bar{\theta}(\omega_i)). \tag{A7}$$

The peasants' strategy is to rebel if $s_i \leq \bar{s}(\omega_i)$. The local elite knows that the peasants are receiving a noisy signal of his own level of loyalty θ_i, where $s_i \sim Unif[\theta_i - \sigma, \theta_i + \sigma]$. He directly observes ω_i and therefore knows the favor ability of peasant conditions. Given expression A6, for the elite at the cutpoint $\bar{\theta}(\omega_i)$, the subjective probability he will be facing a peasant revolt is therefore:

$$Pr(v_i = 1 | \bar{\theta}(\omega_i), \omega_i) = \frac{\bar{s}(\omega_i) - (\bar{\theta}(\omega_i) - \sigma)}{2\sigma} = \frac{\beta - \omega_i}{\tau}, \tag{A8}$$

using expression A6 and canceling terms. This expression is decreasing in ω_i, indicating that the probability of revolt is lower when peasant opportunity costs are higher. Plugging this into the indifference equation, we have that elites are indifferent between defecting and not when:

$$\bar{\theta}(\omega_i) - \frac{\mu(\beta - \omega_i)}{\tau} = -\pi Pr(h \leq k|\bar{\theta}(\omega_i), \omega_i). \tag{A9}$$

Note that the cutpoints for elites observing ω_L and ω_H differ as elites in regions with low (high) peasant opportunity costs expect to face more (less) rebellion at home, which determines the expected cost of peacekeeping.

To solve for the cutpoints explicitly, we begin with the elites' problem. Upon observing their idiosyncratic loyalty θ_i, elites form beliefs about the loyalties of elites in other districts and thus the proportion of their peers who will remain loyal to the Crown. As demonstrated above, elites follow a cutpoint strategy to defect from repressive activities when loyalties are less than the cutpoint signal $\bar{\theta}(\omega_i)$, which depends on local drought conditions. Let the cutpoint signals $\bar{\theta}_L$ and $\bar{\theta}_H$ represent the cutpoint signals in places with low opportunity costs/poor peasant conditions and high opportunity costs/advantageous conditions respectively. By assumption elite loyalties are distributed uniformly on $[\theta - \delta, \theta + \delta]$. Given that p districts experience drought/poor conditions, for a given realization of θ, the expected mass h of elites who will defect from the Crown is given by:

$$\frac{p(\bar{\theta}_L - (\theta - \delta))}{2\delta} + \frac{(1-p)(\bar{\theta}_H - (\theta - \delta))}{2\delta} \tag{A10}$$

We use equation A10 to solve for $Pr(h \leq k|\bar{\theta}_L)$ and $Pr(h \leq k|\bar{\theta}_H)$, the subjective probability that the government will survive at the cutpoint signals. From the perspective of the cutpoint elite, θ is a random variable distributed uniformly on $[\bar{\theta}(\omega_i) - \delta, \bar{\theta}(\omega_i) + \delta]$, where $\bar{\theta}(\omega_i) = \bar{\theta}_H$ if $\omega_i = \omega_H$ and $\bar{\theta}_L$ if $\omega_i = \omega_L$. The posterior probability that $h \leq k$ is thus:

$$1 - \frac{(1-p)(\bar{\theta}_L - \bar{\theta}_H) + (1-k)2\delta}{2\delta} \tag{A11}$$

if $\theta_i = \bar{\theta}_L$ and

$$1 - \frac{p(\bar{\theta}_H - \bar{\theta}_L) + (1-k)2\delta}{2\delta} \tag{A12}$$

if if $\theta_i = \bar{\theta}_H$. We now substitute these into the indifference expression for elites A9 and solve for $\bar{\theta}_L$ and $\bar{\theta}_H$ in terms of the parameters of the model. Let the probability of peasant revolt in districts where $\omega_i = \omega_H$ be $M_H = \dfrac{\mu(\beta - \omega_H)}{\tau}$ and the probability of peasant revolt where $\omega_i = \omega_L$ be $M_L = \dfrac{\mu(\beta - \omega_L)}{\tau}$. Then solving for the elite cutpoints in A9, we have:

$$\bar{\theta}_L = -k\pi + \frac{(\pi p + 2\delta)M_L + \pi(1-p)M_H}{\pi + 2\delta} \tag{A13}$$

and

$$\bar{\theta}_H = -k\pi + \frac{\pi p M_L + (\pi(1-p)+2\delta)M_H}{\pi + 2\delta} \tag{A14}$$

Note that the only difference is an extra 2δ term multiplied by M_L in the expression for $\hat{\theta}_L$ and M_H in the expression for $\hat{\theta}_H$. By the fact that $\omega_H > \omega_L$, we have $M_H < M_L$ (since ω_i is subtracted). This implies that the threshold level of loyalty needed to side with the regime is higher under poor peasant conditions/under low opportunity cost of rebellion. In other words, a larger range of elites will choose to defect when peasant conditions are poor.

We now return to the expression for peasant cutpoints $\bar{s}_H$ and $\bar{s}_L$ (equation A6). Notice that elite cutpoints enter linearly in the expression for the peasants' cutpoints. Using the fact that $\bar{\theta}_H < \bar{\theta}_L$ and that $\omega_H > \omega_L$ by assumption, we have $\bar{s}_H < \bar{s}_L$. This implies that peasants with high opportunity costs (or low grievances) need more assurance that the local elite holds lower loyalty to the government in order to rebel.

A.3 Proof of Proposition 3

Using the expressions derived in the previous subsection, we derive the comparative statics described in Proposition 3. We first examine how elite cutpoint signals change as model parameters shift. We first examine comparative statics with respect to k, the strength of the central government:

$$\frac{\partial \bar{\theta}_H}{\partial k} = \frac{\partial \bar{\theta}_L}{\partial k} = -\pi \tag{A15}$$

where π is the cost of punishment should the government survive. This is negative by the assumption that $\pi > 0$, implying that the threshold level of loyalty needed to maintain ties with the local government is lowered (i.e., a smaller range of elites defect will choose to defect from peacekeeping opportunities) as the government grows stronger. The intuition here is that it is more likely that the government will survive to punish defectors when it is able to weather a larger defection by elites.

Taking the partial derivative with respect to the prevalence of low opportunity costs/poor conditions p, we have

$$\frac{\partial \bar{\theta}_H}{\partial p} = \frac{\partial \bar{\theta}_L}{\partial p} = \pi(M_L - M_H) \tag{A16}$$

Note that this expression is positive as $M_L > M_H$ (because $\omega_L < \omega_H$). This implies that as drought or other poor conditions become more prevalent in society, elites need to reach a higher loyalty threshold to side with the government as a larger proportion of other elites face adverse local conditions. Note that this expression is the same for elites in districts with high and low opportunity costs. Even when not directly affected by drought, poor conditions in other regions test the loyalties of all elites as it raises the possibility that neighbors will defect from peacekeeping responsibilities.

To find comparative statics with respect to the peasants' benefit of rebellion β, the peasants' cost of facing repression τ, the elites' cost of repression μ, and the size of opportunity costs ω_H and ω_L, we first find the partial derivatives of $\hat{\theta}_L$ and $\hat{\theta}_H$ with respect to M_L and M_H.

$$\frac{\partial \bar{\theta}_L}{\partial M_L} = \frac{\pi p + 2\delta}{\pi + 2\delta} \qquad \frac{\partial \bar{\theta}_H}{\partial M_L} = \frac{\pi p}{\pi + 2\delta}$$

$$\frac{\partial \bar{\theta}_L}{\partial M_H} = \frac{\pi(1-p)M_H}{\pi + 2\delta} \qquad \frac{\partial \bar{\theta}_H}{\partial M_H} = \frac{\pi(1-p) + 2\delta}{\pi + 2\delta}.$$

These partial derivatives are all positive by the assumptions that δ, p, and $\pi > 0$. Using that $M_L = \dfrac{\mu(\beta - \omega_L)}{\tau}$ and $M_H = \dfrac{\mu(\beta - \omega_H)}{\tau}$, we have that cutpoints are increasing in β and μ decreasing in τ and ω_L and ω_H. This implies that elites are more likely to remain loyal when the cost of peacekeeping is low and when the relative benefits of collective action for peasants are smaller (in either drought-affected or non-drought affected regions).

Returning to the peasants' cutpoint signal in equation A6, we can see that elite cutpoints enter positively and linearly in the expressions for $\bar{s}_H$ and $\bar{s}_L$. Furthermore, the other terms can be written in terms of a positive coefficient times M_L or M_H with all parameters entering with the same sign as in the expression for elite cutpoints. This implies that the signs of comparative statics with respect to μ, β, τ, ω_L, ω_H, p and k are the same for peasant and elite cutpoints. In other words, $\bar{s}(\omega_i)$ is higher (and thus peasants are more willing to rebel) when β and μ are high, when τ and ω_i are low, when the prevalence of drought is high (p is high), and when the government is weak (k is low).[1]

B. Model with Government as Strategic Actor

The model developed in this paper focuses on the strategic interaction between elites and commoners within and across districts following the government's decision to centralize political control. This allows us to explore how state-building efforts backfire, focusing on the coordination

[1]Note that the comparative statics of all parameters for all cutpoints ($\bar{s}_H, \bar{s}_L, \bar{\theta}_H, \bar{\theta}_L$) are in the same direction. In other words, all cutpoints are increasing or decreasing in any given parameter. This implies that rebellion and defection are both increasing/decreasing simultaneously. Therefore, if government survival depended on the proportion of districts where both elites defect and peasants rebel, all results would be the same.

problems faced by regional elites and the sometimes tragic miscalculations of rebelling citizens. We use the insights from this model to empirically examine regional patterns of rebellion. In this appendix, we shift the focus to consider why state building efforts that backfire may be rationally undertaken in the first place.

We consider an extension of the theory in which the central government acts as a strategic actor, deciding whether to centralize power in the first period of the game. For tractability, we abstract away from the cross-district coordination problems and spillovers highlighted in the main theoretical model. We do this because introducing an earlier decision by the ruler to centralize power leads to several complications in modeling the coordination problem faced by elites, including the loss of equilibrium uniqueness (Angeletos et al. 2006). The model developed in this section places an emphasis instead on how anticipated rebellion/elite defection structures the ruler's initial decision to centralize power. In the final subsection, we discuss the main results and draw a connection between this extension and the empirical setting.

B.1 Setting

Consider a society consisting of a risk-neutral central ruler (R) and a representative district containing a local elite (E) and a unified village of peasants (P). The ruler seeks to maximize the total tax revenue T that is retained by the central government subject to maintaining political control over the district. Whether he can maintain political control depends on the strength of the government, which is endogenously related to the tax revenue retained by the ruler, and on the subsequent actions of the peasant village and local elite. After observing the decision of the ruler, the peasant village determines whether or not to rebel. If peasants rebel, the elite then determines whether or not to repress the rebellion.

In the first period, the ruler decides on a share of revenues, $\theta \in [0,1]$, to offer the local elite in exchange for keeping the peace locally. We use a similar notation as we do for elite loyalties in the main model to draw a direct connection between the arguments as we expect elite satisfaction to increase in the share of revenues that they retain. Note, however, that two things differ in this extension. First, θ is now a choice variable of the ruler. Second, as θ is now narrowly defined as the share of revenue retained by the elite, it enters directly in the utility function of the ruler and in the expression for the strength of government. The ruler receives $(1-\theta)T$ if rebellion in the district is suppressed. The strength of the central government, which determines the ruler's ability to maintain political control, is given by $S = (1-\theta)T + k$, where $k \sim Unif[-\delta, \delta]$ is a random variable representing positive or negative shocks that might amplify or diminish state capacity, such as an unforeseen invasion by a foreign government, rapid technological change, or a natural disaster. This random variable k shares a common notation with the fixed, exogenous parameter for regime strength in the main model to make the connection with shifts in state capacity explicit, though here it is only realized after the ruler chooses θ.

Following the decision of the central ruler, Nature simultaneously draws random variables k and ω, where $\omega \in \{\omega_L, \omega_H\}$ represents climate conditions in the district. Let p be the probability that climate conditions are poor ($\omega = \omega_L$), and $1-p$ be the probability that conditions are good ($\omega = \omega_H > \omega_L$). After these random variables are realized, peasants decide whether or not to rebel ($v = 1$ to rebel; $v = 0$ to take no action). Their decision depends on realized local conditions and on the anticipated actions of the elite. If they choose to rebel, peasants receive an exogenous benefit β, plus a punishment cost of τ if the local elite chooses to repress their rebellion. If they choose to take no action, they receive a payoff based on local conditions ω. Note that, because the peasants' decision depends on the relative benefits of rebellion vs. non-rebellion, it would be equivalent to standardize the payoff of non-rebellion to 0 and assume that the utility of rebellion is decreasing in local conditions. The higher relative payoff to rebellion during poor local conditions could be motivated by higher grievances due to loss of food or by a lower opportunity cost of missed agricultural production. We begin by assuming that $\beta - \tau < \omega_L < \beta < \omega_H$, so that rebellion is only attractive when local peasant conditions are poor and if the elite chooses not to repress. If the peasants choose not to rebel, the ruler maintains control and the game ends.

If the peasants rebel, the local elite then chooses whether to repress the rebellion ($e = 1$) or defect on their peacekeeping responsibilities ($e = 0$). The elite's payoff depends on the share of tax revenues offered by the ruler, the cost of repression, and the strength of the central government. If he chooses to repress the rebellion, he receives the share of revenue offered by the center, θT, and pays a cost of repression, $\mu > 0$. We assume that $0 < \mu < T$, so that repression is worthwhile only if the share of revenues θ offered by the government is sufficiently high, but also that this threshold

θ is not so high that it exceeds all potential revenue in the district. If the elite chooses to repress the rebellion, the ruler maintains control of the government and the game ends.

If the elite fails to repress the rebellion, rebellion grows out of control. The ruler retains enough power only if the strength of government exceeds some threshold $\underline{S}$. To ensure an interior solution, we assume that δ is sufficiently large so that $T - \delta < \underline{S} < \delta$. In other words, the government bears some risk of crisis even if it retains all tax revenues and even a ruler retaining no revenue may be able to maintain power.

If the ruler maintains control, he retains both his and the elite's share of tax revenue (T) and pays a cost $\zeta > 0$ to reestablish order. The defecting elite in this case must pay a punishment cost of $\pi > 0$. If the government loses control, both players' payoffs are standardized to 0. We assume that the punishment cost paid by the elite is higher than the cost of putting down peasant rebellion ($\pi > \mu$), so that the elite would always prefer to repress if he expects the government to survive.

A summary of the game and payoffs is as follows, where u_R, u_E, and u_P represent payoffs to central ruler, local elite, and peasant village respectively:

1. The ruler chooses share θ of tax revenue to offer the elite
2. Nature draws climate conditions ω and stochastic shock to government strength η.
3. Peasants choose whether to rebel
   - If they do not rebel, game ends: $u_R = (1-\theta)T$; $u_E = \theta T$, $u_P = \omega$
4. Elite chooses whether to repress rebellion
   - If they repress, the game ends: $u_R = (1-\theta)T$; $u_E = \theta T - \mu$, $u_P = \beta - \tau$
5. If elite defects from peacekeeping arrangements, the rebellion grows out of control. The government survives only if $S = (1-\theta)T + k > \underline{S}$
   - If the government survives, the government maintains control and elite is punished: $u_R = T - \zeta$; $u_E = -\pi$, $u_P = \beta$
   - If the government falls, the ruler loses control and elite escapes punishment: $u_R = 0$; $u_E = 0$, $u_P = \beta$

B.2 Equilibrium

We solve for the subgame-perfect Nash equilibrium by backwards induction, first considering the choice of an elite facing rebellion in the final period. They choose to repress the peasants if the benefits of doing so $U_E(e=1)$ exceed the benefits of defection $U_E(e=0)$, or if:

$$\theta T - \mu > 0 - \mathbb{1}\{S > \underline{S}\}\pi \tag{A1}$$

Note that S has been revealed by this period of the game and is known with certainty. By the assumption that $\pi > \mu$, the elite would repress if $S > \underline{S}$. If $S < \underline{S}$, the elite would repress only if θT exceeds μ, or if

$$\theta > \frac{\mu}{T} \tag{A2}$$

This implies that the threshold share offered by the center is increasing in μ (a higher cost of peacekeeping necessitates higher concessions) and decreasing in T (as revenues increase, the elite can be bought off with a smaller share). Note that by the assumption that $0 < \mu < T$, this threshold theta is between 0 and 1.[2]

Moving to the prior period, the peasants' best response depends on both local peasant conditions and the anticipated actions of the elite. Peasants will rebel if the benefit of doing so ($u_P(v=1)$) exceeds the benefit of inaction ($u_P(v=0)$). Given the best responses of the elite, rebellion is preferred when:

$$\beta - \mathbb{1}\{S > \underline{S} \text{ or } \theta > \frac{\mu}{T}\}\tau > \omega \tag{A3}$$

Note that by this stage of the game, ω, S, and θ are all known to the peasants. By the assumption that $\beta - \tau < \omega_L < \beta < \omega_H$, the peasants will only rebel if local conditions are poor, $\omega = \omega_L$, and they anticipate inaction by the elite. This will happen only when the government is revealed to be weak enough, $S < \underline{S}$, and the share of revenue that the elite may keep is low enough, $\theta < \frac{\mu}{T}$. Peasants otherwise take no action, receiving ω.

We finally move to the decision of the central ruler in the first period of the game. The central government chooses the share θ to offer the elite to maximize its expected payoff. Note that given the best responses of peasants and elites above, only two outcomes are possible: either peasants

[2] If μ exceeded total tax revenue, no share offered by the ruler would be sufficient to ensure compliance by the elite when $S < \underline{S}$.

are deterred from rebelling at all, in which case the ruler receives $(1-\theta)T$, or the government collapses, and the ruler receives 0.

If local conditions are good, $\omega = \omega_H$, peasants will not rebel and the ruler will retain power regardless of elite actions. If conditions are poor, $\omega = \omega_L$, the ruler retains power only if one or both of the following conditions is met: either the elite receives a high enough concession to ensure that they voluntarily comply with peacekeeping arrangements ($\theta > \frac{\mu}{T}$) or the central government is strong enough to credibly threaten punishment in the last stage of the game ($S > \underline{S}$, where $S = (1-\theta)T + k$). Note that the ruler will never offer the elite more than the minimal share of revenue $\frac{\mu}{T}$, as this is sufficient to ensure that the government survives, regardless of the realization of climate conditions ω or stochastic shock k. Under certain conditions, however, it may be optimal to offer the elite a lower share.

We solve for this optimal θ^* as a function of model parameters. First, note that given the distributions of random variables ω and k, the probability that $\omega = \omega_H$ is $(1-p)$ and the probability that $S > \underline{S}$ is given by:

$$\frac{(1-\theta)T + \delta - \underline{S}}{2\delta}, \tag{A4}$$

where $(1-\theta)T$ is the revenue retained by the elite and δ represents the noise parameter in the distribution of k. The expression for the ruler's expected utility as a function of θ and model parameters is therefore:

$$\left[(1-p) + p\left[\left(\frac{(1-\theta)T + \delta - \underline{S}}{2\delta}\right) + \left(\frac{\underline{S} - (1-\theta)T + \delta}{2\delta}\right)\mathbb{1}\{\theta > \frac{\mu}{T}\}\right]\right](1-\theta)T, \tag{A5}$$

where $\mathbb{1}\{\theta > \frac{\mu}{T}\}$ is an indicator for whether θ exceeds the elite's voluntary compliance level of $\frac{\mu}{T}$.

To solve for θ^*, we first note that θ will never exceed the voluntary compliance level, so the indicator function will take the value 0 in the range of values we are focused on here. Excluding the term on the indicator function and taking the derivative with respect to θ, we have

$$f_\theta = -\left[(1-p) + p\left(\frac{\delta - \underline{S}}{2\delta}\right)\right]T - \frac{2PT^2(1-\theta)}{2\delta}. \tag{A6}$$

Note that this expression is negative everywhere in the interval [0,1] by the assumptions that p, δ, and T are positive and $\delta > \underline{S}$. This implies that the optimal $\theta^* \in [0, \frac{\mu}{T})$ is 0, which is an intuitive result. If the central government does not allow the elite to retain enough revenue to ensure that they will repress in the absence of punishment, the ruler is better off retaining all the revenue to both maximize his potential payoff and the probability that his government will be strong enough to punish a defector. The ruler's problem can therefore be simplified to choosing $\theta \in \{0, \frac{\mu}{T}\}$ to maximize his expected utility.

We collect these results in the following Proposition:

Proposition 1. *There is a unique equilibrium to this game with the following characteristics:*

- *In the first period of the game, the ruler's optimal choice of elite rents collapses to choosing $\theta \in \{0, \frac{\mu}{T}\}$. He either sets θ equal to the voluntary compliance level, $\frac{\mu}{T}$, or he concedes no revenue to the elite.*
- *In the second period of the game, commoners will only rebel if three conditions all hold: 1) local conditions are poor ($\omega = \omega_L$); 2) the government is sufficiently weak ($S < \underline{S}$); and 3) the share of elite rents is sufficiently low ($\theta < \frac{\mu}{T}$). They otherwise take no action and the game ends without mobilization.*
- *In the final period, the elite will only repress mobilization if one of two conditions hold: 1) state strength is high enough to sustain the threat of punishment ($S > \underline{S}$); or 2) the share of elite rents θ is sufficiently high to ensure voluntary compliance ($\theta > \frac{\mu}{T}$). They otherwise take no action, allowing mobilization to grow out of control and the government to fall.*

When will the ruler move to consolidate fiscal authority and relegate the local elite altogether? The ruler's payoff if $\theta = \frac{\mu}{T}$ is $\left(1 - \frac{\mu}{T}\right) T = T - \mu$. Rearranging expression A5, we see that this is smaller than the payoff of setting $\theta = 0$ when:

$$T - \mu < \left[(1-p) + p\left(\frac{T + \delta - \underline{S}}{2\delta}\right)\right] T \tag{A7}$$

This is more likely to hold when μ is high (so the elite needs a larger transfer to ensure compliance), when p is low (so the probability of facing peasant revolt is small), and when $\underline{S}$ is low (so that it is more likely that the government will retain enough capacity to punish defectors). Conversely, when T becomes large, the ruler is better off transferring $\frac{\mu}{T}$ to the elite to obtain a share of T with certainty. (To see this note that $1 = (1-p) + p > (1-p) + p\left(\frac{T+\delta-\underline{S}}{2\delta}\right)$.)[3] Thus:

[3]The effect of noise δ on the expression is ambiguous. If $T > \underline{S}$, the righthand side declines in δ, so the ruler becomes more likely to favor a positive transfer to the elite. If $T < \underline{S}$, a higher δ implies a greater willingness to gamble on transferring 0.

Proposition 2. *The ruler will concede no revenue to the elite, risking mobilization growing out of control, when elite repression cost,* μ*, is sufficiently high; when the probability of poor local peasant conditions, p, is sufficiently small; when state capacity threshold,* $\underline{S}$*, is sufficiently low; and when tax revenue, T, is sufficiently low. Otherwise, he will set* $\theta = \frac{\mu}{T}$*, there will be no mobilization, and the government will survive with certainty.*

B.3 Discussion

This model illustrates how a rational, forward-looking ruler may end up inadvertently losing political control despite investing in capacity. When the risk of rebellion is sufficiently small and when the central government is able to amass sufficient capacity to punish the elite, the ruler's optimal strategy may be to hold onto the entirety of tax revenue despite the risks. Thus, it is precisely a central government whose rule is firmly established at the onset — one that faces a low $\underline{S}$ — that will most likely undergo state-building policies, such as the centralization of tax collection, which reduce the share of revenue conceded to regional elites. This helps to explain the timing of centralization in the Spanish Empire under Bourbon rule, which was undertaken only after solid political control over much of the territory had been established. However, after taking this calculated risk, it remains possible that an unfortunate climate shock hits alongside a sufficiently low realization of k (for example, the unanticipated rise of a formidable foreign adversary). This confluence of shocks can trigger a rebellion that grows out of control, as was the case in colonial Mexico, where widespread drought coincided with the forced abdication of Ferdinand VII by Napoleon in 1808.

C. Extension with uncertainty over peasant conditions in other regions

In this section, we present an extension of the model in which elites and peasants only observe local drought conditions $\omega_i \in \{\omega_l, \omega_H\}$ and the realization of drought across the country is unknown. We assume that local conditions are generated by some society-wide state of the world Ω, which is chosen by Nature. During normal conditions, Ω_N, the probability of receiving $\omega_i = \omega_L$ is p (and probability of $\omega_i = \omega_H$ is $1-p$). During crisis years, Ω_C, $q > p$ districts receive $\omega_i = \omega_L$ and $1-q$ receive ω_H. Let that the baseline probability that $\Omega = \Omega_C$ be r. After observing local conditions, peasants and elites in each district update beliefs about the state of the world Ω_N using Bayes' Rule.

All the results that we present for the baseline model stand in this extended version. We provide revised proofs below.

C.1 Revised Proof of Proposition 1

Equation A1 (the peasants' indifference expression) does not depend on knowledge/beliefs about the prevalence of drought across space and therefore remains the same. As in Appendix A.1 the elite's best response depends on peasant conditions when $\theta_i \in [-\pi, \mu]$ (else always repressing or always defecting is a dominant strategy). In addition to affecting the propensity of peasants to rebel ($\bar{s}_H < \bar{s}_L$), observing poor conditions locally influences the posterior belief that elites in other districts are likely to be facing rebellion. In particular, given the prior belief about the society-wide state of the world, $Pr(\Omega = \Omega_C) = r$, and given that $Pr(\omega_L|\Omega_C) = q$ and $Pr(\omega_L|\Omega_N) = p$, the posterior belief that a crisis year is being experienced ($\Omega = \Omega_C$) given that $\omega_i = \omega_L$, is $Pr(\Omega_C|\omega_L) = \dfrac{qr}{qr + p(1-r)}$, and given that $\omega_i = \omega_H$, the corresponding probability is $Pr(\Omega_C|\omega_H) = \dfrac{(1-q)r}{(1-q)r + (1-p)(1-r)}$. Note that $Pr(\Omega_C|\omega_L) > Pr(\Omega_C|\omega_H)$ by the assumption that $p < q$. This implies that the posterior belief about the state of the world is affected by observed opportunity costs, and in particular that low opportunity costs are tied to the belief that higher fraction of elites is facing disadvantageous rebellion conditions at home, in turn lowering expectations about the proportion likely to side with the government and about the likelihood that defection will be punished.

Note that this "higher-level" information effect of observing drought pushes in the same direction as the more direct impact of drought on local peasant rebellion. As before this implies a cutpoint strategy for elites where they will remain loyal to the regime if their loyalty exceeds some threshold and will defect on repressive activities otherwise, and as before this cutpoint increases when $\omega_i = \omega_L$ as this simultaneously decreases the expected utility of siding with the government (through higher expected costs of repression) and increases the expected utility of defection (through lower expected costs of punishment).

C.2 Revised Proof of Proposition 2

The peasants' indifference expression (A5) and the expression for the peasants' cutpoint signal given ω_i (A6) are unchanged from the base version of the model. The anticipated probability that the government will survive in the elites' indifference expression (A9) now depends on ω_i as this influences posterior beliefs about the distribution of drought in other districts and thus the mass of elites that are expected to defect ($Pr(h \leq k|\bar{\theta}(\omega_i), \omega_i)$).

To solve for the peasant and elite cutpoints explicitly, we begin with the elite who has observed conditions ω_H. For this elite, the posterior probability that the state of the world is Ω_C is $Pr(\Omega_C|\omega_H)$ and the posterior probability that the state of the world is Ω_N is $1 - Pr(\Omega_C|\omega_H)$. He knows that if the state of the world is Ω_C, a proportion q of other elites will face adverse peasant conditions at home, and if the state of the world is Ω_N, proportion $p < q$ will face adverse conditions at home. By assumption, the distribution of these shocks is independent of the distribution of elite loyalties θ_i, which are distributed uniformly on $[\theta - \delta, \theta + \delta]$. The elites' strategy to side with the government if $\theta_i \geq \bar{\theta}(\omega_i)$ (and thus to defect if $\theta_i < \bar{\theta}(\omega_i)$). For a given realization of θ, the expected mass of elites h who defect, conditional on observing ω_H, is therefore:

$$Pr_{C|H}\left[\frac{q(\bar{\theta}_L - (\theta-\delta))}{2\delta} + \frac{(1-q)(\bar{\theta}_H - (\theta-\delta))}{2\delta}\right] + (1 - Pr_{C|H})\left[\frac{p(\bar{\theta}_L - (\theta-\delta))}{2\delta} + \frac{(1-p)(\bar{\theta}_H - (\theta-\delta))}{2\delta}\right],$$

where $P_{C|H}$ is the posterior belief that $\Omega = \Omega_C$ having seen $\omega_i = \omega_H$. The expression for those observing ω_L is nearly identical. The strategy of elites is the same (to defect if θ_i falls under some threshold given ω_i). The only difference is that posterior beliefs about the probability of generalized crisis are higher by $Pr_{C|L} > Pr_{C|H}$, where $Pr_{C|L}$ is the posterior belief that $\Omega = \Omega_C$ having seen $\omega_i = \omega_L$. This yields that the expected value of h given θ is:

$$Pr_{C|L}\left[\frac{q(\bar{\theta}_L - (\theta-\delta))}{2\delta} + \frac{(1-q)(\bar{\theta}_H - (\theta-\delta))}{2\delta}\right] + (1 - Pr_{C|L})\left[\frac{p(\bar{\theta}_L - (\theta-\delta))}{2\delta} + \frac{(1-p)(\bar{\theta}_H - (\theta-\delta))}{2\delta}\right].$$

We use these expressions to solve for $Pr(h \leq k|\bar{\theta}(\omega_i), \omega_i))$. From the perspective of the cutpoint elite, θ is a random variable distributed uniformly on $[\bar{\theta}(\omega_i) - \delta, \bar{\theta}(\omega_i) + \delta]$, where $\bar{\theta}(\omega_i) = \bar{\theta}_H$ if $\omega_i = \omega_H$ and $\bar{\theta}_L$ if $\omega_i = \omega_L$. The posterior probability that $h \leq k$ is thus:

$$Pr(h \leq k|\bar{\theta}_H, \omega_H) = k + (\bar{\theta}_H + \delta)\left[\frac{1 - P_{C|H}(1-q) - (1 - P_{C|H})(1-p)}{2\delta}\right] + (\bar{\theta}_L + \delta)\left[\frac{-P_{C|H}q - (1 - P_{C|H})p}{2\delta}\right]$$

for cutpoint elites having observed ω_H, and

$$Pr(h \leq k|\bar{\theta}_L, \omega_L) = k + (\bar{\theta}_H + \delta)\left[\frac{-P_{C|L}(1-q) - (1-P_{C|L})(1-p)}{2\delta}\right] + (\bar{\theta}_L + \delta)\left[\frac{1 - P_{C|L}q - (1-P_{C|L})p}{2\delta}\right]$$

for cutpoint elites having observed ω_L. We insert these expressions into the indifference equations for elites in low and high peasant opportunity cost regions from expression A9 to solve for $\bar{\theta}_L$ in terms of the parameters of the model.

Let the probability of peasant revolt conditional on seeing ω_H be $M_H = \dfrac{\mu(\beta - \omega_H)}{\tau}$ and the probability of peasant revolt conditional on seeing ω_L be $M_L = \dfrac{\mu(\beta - \omega_L)}{\tau}$. Let:

$$A_H = \frac{1 - P_{C|H}(1-q) - (1-P_{C|H})(1-p)}{2\delta} \qquad B_H = \frac{-P_{C|H}q - (1-P_{C|H})p}{2\delta}$$

$$A_L = \frac{P_{C|L}(1-q) - (1-P_{C|L})(1-p)}{2\delta} \qquad B_L = \frac{1 - P_{C|L}q - (1-P_{C|L})p}{2\delta}.$$

Then solving for $\bar{\theta}_H$ and $\bar{\theta}_L$ we have:

$$\bar{\theta}_L = \frac{\delta(B_H A_L \pi - A_H B_L \pi - A_L - B_L) + k(A_L \pi - A_H \pi - 1) + A_H M_L - A_L M_H + M_L/\pi}{A_H B_L \pi - B_H A_L \pi + A_H + B_L + 1/\pi} \tag{A1}$$

and

$$\bar{\theta}_H = \frac{\delta(B_H A_L \pi - A_H B_L \pi - A_H - B_H) + k(B_H \pi - B_L \pi - 1) + B_L M_H - B_H M_L + M_H/\pi}{A_H B_L \pi - B_H A_L \pi + A_H + B_L + 1/\pi}. \tag{A2}$$

C.3 Revised Proof of Proposition 3

Using the expressions derived in the previous subsection, we derive the comparative statics in Proposition 3, minus the comparative static on p (the known proportion of districts experiencing drought in the base model, which is no longer present).

Note that $A_H, B_L > 0, A_L, B_H < 0$ by the assumption that $p, q \in (0,1)$. Notice also that $A_H + B_H = A_L + B_L = 0$. Simplifying, we demonstrate that $\bar{\theta}_L > \bar{\theta}_H$:

$$\bar{\theta}_L - \bar{\theta}_H = \frac{2\delta(M_L - M_H)}{2\delta + \pi(1 - (P_{C|H} - P_{C|L})(q-p))} > 0, \tag{A3}$$

by the assumptions that $\omega_L < \omega_H$ (so $M_L > M_H$) and that $P_{C|H}, P_{C|L}, q, p < 1$. We now take derivatives to find comparative statics with respect to k, M_L, M_H, and δ. Starting with k, we have:

$$\frac{\partial \bar{\theta}_H}{\partial k} = \frac{\partial \bar{\theta}_L}{\partial k} = -\pi, \tag{A4}$$

which is negative, by the assumption that $\pi > 0$. This implies that, in conditions of greater regime strength, the threshold level of loyalty is lowered. Next, we take the derivatives with respect to M_L and M_H:

$$\frac{\partial \bar{\theta}_L}{\partial M_L} = \frac{\pi(P_{C|H}p - P_{C|H}q - p) - 2\delta}{\pi((P_{C|H} - P_{C|L})(p-q)) - 1) - 2\delta} \qquad \frac{\partial \bar{\theta}_H}{\partial M_L} = \frac{\pi(P_{C|H}p - P_{C|H}q - p)}{\pi((P_{C|H} - P_{C|L})(p-q)) - 1) - 2\delta}$$

$$\frac{\partial \bar{\theta}_L}{\partial M_H} = \frac{\pi(P_{C|L}q - P_{C|L}p - 1)}{\pi((P_{C|H} - P_{C|L})(p-q)) - 1) - 2\delta} \qquad \frac{\partial \bar{\theta}_H}{\partial M_H} = \frac{\pi(P_{C|L}p - P_{C|L}q + p - 1) - 2\delta}{\pi((P_{C|H} - P_{C|L})(p-q)) - 1) - 2\delta}.$$

All of these partial derivatives are positive (both numerators and denominators are negative) by the assumptions that $q > p$ and that probabilities are between 0 and 1. Using that $M_L = \frac{\mu(\beta - \omega_L)}{\tau}$ and $M_H = \frac{\mu(\beta - \omega_H)}{\tau}$, we have that cutpoints are increasing in β and μ decreasing in τ and ω_L and ω_H. This implies that elites are more likely to remain loyal when the cost of peacekeeping is low and when the relative benefits of collective action for peasants are smaller (in either drought-affected or non-drought affected regions).

As in the main model, elite cutpoints enter positively and linearly in the expression for the peasants' cutpoints $\bar{s}(\omega_i)$, and the direct effects of the additional parameters are in the same direction. The sign of all comparative statics is the same for peasants as for elites.

C.4 Discussion

All results proved for the baseline model carry over under this extension. Introducing uncertainty about the society-wide distribution of local peasant conditions introduces an additional mechanism through which local drought/subsistence shocks affect the propensity of peasants to rebel and elites to defect. In addition to the direct effects, local peasant conditions affect beliefs about drought in other areas. Because droughts are correlated, when a local elite sees a drought in his home district, he believes it is more likely that elites in other regions are facing adverse conditions as well. This causes him to increase his assessment of how many of his neighbors will defect from the government, thus lowering his estimation of whether he'll face punishment for defection as well. Though peasants do not directly care about conditions in other regions or the actions of other elites, they know that these society-wide factors influence the behavior of their local elite and thus the likelihood that they will face repression if they rebel. This information mechanism highlights another reason why elites and peasants may under- or overestimate the propensity of those in other regions to rebel or repress. In areas that receive abnormally good or bad shocks to local peasant conditions, actors will gained a skewed perception of conditions in other regions and thus the likely actions of their neighbors.

D. Drought and Maize Prices in Mexico City

In this section, we present evidence linking droughts—measured through the Palmer Drought Severity Index — and maize prices in Mexico City. Bid-ask price data come from Florescano (1969), who compiled it from the *pósito y alhóndiga* books produced by city council officials. The *alhóndiga* was the city's official maize distribution facility; in principle, all maize brought into the city had to be taken there, and only there could the grain be sold to the public. We use the standardized data produced by Arroyo-Abad (2007).

Figure D.1: Maize Prices and Drought in Mexico City, 1720-1813

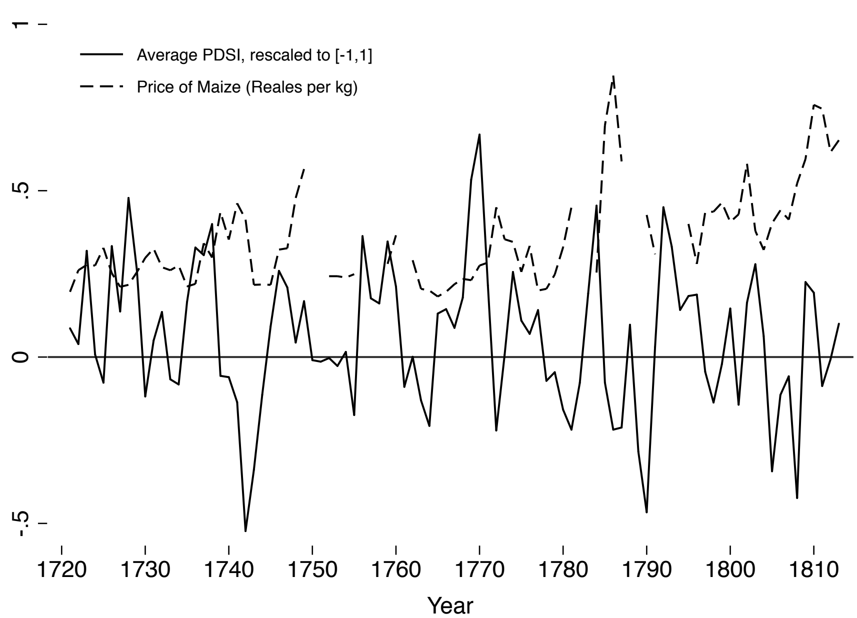

Figure D.1 and table D.1 show that bad weather is associated with higher maize prices. This finding is in line with one mechanism highlighted in past work that finds a relationship between drought and conflict (e.g., Mehlum et al. 2006, Dell et al. 2014).

Table D.1: Maize Prices and Drought in Mexico City, 1720-1813

	Maize Prizes (Reales/kg)			
	Avg. PDSI in Mexico City		Avg. PDSI in New Spain	
	Levels	First Difference	Levels	First Difference
	(1)	(2)	(3)	(4)
Avg. PDSI	-0.016**		-0.017***	
	(0.0069)		(0.0048)	
Avg. PDSI (First Difference)		-0.015**		-0.016***
		(0.0071)		(0.0050)
Constant	0.36***	0.014	0.36***	0.014*
	(0.016)	(0.011)	(0.012)	(0.0079)
Mean of DV	0.35	0.36	0.35	0.36
SD of DV	0.15	0.15	0.15	0.15
R sq.	0.039	0.098	0.044	0.100
Observations	80	73	160	146

OLS estimations. The unit-of-analysis is the year. Robust standard errors in parentheses.

E. Alternative Operationalizations of θ_i and ω_i

Our theory indicates that uncontained rebellion should be more likely where elites are more disloyal, where peasants are more aggrieved, and when the central government is weak (k). In section 3.2, we examine patterns of insurgent activity during a critical period of government weakness following the Napoleonic invasion of Spain in 1808 using one measure of elite dissatisfaction θ_i (exposure to the centralization of the *alcabala* tax) and one measure of peasant grievance ω_i (severity of drought conditions in 1808). In this section, we replicate this analysis using alternate measures of each variable. For θ_i, we use information on the expulsion of the Jesuits by the Crown in 1767, which alienated local elites and differed across space. For ω_i, we examine the expropriation of community trusts as part of the consolidation of Royal bonds in 1806–1808, which stripped funds from peasant villages.

E.1 The Expulsion of the Jesuits and Insurgency in 1810–1821

The Jesuit order, since its establishment in New Spain in 1572, engaged in missionary work in the northwest, but primarily focused on providing education to the colonial elite, through the establishment of schools and colleges (e.g., Osorio Romero 1979,Gerhard 1993). The Jesuits, in contrast to other religious institutions in the Spanish Empire, were perceived to be fiercely loyal to the pope. To consolidate royal authority, as well as to benefit from the expropriation of the order's wealth, the Crown forcibly and suddenly expelled the Jesuits in the summer of 1767. This move was not well received by local elites, many of whom were students and alumni from Jesuit institutions.

We leverage this Crown policy and implement an alternative operationalization of θ_i by using the presence of Jesuit educational institutions in a district prior to the expulsion. Data on the geographic presence of the Jesuits comes from Osorio Romero (1979); we focus on the location of Jesuit educational institutions by the year of the expulsion. Our theoretical expectation is that those districts with Jesuit presence, and in which the local elite were likely to have strong ties with the order, should be more likely to experience rebellion during the War of Independence.

The estimates, shown in Table E.1, provide suggestive evidence that the Jesuit expulsion played a role in promoting unrest during the War of Independence. Districts with Jesuit presence experience more insurgent episodes (columns 4-6), and are more likely to experience rebellion (columns 1-3, though these coefficients are not precisely estimated). This source of elite dissatisfaction predicts insurgent unrest even after conditioning for the exposure to the *alcabala* centralization, which suggests that the Bourbon reforms may have created multiple sources of elite grievance.

E.2 Consolidation of Royal Bonds and Expropriation of *Bienes de Comunidad*, 1806–1808

To help fund its European wars, the Spanish Crown relied on royal bonds (*vales reales*), first issued in 1780. To stabilize the nominal value of the bonds after an accelerated initial depreciation, the Crown created the Bank of San Carlos with the objective of securing funds to progressively withdraw bonds from circulation. This strategy proved successful for as long as the Crown's sovereign promise to repay this debt was perceived as credible. In 1794, however, as the Empire entered into war against Revolutionary France, the Crown issued an additional wave of bonds and implemented a set of reforms to back their value as credibility eroded. Under one of these measures, the consolidation of royal bonds, the Crown expropriated wealth from religious, educational, and social welfare institutions, earmarking the resulting revenue to repay the bonds. First implemented in Spain in 1798, the consolidation was extended to the American colonies by 1804 (von Wobeser 2003; Marichal 2007).

While the consolidation affected a wide array of interests in colonial Mexico, we focus on a set of expropriations targeting peasant interests: expropriations of *bienes de comunidad*, which

Table E.1: The Expulsion of the Jesuits and Insurgency During Mexico's Independence War, 1810–1821

	Insurgent Activity, 1810-1821					
	Any Insurgent Activity			Number of Localities with Insurgent Presence		
	(1)	(2)	(3)	(4)	(5)	(6)
Jesuit School by 1767	0.038	0.075	0.12	3.38*	3.83*	7.64**
	(0.12)	(0.13)	(0.17)	(1.94)	(1.98)	(3.31)
Avg. PDSI in 1808		-0.21***	-0.16**		-0.79**	-0.23
		(0.051)	(0.065)		(0.34)	(0.66)
Alcabala Chartered in 1775			0.31**			3.66**
			(0.15)			(1.53)
Alcabala Farmed in 1775			0.26*			1.21
			(0.15)			(1.10)
Alcabala Revenue Pre-Centralization (1775)			0.026			-0.69
			(0.053)			(0.56)
Std. Dev. PDSI in 1808		1.19***	1.23**		5.90	2.92
		(0.36)	(0.48)		(4.74)	(7.49)
Maize Suitability		0.11	0.049		0.96	1.07
		(0.080)	(0.13)		(0.66)	(1.18)
Avg. Altitude (log)		-0.053	-0.11*		0.21	-0.41
		(0.040)	(0.057)		(0.37)	(0.52)
Surface Area (log)		0.086**	0.038		1.13***	1.35**
		(0.042)	(0.071)		(0.38)	(0.64)
Malarial Zone		0.029	0.066		0.44	1.02
		(0.083)	(0.12)		(0.72)	(1.32)
Dist. to Mexico City (log)		-0.079	-0.15		-0.87**	-2.29***
		(0.050)	(0.090)		(0.34)	(0.76)
Constant	0.49***	-0.33	0.63	1.67***	-8.60*	6.61
	(0.038)	(0.56)	(0.76)	(0.20)	(4.90)	(5.99)
Mean of DV	0.49	0.53	0.67	2	2.16	3.05
SD of DV	0.50	0.50	0.47	3.80	3.93	4.97
R sq.	0.00050	0.23	0.28	0.070	0.24	0.38
Observations	195	178	83	195	178	83

OLS estimations. See equation (3.2) for the econometric specification. The unit-of-analysis is the district. Robust standard errors in parentheses.

were carried out mostly during 1806 but up to 1808. *Bienes de comunidad* were local trusts that were funded with a share of the indigenous capitation tax and thus by the community members themselves. This contrasts with other expropriated entities such as religious *cofradías*, which administered private credit, and whose expropriation affected debt holders across the colony.[4] Funds

[4]For example, Van Young (1992), speculates that these expropriations might have depressed investments and contributed to a severe recession in the countryside; Tutino (2018) examines the backlash that these other type of

Table E.2: The Expropriation of *Bienes de Comunidad*, 1806–1808 and Insurgency During Mexico's Independence War, 1810–1821

	Insurgent Activity, 1810-1821					
	Any Insurgent Activity			Number of Localities with Insurgent Presence		
	(1)	(2)	(3)	(4)	(5)	(6)
Log Expropriated Funds from Indigenous Communities (1806–08)	0.064***	0.053***	0.033**	0.37***	0.34***	0.38**
	(0.0076)	(0.0096)	(0.014)	(0.075)	(0.082)	(0.16)
Avg. PDSI in 1808		-0.19***	-0.18***		-0.67**	-0.19
		(0.045)	(0.062)		(0.28)	(0.56)
Alcabala Chartered in 1775			0.31**			2.57**
			(0.15)			(1.28)
Alcabala Farmed in 1775			0.24			0.50
			(0.15)			(0.98)
Log Alcabala Revenue Pre-Centralization (1775)			0.034			0.37
			(0.045)			(0.36)
Std. Dev. PDSI in 1808		0.76*	1.19**		4.51	2.27
		(0.40)	(0.48)		(4.64)	(7.42)
Maize Suitability		0.026	0.023		0.24	0.85
		(0.070)	(0.12)		(0.54)	(1.26)
Avg. Altitude (log)		-0.022	-0.085		0.46	-0.078
		(0.037)	(0.055)		(0.35)	(0.50)
Surface Area (log)		0.092**	0.035		1.15***	1.54*
		(0.044)	(0.074)		(0.41)	(0.83)
Malarial Zone		0.010	0.028		0.14	0.33
		(0.075)	(0.11)		(0.74)	(1.50)
Dist. to Mexico City (log)		-0.0081	-0.053		-0.44*	-0.87
		(0.051)	(0.10)		(0.26)	(0.67)
Constant	0.23***	-1.03**	-0.25	0.45**	-12.7**	-12.4
	(0.045)	(0.51)	(0.75)	(0.17)	(5.06)	(9.12)
Mean of DV	0.49	0.53	0.67	1.99	2.16	3.05
SD of DV	0.50	0.50	0.47	3.79	3.93	4.97
R sq.	0.25	0.36	0.33	0.15	0.25	0.28
Observations	196	178	83	196	178	83

OLS estimations. See equation (3.2) for the econometric specification. The unit-of-analysis is the district. Robust standard errors in parentheses.

from the *bienes de comunidad* were used to cover religious festivities; to pay for local education and local authorities' salaries; and cope with epidemics, natural disasters, and unforeseen events that prevented the community from a timely payment of the capitation tax. The seizure of these assets placed substantial pressure on peasant communities leading up to the Napoleonic invasion of

expropriations created among the colonial elite; and von Wobeser (2006) emphasizes the role of the organized colonial resistance to these measures in the movement for independence later on.

1808 (e.g., Guardino 1996).

We digitize data on the size of expropriations from these trusts in silver pesos from von Wobeser (2003), who compiled them from the Crown's internal consolidation documents. We surmise that higher expropriations led to more intense peasant grievances, thus interpreting them as an alternative, continuous measure of ω_i. We note, however, that unlike droughts, these expropriations were an explicit Crown policy choice and thus likely endogenous. We estimate equation (3.2) using this measure and present results in Table E.2. The estimates indicate that expropriations of the *bienes de comunidad* are highly predictive of insurgency during the War of Independence across specifications, even after conditioning on drought, our main measure of peasant grievances. A one standard deviation increase in log expropriated funds is associated with a 20.1 percentage point increase in the probability of insurgent activity (column 2) and with a 1.3 increase in the number of localities in the district with insurgent presence.

F. Supplementary Information on Empirics

F.1 Descriptive Statistics

Table F.1: Descriptive Statistics

	count	mean	sd	min	p25	p50	p75	max
Insurgent Activity, 1810–1821	196	0.49	0.50	0	0	0	1	1
Number of Insurgent Rebellions, 1810–1821	196	1.99	3.79	0	0	0	3	28
Avg. PDSI in 1808	191	-3.52	1.01	-5.33	-4.16	-3.70	-2.96	-0.78
Std. Dev. PDSI in 1808	191	0.093	0.092	0	0.033	0.066	0.12	0.52
Alcabala Chartered in 1775	141	0.37	0.48	0	0	0	1	1
Alcabala Farmed in 1775	141	0.41	0.49	0	0	0	1	1
Alcabala Centrally Administered in 1775	141	0.22	0.41	0	0	0	0	1
Log Alcabala Revenue Pre-Centralization (1775)	91	8.00	1.46	5.43	6.91	7.93	8.84	13.2
Jesuit School by 1767	212	0.10	0.31	0	0	0	0	1
Log Expropriated Funds from Indigenous Communities (1806–08)	213	3.82	3.96	0	0	0	7.79	10.6
Maize Suitability	181	0.85	0.49	0	0.56	0.87	1.11	2.66
Avg. Altitude (log)	181	7.19	0.80	3.09	7.11	7.47	7.65	7.97
Surface Area (log)	212	8.15	1.41	4.68	7.18	8.36	9.03	11.9
Malarial Zone	212	0.63	0.48	0	0	1	1	1
Dist. to Mexico City (log)	181	5.35	1.20	0	4.68	5.53	6.21	7.23

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