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

Francisco Garfias† and Emily A. Sellars‡

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Abstract

We examine the complementary roles of elite politics, popular grievances, and central government weakness on rebellion. Efforts to strengthen the central state often come at the expense of the elite intermediaries charged with maintaining local political control. By driving a wedge between local elites and the central government, centralizing reforms can reduce intermediaries' willingness to repress mobilization, providing an opening for popular rebellion during both localized and national crises. For a given level of commoner grievance, revolts from below are thus more likely to be attempted and more likely to spread where elites' incentives to enforce order have been diminished. We formalize these ideas and provide supportive evidence using subnational data on rebellion, tax centralization, and drought in colonial Mexico from the late 17th-century to the War of Independence.

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†Assistant Professor, School of Global Policy and Strategy, UC San Diego. e: fgarfias@ucsd.edu

‡Assistant Professor, Department of Political Science, Yale University. e: emily.sellars@yale.edu

1. Introduction

Subsistence crises are a powerful motivation for social and political unrest (Scott 1976; Tutino 1986; Miguel 2005). However, as has been long recognized, popular grievances alone are not sufficient to explain rebellion. Severe droughts and famines are often accompanied by little to no unrest, while a relatively minor shock during a critical period can lead to large-scale insurgency. As numerous scholars have noted, whether localized crises spill over into large-scale violence depends critically on whether there is a political opening for revolt brought on by state weakness, elite divisions, or other forces (Moore 1966; Wolf 1969; Tilly 1978). In this paper, we examine how state-building efforts, intended to raise revenue and strengthen the government's hold over territory, can backfire and open up opportunities for generalized revolt.

We advance a theory of rebellion that focuses on the role of local elites as intermediaries between commoners and the central government. In contexts where central rulers rely on local elites to maintain political order, efforts to strip the intermediaries of power can make the state more vulnerable to popular rebellion. In determining whether to engage in repression, elites weigh the anticipated costs of enforcing order against any benefits that they receive from backing the government. When their economic or political privileges are eroded, elites become less inclined to follow through on their commitment to keep the peace. This reduces the expected cost of revolt for commoners, encouraging more rebellion and further testing elites' loyalties. When the central government is weakened, for example by external conflict, it becomes more difficult to punish elites who shirk on their peacekeeping duties, further eroding order. Small, localized uprisings that may be otherwise easy to contain can spread into a broader political crisis that threatens government survival.

There are many potential sources of discord between local elites and the central government. State-building reforms represent an important example. Efforts to consolidate the state's fiscal or bureaucratic control over territory, while perhaps laying the foundation for future peace and prosperity (e.g., Dincecco and Katz 2014; Acemoglu et al. 2015), often come at the expense of elite intermediaries (Besley and Persson 2009; Gerring et al. 2011; Garfias 2018; Garfias and Sellars n.d.). State building,

though capacity-enhancing over the long term, can backfire by reducing the willingness of elites to back the government during a crisis. By rupturing existing power relationships between elites and the central government, efforts to centralize power can reduce the resilience of the political system to even low-level shocks by weakening the threat of repression faced by commoners.

We provide empirical support for the theory using subnational evidence on localized uprisings and generalized insurgency in late colonial Mexico. During the 18th century, the Spanish Crown undertook a series of capacity-building reforms, including one that stripped provincial elites of the ability to extract rents through decentralized tax collection. This reform aggravated intermediaries during a time of renewed peasant unrest in the countryside. Elite-funded militias usually contained any small-scale peasant rebellions that emerged during localized droughts quickly. However, the centralizing reforms weakened elites' loyalties to the Crown. When the state's ability to punish elite defection was curtailed following the Napoleonic invasion of Spain in 1808, the effect of drought on peasant rebellion was amplified. This political crisis, which occurred alongside a widespread drought, precipitated Mexico's War of Independence. Consistent with our theory, we show that insurgent violence during the war was concentrated in regions where elites had been disproportionately affected by earlier state-building efforts. Though these centralizing reforms increased revenue collection and state bureaucratic control, they also left the Crown vulnerable to elite defections and peasant revolt during a crisis.

By focusing on the interaction between the strategic problems of elite coordination and peasant revolt, our model highlights how national politics can influence highly localized collective action and vice versa. Building on classic works on the determinants of peasant rebellion (e.g., Moore 1966; Wolf 1969; Paige 1975; Scott 1976), we focus on the interplay between low-level subsistence shocks and the broader opportunity structures that amplify or diminish incentives for rebellion. Even severe grievances may not lead to revolt when collective action is difficult or the threat of repression is high (e.g., Moore 1978; Tilly 1978; Wood 2003). Though commoners' motivations for revolt may be unrelated to national political conflict, national crises can be transmitted to the local level by

influencing how elite intermediaries respond to mobilization. Conversely, even if elites are insulated from the localized sources of peasant grievance, local unrest increases the cost of enforcing order, which tests elite loyalties to the Crown. Highly localized aspects of the peasant economy, such as temporary drought shocks, can therefore have repercussions for elite coordination, and peasant villages with little interest in national political struggles may look to shifts in elite politics when determining how to respond to temporary crises. This has implications for work on the localized causes of revolt, such as the link between between climate and conflict (e.g., Hsiang et al. 2013). Our theory suggests that the consequences of localized rainfall shocks, for example, should depend on national and elite politics, which can amplify or diminish the potential for unrest.

The connection between national- and local-level crisis is especially important to understanding why strengthening state capacity is challenging. Past work has illustrated how intra-elite conflict can undermine state building investments (e.g., Besley and Persson 2009; Garfias 2018; 2019). By focusing attention on elites as intermediaries between central authorities and the general population, our theory develops another mechanism through which state building efforts can destabilize incumbent governments. Disgruntled elites can shirk on repression, allowing localized commoner uprisings to spread out of control and threaten the government. While the prospect of strengthening capacity may be appealing in the long run, centralizing reforms that alienate elite intermediaries can reduce resilience to shocks in the interim. As our model illustrates, because of the complex feedback between national and local politics, the confluence of small shocks during a critical time can cause mass revolt, large-scale elite defections, and the collapse of the central government.

Finally, our paper contributes to understanding Mexico's War of Independence. Existing work highlights explanations for the conflict at three different levels of analysis: imperial weakness in the wake of the Napoleonic Invasion (e.g., Rodríguez 1998), regional conflicts between disaffected elites and the central government (e.g., Hamnett 1986; Pietschmann 1991), and peasant crises related to the drought and famine of 1808 (e.g., Florescano 1969; Tutino 1986; Van Young 2002). This paper

formally integrates all three explanations, illustrates how they relate to one another, and provides empirical evidence on each.

2. Theory: Elite Coordination and Commoner Grievance in Rebellion

Our theory builds on the observation that state-building efforts can paradoxically generate instability by disrupting existing power relationships. Governance arrangements in weakly institutionalized states often depend on the cooperation of elite intermediaries — local warlords, traditional leaders, or members of the aristocracy — to maintain control over the population. These arrangements can be beneficial to both the central government and local potentates. If provincial elites are more able to effectively monitor and coerce the local population, a government may choose to delegate the task of governing territory to elites in exchange for a share of tax revenues or other rents (Gerring et al. 2011; Garfias and Sellars n.d.). Efforts to centralize authority often require curtailing these elite privileges. However, stripping elites of revenue and power can undermine their loyalty to the central government.

Our focus is on the downstream effects of centralization on popular revolt. Dissatisfied elites can take direct action against a central government — for example, through a coup attempt — but they may also play a more subtle role in shaping patterns of uprising among commoners. When elites are charged with keeping the peace in their regions, they may decide to shirk on local repression following the adoption of policies that harm their interests. This lowers the cost of rebellion for commoners, making the central government more vulnerable to revolt from below during times of crisis. Elites' role as intermediaries serves to transmit national-level political conflict down to the local level, and the converse is also true. Even if elites are insulated from the localized factors that motivate commoner rebellion, siding with the government is more costly when commoner grievances (and thus the risk of revolt) are higher. This can exacerbate national-level crises by further testing the ties between local elites and the central government.

Why, given these risks, might a government rationally undertake efforts to centralize power at the expense of elite intermediaries? In Appendix B, we analyze a model in which a government

chooses a level of centralization, weighing potential dangers of alienating local elites against the benefits of consolidating power for the future. As that model illustrates, a ruler is sometimes better off alienating elite intermediaries to retain more revenue and bolster the future strength of the government. However, doing so leaves him at greater risk during adverse economic or political shocks, when commoners may have an incentive to rebel and elites can no longer be counted on to keep the peace. This can explain why other work has found that centralization efforts are more likely to be undertaken when the threat of rebellion from below decreases (e.g., Garfias and Sellars n.d.), as well as when the central government faces intense revenue pressure or a low risk of losing political control.

The theoretical and empirical focus of this paper is on what happens *after* a ruler's decision to centralize power, and specifically on how earlier centralizing reforms can influence patterns of revolt during subsequent, unrelated crises. Our theory centers on the coordination problem faced by local elites as they decide whether to follow through on their peacekeeping responsibilities. During times of crisis, elites face a higher expected cost of maintaining order, which tests their level of commitment to the central government. Elites who are harmed by earlier centralization efforts may be less willing to pay for local repression. Because of their role as critical intermediaries between commoners and the government, elites' choices can trigger a larger-scale crisis. Commoners become more willing to rebel, and elites in other regions — anticipating inaction among their neighbors — begin to doubt that the government can survive.

Our model builds on formal theoretic work on coordination and regime change under incomplete information (e.g., Boix and Svolik 2013; Passarelli and Tabellini 2017; Finkel and Gehlbach 2020; Sellars n.d.; Tyson and Smith 2018), most directly on work examining the strategic interplay between elites and commoners in collective action (e.g., Bueno de Mesquita 2010; Casper and Tyson 2014) and examining spillovers between national and localized patterns of grievance and revolt (e.g., Passarelli and Tabellini 2017; Finkel and Gehlbach 2020). Because of the interplay between elite loyalties, central government strength, and commoners' incentives to rebel, the effect of a shock to any of these

factors individually is amplified through its indirect effects on the others. Because of the positive feedback between these factors, even a stable political system may be endangered by a minor shock under the right conditions.

2.1 Model setting

The model is a simultaneous game of incomplete information. We consider a society consisting of a continuum of districts of mass one, indexed by i, and a central government, which is unmodeled (but see Appendix B). Each district contains a representative elite (E) and a representative peasant village (P).[1] The peasant village in the district can either collectively rebel (v_i=1) or not (v_i=0). In turn, the local elite decides whether to side with the government and put down rebellion ($e_i = 1$) or to defect and shirk on repressive activities ($e_i = 0$).

If peasants choose to rebel, they receive an exogenous benefit $\beta > 0$. This could include feelings of belonging, goods seized during rioting, or other benefits held only by those who join in the action (e.g., Wood 2003; Passarelli and Tabellini 2017).[2] Peasant mobilization, however, is also costly. If the local elite chooses to side with the government and enforce local order (i.e., if $e_i = 1$), peasants participating in collective action pay a punishment cost $\tau > 0$. When peasants choose to participate in collective action, they also pay an opportunity cost, which can be high or low, $\omega_i \in \{\omega_L, \omega_H\}$, where $\omega_L < \omega_H$. In an agrarian society, ω_L could represent a negative shock, such as a drought,[3] which lowers the marginal value of labor in the subsistence sector and reduces the relative cost of conflict (e.g., Dell 2012; Hsiang et al. 2013). Because decisions are based on the relative payoff of rebellion and non-rebellion, it would be equivalent to think of ω_i as a measure of wellbeing if there is no rebellion, or as the inverse of grievances, which may also be heightened during a drought or other subsistence crisis.

[1] We use "peasant" to refer to non-elite actors given our empirical focus on an agrarian society. However, the could theory extend to commoners in other contexts, as we discuss below. To highlight the interplay between national and localized crises, we treat villages as unitary actors, abstracting from away from any within-village collective action problem to focus on how the cross-district coordination problem of elites filters down to the local level.

[2] Both peasants who rebel and elites who defect receive a private benefit, so free-riding problems are not featured in this formalization. The strategic complementarity between actors is common to global-games and similar coordination models.

[3] See Appendix Section E.2 for empirical evidence using an alternative operationalization of ω_i.

The conditions that determine opportunity costs or grievances for peasants are revealed in each district at the beginning of the game. The probability that a district receives poor conditions ($\omega_i = \omega_L$) is $p \in (0,1)$ (the probability of $\omega_i = \omega_H$ is $1-p$). The spatial pattern of peasant conditions is observable to all actors.[4] We assume that $\beta - \tau < \omega_L < \omega_H < \beta$, so that all peasants may choose to rebel if the probability of repercussions is sufficiently low.[5]

The elites' choice of whether to follow through on their peacekeeping responsibilities or to defect depends on their idiosyncratic level of loyalty to the government, θ_i, which is also revealed at the beginning of the game and is only observed by each of them. This parameter can be interpreted as a composite of an elite's status-quo payment, his attachment to the regime, and any other benefits that he receives from funding local repression.[6] Elite loyalties are correlated across districts. Specifically, idiosyncratic elite loyalties θ_i are uniformly distributed on $[\theta - \delta, \theta + \delta]$, where θ, the average level of loyalty of elites to the government, is unknown and where $\delta > 0$ so there is variation in loyalties across elites.[7] Prior beliefs of all actors are that θ may take on any value on $\mathbb{R}$ with equal probability.[8] Elites privately observe their individual θ_i, and from this they form beliefs about the average loyalty in the country. The posterior belief of an elite with loyalty θ_i is to treat θ as distributed $Unif[\theta_i - \delta, \theta_i + \delta]$. Peasants do not directly observe the loyalty of the local elite in their district θ_i. However, they receive a signal s_i where $s_i \sim Unif[\theta_i - \sigma, \theta_i + \sigma]$ and $\sigma > 0$. Given their uninformative prior, peasants' posterior beliefs are to treat θ_i as a random variable distributed $Unif[s_i - \sigma, s_i + \sigma]$. We assume that the realization of elite loyalties is independent of peasant conditions ω_i.

Elites choosing to side with the government must fund peacekeeping activities in their districts. The cost of putting down the rebellion is $\mu > 0$ if local peasants rebel (i.e., $v_i = 1$) and 0 otherwise.

[4] In Appendix C, we develop an extension where actors only observe conditions in their district.

[5] The comparative statics we derive on opportunity costs/grievances would be amplified if $\omega_H > \beta$ (no peasants rebel during good conditions), $\omega_L < \beta - \tau$ (all peasants rebel during bad conditions), or both.

[6] In Appendix Section B, we endogenize this parameter and draw a direct connection between the share of local revenue that the central government allows the elite to retain and their willingness to repress mobilization.

[7] Note that θ_i is not restricted to be positive. An elite with negative θ_i could be thought of as harboring grievances against the government or as having an affinity for rebels.

[8] If the assumption of prior ignorance seems strong, θ can alternatively be thought of as the deviation from typical elite loyalty.

If an elite defects, he does not need to pay this cost of peacekeeping.[9] However, if he defects and the central government survives, he pays a punishment cost of $\pi > 0$. Note that because elite decision-making is based on the relative benefits of cooperation over defection against the regime, this would be equivalent to thinking of π as a benefit to cooperating elites if the government survives. We assume that the central government falls if enough elites defect in rebellious areas, allowing the localized revolts to grow out of control. Let h represent the mass of elites who defect (i.e., those choosing $e_i = 0$).[10] We assume that the government falls if defection h exceeds some exogenous threshold k, representing the strength of the regime. We assume that this threshold k is common knowledge.

A summary of payoffs is as follows. Peasants rebel if the expected benefit of doing so is higher than the expected cost, or if:

$$\beta - \tau e_i > \omega_i, \tag{2.1}$$

where β is the benefit of collective action, τ is the cost imposed by elite repression, e_i is an indicator that takes a value of one if the elite sides with the government and zero otherwise, and ω_i is the peasant opportunity cost (or inverse of grievances). The peasant village forms expectations about the likely actions of elites based on their signal s_i of the local elite's loyalty θ_i and based on the direct observation of local conditions ω_i. The expected benefit of rebelling relative to not rebelling is:

$$\beta - \tau Pr(e_i = 1 | s_i, \omega_i) - \omega_i. \tag{2.2}$$

Likewise, elites choose to side with the government if the expected value of doing so is higher than the expected cost, or if:

$$\theta_i - \mu \mathbb{1}\{v_i = 1\} > -\pi \mathbb{1}\{h \leq k\}, \tag{2.3}$$

where θ_i is the idiosyncratic benefit of remaining loyal to the government, μ is the cost of putting down rebellion locally, and π is the punishment of defection should the government survive. The

[9] The parameter μ can be thought of as the cost of repression relative to inaction in the face of peasant revolt, which allows for elites to bear other costs during peasant rebellion, including looting, vandalism, or the threat of violence.

[10] The comparative statics we derive would be the same if government survival depended on elite defection in rebellious districts only. This result arises because all parameters enter the elite and peasant problems in the same direction (i.e., either increasing/decreasing the risk of both rebellion and defection). See Appendix A.

indicator v_i takes a value of one if the peasants choose to rebel and zero otherwise; similarly, $\mathbb{1}\{h \leq k\}$ indicates whether the government survives, which occurs if the mass of defecting elites h is smaller than the government survival threshold k. While both v_i and h are endogenous, each elite forms beliefs about the likely actions of the local peasantry and of the elite in other regions based on his own known loyalty, θ_i, and the peasant conditions in the district, ω_i. The expected relative benefit of siding with the government is:

$$\theta_i - \mu Pr(v_i = 1|\theta_i, \omega_i) + \pi Pr(h \leq k|\theta_i, \omega_i). \tag{2.4}$$

2.2 Analysis

We solve for the unique Bayesian Nash Equilibrium of this game. We do this in the following steps. We first establish that there is a threshold level of loyalty $\bar{\theta}(\omega_i)$, which depends on local peasant conditions, below which elites will always defect and above which they will remain loyal to the regime, and a threshold signal $\bar{s}(\omega_i)$ below which peasants will always rebel and above which they will not. We then show that these thresholds are higher (so rebellion/defection is more attractive) when peasant conditions are poor (i.e., $\omega_i = \omega_L$). We then solve for the thresholds $\bar{\theta}(\omega_i)$ and $\bar{s}(\omega_i)$ explicitly and calculate the comparative statics. Below we outline the key propositions and provide some intuition for our results. Proofs are provided in Appendix A.

Proposition 1. *In the unique Bayesian Nash Equilibrium, there exist cutpoints $\bar{\theta}(\omega_i)$, $\bar{s}(\omega_i)$, which depend on peasant conditions ω_i, such that an elite defects from peacekeeping if $\theta_i \leq \bar{\theta}(\omega_i)$ and remains loyal otherwise, and a peasant village rebels if $s_i \leq \bar{s}(\omega_i)$ and does not rebel otherwise.*

Proof in Appendix A.1. When elites are very loyal to the government, they follow through on their peacekeeping duties, regardless of what they expect peasants or other elites to do. Conversely, when they are very disloyal or unhappy with the government, they choose to defect, even if doing so is likely to be costly. At moderate levels of θ_i, however, elites' best response depends on the likelihood of facing peasant rebellion, because this determines the cost of peacekeeping, and on the anticipated actions of other elites, because these determine whether the government will survive to punish defection. Elites are more likely to defect if their loyalty θ_i is low, for both direct and indirect reasons.

Directly, the level of loyalty (or status quo payoff) determines the willingness of elites to absorb costs associated with peacekeeping. Indirectly, because elite loyalties are correlated across districts, elites with lower levels of loyalty anticipate more defection from other elites, further reducing the anticipated costs of defection.

Peasants, in turn, use the signal of elite loyalty s_i to form a belief about the likelihood that any rebellion is repressed. When signals are very low, peasants know that elites are not going to repress and rebellion is always preferred to non-rebellion, by the assumption that $\omega_L < \omega_H < \beta$. By contrast, when signals are very high, peasants know that elites are certainly going to repress local mobilization and therefore are always be better off not mobilizing.

Corollary. *Given the peasants' strategy to rebel when their signal is sufficiently low relative to local peasant conditions ($s_i \leq \bar{s}(\omega_i)$), a greater share of peasants will rebel when θ_i declines.*

This corollary follows directly from the distribution $s_i \sim Unif[\theta_i - \sigma, \theta_i + \sigma]$. Peasants receive a noisy but unbiased signal of their local elite's loyalty to the government. As this signal declines, peasants anticipate that it is less likely that they will face repression should they mobilize. There will therefore be more rebellion where elite loyalties are low. While peasants may care little about reforms that influence elite loyalty directly, these enter their calculus by changing the likelihood of repression.

Proposition 2. *Let $\bar{\theta}_H$ and $\bar{\theta}_L$ be the cutpoint level of loyalty in good and bad peasant-condition districts respectively. Then $\bar{\theta}_H < \bar{\theta}_L$. Let $\bar{s}_H$ and $\bar{s}_L$ be the cutpoint signal of elite loyalty received by the peasant village in good and bad peasant-condition districts respectively. Then $\bar{s}_H < \bar{s}_L$.*

In Appendix A.2, we show that both elite and peasant cutpoints are higher when local peasant conditions ω_i are worse. Note that by Proposition 1, this implies that defection is chosen by a larger range of elites and rebellion preferred by a larger range of peasants when local conditions are poor as opposed to good. As above, this is the result of both direct and indirect factors. When the opportunity cost of revolt is low (or grievances are high), peasants become more willing to face some risk of repression than when local conditions are good. This in turn implies that a greater range of elites will

anticipate facing rebellion at home, raising the expected cost of peacekeeping. This makes defection from the central government more appealing.

Together, Propositions 1 and 2 illustrate how a reduction in peasant opportunity costs (or an increase in grievances), ω_i, can amplify the effects of elite loyalty shocks (reductions in θ_i) and vice versa. Though elites with very high (very low) levels of loyalty to the government always remain loyal to the government (defect), elites with intermediate levels of loyalty make their choice based on the anticipated actions of local peasants and other elites. When local peasant conditions are poor and the prospect of rebellion goes up, elites who might otherwise remain loyal to the government may choose to defect. This makes the government less able to contain political backlash to policies that harm elite interests. Similarly, a drought that occurs during a time of high elite loyalty to the government may spur little rebellion because peasants anticipate repression. If the same drought shock occurs during a time when elites are frustrated with the central government, however, many more villages may find it preferable to rebel. This positive feedback highlights the particular risk of alienating important elite intermediaries.

Proposition 3. *Elite and peasant cutpoints $\bar{\theta}(\omega_i)$ and $\bar{s}(\omega_i)$ are increasing in peasant benefits of collective action β, and the elite cost of peacekeeping μ. These cutpoints are decreasing in regime strength k, the peasant cost of repression τ, and local peasant conditions ω_i.*

Proof in Appendix A.3. Given our empirical interest, we focus on the effect of changes to the strength of the central government (k), leaving discussion of the other parameters to the Appendix.

When the central government is strong (i.e., when k is large), it can absorb a lot of elite defection without collapsing. Elites therefore anticipate that they are likely to be punished if they defect, increasing their willingness to remain loyal to the government, even when local conditions are conducive to rebellion. Conversely, if the government becomes weak, elites with marginal levels of loyalty may suddenly find it preferable to defect as the risk of punishment goes down. Though peasants by assumption do not care about national politics directly, the strength of the government still enters their calculus indirectly by influencing elites' willingness to repress mobilization. This

again underscores the role of positive feedback in the model. Because elites are more likely to shirk on peacekeeping duties during times of central government weakness, the risk of peasant revolt increases during these times as well, further weakening elites' incentives to repress and further straining government control.

2.3 Summary of model implications

Focusing on the role of elites as intermediaries between the central government and commoners, this model illustrates the interdependence between elite loyalties θ_i, commoners' incentives to rebel ω_i, and central government strength k in determining patterns of rebellion. When elite loyalties are tested — for example, following targeted state-building efforts — local intermediaries become less willing to deploy repression in response to peasant mobilization. A breakdown in elite compliance can make it difficult for even a strong central government to maintain control when low-level shocks encourage rebellion from below. When a severe drought hits, this effect is amplified: rebellion becomes more attractive to the peasantry, which puts further pressure on elite loyalties and central government strength. During periods of central government weakness, the ability to punish elite defectors is diminished, and elite backlash becomes all the more dangerous as shocks that might otherwise be easy to control can suddenly threaten the survival of the regime.

The model illustrates how even modest shocks to commoner conditions, elite loyalties, and government strength can have outsized effects because of a positive feedback between these individual factors. It also produces predictions about the spatial and temporal patterns of rebellion that we should see in response to local and national shocks. As in other theories, the model suggests that rebellion should be more likely, all else equal, where economic conditions are poor or peasant grievances are worse (ω_i is low). Importantly, however, because of the role that elites play as intermediaries between commoners and the government, peasant rebellion should also depend on elite-level political considerations, even if commoners attach little importance to these considerations directly. There should be more rebellion where elites are more dissatisfied with the central government (θ_i is low) as this reduces the threat of repression. Furthermore, both direct (ω_i is low) and indirect (θ_i is low)

effects should be amplified when the central government is weak (k is low) as this diminishes the ability of the government to enforce compliance among elites.

In the remainder of this paper, we use the model to guide our empirical analysis of small-scale rebellion and insurgency in colonial Mexico.

3. Empirical Evidence

Our theory highlights the interplay between localized commoner or peasant grievances, idiosyncratic elite loyalties, and central government resilience in rebellion. In this section, we discuss how the theory sheds light on instances of unrest — and the absence of unrest — in late colonial Mexico. Our analysis proceeds in two steps. First, we examine spatial and temporal patterns of localized rebellion using panel data from central Mexico from 1680 to 1821. We then expand the analysis to the entire country, focusing on the insurgency that started Mexico's War of Independence in 1810.

3.1 Rebellion in Late Colonial Mexico

The periodic waves of rural revolts in colonial Mexico are poorly explained by classic grievance-based theories of mobilization. Central Mexico experienced over two centuries of relative political calm following the Conquest, despite high levels of oppression, violence, and famine in rural communities (Tutino 1986; Coatsworth 1988; Katz 1988, p. 77). It was not until the 18th century that unrest began to increase.

During this period, the Bourbon monarchy embarked on a series of reforms aimed at modernizing and centralizing the administrative state. The reforms were broad in scope,[11] and they succeeded in modernizing the state and economy in many respects. However, these reforms often came at the expense of regional elites, who had previously enjoyed broad de facto autonomy (Rodríguez 1998; Mahoney 2010; Garfias 2019).

These regional elites — local merchants, landowners, and mining barons — were an important social constituency for the Crown. In addition to forming the backbone of the commercial economy,

[11] Reforms included a reorganization of subnational administration, the suppression of office-selling and new staffing policies for colonial high offices, and the restructuring of tax administration, among others (Brading 1971; Pietschmann 1991).

they played an important role in maintaining control of the Empire. With little direct military presence on the continent, the central government depended on local elites to finance and organize militias and other repressive institutions to respond to unrest (Archer 1987). Rioting, looting, and violence by peasants often directly impacted elites' person or property. However, even when not directly affected by violence, elites invested in local militias as part of participation in colonial society (Archer 1987). The "alliance for repression" between elites and the central government was crucial to maintaining political control, especially during times of crisis (Tutino 2011, p. 237).

Bourbon state-building efforts tested this alliance. Consolidating functions like tax collection in the state administrative apparatus deprived elites of the rent-seeking opportunities that they had enjoyed under decentralized control. While effective by many measures — notably in increasing revenue for the Crown[12] — fiscal centralization weakened the political loyalty of provincial elites that had profited from earlier rent-seeking arrangements. This was dangerous from the perspective of social stability as disgruntled elites could renege on their part of the "alliance for repression." Earlier attempts to limit elite rent-seeking were delayed for this reason (e.g., Tutino 2011). However, centralization accelerated in the late 18th century, after the political challenge of conquering territory had largely subsided and the Crown found itself under increased financial pressure from conflicts in Europe.[13]

This period also saw an increase in peasant rebellion. Local rebellions were seldom oriented toward national politics or directly related to centralization efforts. Taylor (1979, p. 114) describes these events as "localized mass attacks, generally limited to restoring a customary equilibrium," as opposed to aiming for revolutionary change. The grievances expressed during the uprisings were highly local, often related to anger at perceived encroachment on village lands, at food shortages, or at increased taxation (Taylor 1979; Katz 1988). Most events were restricted to a single community, and nearly all were brought under control within a day or two (Taylor 1979, p. 114; Tutino 1986, p. 42).

[12] See Section 3.2.

[13] See Appendix Section B.3 for a discussion.

Though rebellion was seldom motivated by national- or elite-level factors, our theory illustrates that policies that harm elite interests have downstream implications for the actions of commoners. Peasants' decision to rebel depends in part on the anticipated response to mobilization. If peasants believe that elites will renege on their repression duties, this lowers the expected costs of rebellion. This may explain why peasant revolts in colonial and pre-colonial Mexico tended to coincide with conflicts between local elites and central or higher-level authorities (Katz 1988).

We examine how low- and higher-level political crises influenced the spatial and temporal patterns of rebellion. By Proposition 2, for a given level of government strength and local elite loyalty to the Crown, rebellion should be more likely where peasant opportunity costs (ω_i) are lower (or, equivalently, grievances are higher[14]). Moreover, conditional on grievance, rebellion should be more likely when the central government is weaker and where elite loyalties to the Crown are lower (Propositions 1 and 3). To examine these predictions, we digitize data on peasant uprisings in central Mexico and Oaxaca from 1680 to 1810 using information from Taylor (1979). We supplement these data with information on insurgent activity during Mexico's War of Independence (1810–1821) from Ortiz Escamilla (2014). By combining these two datasets, we are able to examine the determinants of both small-scale uprisings that are quickly suppressed by the elite and larger-scale mobilization during a major political crisis. We aggregate the data to the district level, the territorial administrative unit in place by 1786, using the information in Gerhard (1993a). This allows us to use covariates from other sources in our analysis.

We use district-year drought conditions as our measure of peasant opportunity costs, ω_i. Severe drought often led to crop failure (e.g., Florescano 1969), lowering peasants' opportunity cost of revolt and increasing grievances. Our drought data come from Cook and Krusic (2004), who estimate drought for a series of grid points in North America using tree-ring chronologies. These data are recorded in terms of the Palmer Drought Severity Index (PDSI), a common measure of soil moisture that is standardized to measure deviations in local conditions. Negative values correspond

[14] As noted above, grievances in the model can be thought of as the inverse of opportunity costs ω_i.

with drier-than-average conditions and positive values with wetter-than-average conditions. We rasterize these data using inverse distance weighting between grid points and then spatially extract the space-weighted average PDSI within each district-year.[15]

To examine the relationship between drought and peasant uprisings, we estimate:

$$Rebellion_{i,t} = \beta_0 PDSI_{i,t} + \Theta_t X_i + \Pi U_{i,t} + \lambda_t + \gamma_i + \varepsilon_{it}, \tag{3.1}$$

where $Rebellion_{i,t}$ indicates whether there was any uprising in district i in year t; $PDSI_{i,t}$ is the space-weighted average PDSI; λ_t and γ_i represent year and district fixed effects; and $\varepsilon_{i,t}$ is an error term. As control variables, we include $U_{i,t}$, the standard deviation of the district's PDSI (a measure of within-district climatic variation), and X_i, a vector of time-invariant covariates interacted with each year indicator. This includes geographic variables (elevation, surface area, whether the district is in a malarial zone, distance to Mexico City, and maize suitability) that may have had a differential effect on the probability of rebellion over time. Elevation and distance data were calculated based on information from the Mexican National Institute for Statistics and Geography (INEGI). The measure of maize suitability is the space-weighted average productivity of rain-fed, low-input maize in the Food and Agriculture Organization's Global Agro-Ecological Zones dataset.

The theory suggests that rebellion should be more likely under worse drought conditions or more negative values of PDSI (i.e., $\beta_0 < 0$). It further suggests that these effects should be amplified where elites are more dissatisfied with rule and where the central government is weak. We present evidence on elite dissatisfaction in the following subsection and investigate here the role of central government weakness k. We examine changes in the effect of drought on rebellion before and after a major shock to higher-level political institutions: the 1808 Napoleonic invasion of Spain, which removed Charles IV from the throne and precipitated a coup and political crisis in Mexico City. These events weakened the imperial state and, importantly for the theory, the perceived resilience of the Crown to elite defections. Aggrieved peasants — despite having no interest in national politics — should

[15] For an assessment of the reliability of these drought data using modern precipitation figures, see Sellars and Alix-Garcia (2018). In Appendix D, we verify that crop prices increased during periods of drought using data on PDSI and maize prices in Mexico City.

perceive an opening for rebellion as the threat of repression diminished. To examine the effect of government weakness, we modify equation 3.1 by interacting the drought measure, $PDSI_{i,t}$, with a post-1808 crisis indicator. Our theory implies that the coefficient on the interaction term should be negative (i.e., the effect of drought should be larger in magnitude).

Table 1: Drought, Government Strength, and Uprisings in Central Mexico, 1680–1821

	Peasant Uprisings Pre-1808 Coup Period (1680–1808)		Peasant Uprisings Pre-Independence Period (1680–1821)	
	(1)	(2)	(3)	(4)
Avg. PDSI	-0.0080**	-0.0017	-0.0079**	-0.00082
	(0.0036)	(0.0053)	(0.0036)	(0.0052)
Avg. PDSI × Post 1808			-0.019	-0.072*
			(0.034)	(0.042)
Std. Dev. PDSI	No	Yes	No	Yes
Controls × Year FE	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes
Within-District Mean of DV	0.024	0.023	0.029	0.028
Within-District SD of DV	0.13	0.13	0.15	0.14
R sq.	0.057	0.25	0.094	0.30
Observations	3712	3584	4118	3976
Number of districts	29	28	29	28

OLS estimations. See equation (3.1) for the baseline econometric specification. The unit-of-analysis is the district-year. Standard errors (clustered a the district level) in parentheses.

The first two columns in Table 1 present the baseline results for the pre-1808 crisis period. In line with the theory, the estimates in column 1 show that rebellions were more likely when PDSI was lower. A decline of one within-district standard deviation of average PDSI is associated with a 1.6 percentage point increase in the probability of rebellion. Including controls reduces the magnitude and precision of $\hat{\beta}_0$, though the implied effect is still meaningful (about 10 percent of the within-district baseline probability).

In Columns 3 and 4, we add data for the 1808–1821 period and the post-1808 interaction term. Consistent with the theory, the impact of drought becomes more pronounced following the high-level

political crisis. After the crisis of 1808, one within-district standard deviation decline in PDSI is associated with an increase of between 5 and 13 percentage points in the probability of rebellion (columns 3 and 4). While the estimates are noisy, the point estimate on the interaction term is statistically distinguishable from zero when including the time-interacted geographic controls (column 4).

These results provide initial empirical support for the theory. Small-scale rebellions were more likely when climate conditions were worse. Though these revolts had substantively little to do with national politics (Taylor 1979), the effect of drought was magnified after the central government was weakened by crisis, which reduced the threat of punishment for defecting elites. The theory produces several additional empirical implications related to the role of local elites. In particular, rebellion should be more likely where elites are dissatisfied with the central government. It is the interplay between subsistence shocks, elite disloyalty, and national weakness that can enable localized rebellion to grow out of control. To assess these implications, we examine how a specific anti-elite reform, the centralization of *alcabala* tax collection, influenced patterns of rebellion during the Hidalgo Revolt, which sparked Mexico's War of Independence.

3.2 The Hidalgo Revolt

In 1810, Miguel Hidalgo led a rebellion of tens of thousands of peasants in north-central Mexico. Though ultimately unsuccessful, the Hidalgo Revolt represented the most severe challenge to Spanish colonial control in centuries. The insurgents quickly captured a large swath of territory and marched to the edge of Mexico City. However, Hidalgo's rebellion was crushed within a year, and the successful push for independence came later, led by a coalition of conservative elites. Why did Hidalgo's revolt begin when and where it did, and why was it ultimately unsuccessful?

Standard explanations focus on factors at three levels of analysis: national or imperial factors, including central government weakness post-1808 (e.g., Rodríguez 1998); regional elite factors, such as anger over recent reforms (e.g., Hamnett 1986; Pietschmann 1991); and localized peasant concerns, including the subsistence crisis following the famine of 1808 (e.g., Florescano 1969; Tutino 1986; Van Young 2002). The theory in Section 2 formally weaves these explanations together and shows

how they interact. The 1808 drought was not the first subsistence shock to affect the countryside, but it occurred during an unfavorable time for the Crown. Because of the strategic relationship between peasants and elites and between elites and the Crown, the decline in elite loyalties due to earlier centralizing reforms and the weakening of the Crown due to external crisis amplified the consequences of this peasant crisis. Though evidence suggests that peasant participation in Hidalgo's uprising was motivated by localized concerns rather than higher-level political goals (e.g., Hamnett 1986; Van Young 2002), our theory suggests that national- and elite-level factors were critical in shaping patterns of revolt.

The theory indicates that we should see more rural rebellion in areas where elites harbored worse grievances against the Crown. To evaluate this prediction, we focus on a major reform undertaken by King Charles III in 1776, which centralized the administration of the *alcabala*, a sales and turnover tax.[16] The main objective of the *alcabala* reform had been to raise revenue for the Crown during a time of increased fiscal pressure due to ongoing warfare in Europe. While arguably successful in this respect, the reform angered local elite intermediaries with important consequences for the later uprising.

The impact of the reform differed across space. Prior to the reform, the *alcabala* was collected in three different ways. In some districts, agents of the Crown — *corregidores* and *alcaldes mayores* — collected the tax directly. In others, the tax was farmed out for a period of time to individual merchants through a bidding process. Finally, some city councils or merchant consortia received fixed-term charters to collect the tax internally (Smith 1948; Litle 1985; Sánchez Santiró 2001). Figure 1 presents the geography of pre-reform tax institutions (see below for information on the construction of this dataset).

The earlier choice of tax-collection method was driven by a bidding process. Where no private bids were offered, central authorities would collect the tax directly (generally areas where potential

[16] We consider a different source of elite discontent, the expulsion of the Jesuits in 1767, in Appendix Section E.1.

Figure 1: Map of Pre-Reform Tax Administration

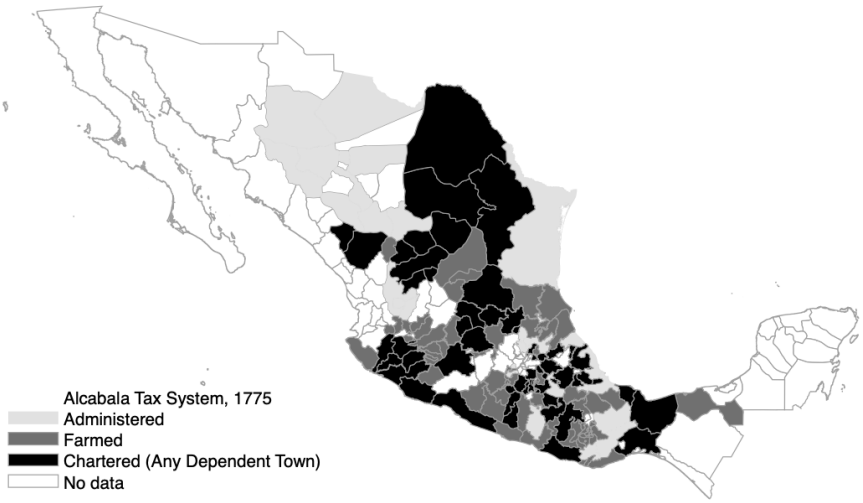


Table 2: Alcabala Tax Revenue Before and After Centralization

Type of Tax Administration 1775	Alcabala Tax Revenue (log) 1775	Alcabala Tax Revenue (log) 1778	Districts
Pre-Centralization	Pre-Centralization	Post-Centralization	
Direct	7.3	8.1	16
Farmed	7.9	8.6	30
Chartered	8.2	9.1	41
Total	8	8.8	87

Note: The sample includes districts with revenue data for both periods and information on pre-centralization type of administration. The total number of districts with information on pre-centralization type of administration, revenue for 1775, and revenue for 1778 is 141, 91, and 98, respectively.

revenue was limited; see Table 2). Indirect collection through tax farms and charters enabled the Crown to avoid incurring the cost of establishing a bureaucratic tax apparatus and created buy-in for royal authority among elite beneficiaries. Elites given the right to enforce local tax policy were both protected from taxation by overzealous officials and able to use their position to extract rents from other taxpayers.

The 1776 reform eliminated all private tax arrangements. A central administration began collecting the tax across the colony, new and more efficient tax collection methods were introduced, and tax enforcement increased (e.g., Litle 1985; Garfias 2019). As Table 2 shows, these efforts were successful at increasing revenue collection (see also Sánchez Santiró 2001). However, as a consequential side effect,

many regional elites were stripped of a source of revenue and power, increasing their dissatisfaction with the Crown. While the sudden repeal of tax contracts generated forceful legal and political resistance from elites (Sánchez Santiró 2001; Hernández Jaimes 2008),[17] there was no large-scale response from the peasantry.[18]

The impact of the reform on revolt, we argue, was felt later, after the weakening of the central government and the subsistence crisis of 1808. Our theory predicts that dissatisfied elites who lost access to *alcabala* rents should be less likely to back the government during a crisis. Further, the model suggests that peasants in reform-affected districts should be more likely to rebel, even conditional on climate conditions, due to the lower perceived threat of repression in these areas. To assess these predictions, we examine subnational patterns of insurgency during the War of Independence using data from Ortiz Escamilla (2014). As above, the measure of drought severity comes from Cook and Krusic (2004).[19]

To measure of elite exposure to the tax reform, we use colonial administrative data on pre-reform *alcabala* administration to identify the pre-1776 tax-collection arrangement in each district. We construct the data in three steps. First, we identify the type of tax collection by regional customs office in 1775, just prior to the reform, using official data reported in Sánchez Santiró (2001). We then identify the operative area of each customs office through lists of dependent towns in Garavaglia and Grosso (1988). Finally, we georeference each town using information from Gerhard (1993a;b;c) and Tanck Estrada et al. (2005) to aggregate the data to the 1786 administrative district level (as above).[20]

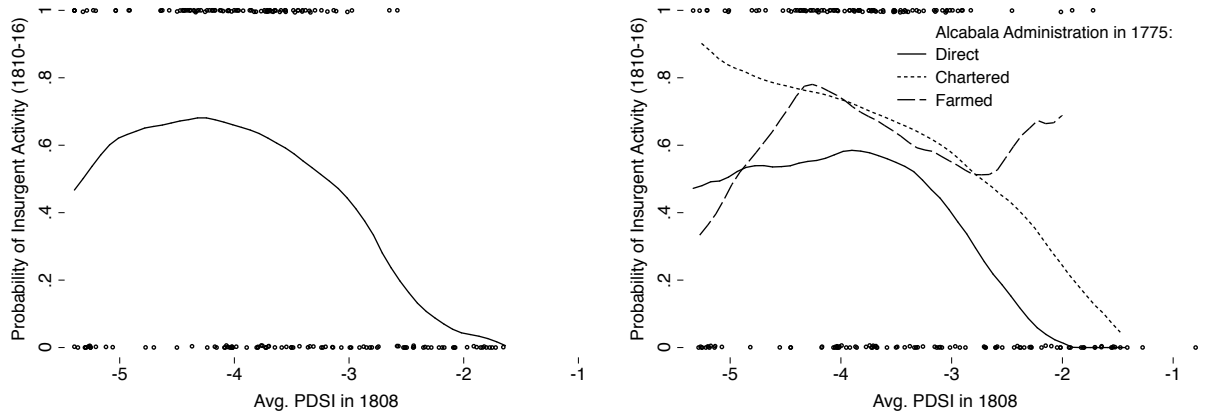
[17] While resistance from the mining elite was subdued by the creation of the Mining Tribunal, which enabled the Crown to credibly commit not to overextract the mining sector, other elite groups were not similarly appeased (Garfias 2019).

[18] By curtailing elite extraction, the reform arguably had an ambiguous effect on the amount of revenue collected from commoners.

[19] While the insurgency data are available for the entire country, we exclude the far southeast due to the lack of PDSI data in this region.

[20] If a district contains a customs office, we assign that office's form of tax collection. If a district does not have a customs office, we aggregate the type of *alcabala* tax collection from dependent towns, giving equal weight to each type (direct, farmed, or chartered).

Figure 2: Drought, Exposure to the Bourbon Tax Reform, and Insurgency, 1810-1821



(a) Drought and rebellion

(b) By exposure to reform

The theory predicts that there should be more rebellion in areas experiencing more intense drought in 1808 and in areas where elites had lost profitable tax farms and charters following the tax reform. Figure 2 provides initial graphical evidence on these relationships. In the left panel, we plot the proportion of districts experiencing insurgency over the drought conditions (measured in PDSI) during the 1808 crisis. On the right, we disaggregate districts by pre-reform tax administration. Two clear patterns emerge. First, the probability of experiencing insurgency is higher in areas experiencing a worse subsistence shock in 1808. Second, the districts that were affected by the earlier tax reform — those in which elites collected rents through tax farms and charters — display a higher average likelihood of rebellion. This relationship is strongest in districts that had been chartered, the most profitable for elites prior to the *alcabala* centralization (see Table 2).

To more systematically examine these relationships, we estimate conditional correlations between insurgent activity during the rebellion, the severity of the 1808 subsistence shock, and exposure to the tax reform:

$$Rebellion_{i,1810-1821} = \beta_0 PDSI_{i,1808} + \alpha_1 Tax\ Farm_{i,1775} + \alpha_2 Charter_{i,1775} + \Theta_t X_i + \varepsilon_i, \quad (3.2)$$

where $Rebellion_{i,1810-1821}$ indicates that whether district i experienced insurgent activity during the War of Independence (1810–1821); $Tax\ Farm_{i,1775}$ and $Charter_{i,1775}$ are indicators for districts

with these forms of indirect tax collection prior to the *alcabala* reform; $PDSI_{i,1808}$ is space-weighted average PDSI during the drought of 1808; X_i is the vector of controls, including pre-reform *alcabala* revenue and the geographic variables discussed above (standard deviation of PDSI in 1808, elevation, surface area, whether the district is in a malarial zone, distance to Mexico City, and maize suitability); and ε_i is the error term.

Table 3: Correlates of Insurgency During Mexico's Independence War, 1810–1821

	Insurgent Activity, 1810-1821					
	(1)	(2)	(3)	(4)	(5)	(6)
Avg. PDSI in 1808	-0.15***	-0.21***			-0.15**	-0.14
	(0.033)	(0.050)			(0.062)	(0.10)
Alcabala Chartered in 1775			0.30***	0.26**	0.29**	-0.25
			(0.11)	(0.11)	(0.14)	(0.52)
Chartered × Avg. PDSI in 1808						-0.14
						(0.13)
Alcabala Farmed in 1775			0.25**	0.23**	0.25*	0.61
			(0.11)	(0.11)	(0.15)	(0.53)
Farmed × Avg. PDSI in 1808						0.093
						(0.14)
Alcabala Revenue Pre-Centralization (1775)					0.046	0.043
					(0.046)	(0.048)
Std. Dev. PDSI in 1808		1.22***			1.22**	1.00*
		(0.36)			(0.47)	(0.55)
PDSI + PDSI × Chartered						-0.28***
						(0.08)
PDSI + PDSI × Farmed						-0.051
						(0.10)
Controls	No	Yes	No	Yes	Yes	Yes
Mean of DV	0.50	0.53	0.56	0.58	0.67	0.67
SD of DV	0.50	0.50	0.50	0.49	0.47	0.47
R sq.	0.091	0.23	0.053	0.25	0.28	0.30
Observations	191	178	140	132	83	83

OLS estimations. See equation (3.2) for the econometric specification. Geographic covariates include elevation, surface area, whether the district is in a malarial zone, and distance to Mexico City, and maize suitability. The unit-of-analysis is the district. Robust standard errors in parentheses.

The results are presented in Table 3. Districts in which the local elite lost control of *alcabala* administration during the reform were substantially more likely to experience insurgent activity relative to areas already under direct administration. These correlations remain stable after conditioning on the geographic covariates and pre-reform *alcabala* revenue (the key determinant of pre-reform institutions). The probability of insurgent activity was also higher where the 1808 drought was more severe, our measure of peasant opportunity costs/grievances. The magnitude of these estimates are comparable to that of column 4 in Table 1. Suggestive evidence on the relationship between drought and rebellion conditional on elite dissatisfaction is weaker, though still somewhat supportive. A one standard deviation drop in PDSI is associated with a 28 percentage-point increase in the probability of rebellion in chartered districts. A differential relationship between drought and insurgency is not evident in previously farmed districts, however, and this coefficient is not precisely estimated. In the Appendix, we present similar results focusing on the consequences of a different anti-elite reform, the expulsion of the Jesuits (Section E.1), and a different source of peasant grievances, the expropriation of indigenous community trusts (Section E.2).

In line with the theory, we see more rebellion where peasant grievances were higher and in areas where elite dissatisfaction with the Crown would have been more acute. Beyond this quantitative evidence, our theory helps to clarify two lingering questions about this context: why anti-elite state-building reforms were undertaken despite the cost to political stability, and why the Hidalgo uprising eventually failed.

As noted above, increasing revenue collection was a key motivation for the *alcabala* reform, and by this measure it was largely successful (see Table 2). The eventual cost of alienating local elites was not immediately obvious. Our model, and the extension presented in Appendix B, illustrate why this could be the case. The reform did not spark large-scale civil conflict, but by lowering intermediaries' loyalties to the Crown and their stake in the colonial administration, it reduced the resilience of the political order to future crises. When the dual shocks of subsistence crisis and external invasion hit in 1808, elites' willingness to back the Crown was severely tested, and aggrieved commoners began

to doubt that any revolt would be repressed. Facing likely mobilization at home, elites also began to question whether other elites would be tempted to defect on their peacekeeping duties and whether the weakened government could survive. Because of the positive feedback between elite loyalties, commoner grievances, and government weakness, the consequence of each individual shock was amplified.

Given the confluence of crises in 1808, it is perhaps surprising that Hidalgo's uprising was concentrated in a few regions and put down relatively quickly. The theory sheds light on this question as well. The uprising began in an area, the north-central Bajío region, that was both disproportionately affected by the Bourbon reforms and unlucky enough to receive an abnormally severe drought shock in 1808. Faced with the challenge of anticipating how elites and peasants elsewhere would react, actors in the Bajío radically underestimated the willingness of elites in other regions to repress the insurgency and overestimated the willingness of distant peasants to join the revolt. However, elites elsewhere mostly stayed loyal to the regime. As Tutino (1986, p. 100) writes, the apparent opening for mass revolt and elite defection was "but a deadly illusion," yet "the clear appearance of that opportunity (however false) was essential to the outbreak of the Hidalgo revolt."

4. Discussion

In this section, we consider the scope conditions of our theory and other cases where it could apply.

A few features of the model are worth highlighting. First, the model examines a setting in which local elites act as as the government's first line of defense in containing mass rebellion and are crucial in maintaining political control. This is characteristic of contexts where central authorities either cannot or choose not to directly fund or control repressive institutions, and instead delegate day-to-day peacekeeping responsibilities to local potentates. Examples include many hard-to-govern frontier areas, regions under colonial rule, and weakly institutionalized states where central authorities are not able to establish direct control over territory (Gerring et al. 2011; Naseemullah and Staniland 2016). This is a relevant set of cases to examine given the substantive focus on state building as a

source of elite grievances. Building state capacity is a challenge because centralization often strips elite intermediaries of power, increasing vulnerability to mass rebellion during localized crises (e.g., Garfias and Sellars n.d.).

A second notable feature of our theory is the somewhat stark assumption that peasants are motivated solely by localized concerns rather than ideology, preferences about regime change, or other broad, national-level considerations. While there is considerable historical support for this assumption in the environment we consider (e.g., Taylor 1979, p. 115–6; Tutino 1986, p. 42), it clearly is not true of all uprisings. However, our focus on localized subsistence shocks as a motivation for revolt can translate to many contexts outside colonial Mexico, as evidenced by the large literature on the relationship between climate and conflict (e.g., Hsiang et al. 2013). Our theory illustrates the importance of considering elite-level politics when thinking about the consequences of subsistence crises in other settings as well.

Finally, though the empirical focus of our paper is peasant collective action in an agrarian society, we believe that the strategic interaction between mass and elite actors and between localized and national motivations for rebellion applies to many other contexts as well. The relationship between elite and mass mobilization has been highlighted in other works (e.g., Moore 1978 , p. 191–196; Bueno de Mesquita 2010; Casper and Tyson 2014). Our theory illustrates the role that intermediaries can play in transmitting national crises to commoners and local crises to other elites and the central government. There are many contexts in which central governments depend on the cooperation of intermediary agents, such as the local bureaucracy or military, to function. Though the institutional environment may be very different, intermediaries may play an important role in linking high- and low-level crises there as well because their behavior influences and is influenced by both localized and national-level factors.

Beyond our specific setting, this model helps to explain other outbreaks of rebellion, as well as their conspicuous absence, elsewhere in the Spanish Empire. One historical puzzle about Spanish colonial rule is the relative absence of mass revolt despite high peasant grievances (e.g., Tutino 1986,

p. 42–3; Katz 1988, p. 5–6). It is notable that two major peasant rebellions in South America — the Tupac Amaru insurgency and the Comunero rebellion — also occurred following the centralization of *alcabala* administration. As in Mexico, this reform harmed the interests of elite intermediaries in these contexts, opening up an opportunity for rebellion during subsequent subsistence crises (e.g., Coatsworth 1988). A similar link between anti-elite reforms, subsistence crisis, and mass revolt can be seen in Mexico's 20th-century Revolution. While peasant mobilization was amplified in drought-affected areas (e.g., Dell 2012), the regional patterns of fighting also highlight the role of lingering elite grievances following Porfirian state-building efforts (e.g., Knight 1986, p. 153–155).

5. Conclusion

In this paper, we highlight how state building can backfire, focusing on the complementarity between elite politics, commoner grievances, and government strength for rebellion. Though efforts to centralize power and build capacity are often undertaken with the objective of strengthening state institutions, these efforts can paradoxically weaken political control by alienating the local elites who serve as important intermediaries between the government and commoners.

In our theory, opportunity costs and grievances are a powerful motivation for popular rebellion. However, we show that national institutions and elite preferences enter into commoners' calculus, even when they are solely motivated by local concerns. Because elites are concerned with national politics, and because local elites are the repressive force in charge of maintaining local order, commoners nonetheless must consider these broader factors when determining whether to rebel. They anticipate that they will face less repression when they sense disloyalty among elites and when they know that national institutions may not be capable of punishing elite defection. Likewise, elites strategically consider commoners' preferences when determining whether to remain loyal to the government. Even when they are individually insulated from subsistence shocks or other sources of popular grievances, elites are more likely to defect during times of commoner crisis because they anticipate facing greater rebellion at home. This exacerbates the effects of local crises when the state is weak and when elites are divided: commoners are more likely to rebel not just because of their

grievances, but also because they sense a political opportunity as elites become reluctant to take on more costly peacekeeping activities.

We provide support for our theory using subnational panel data on rebellion in colonial Mexico from 1680 to 1821 and on insurgency during Mexico's War of Independence. We show that small-scale peasant rebellions were more common during droughts, but also that the effects of climate shocks increased by an order of magnitude when the strength of the state was weakened by the 1808 Napoleonic invasion and political crisis. During the war, we show that insurgent fighting was more severe in areas subjected to the centralization of the *alcabala* tax in the 1770s, which deprived elites of local revenue and created resentment toward the government.

These findings highlight the interplay between national politics and localized grievances in shaping patterns of rebellion. Because of their critical role as intermediaries between the ruler and commoners, elites can transmit crisis back and forth between the center and periphery. Reforms that target these intermediaries weaken the resilience of the political system to high- and low-level shocks alike.

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Supporting Information

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

Contents

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:

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

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:

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

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:

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

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 $M_H=\frac{\mu(\beta-\omega_H)}{\tau}$ and the probability of peasant revolt where $\omega_i=\omega_L$ be $M_L=\frac{\mu(\beta-\omega_L)}{\tau}$. 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

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

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 $M_L = \frac{\mu(\beta - \omega_L)}{\tau}$ 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).

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).[21]

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 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

[21]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.

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.[22]

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 are

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

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 $1 = (1-p) + p > (1-p) + p\left(\frac{T + \delta - \underline{S}}{2\delta}\right)$.)[23] Thus:

[23] 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 $M_H = \frac{\mu(\beta - \omega_H)}{\tau}$ and the probability of peasant revolt conditional on seeing ω_L be $M_L = \frac{\mu(\beta - \omega_L)}{\tau}$. 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

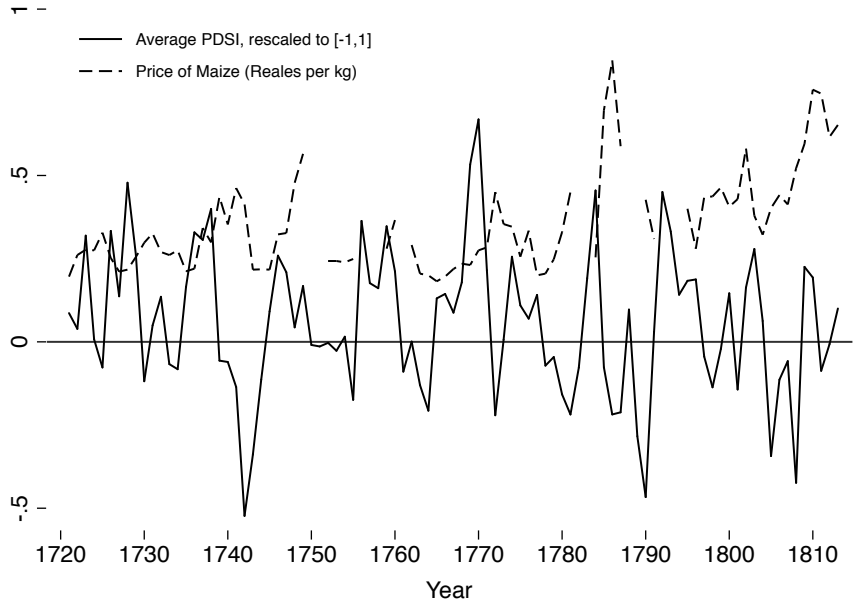

Figure D.1 and table D.1 show that bad weather is associated with higher maize prices. This finding is in line with one mechanism highlighted in past work that finds a relationship between drought and conflict (e.g., Mehlum et al. 2006, Dell et al. 2014).

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 1993a). 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 were carried

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.

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.[24] Funds from the *bienes de comunidad*

[24] 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 expropria-

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.

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 1808 (e.g., Guardino 1996).

tions 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.

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
Jesuit School by 1767	212	0.10	0.31	0	0	0	0	1
Expropriated Savings 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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