When State Building Backfires: Elite Divisions and Collective Action in Rebellion*

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Abstract

We examine the complementary roles of state weakness, elite divisions, and peasant grievances on rebellion. We argue that state-building efforts increase division among local and national elites, which undermines local peacekeeping efforts and allows for uprisings to occur. As a result, for a given level of grievance, peasant revolts are more likely to be attempted and more likely to spread in areas where the elite is divided. We assess these ideas using subnational data on rebellion, tax centralization, and drought from the late 18th-century to the Mexican War of Independence. We show that droughts led to peasant uprisings during the late colonial period, and that their impact was magnified after a major elite split in 1808. During the war, insurgent mobilization was more likely in areas that experienced severe drought just before the onset of conflict, but also in areas of higher exposure to the Bourbon centralization of tax collection, which reduced the rents available to the local elite and thus elite loyalty to the government.

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1. Introduction

Subsistence crises are a powerful motivation for political unrest from below (Scott 1976; Tutino 1986; Miguel 2005; Dell 2012). However, as has been long recognized, peasant 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, in order to sustain a large-scale uprising, grievance must be accompanied by a political opening for rebellion caused by elite divisions or state weakness (Moore 1966; Wolf 1969; Tilly 1978).

In this paper, we develop a theory of how state-building efforts—investments in strengthening capacity—can backfire, reducing resilience to temporary shocks and providing an opening for rebellion. Though strong states may be more able to extend political and economic control over territories (Fearon and Laitin 2003; Dincecco and Katz 2014; Acemoglu, Garcia-Jimeno and Robinson 2015), developing state capacity often disrupts existing political arrangements in ways that can foment unrest (North, Wallis and Weingast 2009; Besley and Persson 2009; Garfias 2018). Building on recent theoretical work on collective action and historical accounts of agrarian revolt, we advance a theory of rebellion that focuses on the role of elites as intermediaries between the local peasantry and national institutions. When central authorities rely on provincial elites to keep order, state-building efforts that undermine elite loyalty can make rulers more vulnerable to political unrest from below, even if peasants are motivated solely by local concerns unrelated to national politics. Sensing higher-level divisions between elites and the government, peasants recognize that elites are more likely to shirk on local peacekeeping duties, increasing their expected benefit of revolt. State-building efforts, which may increase capacity in the long term, can thus make states less able to weather short-term subsistence shocks, especially during times when state strength is low.

We assess the observable implications of the model using subnational data on climate and rebellion in late colonial Mexico. During the late 18th century, the Spanish Crown undertook several reforms aimed at centralizing control over the Empire, including a tax reform that stripped provincial elites of the ability to extract rents from local taxpayers. This period also saw a renewal of peasant unrest in the countryside. In line with our theory, we show that small-scale peasant revolts were more likely in areas experiencing drought conditions, but these shocks did not lead to large-scale insurgency until after an exogenous weakening of the Spanish Crown brought about by the Napoleonic invasion in 1808. After this shock to state strength, the effect of drought on rebellion increases by an order of magnitude, spilling over to the War of Independence. However, the increase in rebellion was not uniform across the colony. We show that areas affected by the earlier tax reform, which lowered elite loyalty to the Crown, saw a robustly higher likelihood of insurgency during the War than unaffected areas. Our results highlight the ambiguous effect of earlier state-building attempts on maintaining control of the Spanish Empire. While the centralization of tax collection increased revenue collection and bureaucratic control, it also left the Crown vulnerable to elite defections and peasant revolt during times of crisis.

Our paper contributes to several literatures on the political economy of protest and revolution. Most directly, we build on classic works on the economic and structural factors leading to peasant rebellion (e.g., Moore 1966; Wolf 1969; Paige 1975; Scott 1976). Like many of these works, our theory focuses on the interplay between peasant subsistence shocks and broader political opportunity structures that can amplify or diminish the possibility of rebellion. Peasants' motivations for revolt are often based on localized factors unrelated to national political conflict. However, even severe local grievances may not lead to revolt in the absence of factors that facilitate or incentivize collective action (e.g., Moore 1978; Tilly 1978; Wood 2003). 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. This connection is critical to understanding why highly localized aspects of the peasant economy, such as temporary drought shocks, can have repercussions for elite politics coordination and why peasant villages with little interest in broader political struggles may look to shifts in national institutions when determining how to respond to temporary crisis.

More narrowly, this paper contributes to two influential strands of the contemporary literature on conflict. The first of these is the large and growing literature on climate shocks and rebellion (e.g., Miguel, Satyanath and Sergenti 2004; Dell 2012; Dube and Vargas 2013). As in much of this literature, temporary shocks to the peasant economy (in this case droughts) that reduce the opportunity cost of conflict are shown to be destabilizing in our model and empirics. However, we extend this analysis both theoretically and empirically in several ways. Our model illustrates why the "severity" of drought shocks from a conflict perspective may be contingent on national and elite politics. This explains why most observed climate shocks do not lead to rebellion, while slight shocks during a political crisis can have wide-ranging effects. Furthermore, our work highlights an additional channel through which drought shocks or similar climate fluctuations can have political consequences. In addition to the direct effects on peasant opportunity costs, because climate shocks tend to be correlated (e.g., Dell, Jones and Olken 2014), observing local conditions provides information about conditions elsewhere. In a setting where there may be important political spillovers or coordination problems between regions (as the elites face in our model), the informational channel can amplify the direct effects of the climate shock on the propensity to rebel by raising expectations that other regions will rebel as well.

The second contemporary literature we contribute to is formal theoretic work on coordination and regime change under incomplete information, most directly work using global-games or similar modeling strategies (e.g., Bueno de Mesquita 2010; Edmond 2013; Boix and Svolik 2013; Cooper and Tyson 2014; Passarelli and Tabellini 2017; Gehlbach and Finkel 2018; Sellars n.d.; Tyson and Smith 2018). Our model builds most directly on work examining the strategic interplay between elites and commoners in collective action (e.g., Bueno de Mesquita 2010; Cooper and Tyson 2014) and examining spillovers between national and localized patterns of grievance and revolt (e.g., Passarelli and Tabellini 2017; Gehlbach and Finkel 2018). Like these works, our model places information and coordination across regions and between elites/peasants at the center of analysis, but the mechanisms we emphasize are somewhat different, focusing in particular on the role of elite intermediaries as peacekeepers. Our model provides additional insight into how elite concerns can influence peasant collective action and the reverse, even when the motivations of these actors are fundamentally distinct.

Beyond conflict, the paper also contributes to our understanding of the risks to political stability posed by state building efforts. Past work has offered a rationale for the observed pervasiveness of low-capacity states based on intra-elite conflict (North, Wallis and Weingast 2009; Besley and Persson 2009; Garfias 2018). Efforts to strengthen state capacity can benefit central rulers, but might also shift the existing balance of power away from powerful elites, and thus disrupt existing political equilibria. Our model illustrates one important way in which these efforts, by inducing elite backlash, can backfire and threaten incumbent rulers. However, elite backlash is not enough in our model; peasant uprisings, induced by subsistence crises, provide an opportunity for disgruntled elites to coordinate against the ruler. Thus, the argument we present can also rationalize failed state-building efforts, since rulers may still find these efforts to be ex-ante appealing.

Finally and most directly, our paper contributes to work on the causes of Mexico's War of Independence. Historical work alternately emphasizes factors at three levels of analysis: at the imperial level, the focus is on the role of state weakness and the crisis generated by the Napoleonic Invasion; at the regional level, explanations center on local elite divisions induced by earlier reforms brought about by Bourbon rule; finally, at the local level, authors highlight the role of subsistence crises linked with crop failure and famine (e.g., Florescano 1969; Tutino 1986; Hamnett 1986; Pietschmann 1991; Rodríguez 1998; Van Young 2007). Our theory formally integrates these three levels and shows how they relate to one another, while our empirical analysis presents new evidence on all three levels.

The remainder of the paper proceeds as follows. In Section 2, we present our theoretical model and derive the comparative statics. Section 3 presents historical background on our time period. The main empirical results are presented in Section 4. We conclude in Section 5.

2. Theory

Our 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. Each district contains a representative elite (E) and a representative peasant village (P). The peasant village in the district faces the option of whether to collectively rebel (v_i=1) or not (v_i=0). Elites in the district face the option of whether to side with the government and engage in local peacekeeping ($e_i = 1$) or whether to defect ($e_i = 0$).

If peasants choose to rebel, they receive some benefit $\beta > 0$. This benefit can be thought of as goods seized during rioting, feelings of belonging, or other benefits held only by those who join in the action (e.g., Wood 2003; Passarelli and Tabellini 2017). Peasant mobilization 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 must pay a punishment cost $\tau > 0$. When peasants choose to participate in collective action, they also pay an opportunity cost, $\omega_i \in \{\omega_L, \omega_H\}$, where $\omega_L < \omega_H$. In an agrarian society, ω_L could be thought of as a negative shock such as a drought, which lowers the marginal value of labor in the subsistence sector and reduces the relative cost of conflict (e.g., Miguel, Satyanath and Sergenti 2004; Dell 2012; Dube and Vargas 2013). More generally, ω_i could also be thought of as the inverse of peasant grievances.

The realization of ω_i is observed by both local peasants and elites in district i at the beginning of the game. 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. 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.[1]

The elites' choice of whether to remain on the side of the government 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. This parameter can be thought of as a composite of an elite's status-quo payment and his attachment to the regime.[2] 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. Prior beliefs of all actors are that θ may take on any value on $\mathbb{R}$ with equal probability.[3] Elites privately observe their individual θ_i, and from this form beliefs about average conditions. In particular, 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 local elite loyalty θ_i. However, they receive a signal s_i where $s_i \sim Unif[\theta_i - \sigma, \theta_i + \sigma]$. 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 the realization of peasant opportunity costs ω_i.

Elites choosing to side with the government must engage in peacekeeping activities in their districts. The cost of putting down the rebellion is $\mu > 0$ if local peasants rebel (i.e., $p_i = 1$) and 0 otherwise. If an elite decides to defect, he does not need to pay this cost of peacekeeping. However, if he defects and the central government survives, he pays a punishment cost of $\pi > 0$ for his defection. Let h represent the mass of elites

[1] The comparative statics we derive on opportunity costs 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.

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

[3] If the assumption of complete prior ignorance seems strong, an alternative is to think of θ as a deviation from average elite loyalty.

who defect (i.e., those choosing $e_i = 0$). We assume that the central government falls if enough elites defect (if 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 will rebel if the expected benefit of doing so is higher than the expected cost, or if:

$$\beta - \tau \mathbb{1}\{e_i = 1\} > \omega_i \tag{2.1}$$

where β is the benefit of collective action, τ is the cost of collective action if the rebellion is put down, $\mathbb{1}\{e_i = 1\}$ is an indicator function taking the value 1 the elite sides with the government and 0 otherwise, and ω_i is the peasant opportunity cost. 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. Taking expectations, the expected relative benefit of rebelling to not rebelling is:

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

Likewise, elites will 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 indicators $\mathbb{1}\{v_i = 1\}$ and $\mathbb{1}\{h \leq k\}$ take the value 1 if the peasants choose to rebel and if the government survives respectively and 0 if not. While both v_i and h are endogenous, an elite forms beliefs about the likely actions of the local peasantry and of the elite in other regions based on his observations of θ_i and ω_i. Taking expectations, the expected relative benefit of siding with the government is thus:

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

2.1 Analysis

We solve for the unique Bayesian Nash Equilibrium of this game. We do this in the following steps. We first establish that both the expected relative benefit of rebellion for peasants and the expected relative benefit of defection for elites are strictly decreasing in local elite loyalties and local peasant opportunity costs. We then solve for the threshold levels of θ_i and s_i where elites and peasants will be indifferent between their two possible actions, given ω_L or ω_H. Given that 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 is unique (Morris and Shin 2003).

Consider the elites' payoff function in Equation 2.3. For high enough θ_i (i.e., $\theta_i > \mu$), the elite will side 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 will choose 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 will rebel if the expected probability of elite repression, $Pr(e = 1|s_i, \omega_i)$, is sufficiently low and will choose not to rebel otherwise. Equation 2.2 implies that a peasant village is indifferent between rebelling and not when:

$$Pr(e_i = 1|s_i, \omega_i) = \frac{\beta - \omega_i}{\tau} \tag{2.5}$$

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 will 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 will side with the government. If s_i is high enough, given opportunity costs ω_i, peasants will 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 will choose 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 2.5.

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 will not rebel. By contrast, if $s_i + \sigma < -\pi$, the peasantry knows that the local elite will defect and will rebel. For middle values, the cutpoint strategy implies that the peasantry will rebel only if $s_i \leq \bar{s}(\omega_i)$. The peasant's strategy as a function of s_i and θ_i is therefore:

$$p_i = \begin{cases} 0 & \text{if } s_i > \mu + \sigma \text{ or if } s_i \in [-\pi - \sigma, \mu + \sigma] \text{ and } s_i > \bar{s}(\omega_i) \\ 1 & \text{if } s_i < -\pi - \sigma \text{ or if } s_i \in [-\pi - \sigma, \mu + \sigma] \text{ and } s_i \leq \bar{s}(\omega_i) \end{cases} \tag{2.6}$$

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 opportunity cost ω_i, we can see that, for $\theta_i \in [-\pi, \mu]$, elite's best response depends on peasant conditions. Though ω_i does does not enter elite preferences directly, it influences both the propensity of peasants to rebel ($\bar{s}_H < \bar{s}_L$) and it influences the posterior belief that other elites are facing likely rebellion in their districts. In particular, given the prior belief that $Pr(\Omega = \Omega_C) = r$ and given that $Pr(\omega_L|\Omega_C) = q$ and $Pr(\omega_L|\Omega_N) = p$, the posterior belief that $\Omega = \Omega_C$ given that $\omega_i = \omega_L$ is $Pr(\Omega_C|\omega_L) = \dfrac{qr}{qr + p(1-r)}$, and given that $\omega_i = \omega_H$ 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 is that a higher fraction of elites is facing disadvantageous rebellion conditions at home, lowering expectations about the proportion likely to side with the government.

Together, these features of preferences suggest a cutpoint strategy for elites as well, where the elite will side with the government if his loyalty θ_i is sufficiently high relative to 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:

$$e_i = \begin{cases} 1 & \text{if } \theta_i > \mu \text{ or if } \theta_i \in [-\pi, \mu] \text{ and } \theta_i \geq \bar{\theta}(\omega_i) \\ 0 & \text{if } \theta < -\pi \text{ or if } \theta_i \in [-\pi, \mu] \text{ and } \theta_i < \bar{\theta}(\omega_i) \end{cases} \tag{2.7}$$

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

A peasant is indifferent between rebelling and not when equation 2.5 is satisfied, given ω_i. Conditional on the local elite's strategy in expression 2.7 and the posterior belief of peasants that $\theta_i \sim Unif[s_i - \sigma, s_i + \sigma]$, the subjective probability that the local elite will side with the government given s_i and ω_i is:

$$P(e_i = 1|s_i, \omega_i) = \begin{cases} 1 & \text{if } s_i > \mu + \sigma \\ \dfrac{s_i + \sigma - \bar{\theta}(\omega_i)}{2\sigma} & \text{if } s_i \in [-\pi - \sigma, \mu + \sigma] \\ 0 & \text{if } s_i < -\pi - \sigma \end{cases} \tag{2.8}$$

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:

$$\frac{\bar{s}(\omega_i) + \sigma - \bar{\theta}(\omega_i)}{2\sigma} = \frac{\beta - \omega_i}{\tau} \tag{2.9}$$

solving for the cutpoint signal given ω_i yields:

$$\bar{s}(\omega_i) = \frac{2\sigma(\beta - \omega_i)}{\tau} - \sigma + \bar{\theta}(\omega_i) \tag{2.10}$$

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

We use expression 2.10 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 will always side with the government when $\theta_i > \mu$ and will never side with the government when $\theta_i < -\pi$. An elite at the cutpoint is indifferent between defecting and not when:

$$\bar{\theta}(\omega_i) - \mu Pr(v_i = 1|\bar{\theta}(\omega_i), \omega_i) = -\pi Pr(h \leq k|\bar{\theta}(\omega_i), \omega_i)) \tag{2.11}$$

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 favorability of peasant conditions. Given expression 2.10, for the elite at the cutpoint $\bar{\theta}(\omega_i)$, the subjective probability he will be facing a peasant revolt is therefore:

$$Pr(v_i = 1|\bar{\theta}(\omega_i), \omega_i) = \frac{\bar{s}(\omega_i) - (\bar{\theta}(\omega_i) - \sigma)}{2\sigma} = \frac{\beta - \omega_i}{\tau} \tag{2.12}$$

using expression 2.10 and cancelling 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:

$$\bar{\theta}(\omega_i) - \frac{\mu(\beta - \omega_i)}{\tau} = -\pi Pr(h \leq k|\bar{\theta}(\omega_i), \omega_i)) \tag{2.13}$$

Note that the cutpoints for elites observing ω_L and ω_H will differ. This is for two reasons. First, elites in regions with low (high) peasant opportunity costs expect to face more (less) rebellion at home, which determines the expected cost of peacekeeping. Second, elites update their beliefs about the probability that society is facing a generalized subsistence crisis (and thus the probability that other elites will be facing a rebellious peasantry) on the basis of observing local conditions. Because peasant opportunity costs are correlated, observing droughts or other subsistence shocks at home increases the elite's subjective probability that elites in other districts will defect. This further increases the relative benefits of defection over remaining loyal.

In Appendix A, we solve for the two cutpoints, $\bar{\theta}_L$ and $\bar{\theta}_H$ as explicit functions of the parameters of the model. Using these expressions, we then solve for the cutpoint signals for peasants with high (ω_H) and low (ω_L) opportunity costs respectively. We then derive comparative statics to motivate our empirical analysis in Appendix Section A.2.

2.2 Summary of comparative statics

We summarize and provide some intuition for the main model predictions below:

- The probability of elite defection is decreasing in the local level of elite loyalty or status quo payoff θ_i. This is for both direct and indirect reasons. Directly, the level of loyalty or status quo payoff determines the willingness of elites to participate in peacekeeping efforts or to defect. Indirectly, peasants receive signals of the local elite's level of satisfaction or dissatisfaction with the government. In equilibrium, the elite knows that peasants are more likely to rebel when they perceive an elite to be less loyal to the government.

- Peasants become more likely to rebel if local peasant conditions ω_i decline. This is both because they hold greater grievances and because of the possibility of elite defections. For elites with moderate levels of loyalty/disloyalty, elites become more likely to defect as peasant conditions deteriorate. This is for two reasons. First, the probability of having to engage in costly peacekeeping activities increases. Second, upon observing $\omega_i = \omega_L$, they update their beliefs about the possibility that elites' in other regions will be facing costly local peasant rebellions and will choose to defect. Because drought shocks are correlated, seeing drought makes elites think that others may be tempted to defect from the government.

- Both elite defection and peasant rebellion are increasing in the benefits of collective action β and decreasing in the costliness of repression for peasants τ.

- A weakened government (i.e., one where k is lower) will lead to more elite defections as defectors are less likely to be punished. While peasants' preferences depend only on local conditions, they also become more likely to rebel as the central government becomes weaker because this makes it less costly for elites to shirk on their peacekeeping duties.

We evaluate these predictions in the remainder of the paper using data on rebellion and insurgency in late colonial Mexico. In the next section, we provide background on our historical context.

3. Historical context

We evaluate the theory's observable implications in late colonial Mexico, where the scope conditions for the theory are met—a weak central government, which relied on local notables to guarantee order, and a large peasant population vulnerable to subsistence shocks.

After the wars of the Conquest in the 16th century, central Mexico experienced over two centuries of relative political calm (Tutino 1986; Coatsworth 1988; Katz 1988, p. 77). While conflicts continued in frontier areas, few peasant revolts took place in the center of the colony during the consolidation of colonial power in the 16th and 17th centuries, a period historian Friedrich Katz has called the Latin American "Pax Hispanica." Several reasons have been proposed for the absence of unrest during this period of intense political change. First, efforts by the Church and the Crown to protect the indigenous population, the target of evangelization efforts and an important source of tribute revenue, reduced the threat of revolt by increasing the legitimacy of colonial rule and providing institutional mechanisms for challenging elite excesses through courts and other legal channels (Katz 1988; Franco-Vivanco 2017). In addition, the devastation of Mexico's indigenous population following the Conquest, a decline of upwards of 90% according to some estimates (e.g., Cook and Borah 1971; Knight 2002), undermined traditional institutions that had facilitated peasant collective action, leaving survivors "demoralized and disorganized" (Katz 1988, p. 80).[4]

This situation began to change at the beginning of the 18th century. The indigenous population began to increase from its catastrophic collapse following the conquest, outpacing economic and productivity growth in the center of the country and thus increasing pressure on scarce resources (Tutino 1986; Katz 1988; Van Young 1981). This exacerbated indigenous grievances during a time when the collective capacity for revolt was rising through improved social organization (Tutino 1986; Katz 1988; Van Young 1981). In addition, economic and political shifts associated with the transition to Bourbon rule (beginning in 1700) had destabilizing consequences. The New Spain saw a return to economic growth after a "Century of Depression" with booms in the mining and commercial sectors in much of the country (Borah 1951; Doblado and Marrero

[4]Some scholars have argued that the demographic collapse may have also reduced peasant grievances as population pressure on arable land declined and as landowners were forced to improve conditions to attract scarce labor, though others have noted that any gains were offset by rising village tribute burdens and increasing land inequality (Borah 1951; Gibson 1964; Hassig 1985; Sellars and Alix-Garcia 2018).

2011). Though perhaps beneficial in the aggregate, the economic expansion was accompanied by widening class divides (Challú 2010). The boom also precipitated a series of crises in the subsistence sector as more agricultural land was diverted to feeding growing cities at the expense of the countryside (Tutino 1986, p. 61–2). In short, renewed economic and demographic expansion set the stage for increased peasant grievances.

These subsistence crises are blamed for a wave of localized peasant revolts starting in the mid-18th century. Though Mexico saw a handful of larger rebellions during this time—notably the Tzeltal Revolt and Canek's Revolt in the south—almost all cases of unrest in central Mexico were limited in scope and short in duration (Florescano 1969; Tutino 1986; Coatsworth 1988; Katz 1988). Most revolts were restricted to a single community and usually only lasted a day or two (Taylor 1979, p. 114; Tutino 1986, p. 42). The grievances expressed driving the uprisings were generally highly local; often anger at the perceived encroachment on village lands, at changes in taxation rates, or at renewed tax enforcement (Taylor 1979; Katz 1988). Taylor (1979) describes these events as "localized mass attacks, generally limited to restoring a customary equilibrium" as opposed to aiming for revolutionary change (p. 114).

Though most explanations for the increase in rural unrest have focused on regional changes in the peasant economy, we argue that broader political shifts under Bourbon rule played a role as well. As we describe in Section 2, national political factors can open or close opportunities for localized unrest by influencing the loyalties of elites in charge of peacekeeping. During the 1700s, the Bourbon monarchy embarked on a series of reforms aimed at modernizing and centralizing the administrative state, which had important consequences for elite loyalties to the Crown. Several of these reforms consolidated power in the state administrative apparatus at the expense of regional elites, many of whom had enjoyed de facto autonomy under Hapsburg rule (Rodríguez 1998; Mahoney 2010).[5]

We focus on one important tax reform undertaken by King Charles III in 1776 that centralized the administration of the *alcabala*, a sales and turnover tax. 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.

[5] The reforms were broad in scope, and sought to reshape the administration of Spanish Empire. They included a reorganization of the military and the subnational administration of the territory through the introduction of *intendencias*; the supression of office-selling and a staffing policy for colonial high offices that privileged peninsular Spaniards over American-born creoles; the implementation of free trade policies within the Empire; and the restructuring of the tax administration (Brading 1971; Pietschmann 1991; Stein and Stein 2003; Marichal 2007).

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).

Indirect collection of the tax—either by private tax farmers or through charters—provided the Crown with a steady revenue stream without requiring royal agents to set up a bureaucratic apparatus and incur high administrative costs. Tax charters offered the additional political advantage of creating rents for the local economic and political elite. By granting local notables the right to broadly enforce taxation, the Crown both insulated them from overzealous officials or tax farmers and endowed them with tools to extract rents and shift the tax burden to others. This created political buy-in for royal authority. Private tax farms shared some of these advantages as they generated rents for a single powerful individual. However, these arrangements were more likely to lead to overextraction as economically important groups were excluded from decision-making. Revenue-maximizing tax farmers, in the words of the attorney for a merchant group in Oaxaca, created "manifest oppression," since they "only [tried] to further their own interests without concern for the destruction of the contributers" (Litle 1985, p. 29).

Despite the fiscal and political benefits of outsourcing the *alcabala*, in some districts no satisfactory bids were placed, which forced the Crown to collect the tax directly. Thus, the type of tax administration prior to centralization appears to have been driven by the intensity of commercial activity (Litle 1985). This is borne out in the available data, as table 1 shows. *Alcabala* tax revenue, both before and after centralization, is higher on average in districts with charters, followed by those with individual farms and those that were directly administered.

After Charles's reform, these arrangements were eliminated and a central *alcabala* administration began collecting the tax across the colony. The main objective of the reform had been to increase revenue for the Crown during a time of increased fiscal pressure due to ongoing warfare in Europe. As table 1 suggests, the reform was highly successful in increasing the *alcabala* revenue (see also Sánchez Santiró 2001).

One consequential side effect of this reform was to strip regional elites of a major source of revenue and local influence, decreasing the benefit of participating in the colonial administration and increasing local elite

Table 1: 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.

grievances toward the Crown. The outcome of this action was not immediately apparent. While a generalized, regional rebellion broke out in Peru in the 1780s, no similar uprising occurred in Mexico until the Hidalgo Revolt in 1810. However, as we discuss below, the consequences of this tax reform sowed the seeds for patterns of insurgent violence during the War by fomenting divisions between elites and the Crown in parts of the country.

The outbreak of the Mexican War of Independence in 1810 is in many ways overdetermined. Napoleon's invasion of Spain and the abdication of Charles IV in 1808 precipitated a major political crisis in the center of the Empire. The viceroy and *Ayuntamiento* in Mexico City responded by seeking increased autonomy from the Crown, only to be overthrown later that year by a group of peninsular Spaniards who feared that American-born (creole) elites would displace them from power. This coup exacerbated tensions with creole elites, who harbored grievances from the earlier tax reform and from the recent seizure of assets associated with the 1804 *Consolidación de Vales Reales* and forced war contributions in 1805 and 1808 (von Wobeser 2006; Marichal 2007). This shock to the strength of colonial power and to divisions among elites occurred alongside a massive subsistence crisis. A severe drought and failure of the maize crop in 1808 led to a deadly famine, which was exacerbated by Crown policies. Peasant grievances in the aftermath of this crisis are central to many explanations of the outbreak of violence in the War (e.g., Tutino 1986).

Existing explanations for the War thus focus on factors at three levels of analysis: national or imperial factors, including state weakness in the wake of the Napoleonic Invasion (e.g., Rodríguez 1998), regional elite factors, such as creole grievances and divisions due to earlier reforms (e.g., Hamnett 1986; Pietschmann 1991), and localized peasant concerns, including subsistence crisis associated with the famine (e.g., Florescano 1969; Tutino 1986). The theory in Section 2 formally weaves together these three levels and shows how they relate to one another. As highlighted by the model, even intense elite grievance does not always lead to defection. If the threat of reprisal is great (i.e., if the state is strong and punishment costs are large), the risk of defection might be too great. A shock to the strength of the state can thus provide an opening for long-standing elite grievances to be expressed. As we show below, insurgent violence during the War was more intense in areas where elites had suffered disproportionately during the *alcabala* tax reform in the 1770s, several decades prior.

Our theory also illustrates why larger-scale factors like the strength of national institutions influenced patterns of peasant rebellion as well. The subsistence crisis of 1808 was far from the first to affect the Mexican countryside. In fact, an especially severe subsistence crisis had occurred in the heartland of the Hidalgo Revolt only a couple of decades earlier, when a drought and early frost in 1785–86 led to a massive famine with over 85,000 casualties in the Bajío (Tutino 1986). However, this crisis did not lead to a large-scale rebellion. Though small uprisings sometimes occurred following droughts, as we document below, it took a change in national institutional strength to precipitate a major rebellion like Hidalgo's uprising. We argue that this is not necessarily because peasants themselves held lofty political aspirations. In fact, much of the evidence suggests that peasant participation in the War of Independence was primarily motivated by localized concerns far removed from anything occurring in Mexico or Madrid (Hamnett 1986; Van Young 2007). Weakness in the national government provided an opening for elite defections by reducing the possibility that peasant uprisings would be repressed locally. This effect was especially acute in areas where the elite harbored grievances against the Crown, making the prospect of defection more likely. This helps to explain why the outbreak of peasant violence occurred in the Bajío, an area where elites were disproportionately affected by the earlier Bourbon tax reform, and not in drought-affected areas without apparent elite divisions.

In the next section, we systematically evaluate the predictions of the model using subnational panel data on drought, reform, and rebellion in central Mexico from 1680 to the War of Independence in 1810.

4. Empirical Analysis

Our theory highlights the interplay between localized peasant grievances, idiosyncratic elite loyalties, and national political stability in rebellion. Our theory suggests that rebellions should become more likely where peasants are aggrieved (i.e., where peasant opportunity costs ω_i are low) and where elites are less likely to engage in local peacekeeping activities. Elites are more likely to defect from the government when they are dissatisfied (when θ_i is low) and when they sense that the government may be more fragile and less able to punish elite defectors. These considerations thus factor into the peasants' calculus as well: for a given level of peasant grievance, rebellions are more likely when elites are dissatisfied or disloyal to the government and when the government is weak. Our theory also suggests that, for a given level of grievance, elites are less likely to remain loyal to the government when the opportunity costs of peasant rebellion are low because they anticipate paying more to keep the peace locally.

We evaluate the observable implications of the theory using subnational rebellion data in Mexico from the late colonial period through the War of Independence. We assess the role of peasant opportunity costs of joining an uprising, ω_i, in conditions of government strength and weakness (when k is high and low, respectively). We also examine the impact of regional elite grievances, θ_i, on the probability of rebellion.

We construct our rebellion data from two sources. We identify and digitize all the uprisings presented in Taylor (1979), who presents archival evidence on peasant rebellions from 1680 to 1810, the starting year of the War of Independence. These data span a long period, but only cover towns in central Mexico and the state of Oaxaca. For the wartime period, we rely on Ortiz Escamilla (2014), who identifies insurgent activity by town across the whole country. We aggregate these data to the district level, the territorial administrative unit in place by 1786, which allows us to match our data with other covariates from other sources (Gerhard 1993*a*).

We begin by considering the role of exogenous changes in ω_i, the opportunity cost that peasants face when participating in an uprising. In an agrarian society like Mexico in the 18th and early 19th centuries, severe drought led to crop failure (e.g., Florescano 1976; 1995). This lowered peasants' opportunity cost of participating in an uprising and increased grievances (which, in the model, can be thought of as the inverse of ω_i). We therefore use a measure of drought, the Palmer Drought Severity Index (PDSI), as a proxy for opportunity costs ω_i. The PDSI is a measure of soil moisture relative to an area's long-term average. Our data come from Cook and Krusic (2004), who estimate PDSI from a series of grid points in North America. We rasterize this data using inverse distance weighting between grid points and then spatially extract the minimum and space-weighted average PDSI within each district-year.[6]

We first focus on the period of colonial rule prior to 1808, which corresponds to conditions of relative government strength (i.e., high values of k). That year, Napoleon invaded Spain and deposed the Bourbon dynasty, which precipitated a coup against the Spanish viceroy in Mexico, marking the beginning of a period of political instability in the colony that culminated with independence in 1821. Before this high-level political crisis, the Crown exerted firm control over its colonial possessions.

During this period, we estimate

$$Rebellion_{i,t} = \beta_0 PDSI_{i,t} + \Theta_t X_i + \Pi U_{i,t} + \lambda_t + \gamma_i + \varepsilon_{it}, \tag{4.1}$$

where $Rebellion_{i,t}$ indicates any uprising in district i in year t; $PDSI_{i,t}$ is the average value of the Palmer Drought Severity Index; λ_t and γ_i represent year and district fixed effects; and $\varepsilon_{i,t}$ is an error term. We also include $U_{i,t}$, the standard deviation of the district's PDSI; and X_i, a vector of time-invariant controls interacted with each year, which includes geographic variables (elevation, surface area, whether the district is in a malarial zone, and distance to Mexico City, and maize suitability) that may have had a differential effect on the probability of rebellion over time. Elevation data are from INEGI, and the measure of maize suitability is the space-weighted average productivity of rain-fed, low-input maize according to the Food and Agriculture Organization's Global Agro-Ecological Zones dataset.

We then leverage the timing of the 1808 crisis to evaluate the effect of peasants' opportunity cost of rebelling in conditions of government fragility (i.e., when k is low). We amend equation 4.1 and estimate

$$Rebellion_{i,t} = \beta_0 PDSI_{i,t} + \beta_1 PDSI_{it} \times Post\ 1808_{i,t} + \Theta_t X_i + \Pi U_{i,t} + \lambda_t + \gamma_i + \varepsilon_{it}, \tag{4.2}$$

[6]For a assessment of the reliability of these drought data using modern precipitation figures, see Sellars and Alix-Garcia (2018). In section B of the appendix we show that, as expected, local crop prices increase in periods of drought: we estimate a strong, negative association between PDSI and maize prices in Mexico City.

where *Post* $1808_{i,t}$ takes a value of one from 1808 to 1821.

The theory presented above suggests that $\beta_0 \leq 0$, and $\beta_1 \leq 0$; that is, intense drought should lead to a higher likelihood of rebellion, and this effect should be more pronounced when the government is weak. Table 2 presents the results, which support the theory. Rebellion is more likely during periods of drought. Though pre-war rebellion data are only available for a small number of districts, the point estimates are statistically distinguishable from 0 in some models.

Table 2: Drought, Government Strength, and Uprising 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 equations (4.1) and (4.2) for the econometric specification. The unit-of-analysis is the district-year. Standard errors (clustered a the district level) in parentheses.

The first two columns focus on the pre-1808 coup period, when the Crown was perceived to be strong. The estimates in column 1 indicate that a decline of a within-district one standard deviation PDSI leads to an increase in the probability of rebellion of 1.6 percentage points, which corresponds to more than half of the within-district baseline probability. Including time-interacted geographic controls in column 2 reduces the magnitude and precision of $\hat{\beta}_0$, but its implied effect is still meaningful, if more modest: a reduction of one within-district standard deviation PDSI leads to an increase in the probability of rebellion of about 10 percent of the within-district baseline probability.

Columns 2 and 3 present estimates of equation 4.2, which suggest similar effects of drought on rebellion for the pre-1808 period. In line with the theory, the impact of drought becomes more pronounced in conditions of government weakness. After the political crisis of 1808, a decrease of one within-district standard deviation PDSI leads to an increase in the probability of rebellion of between 5 and 13 percentage points (columns 3 and 4). As expected, the effects are much larger than in the pre-coup period. This is consistent with government weakness opening possibilities for rebellion, as discussed in the model. The point estimate on the interaction term is statistically distinguishable from 0 in the model that includes time-interacted geographic controls (column 4).

We now turn to evaluating the role of elite grievances, θ_i. To measure local elite grievances, we focus on the centralization of *alcabala* tax administration undertaken by Charles III, as discussed in Section 3. Our theory indicates that dissatisfied elites, those that lost access to *alcabala* rents during the Bourbon reform, should be less likely to engage in peacekeeping activities once the threat of government reprisal fell after due to the Crown's fragility following Napoleon's invasion. Our model also suggests that peasants, sensing elite disloyalty, should be more likely to rebel in areas where elite grievances were greater as the threat of repression diminished. We thus operationalize θ_i with the pre-*alcabala* reform arrangement in each district, and expect rebellion to be more likely in those districts that lost a tax farm or a temporary charter to tax centralization.

We use colonial administrative data on the *alcabala* administration to identify the tax-collection arrangement in each district prior to the reform. We construct pre-centralization, district-level tax administration categories in two steps. First, we identify the type of tax collection by regional customs office in 1775, using official data reported in Sánchez Santiró (2001). We then identify the operative area of each customs office through lists of dependent towns, from Garavaglia and Grosso (1988). Finally, we georeference each town using information from Gerhard (1993*a*;*b*;*c*) and Tanck Estrada, Alvarez Lobato and Miranda (2005) and aggregate their individual assignment to the district level.[7]

To evaluate these ideas, we focus on the subnational patterns of insurgency during the War of Independence. For this period, we have access to nation-wide data from Ortiz Escamilla (2014). However, we exclude the far southeast of the country as we do not have access to drought data in this region.

[7]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 1: Drought, Exposure to the Bourbon Tax Reform, and Insurgency, 1810-1821

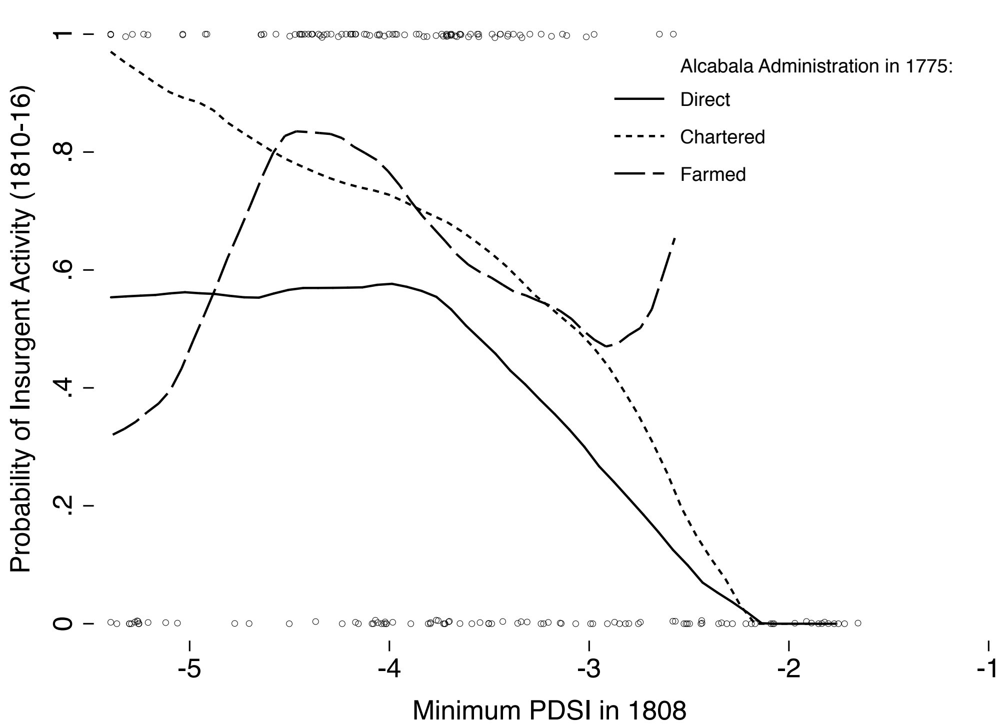

Figure 1 provides initial graphical evidence on the relationship between elite dissatisfaction, peasant grievances and rebellion. Two clear patterns emerge from the figure: first, more a intense drought just prior to the onset of the war is associated with a higher probability of insurgency; second, those districts that were more exposed to the centralization of the *alcabala*—those in which the local elite enjoyed its rents through farms and especially charters—display a higher likelihood of rebellion.

These patterns are reflected in the estimated conditional correlation between our measures of elite disloyalty and peasant grievances, on the one hand, and insurgency, on the other. Our estimating equation is:

$$Rebellion_{i,1810-1821} = \beta_0 PDSI_{i,1808} + \alpha Tax\ Farm_{i,1775} + \delta Charter_{i,1775} + \Theta_t X_i + \Pi U_{i,1808} + \varepsilon_i, \quad (4.3)$$

where $Rebellion_{i,1810-1821}$ indicates any insurgent activity in district i during the War of Independence; $PDSI_{i,1808}$ is space-weighted average PDSI in 1808, when a particularly severe drought hit the country; $U_{i,1808}$ is the standard deviation of the district's PDSI in 1808 (across pixels in the raster); X_i is a vector of geographic controls (elevation, surface area, whether the district is in a malarial zone, and distance to Mexico City, and maize suitability); and ε_i is an error term.

The results are shown in table 3. Districts in which the local elite lost control of the *alcabala* administration during the Bourbon reforms are substantially more likely to experience insurgency during the war (between 26 and 31 percentage points more likely) as compared to districts where the Crown already administered the tax. These conditional correlations remain stable with the inclusion of geographic controls, and even when conditioning on pre-reform *alcabala* revenue.

As before, a decline in the peasants' opportunity cost of rebelling, measured by the intensity of the 1808 drought, is associated with a higher likelihood of insurgency. The implied effect is large, and comparable to that of column 4 in table 2: a one standard deviation drop in the PDSI is associated with an increase in the probability of insurgency of between 15 and 21 percentage points.

To summarize, our results provide strong evidence in support of the theory. Peasant grievances, as operationalized by drought conditions, raise the threat of rebellion even when governments are strong. Government

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

	Insurgent Activity, 1810-1821				
	(1)	(2)	(3)	(4)	(5)
Avg. PDSI in 1808	-0.15***	-0.21***			-0.15**
	(0.033)	(0.050)			(0.062)
Alcabala Chartered in 1775			0.30***	0.26**	0.29**
			(0.11)	(0.11)	(0.14)
Alcabala Farmed in 1775			0.25**	0.23**	0.25*
			(0.11)	(0.11)	(0.15)
Alcabala Revenue Pre-Centralization (1775)					0.046
					(0.046)
Std. Dev. PDSI in 1808		1.22***			1.22**
		(0.36)			(0.47)
Maize Suitability		0.11		0.035	0.050
		(0.080)		(0.10)	(0.13)
Avg. Altitude (log)		-0.051		-0.11**	-0.11*
		(0.040)		(0.044)	(0.057)
Surface Area (log)		0.086**		0.11**	0.043
		(0.043)		(0.050)	(0.070)
Malarial Zone		0.025		0.091	0.062
		(0.083)		(0.091)	(0.12)
Dist. to Mexico City (log)		-0.079		-0.24***	-0.14
		(0.049)		(0.056)	(0.093)
Constant	-0.031	-0.32	0.34***	1.53***	0.45
	(0.11)	(0.56)	(0.087)	(0.48)	(0.73)
Mean of DV	0.50	0.53	0.56	0.58	0.67
SD of DV	0.50	0.50	0.50	0.49	0.47
R sq.	0.091	0.23	0.053	0.25	0.28
Observations	191	178	140	132	83

OLS estimations. See equation (4.3) for the econometric specification. The unit-of-analysis is the district. Robust standard errors in parentheses.

weakness and elite grievances exacerbate the threat. We see an increase in the threat of rebellion (and the effect of drought on rebellion) after the decline in colonial control of Mexico in 1808. Furthermore, this effect was amplified where prior elite grievances dating back to the *alcabala* reform, would have been more acute.

5. Conclusion

In this paper, we highlight the complementarity between subsistence crisis, elite conflict, and state strength for rebellion. We show that state-building efforts can have serious consequences for unrest when unanticipated crises occur. Though reforms are often undertaken with the idea of strengthening state institutions, these efforts can undermine political control by alienating local elites, who serve as important intermediaries between the government and commoners.

In our theory, as in many others, peasants are more likely to rebel when they are facing poor conditions at home. However, we show that national institutions and elite preferences enter into the peasants' calculus, even when peasants are solely motivated by local agrarian concerns. Because elites are concerned with national politics, and because local elites are the repressive force in charge of maintaining order, peasants must consider these broader factors when determining whether to rebel. They anticipate that they will face less elite repression of collective action when they sense disloyalty among elites and when they know that national institutions capable of punishing defecting elites are weak. Likewise, elites strategically consider peasants' preferences when determining whether to remain loyal to the government. Even when they are insulated themselves from subsistence shocks, elites are more likely to defect during times of drought because they anticipate that they will face greater rebellion at home and because they believe other elites might be facing costly local uprisings as well. This exacerbates the effects of drought when the state is weak and when elites are divided: peasants are more likely to rebel not just because of their grievances, but also because they sense a political opportunity—elites become reluctant to take on costly peacekeeping activities.

We find support for our theory using subnational panel data on rebellion in 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 drought shocks increased by an order of magnitude when the strength of the state was weakened by the 1808 Napoleonic invasion and the subsequent coup in

Mexico City. 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 factors, elite divisions, and peasant grievance in shaping patterns of rebellion.

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Appendix

A. Derivation of Bayesian Nash Equilibrium

A.1 Solving for cutpoint elite loyalties

In this section, we derive the cutpoint strategies for elites and peasants as a function of ω_i and the other parameters of the model. We then derive the comparative statics that motivate our empirical exercise.

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, proportion q of other elites will be facing adverse peasant conditions at home, and if the state of the world is Ω_N, proportion $p<q$ will be facing 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 will 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 2.13 to solve for $\bar{\theta}_L$ in terms of the parameters of the model.

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

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

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

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

and

$$\bar{\theta}_H = \frac{\delta(B_H A_L \pi - A_H B_L \pi - A_H - B_H) + k(B_H \pi - B_L \pi - 1) + B_L M_H - B_H M_L + M_H/\pi}{A_H B_L \pi - B_H A_L \pi + A_H + B_L + 1/\pi} \tag{A.2}$$

A.2 Comparative statics

Using the expressions derived in the previous subsection, we derive the comparative statics that motivate our empirical analysis.

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 $\bar{\theta}_L > \bar{\theta}_H$:

$$\bar{\theta}_L - \bar{\theta}_H = \frac{2\delta(M_L - M_H)}{2\delta + \pi(1 - (P_{C|H} - P_{C|L})(q-p))} > 0 \tag{A.3}$$

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:

$$\frac{\partial \bar{\theta}_H}{\partial k} = \frac{\partial \bar{\theta}_L}{\partial k} = -\pi \tag{A.4}$$

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

Turning attention to 2.10, we can see that elite cutpoints enter linearly in the expression for the peasants' cutpoints $\bar{s}(\omega_i)$. First, notice that $\bar{s}_H < \bar{s}_L$ by $\bar{\theta}_H < \bar{\theta}_L$ and by the assumption that $\omega_H > \omega_L$. This implies that peasants with high opportunity costs need more assurance that elites hold less loyalty to the government in order to rebel. Second, because the elite cutpoints enter positively in the expressions for $\bar{s}_H$ and $\bar{s}_L$, the sign of comparative statics with respect to μ, β, τ, ω_L, ω_H, and k are the same. This implies that $\bar{s}(\omega_i)$ is higher (and thus peasants are more willing to rebel) when β and μ are high, when τ and ω_i are low, and when the government is weak (k is low).

B. 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 B.1 and table B.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, Miguel and Torvik 2006; Dell, Jones and Olken 2014).

Table B.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.

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