Capital Cities, Conflict, and Misgovernance: Online Appendix

By Filipe R. Campante, Quoc-Anh Do, and Bernardo Guimaraes

Online Appendix A: A simple model of rebellions

Here we provide a simple set of microfoundations for the reduced-form model of conflict described in Section II and Appendix B.B2. Suppose the cost for an agent to fight against the incumbents is given by

$$(c_i + d_j)w_i$$

where c_i is a group specific random variable, d_j is an individual specific random variable with p.d.f $\tilde{g}$ and c.d.f. $\tilde{G}$ and w_i is the income of an individual in group i. This captures the idea that fighting entails an opportunity cost, as agents could instead spend their time and energy working, so the cost is proportional to their income. As in models of voting, it is not clear why an individual bothers to fight since it is extremely unlikely his efforts will be pivotal, but it is reasonable to assume that the benefit from fighting is proportional to the gain in case the rebellion succeeds:

$$a(y^* - w_i)$$

It follows that individuals will fight if:

$$d_j < a\left(\frac{y^*}{w_i} - 1\right) - c_i$$

and the measure of agents that is willing to fight in a given group is:

$$A_i = \tilde{G}\left(a\left(\frac{y^*}{w_i} - 1\right) - c_i\right)$$

Suppose there is conflict if A_i exceeds a bound $\underline{D}$, which captures the idea that a minimum disturbance is needed for conflict to be recorded in the data. Suppose also that conflict succeeds if $A_i > D_i$, where D_i is a random variable that captures how difficult it turns out to be for a group to win the fight, $D_i = \underline{D} + \eta_i$ and $\eta_i \sim (0, \overline{\eta})$.

Hence there is conflict if

$$\frac{y^*}{w_i} - 1 - \frac{c_i}{a} - \frac{1}{a}\tilde{G}^{-1}(\underline{D}) > 0 \tag{A1}$$

and conflict succeeds if

$$\text{(A2)} \qquad \frac{y^*}{w_i} - 1 - \frac{c_i}{a} - \frac{1}{a}\tilde{G}^{-1}(\underline{D}) > \frac{1}{a}\left(\tilde{G}^{-1}(D_i) - \tilde{G}^{-1}(\underline{D})\right)$$

Assuming that c_i is larger for groups in faraway places, i.e., $c_i = aT\ell_\imath + \tilde{c}_i$, where $\tilde{c}_i$ is a random variable with the same distribution for all i, $\frac{c_i}{a} + 1 + \frac{1}{a}\tilde{G}^{-1}(\underline{D})$ can be written as $T\ell_\imath + \chi_\imath$. Hence the LHS of (A1) and (A2) become the expression for γ_i in the model with conflicts in Appendix B.B2. Moreover, $\left(\tilde{G}^{-1}(D_i) - \tilde{G}^{-1}(\underline{D})\right)$ equals 0 for $D_i = \underline{D}$ and is increasing in D_i, so the RHS of (A2) satisfies the properties of the function π in Appendix B.B2. The shape of function π then depends on the distribution of individual-specific shocks $\tilde{G}$ and on the distribution of D_i which captures the randomness involved in any conflict.

As $\overline{\eta} \to 0$, conflict always succeeds if it happens. As the variance of c_i approaches 0, uncertainty about A_i goes away. Hence, this model yields the expression (1) in Section II in case we set the variance of c_i and D_i to zero.

Online Appendix B: Extensions

B1. Endogenous repression

Suppose incumbents can invest in a protection technology g (for "guns"), which increases their ability to withstand rebellion threats – we can think of that as military spending, to focus ideas. Spending g per citizen (a total of $(1-p)g$) implies that the expression for $\gamma_\imath$ in (1) becomes:

$$\gamma_\imath \equiv \frac{(1-\psi(g))y^*}{w_\imath} - T\ell_\imath - \chi$$

with $\psi(0) = 0$, $\psi' > 0$ and $\psi'' < 0$.

PROPOSITION 2: *Military spending g is decreasing in ℓ and T.*

PROOF:

See Appendix C.C2.

Along with Proposition 1, this result implies that a more isolated capital city will be associated with lower levels of military spending. Intuitively, military spending and isolated capitals are substitutes in protecting the incumbents: when it is cheap to obtain protection by isolating the capital, there is less need to invest in military protection.

B2. The model with conflict in equilibrium

We now extend the model of Section II in order to allow for conflict in equilibrium. We assume that there are n groups of citizens, each with the same size.

Group membership does not cut across different locations: either all individuals in group $\imath$ are in $\mathscr{F}$ ($\ell_\imath = 1$), or they are all in $\mathscr{C}$ ($\ell_\imath = 0$). The net potential gain from conflict for group $\imath$ now is:

$$\gamma_\imath \equiv \frac{y^*}{w_\imath} - T\ell_\imath - \chi_\imath, \tag{B1}$$

where $\chi_\imath$ is a random variable representing the cost of engaging in conflict. This random variable captures fluctuations in the cost of putting together a rebellion, as well as the ability to solve the collective action problem for effective insurrection. For each group $\imath$, $\chi_\imath$ is drawn from a distribution described by a continuous p.d.f. $f(\cdot)$ and c.d.f. $F(\cdot)$, with full support over $[\underline{\chi}, \overline{\chi}]$ such that $0 < \underline{\chi} < \overline{\chi}$, independently across groups.

As before, conflict involving group $\imath$ arises if it pays off for that group ($\gamma_\imath \geq 0$). We further assume that, conditional on conflict arising, the probability that it will dislodge the incumbent regime is given by $\pi(\gamma_\imath)$, with $\pi(0) = 0$ and $\pi' > 0$.[50] Put simply, this captures the idea that the rebellion effort will increase with the potential payoff, and that the likelihood of success is increasing in that effort (this is a result in the model in Appendix A).

The timing of the model is as follows: incumbents choose the share of output to be left to each group, $w_\imath$. Then the variables $\chi_\imath$ are realized, conflict may occur, and payoffs are realized. If there is conflict, ousted incumbents obtain a payoff normalized to zero. In the absence of conflict, everyone collects the payoff stipulated by the incumbents. The incumbent elite want to maximize the expected rents of their representative member, assumed to be risk-neutral, subject to the constraint that dissatisfied groups of citizens may rise up to overthrow them.

Results. — It is convenient to define the cost threshold $\widehat{\chi}_\imath$ so that group $\imath$ will choose to rebel if $\chi_\imath \leq \widehat{\chi}_\imath$:

$$\widehat{\chi}_\imath \equiv \frac{y^*}{w_\imath} - T\ell_\imath. \tag{B2}$$

For a given group $\imath$, a larger $\widehat{\chi}_\imath$ is associated with a lower income, conditional on that group's isolation with respect to the capital. Intuitively, we can thus think of $\widehat{\chi}_\imath$ as a measure of "relative squeeze" of group $\imath$ by the incumbents: how much that group's rents are pushed down, relative to its rebellion potential.

Let the function H denote the probability that group $\imath$ does not overthrow the incumbents. That can be expressed as a decreasing function of $\widehat{\chi}_\imath$:

$$H(\widehat{\chi}_\imath) = 1 - \int_{\underline{\chi}}^{\widehat{\chi}_\imath} \pi\left(\widehat{\chi}_\imath - \chi_\imath\right) f(\chi_\imath) d\chi_\imath.$$

[50] We also assume that $\pi(\gamma_\imath) = 1$ for high enough $\gamma_\imath$, so that citizens always get a positive income $w_\imath$.

We also define the function h as:

$$h(\widehat{\chi}_\jmath) \equiv -\frac{\partial H(\widehat{\chi}_\jmath)}{\partial \widehat{\chi}_\jmath} = \int_{\underline{\chi}}^{\widehat{\chi}_\imath} \pi'\left(\widehat{\chi}_\imath - \chi_\imath\right) f(\chi_\imath) d\chi_\imath. \tag{B3}$$

which lets us define the hazard rate $\frac{h}{H}$ – roughly speaking, the rate at which the incumbent regime avoids being overthrown by a given group j, as a result of a marginal decrease in its relative squeeze $\widehat{\chi}_\jmath$.

The incumbents' objective function is given by:

$$\mathcal{R} = \frac{1}{p}\left(A(p)(Y^* - \phi(\Delta\ell)) - \sum_{\imath=1}^{n} \frac{y^*}{\widehat{\chi}_\imath + T\ell_\imath}\right) \prod_{\imath=1}^{n} H(\widehat{\chi}_\imath) \tag{B4}$$

where the term in brackets is the income incumbents obtain conditional on keeping power, to be shared among the measure p of incumbents, and $H(\widehat{\chi}_\imath)$ denotes the probability that they are not overthrown by group $\imath$. The trade-off is that a larger $\widehat{\chi}_\imath)$ (corresponding to a smaller $w_\imath$) implies higher rents for incumbents in case they keep their power, but raises the risk of a successful rebellion.

Proposition 3 summarizes the key results regarding conflict in this model.

PROPOSITION 3: *Suppose $\frac{h}{H}$ is an increasing function. Then, in equilibrium, $\widehat{\chi}_\imath = \widehat{\chi}_C$ and $w_\imath = w_C$ for all groups $\imath$ in $\mathscr{C}$, and $\widehat{\chi}_\imath = \widehat{\chi}_F$ and $w_\imath = w_F$ for all groups $\imath$ in $\mathscr{F}$. Unless all groups always rebel, we have:*[51]

(i) $\widehat{\chi}_C > \widehat{\chi}_F$: A group in $\mathscr{C}$ is more likely to rebel than a group in $\mathscr{F}$.

(ii) $H(\widehat{\chi}_F) > H(\widehat{\chi}_C)$: Successful rebellions are more likely to come from a group in $\mathscr{C}$ than from a group in $\mathscr{F}$.

(iii) For each $\imath$, an increase in $\ell_\imath$ reduces the risk of conflict and the risk of a successful conflict.

(iv) $\frac{w_C}{w_F} > 1$ and increasing in T: The income of those in $\mathscr{C}$ is larger than income of those in $\mathscr{F}$, and this premium is increasing in T.

PROOF:

See Appendix C.C3.

Parts (i) and (ii) of this Proposition encapsulate the central results: *incumbents will allow for more conflict to emerge close to the capital, even though these rebellions are more dangerous for them.* Intuitively, this follows from the basic logic of the model: groups that have an easier time organizing a successful rebellion – namely, those who are closer to the capital – represent a greater threat to the

[51] It is possible to have a corner solution such that $\widehat{\chi}_C = \widehat{\chi}_F = \overline{\chi}$ and all groups always rebel, but this case is evidently not interesting for our purposes.

incumbent elite. It is thus relatively expensive for incumbents to buy an extra amount of stability from them: it takes a large amount of extra consumption to keep them quiet, even for a relatively bad draw of χ_ι. Hence, incumbents will optimally choose to live with a greater probability of revolt by citizens who are closer to the capital, as opposed to further reducing their own rents in order to bring down that threat.

Part (iii) of Proposition 3 in turn states that a more isolated capital city is associated with less conflict and a lower risk for incumbent elites: insofar as conflict poses a greater threat when it takes place closer to the seat of power, an isolated capital offers protection. Finally, part (iv) shows that those who pose a greater threat end up obtaining more rents in equilibrium. This capital city premium is increasing in T, because a higher T represents an increasing advantage of those in the capital over those who are far away, in terms of the threat they pose to incumbents.

Governance, isolation of the capital and conflict. — Propositions 1 and 2 do not hold in this setting without ammends. Generally speaking, because a more isolated capital tends to lead to more stability, and more stability also increases the incentives for good governance, for some particular combinations of parameters and functional forms, these effects could be so strong that increased isolation might coexist with better governance. (This could help explain, for instance, the institutional development of Brazil in the decades following the move of the capital, as speculated in Campante (2009).)

Under the assumption that the variance of F is sufficiently small, the results in Propositions 1 and 2 go through. A small variance of F effectively limits the impact of incumbents' choices regarding the risk of a rebellion on their choices on the isolation of the capital and on governance, so that this effect is never strong enough to overturn the aforementioned forces working towards a negative correlation.

Online Appendix C: Proofs

C1. Proof of Proposition 1

Simple partial differentiation shows that the RHS of (3) is increasing in T and decreasing in p. That gives us the partial effects of T and p on ℓ. Moreover, since the RHS of (3) is independent of ℓ^*, the partial derivative of ℓ with respect to ℓ^* is one.

Since $A'' < 0$, the LHS of (4) is increasing in p. Simple partial differentiation of the RHS of (4) yields partial negative effects of T and ℓ^* in p. Moreover, the derivative of the RHS of (4) with respect to ℓ is a positive constant times:

$$\left(1 - \frac{T}{\chi + T}\ell\right)\phi'(\Delta\ell) - \frac{T}{\chi + T}(Y^* - \phi(\Delta\ell))$$

Using the condition in (3) to substitute for $\phi'(\Delta\ell)$ leads to an expression equal to a negative number times $\mathcal{R}$, given by (2). Hence, in a neighborhood of the optimally chosen $\Delta\ell$, the partial derivative of p with respect to ℓ is also negative.

In sum, ℓ is increasing in T and ℓ^* and decreasing in p; while p is decreasing in , these derivatives imply that p is decreasing in T, ℓ and ℓ^*. Combined, these results imply that an increase in T or ℓ^* raises ℓ and reduces p, which leads to the claim.

C2. Proof of Proposition 2

Rents received by each individual in power are now given by:

$$\mathcal{R} = \frac{1}{p}\left[A(p)(Y^* - \phi(\Delta\ell)) - (1-p)g - \frac{(1-p)(1-\psi(g))y^*}{\chi}\left(\frac{\chi + T(1-\ell)}{\chi + T}\right)\right]$$

Taking the derivative with respect to g and rearranging yields:

$$\psi'(g) = \frac{\chi}{1 - \frac{T\ell}{\chi+T}}$$

Since $\psi'(g)$ is positive and decreasing in g and the RHS of the above expression is increasing in T and ℓ, g is decreasing in T and ℓ. The result in Proposition 1 also hold in the model with endogenous repression, so ℓ is increasing in T and ℓ^*. Hence changes in T and ℓ^* induce a negative correlation between g and ℓ.

C3. Proof of Proposition 3

The optimal incumbents' choice can be represented by a set of thresholds $\widehat{\chi}_\imath$: the incumbents decide how much each group is to be squeezed in equilibrium. Taking the derivative of (B4) with respect to $\widehat{\chi}_\jmath$ and rearranging yields:

$$\frac{\partial \mathcal{R}}{\partial \widehat{\chi}_\jmath} = \frac{1}{p}\left(\prod_{\kappa=1}^{n} H(\widehat{\chi}_\kappa)\right) D_\jmath \tag{C1}$$

where

$$D_\jmath = \left[\frac{y^*}{(\widehat{\chi}_\jmath + T\ell_\jmath)^2} - \left(A(p)(Y^* - \phi(\Delta\ell)) - \sum_{\imath=1}^{n} \frac{y^*}{\widehat{\chi}_\imath + T\ell_\imath}\right)\frac{h(\widehat{\chi}_\jmath)}{H(\widehat{\chi}_\jmath)}\right]$$

and $h(\widehat{\chi}_\jmath)$ is defined in (B3) – note the minus sign in the definition.

We first show there is at most one set of $\{\widehat{\chi}_\jmath\}$ such that the expression in (C1) is equal to 0 for all groups $\jmath$. For that, we need to show that there is at most one

set of $\{\widehat{\chi}_\jmath\}$ such that $D_\jmath$ is equal to 0 for all groups $\jmath$. Since h/H is an increasing function, $D_\jmath$ is decreasing in $\widehat{\chi}_\jmath$, and increasing in the sum involving all $\widehat{\chi}_\imath$.

Consider the values $\widehat{\chi}_\jmath$ such that $D_\jmath$ is equal to 0 for all groups $\jmath$. Consider now a change to a different set of values $\tilde{\chi}_\jmath$ and suppose that $D_\jmath$ is also equal to 0 for all groups $\jmath$. First, consider the case the sum inside $D_\jmath$ is larger for the set $\tilde{\chi}_\jmath$ (than for the set $\widehat{\chi}_\jmath$). Since $D_\jmath$ is decreasing in $\widehat{\chi}_\jmath$ and increasing in the sum, it has to be that $\tilde{\chi}_\jmath > \widehat{\chi}_\jmath$ in order to make $D_\jmath$ equal to 0, for all $\jmath$. But that implies that the sum inside $D_\jmath$ is smaller for the set $\tilde{\chi}_\jmath$, which is a contradiction. The arguments for when the sum inside $D_\jmath$ is smaller or equal for the set $\tilde{\chi}_\jmath$ are analogous.

Incumbents will never choose $\widehat{\chi}_\jmath = \underline{\chi}$ for any $\jmath$. Since $h(\underline{\chi}) = 0$, it can be seen from (C1) that $\partial\mathcal{R}/\partial\widehat{\chi}_\jmath$ is positive in case $\widehat{\chi}_\jmath = \underline{\chi}$ for any $\jmath$.

Inspection of (C1) then shows that the marginal effect of $\widehat{\chi}_\jmath$ on $\mathcal{R}$ is the same for two groups with the same $\ell_\jmath$. Hence incumbents choose the same $\widehat{\chi}_\jmath$ for two groups in the same location.

Let $\widehat{\chi}_F$ be the optimal choice of $\widehat{\chi}_\kappa$ for a group $\kappa \in \mathscr{F}$. The expression in (C1) then implies that $\frac{\partial\mathcal{R}}{\partial\widehat{\chi}_\jmath} > 0$ for a group $\jmath \in \mathscr{C}$ for any $\widehat{\chi}_\jmath \leq \widehat{\chi}_\kappa$. Therefore, unless $\widehat{\chi}_\kappa = \overline{\chi}$, it is optimal for incumbents to choose $\widehat{\chi}_\jmath > \widehat{\chi}_\kappa$.

The first statement from Proposition 3 follows immediately, since the cumulative distribution function F is increasing in $\widehat{\chi}_\jmath$. The second statement follows from H being decreasing in $\widehat{\chi}_\jmath$, since the probability of a successful rebellion is given by the function $1 - H$.

For the third statement, note that an increase in $\ell_\imath$ for any $\imath$ reduces the sum inside (C1), and thus shifts down the derivative in (C1). This leads to a lower $\widehat{\chi}_\jmath$ at the point $\partial\mathcal{R}/\partial\widehat{\chi}_\jmath = 0$. An increase in $\ell_\jmath$ decreases the first term in brackets, which also leads to a decrease in the derivative in (C1) and a lower $\widehat{\chi}_\jmath$ at $\partial\mathcal{R}/\partial\widehat{\chi}_\jmath = 0$. Using the first two statements from Proposition 3, that implies a reduction in the risk of conflict and in the risk of a successful conflict.

Finally, since $\widehat{\chi}_C > \widehat{\chi}_F$ and h/H is increasing, $h(\widehat{\chi}_C)/H(\widehat{\chi}_C) > h(\widehat{\chi}_F)/H(\widehat{\chi}_F)$. Using (C1), $y^*/(\widehat{\chi}_C)^2 > y^*/(\widehat{\chi}_F + T)^2$. Using the expression for income implicit in (B2), we get that the income of those in $\mathscr{C}$ is larger than the income of those in $\mathscr{F}$.

To complete the proof of the fourth statement, we show by contradiction that an increase in T leads to an increase in w_C and a decrease in w_F. Consider an increase in T, and first suppose w_C decreases. Since $w_C = y^*/\widehat{\chi}_C$, that implies $\widehat{\chi}_C$ increases. Hence the sum term in (C1) must have increased. But an increase in the sum term in (C1) leads to a decrease in w_F. An increase in T also leads to a decrease in w_F (owing to h/H being increasing). Hence w_F must have decreased. But a fall in w_C and w_F implies a fall in the sum term in (C1), which is a contradiction. Second, suppose w_F increases. Since w_C has also increased, the sum term in (C1) must have increased as well. That means $\widehat{\chi}_C$ must have increased, thus w_C must have decreased, which is another contradiction.

Online Appendix D: Data

Cell-level conflict data: Cell-level data are from the PRIO-GRID dataset (Tollefsen Strand Buhaug, 2012) (Advanced Conflict Data Catalogue (ACDC) project). Conflict data from 1989 to 2008 are from Hallberg (2012). The dummy variable $CivConf$ specifies whether a cell lies within a conflict area in a particular year. For each recorded year in an active conflict, its afflicted area is determined by the smallest circle that encompasses all of its related battles. In that year, all cells that intersect this circle will be recorded as $CivConf = 1$. Conflict onset data are from Gleditsch et al (2002), covering the period 1946-2005: the dummy variable *Onset* indicates the year a conflict starts in a cell. Data and detailed coding instructions are available at `http://www.prio.org/Data/PRIO-GRID/`.

Other cell-level data: Cell-level data from the PRIO-GRID dataset also include gross product per cell estimated from nighttime luminosity, population per cell (both available in 1990, 1995, 2000 and 2005 only), distance to border, distance to capital city, travel time to closest urban area (2008) (those variables are calculated from GIS maps), infant mortality rates (2000), proportion of mountain area (2000), proportion of forest (2000), precipitation, and draught. Data references are available at `http://www.prio.org/Data/PRIO-GRID/`.

Regime Change: Based on the variable *REGTRANS* (Regime Transition), from Polity IV project, meant to capture "regime change" defined simply as a three-point change in either the politys democracy or autocracy score. We compute a dummy equal to one if *REGTRANS* is different from zero.

Avg Log Distance: We compute the index using original gridded population maps from the database *Gridded Population of the World* (GPW), Version 3 from the Socio-Economic Data Center (SEDC), Columbia University (2005), containing maps in 1990, 1995 and 2000 of a global grid of 2.5 arc-minute side cells (approximately 5km). The adjusted and unadjusted measures are defined respectively as $1 - GCISC_2$ and $1 - GCISC_1$, as defined in Campante and Do (2010). Specifically, we have the formula $GCISC_1 = \sum_i s_{1i} (\alpha_1 \log(d_i) + \beta_1)$, where s_{1i} is the share of the country's population living in cell i and d_i is the distance between cell i's centroid and the point of interest (e.g. capital city). The parameters (α_1, β_1) are $\left(-\frac{1}{\log(\bar{d}_1)}, 1\right)$, where $\bar{d}_1$ is the maximum distance, across all countries, between a country's capital (or other point of interest) and another point in that country. By the same token, $GCISC_2 = \sum_i s_{2i} (\alpha_2 \log(d_i) + \beta_2)$, where s_{2i} is the share of the country's population living in cell i, normalized by $\log(\bar{d}_2)$, where $\bar{d}_2$ is the maximum distance, for each country, between the country's capital (or other point of interest) and another point in that country. The parameters

(α_2, β_2) are $(-1, 1)$. In this way, $GCISC_2$ controls for the country's size, while $GCISC_1$ does not.

With respect to countries with multiple capital cities, our general rule is to consider the de facto capital as being the site of the executive and the legislature. For instance, this means that we take the capital of the Netherlands to be The Hague (instead of Amsterdam) and the capital of Bolivia to be La Paz (and not Sucre). We leave South Africa out of the sample, since the executive and legislature have always been in different cities, while keeping Chile because the legislative moved more recently (1990). As far as changes in capital cities during our sample period, we have the cases of Myanmar (2005) and Kazakhstan (1997). We drop both from the sample.

Driving-based Distance We obtain from Google Maps travel distance and travel time from each country's capital city to each grid cell center within a country. From December 2017 to March 2018, our program made 8.8 million systematic requests to maps.google.com to obtain Google Maps' suggestions of the fastest trip by car (at 12am, capital city time) between 8.8 million pairs of points. Each pair includes the latitude and longitude of the siege of the government (such as Presidential palaces in presidential regimes) and the latitude and longitude of each grid cell center within the country. The grid cells are the same 2.5 by 2.5 arc minute cells as those that we obtain from the Gridded Population of the World dataset. Our team of web developers made sure that we get the best out of Google Maps, in the sense that missing data due to unanswered requests constitute pairs of points that Google Maps genuinely cannot link by a car trip (and not related to Google Map's restriction policy against large-sized requests).

This procedure produces 3.8 millions of nonmissing answers, or about 43% of the total number of pairs of points. The rate of nonmissing answers varies broadly across countries, from zero in South Korea (where Google Map is legally not allowed to provide driving suggestions) to 100% as in Belgium, Luxembourg, and some other small countries. Countries with a nonmissing rate below 20% include small islands (e.g., Vanuatu), large archipelagoes (e.g. Polynesia), countries with a large uninhabitable area (e.g., Tchad, Greenland, and Canada), and two countries with very disconnected capital cities (Papua New Guinea and Equatorial Guinea).

Because larger countries tend to have considerably lower rate of nonmissing data, probably due to uninhabited and unconnected lands (e.g., a large part of Russia and Canada), the cross-country average of nonmissing answer rate is 63%, considerably higher than the overall rate of nonmissing answer. In the full sample of countries used for the analysis of governance and distance to capital cities (from Table 8 onward), determined by the availability of all control variables, the cross-country average rate of nonmissing answers is 67%, not very different from that in the worldwide set of countries. That

average rate is only 55% among autocracies (Polity score less than or equal to 0), and as high as 86% among established democracies (Polity score greater than 9).

Acknowledging those caveats of missing data, we proceed to construct the variables Average Log Travel Distance and Average Log Travel Duration in the same way as Average Log Distance was (where distance was understood as the geodesic (i.e. "as the crow flies") distance between two points on earth). Because of missing data, in many countries the maximum travel distance or travel duration can contain a large amount of measurement error. To take into account a country's geographical size properly, in all regressions we also include the log of each country's largest geodesic distance from the capital.

Capital Primacy Share of the capital city population over the total population, from the SEDC. Most of the data refer to the period 2000-2002, although many countries have earlier dates.

Distance from Maximum Concentration: This variable is calculated for each country by measuring the distance between the actual site of the capital city, and the site of the capital that would maximize the GCISC. The maximization is done with Matlab's large scale search method (with analytical gradient matrix), from a grid of 50 initial guesses evenly distributed on the country's map for large countries.

World Governance Indicators (WGI): From Kaufman, Kraay, and Mastruzzi (2010), including Voice and Accountability, Control of Corruption, Rule of Law, Government Effectiveness, Political Stability, and Regulation Quality, themselves a composite of different agency ratings aggregated by an unobserved components methodology. On a scale of -2.5 to 2.5. Data are available for 1996-2002 at two-year intervals, and thereafter on an annual basis. We average the data, for each country, for the period 1996-2012. The data are available at: http://info.worldbank.org/governance/wgi/index.asp

Freedom House: Political Rights index (Freedom House). The original data are on a scale of 1 (best) to 7 (worst), which we re-scale, by subtracting from 8, so that higher scores indicate better governance. Average between 1990 and 1999.

Real GDP per capita: From the World Bank World Development Indicators (WDI). Real PPP-adjusted GDP per capita (in constant 2000 international dollars).

Population: From WDI.

Polity: Polity IV composite score as Democracy minus Autocracy, on a scale of -10 to 10, from Polity IV project.

Ethno-Linguistic Fractionalization: From Alesina et al. (2003).

Legal Origin: From La Porta et al. (1999). Dummy variables for British, French, Scandinavian, German, and socialist legal origin.

Region dummies: Following the World Bank's classifications, dummy variables for: East Asia and the Pacific; East Europe and Central Asia; Middle East and North America; South Asia; West Europe; North America; Sub-Saharan Africa; Latin America and the Caribbean.

Executive Constraints: Variable *XCONST* (Executive Constraints), from Polity IV project, averaged between 1975-2010, with transition years coded as missing values. Refers to "the extent of institutionalized constraints on the decision making powers of chief executives, whether individuals or collectivities," i.e. "the checks and balances between the various parts of the decision-making process": 1- Unlimited Authority, 3- Slight to Moderate Limitation, 5- Substantial Limitations, 7- Executive Parity or Subordination. (Even-numbered scores are "Intermediate" categories.)

Participation Competitiveness: Variable *PARCOMP* (Competitiveness of Participation), from Polity IV project, averaged between 1975-2010, with transition years coded as missing values. Refers to "the extent to which alternative preferences for policy and leadership can be pursued in the political arena": 0- Unregulated, 1- Repressed, 2- Suppressed, 3- Factional, 4- Transitional, 5- Competitive.

Recruitment Openness: Variable *XROPEN* (Openness of Executive Recruitment), from Polity IV project, averaged between 1975-2010, with transition years coded as missing values. Refers to "the extent that all the politically active population has an opportunity, in principle, to attain the position through a regularized process": 0- Lack of regulation, 1- Closed, 2- Dual Executive-Designation, 3- Dual Executive- Election, 3- Open.

Recruitment Competitiveness: Variable *XRCOMP* (Competitiveness of Executive Recruitment), from Polity IV project, averaged between 1975-2010, with transition years coded as missing values. Refers to "extent that prevailing modes of advancement give subordinates equal opportunities to become superordinates": 0 - Lack of regulation, 1- Selection, 2- Dual/Transitional, 3- Election.

GDP per capita in capital city: From Dobbs et al (2011), estimates for 2007. We extract the data from the interactive map available at http://www.mckinsey.com/Insights/MGI/Research/Urbanization/Urban_world.

Military Budget: Average (1990-2006) military expenditure as a share of central government expenditures, from WDI.

Interstate War: Dummy for presence of an instance of interstate war between 1975-2007, from Correlates of War (COW) project.

Individual opinion data (Table 10): Opinion data are from the 2005 Afro-Barometer survey (wave 3), available at `http://www.afrobarometer.org`. They come from local-language surveys of random sample of either 1,200 or 2,400 individuals in each country, including 16 sub-Saharan African countries: Benin, Botswana, Ghana, Kenya, Lesotho, Madagascar, Malawi, Mali, Mozambique, Namibia, Nigeria, Senegal, Tanzania, Uganda, Zambia, and Zimbabwe (South Africa is excluded from our analysis). The opinion variables are classified into 4 types, coded from 0 (not at all/never) to 3 (a lot/always). The response on knowledge of the Vice President's name is coded as 1 if the answer is yes, and the respondent gives the correct name.

Additional control variables (Table 10): Control variables in Table 10 are selected in Nunn and Wantchekon's (2011) publicly available data, including: age, age squared, gender, urban, district's ethnic fractionalization, proportion of ethnic group in district, log of total historical slave export per land area, ethnic group average malaria ecology measure, total Catholic and Protestant missions per land area, dummy for historic contact with European explorers, dummy for historical into the colonial railway network, dummy for existence of city among ethnic group in 1400, pre-colonial jurisdictional hierarchies beyond the local community, and categories of the following variables: education level, occupation, religion, living conditions, pre-colonial settlement patterns of ethnicity (included as fixed effects).

Sources for population data (Table 1):*www.saint-petersburg.com/history/1914-1924.asp,*
http://en.wikipedia.org/wiki/History_of_MoscowHistorical_demographics,
http://www.tacitus.nu/historical-atlas/population/russia.htm,
http://en.wikipedia.org/wiki/AnkaraDemographics,
http://en.wikipedia.org/wiki/IstanbulDemographics,
http://looklex.com/e.o/turkey.demographics.htm,
http://en.wikipedia.org/wiki/Melbourne_population_growth,
http://en.wikipedia.org/wiki/Demographics_of_AustraliaPopulation_growth_rate,
http://en.wikipedia.org/wiki/NanjingDemographics,
http://en.wikipedia.org/wiki/BeijingDemographics,
http://en.wikipedia.org/wiki/ChinaDemographics,
http://en.wikipedia.org/wiki/Nouakchott,
http://www.google.com/publicdata/explore?ds=d5bncppjof8f9_&met_y=sp_pop_totl&idim=country:MRT&dl=en&hl=en&q=population+mauritania,
http://en.wikipedia.org/wiki/Rio_de_JaneiroPopulation_growth,
http://www.google.com/publicdata/explore?ds=d5bncppjof8f9_&met_y=sp_pop_totl&idim=country:BRA&dl=en&hl=en&q=brazil+population,
http://www.kigalicity.gov.rw/spip.php?article4,

http://www.google.com/publicdata/explore?ds=d5bncppjof8f9_&met_y=sp_pop_totl&idim=country:RWA&dl=en&hl=en&q=rwanda+population,
http://en.wikipedia.org/wiki/Sana'aDemographics,
http://www.google.com/publicdata/explore?ds=d5bncppjof8f9_&met_y=sp_pop_totl&idim=country:YEM&dl=en&hl=en&q=population+yemen,
http://en.wikipedia.org/wiki/Demographics_of_Karachi,
http://en.wikipedia.org/wiki/Zomba,_Malawi,
http://en.wikipedia.org/wiki/LilongweDemographics,
http://www.google.com/publicdata/explore?ds=d5bncppjof8f9_&met_y=sp_pop_totl&idim=country:MWI&dl=en&hl=en&q=malawi+population,
http://en.wikipedia.org/wiki/Yamoussoukro,
http://en.wikipedia.org/wiki/Abidjan,
http://en.wikipedia.org/wiki/File:Poblaci%C3%B3n_de_Santiago_de_Chile.svg,
http://en.wikipedia.org/wiki/Demographics_of_Chile,
http://en.wikipedia.org/wiki/Greater_Valpara%C3%ADso,
http://www.onlinenigeria.com/links/lagosadv.asp?blurb=322,
http://www.nbs.go.tz/takwimu/references/2002popcensus.pdf (p.10),
http://en.wikipedia.org/wiki/AlmatyDemographics,
http://en.wikipedia.org/wiki/AstanaPopulation.2FDemographics,
http://en.wikipedia.org/wiki/Demographics_of_Kazakhstan,
http://www.statistics.gov.my/portal/index.php?option=com_content&view=article&id=1215&Itemid=89&lang=en,
http://www.britannica.com/EBchecked/topic/651821/Yangon

Online Appendix E: Tables and Figures

Table E1—Descriptive Statistics: Grid Cell Variables (Averages), Polity$\leq$ 0

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Sample	Cells in countries with Polity $\leq$ 0											
Conflict data	Ongoing conflict indicators						Conflict onset indicators					
Variables	N	Mean	Std. Dev.	Min	Max	Median	N	Mean	Std. Dev.	Min	Max	Median
Latitude	14,676	24.71	17.36	-27.25	55.75	27.75	32,116	35.51	27.39	-54.75	77.25	41.25
Infant mortality rate 2000	14,676	680.4	422.2	49	1,932	575	32,116	488.5	413.9	49	2,031	276.9
Share of mountain 2000	14,676	0.289	0.385	0	1	0.0189	32,116	0.270	0.378	0	1	0.00110
Log time to urban area	14,676	6.122	0.915	3.178	10.31	6.043	32,116	6.338	1.089	2.303	10.31	6.223
Log cell area	14,676	7.869	0.203	1.604	8.039	7.912	32,116	7.630	0.381	1.604	8.039	7.722
Averages over time:												
Log distance to capital	14,676	6.459	0.868	1.386	8.196	6.519	32,116	7.032	1.081	1.386	8.845	7.083
Log distance to largest non capital city	14,676	6.611	0.905	0.106	8.383	6.677	32,116	7.105	1.065	0.106	8.828	7.171
Temperature (°C)	14,676	16.86	9.912	-15.31	31.69	20.27	32,116	8.277	14.07	-23.20	31.52	7.388
Precipitation	14,676	558.5	500.1	72.46	3,944	347.6	32,116	545.6	468.3	69.40	4,716	408.5
Log GCP per capita	14,676	7.615	1.106	5.391	15.75	7.433	32,116	8.399	1.298	5.391	15.75	8.666
Log Population	14,676	9.996	2.176	0	16.18	10.08	32,116	8.625	2.863	0	16.54	8.940
By conflict type:			*Ongoing conflicts*						Conflict onsets			
Intrastate Conflict	14,676	0.127	0.233	0	0.950	0	32,116	8.16e-05	0.00159	0	0.0756	0
Interstate Conflict	14,676	0.00222	0.0160	0	0.150	0	32,116	1.48e-06	0.000195	0	0.0308	0
Territory Conflict	14,676	0.0332	0.154	0	0.950	0	32,116	4.14e-05	0.00117	0	0.0735	0
Gov. Conflict	14,676	0.0975	0.188	0	0.950	0	32,116	4.87e-05	0.00120	0	0.0756	0
Intense Conflict	14,676	0.0585	0.143	0	0.850	0	32,116	2.19e-05	0.000762	0	0.0504	0
Less Intense Conflict	14,676	0.0696	0.169	0	0.900	0	32,116	6.60e-05	0.00142	0	0.0735	0
Purely Intrastate Conf.	14,676	0.0936	0.197	0	0.950	0	32,116	7.01e-05	0.00146	0	0.0756	0
Expanded Intrastate Conf.	14,676	0.0330	0.0867	0	0.500	0	32,116	1.14e-05	0.000532	0	0.0435	0

Table E2—Descriptive Statistics: Grid Cell Variables (Averages), Polity$>$ 0

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Sample	Cells in countries with Polity > 0											
Conflict data	Ongoing conflict indicators						Conflict onset indicators					
Variables	N	Mean	Std. Dev.	Min	Max	Median	N	Mean	Std. Dev.	Min	Max	Median
Latitude	39,501	30.62	34.73	-55.25	77.25	45.25	21,203	19.94	34.10	-55.25	74.75	30.75
Infant mortality rate 2000	39,501	271.3	300.6	30	2,031	190	21,203	205.0	237.0	30	1,185	72
Share of mountain 2000	39,501	0.243	0.361	0	1	0	21,203	0.232	0.352	0	1	0
Log time to urban area	39,501	6.261	1.178	2.079	9.076	6.201	21,203	6.048	1.136	2.079	9.076	5.927
Log cell area	39,501	7.595	0.381	-0.0156	8.039	7.651	21,203	7.717	0.330	-0.0156	8.039	7.828
Averages over time:												
Log distance to capital	39,501	7.131	1.118	0.693	8.954	7.255	21,203	6.995	1.038	0.693	8.954	7.116
Log distance to largest non capital city	39,501	7.189	1.098	0.851	8.981	7.377	21,203	7.076	1.035	1.387	8.981	7.249
Temperature (°C)	39,501	8.525	13.42	-22.43	35.13	7.682	21,203	12.99	11.35	-22.77	34.48	15.02
Precipitation	39,501	705.1	574.6	74.71	8,987	501.9	21,203	852.2	645.0	78.57	9,379	636.7
Log GCP per capita	39,501	9.268	1.145	5.627	11.31	9.601	21,203	9.514	1.109	6.165	11.31	10.14
Log Population	39,501	7.841	3.246	0	16.65	7.888	21,203	8.056	3.516	0	16.65	8.277
			Ongoing conflicts						*Conflict onsets*			
Intrastate Conflict	39,501	0.0426	0.166	0	1	0	21,203	5.09e-05	0.00122	0	0.0641	0

TABLE E3—DESCRIPTIVE STATISTICS: GRID CELL VARIABLES (PANEL), POLITY≤ 0

	(1)	(2)	(3)	(4)	(5)	(7)
Sample	(Cell, year) in countries with Polity ≤ 0					
Variables	N	Mean	Std. Dev.	Min	Max	Median
Precipitation	1,914,640	534.1	483.3	67	6,628	393.8
Temperature (°C)	1,914,640	8.064	14.00	-25.84	38.08	7.175
Log distance to capital	1,914,640	7.046	1.099	1.386	8.845	7.082
Log distance to border	1,914,640	5.661	1.450	0	7.987	5.808
By conflict type:						
Intrastate Conflict	1,914,640	9.35e-05	0.00967	0	1	0
Interstate Conflict	1,914,640	1.57e-06	0.00125	0	1	0
Territory Conflict	1,914,640	5.28e-05	0.00726	0	1	0
Gov. Conflict	1,914,640	5.38e-05	0.00733	0	1	0
Intense Conflict	1,914,640	2.45e-05	0.00495	0	1	0
Less Intense Conflict	1,914,640	7.68e-05	0.00876	0	1	0
Purely Intrastate Conf.	1,914,640	8.25e-05	0.00908	0	1	0
Expanded Intrastate Conf.	1,914,640	1.10e-05	0.00331	0	1	0

TABLE E4—CHANGES IN DISTANCE TO THE CAPITAL AND CONFLICT: EXCLUDING GROUPS OF COUNTRIES

	(1)	(2)	(3)	(4)	(5)	(6)
		4 groups excluding:				
Sample	Polity ≤0	Former Soviet republics	Former Yugoslav republics	Capital-moving countries	Others	Only Capital-moving countries
Dependent variable	Conflict *onset*					
Log Distance to Capital	-0.000353**	-0.000561*	-0.000318**	-0.000577***	-0.000345**	-0.000312
	[0.000154]	[0.000333]	[0.000149]	[0.000202]	[0.000162]	[0.000303]
Full set controls	Yes	Yes	Yes	Yes	Yes	Yes
Cell FEs	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,914,640	1,069,138	1,908,037	1,622,203	1,124,487	267,536
R-squared	0.037	0.038	0.037	0.036	0.035	0.034

Robust standard errors in brackets are clustered at country level. Each observation represents a grid cell times year. The dependent variable is the indicator of conflict onsets, averaged from 1946 to 2005 where conflict onset data are available. Column (1) shows the benchmark result in the sample of all countries where time-average polity 2 score is nonpositive. Samples in columns (2) to (6) are detailed in Table 5. Grid cell fixed effects and year fixed effects are included. Control variables include log distance to border, temperature, and precipitation. *** p<0.01, ** p<0.05, * p<0.1.

TABLE E5—ISOLATED CAPITAL CITIES AND MISGOVERNANCE: ADDITIONAL ROBUSTNESS

Dependent Variable: WGI PC	(1)	(2)	(3)	(4)	(5)	(6)
	Full Sample		Autocracies		Democracies	
Avg Log Distance	-0.0434	-0.0360	-0.0465	-0.0267	-0.2881***	0.0348
	[0.055]	[0.056]	[0.053]	[0.058]	[0.045]	[0.134]
Avg Log Distance X Autocracy	-0.1898**	-0.2180**	-0.2122**	-0.1957**		
	[0.087]	[0.085]	[0.083]	[0.090]		
Additional Controls	Schooling	Geographical	Density	All		
Full Set of Controls	X	X	X	X	X	X
Observations	113	120	127	109	36	31
R-squared	0.875	0.874	0.871	0.882	0.884	0.930

Robust standard errors in brackets. Z-scores (normalized variables) reported.
WGI PC: First Principal Component of Worldwide Governance Indicators measures (Rule of Law, Voice and Accountability, Government Effectiveness, Regulatory Quality, Control of Corruption, Political Stability).
Schooling: Total years of schooling in 1995; Geographical: island dummy, length of coastline, date of independence, and fuel and ore exports; Density: Population density.
Autocracies: Polity <=0; Established Democracies: Polity > 9.
Basic Control variables: Log GDP per capita, Log Population, Urbanization, and Region and Legal Origin dummies, Majoritarian and Presidential system dummies, and Ethnic Fractionalization. Columns (1)-(4) also include Autocracy dummy as control variable.

TABLE E6—AVERAGE LOG TRAVEL DISTANCE (GOOGLE MAP) AND GOVERNANCE

Dependant Variable: WGI PC	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Full Sample		Autocracies		Establ. Democracies		Full Sample	
Avg Log Travel Distance	-0.0841	-0.0602	-0.2431**	-0.2327*	0.0680	0.0917	0.0153	0.0207
	[0.053]	[0.050]	[0.108]	[0.127]	[0.083]	[0.076]	[0.053]	[0.055]
Avg Log Travel Distance X Autocracy							-0.2260**	-0.2335**
							[0.101]	[0.102]
Basic Set of Controls	X		X		X		X	
Full Set of Controls		X		X		X		X
Observations	130	130	37	37	33	33	130	130
R-squared	0.818	0.827	0.793	0.816	0.899	0.922	0.859	0.860

Robust standard errors in brackets. Z-scores (normalized variables) reported. WGI PC: First Principal Component of Worldwide Governance Indicators measures (Rule of Law, Voice and Accountability, Government Effectiveness, Regulatory Quality, Control of Corruption, Political Stability). Autocracies: Polity <=0; Established Democracies: Polity > 9. Basic Control variables include Log GDP per capita, Log Population, Largest Log Distance to Capital within a country, Urbanization, and Region and Legal Origin dummies. Full Set of Controls adds Majoritarian and Presidential system dummies, and Ethnic Fractionalization. Columns (7)-(8) also include Autocracy dummy as control variable. The p-values of SUR-based tests of the equality of reported coefficients between columns (3) and (5), and between columns (4) and (6), are less than 0.01. *** p<0.01, ** p<0.05, * p<0.1.

Table E7—Average Log Travel Duration (Google Map) and Governance

Dependant Variable: WGI PC	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Full Sample		Autocracies		Establ. Democracies		Full Sample	
Avg Log Travel Duration	-0.0434	-0.0267	-0.1942**	-0.2152*	0.1750**	0.1762**	0.0554	0.0615
	[0.057]	[0.054]	[0.092]	[0.106]	[0.081]	[0.080]	[0.057]	[0.059]
Avg Log Travel Duration X Autocracy							-0.2368***	-0.2387**
							[0.090]	[0.092]
Basic Set of Controls	X		X		X		X	
Full Set of Controls		X		X		X		X
Observations	130	130	37	37	33	33	130	130
R-squared	0.816	0.825	0.788	0.823	0.919	0.939	0.862	0.862

Robust standard errors in brackets. Z-scores (normalized variables) reported. WGI PC: First Principal Component of Worldwide Governance Indicators measures (Rule of Law, Voice and Accountability, Government Effectiveness, Regulatory Quality, Control of Corruption, Political Stability). Autocracies: Polity <=0; Established Democracies: Polity > 9. Basic Control variables include Log GDP per capita, Log Population, Largest Log Distance to Capital within a country, Urbanization, and Region and Legal Origin dummies. Full Set of Controls adds Majoritarian and Presidential system dummies, and Ethnic Fractionalization. Columns (7)-(8) also include Autocracy dummy as control variable. The p-values of SUR-based tests of the equality of reported coefficients between columns (3) and (5), and between columns (4) and (6), are less than 0.01. *** p<0.01, ** p<0.05, * p<0.1.

Table E8—IV for Isolation: Average Log Distance to Country's Centroid

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Sample	Full Sample				Autocracies				Democracies			
	Second stage	First stage	Second stage	First stage	Second stage	First stage	Second stage	First stage	Second stage	First stage	Second stage	First stage
Dependent variable	WGI PC	Avg Log Distance (to Capital)	WGI PC	Avg Log Distance (to Capital)	WGI PC	Avg Log Distance (to Capital)	WGI PC	Avg Log Distance (to Capital)	WGI PC	Avg Log Distance (to Capital)	WGI PC	Avg Log Distance (to Capital)
Avg Log Distance (to Capital)	-0.5430**		-0.4896		-1.7696		-2.4528		0.0684		-0.0849	
	[0.263]		[0.316]		[3.276]		[7.330]		[0.180]		[0.119]	
Avg Log Distance to Centroid		3.1720**		2.7034*		1.4815		0.9075		4.6596		7.8845**
		[1.397]		[1.379]		[3.712]		[3.975]		[2.762]		[3.053]
Basic set of controls	X	X			X	X			X	X		
Full set of controls			X	X			X	X			X	X
Observations	126	126	126	126	36	36	36	36	31	31	31	31
R-squared	0.748		0.769		-1.902		-3.981		0.885		0.912	
Anderson-Rubin F-stat	4.702		2.653		2.786		1.465		0.0882		0.225	
Anderson-Rubin F-stat p-value	**0.0323**		**0.106**		**0.108**		**0.239**		**0.770**		**0.643**	
Anderson-Rubin chi2	5.386		3.125		4.012		2.397		0.161		0.498	
Anderson-Rubin chi2 p-value	**0.0203**		**0.0771**		**0.0452**		**0.122**		**0.688**		**0.480**	
Kleibergen-Paap statistics	5.158		3.845		0.159		0.0521		2.846		6.668	

Robust standard errors in brackets. Z-scores (normalized variables) reported. WGI PC: First Principal Component of Worldwide Governance Indicators measures (Rule of Law, Voice and Accountability, Government Effectiveness, Regulatory Quality, Control of Corruption, Political Stability). The IV is the Average Log Distance to a country's Centroid, taken over the population distribution over the country's geography. Autocracies: Polity <=0; Established Democracies: Polity > 9. Basic Control variables include Log GDP per capita, Log Population, Urbanization, and Region and Legal Origin dummies. Full Set of Controls adds Majoritarian and Presidential system dummies, and Ethnic Fractionalization. Columns (7)-(8) also include Autocracy dummy as control variable. *** p<0.01, ** p<0.05, * p<0.1.

TABLE E9—IV FOR ISOLATION: LOG DISTANCES TO CENTROID, AVERAGED OVER LAND SUITABILITY DISTRIBUTION

Sample	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Full Sample				Autocracies				Democracies			
	Second stage	First stage	Second stage	First stage	Second stage	First stage	Second stage	First stage	Second stage	First stage	Second stage	First stage
Dependent variable	WGI PC	Avg Log Distance (to Capital)	WGI PC	Avg Log Distance (to Capital)	WGI PC	Avg Log Distance (to Capital)	WGI PC	Avg Log Distance (to Capital)	WGI PC	Avg Log Distance (to Capital)	WGI PC	Avg Log Distance (to Capital)
Avg Log Distance (to Capital)	-0.4777**		-0.3966		-1.1124		-4.0827		-0.0915		-0.1082	
	[0.212]		[0.252]		[1.239]		[22.362]		[0.170]		[0.146]	
Avg Log Distance to Centroid		4.3652***		3.7497**		3.0324		0.7609		6.7578		7.0146
(distribution of land suitability)		[1.603]		[1.636]		[5.185]		[5.855]		[4.937]		[5.711]
Basic set of controls	X	X			X	X			X	X		
Full set of controls			X	X			X	X			X	X
Observations	125	125	125	125	36	36	36	36	30	30	30	30
R-squared	0.774	0.448	0.799	0.457	-0.036	0.508	-14.270	0.560	0.891	0.628	0.903	0.672
Anderson-Rubin F-stat	4.523		2.330		1.612		1.290		0.142		0.232	
Anderson-Rubin F-stat p-value	**0.0357**		**0.130**		**0.216**		**0.268**		**0.712**		**0.638**	
Anderson-Rubin chi2	5.187		2.748		2.322		2.111		0.266		0.536	
Anderson-Rubin chi2 p-value	**0.0228**		**0.0974**		**0.128**		**0.146**		**0.606**		**0.464**	
Kleibergen-Paap statistics	7.415		5.251		0.342		0.0169		1.873		1.509	

Robust standard errors in brackets. Z-scores (normalized variables) reported. WGI PC: First Principal Component of Worldwide Governance Indicators measures (Rule of Law, Voice and Accountability, Government Effectiveness, Regulatory Quality, Control of Corruption, Political Stability). The IV is the Average Log Distance to a country's Centroid, taken over the distribution of land suitability over a country's geography (instead of the population distribution used in the original index). Autocracies: Polity <=0; Established Democracies: Polity > 9. Basic Control variables include Log GDP per capita, Log Population, Urbanization, and Region and Legal Origin dummies. Full Set of Controls adds Majoritarian and Presidential system dummies, and Ethnic Fractionalization. Columns (7)-(8) also include Autocracy dummy as control variable. *** p<0.01, ** p<0.05, * p<0.1.

TABLE E10—IV FOR ISOLATION: LOG DISTANCES TO CENTROID, AVERAGED OVER UNIFORM DISTRIBUTION

Sample	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Full Sample				Autocracies				Democracies			
	Second stage	First stage	Second stage	First stage	Second stage	First stage	Second stage	First stage	Second stage	First stage	Second stage	First stage
Dependent variable	WGI PC	Avg Log Distance (to Capital)	WGI PC	Avg Log Distance (to Capital)	WGI PC	Avg Log Distance (to Capital)	WGI PC	Avg Log Distance (to Capital)	WGI PC	Avg Log Distance (to Capital)	WGI PC	Avg Log Distance (to Capital)
Avg Log Distance (to Capital)	-0.3280*		-0.2485		-0.6895		-0.8630		-0.1185		-0.1300	
	[0.172]		[0.181]		[0.851]		[1.093]		[0.191]		[0.150]	
Avg Log Distance to Centroid		5.9999***		5.4149**		4.9342		3.6874		7.1628		8.6949
(uniform geographical distribution)		[2.129]		[2.141]		[9.204]		[8.799]		[5.090]		[5.886]
Basic set of controls	X	X			X	X			X	X		
Full set of controls			X	X			X	X			X	X
Observations	126	126	126	126	36	36	36	36	31	31	31	31
R-squared	0.809	0.454	0.824	0.462	0.613	0.510	0.570	0.563	0.896	0.613	0.906	0.692
Anderson-Rubin F-stat	3.007		1.692		0.922		0.727		0.191		0.354	
Anderson-Rubin F-stat p-value	**0.0857**		**0.196**		**0.346**		**0.403**		**0.668**		**0.561**	
Anderson-Rubin chi2	3.444		1.992		1.327		1.190		0.348		0.784	
Anderson-Rubin chi2 p-value	**0.0635**		**0.158**		**0.249**		**0.275**		**0.555**		**0.376**	
Kleibergen-Paap statistics	7.943		6.398		0.287		0.176		1.980		2.182	

Robust standard errors in brackets. Z-scores (normalized variables) reported. WGI PC: First Principal Component of Worldwide Governance Indicators measures (Rule of Law, Voice and Accountability, Government Effectiveness, Regulatory Quality, Control of Corruption, Political Stability). The IV is the Average Log Distance to a country's Centroid, taken over a uniform distribution over a country's geography. Autocracies: Polity <=0; Established Democracies: Polity > 9. Basic Control variables include Log GDP per capita, Log Population, Urbanization, and Region and Legal Origin dummies. Full Set of Controls adds Majoritarian and Presidential system dummies, and Ethnic Fractionalization. Columns (7)-(8) also include Autocracy dummy as control variable. *** p<0.01, ** p<0.05, * p<0.1.

TABLE E11—INDIVIDUAL OPINIONS AND DISTANCE TO CAPITAL CITIES

Panel A: Corruption and Politics

	(1)	(2)	(3)	(4)	(5)	(6)
	Perceptions of Corruption				Views on politics:	
Dependent variable	President	Parliament	National Officials	1st Principal Component	People are treated unequally	Careful about what you say
Log Distance to Capital	0.0190**	0.0128**	0.0176***	0.0352***	0.0307***	0.0177**
	[0.00776]	[0.00523]	[0.00495]	[0.00828]	[0.00791]	[0.00689]
Log Distance to Largest	-0.0357***	-0.0333***	-0.0217**	-0.0617***	0.00463	0.0163
Non-Capital City	[0.0108]	[0.00952]	[0.0109]	[0.0174]	[0.0172]	[0.0141]
Full set controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,557	14,893	14,985	13,514	16,688	17,464
R-squared	0.238	0.202	0.181	0.254	0.129	0.183
Region FEs	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: Placebo tests

	(1)	(2)	(3)	(4)	(5)	(6)
	Trust				Interest and Information	
Dependent variable	Trust your relatives?	Trust your neighbors?	Intra-ethnic-group trust	Inter-ethnic-group trust	Interest in public affairs	Know VP's name
Log Distance to Capital	0.000936	0.00995	0.00142	0.0157	-0.00858	-0.00078
	[0.0125]	[0.00993]	[0.00694]	[0.0111]	[0.00782]	[0.00228]
Log Distance to Largest	0.00626	0.00310	0.0172	0.00218	-0.00684	0.0128
Non-Capital City	[0.0151]	[0.0188]	[0.0155]	[0.0145]	[0.0147]	[0.00835]
Full set controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	17,129	17,099	17,052	16,895	18,032	17,115
R-squared	0.194	0.218	0.213	0.178	0.150	0.449
Region FEs	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in brackets are clustered at region level. Dependent variables in Panel A's columns (1) to (3), (5), and (6) are from AfroBarometer 3's questions Q56a, Q56b, Q56d, Q53D, Q53A respectively. Column (4) uses the first principal component of the dependent variables in columns (1) to (3). Dependent variables in Panel B's columns (1) to (8) are from AfroBarometer 3's questions Q84A-D, Q16, Q43C2, Q25, Q41 respectively. See Data descriptions for more details. Control variables include all control variabels used by Nunn and Wantchekon (2011): age, age squared, gender, urban, district's ethnic fractionalization, proportion of ethnic group in district, log of total historical slave export per land area, ethnic group average malaria ecology measure, total Catholic + Protestant missions per land area, dummy for historic contact with European explorers, dummy for historical into the colonial railway network, dummy for existence of city among ethnic group in 1400, pre-colonial jurisdictional hierarchies beyond the local community, and fixed effects for categories of the following variables: education level, occupation, religion, living conditionsm, pre-colonial settement patterns of ethnicity. In addition, region fixed effects are included. *** p<0.01, ** p<0.05, * p<0.1.

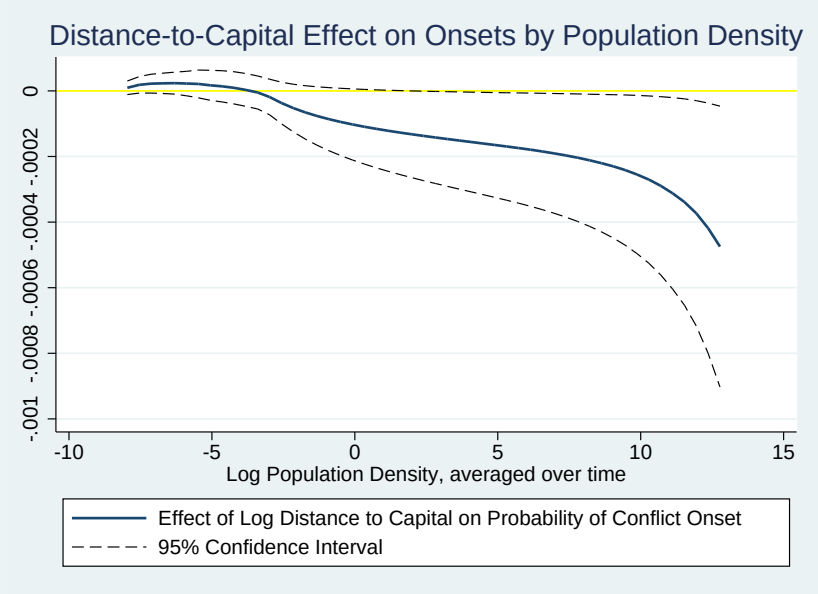


Figure E1. Effect of Log Distance to Capital on Conflict Onsets as a Function of Log Population Density

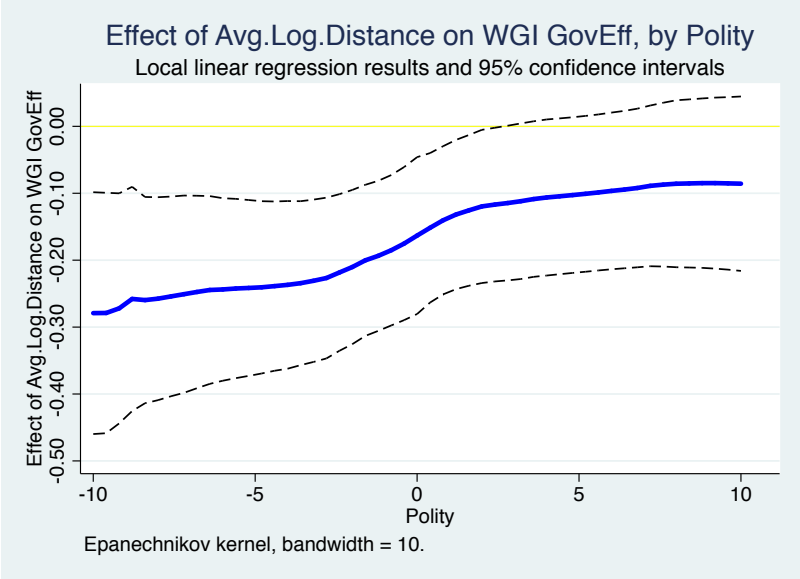
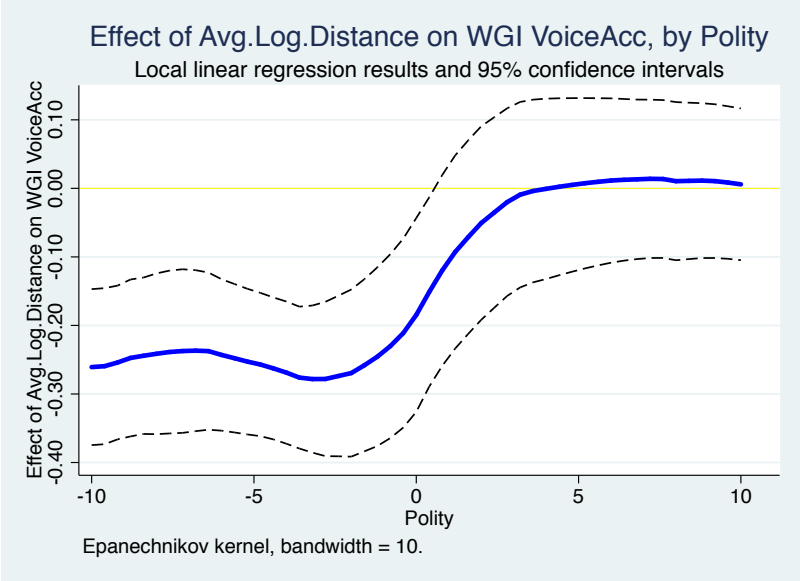


Figure E2. Average Log Distance and Government Effectiveness



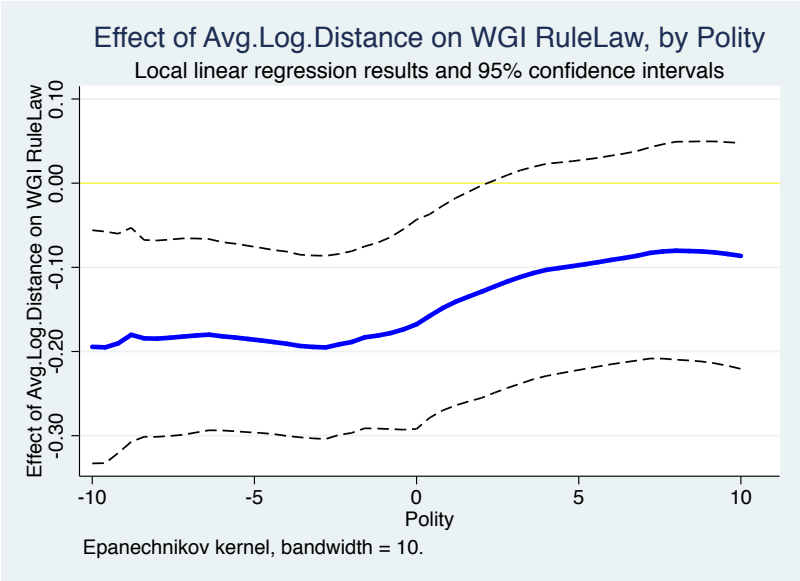
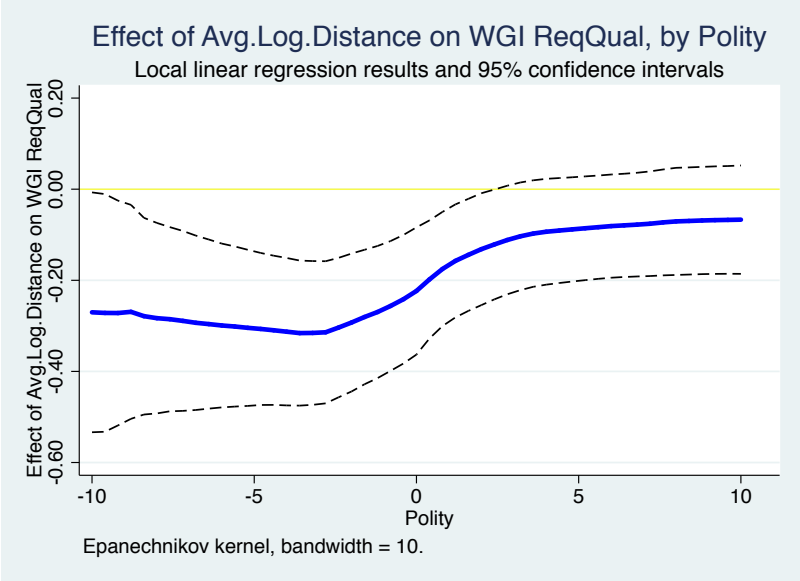


FIGURE E3. AVERAGE LOG DISTANCE, VOICE & ACCOUNTABILITY AND RULE OF LAW



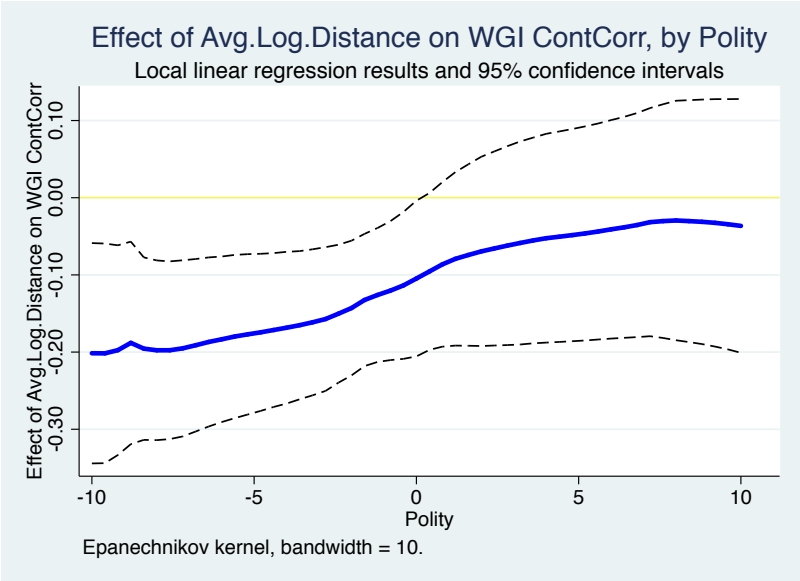


FIGURE E4. AVERAGE LOG DISTANCE, GOVERNMENT EFFECTIVENESS AND CONTROL OF CORRUPTION