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Capital Cities, Conflict, and Misgovernance: Theory and Evidence*

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Abstract

We investigate the links between capital cities, conflict, and the quality of governance, starting from the assumption that incumbent elites are constrained by the threat of insurrection, and that this threat is rendered less effective by distance from the seat of political power. We develop a model that delivers two key predictions: (i) conflict is more likely to emerge (and to dislodge incumbents) closer to the capital, and (ii) isolated capital cities are associated with misgovernance. We show evidence that both patterns hold true robustly in the data, as do other ancillary predictions from the model.

Keywords: Capital Cities; Governance; Institutions; Conflict; Civil War; Revolutions; Insurgencies; Population Concentration; Democracy; Power Sharing; Inefficient Institutions.

JEL Classification: D02, D74, O18, R12

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1 Introduction

Governance goes hand-in-hand with development. It is well-established that the quality of governance is positively correlated with income per capita and a number of variables associated with development (e.g. Kaufman, Kraay and Zoido-Lobaton 1999).[1] In fact, if we interpret the concept broadly as concerning the institutional environment and the ability to implement collective choices (Baland, Moene and Robinson 2009), it has been often argued that it is central in understanding different development paths (e.g. Acemoglu, Johnson and Robinson 2005). In any event, there can be little doubt that the quality of governance directly affects the provision of public goods, and thus matters greatly for welfare.

But governance is clearly endogenous, emerging as part of a collective choice by a society. Since good governance imposes limits on the extent to which rulers and elites can appropriate the apparatus of government to their own benefit, understanding it requires understanding the constraints under which these rulers and elites operate. This is particularly elusive in contexts where there are relatively few explicit, formally established checks and balances, such as those imposed by a well-functioning democratic process through which incumbents might be held accountable.

One constraint that looms large in such contexts is the threat of insurrection and conflict. It is pervasive across weakly institutionalized regimes, and many have studied the emergence of institutions as a result of latent social conflict and (the threat of) violence, e.g. Acemoglu and Robinson (2005), Besley and Persson (2009), Bueno de Mesquita and Smith (2009), or Guimaraes and Sheedy (2013).

We study one specific element that interacts with this threat to affect the extent of informal constraints on rulers: the spatial distribution of a country's population relative to the seat of political power. We start off with the recognition, motivated by the historical evidence, that capital cities have often played a pivotal role in determining the outcome of insurgencies and revolutionary standoffs – and that incumbents react to the incentives posed by this role. It is then natural to ask about its implications for the quality of governance.

We develop a theoretical framework to shed light on these questions. Specifically, we model an incumbent elite that can extract rents, but is subject to the threat of rebellions from dissatisfied citizens. Our key assumption is that rebellions are more effective when they take place closer to the capital city. This embodies the principle that "spatial proximity to power increases political influence" (Ades and Glaeser 1995, p.198), and especially so when that influence is mediated by the threat of violence.

Our first central result is that conflict is more likely to emerge closer to the capital city. Relatedly, we also find that, conditional on its emergence, conflict is more likely to dislodge the incumbent regime when it happens close to the capital. Intuitively, it is cheaper for incumbents to obtain a given amount of stability by buying off those who live far away: they can be placated with less, because they represent a lesser threat. Incumbents are thus willing to live with a greater probability of conflict closer to the capital,

[1] It is still open to debate whether this represents causality in one way or the other, or perhaps both (e.g. Kaufman and Kraay 2002, Sachs et al. 2004).

in spite of the greater danger it entails.

We then extend the model to consider the endogenous choice of the degree of isolation of the capital city, and of the quality of governance. The former captures the tradeoff between protecting against the threat of conflict by locating the seat of political power in an isolated place, and the economic inefficiencies from doing so.[2] The latter in turn encapsulates the choice of whether to share power more broadly. This allows for greater productivity, to the extent that the existence of checks and balances enables the use of more productive technologies that require public goods such as the rule of law or the enforcement of contracts. Such "good governance", however, imposes costs on the elite, because it requires that any rents that they extract be shared more broadly with those with whom power is shared.

This interplay yields our second key result: a negative correlation between the isolation of the capital city and the quality of governance. This reflects causality going in both directions. On the one hand, a more isolated capital induces less power sharing: when incumbent elites are more protected against the threat of rebellion, they can extract rents more easily. This means a smaller incentive to choose good governance, since that implies sharing those rents more widely. On the other hand, bad governance increases the incentive to isolate the capital, because incumbents in a less productive economy will worry less about the losses induced by that additional isolation.

The empirical evidence is very much consistent with the key predictions of our framework. We start by looking at worldwide geolocated data on the onset and prevalence of conflict. We first show that intrastate conflict is more likely to start and to occur in places that are closer to the capital city. This is true if we average all available years in the sample and compare grid cells, controlling for income, population, and a number of geographical variables (including broad measures of isolation unrelated to the capital city). Importantly, this is also true if we make use of the panel variation, controlling for grid-cell fixed effects and hence identifying the effect using changes in country borders and capital city moves, both of which are arguably exogenous with respect to cell characteristics. We thus find both that conflict is more likely in places that are closer to the capital, and also that for a given place it becomes more likely when the capital is moved closer to that place. Finally, we show that, at the country level, there is a greater likelihood of regime change when the spatial distribution of civil conflict is more concentrated around the capital city, further confirming our first central prediction.

Of note, these empirical patterns hold only for relatively non-democratic countries. This is consistent with them being driven by the logic our model highlights, since it is in autocratic contexts that the threat of conflict should gain salience as a constraint on rulers, as a result of the relative dearth of regular means of replacing them. Similarly, we reassuringly find no link between conflict and distance to the capital when it comes to interstate conflict, as the model should not apply to that context either. Last but certainly not least, our findings are pointedly inconsistent with what one might have expected from alternative

[2] We take the choice of location of the capital city as a short-hand description for all the policy levers that affect the spatial distribution of individuals relative to the capital city, of which actually relocating the capital is just a relatively extreme example – though, as we will see, not that infrequently used or contemplated – alongside migration policies, specific economic incentives to populate certain areas, and so forth.

explanations: for instance, if the link were driven by weak state capacity, it would stand to reason that conflict would be more likely farther from the capital, as the reach of the state grows feebler.

We then look at the link between capital cities and governance. We find robust evidence that isolated capitals are indeed associated with misgovernance, controlling for a number of variables that are reckoned to correlate with quality of governance and isolation of the capital, and using different ways of measuring these concepts.

A number of additional pieces of evidence reinforce our confidence that this correlation indeed captures the operation of the forces highlighted by our theory. First, we once again find that the correlation is present only for relatively non-democratic countries. Second, when we unpack the definition of governance, we see that in fact the autocracies where the capital city is in an isolated location have governments that are less effective, less accountable, more corrupt, and less able or willing to sustain the rule of law; however, they are not more unstable. This is consistent with the logic of our model, which postulates that isolation is a way of protecting against the threat of removal. We also show that there is no correlation between isolated capitals and measures of government performance that are unrelated to the kind of institutional incentives our framework highlights, suggesting that our stylized fact is unlikely to be driven by some unrelated correlation between isolated capitals and lack of state capacity.

Similarly, we find evidence that the correlation is indeed about the role of the capital city: controlling for the isolation of the country's largest city other than the capital leaves results unaffected. Along with the evidence on conflict, this is reassuring against the possibility that isolation from the capital might have been proxying for factors related to the state's ability to supply a high-quality institutional infrastructure to relatively isolated places. Finally, we also find direct evidence that isolated capital cities are associated with less power sharing, as captured by constraints on executive power and by the extent of political competition.

The model also yields ancillary testable predictions, and the evidence is again supportive. First, it predicts that, since the capital's inhabitants pose a more serious rebellion threat, incumbent elites will leave them larger rents, and also that this premium will be larger when the capital is more isolated. We find evidence that income per capita in the capital city (relative to that of the country as a whole) is indeed higher in non-democratic countries with more isolated capitals. Finally, the model predicts that military spending will be higher in countries were the capital city is less isolated, inasmuch as such spending can be used as an alternative source of protection. This is also borne out by the data, and again only for the sample of relatively non-democratic countries.

This paper relates to a range of different strands of literature. It fits directly into the one that stresses the political implications of spatial distributions, both in economics (e.g. Ades and Glaeser 1995, Davis and Henderson 2003) and in political science (e.g. Rodden 2010). In fact, the importance of the spatial distribution of population and its connection with the threat of rebellion facing rulers has long been recognized by an important group: rulers themselves. As we discuss in detail later, the history of decisions

on where to locate capital cities makes it remarkably clear that protection against perceived instability threat is a pervasive concern behind capital relocations, either planned or actually implemented – and they are typically in the direction of increased isolation.

We emphasize the special role of the capital city, and in that we are closely related to Campante and Do (2014). That paper looks at how the spatial distribution of population and the isolation of capital cities affect government performance across US states, by conditioning the degree of accountability provided by the news media and the electoral process. We look here at a very different mechanism, related to the threat of conflict, which we show to be in force in a very different, non-democratic context.[3] Another crucial distinction is that, while that paper points at a direction of causality running from the isolation of the capital to governance, we argue here that the reverse direction is just as important in the case of weakly institutionalized polities, as incumbents have considerably more influence in affecting the spatial distribution of population relative to the capital.[4]

Another related literature has studied how the isolation of countries or their geographical size affects institutions and development – such as Nunn and Puga (2012) and Ashraf, Galor and Ozak (2010). In different ways, both papers argue that isolation may have a positive effect on development by reducing the risk of external conflict, even if it may have other negative effects such as through reduced trade. Neither paper deals with the specific institutional role of the capital city, and its isolation with respect to the country's population. On a different vein, Stasavage (2010) emphasizes how geographical distances from European capital cities might have hindered the historical development of representative institutions through reduced accountability, though his historical data do not allow for consideration of the spatial distribution of population.

As previously mentioned, we also build on the literature on the endogenous emergence of institutions, and their implications for development. In particular, we address the broad question of the persistence of inefficient institutions (e.g. Acemoglu 2006). We identify the spatial distribution of individuals as a novel source of variation in the constraints that underpin institutional choices, which may leave agents who stand to benefit from those inefficient institutions better able to get away with their preferences. We

[3]While that paper's results seem in tension with our finding of an absence of a link between the degree of isolation and governance in established democracies, they can be reconciled quite naturally: as much as there is a real difference between the extent of corruption in, say, Minnesota and Louisiana, this is evidently swamped by the variation across countries. It is not surprising that the cross-country evidence is painted with strokes that are too broad to detect the effect of the subtler mechanisms that are in play in established democracies, and which our theory here leaves aside.

[4]This two-way feedback underscores the difficulty of empirically disentangling causality running one way or the other. In particular, it is hard to think of sources of exogenous variation, at the cross-country level, that affect isolation without affecting governance. (For instance, Pierskalla (2012) provides evidence that a long history of statehood increases the concentration of population around the capital, but it stands to reason that such history would also directly affect governance in other ways (Chanda and Putterman 2005).) The source of exogenous variation used by Campante and Do (2014) – the location of a state's centroid – is unfortunately not relevant in the context of the countries we focus on: the equanimous, republican logic of locating the capital at a relatively central position, which underlies the first-stage relationship accross US states, was bound to be much less influential to the decisions of autocrats and/or colonial powers concerning the designation of the capital. As noted by Herbst (2000, p. 16), with respect to Africa, "[most] colonial capitals were located on the coast, demonstrating the low priority of extending power inland compared to the need for easy communication and transport links with Europe." These capitals by and large persisted as such after independence. Unsurprisingly, there is no correlation between the isolation of the capital city and the isolation of the centroid within our sample of autocracies.

are also close to the recent strand of that literature that has tried to unpack the evolution of political institutions along different dimensions, such as checks and balances, power sharing, and political stability (e.g. Besley, Persson, and Reynal-Querol 2013). We provide further support for the view that these can interact in subtle ways, and move in separate directions as a result.

Last but not least, we contribute to the voluminous literature on intrastate conflict and civil wars (see Blattman and Miguel 2010 for a survey). Our focus is on one of the possible motivations for conflict, namely attempts to bring down an incumbent regime – as opposed, say, to separatist conflict – and even more narrowly, on its spatial dimensions. Still, we relate directly to the strand within that literature that considers the role of geographic and demographic factors (e.g. Fearon and Laitin 2003), and in doing so we address several of the aspects highlighted by Sambanis (2005) as in need of empirical exploration: distinctions between established democracies and more fragile environments, geographic concentration of power, or the degree of state control over a country's geographic periphery. As we have argued, our results go against the more standard presumption that isolated areas are more prone to conflict, further illustrating the value of considering the special role of capital cities.[5]

The remainder of the paper is organized as follows: Section 2 discusses the motivating historical evidence on revolutions and capital cities; Section 3 analyzes the model and its implications; Section 4 discusses the empirical evidence; and Section 5 concludes.

2 Revolutions and Capital Cities

Physical proximity to the stronghold of government matters critically when it comes to removing it by force: a relatively small mob in the capital city poses as much of a threat as a much larger group of rebels elsewhere. It follows that the population in and around the capital is especially important in these contexts, as can be illustrated by a brief look at a few revolutionary episodes over the past three centuries.

A classic example is the transition century from the Ancien Régime to the Third Republic, in France. Around the time of the French Revolution, the 550 thousand people living in Paris certainly did not represent the average or median opinion of some 29 million Frenchmen, among which many royalists willing to defend the monarchy at all costs.[6] While turmoil in the countryside was certainly important leading up and in the aftermath of the Revolution (Markoff 1996), it is rather clear that the Parisian crowd packed a far heavier revolutionary punch, as described by Tilly (2003 p. 162-167), than those anywhere else. As put by Traugott (1995) in his analysis of French insurrections during the following century:

[5]For instance, Buhaug and Rod (2006) find evidence, using African data, that separatist conflict is more likely in isolated areas near national borders, and farther from the capital, where control by the central government is weaker (Michalopoulos and Papaioannou 2014). In contrast, Besley and Reynal-Querol (2014) find that conflict in Africa seems to be more likely closer to the capital city, in line with our results.

[6]National and city population figures come from estimates of McEvedy and Jones (1978), and from Braudel (1986), who observed that France at the end of the Ancien Régime was still very much a rural country. Later on, royalist counter-revolutionaries rioted in Brittany, La Vandée and Dauphiné, regions too far from Paris to make any difference.

> "In general, the rural population proved acquiescent, but the will of the capital initially held sway even when the numerical majority living in the countryside seemed resistant to the change. (...) For the period in question, the relationship between insurrections and changes of regime in France is simple to describe: as Paris goes, so goes the nation." (p.148)[7]

The logic linking revolutions and capital cities is by no means limited to 18th- and 19th-century France, of course. As put by *The Economist*, in the context of the 2006 "Orange Revolution" in the Ukraine – and as was repeated in the same country in 2014 – "during a [revolutionary] stand-off, the capital city is crucial."(March 18th 2006, p. 28) The lingering political turmoil in Thailand, in recent years, is another example of how hard it is for a government to stay in power if it lacks support from the population of the capital city, even when such government was largely popular in the countryside (*The Economist*, Sep. 22nd, 2006). By the same token, incumbent regimes are obviously especially concerned with securing the capital city when the threat of rebellion becomes acute (e.g. Arriola 2013 on the case of Ethiopia).

To be sure, the power of the capital is not absolute – for instance, many have emphasized that isolation may help insurgencies by making repression more difficult, as in Mao Zedong's well-known account of guerrilla warfare (Mao 1961). The importance of the capital, however, is underscored by the many incumbent rulers who have tried to manipulate the concentration of population around the capital by moving the latter – more often than not with alleviating revolutionary pressure as one of the explicit, or barely concealed, goals.

It is not hard to come up with examples from history. In the 17th century, Louis XIV moved away from the Parisian masses into the tranquility of Versailles, a move that is thought to have been influenced by his dislike of Paris, stemming from having witnessed and suffered the rebellions against the Crown that became known as the *Frondes* (1648-53), as argued by the contemporary account of the Duc de Saint-Simon. Modern examples are also easy to come by, and many other countries have fiddled with the idea, even if falling short of carrying it through. In just about every case, a chief concern was to have the new capitals to be "quiet, orderly places where civil servants could get on with their jobs without distraction."(*The Economist*, Dec. 18th 1997)

Looking closely at a couple of these modern examples helps illuminate that logic. Brazil had the capital moved in 1960 from Rio de Janeiro to Brasília – many hundreds of kilometers away from the main population centers of Rio de Janeiro and São Paulo, and far from the coast, where most of the country's population was and still is. As Couto (2001) remarks, one of the factors motivating the president who decided to build the new capital from scratch, Juscelino Kubitschek, was a desire to escape from the atmosphere of political agitation in Rio, where the president was more exposed to political crises and student demonstrations. As he himself put it, rather colorfully: "A tramway strike in Rio de Janeiro may

[7]While not every Parisian insurrection managed to change the status quo like those in 1830 and 1848 did, they indeed occurred in a remarkably recurrent pattern: 1827, 1830, 1832, 1834, 1839, 1848, 1849, 1851, 1869, and 1871. Interestingly, insurrections of considerable size originating elsewhere in the country, including the 1831 and 1834 revolts of the *canuts* (silk workers) in Lyon, the second largest city, "systematically failed to produce comparable repercussions at the national level unless they coincided with unrest in the capital" (Traugott 1995, p.148). (See also Bezucha, 1974 and Montagne, 1966).

bring down the President of the Republic." (Couto, 2001, p. 199, our translation)

The recent move in Myanmar (Burma), in 2005, from the major population center of Yangon (Rangoon) to the fortified "secret mountain compound" of Naypyidaw is another illuminating, if somewhat extreme example. (*International Herald Tribune*, Nov 11th 2005) As put by Varadarajan (2007):

> "Vast and empty, Burma's new capital will not fall to an urban upheaval easily. It has no city centre, no confined public space where even a crowd of several thousand people could make a visual – let alone political – impression. Naypyitaw (sic), then, is the ultimate insurance against regime change, a masterpiece of urban planning designed to defeat any putative "colour revolution" – not by tanks and water cannons, but by geometry and cartography. 320 kilometres to the south, Rangoon, with five million people, is home to one-tenth the country's population. But even if that city were brought to a standstill by public protests and demonstrations, Burma's military government – situated happily in the middle of paddy fields in the middle of nowhere – would remain unaffected."

As if to emphasize this design, the city was deliberately planned without mobile phone coverage, and civil servants were not allowed to take their spouses or children along when they originally moved (Htay 2007). These are measures that are hard to justify under the oft-mentioned rationales of developing an underpopulated part of the country or protecting against foreign invasion.

This pattern can be seen more systematically with the help of Table 1. This table lists all instances in which capital cities were moved, on a permanent basis, by formally independent countries since World War I, with the corresponding distances and population numbers (for as close to the event as could be found).[8] The first thing to note is that these are not rare episodes: on average, capital moves happen once every six years – the 1930s were the only decade that did not see one – and there are examples from every continent. Most importantly from our standpoint, the table also shows that the moves are overwhelmingly in the direction of greater isolation, at least under the rough measure of capital primacy (share of population in the capital city). This pattern might have been expected, since the capital is more often than not the largest city in the country, but what is striking is that the typical new capitals is a lot smaller than the old one – quite a few times, a new city built from scratch. In short, rulers and regimes that have chosen to move their capital cities have most often picked a considerably more isolated location.

In sum, the population concentrated in and around the capital city matters more than those located elsewhere, from a political standpoint, particularly when it comes to extra-institutional channels such as revolutions and riots (as opposed to competitive, democratic elections). Just as importantly, rulers recognize that and react. This might involve the relatively extreme policy lever of picking or influencing the location of the capital city, which we have used to illustrate the point, but we should also stress that many others are available. For instance, they can try to placate discontent arising in the capital,

[8] Sources are listed in an online Data Appendix. Exceptions involving temporary moves, or moves within a 10km radius are listed in the notes below the table.

Table 1. Changes in Capital Cities since World War I

Country	From	To	Year	Distance (km)	Population (From)	Population (To)
Russia	St. Petersburg	Moscow	1918	633	2.3 million (1917)	1.8 million (1915)
Turkey	Istanbul	Ankara	1923	351	680K (1927)	75K (1927)
Australia	Melbourne	Canberra	1927	472	670K (1914)	-
China	Nanjing	Beijing	1949	1219	2.8 million (1955)	2.8 million (1953)
Mauritania	-	Nouakchott	1957	-	-	200 (1957)
Brazil	Rio de Janeiro	Brasilia	1960	754	3.1 million (1960)	-
Rwanda	Butare	Kigali	1962	80	n.a.	6K (1962)
North Yemen	Ta'izz	Sana'a	1962	198	87K (1975)	135K (1975)
Pakistan	Karachi	Islamabad	1966	1144	1.9 million (1961)	-
Malawi	Zomba	Lilongwe	1974	227	24K (1977)	99K (1977)
Cote d'Ivoire	Abidjan	Yamoussoukro	1983	228	1.2 million (1978)	200K (2005)
Chile*	Santiago	Valparaiso	1990	98	4.6 million (1990)	800K (2002)
Nigeria	Lagos	Abuja	1991	541	5.7 million (1991)	-
Tanzania*	Dar-es-Salaam	Dodoma	1996	571	2.3 million (2002)	213K (2002)
Kazakhstan	Almaty	Astana	1997	974	1.1 million (1999)	281K (1999)
Malaysia**	Kuala Lumpur	Putrajaya	1999	47	1.7 million (2000)	70K (2000)
Myanmar (Burma)	Yangon	Naypyidaw	2005	330	4.1 million (2007)	-

*Legislative only; **Executive only. Multiple sources (see online appendix). We include designation of capital cities by independent countries; any designation at the time of independence is included only if chosen capital is different from colonial capital. (Mauritania had no colonial capital.) Instances where capital cities were moved within the same metopolitan area (<10km), namely Philippines (1975) and Sri Lanka (1982), are not included. (West) Germany (1990) and Albania (1920) are not included, since in these cases the existing regimes had maintained temporary capitals pending reunification and completion of independence process, respectively. "n.a." stands for "not available". Distance is measured "as the crow flies". All cities are referred to by their current English designations.

or otherwise influence the distribution of population around the capital – say, with special incentives or coercion towards populating certain areas of the country, or with restrictions on domestic migration. Stark examples of such policies are not hard to come by either: from relatively benign registration systems that discourage internal migration (especially to cities) – such as the Chinese *hukou* or the Vietnamese *ho khau* – to more extreme cases such as the mass deportation of ethnic groups and the confinement of dissidents to remote areas in the Soviet Union, or the forced depopulation of cities during the reign of the Khmer Rouge in Cambodia. As with capital city moves, these are all policies that are not motivated solely by a desire to isolate the capital, but it is telling that one can hardly find examples of such regimes encouraging their populations to move closer. It is just as telling that they often specifically target groups considered particularly dangerous in terms of kindling insurgencies.

3 Capital Cities, Conflict, and Misgovernance: A Theory

Against this background, we now propose a theory of the joint determination of the quality of institutions and the degree of isolation of the capital city, in which this determination is mediated by the threat of conflict. Groups of individuals who are dissatisfied with existing institutions, under which an incumbent

elite can extract rents from its citizens, can challenge them by rebelling. Our key assumption is that those who are closer to the capital city – the seat of political power – will (*coeteris paribus*) pose a greater threat in that regard.

Consider an economy populated by a continuum of individuals of measure one. A measure p of individuals are in power (the "incumbent elite", or "incumbents"), and the remaining individuals are "citizens". In order to capture the special role of the capital city in as simple a fashion as possible, we posit that there are two places where citizens can locate: the capital, denoted by $\mathscr{C}$, and elsewhere, which we denote by $\mathscr{F}$ (for "faraway"). We denote the fraction of citizens living in $\mathscr{F}$ by ℓ, which thus captures the degree of isolation of the capital city. Hence there will be a measure $(1-p)\ell$ of citizens in $\mathscr{F}$, and a measure $(1-p)(1-\ell)$ in $\mathscr{C}$.

3.1 Capital Cities and Conflict

We start by studying the simplest possible environment, in which the degree of isolation of the capital and the quality of governance are taken as given, in order to focus on the link between capital cities and conflict. Specifically, we take both p and ℓ to be exogenous. In addition, we assume an endowment economy, with output exogenously set at some Y^*. The only decision we will consider in this simple model is that incumbents choose how much of that output they will get for themselves, and how much they will leave for citizens.

3.1.1 Conflict

Let us describe the rebellion technology.[9] In order to allow for conflict arising from different locations, we assume that there are n groups of citizens, each with the same size, and also (for the moment) that 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 $\mathscr{C}$ ($\ell_\imath = 0$).[10]

Define the net potential gain from conflict for group $\imath$ as:

$$\gamma_\imath \equiv \frac{y^*}{w_\imath} - \psi_\imath, \tag{1}$$

where y^* is a constant, $w_\imath$ is the available income for group $\imath$, chosen by the incumbents, and $\psi_\imath$ is a random variable representing the cost of engaging in conflict. (In Appendix A, we show a simple model that microfounds this reduced-form formulation.)[11]

More precisely, the cost $\psi_\imath$ is given by:

$$\psi_\imath = \chi_\imath + T\ell_\imath, \tag{2}$$

[9] We will henceforth use the terms "rebellion" and "conflict" interchangeably, since conflict in our model emerges as groups of citizens rise against existing institutions.

[10] We take groups as given, for simplicity, but in an earlier version of the paper (Campante, Do and Guimaraes 2013) we show a model where group formation is endogenous.

[11] One possible interpretation for y^* is that, as in Acemoglu and Robinson (2006), a successful rebellion leads to a democracy, in which resources are equally divided among all groups, so that $y^* = Y^*/n$ (possibly up to a constant).

where $T \in (0, \underline{\chi})$ is a positive constant that embodies our key assumption: it is more costly for groups who are far from the capital ($\ell_\imath = 1$) to launch a rebellion. This provides us with a simple shortcut for capturing the special role played by the capital city in rebellions against existing institutions. The random variable $\chi_\imath$ 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. We impose $T < \underline{\chi}$, so that the cost of being away from the capital, by itself, is never more important than all other costs involved in rebelling against the rulers.

A conflict involving group $\imath$ arises if it pays off for that group ($\gamma_\imath \geq 0$), and we further assume that, conditional on that conflict arising, the probability that it will dislodge the incumbent regime is given by $\pi(\gamma_\imath)$, with $\pi(0) = 0$ and $\pi' > 0$.[12] Put simply, this captures the idea that the rebellion effort will increase with the potential payoff, and that the likelihood of the rebellion succeeding in overthrowing the incumbents in increasing in that effort. (We again refer to Appendix A for microfoundations.)

The timing of the model is as follows: incumbents choose the share of output to be left to each group. 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 incumbents.

3.1.2 The Incumbents' Problem

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. Given the conflict technology, the objective function is given by:

$$\mathcal{R} = \frac{1}{p}\left(Y^* - \sum_{\imath=1}^{n} w_\imath\right) \prod_{\imath=1}^{n} H(w_\imath),$$

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

It is convenient to proceed with a change of variables, by defining $\widehat{\chi}_\imath$ such that $\gamma_\imath \geq 0$ (i.e. group $\imath$ will rebel) if $\chi_\imath \leq \widehat{\chi}_\imath$:

$$\widehat{\chi}_\imath \equiv \frac{y^*}{w_\imath} - T\ell_\imath. \tag{3}$$

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

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

The function H can then be expressed, with a slight abuse of notation, as a decreasing function of $\widehat{\chi}_\imath$ only:

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

We also define the function h as:

$$h(\widehat{\chi}_\jmath) \equiv -\frac{\partial H(\widehat{\chi}_\jmath)}{\partial \widehat{\chi}_\jmath} = \int_{\underline{\chi}}^{\widehat{\chi}_\imath} \pi'\left(\widehat{\chi}_\imath - \chi_\imath\right) f(\chi_\imath) d\chi_\imath. \tag{4}$$

which lets us define the hazard rate $\frac{h}{H}$ – roughly speaking, the rate at which the incumbent regime is overthrown by a given group j, based on a marginal increase in its relative squeeze $\widehat{\chi}_\jmath$.

Using (3), we can rewrite the objective function as:

$$\mathcal{R} = \frac{1}{p}\left(Y^* - \sum_{\imath=1}^{n} \frac{y^*}{\widehat{\chi}_\imath + T\ell_\imath}\right) \prod_{\imath=1}^{n} H(\widehat{\chi}_\imath) \tag{5}$$

The optimal incumbents' choice can thus be simply represented by a set of thresholds $\widehat{\chi}_\imath$: the incumbents decide how much each group is to be squeezed in equilibrium.

3.1.3 Results

Proposition 1 summarizes the key results of this simple model.

Proposition 1 *Suppose $\frac{h}{H}$ is an increasing function. 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:*[13]

(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 1 *See Appendix B.1.*

Parts (i) and (ii) of this Proposition encapsulate the central results of our model: *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 incumbent elite. It is thus relatively expensive for incumbents to buy an extra amount of stability from

[13] 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.

them: it takes a large amount of extra consumption to keep them quiet, even for a relatively bad draw of $\chi_\imath$. 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 rents in order to bring down that threat.

This intuition can be seen most clearly by walking through the logic of the incumbents' decision. Taking the derivative of (5) with respect to $\widehat{\chi}_\jmath$ and rearranging yields:

$$\frac{\partial \mathcal{R}}{\partial \widehat{\chi}_\jmath} = \frac{1}{p} \prod_{\kappa=1}^{n} H(\widehat{\chi}_\kappa) \left[\frac{y^*}{(\widehat{\chi}_\jmath + T\ell_\jmath)^2} - \left(Y^* - \sum_{\imath=1}^{n} \frac{y^*}{\widehat{\chi}_\imath + T\ell_\imath} \right) \frac{h(\widehat{\chi}_\jmath)}{H(\widehat{\chi}_\jmath)} \right] \tag{6}$$

where $h(\widehat{\chi}_\jmath)$ is given by (4). With a slight abuse of language, we can define the first term in square brackets as the marginal benefit of an increase in $\widehat{\chi}_\jmath$:

$$MgB_\jmath(\widehat{\chi}_\jmath) = \frac{y^*}{(\widehat{\chi}_\jmath + T\ell_\jmath)^2}. \tag{7}$$

This captures the incumbents' gains from reducing the income of those in group $\jmath$, thereby increasing their own rents. This marginal benefit is clearly decreasing in $\widehat{\chi}_\imath$ and $\ell_\jmath$: isolated groups are less threatening and thus cheaper to buy off, hence a marginal increase in $\widehat{\chi}_\jmath$ leads to a smaller reduction in their income, and correspondingly smaller gains to the incumbents.

On the other hand, the marginal cost of increasing $\widehat{\chi}_\imath$, namely the second term in square brackets in (6), corresponds to the increased probability of losing power:

$$MgC(\widehat{\chi}_\jmath) = \left(Y^* - \sum_{\imath=1}^{n} \frac{y^*}{\widehat{\chi}_\imath + T\ell_\imath} \right) \frac{h(\widehat{\chi}_\jmath)}{H(\widehat{\chi}_\jmath)}. \tag{8}$$

For a given $\widehat{\chi}_\jmath$, this marginal cost is naturally independent of the location of group $\jmath$. The assumption that the hazard rate $\frac{h}{H}$ is increasing in $\widehat{\chi}_\jmath$ – capturing the natural idea that the rate at which the incumbent regime is overthown by group $\jmath$ is increased when that group is squeezed further, increasing its dissatisfaction – implies that the marginal cost curve is increasing.[14]

The choice of $\widehat{\chi}_\jmath$ for group $\jmath$ is sketched in Figure 1.[15] The marginal benefit curve for those in $\mathscr{F}$ (MgB_F) is below the marginal benefit curve for those in the capital city (MgB_C). Figure 1 shows that, as a result of that, we must have $\widehat{\chi}_C > \widehat{\chi}_F$, as per part (i) of the Proposition.

Figure 2 in turn shows the implications of the result for the odds of conflict and the probability that it will succeed in dislodging the incumbent regime. The curve on the right shows the probability of a successful rebellion for a group in $\mathscr{C}$. The curve on the left shows the probability of a successful rebellion for a group in $\mathscr{F}$, and is a translation of the former curve. The set of values of $\chi_\imath$ that trigger conflict is larger for those in the capital city, and for a given $\chi_\imath$, the probability of success is always larger for conflict in the capital, as per part (ii) of the Proposition.

[14] Since H is decreasing in $\widehat{\chi}_\imath$, an increasing function h is a sufficient condition for an increasing h/H. The function h, as can be seen in (4), is the integral of a positive function from $\underline{\chi}$ to $\widehat{\chi}_\imath$, so the range of the integral is increasing in $\widehat{\chi}_\imath$ – actually, $h(\underline{\chi}) = 0$ because the risk associated with an increase in the likelihood of conflict is negligible at that point. As a consequence, h is indeed increasing for a large set of specifications – in particular, if π is linear or convex (for any distribution f) or for uniform distribution f (and any function π).

[15] Strictly speaking, the marginal cost curve is not the same for all groups, due to the denominator of the fraction inside the sum in (8). However, in equilibrium, the marginal cost of increasing $\widehat{\chi}_\jmath$ is given by (8) evaluated at $\widehat{\chi}_\jmath$, and the value of the sum is the same for all groups. Hence Figure 1 is helpful to illustrate the trade-off faced by the incumbents.

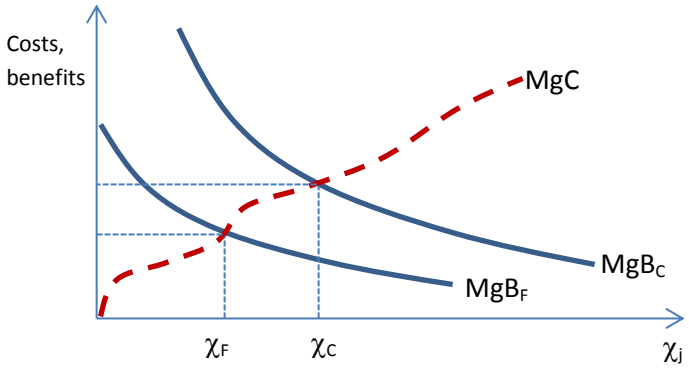


Figure 1: The choice of $\widehat{\chi}_J$

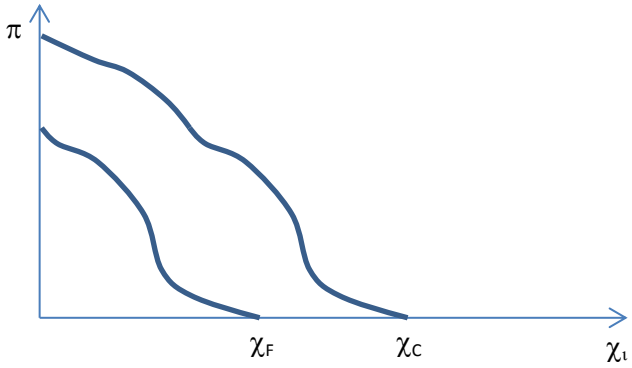


Figure 2: Probability of a successful rebellion

Closely related is the additional implication that a more isolated capital city is associated with less conflict and a lower risk for incumbent elites (part (iii) of Proposition 1). Consider an increase in ℓ_κ (say from 0 to 1) for some κ. Inspection of (8) shows that the marginal cost of increasing $\widehat{\chi}_J$ shifts up: intuitively, it is easier for incumbents to get rents, so they are less willing to face risks. The increase in ℓ_κ will also reduce the marginal benefit of increasing $\widehat{\chi}_\kappa$ – it is cheaper to buy their loyalty when they pose a smaller threat. It can be seen from Figure 1 that these movements would lead to lower values of $\widehat{\chi}_J$, and hence more security. Put simply, insofar as conflict poses a greater threat to incumbents when it takes place closer to the seat of power, an isolated capital offers them protection.

The final item in Proposition 1 (part (iv)) shows that those who pose a greater threat end up obtaining more rents in equilibrium. In other words, although they are squeezed further relative to their rebellion potential (that is, $\widehat{\chi}_C > \widehat{\chi}_F$), their advantage means that they still end up better off in absolute terms ($w_C > w_F$). The intuition is quite clear; formally, this is because the marginal benefit from increasing $\widehat{\chi}_C$ will be larger than the marginal benefit from increasing $\widehat{\chi}_F$.[16] Inspection of (7) shows that the marginal

[16] In Figure 1, the curve MgC will cross MgB_C at a point that is higher than its intersection with MgB_F.

benefit is equal to w_J^2/y^*. This means that an increasing marginal cost curve is a sufficient (and far from necessary) condition for a larger income in the capital city. 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.

3.2 Capital Cities and Quality of Governance

We must take into account, however, that the degree of isolation of the capital city is not exogenously given to incumbent elites. To the contrary, the institutional environment affects the spatial distribution of individuals relative to the capital city through a number of policy levers: from internal migration policies and specific economic incentives to populate certain areas to, most directly, the very location of the capital city – changes of which, as we have seen, have been fairly often considered and implemented.

We thus build on the previous model to study the joint determination of the isolation of the capital city and the quality of governance – that is, endogenizing the choice of ℓ_i and p. In short, besides choosing how much to extract from citizens, the incumbents now also choose the quality of governance and the degree of isolation of the capital.[17] Both of these affect the productivity of the economy, but also have distributional effects that feed back into the threat of insurrection.

3.2.1 Production, Quality of Governance, and the Spatial Distribution of Population

Now instead of an endowment economy, we consider a production function that depends on the spatial distribution of population (relative to the capital) and the quality of governance. Specifically, let ℓ^* be the output-maximizing degree of isolation of the capital city, which we take to be a primitive indicating the efficient spatial distribution of population relative to the capital.[18] We can take this to capture a balance between congestion costs and economies of scale, but the specifics are immaterial: the crucial point is that there is a cost to completely isolating the capital, and any assumption that generates such a cost suffices. Since we have established that isolation helps protect the incumbent elite against the threat of conflict, in the absence of such a cost the elite's problem would be trivially solved by totally isolating the capital, which would be both uninteresting and unrealistic.

We can then write:

$$Y = A(p)(Y^* - \phi(\Delta\ell)), \tag{9}$$

with

$$\ell \equiv \frac{\sum_i \ell_i}{n} \text{ and } \Delta\ell \equiv \ell - \ell^*,$$

[17] Needless to say, in practice incumbent governments can seldom if ever simply choose where their citizens will live. One should think of the isolation of the capital city emerging as part of a spatial equilibrium where choices are made by individuals, but which is affected by choices of the incumbents; our assumption is a shortcut to focus on those choices.

[18] To fix ideas, we can think of a country where resources are geographically concentrated (say, Egypt) as one where the optimal arrangement from a production standpoint involves a low degree of isolation ℓ^*; a country where they are spread over the country's territory (say, the United States) would exemplify a case of high ℓ^*.

and where Y is the level of output, Y^* corresponds to output when $\ell = \ell^*$ and $\phi(\Delta\ell)$ is the output loss owing to a choice of ℓ different from ℓ^*. We assume that ϕ is a convex function satisfying $\phi(0) = 0$ ($\Delta\ell = 0$ is the optimal choice), $\phi'(0) = 0$ (optimality condition) and $\phi'' > 0$. As for power sharing p and productivity A, we assume that p can be chosen in the interval $[\underline{p}, \overline{p}]$ with $0 < \underline{p} < \overline{p} < 1$, and $A' > 0$, $A'' < 0$ and $A(p)/p$ is decreasing in p.[19]

The assumption on the productivity shifter A is the other key ingredient: productivity is enhanced by increasing the measure of individuals in power, p. This is meant to capture the idea that sharing power entails good governance: the provision of public goods such as protection of property rights and enforcement of contracts require checks and balances that have to be provided by a set of civil authorities. We interpret an increase in p as the addition of such a set to the core of the incumbent elite, and their presence enables individuals to access better technologies that rely on the provision of those public goods. With this assumption in mind, we will refer to p interchangeably as a measure of power sharing or of quality of governance.

The downside of good governance, from the incumbents' standpoint, is that sharing power requires sharing rents with the civil authorities: all individuals in power must receive the same payoff.[20] It follows that the choice of governance embeds a crucial trade-off between having a larger pie and taking a larger slice of a smaller one.

3.2.2 Conflict

The rebellion mechanism is essentially the same as described in Section 3.1.1, encapsulating the idea that insurrections are costlier and less effective farther from the capital city.[21] We now allow the incumbent elite to choose each $\ell_\imath$ from the entire interval $[0, 1]$ for the sake of tractability, but the effect of isolation on the difficulties involved in rebelling against the rulers can be interpreted as before.

3.2.3 The Incumbents' Problem

Incumbents now choose not only the income of each group, but also the isolation of each group with respect to the capital, $\{\ell_\imath\}$, and the degree of power sharing, p. Output in the economy is given by (9), so incumbents maximize:

$$\mathcal{R} = \frac{1}{p}\left(A(p)(Y^* - \phi(\Delta\ell)) - \sum_{\imath=1}^{n} \frac{y^*}{\widehat{\chi}_\imath + T\ell_\imath}\right)\prod_{\imath=1}^{n} H(\widehat{\chi}_\imath) \tag{10}$$

To understand the trade-offs facing the incumbents in this setting, let us consider the relevant first-order conditions. Taking the first-order condition with respect to p and manipulating yields:

$$\frac{pA'(p)}{A(p)} = 1 - \frac{\sum_{\imath=1}^{n} \frac{y^*}{\widehat{\chi}_\imath + T\ell_\imath}}{A(p)\left(Y^* - \phi(\ell - \ell^*)\right)} \tag{11}$$

[19] In case $A(p)/p$ is increasing in p, there is no relevant trade-off, and it is optimal to set $p = \overline{p}$.

[20] This trade-off is assumed here but arises as a result in Guimaraes and Sheedy (2013). It reflects the need to provide incentives for individuals in power to defend (and not rebel against) the current set of institutions.

[21] The expression for $\gamma_\imath$ is the same as in (1). Multiplying $\gamma_\imath$ by some function of A would have no effect on results, since current incumbents would take that as given.

The LHS is the elasticity of productivity with respect to the quality of governance, and corresponds to the marginal benefit of the latter: a larger p leads to greater productivity, and hence more output. The RHS in turn amounts to the share of output that goes to the incumbent elite as rents, which have to be shared among more people when p increases: the cost of good governance for the incumbents is the need for sharing rents. Note that the isolation of the capital city affects this trade-off, because it affects how much has to be left by the elite to citizens.

By the same token, differentiating $\mathcal{R}$ in (10) with respect to $\ell_\jmath$ yields:

$$\frac{\partial \mathcal{R}}{\partial \ell_\jmath} = \frac{1}{np} \prod_\imath H(\widehat{\chi}_\imath) \left(-A(p)\phi'(\Delta\ell) + ny^* \frac{T}{(\widehat{\chi}_\jmath + T\ell_\jmath)^2} \right)$$

In consequence, $\ell_\jmath$ is given by:

$$A(p)\phi'(\Delta\ell) = ny^* \frac{T}{(\widehat{\chi}_\jmath + T\ell_\jmath)^2} \tag{12}$$

The LHS of (12) shows the marginal efficiency cost of further isolating the capital. The RHS of (12) in turn displays the marginal benefit of the extra protection bought by that isolation: a more isolated capital makes it cheaper to stave off rebellion, as citizens who are farther away represent a lesser threat and can thus receive a lower level of consumption. Note that the quality of governance affects this trade-off: the more productive the economy, the larger the absolute costs of further isolation.

3.2.4 Results

We can first state the following result, stemming directly from (11) and (12), which helps build intuition for the forces at play in the model:[22]

Proposition 2 *In the model with endogenous location and governance:*

(i) For given $\widehat{\chi}_\imath$ and p, the isolation of the capital city (ℓ) is increasing in T and ℓ^*.

(ii) For given $\widehat{\chi}_\imath$ and ℓ, quality of governance (p) is decreasing in T and ℓ^*.

Proof 2 *See Appendix B.2.*

The first statement identifies two parameters that are monotonically related to the equilibrium isolation of the capital city: an increase in ℓ^* (the optimal degree of isolation) or T (the impact of distance on the cost of rebellion) will increase ℓ. For the latter, the intuition is that a higher impact of distance on the cost of rebellion increases the effectiveness of isolating the capital city as a protection device, as indicated by (12).

[22] As can be seen from inspecting (12), an ancillary implication of the model (again, using the assumption that h/H is increasing) is that the benefit from increasing $\ell_\jmath$ is increasing on $w_\jmath$ and, consequently, decreasing in $\ell_\jmath$. Intuitively, shifting people 20 miles away from the capital is more important for the incumbents than moving people who are already far away to 20 miles further. This leads incumbents to choose the same $\ell_\imath$ for all groups $\imath$ in the economy. This is an advantage for tractability, but also makes it difficult to directly interpret the results in Proposition 1. However, assuming that some groups cannot be moved (say, because some groups have to be in the capital city) has no effect on the results of this section, and implies that essentially all results from Propositiion 1 hold in this model. The one exception is part (iii), which does not apply to this setup, as $\ell_\imath$ is now an endogenous variable.

The second statement shows that quality of governance is decreasing in T and ℓ. A larger T leads to an increase in the RHS in (11), corresponding to an increase in incumbent rents. Intuitively, when the average citizen poses a smaller threat to the incumbent regime, the latter can grab a larger amount of output, and is thus less willing to share rents in exchange for an increase in productivity. A larger ℓ^* has a similar effect.

These two statements, taken together, suggest a negative correlation between the quality of governance and the degree of isolation of the capital city. Still, they are only "partial" results: we need to take into account the mutual influence between p and ℓ, as highlighted in the previous subsection. As it turns out, we can state the following:

Proposition 3 *In the model with endogenous location and governance, if the variance of F is sufficiently small, changes in T and ℓ^* induce a negative correlation between the quality of governance (p) and the degree of isolation of the capital city (ℓ).*

Proof 3 *See Appendix B.3.*

Proposition 3 delivers a key testable prediction, linking capital cities and quality of governance: *isolated capital cities tend to be associated with worse quality of governance.*

This link between isolation of the capital city and misgovernance reflects causality going in both directions. Bad governance increases the incentives for isolating the capital city because incumbents in this case are relatively less worried about the costs of that isolation in terms of output losses. On the other hand, the protection afforded by an isolated capital means that rents can be easily collected; it follows that it is not worth increasing the productivity of the economy by improving governance, given that it would imply distributing the rents among a larger political elite.

Note that Proposition 3 assumes a small variance of F, which 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.[23] 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. If the variance of F is sufficiently small, they are never strong enough to overturn the afrementioned forces working towards a negative correlation.

3.2.5 Endogenous repression

In light of our previous results, it is interesting to ask whether there is any link between the isolation of the capital and the level of concern displayed by incumbents regarding the threat of conflict. To study

[23]The expression in (11) shows that the marginal cost of sharing power is related to the rents incumbents obtain, conditional of keeping power. In the model, it is actually possible that this *decreases* when the capital can be more isolated. Mathematically, expected rents $\mathcal{R}$ always increase in T, but it could be the case that $\mathcal{R}/\prod_i H(\widehat{\chi}_i)$ actually decreases in T.

this question, we extend our basic model by assuming that incumbents can spend resources to increase their military power, in order to make rebellions more costly.

Suppose incumbents can invest in a protection technology D (for "defense"), which increases their ability to withstand rebellion threats – we can think of that as military spending, to focus ideas. The protection technology increases the cost of a rebellion, so the expression for $\psi_\imath$ in (2) becomes:

$$\psi_\imath = \chi_\imath + T\ell_\imath + D$$

The cost of defense D is given by $\delta(D)$, with $\delta' > 0$ and $\delta'' \geq 0$. Rents received by each individual in power are now given by:

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

and the next proposition summarizes the result of this section.

Proposition 4 *If the variance of F is sufficiently small, then D is decreasing in ℓ^* and T.*

Proof 4 *See Appendix B.4.*

Along with our previous results, this 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 – such as when there is relatively little inefficiency in doing so (high ℓ^*), or when isolation is effective in staving off rebellion (high T) – there is less need to invest in military protection.

3.3 Discussion

Our framework, relying on the connection between the spatial distribution of population and the threat of rebellion, makes key predictions linking capital cities, conflict, and quality of governance. With respect to conflict, we predict that:

Prediction 1 *Conflict is more likely to emerge closer to the capital city.*

Prediction 2 *Conflict that emerges close to the capital is more dangerous to incumbents.*

These results come from the basic assumption that it is easier to put together a successful rebellion against an incumbent elite when the rebels are closer to the seat of power, which is in turn predicated on the notion that the latter plays a key role in determining who has control over the polity. This implies that it will be cheaper for incumbents to buy off those who pose a lesser threat, and as a result they will optimally choose to live with a greater equilibrium threat coming from closer to the capital.

The prediction that conflict is more likely closer to the capital stands in contrast with what one might have expected from alternative theories of conflict. For instance, to the extent that conflict is associated

with low state repressive capacity (e.g. Fearon and Laitin 2003), and that the reach of weak states gets even weaker as one moves away from the capital city (Michalopoulos and Papaioannou 2014), one would have predicted that the onset of conflict would be more likely farther from the capital.

With respect to governance, we predict that:

Prediction 3 *Isolated capital cities are associated with misgovernance.*

The link emerges as an equilibrium outcome in which causality runs both ways. Isolated capital cities lead to misgovernance, because the protection they afford to incumbent elites means that they can get away with extracting more rents, thus tilting the optimal balance away from enhancing productivity and towards concentrating rents. Conversely, misgovernance also increases the incentives to isolate the capital city, as it means that the efficiency costs of further isolation are less important.

Since the logic of our theory works through the mechanism of insurrection threats as a check on the behavior of incumbent elites, we would expect that the forces it identifies would be stronger in places where that check is relatively more important. In particular, they should be less relevant in the context of established democracies: it seems far-fetched to imagine that rebellion threats are a particularly meaningful constraint impinging on incumbents in the US or Western Europe. This is another central testable prediction that we can check against the evidence.

Finally, the theory also yields ancillary testable predictions, which are not as central to the logic of the model but can nonetheless be used to further check its explanatory power. The model predicts that the isolation of the capital city will be negatively correlated with direct measures that the elite may resort to in order to defend against the rebellion threat. We interpret this as a negative correlation with military spending, insofar as the latter is often driven, to a substantial extent, by a concern with domestic rebellions.[24] In addition, it predicts that individuals living in the capital city will be better off relative to the population that is far from the capital, because of the greater political threat that they represent, and that this will be positively correlated with the isolation of the capital city.

4 Capital Cities, Conflict, and Misgovernance: Empirical Evidence

We now turn our attention to the empirical evidence regarding the key predictions of our framework. We will start by assessing the link between capital cities and conflict, which is at the heart of the logic of our model, and then move on to the implications linking capital cities and the quality of governance.

[24]This prediction stands in contrast with alternative stories where the isolation of the capital is just an indication that the country is divided in different (and possibly antagonic) regions, since in this case one would expect more investment in protection.

4.1 Capital Cities and Conflict

4.1.1 Data

We start by describing more extensively the variables needed to capture the main concepts needed to test the predictions of our framework regarding conflict and capital cities. (All other variables will be introduced as they are used, and described in the Online Data Appendix.)

Testing our key predictions regarding the likelihood and consequences of conflict as a function of distance to the capital city requires geo-located information ond the incidence of conflict. For that we use the PRIO-GRID dataset (Tollefsen, Strand and Buhaug 2012) (Advanced Conflict Data Catalogue (ACDC) project). This dataset makes available a number of different variables measured at the level of 0.5 x 0.5 decimal degree cells covering all terrestrial areas of the world. Each cell is, on any given year, attributed to one single (independent) country – for cells that straddle country borders, the attribution is to whichever independent country happens to contain the largest share of the cell's territory.

We focus our attention on intrastate conflict, which is the kind of event our framework is concerned with. We use as one of our main variables the dummy $CivConf$, coded for the years between 1989 and 2008 (Hallberg 2012), which specifies whether a cell lies within a conflict area in a particular year. Our second key variable is *Onset* (Holtermann n.d.), which for every cell indicates years in which a conflict started in that cell, and is coded for the 1946-2008 period.

The dataset contains a measure of distance (in kilometers) from the cell centroid to the country's capital, but the designation of capital cities did not generally track the instances of capital city moves – we added those manually (as described in Table 1). The dataset does cover, on the other hand, changes in capital cities due to the breakup and emergence of new countries. We will use that source of variation as an integral part of our identification strategy, as we discuss below.[25]

We will also use the distance information to build a measure of how far from the capital the average conflict is. For this, we use the axiomatically grounded family of measures of spatial concentration (or equivalently, isolation) around a point of interest proposed in Campante and Do (2010). Specifically, they show that a very simple and easily interpretable measure of isolation has a number of desirable properties (and uniquely so): the average log distance to the capital city – which for shorthand we will describe as $AvgLogDistance_Conflict$.[26] We focus on a measure of distance that adjusts for the geographical size of the country, to allow for the possibility that a given distance could mean different things in countries

[25] We were careful not to include as changes in capital cities the instances in which a given cell is reassigned to a different country simply as a result of the latter becoming independent, with no actual breakup or annexation involved. For instance, suppose a cell happens to be on the border between Ghana and Cote d'Ivoire, with 40% of its territory on the former and 60% on the latter. The dataset would attribute that cell to Ghana between 1957 (when that country became independent) and 1960 (when Cote d'Ivoire did), because Cote d'Ivoire was then coded as missing. From 1960 onwards, it would attribute the cell to Cote d'Ivoire. In that case, we attributed the cell to Cote d'Ivoire for all years.

[26] See Campante and Do (2010) and Campante and Do (2014) for a more extensive discussion. A description of the index (both for conflict and population, which we will use in the next subsection) as we actually compute it in practice, given the data we have, can be found in the Data Appendix. An important practical issue refers to how we deal with countries that have multiple capitals. The Data Appendix documents how we deal with these issues, but in any case the results are unaffected by any of these choices.

that are geographically small or large: 100 miles could be seen as a long distance in Belgium, but not so much in Canada. That said, we will also look at a version that does not adjust for geographical size, for the sake of robustness.

4.1.2 Conflict Is More Likely Closer to the Capital

We first consider the evidence on intrastate conflict, taking grid cells as the unit of analysis. The results are in Table 2. All specifications in that table include an extensive set of control variables (also from the PRIO-GRID dataset), which help us deal with a number of factors that may correlate with the likelihood of conflict: income per capita, population, and infant mortality as measures of socio-economic conditions, travel time to the nearest major city as a measure of broad isolation as well as urbanization, and a number of geographic characteristics (share of mountainous terrain and forest coverage, latitude, average temperature and precipitation).

Table 2. Distance to the Capital and Conflict: Cross-cell Regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependant variable	Average probability of conflict (*CivConf*)				Interstate conflict	Average probability of conflict onset (*Onset*)			
Sample	Full	Polity <=0	Polity >=0	Polity >=9	Polity <=0	Full	Polity <=0	Polity >=0	Polity >=9
Log Distance to Capital	-0.0041	**-0.0279****	-0.0017	-0.0014	0.0006	-8.74e-05**	**-0.000149****	-4.81e-05	-2.24e-05
	[0.0048]	**[0.0137]**	[0.0053]	[0.0010]	[0.0006]	[3.45e-05]	**[6.23e-05]**	[2.92e-05]	[1.82e-05]
Full set controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	46,398	9,179	37,632	12,929	9,179	46,283	26,121	20,023	12,179
R-squared	0.856	0.875	0.850	0.838	0.487	0.056	0.053	0.072	0.047
Country FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in brackets are clustered at country level. Columns (1) to (5) use the indicator of ongoing conflicts in each cell, averaged from 1989 to 2008 where conflict data are available. Columns (6) to (9) use the indicator of conflict onsets (the start of a new conflict) in each cell, averaged from 1946 to 2008 where conflict onset data are available. All columns include the averages over the corresponding period of the following variables for each cell: log Gross Cell Products per capita (night luminosity-enhanced measures, available in 1990, 1995, 2000, 2005), log population (available in 1990, 1995, 2000, 2005), temperature, precipitation. In addition, all columns control for: infant mortality rates, proportion of mountain area, proportion of forest (all measured in 2000), log travel time to the nearest urban area, and cell latitude. Country fixed effects are included. *** p<0.01, ** p<0.05, * p<0.1.

Our first dependent variable is the probability of conflict, as measured by the dummy $CivConf$ averaged over the entire available period (1989-2008). The first column in Table 2 shows the correlation with the measure of distance to the capital city, for the full sample. We see no evidence of any link, but the next three columns immediately show that this hides an asymmetry between more and less democratic contexts.

In particular, Column (2) shows that countries with an average Polity score below zero – a threshold meant to encompass "autocracies" and "closed anocracies", as defined by the Polity IV dataset – display a strong negative correlation: conflict is more likely in areas that are closer to the capital. Quantitatively, our estimate of -0.0279 implies that halving the distance to capital city would increase conflict probability

by 1.93 percentage points (= log(2) × 0.0279), or about 11% of 17.48 percentage points, the average probability of conflict per cell in this subsample. (The standard deviation of log distance to capital in this subsample is 0.91, corresponding to a change of distance by 2.5 times.) In contrast, relatively democratic countries (Column (3)), and especially the strongly established democracies with an average Polity score over 9 (Column (4)), display no correlation whatsoever.

In short, the model's prediction is backed by the evidence, exactly in the sample of countries where we would expect the model's logic of insurrections as a check on incumbent behavior to be more important. In contrast, Column (5) shows that no correlation exists between interstate conflict and distance to the capital emerges, even in autocracies. This is reassuring, since we would not expect the logic of our model to speak to this type of conflict.

The remainder of Table 2 considers conflict onset (*Onset*) as the dependent variable. We see that now a correlation emerges, in the same direction as before, even for the full sample. Still, the pattern is once again very different between autocracies and democracies, as the correlation holds only for the former. Quantitatively, the estimate of -0.000149 implies that, in autocracies, halving the distance to capital city would increase the chances of conflict onset by 0.0001, or 86% of 0.00012, the mean of *Onset* in this sample.

4.1.3 Conflict Becomes More Likely When the Capital Is Moved Closer

We can go further in terms of identifying a causal link between distance to the capital and conflict by exploiting the panel dimension of the dataset. Generally speaking, distance to the capital is constant for a given grid cell, but there are two important kinds of exception to this rule that afford us some variation over time. First, when the same grid cell becomes part of a different country, the relevant capital city changes as a result.[27] Second, the same is true when a given country changes its capital. As we have discussed, there are a number of examples of the latter, and our sample also displays many instances of the former – especially, but far from exclusively, with the breakup of the Soviet Union and Yugoslavia. To the extent that these events are uncorrelated with time-variant grid-cell characteristics, we can consider the effects of those quasi-random "treatments" of changing distance to the capital.[28]

We thus implement specifications with grid-cell fixed effects. The results in Table 3, for conflict onset, are indeed consistent with the negative link predicted by the theory.[29] Once again, the result holds only for the non-democratic subsample. In addition, it is robust to controls for time-variant geographic factors such as distance to the closest border, temperature and precipitation (total and variation), as well as an indicator for famine, which have also been flagged in the conflict literature. Quantitatively, the estimate of -0.000485 among non-democratic countries is very large. It implies that halving the distance to capital

[27] As argued in footnote 25, this excludes cases in which the change in assigned country is due to an arbitrary dataset choice, with no change in actual borders.

[28] Note that, to the extent that a ruler's incentives would most likely be towards moving the capital to places where conflict would be intrinsically *less* likely, this would bias us against finding the sign predicted by the theory.

[29] The results for the average probability of conflict are qualitatively similar, but less precisely estimated. This is unsurprising, in light of the considerably smaller sample in terms of number of years.

city would increase conflict onset probability by 0.000336, or about 3 times the mean of *Onset* in the subsample.

Table 3. Distance to the Capital and Conflict: Within-cell Regressions

	(1)	(2)	(3)	(4)
Dependant variable	Conflict onset over time (*Onset*)			
Sample	Baseline	Polity <=0	Polity <=0	Polity >=0
Log Distance to Capital	-0.000252***	**-0.000395*** **	**-0.000485*** **	4.08e-05
	[9.43e-05]	**[0.000144]**	**[0.000162]**	[5.19e-05]
Controls	No	No	Yes	No
Observations	3,912,793	2,032,693	1,672,133	1,671,146
R-squared	0.028	0.030	0.032	0.023
Cell FEs	Yes	Yes	Yes	Yes

Robust standard errors in brackets are clustered at country level. The dependant variable is the indicator of conflict onset in each cell, available from 1946 to 2008. Control variables include log closest distance to the border, temperature, precipitation and an indicator of a famine. Cell fixed effects are included. *** p<0.01, ** p<0.05, * p<0.1.

The panel specification does have drawbacks. First, the variation is coming from a small set of countries, which makes it more remarkable that we find robust results, but also raises natural questions about external validity. Second, we have a reduced set of available time-varying control variables. For instance, we cannot control for population, since the data is available only for a small subset of years, and as such, the effect we find in Table 3 could be partly driven by population being drawn to a certain area once it becomes closer to the capital city. In both regards, it is reassuring that the results are in line with what we had obtained using the cross-sectional variation from the whole sample, in Table 2.

4.1.4 Conflict Is More Dangerous Closer to the Capital

We then turn to our second conflict-related prediction, namely that conflict that happens closer to the capital is more likely to dislodge the incumbent regime. Since regime change happens at the country level, we now consider variation across countries (as opposed to across grid cells), with the dependent variable being *RegimeChange*, the five-year probability of a change in regime as coded in the Polity IV dataset. Our key independent variable of interest is now $AvgLogDistance_Conflict$, which captures the spatial distribution of conflict (relative to the capital city) by measuring how isolated the capital is from the grid cells where conflict is recorded. We discard countries for which no conflict is recorded, since it is not obvious how to code isolation in that case, and as a result we end up with a rather small sample, with 63 countries in total.

Panel A in Table 4 shows the results when we focus on the cross-country variation, by averaging

the variables over the entire sample period. In spite of the small sample, the model's prediction is again supported by the evidence. The first column shows the basic result for the autocracy subsample, controling for the total prevalence of conflict, population, income per capita, and region dummies. The column also examines the robustness of the result to the threat of potential omitted variable bias: the "selection-corrected bound" is the estimate of a conservative bound for that effect, following Oster's (2013) procedure (in the spirit of Altonji, Elder and Taber 2005) which assumes that there is as much selection on unobservables as there is selection on observables.[30] This bound is estimated to be farther from zero than the point estimate, indicating that the negative coefficient we find is very unlikely to be driven by selection on unobservables.

Column (2) shows that the result remains unaltered when we correct for the inevitable selection bias stemming from discarding no-conflict countries.[31] Columns (3)-(4) display the same set of results, but using the measure of isolation that does not adjust for the geographical size of the country, $UnadjAvgLogDistance_Conflict$. Finally, Columns (5)-(6) then show that the pattern is once again absent when it comes to the subsample of more democratic countries.

The spatial distribution of conflict is clearly endogenous, so we cannot interpret the coefficients in Panel A as causal estimates. For instance, it could be the case that the very fact that a regime is wobbling would lead to more conflict arising closer to the capital. To deal with that possibility of reverse causality, we follow the literature that has explored the link between climatic conditions, civil conflict, and regime change (Miguel, Satyanath and Sergenti 2004, Burke et al 2009, Brückner and Ciccone 2011). Specifically, we exploit the variation studied by Couttenier and Soubeyran (2014), who show in the context of Sub-Saharan Africa that droughts are associated with an increased risk of civil war. We use the Palmer Drought Severity Index (PDSI) (Palmer 1965, Dai, Trenberth and Qian 2004), which provides geolocated measures of departures in moisture from a climatological normal.[32] The measure is available at a monthly frequency, which we aggregate up over the period for which the conflict data are available. We then compute the spatial distribution of drought relative to the capital city, $AvgLogDistance_PDSI$, and use that as an instrumental variable for the spatial distribution of conflict.

The results are in Panel B of Table 4, for the adjusted (Columns (7)-(8)) and unadjusted (Columns (9)-(10)) measures of isolation, in the sample of autocracies (Polity score below zero).[33] We see significant negative IV estimates, both for the adjusted and unadjusted measures, which are substantially larger than the OLS estimates in Panel A. The first-stage results show that the instrument is relatively weak when it comes to the adjusted measure, but the table shows that weak-instrument-robust inference (Anderson-

[30] This follows Altonji, Elder and Taber's (2005) argument that there should be at most as much selection on unobservables as there is selection on observables.

[31] Specifically, we implement a Heckman selection model using the averages of temperature, precipitation and famine as excluded IVs in the selection equation. The first stage coefficients of the excluded IVs are jointly significant at 10%.

[32] See Couttenier and Soubeyran (2014) for a discussion of the measure, which uses rainfall, temperature, and soil information. It is on a scale [-15,15], with 0 being a "normal" climatic situation, and 15 and -15 indicating "extremely dry" and "extremely wet" climate, respectively (see Data Appendix).

[33] The first stage is far from significant in the sample of stable democracies – consistent with the fact that the link between climate and civil war does not seem to be important in the latter context.

Table 4. Conflict and Regime Change on Average Across Countries

Panel A: OLS and Heckman selection models

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	5-year probability of regime change (*RegimeChange*)					
Method	OLS	Heckman	OLS	Heckman	OLS	Heckman
Sample	Polity≤0	Polity≤0	Polity≤0	Polity≤0	Polity≥0	Polity≥0
Conflicts' AvgLogDistance	**-1.036*** **	**-0.939***			0.0402	0.284
to capital city (adjusted)	**[0.362]**	**[0.466]**			[1.099]	[0.629]
Conflicts' AvgLogDistance			**-0.470*** **	**-0.396*** **		
to capital city (unadjusted)			**[0.147]**	**[0.123]**		
Total # conflicts	-0.000230	-0.000189	-0.000290*	-0.000211	-0.000952**	-0.000851***
	[0.000157]	[0.000221]	[0.000168]	[0.000216]	[0.000284]	[0.000232]
Inverse Mill's ratio		-0.0227		-0.0131		0.0681*
		[0.0221]		[0.0233]		[0.0337]
Selection-corrected bound	-3.116		-1.232			
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Region FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	43	31	43	33	20	20
R-squared	0.265	0.538	0.270	0.537	0.730	0.844

Panel B: 2SLS (Draught Severity)

	(7)	(8)	(9)	(10)
Dependent variable	Conflicts ALD (adjusted)	*RegimeChange*	Conflicts ALD (unadjusted)	*RegimeChange*
Method	1st Stage	IV	1st Stage	IV
Sample	Polity≤0	Polity≤0	Polity≤0	Polity≤0
PDSI' AvgLogDistance	**0.0397** **			
to capital city (adjusted)	**[0.0187]**			
Conflicts' AvgLogDistance		**-2.413***		
to capital city (adjusted)		**[1.283]**		
PDSI' AvgLogDistance			**0.152*** **	
to capital city (unadjusted)			**[0.0474]**	
Conflicts' AvgLogDistance				**-0.961** **
to capital city (unadjusted)				**[0.376]**
Total # conflicts	-0.000261***	-0.000600	-0.000638***	-0.000589*
	[0.0000701]	[0.000393]	[0.000147]	[0.000336]
Control variables	Yes	Yes	Yes	Yes
Region FEs	Yes	Yes	Yes	Yes
Observations	43	43	43	43
Kleibergen-Paap F-Stat	4.496	-	10.243	-
Anderson-Ruben test $\chi^2(1)$		6.84		9.32
Anderson-Rubin Wald test p-value		**0.0089*** **		**0.0023*** **
R-squared	0.502	0.083	0.481	0.101

Robust standard errors in brackets. The dependent variable is the indicator of regime change within 5 years, averaged over time for each country. Heckman selection models use the averages of temperature, precipitation and famine as excluded IVs in the selection equation. All regressions control for averages of log GDP per capita and log population. Columns (1), (2), (5), (6), (7) and (8) control for the max distance from a cell in each country to its capital city. World region fixed effects are included. Columns (1) and (3) show the bound from 0 with Oster's (2013) correction when selection by unobservables equals selection by observables. *** p<0.01, ** p<0.05, * p<0.1.

Rubin test) delivers similar results. As long as the exclusion restriction is valid – namely, that the spatial distribution of drought conditions would only affect the probability of regime change through its effect on the likelihood of conflict – we may interpret these estimates as causal. In any case, the IV results suggest that the link between conflict closer to the capital and a greater probability of regime change is no mere

artifact, nor purely driven by reverse causality.

Our next step is to make use of the panel variation in the conflict and regime change data, in Table 5. Specifically, this table mirrors the specifications in Panel A of Table 4, but using the variation ove time instead of country averages, and including country fixed effects to control for unobserved, time-invariant factors. We see in Columns (1)-(2) that when conflict becomes more concentrated around the capital, the likelihood of regime change goes up, in the subsample of autocracies. Columns (3)-(4), in contrast, show yet again that democratic countries display no relationship, and Columns (5)-(6) confirm the basic result with the unadjusted measure of isolation.[34]

Table 5. Conflict and Regime Change within Countries

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	5-year probability of regime change (*RegimeChange*)					
Method	OLS	Heckman	OLS	Heckman	OLS	Heckman
Sample	Polity <=0	Polity <=0	Polity <=0	Polity <=0	Polity >=0	Polity >=0
Conflict AvgLogDistance	**-0.859***	**-0.972***			0.707	0.434
to capital city (adjusted)	**[0.478]**	**[0.492]**			[2.206]	[2.211]
Conflicts' AvgLogDistance			**-1.143****	**-1.245****		
to capital city (unadjusted)			**[0.538]**	**[0.557]**		
Log total # conflicts	0.103***	0.104***	0.103***	0.103***	0.0922	0.101
	[0.0271]	[0.0272]	[0.0265]	[0.0266]	[0.0629]	[0.0698]
Inverse Mill's ratio		0.255		0.0901		0.533
		[0.760]		[0.634]		[0.633]
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Observations	309	285	309	285	177	141
R-squared	0.462	0.474	0.459	0.470	0.391	0.380
Country FEs	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in brackets are clustered at country level. The dependent variable is the indicator of regime change within 5 years. Heckman selection models use annual temperature, precipitation and famine (averaged over grid cells) as excluded IVs in the selection equation. All regressions control for log GDP per capita and log population. Columns (1), (2), (5), and (6) control for the max distance from a cell in each country to its capital city. Country fixed effects are included. *** p<0.01, ** p<0.05, * p<0.1.

4.2 Capital Cities and Quality of Governance

4.2.1 Data

In order to test our predictions linking isolated capital cities and misgovernance at the country level, we need measures of quality of governance and of the degree of isolation of country capitals.

In order to measure quality of governance across countries, we resort to the well-known and widely used Worldwide Governance Indicators (WGI), from the World Bank (Kaufman, Kraay and Mastruzzi, 2010). They aggregate information, from a number of different sources ranging from surveys of households and firms to assessments from NGOs, commercial providers and public organizations, into six different measures: Rule of Law, Voice and Accountability, Government Effectiveness, Regulatory Quality, Con-

[34] We do not include IV panel results, as the variation in drought conditions is too noisy for the IV to work in the within-country dimension.

trol of Corruption, and Political Stability. Since the year-to-year variation in the quality of governance measures is not very meaningful, we will average them over time for the entire period for which the WGI are available (1996-2012, bi-annually until 2002). To make things as simple as possible, and making use of the fact that these individual measures are very highly correlated with one another, we will summarize them in a single number, using the first principal component of the six measures taken together.[35]

When it comes to measuring how isolated a capital city is, we use the measure of *AvgLogDistance*, now computed using gridded population data. (We again use both adjusted and unadjusted versions for robustness.) We compute the measure using the database *Gridded Population of the World* (GPW), Version 3 from the Socio-Economic Data Center (SEDC) at Columbia University. This dataset, published in 2005, contains the information for the years 1990, 1995 and 2000, and is arguably the most detailed world population map available. Over the course of more than 10 years, these data are gathered from national censuses and transformed into a global grid of 2.5 arc-minute side cells (approximately 5km, or 3 miles), with data on population for each of the cells in this grid. As it turns out, the autocorrelation in the measure of population concentration is very high across the ten-year period in question. For this reason, we choose to focus on *AvgLogDistance* as computed for the one year, 1990, that is judged by the SEDC as having the highest data quality. [36]

4.2.2 Isolated Capital Cities and Misgovernance

The raw data, as displayed in Figure 3, show a negative correlation between the first principal component of the six WGI governance measures and *AvgLogDistance*, our benchmark measure of isolation. The systematic evidence in Table 6 confirms this message, in Columns (1)-(2). (All tables henceforth report coefficients estimated for the standardized variables, so that they should be interpreted in terms of standard deviations, as computed for the full sample.) The correlation is statistically significant, and robust to a wide range of control variables that are often associated with governance – ranging from GDP per capita, urbanization, and population, to ethnic fractionalization and characteristics of the political system (such as the presence of majoritarian elections or of a presidential system), as well as regional and legal origin dummies.[37] (All control variables in our analysis are averaged over the same period for which the

[35] The correlation between the different average measures, in our sample of 178 countries, is never below 0.73, and typically far above 0.8. The Kaiser-Meyer-Olkin overall measure of sampling adequacy is 0.896, indicating that a principal components analysis is warranted.

[36] We limit our analysis to countries with more than one million inhabitants, since most of the examples with extremely high levels of concentration come from small countries and islands. In addition, all of our analysis will exclude Mauritius, because it is an outlier in terms of the concentration of population. As it turns out, our results are made stronger by its inclusion, so we want to make sure that nothing is driven by this specific case.

[37] Our results are also robust to including educational achievement as a control variable, as measured by total years of schooling in 1995 (from the Barro-Lee dataset). We choose not to include it in our main specifications because it is very highly correlated with income per capita (around 0.75 in the full sample), and ends up being statistically insignificant in all specifications. The results are also unaltered if we control directly for population density, which we do not do in the main specifications because we already include a control for population and the adjustment for country size implicit in our measure of concentration. Last but not least, the results are robust to including a comprehensive set of geographical and historical control variables, including an island dummy, length of coastline, date of independence, and presence of natural resources. All of these can be seen in Appendix Table 1.

governance measure is calculated, 1996-2006, unless noted otherwise.)

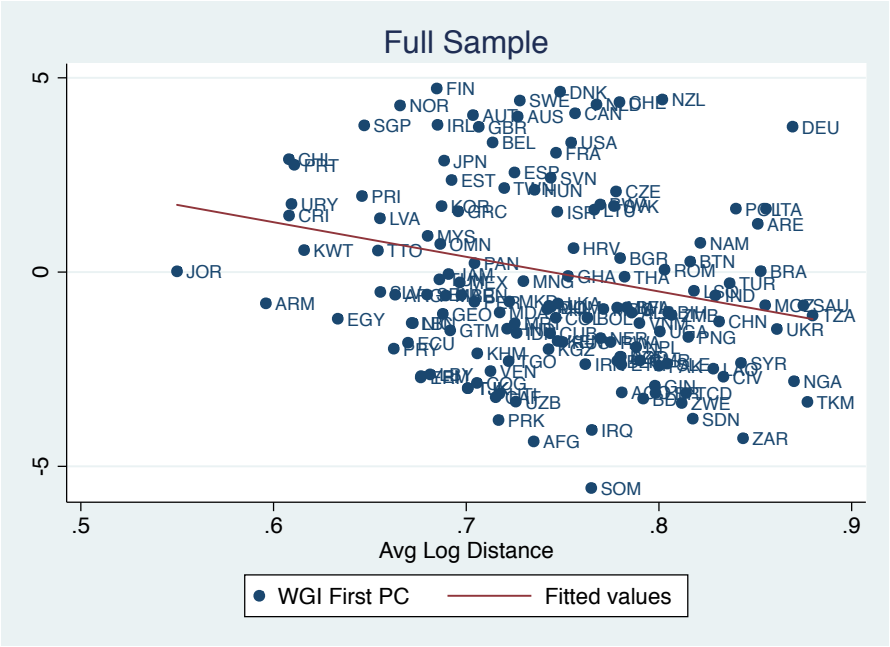


Figure 3: Governance and Isolation of the Capital City

Table 6. Isolated Capital Cities and Misgovernance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep. Var.: WGI PC								
	Full Sample		Autocracies		Establ. Democracies		Full Sample	
Avg Log Distance	-0.1610***	-0.1430***	-0.2670***	-0.3219***	-0.0585	-0.0095	-0.0592	-0.0584
	[0.057]	[0.054]	[0.066]	[0.049]	[0.121]	[0.137]	[0.064]	[0.064]
Avg Log Distance X Autocracy							-0.2316***	-0.2420***
							[0.081]	[0.082]
Basic Set of Controls	X		X		X		X	
Full Set of Controls		X		X		X		X
Selection-corrected bound	-0.137	-0.124	-0.260	-0.338			-0.207	-0.235
Observations	127	127	36	36	31	31	127	127
R-squared	0.823	0.830	0.829	0.884	0.898	0.916	0.869	0.870

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: 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.
Conservative bounds of effects are calculated following Oster (2013) and Altonji et al (2005) in assuming equal selection on observables and selection on unobservables.

*** p<0.01, ** p<0.05, * p<0.1

As it turns out, this broad pattern again masks differences between democracies and non-democracies, as suggested by the theory. To see this, we can again focus on the threshold of Polity score equal to zero, which here translates roughly into the bottom tercile of our sample, and compare it with the set of full-fledged, established democracies, as defined by a Polity score above 9. Figure 4 shows the scatterplots for the two subsamples: there is essentially no correlation in the group of established democracies, whereas

a negative association emerges in the sample of autocracies.[38]

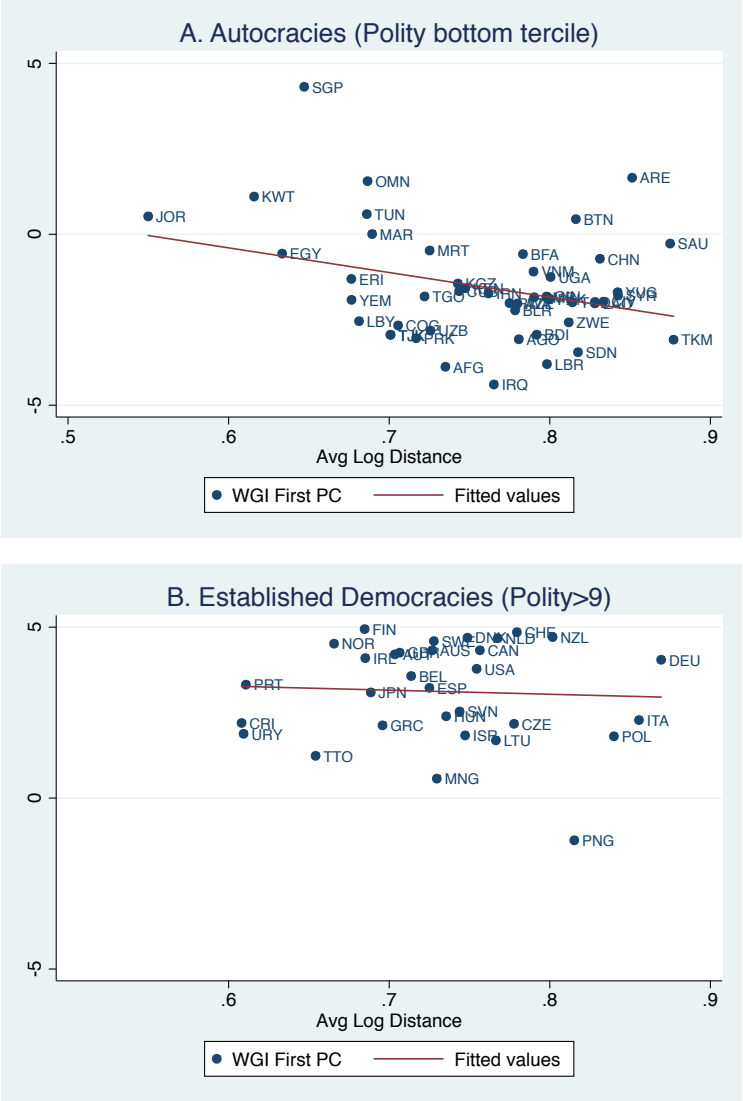


Figure 4: Governance and Isolation of the Capital City: Autocracies vs Established Democracies

This central message is underscored by the systematic evidence in the remainder of Table 6. Columns (3)-(4) show that the negative correlation between isolated capitals and the quality of governance is indeed particularly pronounced in the non-democratic countries, in spite of the relatively small sample size. The results are again robust to correcting for selection on unobservables, as the estimated bounds are very close to the point estimates.[39]

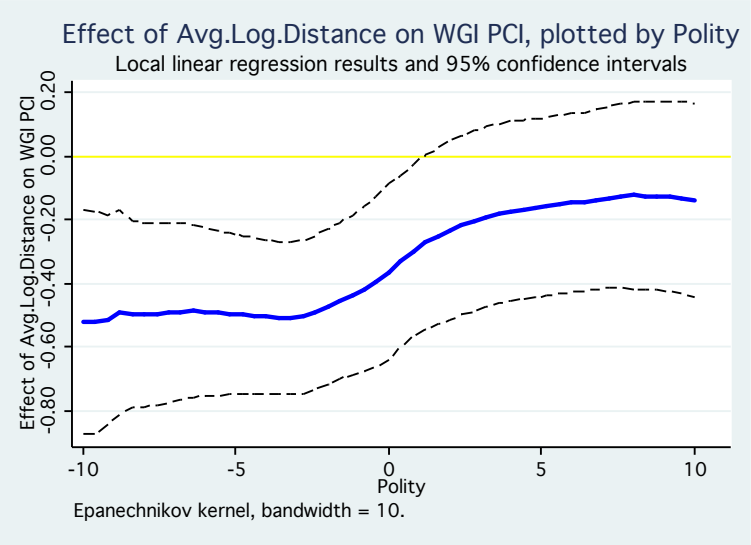
This pattern is in stark contrast with Columns (5)-(6), which show that the correlation is essentially non-existent in countries with established democracies. In fact, in spite of the relatively high standard

[38]The correlation, as well as all the regression results that follow, are robust to the exclusion of Singapore, which seems to be an outlier in terms of governance among the countries in this subsample.

[39]Both Oster (2013) and Altonji, Elder and Taber (2005) argue that, in practice, selection on observables is expected to be of a smaller magnitude than selection on unobservables, in which case our results should be even more robust to omitted variable bias. To put it differently, there has to be a very large ratio of selection on unobservables to selection on observables to be able to fully explain away the negative coefficient of interest – for instance, for Column (2) the ratio must exceed 4.5.

errors, especially in the sample of democracies, we can specifically reject the hypothesis of equality of coefficients on the concentration of population around the capital across the two subsamples (p-value = 0.0018). Last but not least, Columns (7)-(8) show that the same message is conveyed by the full sample, if we include an interaction term between the isolation measure and an autocracy dummy. Put simply, the key prediction of our model linking isolated capitals and misgovernance is also borne out by the data.

The same pattern can be seen using a more flexible, semi-parametric approach. Specifically, we can model the potentially heterogeneous effect of the isolation of the capital on the quality of governance as a non-parametric function of the Polity measure (denoted as p): $WGI_i = \alpha(p_i) + \beta(p_i) * AvgLogDistance_i + X_i\Gamma + \epsilon_i$, where X_i stands for the basic control variables as in Column (1) of Table 7. For each value of p along a 50-point grid over the $[-10, 10]$ range, we run a local linear regression of WGI_i on $AvgLogDistance_i$, using the Epanechnikov kernel with a bandwidth of 10, to obtain an estimate of $\beta(p)$.[40] The resulting function is plotted in Figure 5. We can see a patern in which a significant negative coefficient is found for relatively autocratic countries, at the lower end of the range, while for the more democratic countries the coefficients are much smaller in absolute value, and statistically indistinguishable from zero. Notably, the threshold falls right around around the Polity score of zero that separates the regimes classified as autocracies and closed anocracies.



Notes: WGI First PC: first principal component of six World Governance Indicators measures (Rule of Law, Voice and Accountability, Government Effectiveness, Regulatory Quality, Control of Corruption, Political Stability). The figure plots the coefficients on Avg Log Distance from local linear regressions with WGI PCI as dependent variable, and Log GDP per capita, Log Population, Urbanization, and Region and Legal Origin dummies as control variables. The size of the grid is 50, with a bandwidth of 10, and we use the Epanechnikov kernel.

Figure 5: Governance and Isolation of the Capital City, by Polity Score

We can also assess the quantitative importance of the correlation. Since we report standardized results,

[40] The observed pattern is much similar across a wide range of cross-validated bandwidths (see Li and Racine 2006, ch. 2).

it is easy to interpret the coefficients in Table 6: a one-standard-deviation increase in the isolation of the capital (computed over the distribution for the entire sample) is associated with a decrease in the measured quality of governance of just over 0.3 standard deviation, in the context of the full specification for the non-democratic subsample (Column (4)). To make this more concrete, consider the thought experiment of increasing the isolation of the capital from about average among autocracies (approximately that of Nairobi in Kenya) to one standard deviation above it (roughly that of Sudan's Khartoum). As it turns out, the quality of governance in Kenya is also measured as about average for our sample of autocracies, whereas Sudan's is among the very worst in the world – better only than Iraq, Afghanistan, and Liberia. The estimated coefficient suggests that the increase in isolation would be associated with a decrease in the quality of governance that corresponds to about 40% of the actual difference between the two countries. This is not a causal estimate of the impact of increasing isolation, of course, and our theory itself is explicit about the presence of reverse causality; still, this suggests that the mechanism linking accountability and isolation via the threat of conflict is important from a quantitative perspective.

4.2.3 Robustness

The association between isolated capital cities and poor governance, as well as the fact that it is present only in relatively non-democratic contexts, also holds under different ways of measuring the degree of isolation of the capital and the quality of governance.

We consider three alternative measures of isolation: (i) the "unadjusted" version of *AvgLogDistance*; (ii) the (log of the) distance between the actual capital and the least isolated place in the country;[41]; and (iii) capital primacy, namely the share of the country's population living in the capital city as officially delimited, which is an inverse measure of isolation. The pairwise correlations between these variables and (adjusted) *AvgLogDistance* in our sample – 0.62, 0.59, and -0.37, respectively – clearly show that the measures are related, as expected, but substantially different nonetheless. In particular, capital primacy is a rather unsatisfactory measure, as it relies on arbitrary definitions of what counts as the capital city and discards all the information on the spatial distribution outside of that arbitrarily delimited city, and the lower correlation underscores that it is indeed noisier. Still, it is sufficiently common so as to warrant checking, for the sake of completeness. As for the quality of governance, we use another measure, the Rule of Law index compiled by Freedom House, which also gives us a sufficiently wide coverage in terms of the number of countries – and particularly of non-democratic ones. (We rescale the index so that higher scores correspond to better governance.)

The results are shown in Table 7. Columns (1)-(4) reproduce the specifications for autocracies and established democracies, respectively from Columns (4) and (6) in Table 6, but looking at unadjusted *AvgLogDistance* and the distance to the least isolated place, respectively, as key independent variables.

[41] Notably, for most countries the least isolated location is the country's largest city, which often turns out to be the capital city itself. The exceptions are illustrative: in China, it is close to Zhengzhou, the largest city in that country's most populous province (Henan); and similarly for India, where it is also in the most populous state (Uttar Pradesh). In the US, it is Columbus, OH, right in the middle of the large population concentrations of the East Coast and the Midwest.

Table 7. Isolated Capital Cities and Misgovernance: Robustness

Dep. Var.:	(1) WGI PC	(2) WGI PC	(3) WGI PC	(4) WGI PC	(5) WGI PC	(6) WGI PC	(7) FH	(8) FH	(9) WGI PC
	Autocracies	Democracies	Autocracies	Democracies	Autocracies	Democracies	Autocracies	Democracies	Full Sample
Avg Log Distance (unadj.)	-0.4499***	0.1018							
	[0.115]	[0.308]							
Distance Min. Isolation			-0.2277***	0.0364					
			[0.058]	[0.082]					
Capital Primacy					0.1137	-0.1679**			
					[0.070]	[0.076]			
Avg Log Distance							-0.2009**	0.0066	-0.0057
							[0.080]	[0.025]	[0.070]
Avg Log Distance X Autocracy									-0.2736***
									[0.096]
Avg Log Distance (Other Largest)									-0.1489*
									[0.081]
Avg Log Distance (Other Largest) X Autocracy									0.0714
									[0.116]
Selection-corrected bound	-0.474		-0.244		0.0783		-0.227		-0.272
Observations	36	31	34	31	32	31	35	29	126
R-squared	0.859	0.918	0.846	0.918	0.846	0.928	0.611	0.891	0.877

Robust standard errors in brackets. Z-scores (normalized variables) reported. WGI PC (Columns (1)-(6) and (9)): First Principal Component of Worldwide Governance Indicators measures (Rule of Law, Voice and Accountability, Government Effectiveness, Regulatory Quality, Control of Corruption, Political Stability). FH (Columns (7)-(8)): Freedom House Rule of Law Index. Autocracies: Polity <=0, except for Column (5) where the threshold is the median Polity score (<=6); Established Democracies: Polity > 9. Control variables: Log GDP per capita, Log Population, Urbanization, and Region and Legal Origin dummies, Majoritarian and Presidential system dummies, and Ethnic Fractionalization; and Log Land Area and Maximum Distance in the Country (Log of maximum distance (in km) between capital city and any point in the country), for Columns (1)-(4) only. Column (9) also includes Autocracy dummy as control variable. Columns (1), (3), (5), (7) and (9) show the bound from 0 with Oster's (2013) correction when selection by unobservables equals selection by observables. *** p<0.01, ** p<0.05, * p<0.1.

In both cases we see a similar negative, statistically significant correlation between isolated capital cities and quality of governance, for the autocracy subsample only. Note that the results are not too far, quantitatively speaking, from what we found in our baseline.

Columns (5)-(6) then consider the coarser measure, capital primacy. Unfortunately, our data on capital city populations is considerably more sparse, so in order to obtain reasonable sample sizes we consider an "autocracy" threshold at the median Polity score in our distribution (equal to 6). This includes what the Polity dataset classifies as "open anocracies" (Polity score between zero and 5), as well as a few less established "democracies". We see a positive coefficient (p-value: 0.122), only for the subsample of autocracies (Column (3)). Note also that the estimated coefficients are considerably smaller and less precisely estimated, consistent with substantial measurement error being introduced by the coarseness of the measure.

In addition, Columns (7)-(8) repeat the same exercise with the Freedom House measure of governance – reverting back to using our standard zero threshold for autocracies, and *AvgLogDistance* as our key independent variable. The results are very much consistent, which is unsurprising given that the measures of governance are very highly correlated (in excess of 0.80). Still, and particularly with our small samples, it is reassuring to learn that the results are not very sensitive to that choice of measures.

The last column in Table 7 then addresses a different robustness exercise: whether the results are indeed driven by the role of the capital city itself, as opposed to other correlated features of the spatial distribution of population. Specifically, it could be that relatively isolated capital cities often correspond to the existence of a major economic center away from the capital, like Istanbul or São Paulo or Lagos. This

could be associated with another elite based in that other city, which might be conducive to misgovernance in different ways – say, through their own predatory behavior, or through disputes with the political elites situated in the capital. In order to check that our results are not driven by this type of mechanism, we compute our measure of isolation $AvgLogDistance$ with respect to the largest city in each country, other than the capital itself (as of 2000).[42] Column (9) shows, using a specification akin to that of Column (8) in Table 6, that our results are essentially unaffected, qualitatively or quantitatively, when we control for the degree of isolation of the other largest city.[43] This suggests that what we find indeed relates to the special role of the capital city.

4.2.4 Unpacking Governance

We can further assess the reach of the explanatory power of the theory by unpacking the different dimensions that go into measures of governance. Consider first the different component measures of the WGI. As we have noted, the six measures are highly correlated with one another, and in light of that one might expect that they would display a similar relationship with the isolation of the capital if considered separately. As it turns out, this is true of five of the six measures, but not for Political Stability. Panel A in Figure 6 shows that the coefficients obtained from local linear regressions are statistically indistinguishable from zero, and with no apparent difference with respect to autocracies versus democracies. This suggests that isolated capital cities are associated with worse governance across all dimensions, except that they are not linked to the political system being less stable.[44]

This is not surprising when looked at through the lens of our framework, in which isolating the capital city is a rebellion-preventing measure. In fact, we have pointed out that the simple version of the model in which we take isolation and governance as exogenous implies that more isolated capitals are associated with less conflict and less risk for incumbent elites. Once we consider the interaction between political stability and the choices of degree of isolation and quality of governance, the relationship becomes ambiguous, but in any case we would not expect from our framework that incumbent regimes would necessarily be less stable when the capital is more isolated.[45]

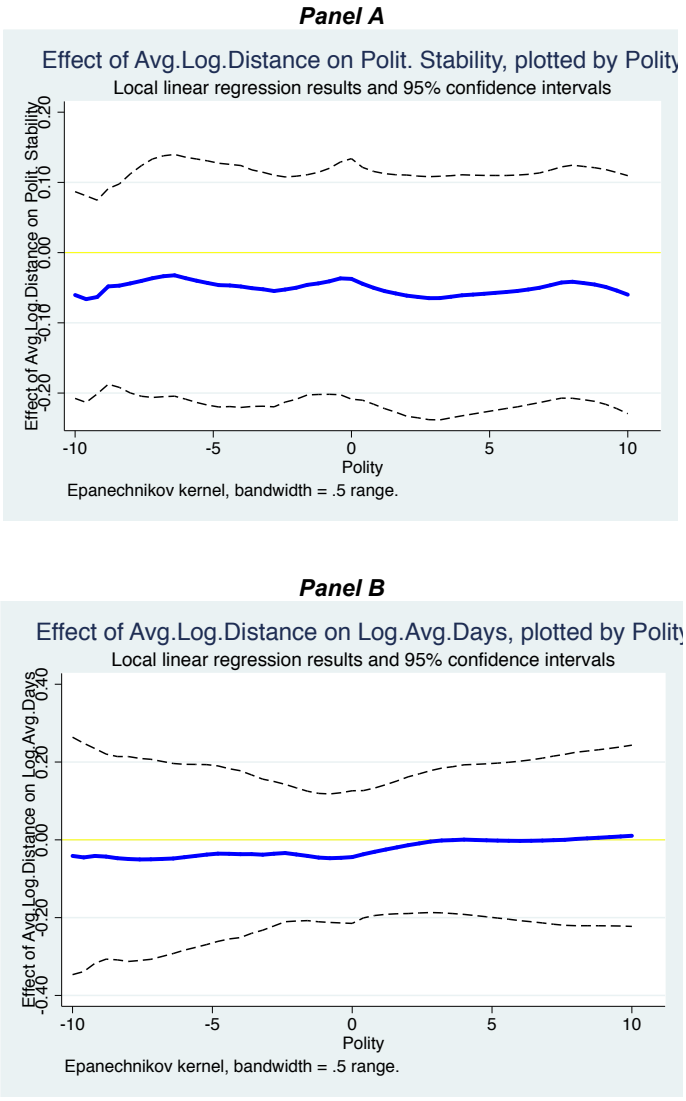
In contrast, this is quite unlike what one would expect from alternative stories that one might concoct to explain the connection between isolated capitals and poor governance, such as one based on state capacity. For the sake of an example, consider a story where, if the capital is somehow located in an isolated place, the state has a harder time taxing its citizens and developing its fiscal capacity, the lack of which leads to bad governance. Besides begging the question of why an incumbent regime would refrain

[42] This is either the country's largest city or, more often, its second largest, since the capital is also the largest city in about five out of six countries. The correlation between the measure and the isolation of the capital city is around 0.53 – substantial but far from overwhelming.

[43] The results are the same if we split the sample between autocracies and established democracies. (Appendix Table 1). The coefficient on the isolation of the other largest city in autocracies is small and statistically insignificant.

[44] The plots for the other five measures can be seen in the Online Appendix.

[45] To see why it would not necessarily be the case that less isolation would be associated with less stability in equilibrium, note that it could happen that a relatively unprotected elite would still achieve stability by sharing power and rents more broadly, thus discouraging rebellions.



Notes: The figure plots the coefficients on Avg Log Distance from local linear regressions with Political Stability and Log Avg Days to return a letter as dependent variables, respectively, and Log GDP per capita, Log Population, Urbanization, and Region and Legal Origin dummies as control variables. The size of the grid is 50, with a bandwidth of 10, and we use the Epanechnikov kernel.

Figure 6: Political Stability, Log Avg Days, and Isolation of the Capital City, by Polity Score

from moving its capital to a more favorable location, such a story about a relative lack of control over the population would lead us to expect that this would be a more fragile, unstable regime.[46]

Another way to unpack the meaning of governance is to look at a measure of government performance that is unrelated, at least directly, to the political incentives of rulers and elites as it pertains to power sharing or political survival. One such measure has been proposed by Chong et al (2014), to isolate the government's ability to perform a simple task effectively: the average number of days it takes a country's post office to return letters sent to non-existent addresses in the countries' five largest cities. Of course, this measure ought to be correlated with broader measures of governance, not the least since one might

[46] This is as suggested by Herbst (2000), in a different context, with respect to low population densities in Africa.

imagine that less accountable governments could be more likely to pursue actions that would result in ineffective provision of services – say, by packing the post office with incompetent political appointees. (In fact, the raw correlation with the WGI principal component in our sample is substantial, at -0.72.) Still, we would not expect it to respond directly to the incentives highlighted by our theory.

Panel B in Figure 6 shows that, in spite of that high correlation with governance, we find no correlation between that measure of government performance and the isolation of the capital city – and again with essentially no distinction between democracies and autocracies. This provides further evidence that the stylized fact we detect is not an artifact of some correlation between isolated capitals and generally low state capacity that is unrelated to the kind of forces our theory underscores.

We now turn to the question of whether we can shed direct light on the power sharing mechanism highlighted by the theory, by looking at the Polity IV data set. We have used the aggregate Polity measure to parse the sample between democracies and autocracies, but the data contain more information that can be used to study more subtle distinctions. In particular, the Polity measure aggregates the content of several other measures – and the extent to which they can be interpreted as relating to the degree of power sharing varies considerably.

Out of the four variables aggregated into the Polity IV index of Democracy, two are described as pertaining to either the realm of "independence of executive authority" (*ExecutiveConstraints*) or to that of "political competition and opposition" (*ParticipationCompetitiveness*).[47] These are clearly related to the degree of power sharing that exists within a political system: an unchecked executive and a limited scope for political competition are clear signals of concentration of power.

A first look at how these measures relate to the isolation of the capital city can be had by revisiting the instances of capital city moves that were listed in Table 1. Table 8 reproduces that list, excuding the cases of partial capital moves, but also adding two columns describing the changes in *ExecutiveConstraints* and *ParticipationCompetitiveness* from ten years before to ten years after the date of the move (or closest date available). We see that on average there is a substantial drop in the two measures, which is indeed statistically distinguishable from zero in the case of *ParticipationCompetitiveness*, in spite of the very small sample. This indicates that the capital city moves are typically accompanied by more concentrated power.

This pattern actually holds more systematically, beyond the extreme example of capital city moves. Table 9 starts off, in Column (1), by looking at the aggregate Polity measure and how it relates to the degree of isolation in autocracies. Here we extend the definition of non-democracies to include what Polity defines as "open anocracies", delimited by the threshold score of 5, because there is naturally considerably less variation in the Polity components in the subset of autocracies and closed anocracies. We see a negative correlation, showing that countries with isolated capital cities tend to display institutions that

[47] The former refers to "the extent of institutionalized constraints on the decisionmaking powers of chief executives" (Marshall, Jaggers, and Gurr 2011, p. 24), ranging from "unlimited authority" to "executive parity or subordination". The latter in turn captures "the extent to which alternative preferences for policy and leadership can be pursued in the political arena" (p. 26), and ranges from "repressed" to "competitive".

Table 8. Changes in Capital Cities and Power Sharing

Country	From	To	Year	*Δ Exec. Constr.*	*Δ Part. Comp.*
Russia	St. Petersburg	Moscow	1918	1	-2
Turkey	Istanbul	Ankara	1923	-2	-1
Australia	Melbourne	Canberra	1927	0	0
China	Nanjing	Beijing	1949	1	-2
Mauritania	-	Nouakchott	1957	-2	0
Brazil	Rio de Janeiro	Brasilia	1960	-4	-2
Rwanda	Butare	Kigali	1962	0	0
North Yemen	Ta'izz	Sana'a	1962	2	-1
Pakistan	Karachi	Islamabad	1966	0	0
Malawi	Zomba	Lilongwe	1974	0	0
Cote d'Ivoire	Abidjan	Yamoussoukro	1983	1	1
Nigeria	Lagos	Abuja	1991	-2	-3
Kazakhstan	Almaty	Astana	1997	-1	-1
Myanmar (Burma)	Yangon	Naypyidaw	2005	-1	0
Average				*-0.50*	*-0.79*
p-value				*0.266*	*0.021*

Excluding partial changes. For sources and notes, see Table 1. Changes in Polity IV variables ("Executive Constraints" and "Participation Competitiveness") are between 10 years after and 10 years before change of capital, with the exception of Mauritania, Rwanda, and Kazakhstan ("pre" measure for first year of independence) and Myanmar (Burma) ("post" measure for 2010, latest available). P-values for two-sided t-test of null hypothesis of Average equal to zero, with 13 degrees of freedom.

are farther from the democratic ideal; the correlation is statistically significant at the 10% level only. The connection is brought into sharper focus, however, when we look at the power sharing measures of *ExecutiveConstraints* and *ParticipationCompetitiveness*, in Columns (2) and (3) respectively. The quantitative implications are in fact very similar to what we found for our measures of governance.

Table 9. Isolated Capital Cities and Power Sharing in Autocracies

	(1)	(2)	(3)	(4)	(5)
Dep. Var.:	Polity	Executive Constraints	Particip. Compet.	Recruit. Compet.	Recruit. Openness
Avg Log Distance	-0.1831*	-0.2123***	-0.3249***	-0.0554	0.1715
	[0.109]	[0.073]	[0.084]	[0.097]	[0.225]
Selection-corrected bound	-0.325	-0.288	-0.414		
Observations	63	63	63	63	63
R-squared	0.450	0.622	0.533	0.541	0.288

Robust standard errors in brackets. Z-scores (normalized variables) reported.

Autocracies: Polity(<=5).

Control variables: Log GDP per capita, Log Population, Urbanization, Region and Legal Origin dummies, Majoritarian and Presidential system dummies, and Ethnic Fractionalization. Columns (1) to (3) include the bound from 0 with Oster's (2013) correction when selection by unobservables equals selection by observables.

*** p<0.01, ** p<0.05, * p<0.1

Interestingly, Columns (4)-(5) show no evidence of a negative link between isolated capital cities and the other two component measures (*RecruitmentCompetitiveness* and *RecruitmentOpenness*), which have to do with "executive recruitment".[48] The measure of openness in particular, while clearly related to democracy, does not speak directly to how power is shared between different groups in society: countries receive a maximum score in the openness measure essentially as long as succession is not hered-

[48] In spite of the small samples, the equality of coefficients between combinations of Columns (2)-(3) and Columns (4)-(5) can be decisively rejected at standard levels of confidence, with the exception of that between Columns (2) and (4).

itary.[49] Naturally, all four measures tend to be correlated, so that countries with high degrees of power sharing will typically score high in the recruitment measures as well. It is nevertheless interesting that *RecruitmentOpenness* is the least correlated with the other three, and particularly so with the power sharing measures: 0.59 and 0.47, when the pairwise correlations between the other three is never below 0.83. This suggests that it should indeed be interpreted as addressing other aspects of the institutional setting.

4.3 Additional Predictions

Beyond the central implications of the model, with respect to conflict and quality of governance, we can also check its ancillary predictions. We first look at the prediction that capital city inhabitants will be better off relative to their faraway brethren, since the greater threat they represent for incumbents enables them to extract additional rents in equilibrium, and that this advantage will be greater when the capital is more isolated.[50]

To check this prediction, we obtain cross-country data, from the McKinsey Global Institute (Dobs et al. 2011), on city-level income per capita, in 2007, for 600 cities around the world. Out of these, 77 are country capitals, and for all these countries we compute the capital city premium as the ratio between the capital's income per capita and the countrywide GDP per capita that we have used in the previous analysis. By the same token, we proxy investment in military strength by the amount of military expenditures pursued by a country's central government, as a percentage of total central government expenditures, averaged between 1990 and 2006 (from the World Development Indicators).[51]

Table 10 displays the results of a simple regression analysis along the lines of Table 6. The aforementioned data caveats aside, we see a positive correlation between the capital city premium and the isolation of the capital in autocracies. This correlation is quantitatively considerable, being actually larger in size than what we found in the case of governance. In other words, the inhabitants of isolated capital cities of

[49] This allows, for instance, the post-Stalin Soviet Union, no one's idea of a regime with widespread power sharing, to achieve that maximum score.

[50] We find related evidence that individuals who live closer to the capital report being more satisfied with what they get from national institutions, which we report in Table A2 in the Appendix to save space. That table uses data from the AfroBarometer, which report information on the location of respondents, at the village level, and covers countries that are young democracies at best, where the logic of our model is a meaningful background in their institutional settings. Individuals who live farther from the capital are significantly more dissatisfied with the national political system (Panel A). (This is true controlling for distance to the largest city besides the capital, and for region fixed effects, which suggests that they are not driven by the effects of isolation on monitoring or public good provision. We also control for a comprehensive set of control variables flagged by Nunn and Wantchekon (2011) as possibly correlated with trust.) In contrast, distance to the capital is uncorrelated with measures of generalized trust and of the the degree of interest and information regarding public affairs, which could also be correlated with perceptions of corruption (Panel B).

[51] The sample size is now smaller, in light of the limited number of countries for which we have data on income per capita for the capital city (particularly among non-democracies), so we now split the sample between autocracies and democracies according to the average of the Polity score between 1975 and 2000, using the threshold of zero. (We stop at 1975 in order to restrict ourselves to the post-decolonization period.) This helps us obtain a reasonable sample size of autocracies, in contrast with the more recent time period used in Tables 6-9. On the other hand, going back to this less democratic period greatly restricts the sample of countries with a Polity score above 9. For this reason, we contrast the autocracy sample with the set of countries with scores above zero. All in all, we are still left with a small sample, and for that reason we have to be especially parsimonious when it comes to the set of control variables.

autocratic countries earn a substantially larger premium over the rest of the population. This correlation is exactly what was predicted by our model. It could certainly be the case that omitted factors are also influencing this correlation, but it is telling that once again, as shown by Columns (2)-(3), this connection does not extend to those countries that are more democratic, just as we would expect from our framework.

Table 10. Isolated Capital Cities, Capital Premium, and Military Expenditures

Dep. Var.:	(1) Capital Premium	(2) Capital Premium	(3) Capital Premium	(4) Military Budget	(5) Military Budget	(6) Military Budget
	Autocracies	Democracies	Full Sample	Autocracies	Democracies	Full Sample
Avg Log Distance	**0.4158*** **	-0.1040	-0.0287	**-0.3393*** **	-0.0150	0.0986
	[0.141]	[0.209]	[0.148]	**[0.124]**	[0.133]	[0.116]
Avg Log Distance X Autocracy			**0.4096** **			**-0.3912** **
			[0.197]			**[0.169]**
Interstate War				0.4441*	0.6072**	0.5975***
				[0.247]	[0.235]	[0.192]
Selection-corrected bound	0.475		0.466	-0.716		-0.714
Observations	32	32	64	55	51	106
R-squared	0.398	0.436	0.409	0.382	0.477	0.418

Robust standard errors in brackets. Z-scores (normalized variables) reported.
Dependent variables: GDP per capita in capital city / GDP per capita and Military Budget (Log of Share of Central Government Budget, avg. 1990-2006, WDI).
Interstate War: dummy for involvement in interstate war between 1975 and 2007 (Correlates of War).
Autocracies: Polity (1975-2000) <=0; Democracies: Polity (1975-2000) >0. Control variables: Log GDP per capita, Log Population, Urbanization, Majoritarian and Presidential system dummies, and Ethnic Fractionalization.
Columns (1), (3), (4) and (6) show the bound from 0 with Oster's (2013) correction when selection by unobservables equals selection by observables.
*** p<0.01, ** p<0.05, * p<0.1

Table 10 also shows that autocratic regimes facing a population that is more concentrated around its capital city will spend significantly more with the military than regimes with isolated capitals. This is exactly in line with the model's prediction: isolated capital cities work as protection against rebellion threats, and hence obviate the need for further protection. The same is not at all true of relatively democratic regimes, which again reaffirms the model's logic.[52]

5 Concluding Remarks

Our results underscore the importance of the spatial distribution of the population as a source of informal checks and balances over autocratic regimes. As long as we care about the quality of governance – either as an end in itself or as a means of fostering development – the lesson is that we ought to be especially attentive to those countries where the spatial distribution is particularly inimical to accountability, e.g. those regimes that are able to ensconce themselves in an isolated capital. By the same token, one should pay attention to policies that enhance that ability, say by restricting internal mobility.

Isolated capitals in weakly institutionalized contexts should thus be seen as both a symptom and an enabler of misgovernance. At the same time, the model also highlights that this accountability mechanism comes at a price, since it operates via the threat of conflict and violent removal from office.[53]

[52] Of course, the use of military spending as our proxy for anti-rebellion investment is predicated on the assumption that this kind of spending is driven to a substantial extent by this sort of domestic concern. In that regard, note that we include as a control variable a dummy for whether the country has been involved in an interstate conflict between 1975 and 2007, as coded by the Correlates of War dataset.

[53] See e.g. Campante and Glaeser (2009), on the case of Argentina.

From a broader perspective, we can think of the spatial distribution of individuals as a source of variation in the constraints that underpin institutional choices, but one that perhaps strikes a middle ground between what Banerjee and Duflo (2014) term "deterministic" and "non-deterministic" views of political economy: the spatial distribution of population is typically very persistent, but is certainly amenable to policy intervention, and does evolve in the long run. In that sense, long-run forces towards less isolation– say, because the capital city is a pole of attraction due to its very role as the seat of political power – would tend to constrain governments, and work towards the consolidation of better institutions.

We should also point out that the framework we have developed can presumably be used to understand other phenomena related to the threat of revolutions and the response of incumbent regimes to such threat. In this paper, the variable that affects the extent to which an individual or group represents danger to an incumbent elite is their distance to the seat of political power, but we can think of other factors that may act in similar ways – for instance, Glaeser, Ponzetto, and Shleifer (2007) emphasize the role of education in facilitating coordination among potential rebels. Applying our framework to these other contexts, we can sketch a theory of incumbent regimes that may choose to pair less power sharing and worse governance with, say, less human capital.

As a final example, we can also think about the formation and size of countries. Our framework has taken polities as given, but it is natural to think that the tensions we have highlighted could translate into pressures in the direction of breaking up countries. In that sense, we might think about the potential role of the spatial distribution of population (and of different subgroups in that population) around the capital city in affecting the equilibrium configuration of countries, as modeled for instance by Bolton and Roland (1997) and Alesina and Spolaore (2003). We leave these applications as promising avenues for future research.

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A Appendix: A simple model of rebellions

Here we provide a simple set of microfoundations for the reduced-form model of conflict described in Section 3.1.1. 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:

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

Suppose there is conflict if the measure of agents that is willing to fight in a given group (call it 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, $D_i \sim (\underline{D}, \overline{D})$.

Hence there is conflict if

$$\frac{y^*}{w_i} - 1 - c_i - \frac{1}{a}\tilde{G}^{-1}(\underline{D}) > 0 \tag{13}$$

and conflict succeeds if

$$\frac{y^*}{w_i} - 1 - c_i - \frac{1}{a}\tilde{G}^{-1}(\underline{D}) > \frac{1}{a}\left(\tilde{G}^{-1}(D_i) - \tilde{G}^{-1}(\underline{D})\right) \tag{14}$$

Let $\psi_i = c_i + 1 + \frac{1}{a}\tilde{G}^{-1}(\underline{D})$ and the LHS of (13) and (14) become the expression for γ_i in the main text (assuming that c_i is larger for groups in faraway places). Moreover, $\left(\tilde{G}^{-1}(D_i) - \tilde{G}^{-1}(\underline{D})\right)$ equals to 0 for $D_i = \underline{D}$ and is increasing in D_i, so the RHS of (14) satisfies the properties of the function π in the main text. 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.

B Appendix: Proofs

B.1 Proof of Proposition 1

We first show there is at most one set of $\widehat{\chi}_\imath$ such that the expression in (6) is equal to 0 for all groups $\imath$. For that, the terms outside square brackets can be ignored from the analysis. Since h/H is an increasing function, $\partial\mathcal{R}/\partial\widehat{\chi}_\jmath$ is decreasing in $\widehat{\chi}_\jmath$, and increasing in the sum inside (6) involving all $\widehat{\chi}_\imath$ (ignoring the terms outside square brackets).

Consider the values $\widehat{\chi}_\imath$ such that the expression in (6) is equal to 0 for all groups $\imath$. Consider now a change to a different the set of values $\tilde{\chi}_\imath$ and suppose that the expression in (6) is also equal to 0 for all groups $\imath$. First, consider the case the sum inside (6) is larger for the set $\tilde{\chi}_\imath$ (than for the set $\widehat{\chi}_\imath$). Since $\partial\mathcal{R}/\partial\widehat{\chi}_\jmath$ 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 the expression in (6) equal to 0, for all $\jmath$. But that implies that the sum inside (6) is smaller for the set $\tilde{\chi}_\imath$, which is a contradiction. The arguments for when the sum inside (6) is smaller or equal for the set $\tilde{\chi}_\imath$ are analogous.

Incumbents will never choose $\widehat{\chi}_\jmath = \underline{\chi}$ for any $\jmath$. It can be seen from (6) that $\partial\mathcal{R}/\partial\widehat{\chi}_\jmath$ is positive in case $\widehat{\chi}_\jmath = \underline{\chi}$ for any $\jmath$.

Inspection of (6) 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 (6) 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 1 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 (6), and thus shifts down the derivative in (6). 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 (6) and a lower $\widehat{\chi}_\jmath$ at $\partial\mathcal{R}/\partial\widehat{\chi}_\jmath = 0$. Using the first two statements from Proposition 1, 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 (6), $y^*/(\widehat{\chi}_C)^2 > y^*/(\widehat{\chi}_F + T)^2$. Using the expression for income implicit in (3), 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 (6) must have increased. But an increase in the sum term in (6) 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 (6), which is a contradiction. Second, suppose w_F increases. Since w_C has also increased, the sum term in (6) must have increased as well. That means $\widehat{\chi}_C$ must have increased, thus w_C must have decreased, which is another contradiction.

B.2 Proof of Proposition 2

An argument similar to the proof of the fourth statement of Proposition 1 shows that income is decreasing in $\ell_\jmath$ and that the last term in the expression for $\partial\mathcal{R}/\partial\ell_\jmath$ (Equation 3.2.3) is decreasing in $\ell_\jmath$. Consequently, there cannot be $\ell_\jmath > \ell_\kappa$ for groups $\jmath$ and κ because increasing $\ell_\jmath$ and reducing ℓ_κ by the same amount and keeping everything else unchanged would increase $\mathcal{R}$. Thus $\ell_\imath = \ell$ for all groups $\imath$. An argument similar to the used in Proposition 1 then shows that $\widehat{\chi}_\imath = \widehat{\chi}$ for all $\imath$.

The optimality condition in (12) can then be written as:

$$\phi'(\Delta\ell) = ny^* \frac{T}{A(p)(\widehat{\chi} + T\ell)^2} \tag{15}$$

The LHS of (15) is increasing in $\Delta\ell$. The RHS is increasing in T if $\widehat{\chi} > T$, which is implied by the assumption $\underline{\chi} > T$. Hence for given p and $\widehat{\chi}$, $\Delta\ell$ is increasing in T. Moreover ℓ is also increasing in ℓ^* (for given p and $\widehat{\chi}$) for suppose not: then an increase in ℓ^* would lead to a lower (or equal) ℓ and thus a larger RHS of (15) but a lower $\Delta\ell$ and thus a larger LHS of (15), which is a contradition.

For the second statement, note that the optimality condition in (11) can be written as:

$$A(p) - pA'(p) = \frac{ny^*}{(\widehat{\chi} + T\ell)(Y^* - \phi(\ell - \ell^*))} \tag{16}$$

The LHS of (16) in increasing in p and the RHS is decreasing in T and ℓ^* for given ℓ and $\widehat{\chi}$, which proves the claim.

B.3 Proof of Proposition 3

First consider a change in T. The effect of T on p is given by:

$$\frac{dp}{dT} = \frac{\partial p}{\partial T} + \frac{\partial p}{\partial \ell}\frac{d\ell}{dT} + \frac{\partial p}{\partial \widehat{\chi}}\frac{d\widehat{\chi}}{dT} \tag{17}$$

The partial derivative of p with respect to T is negative (Proposition 2). The last term in (17) becomes unimportant as the variance of f approaches zero. In order to show that the partial derivative of p with respect to ℓ is also negative, we need to show that the RHS of (16) is decreasing in a change in ℓ in a neighborhood of the optimal $\Delta\ell$. That is the same as showing that

$$(\widehat{\chi} + T(\ell))(Y^* - \phi(\ell - \ell^*))$$

is increasing in $\Delta\ell$. Differentiating this expression with respect to ℓ yields:

$$-(\widehat{\chi} + T\ell)\phi'(\Delta\ell) + (Y^* - \phi(\Delta\ell))T$$

Using the first order condition with respect to $\Delta\ell$ and rearranging leads to

$$\frac{T}{A(p)}\left[A(p)(Y^* - \phi(\Delta\ell)) - \frac{ny^*}{\widehat{\chi} + T\ell}\right]$$

which is positive (since incumbents can get positive rents).

The effect of T on ℓ is given by:

$$\frac{d\ell}{dT} = \frac{\partial \ell}{\partial T} + \frac{\partial \ell}{\partial p}\frac{dp}{dT} + \frac{\partial \ell}{\partial \widehat{\chi}}\frac{d\widehat{\chi}}{dT}$$

The partial derivative of ℓ with respect to T is positive (Proposition 2). The partial derivative of ℓ with respect to p is negative, because the RHS of (15) is decreasing in the productivity of the economy $A(p)$. The last term becomes unimportant as the variance of f approaches zero.

As the variance of f approaches zero, the derivatives dp/dT and $d\ell/dT$ are given by a system of two equations that yields the claim. An increase in T has a direct negative effect on p and a direct positive effect on ℓ. The indirect effects reinforce the direct effects. This argument assumes a vanishing variance of f but by continuity, the result goes through as long as the variance of f is small enough.

Now consider a change in ℓ^*. The effect of ℓ^* on ℓ is given by:

$$\frac{d\ell}{d\ell^*} = \frac{\partial \ell}{\partial \ell^*} + \frac{\partial \ell}{\partial p}\frac{dp}{d\ell^*} + \frac{\partial \ell}{\partial \widehat{\chi}}\frac{d\widehat{\chi}}{d\ell^*}$$

The partial derivative of ℓ with respect to ℓ^* is positive (Proposition 2). The partial derivative of ℓ with respect to p is negative, as argued above. The last term becomes unimportant as the variance of f approaches zero.

The effect of ℓ^* on p is given by:

$$\frac{dp}{d\ell^*} = \frac{\partial p}{\partial \ell^*} + \frac{\partial p}{\partial \ell}\frac{d\ell}{d\ell^*} + \frac{\partial p}{\partial \widehat{\chi}}\frac{d\widehat{\chi}}{d\ell^*}$$

The partial derivative of p with respect to ℓ^* is negative (Proposition 2). The last term becomes unimportant as the variance of f approaches zero. As argued above, the partial derivative of p with respect to ℓ is also negative.

Again, as the variance of f approaches zero, the derivatives $dp/d\ell^*$ and $d\ell/d\ell^*$ are given by a system of two equations that yields the claim. An increase in ℓ^* has a direct negative effect on p and a direct positive effect on ℓ and the indirect effects reinforce the direct effects. The argument assumes a vanishing variance of f but by continuity, the result goes through as long as the variance of f is small enough.

B.4 Proof of Proposition 4

Taking the derivative with respect to D, making $\ell_\imath = \ell$ and $\widehat{\chi}_\imath = \widehat{\chi}$ for all $\imath$ (Appendix B.2) and rearranging yields:

$$\delta'(D) = \frac{y^*}{\widehat{\chi} + T\ell + D}$$

This expression implicitly defines D and it is easy to verify D is decreasing in $\widehat{\chi}$, T and ℓ. If the variance of f is arbitrarily small, so is the effect of T and ℓ^* on $\widehat{\chi}$. The results in Proposition 3 also hold in the model with endogenous repression, so ℓ is increasing in T and ℓ^*. That yields a negative correlation between D and ℓ.

C Online Appendix (not for publication)

C.1 Data Appendix

Capital city population (Tables 1 and 4): See Online Appendix.

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. Conflict onset data are from Holtermann: 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, and take the average over five-year periods between 1946-2008.

Drought Severity Index: Palmer Drought Severity Index (PDSI), the most prominent index of drought in meteorology and hydrology, is available at: `http://webmap.ornl.gov/wcsdown/dataset.jsp?ds_id=10019`. It is based on a model of soil moisture using precipitation, temperature and the local available water content of the soil, and captures departures from average local climatic conditions. We take the annual average of the monthly data, and fit the index into the [-15,15] scale, where 15 denotes the driest and -15 the wettest.

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.

Avg Log Distance Conflict: Computed in the same way as above, but using the conflict $CivConf$ grid data in lieu of the gridded population maps. Because we use time variation, we do not drop countries that changed capital cities. As noted in the main text, we discard countries for which no conflict is recorded, since it is not obvious how to code isolation in that case.

Avg Log Distance PDSI: Computed in the same way as above, but using the grid data of $PDSI$ in lieu of the gridded population maps. This variable measures how close drought weathers are located vis-à-vis the capital city.

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 decisionmaking 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 AfroBarometer 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,
$http://en.wikipedia.org/wiki/Abidjan$,
$http://en.wikipedia.org/wiki/File:Poblaci\%C3\%B3n_de_Santiago_de_Chile.svg$,
$http://en.wikipedia.org/wiki/Demographics_of_Chile$,
$http://en.wikipedia.org/wiki/Greater_Valpara\%C3\%ADso$,
$http://www.onlinenigeria.com/links/lagosadv.asp?blurb=322$,
$http://www.nbs.go.tz/takwimu/references/2002popcensus.pdf(p.10)$,
$http://en.wikipedia.org/wiki/AlmatyDemographics$,
$http://en.wikipedia.org/wiki/AstanaPopulation.2FDemographics$,
$http://en.wikipedia.org/wiki/Demographics_of_Kazakhstan$,
$http://www.statistics.gov.my/portal/index.php?option=com_content\&view=article\&id=1215\&Itemid=89\&lang=en$,
$http://www.britannica.com/EBchecked/topic/651821/Yangon$

C.2 Appendix Tables and Figures

Appendix Table 1. Isolated Capital Cities and Misgovernance: Additional Robustness

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.: WGI PC						
			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 A2. Individual Opinions and Distance to Capital Cities

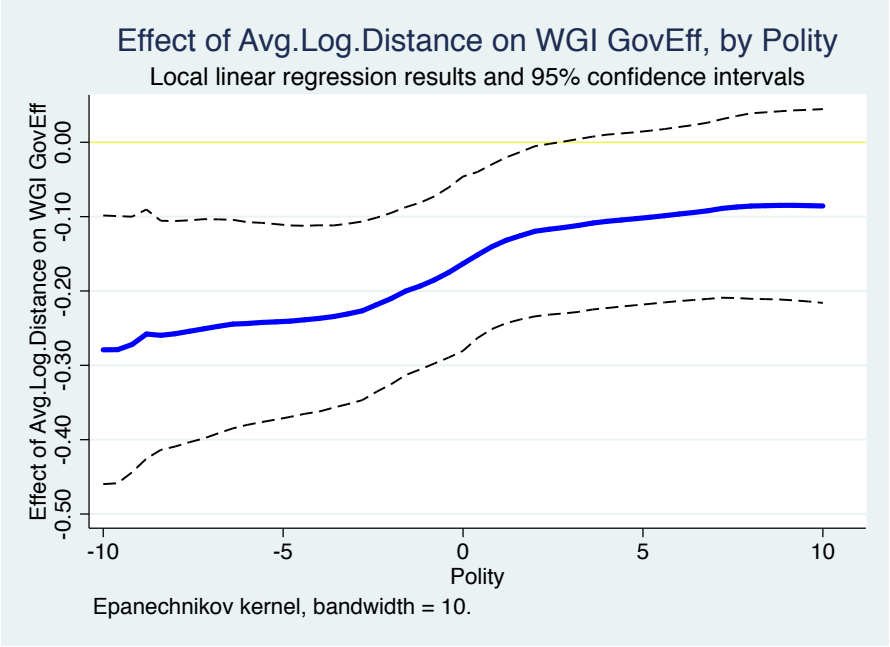
Panel A: Corruption and Politics

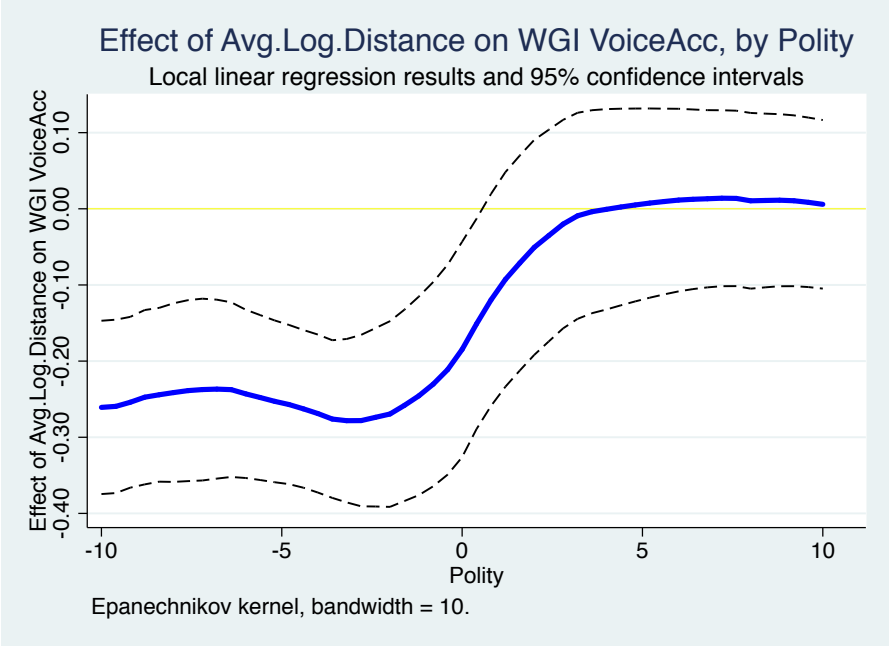
	(1)	(2)	(3)	(4)	(5)	(6)
	Perceptions of Corruption				Views on politics:	
Dependent variable	President	Parliament	National Officials	1st Principal Component	People are treated unequally	Careful about what you say
Log Distance to Capital	0.0190**	0.0128**	0.0176***	0.0352***	0.0307***	0.0177**
	[0.00776]	[0.00523]	[0.00495]	[0.00828]	[0.00791]	[0.00689]
Log Distance to Largest Non-Capital City	-0.0357***	-0.0333***	-0.0217**	-0.0617***	0.00463	0.0163
	[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

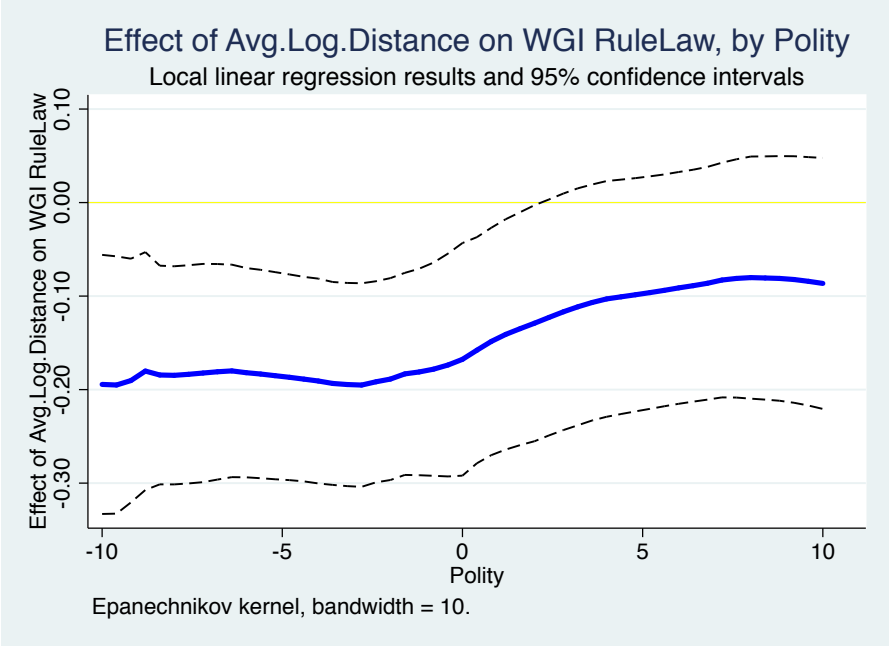
Panel B: Placebo tests

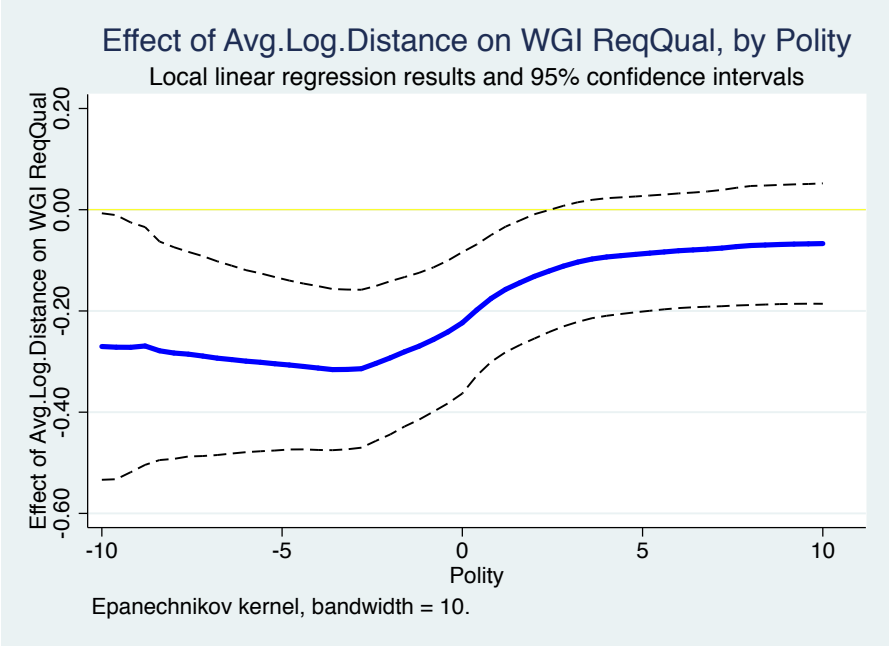
	(1)	(2)	(3)	(4)	(5)	(6)
	Trust				Interest and Information	
Dependent variable	Trust your relatives?	Trust your neighbors?	Intra-ethnic-group trust	Inter-ethnic-group trust	Interest in public affairs	Know VP's name
Log Distance to Capital	0.000936	0.00995	0.00142	0.0157	-0.00858	-0.00078
	[0.0125]	[0.00993]	[0.00694]	[0.0111]	[0.00782]	[0.00228]
Log Distance to Largest Non-Capital City	0.00626	0.00310	0.0172	0.00218	-0.00684	0.0128
	[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

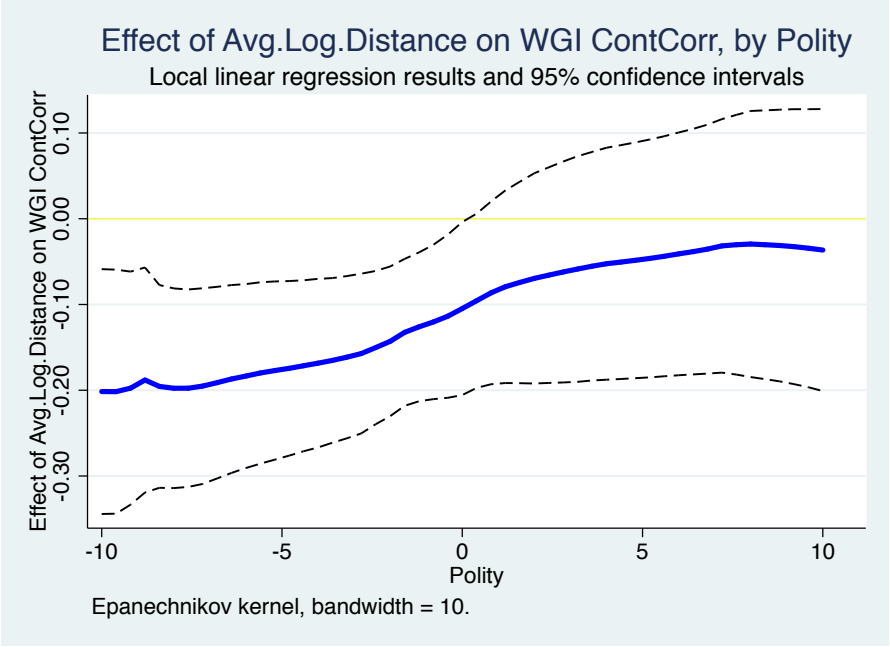
Robust standard errors in brackets are clustered at region level. Dependent variables in Panel A's columns (1) to (3), (5), and (6) are from AfroBarometer 3's questions Q56a, Q56b, Q56d, Q53D, Q53A respectively. Column (4) uses the first principal component of the dependent variables in columns (1) to (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 + Protestan 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.


Effect of Avg.Log.Distance on WGI GovEff, by Polity
Local linear regression results and 95% confidence intervals
Effect of Avg.Log.Distance on WGI GovEff
0.00
-0.10
-0.20
-0.30
-0.40
-0.50
-10
-5
0
5
10
Polity
Epanechnikov kernel, bandwidth = 10.


Effect of Avg.Log.Distance on WGI VoiceAcc, by Polity
Local linear regression results and 95% confidence intervals
Effect of Avg.Log.Distance on WGI VoiceAcc
-0.40
-0.30
-0.20
-0.10
0.00
0.10
-10
-5
0
5
10
Polity
Epanechnikov kernel, bandwidth = 10.


Effect of Avg.Log.Distance on WGI RuleLaw, by Polity
Local linear regression results and 95% confidence intervals
Effect of Avg.Log.Distance on WGI RuleLaw
-0.30
-0.20
-0.10
0.00
0.10
-10
-5
0
5
10
Polity
Epanechnikov kernel, bandwidth = 10.


Effect of Avg.Log.Distance on WGI ReqQual, by Polity
Local linear regression results and 95% confidence intervals
Effect of Avg.Log.Distance on WGI ReqQual
-0.60
-0.40
-0.20
0.00
0.20
-10
-5
0
5
10
Polity
Epanechnikov kernel, bandwidth = 10.


Effect of Avg.Log.Distance on WGI ContCorr, by Polity
Local linear regression results and 95% confidence intervals
Effect of Avg.Log.Distance on WGI ContCorr
-0.30
-0.20
-0.10
0.00
0.10
-10
-5
0
5
10
Polity
Epanechnikov kernel, bandwidth = 10.