

Country Size and the Rule of Law: Resuscitating Montesquieu

Ola Olsson* and Gustav Hansson

Göteborg University

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Abstract

In this paper, we demonstrate that there is a robust negative relationship between the size of country territory and a measure of the rule of law for a large cross-section of countries. We outline a framework featuring two main reasons for this regularity; firstly that institutional quality often has the character of a local public good that is imperfectly spread across space from the core of the country to the hinterland, and secondly that a large territory usually is accompanied by valuable rents and a lack of openness that both tend to distort property rights institutions. Our empirical analysis further shows some evidence that whether the capital is centrally or peripherally located within the country matters for the average level of rule of law.

Keywords: country size, rule of law, institutions, development, Montesquieu.

JEL Codes: N40, N50, P33.

”It is in the nature of a republic that it should have a small territory; without that, it could scarcely exist. In a large republic, there are large fortunes, and consequently little moderation of spirit...

In a large republic, the common good is sacrificed to a thousand considerations; it is subordinated to various exceptions; it depends on accidents. In a small republic, the public good is more strongly felt, better known, and closer to each citizen...”

(From *The Spirit of Laws*, C.L. Montesquieu, 1750, Book VIII)

1 Introduction

We demonstrate that there is a robust negative relationship between the size of country territory and the strength of rule of law for a large cross-section of

*Corresponding author: Ola Olsson, Department of Economics, Göteborg University, Box 640, 405 30 Göteborg, Sweden. Email: ola.olsson@economics.gu.se. We are grateful for comments from Carl-Johan Dalgaard, Assar Lindbeck, Joel Mokyr, Finn Tarp, Ragnar Torvik, David Weil, Alan Winters, and seminar participants at University of Copenhagen, Göteborg University, NTNU in Trondheim, RIIIE in Stockholm, the DEGIT XI Conference in Jerusalem, the EEA Conference in Vienna, and the Säröhus workshop on globalization.

countries. We also show that the internal location of the capital matters for the geographical spreading of institutions. In the spirit of Montesquieu, we argue that there are two basic reasons for these results; firstly that large countries tend to have a low dependency on foreign trade and be endowed with sizeable potential rents that distort the incentives of the regime, and secondly that the rule of law has the character of a local public good that is imperfectly broadcast from the country capital to the hinterland.

The importance of country size for social development has been a topic among political philosophers for centuries. Both Plato and Aristotle preceded Montesquieu arguing that small nations like the Greek city states were naturally superior to larger entities and that a country's entire territory should not be larger than that it could be surveyed from a hill. Likewise, Rousseau later claimed that small states prosper "...simply because they are small, because all their citizens know each other and keep an eye on each other, and because their rulers can see for themselves the harm that is being done and the good that is theirs to do..." (Rousseau, quoted in Rose, 2005).

The opposite argument, that the diversity of preferences and the effects of fractionalization are more easily handled within large countries, was proposed by both David Hume and James Madison.¹ Later influential works like Dahl and Tufte (1973) and Alesina and Spolaore (2003) have tended to think of the problem as encompassing a trade-off where small countries have advantages in terms of democratic participation and preference homogeneity, whereas smallness on the other hand implies higher per capita costs of non-rival public goods, a small internal market, and that small countries easily might be partitioned or swallowed by larger countries with a greater military capacity. The latter argument appears to have been particularly relevant for the European continent (Tilly, 1990).

Within the economics discipline, the relationship between country size and economic performance has not rendered a lot of attention. Early endogenous growth models like Romer (1990) and Aghion and Howitt (1992) included a prediction that larger countries should grow faster because they had a larger pool of potential innovators. On the whole, these early models did not receive strong empirical support.² Alesina et al (1998) show that large countries tend to have large governments and that they are less open to trade than smaller countries. Using the level of the population as the measure of country size, Rose (2005)

¹See Dahl and Tufte (1973), Alesina and Spolaore (2003), and Rose (2005) for reviews of the older literature.

²Kremer's (1993) extreme long-run analysis of population growth on different continents is sometimes viewed as giving some support to the 'scale-effect' prediction, but it was effectively refuted by the evidence in Jones (1995) and led to the development of growth models without scale effects.

fails to find any systematic effect of size on a range of institutional and economic performance variables. Similarly, Knack and Azfar (2003) argue that empirical studies that have shown a negative relationship between corruption and population size have suffered from sample selection bias and that the relationship disappears when a broader sample is used. Dahl and Tufte (1973) is probably the most comprehensive study of the importance of country size and is one of few studies that actually considers country area as a potential determinant of economic outcomes.

In this article, we show that the size of country territory is strongly negatively associated with rule of law. Figure 1 shows the unconditional correlation for all 208 countries in the world with available data. The relationship is significant (t -value is 6.83) and size alone explains nearly 15 percent of the whole variation in the rule of law which is remarkable for a cross-country regression. We recognize however that boundaries are potentially endogenous to institutional quality and therefore restrict our analysis to former colonies whose borders were determined by the colonial powers.

We argue that country size has two primary effects: Firstly, that a large territory means a lower dependency on foreign trade and a larger absolute value of expected rents from lands and mines. Our argument is that both the lower openness and the easy flow of rents give autocratic rulers weak incentives for upholding a strong rule of law. Secondly, we propose (in the spirit of the emerging literature on 'new economic geography') that the strong concentration of power in the capitals and core areas of former colonies implies that public goods like the rule of law diffuse according to a spatial decay-function so that the levels felt in the hinterland are much weaker than in the capitals. This problem should be further exacerbated in countries where the capital is non-centrally located.

As the base sample for testing our hypotheses, we use data from 127 former colonies which - unlike most of the previous literature on colonialism - arguably contains all large and small countries that were ever colonized. We show that the size of country territory has a very robust negative impact on our measure of the rule of law, even after controlling for distance from the equator, openness to trade, settler mortality, ethnic fractionalization, colonial history, continental dummies, and a number of other variables. We also show that country territory appears to have a stronger association with rule of law than the level of the population. This fact, together with the general endogeneity of population size to institutions, suggest to us that country territory is a more appropriate indicator of country size than population.

Unlike any other study that we are aware of, we further construct two indicators of the peripherality of the capital. As hypothesized, it turns out that when we hold country territory and some other controls constant, the strength

of rule of law decreases with our size-neutral measure of the peripherality of the capital. Our interpretation of these results is that exogenously determined country territory has been a major impediment to the creation of strong institutions in large countries like Indonesia, Sudan, and Algeria, whereas it has been highly beneficial to small countries like Bahrain, Martinique, and Singapore.

Since the strength of rule of law is a kind of institutional variable, our approach is obviously highly related to the growing empirical literature on the determinants of institutional strength (Hall and Jones, 1999; Acemoglu et al, 2001, 2002; Rodrik et al, 2004). In the spirit of Glaeser et al (2004), we think of property rights institutions and the rule of law as variables that governments actually can influence in the medium run. This assumption distinguishes our approach somewhat from works in the tradition of Douglass North (1990) such as Acemoglu et al (2001, 2002) where institutional persistence from colonial times is a central element.

The article is organized as follows: In section two, we develop a general theoretical framework for understanding the linkages between size and institutions. In section three, we provide the main empirical investigation using the reduced sample of former colonies. Section four concludes.

2 The institutional impact of country size

In this section, we discuss the potential channels through which country size affects institutional quality within countries. We argue that there are two primary effects of country territory: A direct *broadcasting effect* and an indirect *openness/rent seeking effect*.

2.1 The broadcasting effect

Power within states almost always originate from one core area of the country, usually from the area around the capital.³ The broadcasting of power to the other parts of the country, or even beyond existing borders, is essentially a story of state consolidation, well known from accounts on European history. The basic notion that our argument in this section rests upon is that the political influence from the core will typically diminish with geographical distance. We argue that this has been a stylized fact throughout history as well as in more recent times. For example, during antiquity, the Roman influence on the Campanian region in the Italian south was naturally greater than its influence in the British isles. To use a more current example, the government of Singapore has a far greater

³This core area or city might of course change over longer time horizons. Even the Roman empire eventually shifted its epicenter from Rome to Constantinople and Ravenna.

potential to effectively broadcast power to all parts of their geographically tiny country than the government of vast, nearby Indonesia.⁴

The spatial broadcasting of state power includes several important components, for instance taxation and a shared monetary system. Another key factor in the exercise of state power is the maintenance of *rule of law*, i.e. basic law and order, a respected police force, and courts that rule impartially in accordance with codified and generally recognized law. An efficient rule of law is characterized by that the state has the power to protect its citizens from predation by other citizens but also guarantees that the government itself (or any other public authorities) will not predate on its people.

Although the rule of law is typically partly organized on a local basis (through for instance local police, local courts, or district attorneys), the laws that it all rests upon essentially emanate from the capital or the core region where legislation is made. We argue that both the supply and the demand for the rule of law will depend on geographical distance from the core. On the supply side, although the law will typically be the same throughout the country, it is likely that the 'legislative signal' is felt stronger near the capital than in the periphery, where people possibly are subject to the influence of a competing neighbouring country's government's jurisdiction.⁵ On the demand side, it is likely that people's political preferences in the periphery are different from those in the core where most major decisions are made.⁶ Both supply and demand considerations thus lead us to believe that a country's rule of law in general is strongest in the core from where it ultimately emanates.

We argue that this assumption is well in line with a large literature in economic geography showing that there are in general significant costs associated with the diffusion of public goods over space. For instance, Keller (2002) shows that the benefits from technology externalities are halved every 1,200 kilometers from the center of origin. Arzaghi and Henderson (2005) have recently suggested that similar costs of distance apply also for other public goods. A

⁴When East Timor formally seceded from Indonesia in 2002, it was one of the most geographically distant areas from capital Jakarta that was lost.

⁵The situation in the Democratic Republic of the Congo is a good current example of how the supply of rule of law depends on geography. It is generally recognized that whereas the new government has a certain degree of control over the Western provinces near the capital Kinshasa, it has still very little control over the eastern parts which are characterized by widespread lawlessness. Even before the fall of Mobutu in 1997, Eastern Congo was something of power vacuum, a circumstance which contributed to the mass plunder that about a dozen neighbouring African armies engaged in at the turn of the millennium (Olsson and Congdon Fors, 2004). The influence of the well organized militaries of Uganda and Rwanda continue to loom over Eastern Congo, despite the presence of UN peacekeepers.

⁶This is indeed a key argument in Alesina and Spolaore (1997). Even here, DR Congo might serve as an example. The Banyamulenge ethnic group in Eastern Congo are historically close to the Tutsi of Rwanda. When Mobutu harassed the Banyamulenge in the summer of 1996, they asked the Tutsi government in Rwanda for help. This triggered the war that eventually ousted Mobutu from power.

recurring theme in the development literature is how the broadcasting of power over space in former colonies is associated with significant challenges, particularly in Africa (Herbst, 2000). Public goods like the legislation and enforcement of property rights are most strongly felt in and around the capital among the elite groups that control the state and its functions. These geographical limitations in the broadcasting of public goods and power are further the fundamental reason why the world comprises some 200 odd states rather than, say, just one.

There is further a common assertion in the literature that in particular among former colonies, both executive and legislative power tend to originate almost exclusively from the capitals (Bates, 1981; Herbst, 2000). Following the old colonial logic, whoever controls the capital is usually also internationally recognized as the legitimate regime. Given the lack of democracy and the rarity of strong regional identities or federal states, the maintenance of rule of law has remained highly centralized.⁷

If this is a correct assertion, then the location of the capital or core area in relation to the rest of the country, should also matter for the success of broadcasting power to the whole country. Obviously, a capital located in the geographical center of the country should make it easier for public goods to reach the whole country, whereas capitals located on the border should be less effective in this regard.

In order to illustrate these ideas somewhat more rigorously, let us imagine that the strength of rule of law in the core area of country i is given by a variable z_i . We will henceforth approximate the location of the core area with the location of the capital. Let us also imagine, as in Alesina and Spolaore (1997), that the size and location of countries in the world can be described as non-overlapping intervals on the real line where $s_i > 0$ is the size of country i and where $[l_i, l_i + s_i] \subset \mathbb{R}_+$ defines the unique country location with $l_i > 0$ as the 'coordinate' for the left-hand side border.⁸ The capital of the country, in turn, is located at a point $c_i \in [l_i, l_i + s_i]$. Obviously, if the capital is located exactly in the middle of the country, it will be found at $c_i = l_i + s_i/2$. The geographical distance from the capital to some location $l_{i,j} \in [l_i, l_i + s_i]$ within country i is described by the term $d_{i,j} = |l_{i,j} - c_i| \in [0, s_i]$ (see Figure 2 for a graphical illustration). We further make the implicit assumption for now that within countries, the population is uniformly distributed.

As discussed above, we might postulate that the strength of rule of law diminishes with distance from the capital according to a spatial decay-function

⁷There are of course exceptions to this generalization. India is a well-known example of a democratic country with strong regional autonomy.

⁸The one-dimensional nature of country size is used for simplicity. As shown by Alesina and Spolaore (1997), modelling size as two-dimensional significantly increases the complexity of calculations without any intuitive gains.

$$z_{i,j} = z_i (1 - a_i d_{i,j}) \quad (1)$$

where $z_{i,j}$ is the level of rule of law at location $l_{i,j}$ and where $a_i > 0$ is a parameter describing the marginal decline in institutional quality over space. The level of a_i is assumed to be such that $a_i s_i < 1$.⁹

If we define the average distance to the capital within a country as \bar{d}_i , we can calculate this measure as a weighted average

$$\bar{d}_i = \frac{(c_i - l_i)^2 + (l_i + s_i - c_i)^2}{2s_i}. \quad (2)$$

This distance function can assume two extreme values. The first is given by the situation when the capital is located exactly in the middle of the country so that $c_i = l_i + s_i/2$. In this case, simple algebra shows that $\bar{d}_i = \frac{s_i}{4}$. In the other extreme case with the capital located at either of the two borders, we will have that $\bar{d}_i = \frac{s_i}{2}$. We can thus describe average distance more generally as

$$\bar{d}_i = \frac{(1 + q_i) s_i}{4} \quad (3)$$

where $q_i \in [0, 1]$ is a size-neutral index of the 'peripherality' or 'uncentrality' of the capital where a high q_i indicates a location near (or at) a border and where a low q_i means a location near (or at) the center of the country.

The strength of rule of law for the average person in this country should thus be:

$$\bar{z}_i = z_i \left(1 - \frac{a_i (1 + q_i) s_i}{4} \right) \quad (4)$$

A straightforward insight from this kind of spatial decay-function is that with a given strength of rule of law in the core area z_i , average rule of law \bar{z}_i should decrease with country size s_i . Average rule of law should also decrease with spatial frictions a_i and with the peripherality of the capital q_i . Among countries with an ocean coast, it seems however likely that capitals by the sea might have a beneficial effect due to a greater openness to the outside world. In the empirical section, we will investigate both the country size argument and our hypotheses regarding the internal location of the capital.

It is important to recognize however that the results above do not necessarily imply that the average person in a large country experiences a weaker rule of law than an average person in a small country. In general, \bar{z}_i will depend to a great

⁹This condition is imposed to ensure that $z_{i,j} > 0$ at all $l_{i,j}$. The same type of spatial decay-function for public goods is used by Arzaghi and Henderson (2005). 'Iceberg' functions in spatial economics and in the 'new economic geography' is discussed for instance by Krugman (1998).

extent on the level in the core area z_i , which might happen to be greater in a large country and thus might neutralize the negative impact of a great s_i . One might further plausibly argue that large countries are large because they are endowed with a strong and efficient government that is capable of extending its power over great distances, i.e. a very high level of z_i . Analogously, small countries might be small because their government is weak. In terms of the expression above, this reasoning would suggest that s_i could be a function of z_i . This potential endogeneity of borders over the long run is indeed the central theme of the 'endogenous borders'-literature (Friedman, 1977; Alesina and Spolaore, 1997, 2003; and Wittman, 2000).

We argue that among former colonies, it is highly implausible that s_i could be a function of z_i . Although the type of process envisaged by Alesina and Spolaore probably well describes developments in Europe and parts of Asia where country formation has been going on for centuries or even millennia, it is less apparently relevant for the former colonies in America and Africa that received independence much more recently. Herbst (2000) argues that for Africa in particular, the size and number of countries was organized in a more or less random manner during the infamous Berlin conference of 1885.¹⁰

For one thing, there was relatively little a priori information for boundary creators due to a lack of traditional boundaries as well as natural geographic boundaries. Ultimately, the Berlin conference made it possible to claim sovereignty over an area regardless of the ability to administer the area. Therefore, there was no discrimination enabling only the more powerful colonizers to claim large areas. The logic of the partition was primarily to serve European strategic interests and the colonial powers more or less ignored existing state structures and ethnic boundaries (Pakenham, 1991).¹¹ Indeed, the wider effects of the random nature of African borders has been a major topic in social science (Davidson, 1992; Englebert et al, 2002; Alesina et al, 2006). The endogeneity of borders with respect to levels of social and economic development can also be questioned for the other former colonies, although there are some examples of country break-ups after independence.¹² In sum, we will treat s_i as exogenous

¹⁰In Herbst's (2000, p 141) own words: "...the inertia of the national experience and the incentives posed by international structures and norms that have developed over time combine to make the demarcation of the state a non-issue in most countries most of the time. Here, I differ greatly from writings by economists who seek to find the optimal number of states by assuming that states cooperate to design themselves in a way that will maximize 'their joint potential net revenue' [Friedman] or who believe that the size and shape of states is determined on the basis of majority votes motivated by precise calculations of economic interests [Alesina and Spolaore]"

¹¹In Jackson and Rosberg's (1985, p 46) words: "The boundaries of many countries, particularly but by no means exclusively in French-speaking Africa, were arbitrarily drawn by the colonial powers and were not encouraging frameworks of unified, legitimate, and capable states."

¹²Well-known incidences of break-ups of colonies include the formation of India, Pakistan,

to levels of institutional development in the analysis ahead.

2.2 The rent seeking/openness effect

It is a well-known fact in the empirical trade literature that trade intensity is inversely related to measures of country size. Both Frankel and Romer (1999) and Alcalá and Ciccone (2004) show that both the sizes of country area and population have a negative association with the sum of imports and exports as a share of GDP. Larger countries are more likely to host most of the production of goods and services that their citizens demand within their borders. In this sense, it is not surprising that, for instance, the United States is less dependent on foreign trade than the Netherlands.

What is then the link from trade to institutions like the rule of law? Our main argument is that trade and openness to the outside world has a disciplining effect on government's willingness to commit themselves not to predate on foreign or domestic firms. For a small country dependent on several internationally traded goods, it might be devastating to have a government that expropriates production and reneges on contracts. As emphasized in the literature on 'the liberal peace', free trade among countries appears to foster a sense of liberal attitudes emphasizing private property rights, the honoring of contracts, and a general distaste for violence as a means of solving disputes (Mousseau, 2003). Large countries, on the other hand, can more easily find internal substitutes for internationally traded goods and also typically have a stronger power to solve international disputes to their own short term advantage. Trade is therefore usually not an effective behavioral constraint for governments in large countries.

There is potentially yet another channel through which country size affects institutions. Not only are large countries less dependent on the tradeables sector, they are also generally more endowed with valuable natural resources. A growing literature on 'the curse of natural resources' have shown that a large inflow of natural resource rents can be devastating for institutional quality (Leite and Weidemann, 1999; Sala-i-Martin and Subramanian, 2003; Dalgaard and Olsson, 2007). The reason is mainly that easily appropriable rents from minerals like diamonds and oil tend to become objects of predatory struggles involving government elites, guerillas, warlords, and criminal gangs. Congdon Fors and Olsson (2007) develop a model of endogenous institutional choice among newly independent former colonies. A key result is that in countries without natural resources and where a manufacturing sector is relatively important, it is even

and Bangladesh in 1949 and of Colombia, Venezuela, and Ecuador in 1830. However, all the countries mentioned had their break-up in conjunction with or very soon after independence and post-colonial developments have therefore had at most a very small impact on border formation.

in the private interests of the ruling elite in the core to restrain themselves from predatory activities since such a policy will generate legitimate private rents that exceed predatory rents. In natural resource-dominated economies, on the other hand, rent seeking elites are more likely to favor weak institutions so that they can more easily appropriate resource rents from the highly immobile mining enterprises.¹³ In terms of equation (4) above, we might thus expect a negative indirect rent seeking/openness effect of s_i on z_i which is distinct from the broadcasting effect.

Figure 3 summarizes the joint framework that will form the basis for the subsequent empirical analysis. Our main efforts will be devoted to analyzing the causal relationships indicated by the double arrows 1-3, controlling for geography, colonial history and additional variables suggested by the literature.

3 Empirical analysis

3.1 Data and model specification

The dependent variable throughout is *Rule of law* in 2004 from Kaufmann et al (2005). *Rule of law* measures the quality of contract enforcement, the quality of the police and the courts, as well as the likelihood of crime and violence. As our main measure of country size, we use *LogArea*, which shows the logged value of the total area of a country (including lakes and rivers) in square kilometers. Due to the potential endogeneity of country size, we use a restricted sample of 127 former colonies that we have identified among the 208 countries listed in Kaufmann et al (2005). These countries were colonized between 1462 and 1922 following the expansion of Western Europe. Borders in former colonies have rarely been changed since colonial days and might thus reasonably be regarded as being exogenous to current levels of economic and institutional development. Some of the countries in our sample are very small both in terms of population and territory (for instance Nauru with a population of roughly 12,000 individuals on 21 square kilometers) and some are still dependencies to their old colonial powers. Many cross-country studies exclude such tiny countries, but given the issue at hand, they are relevant observations in our study.¹⁴ We further believe that this inclusion neutralizes the concerns of Knack and Azfar (2003) about a commonly observed sample selection bias towards including only those relatively developed small countries where international investors have economic interests. Our sample is further by far the largest sample of former colonies in the literature

¹³In a working paper version, we included some basic equations describing the most important features of this model (Hansson and Olsson, 2006).

¹⁴In section 4.4, we show that our main results are robust when we control for dependencies and exclude the smallest countries as well as those with the most uncertain data.

and arguably includes all countries that were ever colonized.

The basic equation that we test in this section is given in (5)

$$Z_i = \alpha_0 + \alpha_1 S_i + \alpha_2 C_i + \epsilon_i \quad (5)$$

where Z_i is the measure of *Rule of law* in country i , S_i is our country size variable (mainly *LogArea*), and C_i is a vector of control variables that are non-correlated with S_i , ϵ_i is the normally distributed error term, and α_k are the coefficients.

The main variable of interest here is of course S_i . As argued in the theoretical section above, the issue of identification should be resolved since it seems highly implausible that Z_i could have caused S_i in the sample at hand. Our main hypothesis is obviously that $\alpha_1 < 0$. The vector of controls in C_i will always include the purely exogenous variable *Latitude*, measuring the absolute distance from the equator in latitude degrees, and the regional dummies *Sub-Saharan Africa* and *Neo-Europe*. The motivation for including *Latitude* is partially that it can be regarded as a proxy for the marginal 'spatial cost' of broadcasting institutions, a_i and possibly also as a correlate of colonial institutions.¹⁵ A *Neo-Europe*-dummy for Australia, Canada, New Zealand, and the United States is included since these four countries are extreme outliers and do not fit well into our basic framework, as explained above. Including a Sub-Saharan Africa dummy in our baseline regression further ensures that our results are not driven by some special characteristic of the African countries.

However, if we use the regression equation in (5), we are not able to distinguish between a broadcasting effect and a rent seeking/openness effect. The parameter α_1 will simply pick up both types of effects. If we add a vector of intermediate variables X_i that are structurally related to size, we can estimate the following equation:

$$Z_i = \beta_0 + \beta_1 S_i + \beta_2 C_i + \beta_3 X_i + \eta_i \quad (6)$$

The main variables that we will include in X_i are proxies for openness and rent seeking, in accordance with our hypothesis above. Obviously, we would expect that β_3 is significant if the rent seeking/openness hypothesis applies (arrow 3 in Figure 3).¹⁶ Similarly, if $\beta_1 < 0$ and significant, we might interpret this as a support of the broadcasting hypothesis (arrow 1 in Figure 3).

Suppose further that we can model the indirect effect of country size (arrow

¹⁵See Diamond (1997), Herbst (2000), and Olsson and Hibbs (2005) for general treatments and Sachs (2001) for a more detailed discussion of the economic and institutional difficulties that are faced by governments near the equator. Hall and Jones (1999) develop further the argument for how *Latitude* might be seen as a proxy for Western influence.

¹⁶The sign will depend on what variable we include.

2 in Figure 3) as

$$X_i = \gamma_0 + \gamma_1 S_i + v_i. \quad (7)$$

In this case, there is clearly a 'built-in' colinearity between S_i and X_i that makes inference about the coefficients in (6) problematic. If we substitute the equation in (7) for X_i into (6), the reduced-form expression for *Rule of law* can be rewritten as

$$Z_i = \beta_0 + \beta_3 \gamma_0 + \beta_2 C_i + (\beta_1 + \beta_3 \gamma_1) S_i + \beta_3 v_i + \eta_i. \quad (8)$$

Note that this equation is the equivalent of (5) with $\alpha_0 = \beta_0 + \beta_3 \gamma_0$, $\alpha_1 = \beta_1 + \beta_3 \gamma_1$, $\alpha_2 = \beta_2$, and $\epsilon_i = \beta_3 v_i + \eta_i$. The central feature of this expression is that it shows how the reduced form-estimate for S_i picks up both the direct effect β_1 and the indirect effect $\beta_3 \gamma_1$ of country size.¹⁷

3.2 Correlates of country size

Column 1 in Table 1 shows the baseline regression of our study, which is the equivalent of equation (5). *LogArea* is here strongly and negatively related to *Rule of law*, and together with the three controls (*Latitude*, *Neo-Europe*, and *Sub-Saharan Africa*) it explains 57 percent of the variation in *Rule of law*. That there indeed is a clear relationship between *LogArea* and *Rule of law* is probably best described by a partial scatter plot as in Figure 4. If we were to interpret this result, a 100 percent increase in total area for any country implies a reduction in the *Rule of Law*-index by 0.152, which translates into about 3.6 percent of the whole dispersion between the highest and the lowest possible score (4.23). This relatively small effect is explained by that countries differ drastically in size.¹⁸ If we instead compare a country with a total area of 1,000 square kilometers (about the size of Hong Kong) with a country with an area of 1,000,000 square kilometers (like Mauretania or Bolivia), the model predicts that all else equal the larger country should have a score on *Rule of law* that is 1.05 points lower, which is clearly a large effect.

Country area is however not the only variable that captures important elements of country size. In the tradition of Alesina and Spolaore (1997, 2003) most studies have used the level of the population as the indicator of country size. In a recent paper, Rose (2005) investigates whether the level of the pop-

¹⁷A potential alternative strategy would be to try to find instruments for X_i , the rent seeking and openness variables. Frankel and Romer (1999) use country size as an instrument for trade openness, but given the hypothesis in this paper of a direct effect of size on institutions, this is not a viable strategy. The approach above is instead in the spirit of for instance Easterly and Levine (1997) who empirically described a direct and indirect effect of ethnic fractionalization on income growth.

¹⁸India, one of the largest countries in our sample, is about 130'000 times larger than Macau, which is one of the smallest countries in our sample.

ulation has an impact on a battery of economic and institutional variables and finds that it has no or, at best, a very weak effect. We argue that unlike country area, the level of the population is in general endogenous to economic and institutional environments, sometimes even in the short run.¹⁹ Nonetheless, we include the level of the population as a regressor in Table 1 to check whether country area or population size can best explain variations in *Rule of law*.

Column 2 shows that when *LogArea* is replaced by *LogPop* (the natural logarithm of the level of the population), the effect from *LogPop* is also negative and significant.²⁰ When included together with *LogArea* in column 6, the effect from *LogPop* is insignificant and changes sign whereas *LogArea* is still significant. Given the high correlation between *LogArea* and *LogPop*, one should of course not take the specific estimate too seriously, but column 6 appears to indicate that even when holding population constant, *Rule of law* diminishes with country territory and retains its significance.

Table 1 also includes two variables that are intended to be proxies for our intermediate rent seeking/openness effect. The first one is an indicator of natural resource rents, *Log Natural Resources*, measuring the absolute energy rents (oil, gas and coal) in 2001. In our theoretical reasoning above we assumed that the abundance of natural resources is a positive function of country area. Hence, we believe that *LogArea* and *Log Natural Resources* should be collinear. This presumably also explains why *Log Natural Resources* is negatively and significantly related to *Rule of law* in column 3 but insignificant when run together with *LogArea* in column 6.

The second variable that is highly related to country size is *LogOpen*, measured in the conventional way as the log of imports plus exports as a share of GDP. In accordance with our theory, Table 1 suggests that a high degree of openness appears to act as a disciplining device for countries to uphold strong property rights and judicial constraints against opportunistic behavior by governments and individuals. The estimate in column 4 is positive and highly significant and the coefficient is still significant when *LogArea* is included in column 7. Finally in column 8, *LogArea*, *Log Natural Resources*, and *LogOpen* are included alongside each other.

In Table 2, we proceed with some simple tests of arrow 2 in Figure 3 concerning the effect of size on rent seeking/openness. We indeed find that *LogArea*

¹⁹There are several recent examples of episodes when the population has changed drastically as a result of institutional failures. In 1994, 800,000 Tutsi were slaughtered in Rwanda as a result of a collapse of the rule of law. The older experiences of Nazi Germany and Stalin's Soviet Union are well-known examples of how bad institutions have a very large impact on the level of the population.

²⁰This result stands in sharp contrast to the main tendency in Rose (2005) who finds no robust association between population size and a number of institutional and economic variables.

positively affects *Log Natural Resources* and negatively affects *LogOpen*. The final specification in column 8, Table 1 is therefore clearly affected by endogeneity, and we will henceforth drop *Log Natural Resources* and *LogOpen* from the analysis. It should be kept in mind, however, that by excluding these variables the estimate for *LogArea* will be greater in absolute terms than it would be otherwise since it captures both direct and indirect effects of size, as shown in equation (8).

3.3 Location of the core area

Apart from the size of country territory, the degree of peripherality of the capital q_i was an important ingredient of the theoretical reasoning above. The model predicts that rule of law should decrease with q_i , holding country size s_i constant. Using data from CEPII (2006) and CIA (2005), we have constructed a measure of the distance in kilometers from the approximate center of the country to the city hosting the seat of the government (which is usually also the capital).²¹ The measure is available for 120 countries in our ex-colony sample. The countries with the greatest distances are not surprisingly the United States and Canada.

The natural logarithm of this score makes up *LogDistance*, which is featured in Table 3. When run together with *LogArea*, *LogDistance* is negative and significant in column 4, and strongly significant in column 1 when featured alone. The distance measure is however clearly correlated with country area (larger countries like Brazil and Indonesia will, ceteris paribus, have a greater absolute distance from center to capital), and the coefficient in column 1 where *LogArea* is excluded presumably picks up some of the effect of country size. Furthermore, *LogDistance* is an imperfect proxy for q_i in the theory section since q_i is a size-neutral index of the peripherality of the capital.

We have therefore created a measure that, we believe, more clearly reflects the degree of peripherality. We have done so by dividing our calculated distance from center to capital by an approximate measure of the distance from the center of the country to the border, where we approximate the shape of all countries to be congruent to a circle as is standard in the trade literature (Head and Meyer, 2002). Countries which are divided, like for example island groups, can clearly not be said to have a country area approximate to a circle, and are therefore dropped from the sample (see Data Appendix for details).

Table 4 shows the countries with the five lowest and the five highest scores on *Periphery*. This size-adjusted measure shows countries like Namibia and Costa Rica as being among the very lowest scorers whereas the countries with the most

²¹The measure was produced by translating data on locations in latitude and longitude degrees to distances in kilometers by employing the Great Circle Formula. See the Data Appendix for the exact details.

peripheral capitals include Mozambique and Benin. Interestingly, Namibia, one of the least peripheral countries, has a larger country size than any of the five countries with the highest score on *Periphery*. In fact, the correlation between *Periphery* and country area is only 0.1, which indicates that we seem to have created a size neutral measure of periphery.

Our theoretical reasoning predicts that the strength of *Rule of law* should decrease with *Periphery*. Including *Periphery* instead of *LogArea* in the regression, as in column 2, Table 3, the effect from *Periphery* is indeed negative but insignificant.

Often when the capital is uncentrally located, it is instead positioned at the coast to enable trade and contact with the rest of the world. A capital which is uncentrally located could then presumably offset the negative effect from *Periphery* by being located by the coast. Therefore in column 3 we include a dummy for *Core Area by Coast*. The effect from *Periphery* is now both negative and significant whereas *Core Area by Coast* has a positive impact, as predicted. Our theoretical reasoning further predicts that *Periphery* would have a negative effect while holding country size constant, and therefore column 5 includes *LogArea*. As before, *LogArea* remains negative and significant whereas *Periphery* is negative but loses its significance.²²

To conclude, we believe that Table 3 provides some supporting evidence of the notion that the geographical peripherality of the capital negatively affects the average intensity of *Rule of law* although the results are not very robust. It is further quite likely that our measure of *Periphery* is measured with error. More work on the impact of core area location should be able to shed further light on the true relationship. It should also be noted that the coefficient for *LogArea* remains negative and highly significant throughout all specifications.

3.4 Robustness tests

In Table 5, we extend our set of control variables in C_i from just *Latitude*, *Neo-Europe*, and *Sub-Saharan Africa* to include several other variables that have been suggested in the literature. Ethnic, cultural, and or religious fractionalization is an often argued cause for differences in institutional quality and civil conflict (see for example Alesina et al (2003), Easterly and Levine (1997), and Hibbs (1973)). Recently, partly due to the revived interest in the effects of fractionalization, Alesina et al (2003) and Fearon (2003) have created new measures for different aspects of fractionalization. The measures Ethnic fractionalization from Fearon (2003) (*Ethnicity1*, used above) and Ethnic and Religious fractionalization (hereafter called *Ethnicity2* and *Religion*) both from Alesina et al

²²The p -value is 0.134.

(2003) are used as control variables. As can be seen from Table 5, the coefficient for *LogArea* is still negative and statistically significant, while controlling for the fractionalization measures. Before we leave the fractionalization measures, it is interesting to note that the correlations between *LogArea* and the three fractionalization measures are surprisingly low.²³ A large country, therefore, does not automatically imply a more fractionalized country.

Intuition suggests that large countries are more likely to be federal states with bicameral legislatures, i.e. with more regionally decentralized power. If public goods like the rule of law are primarily provided by regional governments, the negative impact of country size should be smaller. In order to control for this, we include a measure of *Unitarism*, a proxy for the degree of power separation between national and regional polities developed by Gerring et al (2005). A country with a high score on *Unitarism* is characterized by a high power concentration with the national government (non-federalism) and a single 'house' of parliament (non-bicameralism), whereas the lowest score implies a federal, bicameral state. In column 4, *Unitarism* has a negative but insignificant effect on *Rule of law*. The effect from *LogArea* remains negative and significant, indicating that a large country size is bad for institutional quality regardless of whether countries have centralized or decentralized modes of governance.

Since we have a sample of former colonies, variables related to colonial heritage are obviously highly relevant. An often used variable is Acemoglu et al's (2001, 2002) famous proxy for settler mortality, constructed by using data on the mortality of soldiers and bishops in tropical diseases during colonial days. The hypothesis proposed by Acemoglu et al (2001) was that a high settler mortality and a subsequent low intensity of European settlement should have contributed to extractive, harmful colonial institutions that have persisted to this day, and vice versa.²⁴ When controlling for *Log Settler Mortality* in column 5 the coefficient for *LogArea* is still negative and significant.

The other colonial variables are *Duration of colonial rule* (suggested by Grier, 1999, and Price, 2003), *Years of independence from colonial rule*, and *Legal Origin* (as suggested by La Porta et al, 1999). Controlling for these measures of colonial heritage does not alter the main results; the coefficient for *LogArea* is still negative and significant in all regressions.

Some additional variables related to geography and urbanization are included in Table 6. In column 1, we include an adjusted measure of country area, taking into account that large portions of countries might be more or less uninhabitable. Consider for instance the population distribution of Algeria in Figure 5.

²³The Pearson correlation coefficients between *LogArea* and *Ethnicity1*, *Ethnicity2*, and *Religion*, are respectively; 0.1735, 0.4441, and -0.0920.

²⁴See Rodrik et al (2004) and Glaeser et al (2004) for further discussions of this work.

Although the country has the eighth largest territory area in our sample, the politically relevant area where people live in the north is much smaller.²⁵ In order to test whether hinterland countries like Algeria in any way drive our results, we subtract areas with four or less inhabitants per square kilometers from country size to form *LogArea2* (see Data Appendix for details). The sample is reduced to 117 countries but the effect from country size is still negative and significant. A previous version of this paper also adjusted area by subtracting polar and desert areas, and the effect from *LogArea* was still significant.

Controlling for *Island* status or whether the country is *Landlocked* or a *Dependency* (a country that is not sovereign) does not alter the significance of the coefficient for *LogArea*. The results remain unchanged when including a *Latin America* dummy in column 5.

In columns 6 and 7 we include further controls for the distribution of the population: *Urbanization* (urban population as percentage of total population) and *Variation in Pop.Density* (the standard deviation of population density among regional units within countries). We do this since our theoretical framework actually assumes a uniform distribution of the population, a fact which we have so far not controlled for. When holding these measures of population distribution constant, the effect from *LogArea* is still significant. More urbanized countries further appear to have a stronger *Rule of Law*.

As the presence of mountains naturally impedes the ability to broadcast power, we have in the last column in Table 6 included a measure for the *Variation in Elevation* (standard deviation of elevation among regional units within countries). As expected, more variation in elevation reduces the quality of *Rule of law*, although the effect from *LogArea* is almost unchanged.

Lastly, in Table 7, we have attempted to control for sample selection bias and measurement error. In row 1, we exclude the smallest countries in the sample, and in row 2 we exclude countries with the largest potential measurement error. In the latter case, we exclude observations with a standard error in the measurement of the dependent variable that is larger than 0.2, which reduces the sample to 90 countries.²⁶ This does not alter the significance of the effect from *LogArea*. In rows 3-4, we use two related measures from Kaufmann et al

²⁵We do not argue, however, that deserts or uninhabited land is irrelevant for a country's level of institutional quality. In line with Herbst (2000) and others we argue that hinterlands like the Sahara constitutes an enormous challenge to governments since such areas easily become the home of rebel groups and other destabilizing forces.

²⁶Our *Rule of Law* measure from Kaufmann et al (2005) is a composite index based on several different independent sources. Therefore, attached to each country's score is also the estimate's standard error and how many sources that has been used for that particular estimate. For the *Rule of Law* 2004 estimate, the great majority of countries have a standard error of between 0.1 and 0.2. The cut-off point that we employ is therefore to exclude countries with a standard error larger than 0.2. This turns out to be almost the same as excluding those countries with less than six independent sources.

(2005) as dependent variables instead of *Rule of law: Government Effectiveness* and *Regulatory Quality*. The level of the estimate changes somewhat but the relationship is still robustly negative. Finally, in row 5, we use a quantile regression, or median regression, which estimates the median of the dependent variable and therefore is more robust to outliers. The coefficient for *LogArea* remains negative and significant.²⁷

4 Conclusions

In the spirit of Montesquieu, this paper demonstrates that there is a clear, robust and significant negative relationship between the size of nations and the strength of rule of law for a large cross-section of countries. For former colonies, up to 60 percent of the variation in rule of law is explained by the variables *LogArea*, *Latitude*, and *Sub-Saharan Africa*, and *NeoEurope*. This strong negative relationship is robust to the inclusion of a variety of control variables such as trade openness, ethnic and religious fractionalization, settler mortality, colonial heritage, and legal origin. The negative relation between *LogArea* and *Rule of Law* is even robust to including the level of the population, suggesting that country area is a stronger predictor of institutional quality than population levels. We believe that these results suggest that large countries are seriously disadvantaged in the formation and maintenance of institutions for economic development.

In our model, we further propose that the centrality of the capital should play an important role in the broadcasting of high quality institutions. We therefore construct a measure for the peripherality of the capital by relating the distance in kilometers from the capital to the center of the country, to the approximate distance from the center of the country to the border. As predicted by our model, the peripherality of the capital appears to be negatively associated with *Rule of Law*, although the result is not very robust. We believe that the relationship between the location of the capital and the country-wide provision of public goods is a potential area for future research.

References

- [1] Acemoglu, D., S. Johnson and J.A. Robinson (2000) "The Colonial Origins of Comparative Development: An Empirical Investigation" *NBER Working Paper 7771*, <<http://www.nber.org/papers/w7771>>

²⁷A similar result is achieved is using a robust regression (rreg in STATA).

- [2] Acemoglu, D., S. Johnson and J.A. Robinson (2001) "The Colonial Origins of Comparative Development: An Empirical Investigation" *American Economic Review* 91(5): 1369-1401.
- [3] Acemoglu, D., S. Johnson and J.A. Robinson (2002) "Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution", *Quarterly Journal of Economics* 117(4): 1231-1294.
- [4] Aghion, P. and P. Howitt (1992) "A Model of Growth Through Creative Destruction", *Econometrica* 60(2), 323-351
- [5] Alcalá, and Ciccone (2004) "Trade and Productivity" *Quarterly Journal of Economics*, 613-646.
- [6] Alesina, A., Devleeschauwer, A., Easterly, W., Kurlat, S., and R. Wacziarg. (2003). "Fractionalization", *Journal of Economic Growth*. 8(2), 155-194.
- [7] Alesina, A., W. Easterly, and J. Matuszeski (2006) "Artificial States", Harvard University, *mimeo*.
- [8] Alesina, A. and G. Spolaore (1997) "On the Number and Size of Nations" *Quarterly Journal of Economics* 112: 1027-1056.
- [9] Alesina, A. and G. Spolaore (2003) *The Size of Nations* Cambridge, Mass: MIT Press.
- [10] Alesina, A, G. Spolaore, and R. Wacziarg (1998) "Openness, Country Size, and Government" *Journal of Public Economics* 69: 305-321.
- [11] Arzaghi, M. and V. Henderson (2005) "Why Countries Are Fiscally Decentralizing" *Journal of Public Economics* 89: 1157-1189.
- [12] Bates, R.H. (1981) *Markets and States in Tropical Africa: The Political Basis of Agricultural Policies*, Berkeley: University of California Press.
- [13] CEPII (2006) "Distances" <<http://www.cepii.fr/anglaisgraph/bdd/distances.htm>>.
- [14] CIA (2005) *The World Factbook 2005*. <<http://www.cia.gov/cia/publications/factbook/index.html>>, accessed nov-dec.
- [15] CIESIN (2006) "Gridded Population of the World Project" <<http://sedac.ciesin.columbia.edu/gpw/country.jsp?iso=DZA>>, accessed September 2006.
- [16] Congdon Fors, H. and O. Olsson (2007) "Endogenous Institutional Change After Independence" *European Economic Review*, forthcoming.
- [17] Dahl, R.A. and E.R. Tufte (1973) *Size and Democracy*. Stanford University Press.
- [18] Dalgaard, C.J. and O. Olsson (2007) "Windfall Gains, Political Economy, and Economic Development", *Journal of African Economies*, forthcoming.

- [19] Davidson, B. (1992) *The Black Man's Burden: Africa and the Curse of the Nation-State*, New York: Times Books.
- [20] Diamond, J. (1997) *Guns, Germs, and Steel: The Fates of Human Societies*. London: W W Norton & Company.
- [21] Englebert, P., S. Tarango, and M. Carter (2002) "Dismemberment and Suffocation: A Contribution to the Debate on African Boundaries" *Comparative Political Studies* 35(10), 1093-1118.
- [22] Easterly, W., and R. Levine. (1997) "Africa's Growth Tragedy: Policies and Ethnic Divisions" *Quarterly Journal of Economics*, Vol. 112, No. 4: 1203-1250.
- [23] Fearon, J. (2003) "Ethnic and Cultural Diversity by Country" *Journal of Economic Growth* 8(2): 195-222.
- [24] Frankel, J. and D. Romer (1999) "Does Trade Cause Growth?" *American Economic Review* 89(3): 379-399.
- [25] Friedman, D. (1977) "A Theory of the Size and Shape of Nations" *Journal of Political Economy* 85(1): 59-77.
- [26] Gerring, J., S.C. Thacker, and C. Moreno (2005) "Centripetal Democratic Governance: A Theory and Global Inquiry" *American Political Science Review* 99(4): 567-581.
- [27] Glaeser, E., R. la Porta, F. Lopez-de-Silanes, and A. Shleifer (2004) "Do Institutions Cause Growth?" *Journal of Economic Growth* 9: 271-303.
- [28] Grier, R. M., (1999), "Colonial legacies and economic growth", *Public Choice* Vol. 98:317-335.
- [29] Hall, R. and C.I. Jones (1999) "Why Do Some Countries Produce So Much More Output Than Others?" *Quarterly Journal of Economics* 114(1): 83-116.
- [30] Hansson, G. and O. Olsson (2006) "Country Size and the Rule of Law: Resuscitating Montesquieu" *Working Papers in Economics* no 200, Department of Economics, Göteborg University.
- [31] Head, K. and T. Meyer (2002) "Illusory Border Effects: Distance Mismeasurement Inflates Estimates of Home Bias in Trade" *CEPII Working paper*, 2002-01, <<http://www.cepii.fr/anglaisgraph/workpap/summaries/2002/wp02-01.htm>>.
- [32] Herbst, J. (2000) *States and Power in Africa*. Princeton University Press.
- [33] Hibbs, D.A. (1973), *Mass Political Violence*, New York, Wiley
- [34] Jackson, R.H. and C.G. Rosberg (1985) "The Marginality of African States", in Carter, G. and P. O'Meara, *African Independence: The First Twenty Five Years*. Bloomington: Indiana University Press.

- [35] Jones, C. (1995) "R&D-Based Models of Economic Growth", *Journal of Political Economy* 103(4), 759-784.
- [36] Kaufmann, D., A. Kraay, and M. Mastruzzi (2005) "Governance Matters IV: Governance Indicators for 1996-2004" *World Bank Policy Research Working Paper 3630*.
- [37] Keller, W. (2002) "Geographic Localization of International Technology Diffusion" *American Economic Review* 92(1): 120-142.
- [38] Knack, S. and O. Azfar (2003) "Trade Intensity, Country Size, and Corruption" *Economics of Governance* 4: 1-18.
- [39] Kremer, M. (1993) "Population Growth and Technological Change: One Million B.C. to 1990" *Quarterly Journal of Economics* 108(3): 681-716.
- [40] Krugman, P. (1998) "Space: The Final Frontier" *Journal of Economic Perspectives* 12(2): 161-174.
- [41] La Porta, R., Lopez-de-Silanes, F., Shleifer, A., and R. Vishny., (1999), "The Quality of Government", *Journal of Law, Economics, & Organization*, V15, N1.
- [42] Leite, C. and J. Weidmann (1999) "Does Mother Nature Corrupt? Natural Resources, Corruption and Economic Growth" *IMF Working Papers* 99/85.
- [43] Montesquieu, C.L. (1750) *The Spirit of Laws*. (Quoted in Dahl, R.A. and E.R. Tufte (1973), p 7).
- [44] Mousseau, M. (2003) "The Nexus of Market Society, Liberal Preferences, and Democratic Peace: Interdisciplinary Theory and Evidence" *International Studies Quarterly* 47: 483-510.
- [45] North, D. (1999) *Institutions, Institutional Change and Economic Performanc.* Cambridge University Press
- [46] Olsson, O. and D.A Hibbs (2005) "Biogeography and Long-Run Economic Development" *European Economic Review* 49(4): 909-938.
- [47] Pakenham, T. (1991) *The Scramble for Africa*. London: Abacus.
- [48] Price, G. N., (2003), "Economic Growth in a Cross-section of Nonindustrial Countries: Does Colonial Heritage Matter for Africa?", *Review of Development Economics*, Vol. 7(3): 478-795.
- [49] Rodrik, D., A. Subramanian and F. Trebbi (2004) "Institutions Rule: The Primacy of Institutions Over Geography and Integration in Economic Development" *Journal of Economic Growth* 9(2): 131-165.
- [50] Romer, P. (1990) "Endogenous Technological Change", *Journal of Political Economy* 98(5), 71-102.

- [51] Rose, A.K. (2005) "Size Really Doesn't Matter: In Search of a National Scale Effect" *CEPR Working Paper* No 5350.
- [52] Sachs, J. (2001) "Tropical Underdevelopment" *NBER Working Paper* 8119, NBER.
- [53] Sala-i-Martin, X. and A. Subramanian (2003) "Addressing the Natural Resource Curse: An Illustration from Nigeria" *NBER Working Paper* No. 9804, NBER.
- [54] Tilly, C. (1990) *Coercion, Capital, and European States, AD 990-1992*. Cambridge, Mass: Blackwell.
- [55] Wittman, D. (2000) "The Wealth and Size of Nations" *Journal of Conflict Resolution* 44(6): 868-884.

Table 1: OLS regressions for Rule of Law

	Dependent Variable: Rule of Law							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LogArea	-0.152 ^{***} (0.016)				-0.132 ^{***} (0.043)	-0.190 ^{***} (0.041)	-0.106 ^{***} (0.025)	-0.107 ^{**} (0.047)
LogPop		-0.173 ^{***} (0.021)			-0.030 (0.055)			
Log Natural Resources			-0.015 [*] (0.009)			0.005 (0.008)		0.004 (0.008)
LogOpen				0.569 ^{***} (0.116)			0.273 [*] (0.140)	0.324 ^{**} (0.155)
Latitude	0.023 ^{***} (0.006)	0.022 ^{***} (0.007)	0.018 [*] (0.009)	0.022 ^{***} (0.007)	0.023 ^{***} (0.007)	0.022 ^{***} (0.008)	0.025 ^{***} (0.007)	0.026 ^{***} (0.007)
Neo -Europe	1.953 ^{***} (0.256)	1.643 ^{***} (0.238)	1.773 ^{***} (0.284)	1.864 ^{***} (0.202)	1.924 ^{***} (0.268)	2.071 ^{***} (0.312)	2.012 ^{***} (0.250)	2.041 ^{***} (0.272)
Sub-Saharan Africa	-0.374 ^{***} (0.122)	-0.498 ^{***} (0.128)	-0.455 ^{**} (0.198)	-0.409 ^{***} (0.131)	-0.383 ^{***} (0.120)	-0.188 (0.161)	-0.325 ^{**} (0.125)	-0.205 (0.164)
Constant	1.176 ^{***} (0.203)	2.180 ^{***} (0.294)	-0.397 (0.281)	-0.351 ^{**} (0.144)	1.411 ^{***} (0.397)	1.545 ^{***} (0.547)	0.685 ^{**} (0.277)	0.628 (0.522)
<i>n</i>	127	127	88	97	127	88	97	80
<i>R</i> ²	0.571	0.520	0.402	0.510	0.573	0.532	0.596	0.565

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Robust standard errors in parentheses.

Table 2: Bivariate regressions estimating the impact of LogArea on correlated variables.

Independent variable: LogArea				
Dependent variables	Constant	LogArea coefficient	<i>n</i>	<i>R</i> ²
(1) Log Natural Resources	-18.431 ^{***} (6.558)	2.369 ^{***} (0.512)	88	0.212
(2) LogOpen	0.911 ^{***} (0.150)	-0.108 ^{***} (0.012)	97	0.317

Notes: The superscript ^{***} denotes significant at the 1% level, ^{**} denotes significant at the 5% level, and ^{*} denotes significant at the 10% level. In parenthesis are robust standard errors.

Table 3: Uncentrality of Core Area

Independent Variables	Dependent Variable: Rule of Law				
	(1)	(2)	(3)	(4)	(5)
LogArea				-0.100*** (0.028)	-0.163*** (0.032)
LogDistance	-0.267*** (0.040)			-0.123** (0.056)	
Periphery		-0.145 (0.158)	-0.376** (0.169)		-0.222 (0.147)
Core Area by Coast (dummy)			0.498*** (0.158)		0.184 (0.150)
Controlling for Latitude, Neo-Europe, and Sub-Saharan Africa	Yes	Yes	Yes	Yes	Yes
<i>n</i>	120	94	94	120	94
<i>R</i> ²	0.520	0.353	0.422	0.557	0.554

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Robust standard errors in parentheses. Intercept included but not reported.

Table 4: Lowest and Highest Five Scores on Periphery Measure

Country	Isocode	Periphery	Distance (km)	Area (sq km)
Lowest Five Scores				
Costa Rica	CRI	0.059	7.542	51100
Belize	BLZ	0.076	6.483	22966
Rwanda	RWA	0.115	10.493	26338
Namibia	NAM	0.125	63.923	825418
Gambia, The	GMB	0.150	9.022	11300
Highest Five Scores				
Bahrain	BHR	1.634	23.774	665
Cuba	CUB	1.635	307.151	110860
Vietnam	VNM	1.725	558.680	329560
Mozambique	MOZ	1.771	894.444	801590
Benin	BEN	1.829	346.374	112620

Table 5: Controlling for Fractionalization, Unitarism, and Colonial Heritage

	Dependent Variable: Rule of Law							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LogArea	-0.158*** (0.042)	-0.168*** (0.020)	-0.145*** (0.016)	-0.140*** (0.019)	-0.183*** (0.035)	-0.149*** (0.016)	-0.137*** (0.021)	-0.135*** (0.018)
Ethnicity1	0.762** (0.304)							
Ethnicity2		0.427 (0.263)						
Religion			0.546** (0.212)					
Unitarism				-0.016 (0.123)				
Log Settler Mortality					-0.237** (0.096)			
Duran of Colonial Rule						0.001* (0.000)		
Years of Independence from Colonial Rule							-0.002 (0.001)	
Legal Origin France (dummy)								0.822*** (0.195)
Legal Origin UK (dummy)								0.978*** (0.207)
Controlling for Latitude, Neo-Europe, and Sub-Saharan Africa	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>n</i>	92	117	125	88	69	127	127	125
<i>R</i> ²	0.527	0.568	0.592	0.568	0.652	0.579	0.578	0.623

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Robust standard errors in parentheses. Intercept included but not reported. a: Omitted group is Socialist Legal origin (coefficient for constant=0.1402, se=0.3047).

Table 6: Controlling for Geography and Urbanization

	Dependent Variable: Rule of Law							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LogArea		-0.145*** (0.023)	-0.150*** (0.016)	-0.137*** (0.017)	-0.152*** (0.016)	-0.145*** (0.017)	-0.121*** (0.035)	-0.140*** (0.023)
LogArea2 ^a	-0.177*** (0.022)							
Island (dummy)		0.067 (0.169)						
Landlocked (dummy)			-0.120 (0.166)					
Dependency (dummy)				0.584*** (0.151)				
Latin America (dummy)					0.172 (0.144)			
Urbanization						0.009*** (0.002)		
Variation in Pop. Density							-0.026 (0.029)	
Variation in Elevation								-0.093*** (0.031)
Controlling for Latitude, Neo-Europe, and Sub-Saharan Africa	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>n</i>	117	127	127	127	127	123	112	109
<i>R</i> ²	0.576	0.572	0.573	0.591	0.577	0.624	0.521	0.581

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Robust standard errors in parentheses. Intercept included but not reported. a: Only country area with more than 4 persons per square kilometer.

Table 7: Controlling for sample selection bias and measurement error.

Dependent variable: Rule of Law				
	LogArea coefficient	Controls for Latitude, Neo-Europe, and Sub- Saharan Africa	<i>n</i>	<i>R</i> ²
(1) Excluding countries w/ population<1,000,000	-0.162*** (0.045)	Yes	90	0.506
(2) Excluding countries w/ imprecise estimates (standard error of Rule of Law>0.2)	-0.161*** (0.039)	Yes	90	0.521
(3) Using Government Effectiveness as dependent variable	-0.081*** (0.022)	Yes	127	0.420
(4) Using Regulatory Quality as dependent variable	-0.115*** (0.021)	Yes	126	0.390
(5) Quantile Regression	-0.158*** (0.026)	Yes	127	0.377 ^a

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Robust standard errors in parentheses. Intercept included but not reported. OLS estimator in rows (1)-(4), and quantile regression (*qreg* in *Stata*) in row (5). a: Pseudo *R*².

Figure 1: Simple correlation between Rule of Law and LogArea for 208 countries.

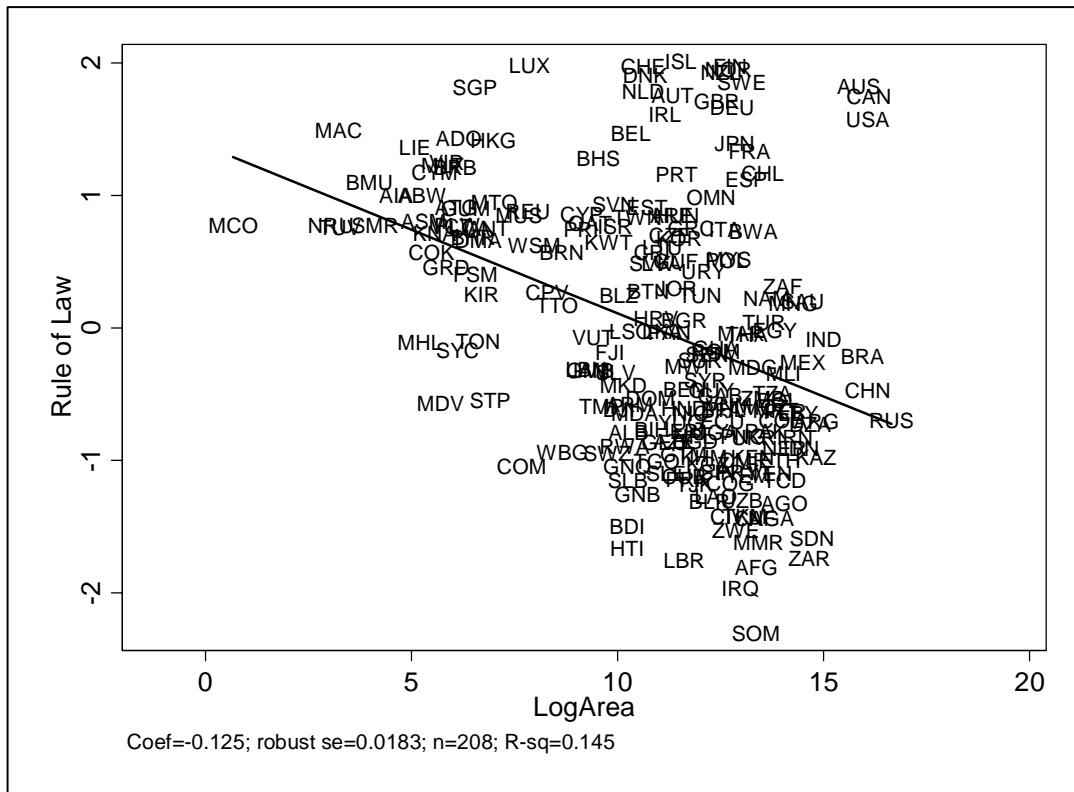


Figure 2: Illustration of Distance to Capital

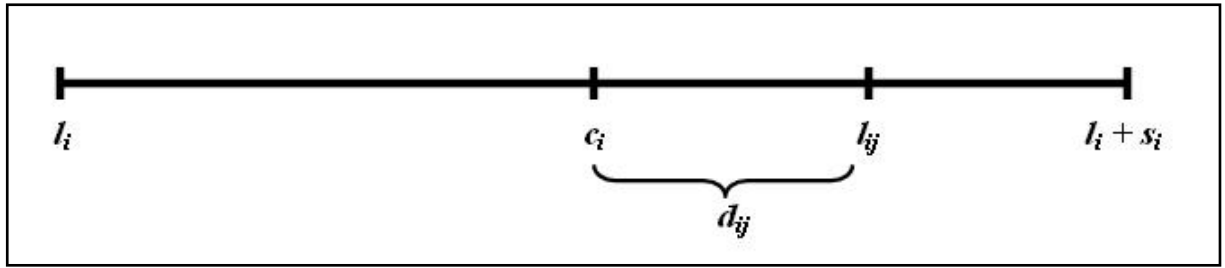


Figure 3: Hypothesized Causal Linkages

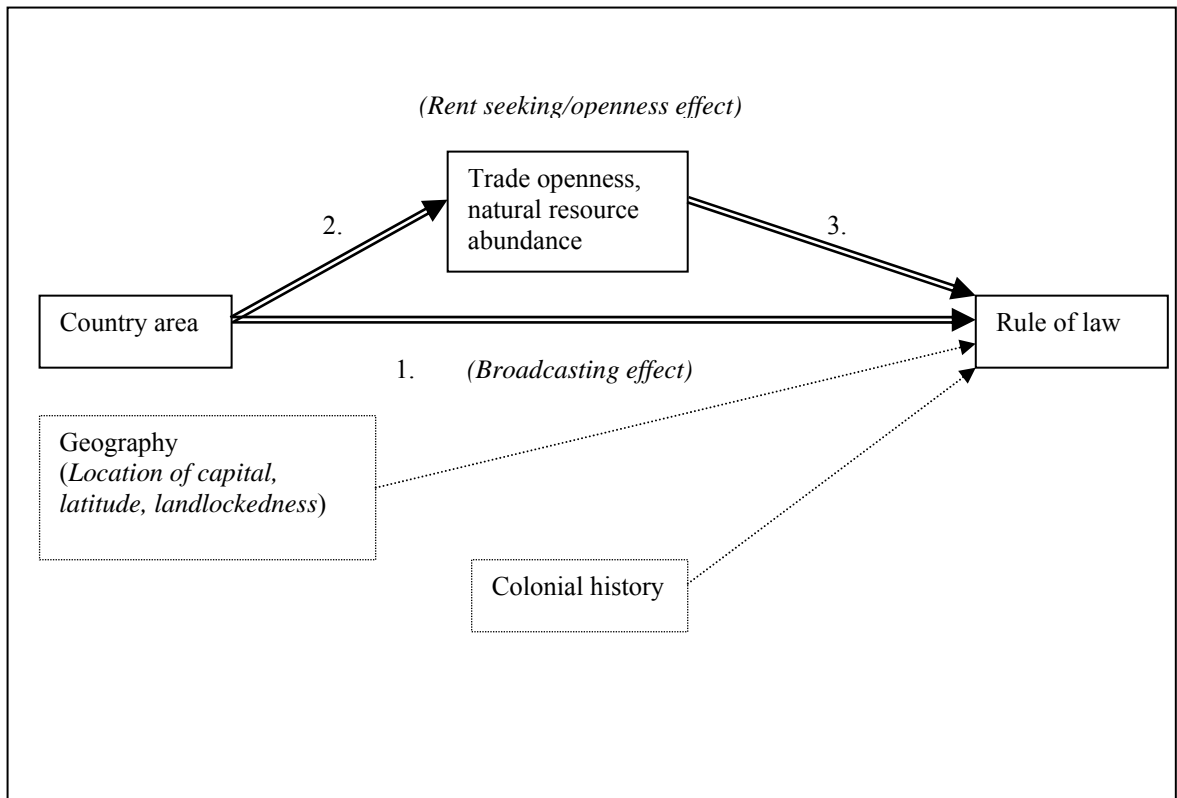
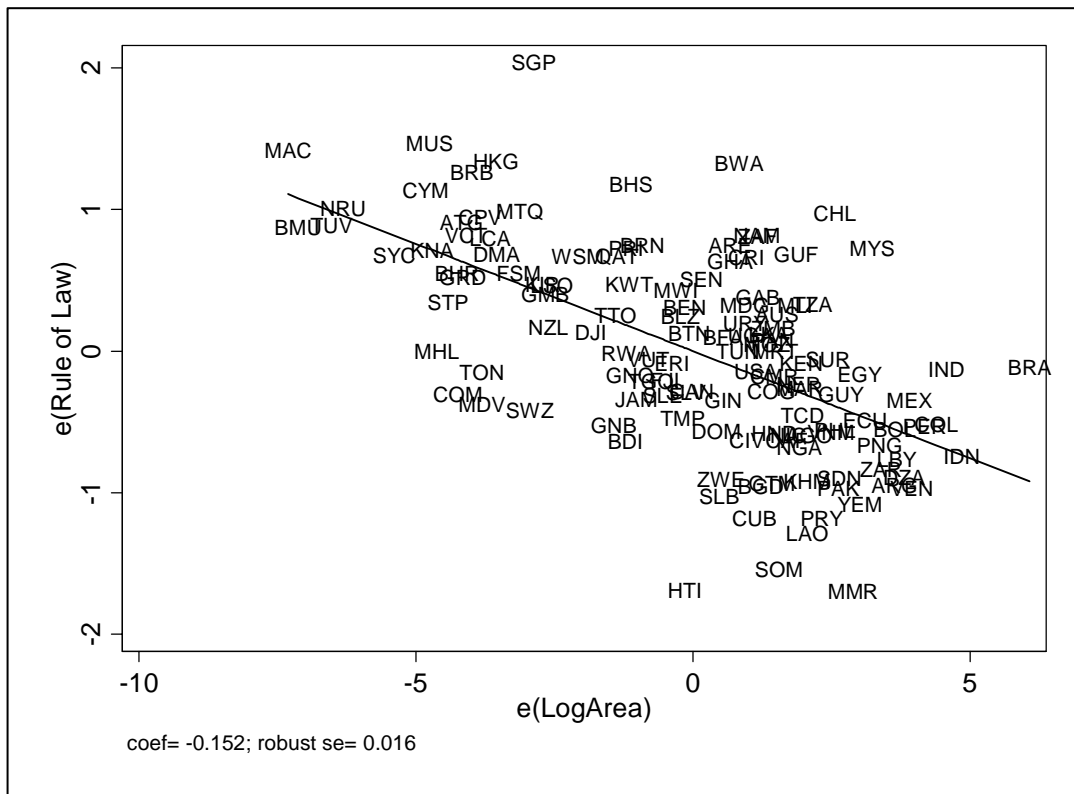
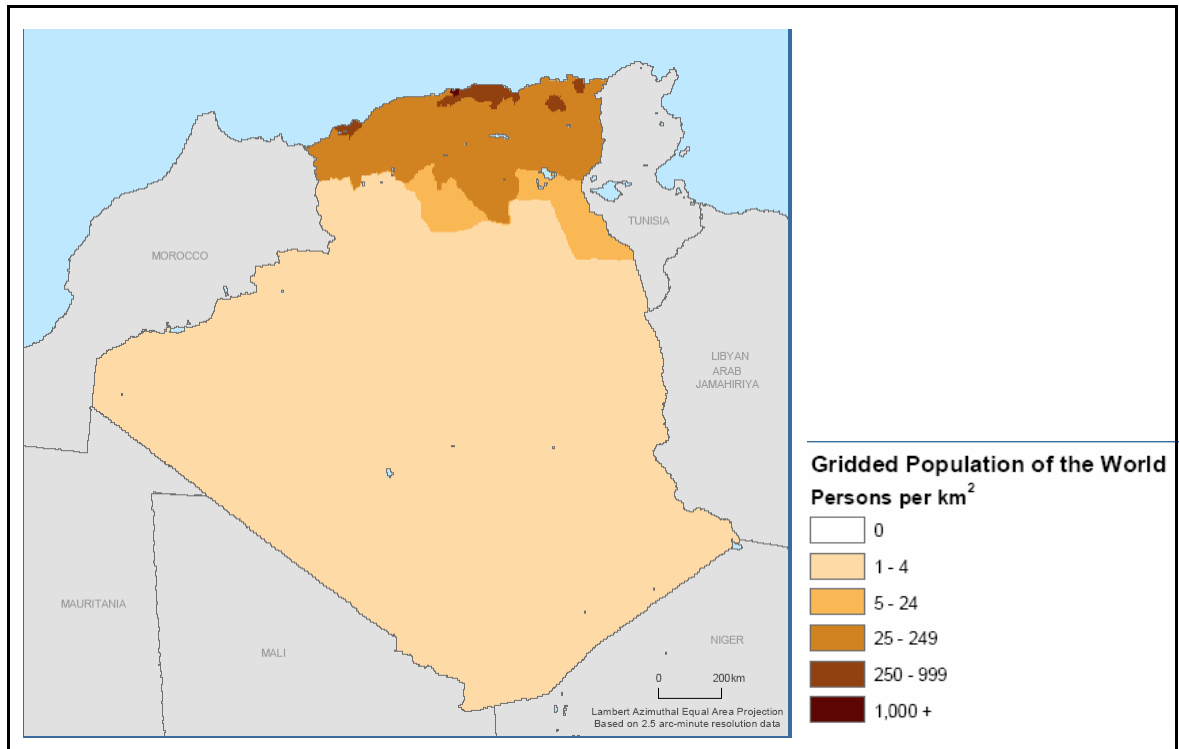


Figure 4: Partial Scatter Plot, Rule of Law vs. LogArea (former colonies)



Notes: Partial scatter from regression 1 in Table 1.

Figure 5: Population Distribution of Algeria.



Source: CIESIN (2006).

Variable Description

Core Area by Coast	Dummy =1 if capital is located at ocean coast. Own assessment based on maps.google.com.
Dependency	Dummy variable. =1 if country is not independent according to CIA World Factbook 2005
Duration of Colonial Rule	Duration of colonial rule. Year of independence (max 2004) minus year of colonialization. Own assessment.
Ethnicity1	Ethnic Fractionalization. From Fearon (2003)
Ethnicity2	Ethnic Fractionalization. Covers the period 1979-2001. From Alesina et al (2003)
Island	Dummy variable. =1 if Island. An Island is defined as a country with no land boundary. Based on "land boundary" from CIA World Factbook 2005.
Landlocked	Dummy variable. =1 if country is landlocked. From CIA World Factbook 2005
Latin America	Dummy variable. =1 if country is part of Latin America
Latitude	Absolute latitude degree. Source CIA World Factbook 2005,
Legal Origin France	Legal Origin French From La Porta et al (1999)
Legal Origin UK	Legal Origin British, From La Porta et al (1999)
Log Natural Resources	Natural logarithm of total energy rents +1. Rents from energy depletion 2001 in current USD. Energy consists of crude oil, natural gas, and coal, and the rents=volume*(market price-production cost). From World Bank data on Adjusted Net Savings. http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/NVIRONMENT/EXTEEI/0,,contentMDK:20502388~menuPK:1187778~pagePK:148956~piPK:216618~theSitePK:408050,00.html
Log Settler Mortality	Natural logarithm of Settler Mortality, from Acemoglu et al (2000)
LogArea	Natural logarithm of total area (including lakes and rivers) in sq km. Source CIA World Factbook 2005
LogArea2	Natural logarithm of country area with more than 4 persons per square kilometer. Calculated by using data on population and area from the G-econ dataset. (G-Econ Project, Yale University, New Haven, CT, USA, William D. Nordhaus, Project Director)
LogDistance	<p>Natural logarithm of the distance in kilometers from the Seat of the Government (data from CEPIL, 2006) to the approximate center of the country (CIA, 2005). Calculated by Great Circle Distance Formula (see http://mathworld.wolfram.com/GreatCircle.html, and; http://www.meridianworlddata.com/Distance-Calculation-asp)</p> <p>Step 1: Retrieve the coordinates for the two locations, expressed in decimal degrees. Step 2: Convert all latitude and longitude degrees into radians by taking the decimal degree/(180/ Π) where $\Pi=3.14159$. Define the first coordinate as "lat1" and "lon1" and the second coordinate as "lat2" and "lon2". Step 3: calculate according to Great Circle Formula:</p> $Distance=r*\arccos*[\sin(lat1)*\sin(lat2)+\cos(lat1)*\cos(lat2)*\cos(lon2-lon1)]$ <p>where $r=6378.7$ is the radius of the earth in kilometers.</p> <p>A number of countries had clearly erroneous values for either seat of government or approximate center. For 25 of these countries the distance value was therefore manually adjusted. Although these changes are small, the correlation between adjusted and unadjusted distance data is 0.97. For six countries adjustment was not possible (Kiribati, Micronesia, Nauru, Saint Vincent and the Grenadines, Seychelles, and Tuvalu).</p>
LogOpen	Natural logarithm of Open, where Open=(exports + imports)/GDP, all from 2002 in current prices local currency units. Source World Development Indicators 2004
LogPop	Log of total population (2002). Source UNSTATS
Neo-Europe	Dummy variable, =1 if Australia, Canada, New Zealand, or the USA
Periphery	<p>Measure of uncentrality of core area (seat of government). $Periphery=Distance/(Area/\Pi)^{1/2}$, For <i>Distance</i> see description of LogDistance.</p> <p>The shape of all countries is here assumed to be congruent to a circle where $(Area/\Pi)^{1/2}$</p>

	<p>is the radius of that circle, hence the approximate distance from the center to the border.</p> <p>Countries which we defined as “island group” have been excluded. Island groups are the countries which shape least can be approximated as a circle. Countries classified as an Island group are: Antigua and Barbuda, The Bahamas, Bermuda, Comoros, Cape Verde, Cayman Islands, Fiji, Grenada, Saint Kitts and Nevis, Maldives, Marshall Islands, New Zealand, Philippines, Solomon Islands, Sao Tome and Principe, Tonga, Trinidad and Tobago, Vanuatu, and Samoa. Also excluded are countries which cover water or in other ways are divided: Brunei, Equatorial Guinea, Hong Kong, Haiti, Indonesia, Macau, Malaysia, and Papua New Guinea.</p>
Religion	Religious Fractionalization, for 2001. From Alesina et al (2003)
Rule of Law	Rule of Law, source Kaufmann et al (2005)
Rule of Law n	Standard Error of Rule of Law measure, source Kaufmann et al (2005)
Rule of Law se	Number of sources per estimate, source Kaufmann et al (2005)
Sub-Saharan Africa	Dummy variable. =1 if country is part of Sub-Saharan Africa
Unitarism	Unitarism year 2000. Average of Nonfederalism and Nonbicameralism. Nonfederalism is coded as 0 = federal (elective regional legislatures plus conditional recognition of subnational authority), 1= semifederal (where there are elective legislatures at the regional level but in which constitutional sovereignty is reserved to the national government), or 2=nonfederal. Nonbicameralism is coded as 0=strong bicameral (upper house has some effective veto power; the two houses are incongruent), 1 = weak bicameral (upper house has some effective veto power, though not necessarily a formal veto; the two houses are countuent), or 2 = unicameral (no upper house or weak upper house). Source: Teorell, Jan, Sören Holmberg & Bo Rothstein. 2006. The Quality of Government Dataset, version 1Jul06. Göteborg University: The Quality of Government Institute, http://www.qog.pol.gu.se .
Urbanization	Urban population as percentage of total in 2004. Source: World Development Indicators
Variation in Elevation	Natural logarithm of the average standard deviation in elevation (in km). Source: G-econ data.
Variation in Pop.Density	Natural logarithm of the standard deviation of population density in country. Weighted to account for the different area size of the grid cells. Calculated using data on population and area from the G-econ data..
Years of Independence	Years of independence since colonialization. 2004 minus year of independence. Own assessment.

Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Colonized after 1850	127	0.5197	0.5016	0.0000	1.0000
Core Area by Coast	95	0.4632	0.5013	0.0000	1.0000
Dependency	127	0.0551	0.2291	0.0000	1.0000
Duration of Colonial Rule	127	173.1890	126.5852	38.0000	513.0000
Ethnicity1	92	0.5522	0.2536	0.0395	1.0000
Ethnicity2	117	0.4932	0.2601	0.0000	0.9302
Island	127	0.2992	0.4597	0.0000	1.0000
Landlocked	127	0.1417	0.3502	0.0000	1.0000
Latin America	127	0.2756	0.4486	0.0000	1.0000
Latitude	127	15.2793	10.0048	0.0000	60.0000
Legal Origin France	125	0.4960	0.5020	0.0000	1.0000
Legal Origin UK	125	0.4640	0.5007	0.0000	1.0000
Log Natural Resources	88	10.9669	10.4610	0.0000	25.4591
Log Settler Mortality	69	4.6852	1.2171	2.1459	7.9862
LogArea	127	10.9877	3.0812	3.0445	16.1166
Area	127	680882.0000	1634000.0000	21.0000	9984670.0000
LogArea2	117	10.9671	2.5215	3.2347	15.4256
LogDistance	120	4.9109	1.4181	0.9285	7.6325
LogOpen	97	-0.3360	0.5369	-1.4426	1.0761
LogPop	127	15.0881	2.3000	9.2398	20.7762
Neo-Europe	127	0.0315	0.1753	0.0000	1.0000
Periphery	94	0.7801	0.4123	0.0591	1.8294
Religion	125	0.4621	0.2427	0.0023	0.8603
Rule of Law	127	-0.2194	0.8876	-2.3068	1.9258
Rule of Law n	127	9.2047	4.4496	1.0000	17.0000
Rule of Law se	127	0.1786	0.0749	0.1135	0.7105
Sub-Saharan Africa	127	0.3622	0.4825	0.0000	1.0000
Unitarism	88	1.5455	0.6371	0.0000	2.0000
Urbanization	123	50.0997	25.5773	9.7200	100.0000
Variation in Elevation	109	-4.1316	1.8674	-13.4497	-0.3716
Variation in Pop.Density	112	8.9828	2.5665	-0.5556	13.2038
Years of Independence	127	62.7638	57.3785	0.0000	228.0000