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The Colonial and Geographic Origins of Comparative Development

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Abstract

While the direct impact of geographic endowments on prosperity is present in all countries, in former colonies, geography has also affected colonization policies and, therefore, institutional outcomes. Using non-colonized countries as a control group, I develop an empirical strategy that disentangles the partial effects of institutions and of endowments on income. I find that institutions are the main determinant of development, but that endowments have a sizeable direct impact, as well. Last, I apply the empirical strategy to examine the theories put forward by La Porta et al. (1999) and by Acemoglu et al. (2001), finding support for both theories, but also evidence that the authors' estimates are biased since they mix up the effect of the historical determinants of institutions with the sizeable direct impact of access to trade and of disease environment.

Keywords: Growth, Institutions, Geography, Comparative Development, Colonialism

JEL Codes: O11, P16, P51, R11, N50, F54

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Is the large inequality in the wealth of nations a result of man-made history or, rather, the inevitable consequence of nature?

Two rivaling schools of thought emphasize either geographic endowments or institutions as the main determinant of comparative development. The "endowments" view, developed among others by Diamond (1997), Bloom and Sachs (1998), Gallup et al. (1998), and Frankel and Romer (1999), argues that climate, the quality of soil, location, and other geographic features directly impact the prevalence of disease, the productivity of labor, and prosperity.

In contrast, the "institutions" view, pioneered in its modern form by North (1981), argues that the organization of society is the basic force of comparative development. This hypothesis has received strong support from the empirical work of Mauro (1995), La Porta et al. (1997, 1998, and 1999), Hall and Jones (1999), Acemoglu et al. (2001 and 2002), and Feyrer and Sacerdote (2008). These authors instrument for the endogenous quality of institutions with the institutions induced by the course of history.

Although it is fair to say that the literature arguing for the importance of institutions is currently the dominant view of development,[1] it is not free from criticism. A major concern is that the instrumental variables used to establish the effect of institutions were affected by endowments and early economic development, and that the instrumentation strategies are, therefore, invalid. For example, the correlation between disease environment and income per capita can be attributed to either the indirect effect of settler mortality rates on colonization policies in accordance with the theory of Acemoglu et al. (2001), or to the direct impact of disease on income. Similarly, the regularity that legal systems based on British common law are generally associated with higher income than systems based on civil law could reflect the causal impact of the legal system on economic performance, but it could also reflect the fact that the British tended to colonize countries with more favorable endowments.[2]

This study contributes to the understanding of the partial effects of institutions and of en-

[1] A frequent finding of this literature is that, once the quality of institutions is accounted for, endowments matter only marginally for development. See also Easterly and Levine (2003) and Rodrik et al. (2004).

[2] As I argue below, adding controls for the potential direct effect of endowments to the empirical estimations does not alleviate this concern since also these controls potentially affect development both directly and indirectly via colonization policies. What is missing in the current literature is a clear control group that distinguishes the direct effect of endowments from the impact of colonization policies. I set out to build such a control group below.

dowments for comparative development. The key insight is that one can utilize the interaction of colonial history and geography to identify the partial effects of institutions and endowments. In countries that have been colonized, geographic location has affected the identity of the colonizer and thus the nation's legal origin. In these nations, disease environment and the resulting mortality rates of European settlers have determined the way in which a country was colonized. These indirect effects of endowments on colonization policies were only present in former colonies. In contrast, the direct impact of endowments on development is present also in countries that have not been colonized (non-colonies).

Since endowments had both a direct as well as an indirect effect on colonization policies in the group of former colonies, but shaped development only directly in the group of non-colonies, the difference in how geography has affected economic outcomes in these two groups can identify the determinants of development. In this respect, the current studies formalizes the hypotheses of Engerman and Sokoloff (1997) and Acemoglu et al. (2002), who argue that the effect of geography on economic development was reversed during colonization: endowments that were favorable for development early on lead later to unfavorable colonization policies.[3]

The analysis of this paper proceeds in three steps. In the first step, I document that while geography and the instrumental variables used in the current literature to identify the causal effect of institutions are highly collinear, geography itself had a different effect on development in former colonies and in the rest of the world. I then show how the partial effects of endowments and institutions on income can be disentangled.

In the two-stage least square estimations developed below, the identifying assumption is that the difference in how endowments have shaped development in former colonies and in the rest of the world is the result of the institutions brought about by colonization. In contrast to the existing literature on institutions, this identification does not restrict the common effect of endowments on prosperity to be absent. It therefore allows testing whether endowments do have a direct impact on development.[4]

[3]This basic insight is also related to the work of Nunn and Puga (2008), who demonstrate that the slave trade has reversed the impact of internal transportation cost due to the protection from slave traders that rugged terrain provided.

[4]In the analysis below, I document that although colonization is likely endogenous, the interaction coefficients that are utilized to identify the determinants of development are not affected by this potential endogeneity.

In the second step of the analysis, I present estimates of the partial effects of institutions and endowments on economic development. Both forces are shown to be statistically significant and economically relevant. In a baseline estimation, a one standard-deviation difference in endowments is associated with a direct impact on prosperity equivalent to a roughly eight-fold difference in income per capita. In former colonies, the same one standard-deviation difference in geographic endowments had an additional effect on colonization policies and institutional outcomes that amounts to a roughly 34−fold difference in income per capita. The point estimate for the importance of institutions for income implies that a one standard-deviation difference in institutional quality is associated with a roughly seven-fold difference in income per capita.[5]

In the third step of the analysis, to relate the findings of this study to the existing literature, I examine the theories of Acemoglu et al. (2001) and La Porta et al. (1999) using the methodology of this paper. I first highlight the role of disease on development throughout history. To that end, I construct a measure of the geographic potential for disease, i.e., the level of germs that would prevail if a country was untouched by Western civilization. For a former colony, a 1% higher level of potential for disease is associated with a roughly 1.2% lower level of income per capita. In a baseline estimation of this paper, around three fourths of the total effect of disease is attributed to the institution-building channel, i.e., to the impact that settler mortality rates had on colonization policies and institutions, hence confirming the theory of Acemoglu et al. (2001). The remaining quarter is, however, attributed to the direct impact of disease on development.

I next examine the importance of legal origin for institutional outcomes taking into account that location and transportation costs could have mattered for colonizer identity and, consequently, for legal origin. Indeed, I document that the location of former colonies can very well predict legal origin. Controlling for this relation, I find that the causal effect of adopting a common law system is larger than what the estimations of La Porta et al. suggest. The reason for this is the following. Countries with a location such that they where likely to be colonized by Britain are, on average, remote from export markets, which is detrimental to growth. Consequently,

[5] The instrumentation strategy relies on the interaction of endowments and a colony dummy. Consequently, the instrument varies only within the group of former colonies. These numbers, as well as the results presented below, thus measure the importance of institutions in the group of former colonies, but not necessarily in the rest of the sample.

the positive effect of adopting a British legal system is partly obscured by the negative effect of remoteness.

Overall, this leads me to conclude that both the direct and the indirect institution-building effect of various geographic endowments matter for development. This fact reconciles the contrasting findings of the two rivaling literatures. In the studies arguing for the importance of institutions, identifying the relation between institutions and income attributes all of the correlation between endowments and income to the impact of institutions. Similarly, the literature arguing for the importance of geography attributes all of this correlation to the direct impact of endowments. Since both channels matter, existing studies are biased in favor of their starting hypothesis.

The structure of this paper is the following. Section 1 discusses the existing literature. Section 2 documents how the two forces of development can be distinguished and Section 3 sets up the econometric framework. Section 4 presents the results using geographic variables directly. Section 5 examines the role of disease environment. Section 6 examines the role of location and legal origin for development and Section 7 concludes.

1 Two Theories, But One Correlation?

It goes without saying that throughout history, the development of human culture has been strongly influenced by geography. For example, Diamond's (1997) seminal theory of development is so convincing because it is self-evident that hunters could only evolve into farmers in places where nature offered plants of sufficient nutritional value. Similarly, the efficient use of the plow – and thus the incentives to invent it – hinges on the incidence of large mammals, thus explaining why this technology never reached widespread use in Australia, where large mammals where extinct shortly after humans arrived.

A question of much more policy relevance, however, is to what extent endowments continue to affect economic development today. Much of the current literature is focused on identifying the impact of disease. Since unhealthy people are less productive and shorter life expectancy reduces investment in human capital, the strong correlation between the prevalence of disease and income levels is not surprising. For example, Gallup and Sachs (2001) estimate that the growth of income per capita is 1.3 percentage points lower in countries with high prevalence of malaria. To demonstrate that this correlation is causal, Sachs (2003) instruments for the prevalence of the disease with the natural incidence of mosquito vectors that are more prone to carry the parasite and with climate conditions, confirming that widespread prevalence of malaria is associated with substantial economic costs.

A second major channel through which endowments affect development today are transportation costs. Modern economies grow via the accumulation of technology and recouping the costs of innovation requires access to a large market. In their ingenious study, Frankel and Romer (1999) document that some countries are virtually in a much better position than others to reap the benefits of globalization since they are located close to big export markets. To estimate the causal effect of trade on growth they first construct estimates of a country's geographic potential for trade. They then instrument for actual trade flows with the constructed measure and document that better access to trade is associated with a substantial effect on income.

In addition to disease and transportation costs, endowments affect development through many additional channels. For example, soil quality still greatly impact agricultural yields. Dell et al. (2008) document that variation in climate has large growth effects in developing nations. Overall, Bloom and Sachs (1998) estimate that around two-thirds of Africa's miserable growth record over the last two centuries can be attributed to the effect of adverse endowments, and only one third to economic policy and institutions.

This result stands in strong contrast to findings of a large body of literature establishing that institutional performance, such as the rule of the law or the protection from expropriation, is the strongly correlated with income. To determine whether this correlation is causal, many studies instrument for the endogenous quality of institutions with the institutions brought forward by a nation's colonization experience. For example, La Porta et al. (1997, 1998, and 1999) propose dummies origin of the legal system as an instrument for institutional outcomes. They argue that owing to their fundamentally different legal systems, different colonizers such as France and Britain installed different institutions in the countries they colonized, with very different associated economic outcomes.

Acemoglu et al. (2001 and 2002) focus on how different local conditions in the colonies shaped institutional outcomes. Acemoglu et al. (2001) argue that in places unfavorable to European physiology, the main objective of the colonizers was to extract resources by corrupting local institutions. In contrast, when chances of survival where high, European settlers came in large numbers and the focus of the colonizers was to produce rather than to extract, leading them to install institutions geared towards ensuring good property rights. Acemoglu et al. (2002), in turn, argue that colonizers were more likely to install extractive institutions in initially rich and densely populated areas. Last, Feyrer and Sacerdote (2008) instrument for the timing and duration of colonization of islands with wind direction and speed.

These articles and the large literature deriving from them hold in common the following set of three underlying assumptions.

1. Colonization policies were influenced by colonizer identity or local conditions prevailing in the colonies.

2. Different colonization policies created differences in early institutional arrangements that persist until today.

3. Colonization policies were not affected by country characteristics that directly influence prosperity.

The current literature centers on establishing the validity of the first two assumptions. This paper examines the remaining one. As has been emphasized in particular by Dollar and Kray (2003), the instrumental variables of the current literature are highly collinear with geographic variables (see also the four rightmost Columns of Table 1). The mere collinearity between endowments and the proposed instruments for institutions, however, does not necessarily invalidate the results of the current literature, since it is possible to control for the effect of endowments.

The fundamental problem of the current literature is that geographic endowments impact development directly, but they have also indirectly mattered for development through their impact on colonization policies in the past.

Can we attribute the correlation between the prevalence of malaria and of income to the direct impact of the disease, or alternatively to the indirect impact of settler mortality rates?[6] Pre-colonial income levels where heavily influenced by the quality of soil and a country's climate. Is the relation between these measures and income per capita the direct result of how geography affects the productivity of the agricultural sector, or is it reflecting the past impact of geography on pre-colonial income levels and colonization policies? As I document below, the location of former colonies had a strong impact on the origin of the country's colonizer and thus the origin of its legal system. Can one attribute the relation between the geographic potential for trade and income to the direct impact of access to trade, or to the indirect effect of legal origin on institutional outcomes?

In sum, endowments have shaped colonization policies through multiple channels, but they also directly impact prosperity. Is the correlation between geographic features and economic outcomes a consequence of the direct impact of endowments on development, or rather, the indirect result of how colonization policies were affected by endowments?

2 Distinguishing the Theories

In this paper, I argue that the comparison of how endowments have shaped economic development in the group of former colonies and in the rest of the world can distinguish between the rivaling literatures. The methodology of this paper is best exemplified for the theory of Acemoglu et al. (2001). The endowments view predicts a direct correlation of disease and development that is common to all countries. The theory of Acemoglu et al. (2001) predicts a correlation of disease environment and institutional outcomes that is exclusively present in the group of former colonies. Since disease affected both colonization policies and development directly in former colonies, but only had one of these two effects in non-colonies, the difference in how disease environment mattered for development between these two groups is the exclusive result of colonization policies and can be utilized to estimate the partial effects of development.

More generally, the effect of any endowment on colonization policies was only present in former

[6] In particular, Acemoglu et al. (2003), argue that most important channel through which the disease has affected development is via its historical impact on the formation of institutions, while Sachs (2003) arrives at the opposite conclusion although he is using the same data.

colonies. The direct effect of the same variable is present in all countries. Thus, while the effects of endowments and colonization policies are observationally equivalent in a sample of former colonies, they can be disentangled in a larger sample that also includes non-colonized countries by using the fact that the effect of the same variable was different across the two groups of countries.

A graphical inspection is expedient to examine how distinct the impact of geography on colonization policies and, therefore, institutional outcomes was. In Figure 1 to 3, and in the main part of the text, a country is counted as a former colony if it ever has either been an officially colonized, was under the control of an empire-affiliated organization such as the Dutch and British East Indies Companies, had the status of protectorate of a non-adjacent empire, or lost the sovereignty over its foreign policy following a military conflict with a non-adjacent empire. With this definition, 56 countries are classified as non-colonized nations, while 95 are classified as former colonies.[7]

Did geography indeed influence colonization policies and if so, through which mechanisms? The upper scatter plot of Figure 1 relates a country's average rainfall to its score for the rule of law in the group of colonies. The lower plot presents the same relation for the rest of the sample. While there is a strong negative association between these two variables in colonies, they are essentially uncorrelated in the group of non-colonies. As I demonstrate in Section 5 below, the negative effect of higher rainfall on colonization policies stems from the positive relation of rainfall and settler mortality rates.

Colonization also influenced how a country's development depends on its access to trade. Both scatter plots of Figure 2 relate a country's distance from Europe to its score for the rule of law. Since countries that are close to Europe tend to be close to many export markets, they have easier access to trade and should be economically more developed. Indeed, I confirm this finding of Frankel and Romer (1999) in the group of non-colonies, where higher access to trade is associated with better outcomes for the rule of law. However, the impact of trade access has been reversed in former colonies, where more remote colonies are characterized by better institutional outcomes (see upper scatter plot). Section 6 documents that the reversal of how remoteness mattered for

[7] None of the results in this paper are dependent on using this precise definition of the colony dummy. Table 9 in Appendix B examines alternative definitions.

development stems from the fact that Britain was more likely to colonize remote nations than were France or Spain.

Last, Figure 3 documents that colonization also has partly reversed the effect of elevation on development. Owing to higher internal transportation costs in more elevated areas, the relation between institutions and elevation is negative in non-colonies. However, this negative relation is much milder in the group of former colonies, a pattern that could be rationalized by elevated areas being harder to control for the colonizers, thus limiting the detrimental impact of colonization policies.

Table 2 analyzes whether the patterns uncovered in Figures 1 to 3 are statistically significant and extends the analysis to alternative measures of endowments. In all regressions, the dependent variable is the average score for the rule of law. Consider first the OLS specifications in Panel A. In the first two estimations, the independent variable is the logarithm of average rainfall. The sample consists of former colonies in Column 1 and of countries that have not been colonized in Column 2. While higher rainfall is associated with significantly worse institutional outcomes in the group of colonies, this is not the case in the rest of the world. To investigate whether this difference in the effect of rainfall is significant, the next column adds a dummy equal to one for former colonies and the interaction of this dummy with average rainfall. The interaction coefficient is equal to the difference in the effect of rainfall in Columns 1 and 2. It is significant and negative, thus confirming that rainfall had a different impact on institutional development between former colonies and the rest of the world.

A potential concern with the OLS specification of Panel A could be that the interaction coefficient is influenced by a latent nonlinear relation between rainfall and economic outcomes. For example, while more rainfall is good for economic outcomes in dry climate, more rainfall might be detrimental for growth in an already wet climate. Since colonies are, on average, characterized by a higher level of rainfall than are non-colonies (see Table 1), the negative interaction in Column 3 could, consequently, be the result of a non-linear main effect of rainfall, rather than the consequence of colonization. To address this concern, in Panel B, I report the results from a semi-parametric estimation allowing for a nonlinear main effect of rainfall. This model estimates an equation of the form $Rule_i = F(Rainfall_i) + \lambda_R * C_i + \theta_R * C_i * Rainfall_i + \nu_i$, where C_i is a dummy equal to one if i is a former colony, $F(...)$ is an unknown function, and the interaction effect θ_R is restricted to be linear. Panel B reports the coefficient and standard error for the interaction coefficient. For the main effect of rainfall, the p-value corresponding to the null hypothesis that $F(...) = 0$ is reported. The nonlinear main effect of rainfall is not significant and accounting for a potential nonlinearity does not influence the estimated interaction coefficient substantially.

Colonization has reversed the impact of rainfall on institutional outcomes. Column 4 examines whether the same is true for distance from Europe, termed "market access". As in Column 3, the sample includes all countries and the specification includes the colony dummy and the interaction of market access with the colony dummy. Indeed, the pattern unveiled in Figure 2 is statistically significant.

In Column 5, the OLS estimation in Panel A suggests that the also difference in how elevation affected the rule of law is significantly different between former colonies and the rest of the sample. However, the interaction effect is far from significant once a possible nonlinearity is accounted for in Panel B. Closer inspection of the data reveals that the positive least-squares interaction coefficient is driven by a less-than-linear main effect of elevation on the rule of law and the fact that a few non-colonies such as Bhutan are very elevated.

Columns 6 and 7 document that colonization has also reversed the effect of average temperature and humidity. In the OLS estimation of Column 6, the main effect of average temperature is estimated around zero, while the interaction coefficient is significant and negative. Similarly, in Column 7, the main effect of humidity is positive, while the interaction coefficient is negative. In the two latter specifications, a possible nonlinear main effect in the semi-parametric estimation of Panel B is nto significant at the 5% level.

Column 8 includes Malaria Ecology from Kiszewski et al. (2004), which measures the geographic potential for malaria. Higher levels of malaria are associated with lower scores for the rule of law in all countries, but the effect is more pronounced in former colonies. However, neither of the two coefficients is significant in either the OLS or the semi-parametric estimation.[8]

[8] It should be noted that the only non-colony with a high potential for malaria is Thailand, an economy with a relatively high score for the rule of law. Thus, the covariance of malaria ecology and the rule of law within the group of non-colonies - and, therefore, both the main and the interaction coefficient - is very sensitive to the inclusion of Thailand.

Since it is a good proxy for many aspects of climate, the distance from the equator has often been used as summary measure of geographic endowments. In Column 9, I examine whether also this variable has affected development differently in the different groups of countries. In the OLS estimation, the main effect is significant, while the interaction coefficient is small and insignificant. However, in the semi-parametric estimation, both the direct and the indirect effect of latitude are significant and the interaction coefficient is economically sizeable. For example, a one standard-deviation difference in latitude (16.8) is associated with an institution-building effect during colonization that amounts to a change in the rule of law of 1.34 points, a difference roughly equal to that between Australia and Argentina.

3 Econometric Framework

A wide set of geographic variables had a markedly different effect on development in former colonies and the rest of the world, a pattern that can be utilized to identify the partial effects of institutions and endowments. Throughout the analysis, let Y_i denote the logarithm of GDP per capita and R_i the measure of institutional quality in country i. Denote geographic endowments by E_i and the measure summarizing European colonization policies by P_i. Last, the dummy C_i equals 1 for former colonies and 0 otherwise. Abstracting from covariates, the joint model of colonization, institutions, and income is given by:

$$Y_i = \widetilde{\lambda}_Y + \widetilde{\lambda}'_Y C_i + \widetilde{\alpha} R_i + \widetilde{\eta}_Y E_i + \widetilde{\nu}_{Y,i} \quad (1)$$

$$R_i = \widetilde{\lambda}_R + \widetilde{\lambda}'_R C_i + \widetilde{\eta}_R E_i + \widetilde{\beta} Y_i + C_i \widetilde{\theta}_R P_i + \widetilde{\nu}_{R,i} \quad (2)$$

$$P_i = \widetilde{\lambda}_P + \widetilde{\theta}_P E_i + \widetilde{\nu}_{P,i} \quad (3)$$

where (3) applies only to former colonies.

A country's institutions and income level depend on endowments through three potential channels. First, endowments may directly affect technology and income, measured by $\widetilde{\eta}_Y$ in Equation (1). Second, the analysis allows for a potential direct effect of endowments on institutions, measured by $\widetilde{\eta}_R$ in Equation (2). The latter channel accounts for the possibility that the organization of society and the quality of institutions depends directly on climate, disease, and other endowments. For example, terrain ruggedness may affect the fractionalization of the population along ethnic lines, thereby influencing the accountability of the local political elite, which also affects postcolonial institutions (see Gennaioli and Rainer (2007)). Third, the theories relating institutional origin to colonial experience predict that endowments affected colonization policies and institutional outcomes in former colonies, measured by $\widetilde{\theta}_P$ in Equation (3).

With these three distinct effects in mind, consider an estimation of the reduced form of Equation (1), (2), and (3) in a sample composed of former colonies such that $C_i = 1$ for all observations. In an instrumental variable estimation using this sample, the first-stage coefficient of endowments could be significant either because colonization policies were affected by endowments $(\widetilde{\theta}_P\widetilde{\theta}_R)$, because endowments have a direct effect on institutions $(\widetilde{\eta}_R)$, or because endowments directly impact income, which in turn affects institutions $(\widetilde{\beta}\widetilde{\eta}_Y)$. In the second-stage estimation of Equation (1), the effect of institutions on income could be overstated because the restriction that endowments do not directly affect development $(\widetilde{\eta}_Y = 0)$ is needed to identify the system. Due to this restriction, all of the correlation between endowments and income is attributed to the institutional channel and the coefficient of instrumented institutional quality in (1) is biased if geography also has a direct effect on income.

In contrast, consider an estimation of the reduced form of Equations (1), (2), and (3) in a sample that also includes non-colonized nations.[9]

$$Y_i = \lambda_Y + \lambda'_Y C_i + \alpha \overrightarrow{R_i} + \eta_Y E_i + \nu_{Y,i} \tag{4}$$

$$\overrightarrow{R_i} = \lambda_R + \lambda'_R C_i + \eta_R E_i + \theta_R (E_i C_i) + \nu_{R,i} \tag{5}$$

Where $\overrightarrow{R_i}$ is the first-stage projection of R_i. The first-stage estimation of the reduced-form model in Equation (5) includes the main effect of endowments, a colony dummy, as well as the interaction of these two variables. Since the additional variation in the group of non-colonized countries determines the coefficient for the direct impact of endowments on income (η_Y), the

[9] When comparing the coefficients in Equations (1), (2), and (3) to the ones in (5) and (4), $\theta_R = \widetilde{\theta}_R\widetilde{\theta}_P / \left(1 - \widetilde{\alpha}\widetilde{\beta}\right)$ and $\nu_{R,i} = \left(\widetilde{\nu}_{Ri} + C_i\widetilde{\theta}_R\widetilde{\nu}_{Pi}\right) / \left(1 - \widetilde{\alpha}\widetilde{\beta}\right)$, demonstrating that there may be heterscedasticity between the two groups of countries. All results presented below are thus estimated with heteroscedasticity-robust standard errors.

estimation can disentangle the true relation between institutions and income. η_R captures the direct effect that geography has on institutional development, while θ_R captures the institution-building effect of endowments during colonizations.

It is noteworthy that the identification does *not* assume that colonization is orthogonal to either income or institutions. If colonization is correlated with $\widetilde{\nu}_{Y,i}$ *or* $\widetilde{\nu}_{R,i}$, the colony dummies λ'_Y and λ'_R are biased, but the other coefficients are not affected.

Remark 1 *Assume that*

$$\widetilde{\nu}_{R,i} = \gamma_R C_i + \widetilde{\epsilon}_{R,i} \quad \textit{and} \quad \widetilde{\nu}_{Y,i} = \gamma_Y C_i + \widetilde{\epsilon}_{Y,i} \ ,$$

where, by construction, $\widetilde{\epsilon}_{R,i}, \widetilde{\epsilon}_{Y,i} \perp C_i$. *Denote the expectation of the two-stage least square point estimates of* θ_R *and* α *in the estimation of (4) and (5) by* $E\left[\widehat{\theta}_R\right]$ *and* $E\left[\widehat{a}\right]$. *It is true that*

$$\begin{aligned} E\left[\widehat{\theta}_R\right]\Big|_{\gamma_{R\neq 0} \ or \ \gamma_{Y\neq 0}} &= E\left[\widehat{\theta}_R\right]\big|_{\gamma_{R=0} \ and \ \gamma_{Y=0}} = \theta_R \\ E\left[\widehat{a}\right]\Big|_{\gamma_{R\neq 0} \ or \ \gamma_{Y\neq 0}} &= E\left[\widehat{a}\right]\big|_{\gamma_{R=0} \ and \ \gamma_{Y=0}} \end{aligned}$$

Proposition 1 ***Proof.*** *see Appendix A* ■

Remark 1 is intuitive. Since the presence of the colony dummy in both stages eliminates all across-group variation and co-variation, the coefficients of interest, $\widehat{\theta}_R$ and $\widehat{a}$, depend on within-group variances and covariances only. Although the endogeneity of colonization affects across-group differences, it has no effect on the within-group differences. Consequently, the point estimates that depend only on within-group variation are not affected by the endogeneity of colonization.

A note of caution, however, is in order regarding the comparability of former colonies and the rest of the world and, therefore, on the generality of the results presented below. The analysis of this study is based on the premise that the direct effects of geographic endowments on prosperity are equal across all countries. Nevertheless, the analysis does not assume that the effect of institutions on income is the same across these two groups of countries. The employed instrument utilizes the interaction of endowments and the colony dummy. It consequently varies only within the group of former colonies. The estimation results presented below thus measure the effect of institutions on income in the group of former colonies, but not necessarily in the rest of the sample.

4 The Partial Effects of Endowments and Institutions

I next estimate the partial effects of institutions and endowments. Of the geographic variables examined in Table 2, I exclude elevation and latitude since the non-parametric estimation indicates that the interaction coefficients could be biased due to a latent nonlinear direct effect of endowments on economic outcomes. I also exclude malaria ecology since the variable varies only very little in the group of former colonies and the results become very sensitive to the in- or exclusion of Thailand when this variable is added to the estimation. The four remaining geographic variables are rainfall, temperature, humidity, and remoteness.

Panel A of Table 3 displays the first-stage estimation relating geography and colonization experience to institutional quality. Panel B displays the second-stage estimation relating endowments and instrumented institutional quality to income. In Panel A, the dependent variable is the 1996 to 2004 average of the score for the rule of law. In Panel B, the dependent variable is the logarithm 2003 GDP per capita estimate from the Worldbank Development Indicators.

Columns 1 to 3 highlight the methodology of this paper. In all three models, the independent variable is humidity. The first two columns display the raw correlation between this variable and income per capita in Panel B or the rule of law in Panel A. In Column 1, the sample includes only former colonies, while it includes only non-colonies in Column 2. Column 3 identifies the relation between institutions and income by utilizing the difference in how humidity has affected development in former colonies and in the rest of the world. In the latter estimation, the sample includes all 151 countries and the first-stage estimation adds the interaction of average humidity and the colony dummy.

The interaction coefficient is significant at the 5% level and estimated at -3.67, the difference between the first-stage coefficients for humidity in Columns 1 and 2. In Column 3, Panel B, the restriction identifying the relation between institutions and income is that the difference in how humidity has affected development is the exclusive result of the institutions installed during colonization. The significant coefficient of the rule of law is equal to the difference in how humidity has affected income per capita divided by the difference in how humidity affected institutional outcomes (Up to rounding $1.31 = (-1.44 - 3.38)/(-0.85 - 2.82)$, i.e., a one standard-deviation difference in the rule of law is associated with about a fourfold difference in income per capita. Humidity also does have a direct impact on development. Combining first- and second stage effects, a one percentage point more humid climate is associated with a 3.4% higher income per capita. Colonization, however, reversed the effect of humidity on development. A one percentage point more humid climate is associated with an effect on colonization policies resulting in a 0.0367 point lower score of the rule of law, equivalent to a 4.8% lower income per capita.

Columns 4 to 6 repeat this decomposition for rainfall, temperature, and remoteness from Europe. The interaction coefficient is significant at the 5% level for the case of rainfall and at the 1% level in the other two specifications. For these three variables, the direct effect of endowments on income is never significant and the direct effect on the rule of law is significant only for the case of remoteness.

I proceed to a joint estimation including all four measures of endowments. Column 7 presents the OLS relation between these four variables and GDP per capita in Panel B and the score for the rule of law on Panel A. Column 8 presents the two-stage least-square results. At the bottom of Table 3, I report two p-values corresponding to the null hypotheses that the included measures of endowments matter directly for income or for institutions.

Also the joint estimation confirms that colonization has reversed the impact of many endowments. For example, in the OLS estimation, a 1% higher level of rainfall is associated with a 0.33% lower income per capita. In contrast, the estimation in Column 8 predicts that for a non-colony, 1% more rainfall is associated with a 0.10 higher score for the rule of law and – combining first- and second stage effects – a 0.10% *higher* income per capita. For a former colony, the additional institution-building effect amounts to a 0.37 percent lower score for the rule of law, which is associated with a 0.63% *lower* income per capita.

Overall, how important is the institution-building channel and how much of the correlation between income and geography is due to the direct effect of endowments? Consider a one standard-deviation (standard deviations are listed in Table 1) change of all four endowments for a non-colony. In the model of Column 8, such a change (more rainfall, higher temperature and humidity, and closer to Europe) is associated with a total effect of 2.05 ln-points, or a nearly eightfold difference in income per capita. In former colonies, the same difference in endowments has had an additional effect equivalent to a 3.5 ln-points difference in income per capita (34-fold). Thus, the indirect institution-building effect of endowments during colonization is much more pronounced than the direct effect.

Owing to the distinct importance of endowments during colonization, institutional outcomes are estimated to have a large impact on economic outcomes. In the baseline estimation of Column 8, a one standard-deviation difference in the rule of law is associated with a more than five-fold difference in income per capita, a point estimate in line with the findings of the existing literature.[10]

Table 4 examines the robustness of these findings with respect to changes in the sample, addition of further controls, and use of alternative measures of institutional outcomes. The structure of the table mirrors Table 3 and all estimations include the four regressors from the baseline estimation in Column 8 of Table 3. Columns 1 to 5 check whether the results presented so far are driven by the inclusion of specific groups of countries. Columns 6 to 8 add further controls to the estimation and Columns 9 to 10 use alternative measures of institutional outcomes.

A first concern is that many African former colonies are poor and characterized by adverse endowments. If African countries are poor for reasons other than colonization, inclusion of this group could be the sole driver of the presented relations. In Column 1, the sample thus excludes all 47 countries that lie on the African tectonic plate. A second key concern could be that the group of oil-rich nations – including a number of nations on the Arabian Peninsula with extremely dry and hot climate – are not representative for the theories of development examined in this study, since the wealth from oil has overshadowed all other forces of development. The estimation in Column 2 thus excludes 34 nations in which proven oil reserves exceed 50,000 barrels per capita. Third,

[10] The point estimates for the impact of the rule of law varies somewhat when using alternative geographic variables in Columns 3 to 6. To examine whether the differences in this point estimate are significant, in the specification of Column 8 that includes all instruments, the heteroscedasticity-robust Hansen J test for overidentification (all instruments) is reported, which cannot be rejected also at the 10% level.

among the group of former colonies, the "neo-Europes" Australia, Canada, New Zealand, and the USA stand out in that they are rich and endowed with a rather mild climate. The estimation in Column 3 thus excludes these four "neo-Europes". Fourth, one could argue that former Soviet countries where in fact not truly independent nations and a similar case could be made for all former members of the Warsaw Pact. To address this potential concern, the estimation in Column 4 excludes all former members of the Warsaw pact except Russia itself.

In- or exclusion of each of these above-mentioned groups of countries has a very limited impact on the estimated coefficient of the rule of law, the interaction coefficients in the first-stage estimation, and the direct impact of endowments in the second-stage estimation. The results may, however, be sensitive to a few other outliers that do not belong to a group that can easily be identified. To examine this concern, Column 5 presents a quantile instrumental variable estimation, which is influenced by outliers to a much lesser extent than least square estimations. The estimation results for the 50th quantile are presented. Again, I find that institutions are significant determinants of income and the point estimates are in line with the results of the least-squares estimations.

Rather than changing the composition of the sample, I next add three sets of controls to the estimation. Both economic outcomes and geographic endowments vary considerably across the continents, but to a much lesser extent within each continent. Are the results presented so far driven by across-continent differences, or can endowments and colonial history also explain differences within continents? The estimation in Column 6 includes continent dummies for Africa, Asia, Oceania, and Asia, thus making the Americas the omitted group. In this estimation, owing to the relatively small within-continent variation of GDP per capita, the coefficient for the rule of law is estimated somewhat lower at 1.45. Nevertheless, the coefficient is significant at high levels, the first stage is well identified, and the overidentification cannot be rejected.

Column 7 adds ethnic fractionalization from Alessina et al. (2004) to the estimation. This variable takes values between 0 and 1 and is higher for societies that are ethno-linguistically more fractionalized. Such fractionalization could be detrimental for institutional outcomes, since internal conflict arises more often, thereby making it easier for the ruling elite to play off groups against each other, as highlighted for example by Padro-I-Miquel (2007). Confirming the identification assumption made in the empirical analysis of Mauro (1995), fractionalization indeed influences development mostly through its impact on institutional outcomes. However, the addition of this variable has no impact on the main and interaction effects of endowments, nor on the estimated coefficient for the rule of law.

In Column 8, to control for a much richer set of geographic information, the specification adds seven geographic variables to the estimation. The logarithm of elevation, a landlocked dummy, distance from the equator, the length of coastline, the percentage of a country's surface that is arable, and the "Total Sum of Minerals" measure – all from Parker (1997) – are included to the estimation. Total sum of minerals is equal to the sum of the country's share in world reserves in the 20 most important minerals (excluding oil). The estimation also adds Malaria Ecology from Kiszewski et al. (2004).[11]

The two last robustness checks of Table 4 examine whether the importance of institutions hinges on the use of the score for the rule of the law to measure institutional outcomes. In Column 9, I use the 1996 to 2004 average for "Control of Corruption" from Kaufmann et al. (2005), measuring the extent to which public power is exercised for private gain. Control of corruption is standardized in the same fashion as is the score for the rule of law. The second-stage coefficients for these two (instrumented) measures of institutional outcomes hence can easily be compared. Indeed, the coefficient is nearly identical; it is estimated at 1.67 as compared to 1.70 when using the score for the rule of law.

In Column 10, I use the score for "Constraints on the Executive" (xconst) from the Polity IV database. The xconst score measures the extent of institutionalized constraints on the decision-making powers of chief executives. It takes values from zero to seven, with a higher score being associated with better institutional outcomes. The coefficient is estimated at 0.59 and is highly significant. Again, this result is in line with the previously presented results: a one standard-deviation (1.96) difference in the score for democracy is associated with a difference in GDP per capita of 1.16 log points.[12]

[11] The results of this estimation have to be interpreted with care since I do not include the interaction of the additional geographic variables with the colony dummy to the first stage.

[12] When using the score for constraints on the executive, temperature and its interaction with the colony dummy have been dropped from the estimation, since the overidentification test would reject otherwise.

For a wide set of robustness test, I find that institutions and endowments are both economically and statistically significant forces of development, with institutions being the major force of development. I next highlight two channels through which endowments have affected colonization policies and two channel through which they affect income directly.

5 Disease, Institutions, and Prosperity

This section applies the methodology developed above to examine the theory of the colonial origins of institutions developed by Acemoglu et al. (2001), i.e., I examine whether the correlation between disease and income can be attributed to the direct importance of germs for prosperity or to the indirect effect of settler mortality on institutional development during colonization.

To this end, I construct a measure of the geographic potential for disease termed "Early Disease Environment" (EDE). Following the two-step methodology developed by Kiszewski et al. (2004) and Sachs (2003), EDE is constructed by first estimating the relation between the settler mortality rates from Acemoglu et al. (2001) and a set of geographic variables that are ex ante likely to be correlated with disease. Next, I use the estimated relation between geography and disease to construct the geographic potential for disease in 151 nations.

The empirical strategy of this section is motivated by the following. "Settler mortality measures the disease environment as European settlers arrived and thereby provides an exogenous indicator of "germs"" (Easterly and Levine (2003), p. 12). This exogenous indicator of germs is well suited to estimating the direct and the indirect effects of disease. It is straightforward to enlarge the sample of Acemoglu et al. (2001) since the natural prevalence of germs is determined by a country's climate and landscape. One can estimate this relation between climate and disease by using the mortality rates collected from historical sources and a set of geographic variables. The estimated relation between germs and geography can then be extrapolated to construct a measure of early disease environment using the widely available geographic information.

In Column 1 of Table 5, the dependent variable is the natural logarithm of the settler mortality rate collected by Acemoglu et al. (2001).[13] The independent variables are average annual temper-

[13] In Table 5, Malta and the Bahamas are missing because their population is smaller than 500,000. See sample criterion above.

ature, minimum monthly rainfall, and maximum monthly rainfall from Parker (1997). Warmer climate and areas with pronounced dry (low minimum monthly rain) or wet seasons (high maximum monthly rain) are characterized by high mortality rates. All three regressors are significant. The bottom of Table 5 reports a p-value corresponding to the joint null-hypothesis that the included geographic variables together do not matter for mortality. This hypothesis is rejected at the 0.1% significance level in all regressions of Table 5. Column 2 adds four dummies that respectively equal one if a country is characterized by natural incidence of savanna, natural incidence of temperate grassland or forest, is characterized by Mediterranean climate, or has mountains. It also adds a measure of the temperature at maximum humidity. All variables are from Parker (1997). With the exception of the mountain dummy, all added variables are significant.[14] To check whether the selection of the geographic variables in Column 2 is exhaustive, I next add distance from the equator (Column 3) and the fraction of the population living in temperate areas (KGPTEMP from Mellinger et al. (2000), Column 4) to the estimation. Conditional on the other variables, these two measures are not significant predictors of mortality.

The data of Acemoglu et al. (2001) has been criticized by Albouy (2008), who argues that the mortality rates are not comparable because they are sampled from different populations.[15] Column 5 controls for the sampling population and adds three dummies that respectively equal one if the mortality rate was sampled from soldiers in campaign, from bishops, or from forced laborers. Indeed, the sampling population has a sizeable influence on mortality. Compared to the omitted group – soldiers stationed in barracks – soldiers in a campaign are $Exp[0.71] \approx 2$ times as likely to die from disease. Also forced laborers are more likely to die from disease, whereas bishops faced a slightly lower mortality rate. The bottom of Table 5 reports the p-value corresponding to the joint null-hypothesis that these three population dummies equal zero, which is rejected at the 5% level.

Using the estimated coefficient relating geography and settler mortality in Column 5 of Table

[14] In Columns 2 to 5 of Table 5, maximum monthly rainfall is not significant; this is symptomatic of the high degree of collinearity between the minimum and maximum monthly rainfall. Inclusion of maximum rainfall improves the fit of the model considerably.

[15] An earlier version of Albouy's work also criticizes other aspects of the mortality rates collected by Acemoglu et al. (2001). The working paper version of this study adresses all his revisions, with results identical to the ones presented below.

5, I next predict several measures of the geographic potential for disease in 151 countries. In the analysis below, I refer to this measure as "Early Disease Environment," or EDE. Paralleling the definition of "settler mortality" in Acemoglu et al. (2001), EDE refers to the logarithm of the annualized probability of death for European males in the age cohort of soldiers. It is important to note that the use of EDE – measuring the hypothetical mortality rate rather than the actual one – is in accordance with the institution-building hypothesis of Acemoglu et al. (2001), who provide evidence that knowledge about the widespread prevalence of disease alone was enough to deter migration to a colony. The estimation takes into account the sampling population, and when predicting, I partial out the population dummies. Since soldiers stationed in barracks are the omitted group, EDE measures the potential annual mortality of soldiers stationed in barracks.

Table 6 displays the relation between EDE, institutions, and income differences. The upper Panel B presents the second-stage estimation between disease, institutional outcomes, and income. The lower Panel A presents the relation between disease and institutional outcomes. EDE is strongly correlated with development in former colonies, while this is not the case in the rest of the world. In the estimation of Column 1 that is restricted to former colonies, a 1% lower level of early disease environment is associated with a 1.17% higher income per capita and a 0.566 percentage points higher score of the rule of law. In a non-colonized nation, the same difference is associated with a 0.29% higher income per capita and a 0.022 percentage points higher score of the rule of law (see Column 2).

Column 3 disentangles the direct and indirect institution-building effect of disease on prosperity. The assumption identifying the relation between institutions and income is that the additional impact of disease in former colonies is the exclusive result of the adopted colonization policies and, thus, institutions. A one standard-deviation difference in institutional quality is estimated to result in a difference in income per capita of 1.62 ($\approx (1.17 - 0.29) / (0.566 - 0.022)$) log points. Column 3 also documents that disease environment has a large direct effect on income. For given institutional quality, a one standard-deviation higher level of EDE is associated with a 0.256 log points lower level of income per capita.[16]

[16] This finding is in line with the results of Weil (2007), who estimates that health has a significant but small effect on income per capita.

Although these findings highlight the importance of germs for colonization policies, they also document that the point estimates of Acemoglu et al. (2001) are somewhat too large since they attribute all of the correlation between disease and development to the institutional channel. Column 4 documents this bias. Consider again a 1% difference in EDE in the estimation of Column 4 including only colonies. This is associated with an increase of score of the rule of law by 0.566 percentage points. Since the direct effect of mortality is restricted to equal zero, the estimation attributes all of the difference in income levels to institutional quality. The coefficient of institutions in Column 4 is hence estimated at 2.077, which – up to rounding – satisfies $0.566 * 2.077 = 0.566 * 1.624 + 0.256$. The importance of institutions is overstated by around 27% in the sample restricted to former colonies.

The remainder of Table 6 repeats some of the robustness tests of Table 4. Column 5 excludes all African countries from the estimation. Column 6 excludes the four European offshoots Australia, Canada, New Zealand, and the USA. Instead of excluding former colonies, Column 7 excludes the 20 former members of the Warsaw Pact. For these robustness tests, I again find that institutions are the main determinant of development, while disease also does have a substantially smaller, but non-negligible direct effect.[17]

6 Location and Legal Origin

This section applies the methodology of this study to examine the theory of the importance of the origin of the legal system developed by La Porta et al. (1997, 1998, and 1999). These authors argue that differences in the historical origins of the legal system – most notably whether the country has adopted a system based on common or civil law – resulted in considerable differences in economic outcomes. The authors are well aware that initially more successful countries could have adopted better legal systems, but argue that the relation is causal since legal institutions were often superimposed by a foreign colonizer. They further argue that the random variation in legal systems that was induced by colonization can be utilized to establish the effect of legal origin on prosperity.

[17] A semiparametric estimation similar to those of Panel B in Table 2 does not provide any evidence that the significance of the interaction coefficient is the result of a latent nonlinear main effect of disease.

In this section, I first document that colonizer identity and, consequently, legal origin were not assigned randomly, but vary systematically with a country's location, in particular with its relative proximity to the respective colonizers as well as the absolute distance from Europe. This is potentially worrying, since proximity to export markets has a substantial direct impact on development.

Are coastal nations on average richer due to the generally positive impact of access to the open sea, or rather, because the naval power Britain tended to colonize such nations more often? To answer this question, I first estimate the probability that a colony adopts a particular legal system given the country's geographic location. Using this model, I then predict measures of "relative proximity" to Britain, France, and other nations for the entire sample and estimate whether proximity did affect development differently in the group of former colonies and in the group of non-colonized countries.

I find that colonization has partly reversed the effect of proximity to Europe. Countries that were likely to be colonized by Britain, on average, are remote from other markets to trade with, which is detrimental to growth. Consequently, the estimations of this paper suggest that the causal effect of legal origin on development is in fact *larger* than what empirical exercises along the lines of La Porta et al. (1999) suggest.

To what extent did location affect a former colony's legal origin? The upper scatter plot of Figure 4 relates a dummy that equals one for former British colonies to the logarithm of the country's relative distance from France. The relative distance from France is defined as distance from France divided by distance from Britain. The lower scatter plot of Figure 4 relates the same dummy to the logarithm of the average distance from France and the UK. These two scatter plots suggest that British colonies are, when compared to French ones, relatively closer to Britain and more distant from Europe in absolute terms. Table 7 examines the statistical significance of these patterns. It relates the relative distances from the colonizers and other measures of endowments to the probability of being colonized by or adopting the legal system of a certain country. In all specifications, I estimate the probability of adopting a particular legal system conditional on having been colonized. This conditionality is appropriate, since I want to establish the effect of adopting a particular legal system conditional on the fact that the legal system has been superimposed by a foreign power.

In the Probit estimations of Columns 1 to 4, the dependent variable is a dummy equal to one for former British colonies. The sample includes all countries that have been colonized by either France or Britain. The dependent variables are the log in distance from France minus log distance from Britain (Column 1), the logarithm of the average distance from France and Britain (Column 2), "geographic openness" from Frankel and Romer (1999) (Column 3), and the distance from the equator (Column 4). Compared to French colonies, former British colonies tend to be closer to Britain. The latter nations are also more distant from Europe, geographically less open to trade, and further away from the equator. The order of magnitude of the coefficients suggests that location was a major determinant of colonizer identity. For example, a one standard-deviation difference (0.49) in the log-difference from Europe is associated with a 0.6 increase in the predicted z-score for the country's probability of becoming a British colony (for example, equivalent to a move from the 50th to the 73rd percentile).

Not all countries have adopted the legal system of their colonizer. For example, Egypt was a British protectorate, but its legal system is nevertheless based on the Napoleonic Code. To demonstrate that location can also explain the legal origin rather than the colonial one, I next relate the legal origin of former colonies to geography. In Columns 5 and 6, the dependent variable is a British legal origin dummy and the sample is restricted to all former colonies with either British or French legal origins. As is to be expected from the previous analysis, also countries that have adopted the British legal system are relatively closer to Britain than to France and are relatively more distant from Europe.

I next turn to a multinomial Probit estimation with three categories for French, British, and other legal origin. The "other" group includes countries with German, Scandinavian, or communist legal origin. Column 7 presents these two estimations relating the probability of adopting a French (left part of Column 7) or "other" (right part of Column 7) legal system. Due to the colinearity of the regressors, only few of the coefficients are significant, but the joint model is significant at the 5% level. I next predict the multinomial Probit model of Column 7 for the entire sample (there is no distance data for West Bank and Gaza). The three resulting variables measure the estimated probability that a country – had it been colonized – would have adopted a British, French, or other legal system.

Table 8 examines if this measure of "relative proximity" to Britain, France, and the other group did also influence economic outcomes directly. Columns 1 and 2 serve to compare the empirical approach of this study to the work of La Porta et al. For easier interpretation, the sample first includes only the measure of "Proximity to Britain," hence comparing a British legal origin to all other legal origins. In the estimation in Column 1 of Table 8, the sample includes only former colonies and I instrument for the rule of law with the geographic prediction of the British legal origin dummy. In this estimation, the first-stage coefficient is estimated at 1.49, i.e., a location closer to Britain such that the country is 10% more likely to adopt a British legal origin (Proximity to Britain takes values between 0 and 1) leads to a 0.149 point higher predicted score for the rule of law. In the second-stage estimation in Panel B, a change in the rule of law of one standard deviation is associated with a change in income per capita of 1.43 log points.

The identifying assumption made in Column 1 is equivalent to that of La Porta et al., i.e., that adopting a British legal system impacts development, but that proximity to Britain itself has no impact on prosperity. I test this assumption in Column 2, where the sample also includes the group of non-colonized countries. This estimation adds the colony dummy as well as the interaction of proximity to Britain with the colony dummy to the estimation. Since the direct effect of relative proximity to the UK is present in all countries, it is captured in the main coefficient of proximity in the second stage estimation in Panel B.

The (insignificant) direct effect of proximity to the UK is positive, so that the coefficient for the rule of law is estimated lower in Column 2 than in Column 1. The coefficients for the rule of law in Column 1 and 2 compare as follows. In a former colony, a change of 1 in the score for "proximity to Britain" is associated with a difference in the score for the rule of law of 1.90 and a difference in the logarithm of GDP per capita of 2.73, hence resulting in a coefficient of 2.73/1.90=1.43. In the specification of Column 2 also allowing for proximity to Britain to affect income directly, 0.34 log points of the difference in GDP are attributed to the direct impact of location on income and, consequently, the coefficient for the rule of law is estimated at (2.73-0.34)/1.90=1.26.

The most important pattern uncovered in Column 2 is that location has a sizeable direct impact on institutional outcomes. For non-colonies, higher proximity to Britain is associated with worse institutional outcomes. This correlation – reflecting the detrimental effect of the lack of possibilities to trade and the associated effect on the local political economy – leads to an underestimation of the causal impact of legal origin on economic development. For example, comparing the first-stage coefficients in Columns 1 and 2, the effect of a higher likelihood of adopting a legal system based on the British one is estimated around 50% higher in Column 2 than in the estimation in Column 1 that neglects the direct effect of access to trade on economic outcomes.

La Porta et al. underestimate the importance of legal origin on institutional development because remoteness from Europe had two effects on development that work in opposite directions. On the one side, remote nations tended to be colonized by the British, hence resulting in better institutional outcomes for remote colonies. On the other side, remoteness itself is detrimental for growth. By the same token, this also suggests that also Frankel and Romer (1999) underestimate the direct effect of access to trade, although the measures of proximity constructed in this section are arguably only crude measures for the geographic potential for trade since other centers of economic activity, such as East Asia, have arisen after the World Wars.

The estimation in Column 3 adds relative proximity to France and its interaction with the colony dummy to the estimation, hence the omitted group and omitted interaction in the first stage estimation are countries with German, Soviet, or Scandinavian Legal origin. Also in this specification, proximity to either France or Britain are not significant direct determinants of income, but the estimated coefficients are non-negligible. More importantly, proximity does have a sizeable and significant direct effect on the rule of law, that is of the opposite effect as is the indirect one on colonization policies. Hence, this specification again confirms that conventional specifications underestimate the importance of legal origin.

I next examine the robustness of this finding. The estimation of Column 4 excludes 47 African countries. The effect of proximity to France on income per capita is estimated significant and positive once the African countries – mostly poor and relatively close to France – are excluded. Consequently, this estimation results in a substantially smaller point estimate for the coefficient of rule of law. I next exclude the four Neo-Europes in Column 5 and the 20 former members of the Warsaw pact in Column 6, with findings that are comparable to the baseline specification in

Column 3.

Columns 1 to 6 exclude the five colonizers (Britain, France, Germany, Portugal, and Spain). I include these to the estimation in Column 7, again with findings that are comparable to the baseline estimation. Column 8 uses a different measures of relative proximity. The respective measures of proximity to Britain, France, Spain, and the omitted group are constructed from a multinomial Probit estimation using the regressors used in Column 7 of Table 7, but with colonizer dummies instead of legal origin dummies as the dependent variable. In this specification, I also distinguish the Spanish from the French legal origin (both are counted as French legal origin in the other estimations). I find that proximity to Spain has a large direct effect on income, but that the likelihood of being colonized by these two countries had a very detrimental effect on institutional quality.

In Column 9, I also add EDE and its interaction with the colony dummy to the estimation. Both early disease environment and legal origins have a distinct effect on institutional development in former colonies. It is noteworthy that the first stage coefficients for both sets of instruments (EDE and the measures of proximity; all interacted with the colony dummies) are significant at higher levels than in estimations that include only one set of instruments. Also a (not reported) over identification test examining whether the two sets of instrument predict different coefficients for the rule of law is not rejected at the 10% level.[18]

7 Conclusion

In this paper, I estimate the partial effects of geographic endowments and institutions on income. The existing literature fails to distinguish between these two channels of development, since endowments have influenced colonization policies and institutions, but they also affect prosperity directly.

The paper's main insight is that one can utilize the interaction of history and geography to distinguish the effects of institutions and geographic endowments on comparative development.

[18] As has been noted by Acemoglu and Johnson (2005), settler mortality rates and legal origin dummies are nearly orthogonal. The same is true for the geographic projections of mortality and legal origin and, consequently, the significance and economic importance of one set of instruments is not affected by the inclusion of the other set to the estimation.

Historical events – such as colonization or the rise of trade with the new world – have influenced how climate, transportation costs, and disease have affected development. For example, during colonization, the mortality rates of European settlers has affected colonization policies, which in turn determined the quality of institutions in the respective colonies. Disease environment may, however, also directly affect economic outcomes.

What distinguishes the direct impact of endowments on income from the indirect impact of endowments on colonization policies is the following. While the direct impact is present in all countries, the institutional channel only applies to a subset of countries, namely former colonies. Based on this insight, I develop an instrumental variable framework that identifies the relation between income and institutions, while also allowing for geographic endowments to directly affect growth.

I find that colonization policies and institutions are the major determinant of development, but that endowments also have a sizeable direct impact on development. In a baseline estimation, a one standard-deviation difference in colonization policies is associated with an over 34-fold difference in income per capita. A one standard-deviation difference in the included endowments is associated with an 8-fold difference in income per capita.

I next apply the developed methodology to examine the theories of Acemoglu et al. (2001) and La Porta et al. (1997) that relate settler mortality rates or the historical origin of the legal system to institutional outcomes. While I confirm both of these theories, I also document that their empirical evidence is somewhat biased. For the case of settler mortality rates, I document that around a quarter of correlation between disease and income can indeed be attributed to the direct effect of the disease, rather than the indirect effect of settler mortality rates on colonization policies. For the case of legal origins, I document that the causal effects of having a common law is in fact larger than what the current empirical literature suggests. The reason for this is the following. The naval nation Britain tended to colonize nations that are remote from Europe. This remoteness has a detrimental direct effect on development, hence partly masking the positive impact of an efficient legal system on economic development.

These two examples highlight the main conclusion of this study: while endowments do matter directly for income differences today, they have mattered even more in the past. Since the same variables did impact development through different channels at different stages in history, only the interaction of history and geography can clearly identify the forces of development.

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8 Appendix A: Proof of Remark 1

Remark 2 (Remark 1) ***Proof.***

Consider first the structural model (1) and (2), with the impact of colonization policies (3) netted into the determinants of the rule of law.

$$Y_i = \widetilde{\lambda}_Y + \widetilde{\delta}_Y C_i + \widetilde{\alpha} R_i + \widetilde{\eta}_Y E_i + \widetilde{\nu}_{Y,i} \quad (6)$$

$$R_i = \widetilde{\lambda}_R + \widetilde{\delta}_R C_i + \widetilde{\eta}_R E_i + \widetilde{\beta} Y_i + C_i \widetilde{\theta}_R E_i + \widetilde{\nu}_{R,i} \quad (7)$$

The reduced from of the first stage (7) is

$$R_i = \lambda_R + \lambda'_R C_i + \eta_R E_i + \theta_R C_i E_i + \upsilon_{R,i},$$

where $\lambda_R = \frac{\widetilde{\lambda}_R + \widetilde{\beta}\widetilde{\lambda}_Y}{1-\widetilde{\alpha}\widetilde{\beta}}$, $\lambda'_R = \frac{\widetilde{\delta}_R + \widetilde{\beta}\widetilde{\delta}_Y + \widetilde{\beta}\gamma_Y + \gamma_R}{1-\widetilde{\alpha}\widetilde{\beta}}$, $\eta_R = \frac{\widetilde{\eta}_R + \widetilde{\beta}\widetilde{\eta}_Y}{1-\widetilde{\alpha}\widetilde{\beta}}$, $\theta_R = \frac{\widetilde{\theta}_R}{1-\widetilde{\alpha}\widetilde{\beta}}$ *and* $\upsilon_{R,i} = \frac{\widetilde{\beta}\gamma_Y + \gamma_R}{1-\widetilde{\alpha}\widetilde{\beta}} C_i + \frac{\widetilde{\epsilon}_{R,i} + \widetilde{\beta}\widetilde{\epsilon_{Y,i}}}{1-\widetilde{\alpha}\widetilde{\beta}}$. *If either* $\gamma_Y \neq 0$ *or* $\gamma_R \neq 0$, $\upsilon_{R,i}$ *is correlated with the colonization dummy. Denote all estimated coefficients by a* $\widehat{\ }$ *superscript. The four FOCs of the OLS minimization problem yield the following point estimates for the coefficients*

$$\widehat{\lambda}'_R = \frac{\sum\limits_{i,D=1} (Y_i - (\eta+\theta) X_i)}{N_1} - \frac{\sum\limits_{i,D=0} (Y_i - \eta X_i)}{N - N_1} \quad and \quad \widehat{\lambda}_R = \frac{\sum\limits_{i,D=0} (Y_i - \eta X_i)}{N - N_1},$$

$$\widehat{\eta}_R = \frac{Cov(Y,X|D=0)}{Var(X|D=0)} \quad and \quad \widehat{\theta}_R = \frac{Cov(R,E|D=1)}{Var(E|D=1)} - \frac{Cov(R,E|D=0)}{Var(E|D=0)}.$$

Due to the endogeneity of colonization, $E\left[\widehat{\lambda}'\right] \neq \lambda'_R$, *but* $\widehat{\theta}_R$ *is an unbiased estimator of* θ :

$$E\left[\widehat{\theta}_R\right] = E\left[\frac{\sum\limits_{i,D=1}\left(Y_i - \overline{Y}_{D_i=1}\right)\left(E_i - \overline{E}_{D_i=1}\right)}{\sum\limits_{i,D=1}\left(E_i - \overline{E}_{D_i=1}\right)^2} - \frac{\sum\limits_{i,D=0}\left(Y_i - \overline{Y}_{D_i=0}\right)\left(E_i - \overline{E}_{D_i=0}\right)}{\sum\limits_{i,D=0}\left(E_i - \overline{E}_{D_i=0}\right)^2}\right]$$

where $\nu_{R,i} = \frac{\widetilde{\beta}\gamma_Y + \gamma_R}{1-\widetilde{\alpha}\widetilde{\beta}} C_i + \frac{\widetilde{\epsilon}_{R,i} + \widetilde{\beta}\widetilde{\epsilon_{Y,i}}}{1-\widetilde{\alpha}\widetilde{\beta}}$, $\sum\limits_{i,D=1} \frac{\nu_{R,i}}{N_1} = \frac{\widetilde{\beta}\gamma_Y + \gamma_R}{1-\widetilde{\alpha}\widetilde{\beta}} + \sum\limits_{i,D=1} \frac{\widetilde{\epsilon}_{R,i} + \widetilde{\beta}\widetilde{\epsilon_{Y,i}}}{1-\widetilde{\alpha}\widetilde{\beta}} \frac{1}{N_1}$, *and* $\sum\limits_{i,D=0} \frac{\nu_{R,i}}{N_1} =$

$\sum_{i,D=0} \frac{\widetilde{\epsilon}_{R,i}+\widetilde{\beta}\widetilde{\epsilon_{Y,i}}}{1-\widetilde{\alpha}\widetilde{\beta}} \frac{1}{N-N_1}$. *By construction,*

$$
\begin{aligned}
E\left[\left(\frac{\widetilde{\epsilon}_{R,i}+\widetilde{\beta}\widetilde{\epsilon_{Y,i}}}{1-\widetilde{\alpha}\widetilde{\beta}} - \sum_{i,D=1} \frac{\frac{\widetilde{\epsilon}_{R,i}+\widetilde{\beta}\widetilde{\epsilon_{Y,i}}}{1-\widetilde{\alpha}\widetilde{\beta}}}{N_1}\right)\left(E_i - \sum_{i,D=1} \frac{E_i}{N_1}\right)\right] &= 0 \\
E\left[\left(\frac{\widetilde{\epsilon}_{R,i}+\widetilde{\beta}\widetilde{\epsilon_{Y,i}}}{1-\widetilde{\alpha}\widetilde{\beta}} - \sum_{i,D=0} \frac{\frac{\widetilde{\epsilon}_{R,i}+\widetilde{\beta}\widetilde{\epsilon_{Y,i}}}{1-\widetilde{\alpha}\widetilde{\beta}}}{N-N_1}\right)\left(E_i - \sum_{i,D=0} \frac{E_i}{N-N_1}\right)\right] &= 0
\end{aligned}
$$

Therefore, $E\left[\widehat{\theta}_R\right] = \theta_R$ *holds for any combination of* γ_R *and* γ_Y*. Consequently, it is also true that* $\frac{\partial E\left[\widehat{\theta}_R\right]}{\partial \gamma_R} = \frac{\partial E\left[\widehat{\theta}_R\right]}{\partial \gamma_Y} = 0$. *Next, consider the second-stage estimate of* α, $\widehat{\alpha}$. *This coefficient for the rule of law is part of the solution to the second-stage least square minimization problem*

$$
\min_{\widehat{\lambda_Y},\widehat{\lambda'_Y},\widehat{\alpha},\widehat{\eta}_Y} \sum_i \left(Y_i - \left(\widehat{\lambda_Y} + \widehat{\lambda'_Y} C_i + \widehat{\alpha}\overrightarrow{R_i} + \widehat{\eta}_Y E_i\right)\right)^2 \tag{8}
$$

Where $\overrightarrow{R_i}$ *is the projection of* R_i *obtained from the first stage. It is important to note that since the colony dummy* $\widehat{\lambda}'_R$ *in the first-stage estimation is biased, it is not true that* $E\left[\overrightarrow{R_i}\right] = E\left[R_i\right]$. *This has, however, no consequence for* $\widehat{\alpha}$, *which depends only on with-group variations and covariances. The FOCs of the minimization problem (8) yield*

$$
\begin{aligned}
\widehat{\lambda}'_R &= \frac{\sum_{i,D=1}\left(Y_i - \widehat{\alpha}\overrightarrow{R_i} - \widehat{\eta}_Y X_i\right)}{N_1} - \frac{\sum_{i,D=0}\left(Y_i - \widehat{\alpha}\widetilde{R_i} - \widehat{\eta}_Y X_i\right)}{N-N_1}, \qquad (9) \\
\widehat{\lambda}_R &= \frac{\sum_{i,D=0}\left(Y_i - \widehat{\alpha}\widetilde{R_i} - \widehat{\eta}_Y X_i\right)}{N-N_1}, \qquad (10) \\
0 &= \sum_i \overrightarrow{R_i}\left(Y_i - \left(\widehat{\lambda_Y} + \widehat{\lambda'_Y} C_i + \widehat{\alpha}\widetilde{R_i} + \widehat{\eta}_Y E_i\right)\right), \qquad (11) \\
0 &= \sum_i E_i\left(Y_i - \left(\widehat{\lambda_Y} + \widehat{\lambda'_Y} C_i + \widehat{\alpha}\widetilde{R_i} + \widehat{\eta}_Y E_i\right)\right). \qquad (12)
\end{aligned}
$$

Define the following average within-group covariances and average within-group variances.

$$
\begin{aligned}
\widetilde{Cov}\,(Y,E) &\equiv (N-N_1)\,(Cov\,(Y,E|\,D=0)) + N_1\,(Cov\,(Y,E|\,D=1)) \\
\widetilde{Cov}\left(Y,\overrightarrow{R_i}\right) &\equiv (N-N_1)\left(Cov\left(Y,\overrightarrow{R_i}\right|D=0\right)\Big) + N_1\left(Cov\left(Y,\overrightarrow{R_i}\right|D=1\right)\Big) \\
\widetilde{Cov}\left(\overrightarrow{R_i},E\right) &\equiv (N-N_1)\,Cov\left(\overrightarrow{R_i},E\right|D=0\Big) + N_1\left(Cov\left(\overrightarrow{R_i},E\right|D=1\right)\Big) \\
\widetilde{Var}\,(E) &\equiv (N-N_1)\,Var\,(E|\,D=0) + N_1 Var\,(E|\,D=1) \\
\widetilde{Var}\left(\overrightarrow{R_i}\right) &\equiv (N-N_1)\,Var\left(\overrightarrow{R_i},E\right|D=0\Big) + N_1 Var\left(\overrightarrow{R_i},E\right|D=1\Big)
\end{aligned}
$$

These variances and covariances equal the standard definitions, except that the across-group differences in the mean between non-colonies and colonies are netted out. For example, the average within-group variance of R_i is equal to the variance of R_i in the entire sample if the mean of R is equal in former colonies and in the non-colonies. With this notation, the point estimate of α equals

$$
\widehat{\alpha} = \frac{\widetilde{Var}\,(E)\,\widetilde{Cov}\,(Y,R) - \widetilde{Cov}\,(Y,E)\,\widetilde{Cov}\,(R,E)}{\widetilde{Var}\,(E)\,\widetilde{Var}\,(R) - \left(\widetilde{Cov}\,(R,E)\right)^2} \tag{13}
$$

Due to the presence of the standard small-sample instrumental variable bias, it is not generally true that $E[\widehat{\alpha}] = \alpha$. However, since all of the elements in (13) depend exclusively on the within-group variation, the small sample bias of $\widehat{\alpha}$ is not affected by the endogeneity of colonization; i.e., $\frac{\partial E[\widehat{\alpha}]}{\partial \gamma_R} = \frac{\partial E[\widehat{\alpha}]}{\partial \gamma_Y} = 0$. ■

9 Appendix B: Alternative Definitions of Former Colonies

Table 9 documents that the results presented above are not dependent on the precise way in which countries are being classified as former colonies versus non-colonized nations. In the main part of the text, a country is classified as a former colony if it ever has either been an official colony, was under the control of an empire-affiliated organization such as the Dutch and British East Indies Companies, had the status of protectorate of a non-adjacent empire, or lost the sovereignty over its foreign policy following a military conflict with a non-adjacent empire. With this definition, 56 countries are classified as non-colonized nations, while 95 are classified as former colonies.

Columns 1, 2 and 3 employ a "wide" definition of former colonies. In these two specifications, the colony dummy also equals one if the country was under a League of Nations mandate after World War I. This, in addition, classifies Israel, Jordan, Lebanon, the Syrian Arab Republic and West Bank and Gaza as former colonies. There are thus 100 former colonies and 51 non-colonized nations. Column 1 repeats the baseline specification including the three geographic variables from Column 8 of Table 3. In Column 2 and 3 repeat the specifications respectively using EDE or the measures of proximity. In Columns 3 to 6 a "narrower" definition of former colonies is adopted. This colony dummy equals one only if the country ever has been an official colony, was under the control of an empire-affiliated organization such as the Dutch and British East Indies Companies, or had the status of protectorate of a non-adjacent empire. This classifies the United Arab Emirates and Bhutan as non-colonized nations, leading to 93 former colonies.

For some countries, defining whether the country has been a colony or not is difficult. Ethiopia has been colonized, but only during the period of 1936 to 1941. Korea has been a occupied by Japan in 1910, again far later than other countries that are classified as colonies. Current Liberia was founded by the empire-affiliated American Colonization Society, and to ensure that the classification rule is consistent, the country is counted as a former colony in the main text. Finally, parts of China have been colonized, and the country was also under heavy foreign influence during much of its modern history. Columns 7 to 9 exclude these four countries. In all estimations of Table 9, the first-stage estimation is a highly significant predictor of institutional outcomes. Also the estimated impact for institutions is significant and comparable in magnitude to the baseline estimation.

Table 1 - Summary Statistics and Pairwise Correlations

	Summary Statistics					Pairwise Correlation Coefficients			
	Number of Observations	Mean	Standard Deviation	Min Value	Max Value	Ethnic Fract.	French Legal Org.	Settler Mortaltiy	Pop. Density in 1500
Entire Sample									
Log (GDP per Capita 2003)	151	7.525	1.629	4.443	10.556	-0.5234**	-0.1444	-0.6886**	-0.5628**
1996-2004 Avg. of "Rule of Law"	151	-0.023	0.966	-1.842	2.137	-0.4901**	-0.2227**	-0.6598**	-0.5334**
Log (Avg. Elevation)	151	4.413	1.917	0.000	7.792	0.1098	0.0573	-0.039	-0.0499
Log (Avg. Rainfall)	151	4.335	0.841	1.253	6.481	0.1945*	-0.0428	0.2919*	-0.0233
Humidity (Afternoon Max.)	151	73.0%	10.2%	35.0%	92.0%	-0.0551	-0.1195	0.2807*	0.0282
Avg. Temperature (Celsius)	151	18.715	8.019	-4.000	31.000	0.354**	0.4259**	0.5233**	0.408**
Log (Avg. Dist Europe)	151	9.514	0.750	7.658	10.94962	0.2096*	0.0586	-0.4502**	-0.4788**
Latitude (in Degrees)	151	26.963	16.842	0.200	64.000	-0.5117**	-0.3656**	-0.4796**	-0.2645*
Malaria Ecology	147	0.863	1.102	0.000	3.483	0.5424**	0.2039*	0.6885**	0.1113
Former Colonies									
Log (GDP per Capita 2003)	95	7.066	1.538	4.443	10.472	-0.3762**	-0.15	-0.6886**	-0.5559**
1996-2004 Avg. of "Rule of Law"	95	-0.264	0.846	-1.842	2.003	-0.3573**	-0.3209**	-0.6598**	-0.5369**
Log (Avg. Elevation)	95	4.343	2.043	0.000	7.792	0.0243	0.1335	-0.039	-0.0724
Log (Avg. Rainfall)	95	4.552	0.902	1.253	6.481	0.1257	-0.1525	0.2919*	-0.0362
Humidity (Afternoon Max.)	95	71.0%	10.1%	35.0%	92.0%	0.1106	0.0599	0.2807*	0.0078
Avg. Temperature (Celsius)	95	23.116	4.991	4.000	31.000	0.2029	0.1873	0.5233**	0.4355**
Log (Avg. Dist Europe)	95	9.892	0.481	8.278	10.950	-0.2861*	-0.2596*	-0.4502**	-0.4884**
Latitude (in Degrees)	95	17.004	11.134	0.200	53.000	-0.421**	-0.1478	-0.4796**	-0.2841**
Malaria Ecology	93	1.333	1.131	0.000	3.483	0.4943**	0.0276	0.6885**	0.1331
Non-Colonies									
Log (GDP per Capita 2003)	56	8.302	1.488	5.319	10.556	-0.5980**	0.2278	-	-
1996-2004 Avg. of "Rule of Law"	56	0.385	1.026	-1.316	2.137	-0.5483**	0.1766	-	-
Log (Avg. Elevation)	56	4.532	1.693	0.000	7.201	0.3970**	-0.0716	-	-
Log (Avg. Rainfall)	56	3.967	0.562	2.398	5.242	-0.0967	-0.2328	-	-
Humidity (Afternoon Max.)	56	76.4%	9.4%	44.0%	89.0%	-0.0953	-0.2526	-	-
Avg. Temperature (Celsius)	56	11.250	6.529	-4.000	29.000	0.036	0.4788**	-	-
Log (Avg. Dist Europe)	56	8.873	0.690	7.658	10.306	0.2938*	-0.1710	-	-
Latitude (in Degrees)	56	43.857	9.990	13.000	64.000	-0.2929*	-0.2993*	-	-
Malaria Ecology	54	0.055	0.271	0.000	1.988	0.1974	-0.043	-	-

Notes: Table 1 displays summary statistics and pair wise correlations between measures of geographic endowments and instrumental variables for institutional outcomes. The four instrumental variables are Ethnic Fractionalization from Alesina et al. (2004), a dummy equal to one in countries with French Legal Origin from La Porta et al. (1997), the Logarithm of European Settler Mortality from Acemoglu et al. (2001), and the logarithm of the population density in 1500 from Acemoglu et al. (2002). The latter two variables are only available for former colonies. The measures of endowments are from Parker (1997), except Malaria Ecology (from Kiszewski et al. (2004)) and Distance from Europe, which is equal to the average distance from France, the UK, and Spain in the CEPII distance data set; a * denotes a correlation coefficient significant at 5% and ** denotes a

Table 2 - The Different Effect of Endowments on Institutional Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	(1) - (3) Average Rainfall			Market Access	Elevation	Temperature	Humidity	Malaria	Latitude
Sample	*Former Colonies*	*Not Colonized*	*All*	*All*	*All*	*All*	*All*	*All*	*All*
Panel A: OLS Estimations. Dependent Variable is the 1996-2004 Average Score for "Rule of Law" from Kaufmann et al. (2005)									
Log Rainfall	-0.24	0.28	0.28						
	[0.09]**	[0.23]	[0.23]						
Log Rainfall * Colony Y/N			-0.52						
			[0.24]*						
Log (Avg. Dist. Europe)				-0.79					
				[0.19]**					
Log (Avg. Dist. Europe) * Colony Y/N				1.23					
				[0.28]**					
Log Elevation					-0.28				
					[0.06]**				
Log Elevation * Colony Y/N					0.21				
					[0.07]**				
Avg. Temperature						0			
						[0.02]			
Avg. Temperature * Colony Y/N						-0.07			
						[0.02]**			
Humidity							2.82		
							[1.36]*		
Humidity * Colony Y/N							-3.67		
							[1.59]*		
Malaria Ecology (ME)								-0.14	
								[0.13]	
ME * Colony Y/N								-0.18	
								[0.15]	
Latitude									0.03
									[0.01]*
Latitude * Colony Y/N									0.01
									[0.02]
Colony Y/N			1.55	-12.02	-1.65	0.96	2.11	-0.27	0.06
			[0.98]	[2.57]**	[0.36]**	[0.50]	[1.19]	[0.20]	[0.59]
Panel B: Semiparametric Estimation allowing for Nonlinear Main Effect. Dependent Variable is the 96-04 Avg. For the Rule of Law									
Main Effect (P Value):	-	-	0.057	0.117	0.041	0.686	0.160	0.290	0.001
Interaction Coefficient	-	-	-0.65	0.202	0.12	-0.1	-3.68	-0.51	0.08
			[0.31]*	[.402]	[0.11]	[0.05]*	[2.07]	[0.48]	[0.03]**
Observations	95	56	151	151	151	151	151	147	151
R-squared (OLS)	0.066	0.023	0.147	0.253	0.185	0.185	0.139	0.208	0.287

Notes: Panel A of Table 2 presents the OLS relation between geographic variables and the 1996 to 2004 average score of the "Rule of Law" from Kaufmann et al. (2005). Columns 1 and 2 relate (the logarithm of) annual rainfall to the rule of law in the group of former colonies (1) and in the Group of non-colonies (2). From Column 3 onwards, the sample includes both groups and each estimation includes one measure of endowments, a dummy equal to one for former colonies, and the interaction of the dummy and the measure of endowments. From Column 3 onwards , Panel B reproduces the specification of Panel A in a a semiparametric estimation. Each estimation is computed using Stata's plreg command and allows for the main effect of the geographic variable to be nonlinear, while the interaction effect is restricted to be linear. Panel B reports the coefficient and the standard error for the linear interaction coefficient and the p-value corresponding to the null hypothesis for the main effect of endowments. In Panel A, heteroscedasticity robust standard errors are reported in brackets; * significant at 5%; ** significant at 1%.

Table 3 - Endowments, Institutions, and Income

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample:	*Fm. Colonies*	*Non-colonies*			*(3) to (8): All Countries*			
Measure of Endowments		*(1) to (3) Humidity*		*Avg. Rainfall*	Temperature	*Remoteness*	*Humidity, Rain, Temp., Remoteness*	
Estimation Type:	*OLS*	*OLS*	*IV*	*IV*	*IV*	*OLS*	*OLS*	*IV*
Panel B: Dependent Variable is the Ln of GDP per Capita in 2003								
Rule of Law			1.31	1.39	1.92	1.69		1.70
			[0.31]**	[0.36]**	[0.41]**	[0.22]**		[0.21]**
Humidity	-1.44	3.38	-0.32				0.63	-0.21
	[1.34]	[2.15]	[0.64]				[1.18]	[0.81]
Log Rainfall				-0.13			-0.33	-0.07
				[0.09]			[0.16]*	[0.11]
Avg. Temperature					0.01		-0.05	0.00
					[0.02]		[0.02]*	[0.02]
Log (Avg. Dist. Europe)						0.04	-0.33	0.05
						[0.16]	[0.20]	[0.14]
Colony y/n			-0.4	-0.26	-0.1	-0.18		-0.17
			[0.23]	[0.25]	[0.26]	[0.22]		[0.24]
R^2	0.009	0.046	-	-	-		0.2073	
Panel A: Dependent Variable is the 96-04 Avg. of "Rule of Law"								
Humidity	-0.85	2.82	2.82				0.47	2.36
	[0.83]	[1.36]*	[1.36]*				[0.74]	[1.68]
Humidity * Colony Y/N			-3.67					-1.57
			[1.59]*					[1.88]
Log Rainfall				0.28			-0.15	0.1
				[0.23]			[0.10]	[0.23]
Log(Rainfall) * Colony Y/N				-0.52				-0.37
				[0.24]*				[0.25]
Avg. Temperature					0		-0.03	0.04
					[0.02]		[0.01]**	[0.02]
Avg. Temperature * Colony Y/N					-0.07			-0.1
					[0.02]**			[0.03]**
Log (Avg. Dist. Europe)						-0.79	-0.2	-0.76
						[0.19]**	[0.13]	[0.19]**
Log (Avg. Dist. Europe) * Colony Y/N						1.23		1.09
						[0.28]**		[0.26]**
Colony y/n			2.11	1.55	0.96	-12.02		-5.93
			[1.19]	[0.98]	[0.50]	[2.57]**		[3.09]
Hypothesis Tests								
(Joint) Wald Test: Direct Effect of Endowments Equal to 0 (Either first- or second-stage estimation)								
P Value Second Stage			0.616	0.167	0.641	-	0.0015	0.8399
P Value First Stage			0.040	0.222	0.894	-	<0.0001	0.0001
Anderson Canonical Correlation LR Statistic (identification/IV relevance test all instrument)								
P Value:	-	-	0.0203	0.0296	0.0059	-	-	<0.0001
Hansen J Test of Overidentication (all Instruments)								
P Value:	-	-	-	-	-	-	-	0.6352
Observations	95	56	151	151	151	151	151	
R^2 (first stage)	-	-	0.139	0.147	0.185	-	-	

Notes: Table 3 displays the relation between geography and institutional quality (Panel A) and the relation between endowments and/or institutional quality and income (Panel B). In Columns 1 to 3, the independent variable is humidity. In Column 1, the sample consists of 95 former colonies and in Column 2 it consists of 56 countries that have not been colonized. In all other estimations the sample includes all 151 countries and each regression also adds the interaction of the measure of geography with the colony dummy. In Panel B, Columns 1, 2, and 7 presents OLS results; in the other columns, the score for the rule of law is instrumented and two-stage least-squares estimates are presented. Heteroscedasticity-robust standard errors in brackets; * significant at 5%; ** significant at 1%.

Table 4 - Robustness Analysis (Two-Stage Least Squares Estimation Results)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Excluding Africa	*Excluding Oil-Rich Nations*	*IV Excl. AUS CAN, NZL, USA*	*Excl. Warsaw Pact*	*Quantile IV Regression*	*With Continent Dummies*	*Ethnic Fract.*	*ad Geogr. Controls*	*Instrumenting for Cont. Corpt.*	*Xconst*
Panel B: OLS or Second Stage Estimation - Dependent Variable is the Ln of GDP per Capita in 2003										
Rule of Law 1996 to 2004	1.52	1.94	1.77	1.82	1.78	1.39	1.71	1.52		
	[0.25]**	[0.25]**	[0.26]**	[0.33]**	[0.34]**	[0.21]**	[0.26]**	[0.20]**		
Control of Corruption 1996 to 2004									1.67	
									[0.20]**	
Xconst Score 1999 (Politiy IV)										0.59
										[0.09]**
Humidity	-1.24	-0.38	-0.19	-0.64	-0.18	-0.25	-0.35	-0.09	-0.86	-0.26
	[0.75]	[1.06]	[0.89]	[1.04]	[1.68]	[0.56]	[0.84]	[0.74]	[0.89]	[1.13]
Log Rainfall	-0.16	-0.03	-0.07	0	-0.13	-0.09	-0.06	0.01	-0.12	-0.39
	[0.07]*	[0.14]	[0.11]	[0.15]	[0.18]	[0.09]	[0.11]	[0.07]	[0.11]	[0.17]*
Avg. Temperature	0	0.01	0	0.01	-0.01	0.01	0	-0.01	0.01	
	[0.01]	[0.02]	[0.02]	[0.02]	[0.03]	[0.01]	[0.02]	[0.02]	[0.02]	
Log (Avg. Dist. Eur)	-0.21	0.28	0.12	0.01	0.21	-0.35	0.05	-0.09	0.17	-0.24
	[0.17]	[0.17]	[0.17]	[0.15]	[0.45]	[0.21]	[0.15]	[0.14]	[0.16]	[0.17]
Ethnic Fractionalization							-0.05			
							[0.45]			
Panel A: First Stage Estimation - in (1) - (8) Dep. Var is the 1996 to 2004 Average of the Rule of Law									**Control of Corruption**	**Constraints on Executive**
Humidity	2.36	2.18	2.36	3.55	0.85	2.5	2.39	0.48	2.41	5.24
	[1.71]	[2.30]	[1.68]	[1.59]*	[1.44]	[1.78]	[1.59]	[1.78]	[1.60]	[2.56]*
Humidity * Colony Y/N	-1.01	-1.32	-1.83	-2.75	-0.01	-2.07	-1.51	-0.31	-1.15	-7.72
	[2.30]	[2.46]	[1.87]	[1.80]	[1.65]	[1.97]	[1.83]	[1.97]	[1.78]	[3.00]*
Log Rainfall	0.1	0.35	0.1	-0.18	0.11	0.12	0.07	0.14	0.12	0.94
	[0.23]	[0.26]	[0.23]	[0.27]	[0.17]	[0.23]	[0.21]	[0.23]	[0.21]	[0.43]*
Log(Rainfall) * Colony Y/N	-0.23	-0.6	-0.35	-0.1	-0.41	-0.34	-0.33	-0.26	-0.38	-1.12
	[0.30]	[0.29]*	[0.25]	[0.29]	[0.19]*	[0.25]	[0.23]	[0.25]	[0.23]	[0.47]*
Avg. Temperature	0.04	0.02	0.04	0.02	0.03	0.04	0.04	0.05	0.04	*dropped*
	[0.02]	[0.03]	[0.02]	[0.02]	[0.02]	[0.02]	[0.02]	[0.03]	[0.02]	
Avg. Temperature * Colony Y/N	-0.11	-0.06	-0.07	-0.08	-0.08	-0.11	-0.09	-0.09	-0.1	*dropped*
	[0.03]**	[0.04]	[0.03]*	[0.03]**	[0.03]**	[0.03]**	[0.03]**	[0.03]**	[0.03]**	
Log (Avg. Dist. Eur)	0.82	1.08	1.01	0.83	1.17	0.7	0.82	1.12	1.16	3.13
	[0.53]	[0.34]**	[0.25]**	[0.27]**	[0.23]**	[0.32]*	[0.25]**	[0.26]**	[0.26]**	[0.44]**
Log (Avg. Dist. Eur) * Colony Y/N	-0.76	-0.71	-0.76	-0.5	-1	-0.84	-0.65	-0.76	-0.87	-1.3
	[0.19]**	[0.19]**	[0.19]**	[0.20]*	[0.15]**	[0.28]**	[0.18]**	[0.18]**	[0.18]**	[0.32]**
Ethnic Fractionalization							-1.14			
							[0.29]**			
Model Information and Hypothesis Tests										
Colony Dummy (both st	y	y	y	y	y	y	y	y	y	y
Continent Dummies						y				
Further Geographic Controls								y		
Joint Wald Test: Direct Effect of Endowments Equal to 0 (Either first- or second-stage estimation)										
P Value Second Stage	0.0143	0.4999	0.7871	0.8877	0.8263	0.4176	0.8425	<0.001	0.1119	0.0257
P Value First Stage	<0.001	<0.001	0.0001	0.0028	-	0.0134	0.0005	<0.001	<0.001	<0.001
Anderson Canonical Correlation LR Statistic (identification/IV relevance test all instrument)										
P Value	0.004	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001
Hansen J Test of Overidentication (all Instruments)										
P Value	0.8353	0.2141	0.3982	0.404	-	0.209	0.584	0.824	0.838	0.0864
Observations	104	117	147	132	151	151	148	141	151	145
R2 First Stage	0.282	0.389	0.364	0.417	-	0.429	0.448	0.548	0.366	0.452

Notes: Table 4 presents robustness tests for two-stage least-squares relation between institutions, endowments, and income. In the second-stage estimation of Panel B, the dependent variable is the logarithm of 2003 per capita GDP. In Panel A, the dependent variable a measure of institutional outcomes. In Columns 1 to 8, this measure is equal to the 1996 to 2004 average for the score of the rule of law. The estimation in turn excludes 47 African countries (Column 1), 34 countries with more than 50,000 barrels of proven oil reserves per capita in 1994 (2), the four neo-Europes (3), and all members of the Warsaw pact except Russia (4). The estimation in Column 5 adds four continent dummies for Africa, Asia, Oceania, and Asia (neither first- nor second- stage coefficients for the dummies are reported). Column 6 presents the baseline specification estimated in a quantile instrumental variable estimation. Results for the 50th percentile are reported. Column 7 adds ethnic fractionalization from Alesina et al. (2004). Column 8 adds Malaria Ecology from Kiszewski et al. (2004) and elevation, a landlocked dummy, distance from the equator, the length of coastline, the percentage of a country's surface that is arable, and the "Total Sum of Minerals" from Parker (1997) to the estimation. Columns 9 and 10 repeat the baseline specification, using the 1996 to 2004 average for control of corruption from Kaufmann et al. (2005) and the score for "Constraints on the Executive" (xconst) from the Polity IV database as proxies for institutional outcomes. Control of Corruption is standardized, with higher values associated with more control of corruption. xconst takes value between 0 and 7, with higher values associated with more constrained executives. Heteroscedasticity-robust standard errors in brackets; * significant at 5%; ** significant at 1%.

Table 5 - The Geographic Determinants of Soldier Mortality Rates

	(1)	(2)	(3)	(4)	(5)
	Rainfall & Temperature	*Extensive Georg. Model*	*adding KGTEMP*	*adding Latitude*	*Extensive Model & Pop. Dummies*
Dependent Variable is the Standardized Ln of the Mortality Rate from Acemoglu et al. (2001)					
Avg. Temperature	0.63	0.64	0.58	0.61	0.49
(std.)	[0.17]**	[0.33]	[0.35]	[0.34]	[0.31]
Min. of Monthly Rain	-0.32	-0.32	-0.36	-0.33	-0.19
(std.)	[0.06]**	[0.05]**	[0.10]**	[0.05]**	[0.07]**
Max. of Monthly Rain	0.22	0.16	0.17	0.15	0.14
(std.)	[0.09]*	[0.08]	[0.10]	[0.08]	[0.09]
Temp. at max Humidity		-0.68	-0.64	-0.71	-0.51
(std.)		[0.28]*	[0.37]	[0.29]*	[0.29]
Savanna y/n		0.6	0.53	0.55	0.51
		[0.19]**	[0.21]*	[0.22]*	[0.21]*
Temperate Vegetation y/n		-0.7	-0.51	-0.6	-0.61
		[0.25]**	[0.26]	[0.31]	[0.19]**
Mediteranean Climate y/n		-1.08	-1.11	-1.05	-0.95
		[0.31]**	[0.35]**	[0.32]**	[0.30]**
Mountains y/n		-0.49	-0.55	-0.51	-0.62
		[0.26]	[0.28]	[0.26]	[0.28]*
KGPTEMP			-0.13		
			[0.66]		
Latitude				-0.13	
(std.)				[0.18]	
Campaign Rate y/n					0.71
					[0.28]*
Forced Laborer Rate y/n					0.56
					[0.26]*
Bishop Rate y/n					-0.01
					[0.24]
Model Information and Hypothesis Tests					
p-value: geography	<0.001	<0.001	<0.001	<0.001	<0.001
p-value: Pop. dummies	na	na	na	na	0.023
Observations	62	62	60	62	62
Clusters	35	35	35	35	35
R-squared	0.48	0.66	0.65	0.67	0.72

Notes: Table 5 presents the relation between geography and the settler mortality estimates from Acemoglu et al. (2001). All dependent variables except dummies and KGPTEMP are standardized. KGPTEMP takes values between 0 and 1 and is equal to the fraction of the population living in temperate areas. The population dummies used in Column 5 are from Albouy (2008). The bottom rows report two Wald tests corresponding to the joint null hypothesis that the geographic variables all equal 0 and that the three population dummies all equal 0 (Column 5 only). Heteroscedasticity robust and clustered standard errors in parentheses; * significant at 5%; **significant at 1%;

Table 6 - Estimating the Partial Effects of Disease and Institutional Quality

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Former Colonies OLS	*Not Colonized OLS*	*Full Sample IV*	*Former Colonies IV*	*w/o African Countries IV*	*w/o AUS, CAN NZL, USA IV*	*w/o Warsaw Pact IV*	*Full Sample IV*
Panel B: OLS or Second Stage Results - Dependent Variable is the Ln of GDP per Capita in 2003								
Rule of Law			1.624	2.077	1.12	1.89	1.54	1.191
			[0.265]**	[0.233]**	[0.28]**	[0.44]**	[0.22]**	[0.377]**
EDE	-1.174	-0.292	-0.256		-0.27	-0.25	-0.3	0.081
	[0.121]**	[0.241]	[0.100]*		[0.10]*	[0.12]*	[0.09]**	[0.259]
EDE Squared								-0.098
								[0.072]
Colony y/n			0.108		0.19	0.34	0.21	0.024
			[0.180]		[0.14]	[0.29]	[0.22]	[0.149]
R-Sq	0.433	0.025	-	-	-	-	-	-
Panel A: First Stage Estimation - Dependent Variable is the 96-04 Avg. of "Rule of Law"								
EDE	-0.566	-0.022	-0.022	-0.566	-0.022	-0.022	0.122	-0.145
	[0.090]**	[0.158]	[0.157]	[0.090]**	[0.158]	[0.157]	[0.170]	[0.322]
EDE* Colony y/n			-0.543		-0.639	-0.402	-0.688	-0.627
			[0.181]**		[0.230]**	[0.179]*	[0.193]**	[0.256]*
EDE Squared								0.035
								[0.073]
Colony y/n			-0.397		-0.35	-0.519	-0.9	-0.429
			[0.185]*		[0.199]	[0.184]**	[0.213]**	[0.181]*
Model Information and Hypothesis Tests								
Wald Test: Direct Effect of Endowments Equal to 0 (Either first- or second-stage estimation)								
P Value Second Stage								
P Value First Stage	-	-	0.225	-	0.229	0.225	0.674	0.4234
Anderson Canonical Correlation LR Statistic (identification/IV relevance test all instrument)								
P Value:	-	-	0.0017	0	0.0097	0.0209	0.0001	0.0164
Observations	95	56	151	95	104	147	131	151
R-sq first stage	0.332	0	0.266	0.332	0.131	0.236	0.392	0.267

Notes: Table 6 presents the first stage relation between early disease environment and institutional quality (Panel A) and the second stage relation between instrumented institutional quality and income (Panel B). The measure of early disease environment (EDE) is predicted from Table 5, Column 5. The variable "EDE * Colony y/n" is the interaction of the colony dummy and EDE. "EDE Square" equals (EDE+2.72)^2, where -2.72 is the minimum value of EDE in the sample. Heteroscedasticity robust standard errors in parentheses; * significant at 5%; ** significant at 1%

Table 7 - Location and Legal Origin (Probit Estimations)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Independent Variable	*Rel. Distance*	*Abs. Distance*	*Openess*	*Latitude*	*Rel. Distance*	*Abs. Distance*	*Rel & Abs. Distance*	
Model	*Probit*	*Probit*	*Probit*	*Probit*	*Probit*	*Probit*	*Multinominal Probit*	
Sample	*(1)- (4): Former French or UK Colonies*				*(5), (6): French or UK Legal Origin*		*All Former Colonies*	
Dependent Variable	***Uk Colony Dummy***	***Uk Colony Dummy***	***Uk Colony Dummy***	***Uk Colony Dummy***	***Uk Legal Origin Dummy***	***Uk Legal Origin Dummy***	***French Legal Origin Dummy***	***Other Legal Origin Dummy***
Log (Dist. from France / Dist. from UK)	7.17 [2.60]**							
Log (Dist. from France + and UK)		1.21 [0.43]**						
Frankel Romer Tradeshare (Log)			-0.129 [0.257]					
Latitude (Std.)				0.47 [0.26]				
Log ((Dist FRA +Dist. ESP) / Dist. GBR)					3.12 [1.14]**			
Log (Dist FRA + Dist. ESP + Dist GBR)						0.68 [0.31]*		
Log (Dist FRA / (Dist FRA + Dist. DEU + Dist GBR))							-19.85 [7.28]**	153.09 [102.49]
Log (Dist GBR / (Dist FRA + Dist. DEU + Dist GBR))							-12.45 [5.18]*	30.77 [57.94]
Log (Dist FRA + Dist. DEU + Dist GBR)							-0.16 [0.80]	0.36 [3.11]
Observations	58	58	56	58	91	91	95	
Model significance (P Value)	0.001	0.0021	0.6152	0.0681	0.0062	0.0236	0.013	

Notes: Table 7 presents the relation between endowments and the colonizer identity or legal origin. In Columns 1 to 4 , the Probit estimation results each relate a measure of endowments to the probability of having been colonized by the UK. In Columns 1 to 4, the sample is restricted to the group of former French or British colonies, so that the estimated coefficients measure the impact of endowments on the relative likelihood of being colonized by either France or the UK. In Column 1, the independent variable is the logarithm of the country's relative distance to France, defined as the distance to France divided by the distance to the UK. In Column 2, the independent variable is logarithm of the average distance to France and UK, defined as the sum of Distance from France and distance from the UK. In Column 3, the independent variable is the "geographic openness to trade" from Frankel and Romer (1999). In Column 4, the dependent variable is the distance from the equator. In Columns 5 and 6, the sample includes all former colonies with either French or British legal origin in La Porta et al. (1998). The independent variables are the relative distance from France or Spain (averaged) compared to the distance from Britain and the logarithm of the absolute difference from France, Spain, and Britain. In Column 7, the multinominal Probit estimation includes all 95 former colonies and the outcome takes different values for UK, French, or "other" legal origin. The left sub-column reports the results for the French Legal Origin and the right sub column reports the results for the "other" legal origin dummy. The independent variables include the relative difference from the UK, the relative difference from France, and the absolute average difference from France, Germany, and the UK. All distance data is from the CEPII distance data set; * significant at 5%; ** significant

Table 8 - Proximity, Legal Origin, and Prosperity (Two-Stage Least Square Estimations)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Sample:	*only former Colonies*	*all w/o 5 Colonizers*	*all w/o 5 Colonizers*	*w/o Colonizer, w/o African*	*w/o Colonizer, w/o AUS, CAN*	*w/o Colonizer, w/o Warsaw P.*	*all Nations*	*w/o Colonizer,*	*w/o Colonizer*
Relative Proximity:	*(1),(2): UK vs. Non-UK Legor*		*(3) - (8): Proximity from Column 7 of Table 8 (FRA, UK, other)*						*& Spain*
Panel B: OLS or Second Stage Results - Dependent Variable is the Ln of GDP per Capita in 2003									
Rule of Law	1.36	1.17	1.4	0.89	1.43	1.36	1.37	1.42	1.51
	[0.36]**	[0.27]**	[0.15]**	[0.20]**	[0.17]**	[0.17]**	[0.14]**	[0.14]**	[0.14]**
Proximity to UK		0.28	0.38	-0.06	0.4	0.65	0.38	0.26	1.53
		[0.23]	[0.21]	[0.27]	[0.22]	[0.41]	[0.21]	[0.22]	[1.16]
Proximity to France			0.23	1.03	0.19	0.44	0.2	0.29	1.12
			[0.25]	[0.32]**	[0.25]	[0.33]	[0.20]	[0.24]	[1.12]
Proximity to Spain									2.27
									[0.94]*
EDE								-0.3	
								[0.08]**	
Colony y/n		-0.5	-0.48	-0.36	-0.45	-0.52	-0.48	-0.12	-0.32
		[0.18]**	[0.17]**	[0.21]	[0.19]*	[0.20]**	[0.17]**	[0.16]	[0.23]
Panel A: First Stage Estimation - Dependent Variable is the 96-04 Avg. of "Rule of Law"									
Proximity to UK	1.49	-0.69	-0.9	-0.9	-0.9	-2.08	-0.9	-0.9	-0.63
	[0.47]**	[0.34]*	[0.32]**	[0.32]**	[0.32]**	[0.33]**	[0.31]**	[0.31]**	[3.70]
Proximity to UK *		2.18	1.61	2.25	1.08	2.78	1.61	1.91	4.47
Colony y/n		[0.58]**	[1.01]	[1.34]	[0.96]	[1.02]**	[1.01]	[0.81]*	[3.84]
Proximity to France			1.5	1.5	1.5	0.28	1.21	1.21	0.88
			[0.36]**	[0.36]**	[0.36]**	[0.37]	[0.26]**	[0.27]**	[3.53]
Proximity to France*			-2.22	-1.56	-2.38	-1	-1.93	-1.12	1.38
Colony y/n			[0.84]**	[1.00]	[0.79]**	[0.85]	[0.81]*	[0.65]	[3.64]
Proximity to Spain									7.71
									[33.57]
Proximity to Spain*									-5.27
Colony y/n									[33.58]
EDE								-0.01	
								[0.13]	
EDE * Colony y/n								-0.52	
								[0.16]**	
Colony y/n		-1.33	-0.49	-0.88	-0.28	-1.66	-0.54	-0.89	-3.36
		[0.28]**	[0.82]	[1.01]	[0.77]	[0.82]*	[0.82]	[0.63]	[3.61]
Model Information and Hypothesis Tests									
Joint Wald Test: Direct Effect of Endowments on Income Equal to 0 (combining first- and second-stage effect)									
P Value:	-	0.275	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Anderson Canonical Correlation LR Statistic (identification/IV relevance test all instrument)									
P Value:	0.0022	0.0006	0.0001	0.0048	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Hansen J Test of Overidentication (all Instruments)									
P Value:	-	-	0.4246	0.9472	0.4192	0.3117	0.4419	0.289	0.7014
Observations	95	145	145	98	141	125	150	145	145
R-sq first stage	0.094	0.148	0.198	0.129	0.235	0.374	0.252	0.378	0.313

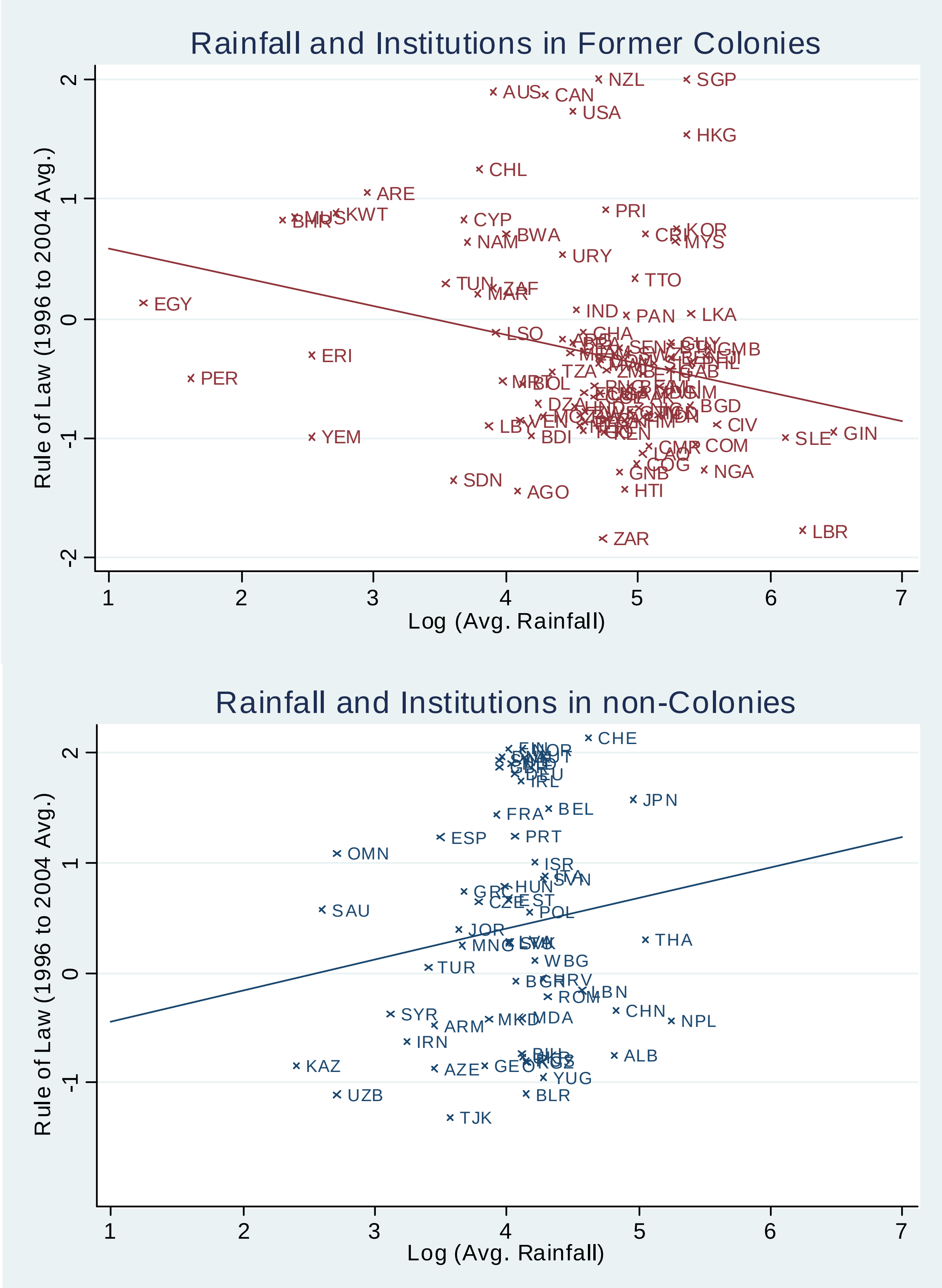
Notes: Table 8 presents the relation between relative proximity to the colonizers, institutional outcomes, and income. Panel A presents the first-stage estimations relating proximity to institutional outcomes and Panel B the second-stage estimations relating institutional outcomes and proximity to income per capita. In Column 1, the sample includes only former colonies and the independent variable in Panel A is the relative proximity to the UK. In Column 2, the first-stage estimation adds the colony dummy and the interaction of this dummy with relative proximity to the UK. The second-stage estimation adds relative proximity to the UK. The sample includes the entire sample except five colonizers (DEU, ESP, FRA, PRT, GBR). Column 3 adds relative proximity to France measure, making the proximity to "other" nations the omitted group (rel. proximity to UK, to France and to "other" add up to one). From Column 4 onwards, robustness tests are presented. Column 4 excludes African countries, 5 the four neo-Europes, and Column 6 includes the former members of the Warsaw Pact. Column 7 adds the five colonizers to the sample. Column 8 adds EDE to both the second- and first-stage estimation and EDE interacted with the colony dummy to the first stage. Column 9 uses different measures of proximity (see text). Heteroscedasticity-robust standard errors in parentheses; * significant at 5%; ** significant at 1%.

Table 9 - Robustness Analysis: Alternative Definitions for the Colony Dummy

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	(1) - (3) "Wide" Definition of Former Colony			*(4) - (6) "Narrow" Definition of Former Colony*			*(7) - (9) Defining LBR, ETH, KOR as Non-Colonies*		
Regressors:	Geographic Variables	Early Disease Environment	Proximity to Colonizers	Geographic Variables	Early Disease Environment	Proximity to Colonizers	Temp, Elev. Rainfall	Early Disease Environment	Proximity to Colonizers
Panel B: Second Stage Results - Dependent Variable is the Ln of GDP per Capita in 2003									
Rule of Law	1.55	1.58	1.43	1.65	1.66	1.39	1.68	1.57	1.28
	[0.26]**	[0.25]**	[0.15]**	[0.26]**	[0.26]**	[0.16]**	[0.34]**	[0.36]**	[0.23]**
Humidity	-0.1			-0.08			-0.08		
	[0.11]			[0.11]			[0.12]		
Log Rainfall	-0.2			-0.24			-0.2		
	[0.79]			[0.81]			[0.86]		
Avg. Temperature	0			0			0		
	[0.02]			[0.02]			[0.02]		
EDE		-0.28			-0.24			-0.29	
		[0.10]**			[0.10]*			[0.14]*	
Proximity to UK			0.44			0.38			0.28
			[0.21]*			[0.21]			[0.25]
Proximity to France			0.2			0.27			0.09
			[0.24]			[0.25]			[0.28]
Panel A: First Stage Results - Dependent Variable is the 96-04 Avg. of "Rule of Law"									
Humidity	0.13			0.01			-0.12		
	[0.26]			[0.24]			[0.26]		
Humidity * Colony Y	-0.37			-0.23			-0.11		
	[0.28]			[0.25]			[0.28]		
Log Rainfall	4.65			4.14			2.94		
	[1.89]*			[1.59]*			[1.71]		
Log(Rainfall) * Colo Y/N	-3.75			-3.14			-1.88		
	[2.06]			[1.80]			[1.90]		
Avg. Temperature	0.04			0.04			0.01		
	[0.02]*			[0.02]*			[0.02]		
Avg. Temperature * Colony Y/N	-0.11			-0.11			-0.08		
	[0.03]**			[0.03]**			[0.03]**		
EDE		0			-0.01			-0.15	
		[0.17]			[0.15]			[0.17]	
EDE * Colony y/n		-0.57			-0.56			-0.41	
		[0.19]**			[0.18]**			[0.20]*	
Proximity to UK			-0.93			-0.86			-0.77
			[0.35]**			[0.32]**			[0.36]*
Proximity to UK * Colony y/n			1.63			1.3			2.47
			[0.97]			[1.03]			[1.52]
Proximity to France			1.46			1.54			0.67
			[0.36]**			[0.36]**			[0.75]
Proximity to France* Colony y/n			-2.18			-2.4			-0.53
			[0.84]*			[0.88]**			[1.42]
Model Information and Hypothesis Tests									
Joint Wald Test: Direct Effect of Endowments on Income Equal to 0 (combining first- and second-stage effect)									
P Value:	0.1903	0.280	0.0000	0.1475	0.289	0.0000	0.4388	0.052	0.3736
Anderson Canonical Correlation LR Statistic (identification/IV relevance test all instrument)									
P Value:	0.0002	0.0015	0.0001	0.0003	0.0011	0.0001	0.0238	0.0166	0.0028
Hansen J Test of Overidentication (all Instruments)									
P Value:	0.1341	-	0.5297	0.2656	-	0.3133	0.3615	-	0.4385
Observations	151	151	145	151	151	145	151	151	145
No. Of Colonies	100	100	99	93	93	93	92	92	92
R-sq first stage	0.262	0.264	0.195	0.259	0.271	0.198	0.209	0.242	0.148

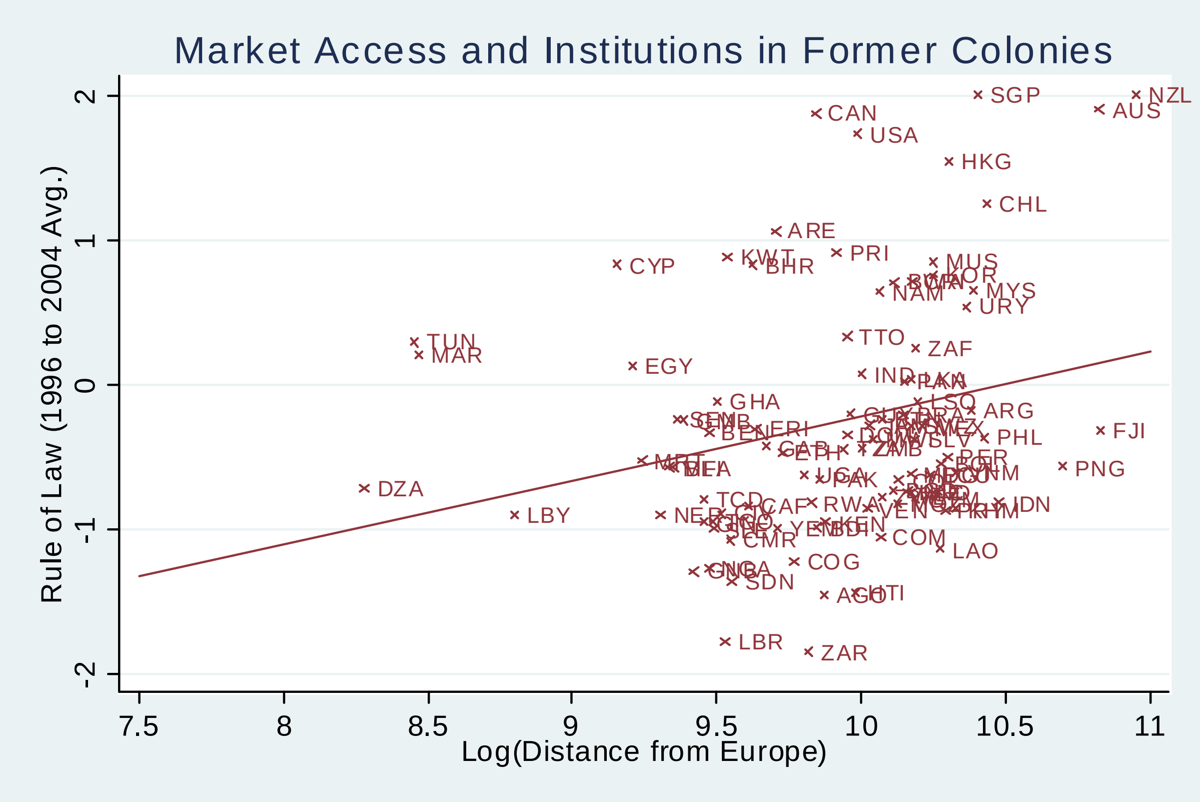
Notes: Table 9 displays two stage least square results for alternative definitions of former colonies. Panel A presents the first-stage estimations relating endowments and colonial history to institutional outcomes and Panel B the second-stage estimations relating institutional outcomes and endowments to income per capita. In Columns 1 to 3, the colony dummy is equal to one for all countries that have been an official colony or protectorate, were under the control of an empire-affiliated organization such as the Dutch and British East Indies Companies, had the status of protectorate of a non-adjacent empire, lost the sovereignty over its foreign policy following a military conflict with a non-adjacent empire, or was under a League of Nations mandate after World War I. The colony dummy in Columns 4 to 6 is equal to one for all countries that have been an official colony, were under the control of an empire-affiliated organization, or had the status of protectorate of a non-adjacent empire. The colony dummy in Columns 7 to 9 is the same as the colony dummy in the main part of the paper, except that Ethiopia, Liberia, and South Korea are counted as non-colonies. Heteroscedasticity robust standard errors are reported in parentheses; * significant at 5%; ** significant at 1%.

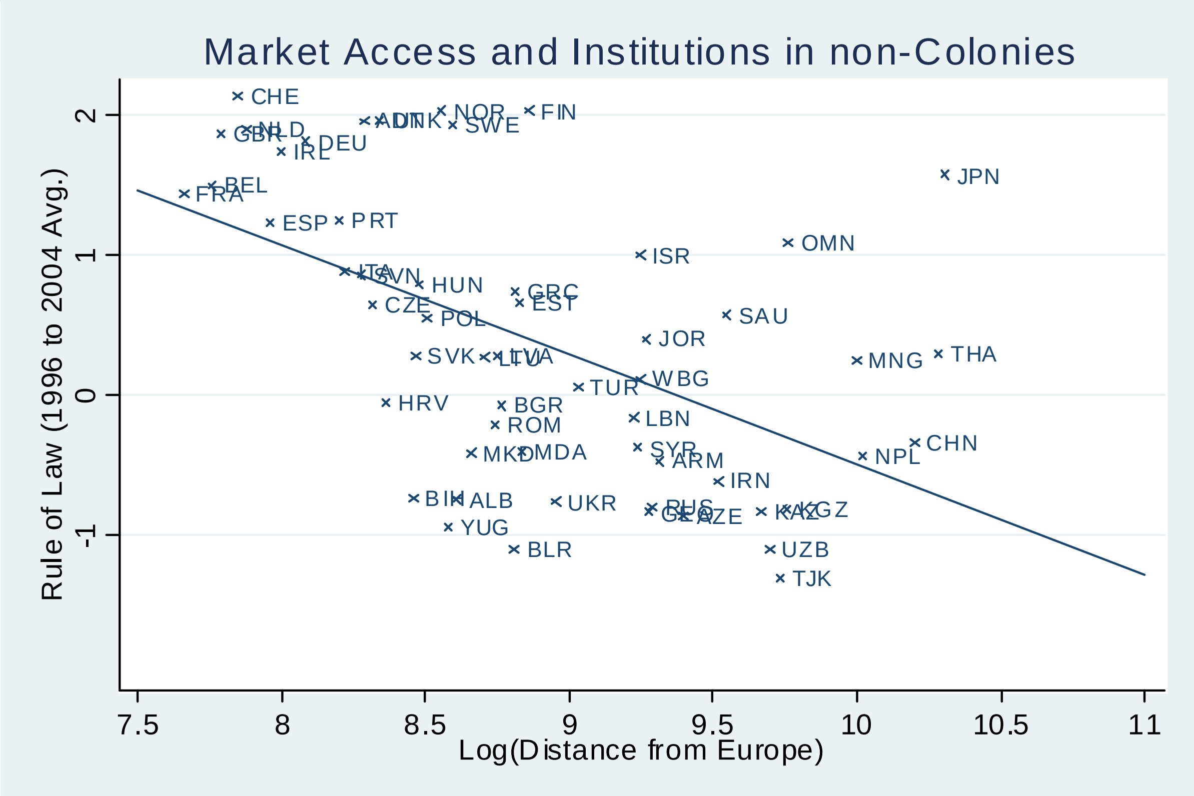
Figure 1 - Rainfall and Institutions in Former Colonies and Non-Colonized Countries



Notes: The upper plot of Figure 1 presents the relation between the log of average annual rainfall and the 1996 to 2004 average of the score for the "rule of Law" for former colonies. The lower plot of Figure 1 presents the same relation for countries that have not been colonized. In each plot, the solid line is the prediction of a simple OLS regression. Average annual rainfall is from Parker (1997). The score for the rule of law is from Kaufmann (1995). Countries are denoted by Worldbank country codes.

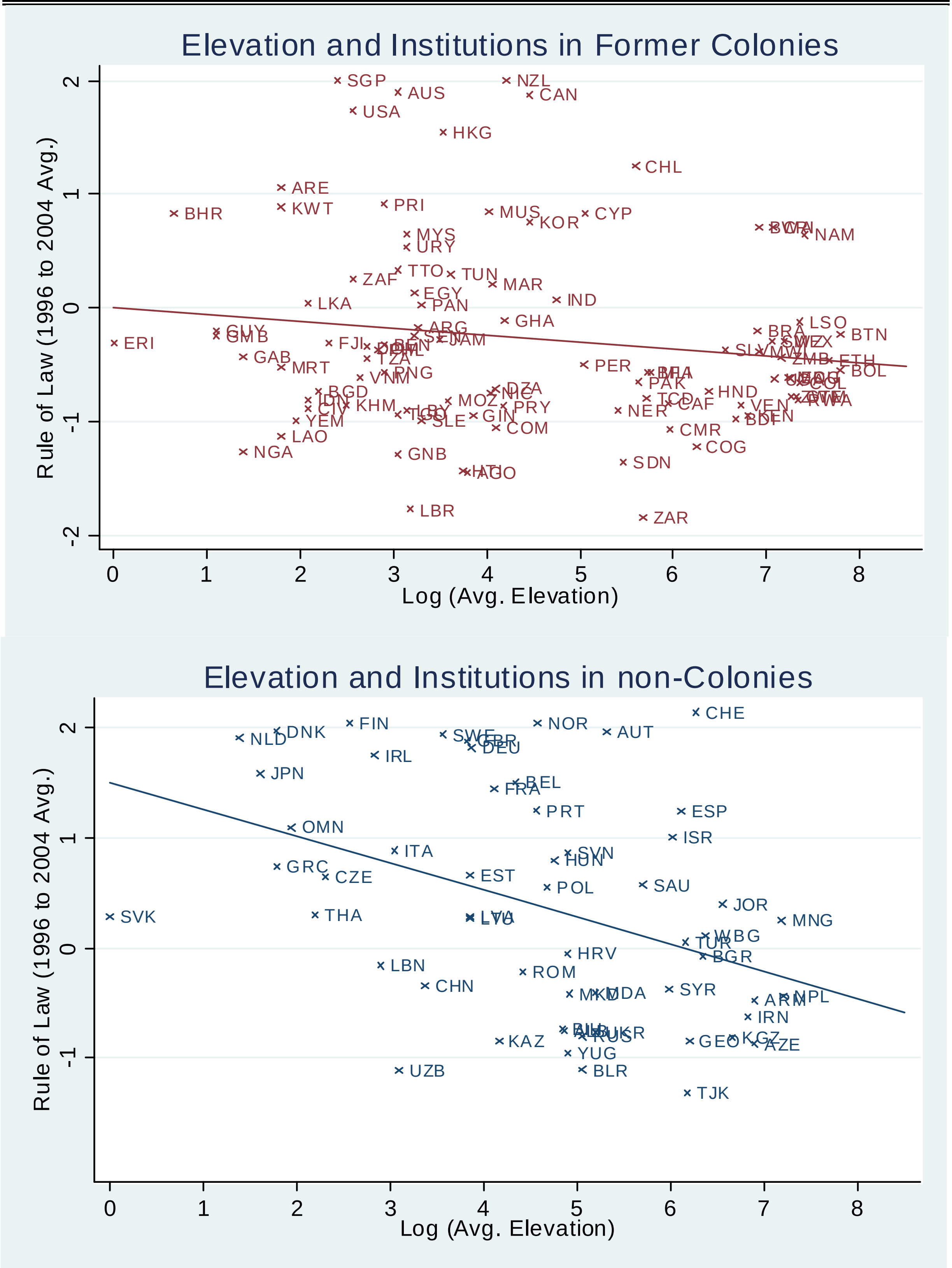
Figure 2 -Proximity to the Colonizers and Institutions





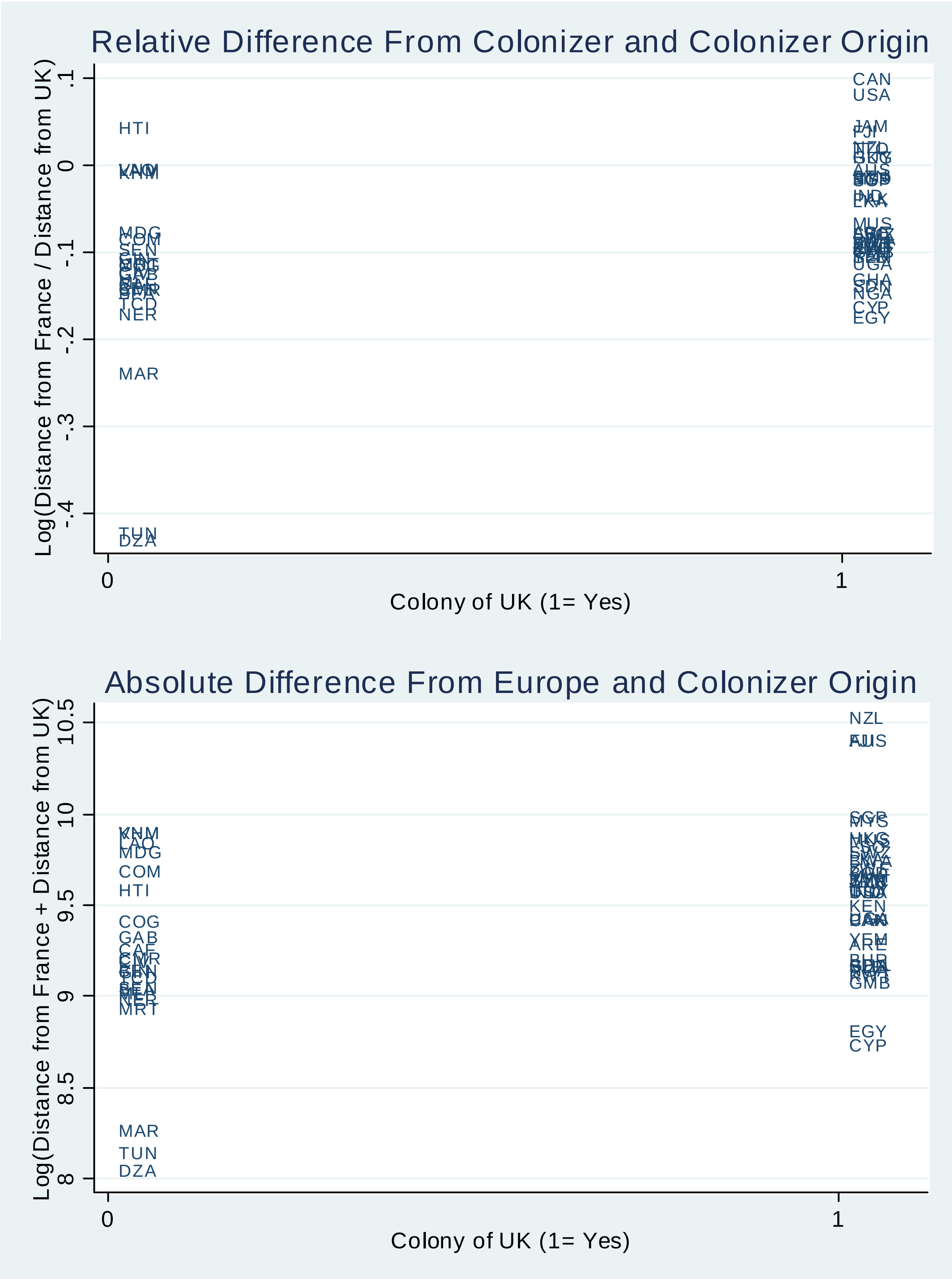
Notes: The upper plot of Figure 3 presents the relation between the logarithm of the average distance from France, the UK, and Spain and institutional outcomes for countries that have not been colonized. The lower plot of Figure 3 presents the same relation for former colonies. In each plot, the solid line is the prediction of a simple OLS regression line. The measure of institutional quality is the 1996 to 2004 average score of the rule of law from Kaufmann (1995). Countries are denoted by Worldbank country codes.

Figure 3 - Elevation and Institutions in Former Colonies and Non-Colonized Countries



Notes: The upper plot of Figure 3 presents the relation between the log of average elevation and the 1996 to 2004 average of the score for the "rule of Law" for former colonies. The lower plot of Figure 3 presents the same relation for countries that have not been colonized. In each plot, the solid line is the prediction of a simple OLS regression. Average elevation is from Parker (1997). The score for the rule of law

Figure 4 - Location and Colonizer Identity



Notes: The upper scatter plot of Figure 4 presents the relation between the relative distance from France and a British colony dummy. Relative distance from France is equal to the logarithm of the country's distance from France minus the logarithm of the country's distance from Britain. The lower scatter plot presents the relation between the absolute distance from France and Britain and a British colony dummy. Absolute distance from France and Britain is equal to the logarithm of the sum of the distances from France and Britain. The sample includes all countries that have either been French or British colonies. Countries are denoted by Worldbank country codes.