Unbundling Ex-Colonies: A Comment on Acemoglu, Johnson, and Robinson, 2001

Working Papers in Economics No 146
(September, 2004)

Ola Olsson

Department of Economics
Göteborg University
Box 640, Vasagatan 1, 405 30 Göteborg
SWEDEN
Email: Ola.Olsson@economics.gu.se,

Unbundling Ex-Colonies: A Comment on Acemoglu, Johnson, and Robinson (2001)

Ola Olsson*
Department of Economics,
Göteborg University
email: ola.olsson@economics.gu.se

August 30, 2004

Keywords: geography, institutions, development.
JEL Codes: N40, N50, P33.

1 Introduction

In their often cited article on the origins of comparative development, Daron Acemoglu, Simon Johnson, and James Robinson (henceforth AJR) (2001) argue that the quality of countries' institutions is the central factor behind the great international dispersion in levels of wealth. However, due to problems of reverse causality, econometric specifications that regress current levels of income per capita on cross-country institutional quality tend to be biased. In order to solve this problem, AJR (2001) introduce an instrumental variable that measures potential settler mortality from illnesses like malaria and yellow fever in former colonies. They also develop a theory of how differences in mortality among European settlers during colonial times explained the intensity of permanent European settlements, which in turn explained the quality of colonial institutions that are thought to have persisted to the present day.

In their regression exercises, AJR (2001) use data from Curtin (1989, 1998) and others on the mortality among mainly soldiers and bishops in 64

*I am very grateful to David Albouy and Robin Grier for sharing their data, Karin Gullon for research assistance, Daniela Andrén for SAS consultations, Arne Bigsten, C-J Dalgaard, Douglas Hibbs, Halvor Mehlum, Nathan Nunn and seminar participants at Göteborg University for useful comments. Malmstensstiftelsen has provided generous financial support.

former colonies during the period 1604-1848 and show that this measure is strongly correlated with current institutional quality. This settler mortality variable has also featured prominently in a number of related works by the authors, notably in AJR (2002) and in Acemoglu et al (2003), as well as in recent articles by other scholars (Easterly and Levine, 2003; Rodrik et al, 2004; Nunn, 2004). In a critical comment article, Albouy (2004) argues that AJR:s (2001) settler mortality measure is partially flawed and shows that when a revised series is used instead, AJR's (2001) analysis suffers from a 'weak instrument' problem that makes their results less robust. Finally, Glaeser et al (2004) provide a general critique of the institutional measures used in the literature and show that settler mortality might have had a stronger influence on human capital accumulation in the colonies than on institutions.

The argument made in this article is that AJR's (2001) approach of bundling colonies existing between 1500-1830 (Latin America) with colonies created after 1885 (Africa) into a single historical framework poses serious theoretical and empirical problems. From a theoretical point of view, it is commonly asserted among historians that the very heterogeneous process of colonizing the non-Western world can be described as having occurred in two major waves; an early 'mercantilist' wave with the colonization of the Americas as the central feature, and a much later 'imperialist' wave of colonization with the scramble for Africa as the key event (Fieldhouse, 1984; Osterhammel, 1997; Curtin, 1998). In between these two waves came the more gradual colonization of the far more developed Asian continent and of the future 'Neo-European' areas of Australia, Canada, New Zealand and the United States.

Among numerous differences between these three broad colonial episodes, the most important ones for AJR's (2001) argument is probably that during the first wave of mainly Spanish and Portuguese conquest in the 1500s, good capitalist institutions hardly existed even in Europe and therefore was not a feasible option for colonial policy regardless of disease environment. When the second wave of colonization started after 1885, on the other hand, fully developed capitalist institutions were certainly an alternative for Africa, but by this time, medical advances such as the use of quinine had dramatically reduced settler mortality in malaria and yellow fever and thus diminished the importance of disease environment for colonial policy. AJR's (2001) major source Curtin (1998) even argues that these strong advances in medicine - in particular between 1840 and 1860 - might have sparked the late colonization of the African continent. AJR's data for Africa, on the other hand, are from 1817-1848, i.e. largely before the 'revolution' in tropical medicine and about half a century before the big scramble.

With this historical background in mind, it is not surprising that when we disaggregate AJR's (2001) sample into a Latin American, an African, and an Asian and Neo-European group of countries, the hypothesis of a link

between disease environment and institutions is weak or rejected for the Latin American and African subsamples (which together constitute roughly 78 percent of all observations) whereas it works very well for the remaining former colonies. The same basic pattern emerges even more clearly with Albouy's (2004) revised settler mortality data. As a further check of robustness, we also try two alternative measures of institutional quality (*Rule of law* and *Social infrastructure).* AJR's (2001) theory then fares somewhat better for Africa, but there is no relationship at all for Latin America. Settler mortality is neither a good predictor of the intensity of European settlements in Africa. Lastly, when settler mortality is used as an instrument for institutional quality in IV-regressions with current income per capita as the dependent variable, it follows from above that no significant results are to be found in the Latin American and African subsamples.

Thus, although AJR's (2001) theory appears to have some explanatory power for institutional variation (and associated wealth) in Asia and in the 'Western offshoots', as well as between continents, it has a very small explanatory value for understanding comparative development within the world's two most underdeveloped continents. In the same vein as for instance Grier (1999), Sokoloff and Engerman (2000), Bertocchi and Canova (2002), and Nunn (2004), we therefore conclude that an unbundling of former colonies is a more reasonable approach for understanding the impact of colonialism on current levels of economic performance.

2 Two Waves of Colonization

Western colonialism is a highly heterogeneous process spanning almost four hundred years from Columbus to the second half of the twentieth century. Figure 1 shows the dates of colonization and decolonization (i.e. independence) for 76 former colonies in AJR's (2001) sample.[1] In this maze of events, two major clusters are clearly distinguishable. The first cluster in the lower-left corner shows 18 colonies in Latin America, created by the Spanish but also the Portuguese, between 1492-1541 and decolonized around 1820.[2] A primary motive for this early 'mercantilist' wave was the prospects of capturing gold and silver treasures. As colonial policy matured, the subsequent centuries saw a considerable number of Spanish and Portuguese settling down permanently in the acquired lands. The mature part of the

[1] For the great majority of countries, we have used Grier's (1999) data on dates of colonization and decolonization. When there were no available dates, we have consulted CIA (2003). The data is presented in the Data Appendix.

[2] Latin America here refers to all countries in America except Canada and the United States. It might be argued that for instance Guyana, colonized between 1814-1966, and Haiti (1697-1984) should fall into another sub-category. However, we believe that it is reasonable to categorize these countries as Latin American nonetheless since they obviously have been greatly influenced by their Spanish and Portuguese speaking neighbors.

mercantilist phase also included the establishment of the Caribbean plantation economy by other colonial powers around 1650 which depended on the mass importation of black slaves from West Africa (Osterhammel, 1997). The African slaves were traded from a few Atlantic ports and never involved any penetration of the African interior.

Between 1776 and 1830, the Western colonial empires in America were almost completely dismantled and the majority of the Latin American colonies became independent. The British terminated slavery in 1809, which substantially weakened the Western powers' interest in West Africa (Curtin, 1989). A few dispersed colonies in Africa, Asia, and the Neo-European lands were set up between 1750-1850. However, as can be inferred from Figure 1, the great new wave started just after 1880 with the emergence of 30 new colonies, the great majority (26) in Africa. The 'imperialist' race for the African continent started and received its basic ground rules in the infamous Berlin conference of 1885.[3] A brief colonial epoch then proceeded until around 1960 when almost all African countries got their independence.

The major argument in this section is that the two colonial eras were very different in nature, probably too different to be modelled as one integrated process, driven by one variable (settler mortality) as in AJR (2001). Although all broad generalizations can be problematic, we propose that the two major colonial eras had the following central differences: (1) *Supply of favorable institutions*, (2) *disease environment,* and (3) *supply of potential settlers.* By the time of mercantilist colonialism in the sixteenth and seventeenth centuries, strong rules of private property or for the constraint of the executive were not to be found anywhere in Europe. As documented by AJR (2004), the constraints on the executive were somewhat stronger in England and in the Netherlands by 1500 than in Spain and Portugal, but private property rights were generally weak and monarchs absolutist. Not until the later half of the seventeenth century did institutional development take off in England and in the Netherlands, although really strong capitalist institutions were probably not in place even there until the nineteenth century (North, 1990; AJR, 2004).[4] Hence, for the mainly Spanish and Portuguese colonists during the mercantilist era, a choice between 'extractive' and 'productive' institutions - supposedly influenced by disease environment - does not seem to have been in place.

By 1885, however, the situation was very different. The Industrial Revolution had fundamentally changed Western societies and strong private property rights and constraints against the executive were more or less generally accepted in the major colonial powers. A discriminatory colonial

[3] See for instance Pakenham (1991) for an account of these events.

[4] In England, the Glorious Revolution of 1688 is commonly believed to be a milestone for the development of stronger constraints against the executive. In the Netherlands, independence from the Habsburg empire in 1648 appears to be an equally important event (AJR, 2004).

policy giving favorable institutions to those colonies where the disease environment was kind to Western settlers, would certainly have been possible. Yet, by this time, the disease environment had drastically changed.

(2) *Disease environment.* Mercantilist colonial strategies were probably to some extent influenced by settler mortality, but probably even more so by the devastating mortality among the indigenous population in smallpox and other diseases introduced by Westerners. In for instance Mexico, the size of the Indian population is believed to have plummeted from about 20 million by the time of Cortés' arrival in 1520 to 1.5 million in 1620 (Diamond, 1997, p 210). During the imperialist era, on the other hand, the discovery of quinine and other medical practices between 1840-60 meant that late nineteenth century colonialism appears to have been relatively unconstrained by disease (Curtin, 1998).[5] The data used by AJR (2001) on settler mortality in Africa are mostly from 1817-1848 and their relevance for understanding the scramble for Africa, starting after 1885, is therefore questionable.[6]

(3) *Supply of settlers.* The mercantilist wave included a great number of people who wished to escape land shortage in agricultural, pre-industrial Europe and who sought to escape political repression, religious persecution, or even prison sentences. Imperialist colonialism started when many of the great powers had experienced several decades of industrialization which had soaked up much of the supplies of rural, surplus labor. Those who were still willing to leave Europe had superior alternatives in the expanding and already established 'settler economies' of North America, New Zealand, and Australia. Another fact worth mentioning is that AJR's (2001) major measure of European settlements focuses on the year 1900, i.e. before 12 of the African countries had been colonized at all (see Data Appendix).

We might thus make the following hypotheses: Firstly, the non-existence of good institutions in Europe during the mercantilist era should imply that the relationship between settler mortality and institutions is weak for Latin America. Secondly, the revolution is tropical medicine in mid-nineteenth century seems to suggest that colonial policy in Africa was not as much affected by the disease environment as AJR (2001) claim and that the relationship between settler mortality and institutions might be weak also for Africa. Thirdly, the late colonization of Africa should mean that the link be-

[5] In for instance Algeria, the annual mortality among French troops fell from 81 per thousand soldiers in 1836-46 to 22 deaths per thousand in 1859-67, implying a decrease in mortality of 73% during just two decades. The rapid decline in mortality continued ever after 1860. In French West Africa, annual mortality fell from 164 per thousand soldiers in 1819-38 to below 7 deaths per thousand in 1909-13, i.e. a reduction by 93%. Data for British West Africa and South Africa show similar developments (Curtin, 1989, Tables 1.1 and 1.8).

[6] For some African countries, AJR (2001) use later data: Egypt (1882), Sudan (1885), Mali (1878), and Niger (1880-83). See Albouy (2004) for a careful discussion of the settler mortality data and for revised estimates.

tween settler mortality and AJR's (2001) measure of European settlements is weak. Fourthly, the problems related above should imply that settler mortality is a weak instrument for institutions in the Latin American and African subsamples.

3 A Disaggregated Empirical Analysis

The brief empirical analysis in this section disaggregates AJR's (2001) data on settler mortality, institutional quality, and the level of European settlements in 1900 into a Latin American, an African and an Asian/Neo-European subsample in order to test our hypothesis outlined above. We have already discussed the logic behind breaking out the Latin American and African colonies. The last category of countries - consisting of only 14 geographically and historically (see Figure 1) dispersed colonies - have in common that they were either 'settler economies' or 'Western offshoots' such as Australia, Canada, Hong Kong, New Zealand, Singapore, and the United States, or that they were built upon already existing, advanced Old World state formations such as those of India (including Pakistan, Bangladesh, and Sri Lanka), Laos, Malaysia, and Myanmar (Burma). Malta is also included in this category since it is arguably a part of Europe.

The two key variables in AJR (2001) and in this section are *Log settler mortality* and *Risk of expropriation*. Log settler mortality is the natural logarithm of a measure of settler mortality among soldiers and bishops in Western colonies between 1604-1848, extracted mainly from Curtin (1989). It shows the annual number of deaths in malaria and yellow fever per 1000 people and is, to our knowledge, available for 76 countries. Albouy (2004) has produced a revised series of settler mortality that corrects some factual errors and makes alternative interpretations of Curtin's data. This variable is also used below. Risk of expropriation is AJR's (2001) main institutions variable, believed to capture the general quality of relevant economic institutions. It measures the average risk of expropriation during the years 1985-95 with higher scores indicating a lower risk (i.e. better institutions). The variable is available for 64 countries that therefore make up the base sample, specified in AJR, 2001, Appendix Table A2.

As a start, we establish that a strong relationship between the quality of institutions and income per capita indeed exists in all three subsamples. Figure 2 shows the linear relationship between Risk of expropriation and Log GDP per capita in 1995 with the estimated equation stated. Although the slope coefficients vary from 0.3 (Africa) to 0.68 (Asia/Neo-Europe), the positive parameter is significant in all three subsamples.

Table 1 then reports the results from OLS regressions using Risk of expropriation as the dependent variable and the two measures Log settler mortality I (AJR, 2001) and Log settler mortality II (Albouy, 2004) as inde-

pendent variables. Starting with column (1), we replicate the key result in AJR (2001, Table 3, Column 9) that when all 64 former colonies from AJR's base sample are included, there is a strong and highly significant relationship between Log settler mortality I and Risk of expropriation. In Columns (2)-(4), we then investigate the relationship within our three 'continental' subsamples, neither of which are presented in AJR (2001).[7] The scatter plots for these regressions are shown in Figure 3. As our threoretical conjecture suggested, it appears that the relationship is weak and insignificant for both Latin America and Africa but quite strong for Asia/Neo-Europe. In particular, the R^2-value for the 27 African observations is very low (0.015), indicating that Log settler mortality has at best a very modest explanatory power for understanding the variation in Risk of expropriation.[8] Note also the great proportional difference in the slope parameters of Africa and Asia/Neo-Europe. This pattern becomes even stronger when we instead use Albouy's (2004) revised Log settler mortality II as the independent variable. This time, apart from having insignificant slope estimates, R^2 for Africa is too small to measure and the corresponding figure for Latin America shrinks to 0.034.

To test the robustness of this continental heterogeneity, we use two other measures of institutional quality as dependent variables in Table 2. The first is called *Rule of law* and has been compiled by researchers at the World Bank, using 25 separate data sources from 18 organizations for the year 1996 (Kaufmann et al, 2003). The basic data set presents an additional five indicators of governmental quality, but we believe that the measure Rule of Law is the one that is most similar to AJR's Risk of expropriation since strength of property rights is explicitly included. We have normalized the variable to range between 0 and 10. The other measure is *Social infrastructure* and is taken from Hall and Jones (1999). The inclusion of these two variables makes it possible to extend our sample to 74 and 73 countries respectively.

Panels A and B display basic results that are at first sight more conducive to AJR's (2001) hypothesis. When Rule of law and Social infrastructure are used as dependent variables for the extended samples, Log settler mortality has negative and strongly significant estimates in columns (1) and (5) and the R^2:s are actually much higher than for the base sample in Table (0.372 and 0.34 versus 0.274). But as before, the fit is extremely weak for Latin America in columns (2) and (6), suggesting no relationship at all. Interestingly, the negative estimates for Settler mortality in the African colonies turn out to be moderately significant in Panel A, column (3), as well as in Panel B, column (7). Hence, the use of these alternative measures of institutional

[7] AJR (2001, Table 4) choose to show the relationship within other subsamples such as the base sample without Africa and the base sample without Neo-Europes.

[8] AJR (2001) recognize this in footnote 21: "...we conclude that the relationship between settler mortality and institutions is weaker within Africa".

quality seem to provide a stronger case for the notion that settler mortality had an influence on institutions in Africa. However, it is noteworthy that in both panels the slope coefficient for Africa is proportionally far lower in absolute terms than in the Asian/Neo-European subsample. Our conclusion from this is that the nature of the relationship is very different across continents and types of colonization and that it is far weaker in Latin America and in Africa than in Asia/Neo-Europe.

In Table 3, we then introduce *European settlements in 1900* as an intervening variable, just as AJR (2001, Table 3) do. This variable measures the fraction of the country's population that was of European descent in the year 1900. Panel A, column (1) shows the effect of Log settler mortality on the proportion of European settlements for the whole extended sample. Just like AJR (2001), we receive a strong and significant negative effect.[9] The negative coefficient falls drastically and becomes insignificant for the Latin American colonies in column (2). The estimate for Africa is close to zero (albeit significant) in column (3). As before, the Asia/Neo-Europe subsample shows a strong statistical relationship, this time between settler mortality and European settlements.

It is worth pointing out, however, that the African subsample of 36 colonies contains 27 that score 0 and that only three early colonies have a European share of its population of more than 5 percent (Angola 0.08, Algeria 0.13, and South Africa 0.22). There is thus severe problems of outlier influence as well as of heteroskedasticity in the regression.[10] The reason why so many African countries had no European population in 1900 is of course that they were not usually colonized until the 1890s, and as many as 12 African colonies were not properly colonized until after 1900 (see Data Appendix). The significant result for Africa in Panel A is therefore to some extent misleading.

When we use Risk of expropriation as the dependent variable and European settlements in 1900 as the independent as in Panel B, columns (5)-(8), the same typical pattern repeats itself. European settlements has a positive and significant impact on institutional quality for the full sample and for Asia/Neo-Europe, but is insignificant for Africa. The relationship is weak but significant at the 0.1 level for Latin America. Once again, we see that the explanatory power of AJR's underlying model varies systematically across continents and colonial histories.

Lastly, we have performed the same or similar 2SLS specifications as in AJR (2001, Table 4) in Table 4. The dependent variable is Log of GDP per capita in 1995 and Log settler mortality is used as an instrumental variable for Risk of expropriation in order to address the problem of reverse causality. Like AJR (2001), we have included a geographical variable *Distance from*

[9] We use 75 observations whereas AJR (2001) use 73.

[10] A White-test rejects the null hypothesis of no heteroskedasticity with $p < 0.01$.

the equator in these specifications which measures distance from equator in absolute latitude degrees.[11] This measure has no significant coefficients either in the first-stage regression or in the second stage regression.

The key result from Table 4 is that when we disaggregate the sample into three continental subsamples as before, Log settler mortality works very well as an instrument for institutional quality in the base sample and in the Asia/Neo-Europe cluster whereas it proves to be an inadequate instrument for the African subsample. All coefficients in (5)-(6) are insignificant, which is hardly surprising given the already documented poor fit in the first-stage of the regression.

In the second stage, the estimate for Risk of expropriation is close to being significant in the Latin American samples, which at first sight is somewhat surprising. However, as demonstrated by Zivot et al (1998) and as discussed by Albouy (2004) in conjunction with AJR (2001), an insignificant relationship in the first stage means that the 'weak instrument'-problem arises in the second stage. Among other things, this property implies that conventional calculations of confidence intervals for the second stage estimate based on the Wald statistic are invalid. If an 'AR statistic' is used instead to calculate confidence intervals in the Latin American specifications, we fail to reject the null hypothesis that the second stage estimates for settler mortality are different from zero.[12]

Therefore, regardless of whether we treat settler mortality as a variable that affects institutions through a specific causal chain as suggested by AJR, or if we simply treat it as an instrument for institutions with some nice statistical properties in regressions of cross-country differences in income per capita, we are left with the conclusion that the IV approach works poorly if at all for Latin America and Africa.

4 Conclusions

In this brief comment on AJR (2001), we have argued that a bundling of all former colonies into one 'colonial' theory of comparative development is problematic for several reasons. Firstly, it seems quite reasonable that colonies that were created and dismantled during the so-called mercantilist era of 1500-1830 (mainly Latin America) should have followed a rather different historical trajectory than colonies created after 1885 during the imperialist wave (mainly Africa). The most important differences between

[11] AJR (2001) use a similar measure called *Latitude,* based on latitudinal degrees but normalized to range between 0 (at the equator) and 1.

[12] The AR statistic is attributed to and described by Anderson and Rubin (1949). The lack of significance of Settler mortality in the first stage regression of the Latin American sample means that the confidence region calculated according to the AR procedure is unbounded in both directions. This means that the confidence region includes zero. See Albouy (2004) for a more detailed econometrical exposition.

the two eras are probably that in the 1500s, favorable institutions hardly existed anywhere in Europe and particularly not in the colonizing nations Spain and Portugal. When Africa was colonized after 1885, on the other hand, the Industrial revolution had dramatically improved the strength of capitalist institutions in the Western world whereas advances in tropical medicine during the middle of the nineteenth century had greatly reduced settler mortality in illnesses like malaria and yellow fever. These circumstances led us to suspect that the statistical relationship between settler mortality and institutional quality was not so strong when the sample is disaggregated on the basis of history.

In line with our predictions, it turns out that the relationship is very weak for the Latin American and African subsamples whereas it is quite strong for the Asian/Neo-European subsample. When alternative measures of institutional quality or settler mortality are used and the sample of countries is extended, the same basic pattern prevails, although AJR's (2001) theory receives somewhat stronger support for Africa. A natural consequence of the lack of fit in the first stage is further that 2SLS regressions that use settler mortality as an instrument for AJR's (2001) institutional measure provide no significant results for the Latin American and African subsamples.

Our results suggest that one should be very cautious about drawing conclusions about Latin America and Africa on the basis of the general theory in AJR (2001). On the one hand, it seems plausible that the high average settler mortality rates in Latin America and Africa might explain why both continents tend to have weaker institutions on average than other continents. On the other hand, settler mortality turns out to be a poor predictor of institutional quality within Latin America and Africa. Future empirical analyses in this tradition would therefore probably benefit from treating the early 'mercantilist' and the late 'imperial' colonies separately, as argued by some existing works.

References

[1] Acemoglu, D., S. Johnson and J.A. Robinson (2001) "The Colonial Origins of Comparative Development: An Empirical Investigation" *American Economic Review* 91(5): 1369-1401.

[2] Acemoglu, D., S. Johnson and J.A. Robinson (2002) "Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution", *Quarterly Journal of Economics* 117(4): 1231-1294.

[3] Acemoglu, D., S. Johnson and J.A. Robinson (2004) "The Rise of Europe: Atlantic Trade, Institutional Change and Economic Growth", *in press.*

[4] Acemoglu, D., S. Johnson, J.A. Robinson, and Y. Tchaicharoen (2003) "In-

stitutional Causes, Macroeconomic Symptoms: Volatility, Crises, and Growth", *Journal of Monetary Economics* 50: 49-123.

[5] Albouy, D. (2004) "The Colonial Origins of Comparative Development: A Reinvestigation of the Data" UC Berkeley, *mimeo.*

[6] Anderson, T. and H. Rubin (1949) "Estimation of the Parameters of a Single Equation in a Complete System of Stochastic Equations", *Annals of Mathematical Statistics, Econometrica*, 1009-1028.

[7] Bertocchi, G. and F. Canova (2002) "Did Colonization Matter or Growth? An Empirical Exploration Into the Historical Causes of Africa's Underdevelopment", *European Economic Review* 46, 1851-1871.

[8] CIA (2003) *The World Factbook 2003.* <http://www.cia.gov/cia/publications/factbook/index.html>, accessed 1 March, 2004.

[9] Curtin, P.D. (1989) *Death by Migration: Europe's Encounter With the Tropical World in the Eighteenth Century.* Cambridge University Press.

[10] Curtin, P.D. (1998) *Disease and Empire: The Health of European Troops in the Conquest of Africa.* Cambridge University Press.

[11] Diamond, J. (1997) *Guns, Germs and Steel: The Fates of Human Societies.* London: W W Norton & Company.

[12] Easterly, W. and R. Levine (2003) "Tropics, Germs, and Crops: How Endowments Influence Economic Development", *Journal of Monetary Economics* 50: 3-39.

[13] Fieldhouse, D.K. (1984) *Economics and Empire* - 1830-1914. London: MacMillan Publishers.

[14] Glaeser, E., R. la Porta, F. Lopez-de-Silanes, and A. Shleifer (2004) "Do Institutions Cause Growth?" *NBER Working Paper* No. 10568.

[15] Grier, R. (1999) "Colonial Legacies and Economic Growth", *Public Choice* 98: 317-335.

[16] Hall, R. and C.I. Jones (1999) "Why Do Some Countries Produce So Much More Output Than Others?" *Quarterly Journal of Economics* 114(1): 83-116.

[17] Kaufmann, D., A. Kraay, and M. Mastruzzi (2003) "Governance Matters III: Governance Indicators for 1996-2002" *World Bank Research Working Paper.*

[18] North, D. (1990) *Institutions, Institutional Change and Economic Performance.* Cambridge University Press.

[19] Nunn, N. (2004) "Slavery, Institutional Development, and Long-Run Growth in Africa, 1400-2000", University of Toronto, *mimeo.*

[20] Osterhammel, J. (1997) *Colonialism: A Theoretical Overview.* Princeton: Markus Wiener Publishers.

[21] Pakenham, T. (1991) *The Scramble for Africa: 1876-1912*. London: Weidenfeld & Nicolson.

[22] Rodrik, D., A. Subramanian and F. Trebbi (2004) "Institutions Rule: The Primacy of Institutions Over Geography and Integration in Economic Development" forthcoming in *Journal of Economic Growth 9* (June).

[23] Sokoloff, K.L. and S.T. Engerman (2000) "History Lessons: Institutions, Factor Endowments, and Paths of Development in the New World" *Journal of Economic Perspectives* 14(3): 217-232.

[24] Zivot, E., R. Startz, and C.R. Nelson (1998) "Valid Confidence Intervals and Inference in the Presence of Weak Instruments" *International Economic Review* 39(4): 1119-1143.

Table 1: OLS estimates of institutional quality in former colonies.

	Dependent variable: Risk of expropriation (AJR, 2001)						
	(1) Base sample	(2) Latin America[a]	(3) Africa	(4) Asia and Neo-Europe[b]	(5) Latin America[a]	(6) Africa	(7) Asia and Neo-Europe[b]
Intercept	9.37*** (0.61)	9.77*** (2.88)	6.54*** (1.11)	11.73*** (1.16)	8.68*** (2.66)	5.73*** (1.30)	12.42*** (1.94)
Log settler mortality I (AJR, 2001)	-0.613*** (0.13)	-0.76 (0.65)	-0.12 (0.20)	-1.13*** (0.33)			
Log settler mortality II (Albouy, 2004)					-0.52 (0.61)	0.03 (0.25)	-1.09** (0.46)
N	64	23	27	14	23	27	14
R^2	0.274	0.061	0.015	0.493	0.034	0.000	0.317

Note: In parenthesis are standard errors. Log Settler Mortality I is the main measure used by AJR (2001) whereas Log Settler Mortality II is the revised series created by Albouy (2004). The superscript *** denotes a p-value smaller than 0.01, ** denotes a p-value smaller than 0.05, and * denotes a p-value smaller than 0.1.

[a] Includes all American colonies in the base sample except Canada and USA.

[b] Includes the 9 Asian colonies in the base sample plus Malta plus the neo-European colonies Australia, Canada, New Zealand, and USA.

Table 2: OLS regressions using alternative measures of institutional quality

	Panel A Dependent variable: Rule of law (Kaufmann et al, 2003)				Panel B Dependent variable: Social infrastructure (Hall and Jones, 1999)			
	(1) Extended sample[c]	(2) Latin America	(3) Africa	(4) Asia and Neo-Europe	(5) Extended sample[d]	(6) Latin America	(7) Africa	(8) Asia and Neo-Europe
Intercept	8.48***	5.55**	6.05***	12.27***	8.64***	4.67	4.87***	13.17***
	(0.62)	(2.65)	(0.96)	(1.50)	(0.81)	(3.68)	(1.01)	(2.63)
Log settler mortality I (AJR, 2001)	-0.83***	-0.21	-0.39**	-1.80***	-1.02***	-0.12	-0.37**	-2.19**
	(0.13)	(0.60)	(0.17)	(0.43)	(0.17)	(0.84)	(0.18)	(0.78)
N	74	25	34	15	73	24	35	14
R^2	0.367	0.005	0.139	0.576	0.340	0.001	0.112	0.397

Note: In parenthesis are standard errors. The superscript *** denotes a p-value smaller than 0.01, ** denotes a p-value smaller than 0.05, and * denotes a p-value smaller than 0.1.

[c] Includes the base sample of 64 countries minus Cameroon plus Barbados, Benin, Burundi, Central African Republic, Chad, Guinea-Bissau, Mauritania, Mauritius, Myanmar, Rwanda, and Surinam.

[d] Identical to the extended sample in Panel B but excludes Bahamas and Vietnam.

Table 3: OLS regressions with European settlements in 1900 as an intervening variable.

	Panel A Dependent variable: European settlements				Panel B Dependent variable: Risk of expropriation			
	(1) Extended sample [e]	(2) Latin America	(3) Africa	(4) Asia and Neo-Europe	(5) Base sample	(6) Latin America	(7) Africa	(8) Asia and Neo-Europe
Log settler mortality I (AJR, 2001)	-0.10***	-0.005	-0.018***	-0.307***				
	(0.02)	(0.08)	(0.006)	(0.097)				
European settlements in 1900					3.27***	2.39*	4.63	2.70***
					(0.61)	(1.35)	(4.84)	(0.74)
N	75	25	36	14	64	23	28	13
R^2	0.263	0.000	0.229	0.457	0.314	0.130	0.034	0.548

Note: In parenthesis are standard errors. The superscript *** denotes a p-value smaller than 0.01, ** denotes a p-value smaller than 0.05, and * denotes a p-value smaller than 0.1. Intercepts are not reported.

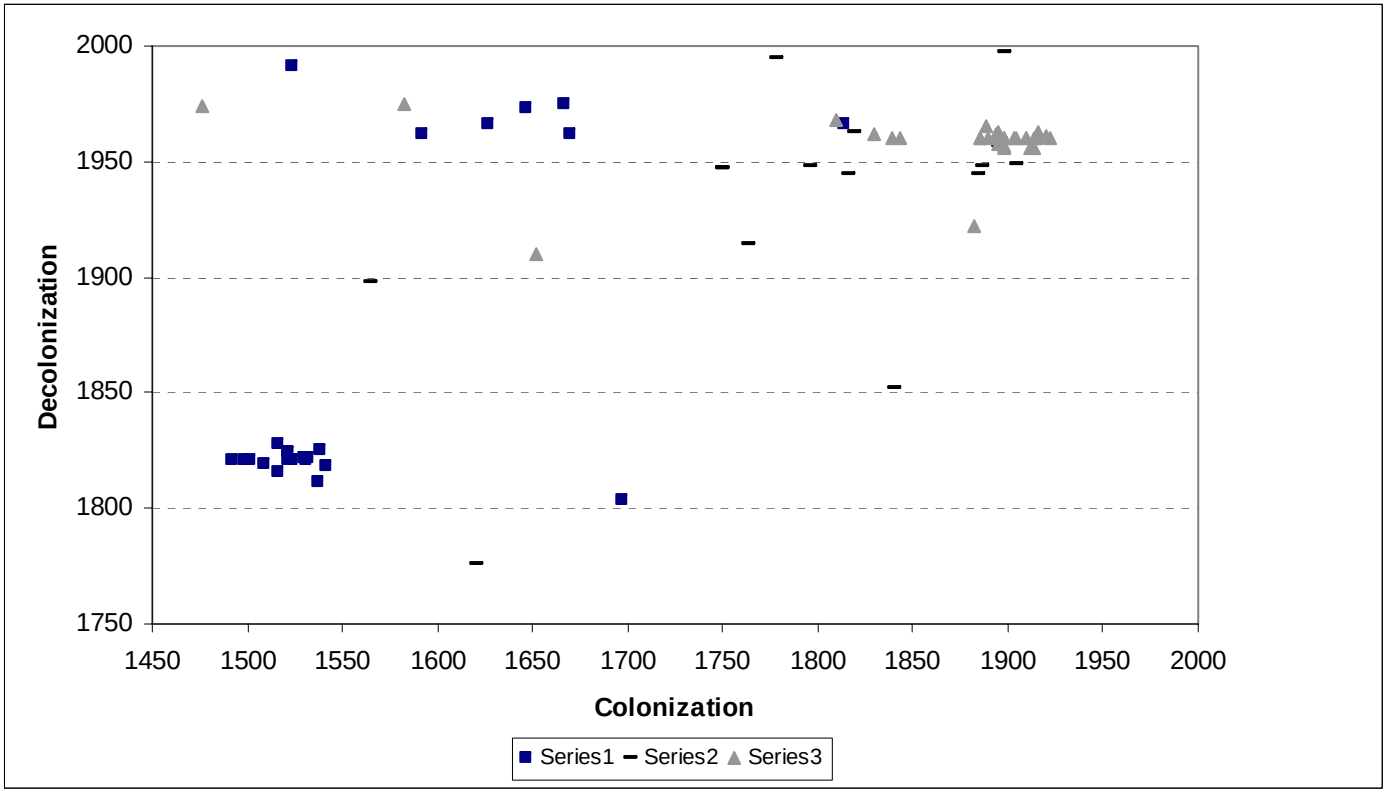
[e] Includes the base sample of 64 countries minus Malta plus Barbados, Benin, Burundi, Central African Republic, Chad, Djibouti, Guinea-Bissau, Mauritania, Mauritius, Myanmar, Rwanda, and Surinam.

Table 4: 2SLS regressions of log GDP per capita.

	(1) Base sample	(2) Base sample	(3) Latin America	(4) Latin America	(5) Africa	(6) Africa	(7) Asia and Neo-Europe	(8) Asia and Neo-Europe
Panel A: Two-stage least squares								
Risk of expropriation	0.92 (0.15)	0.94 (0.21)	0.465 (0.279)	0.468 (0.274)	2.00 (2.955)	4.75 (43.67)	0.953 (0.211)	1.015 (0.258)
Distance from equator		-0.0026 (0.014)		0.010 (0.010)		-0.077 (1.046)		-0.010 (0.020)
Panel B: First-stage regressions for Risk of expropriation								
Log settler mortality I (AJR, 2001)	-0.613 (0.13)	-0.528 (0.145)	-0.762 (0.650)	-0.768 (0.650)	-0.12 (0.20)	-0.023 (0.226)	-1.13 (0.33)	-1.158 (0.393)
Distance from equator		0.019 (0.016)		-0.025 (0.024)		0.023 (0.025)		-0.004 (0.028)
N	64	64	23	23	27	27	14	14
R^2	0.274	0.290	0.061	0.107	0.015	0.046	0.493	0.494

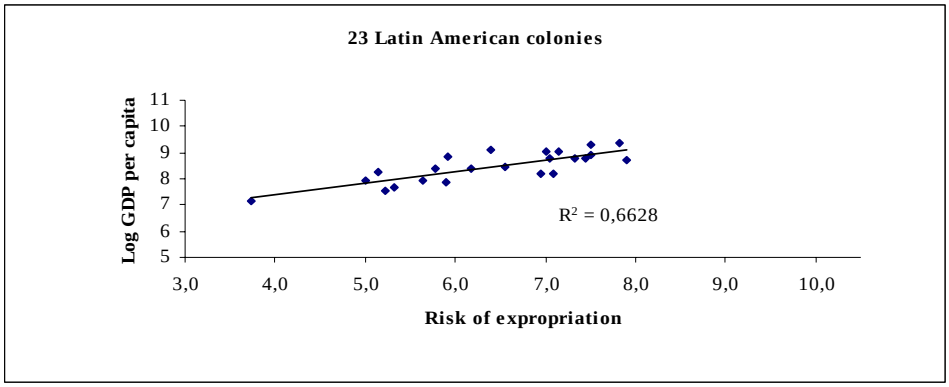
Note: In parenthesis are standard errors. Panel B shows the first-stage regression whereas Panel A shows the second-stage regression with Log settler mortality I alone and together with Distance from equator as instruments for Risk of expropriation.

Figure 1: Dates of colonization and decolonization for 76 former colonies in AJR's (2001) sample.

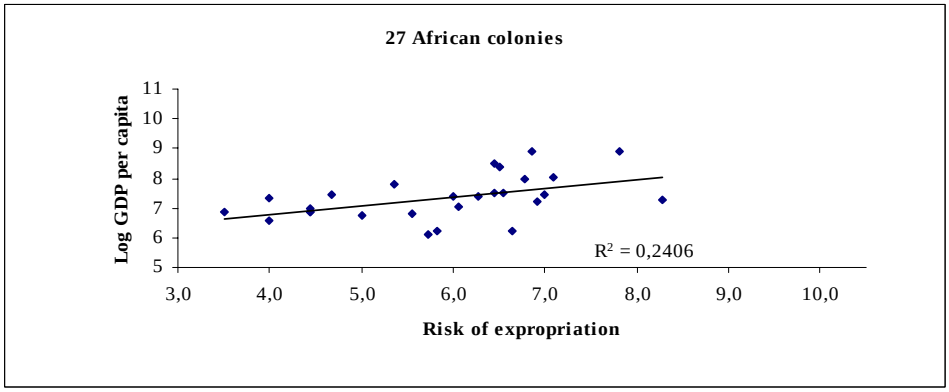


Note: Series 1 shows 26 Latin American countries, Series 2 shows 16 Asian or Neo-European countries, and Series 3 shows 34 African countries.
Sources: Data used and communicated by Grier (1999). When there were missing observations, we extracted dates from CIA (2003).

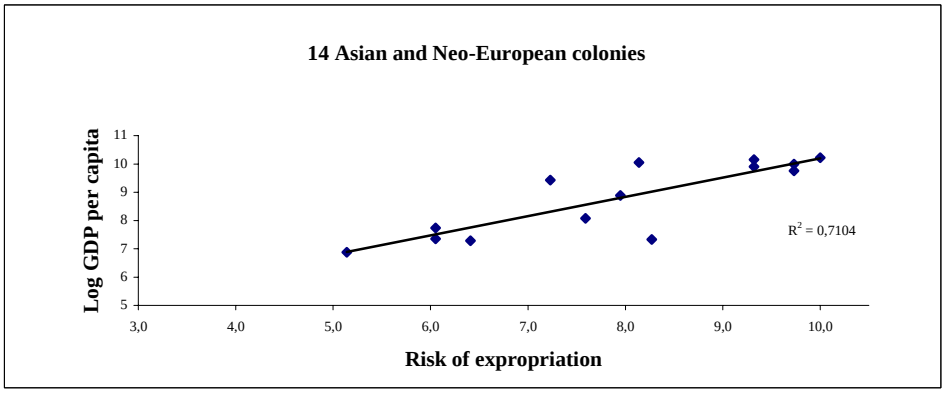
Figure 2: OLS relationship between Log GDP Per Capita and Risk of Expropriation for three subsamples.



Note: The estimated coefficients for the regression equation above (with standard errors in parenthesis) is Log GDP per capita = 5.63 (0.45) + 0.44 (0.07) x Risk of expropriation.

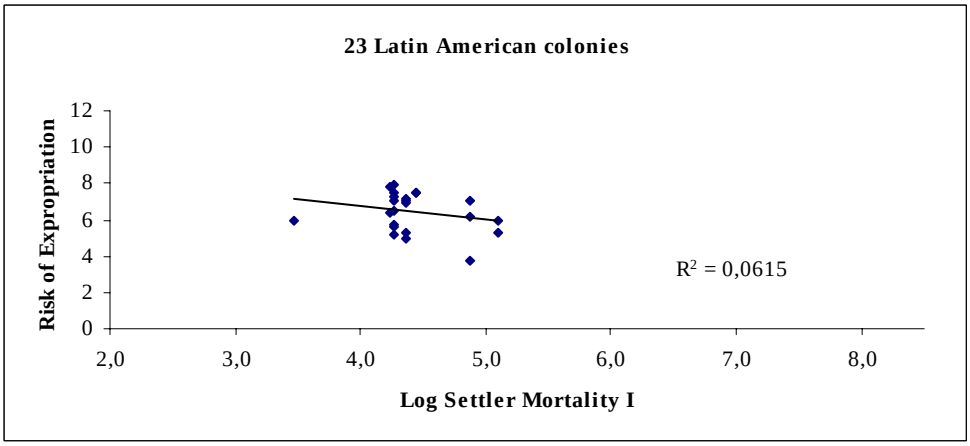


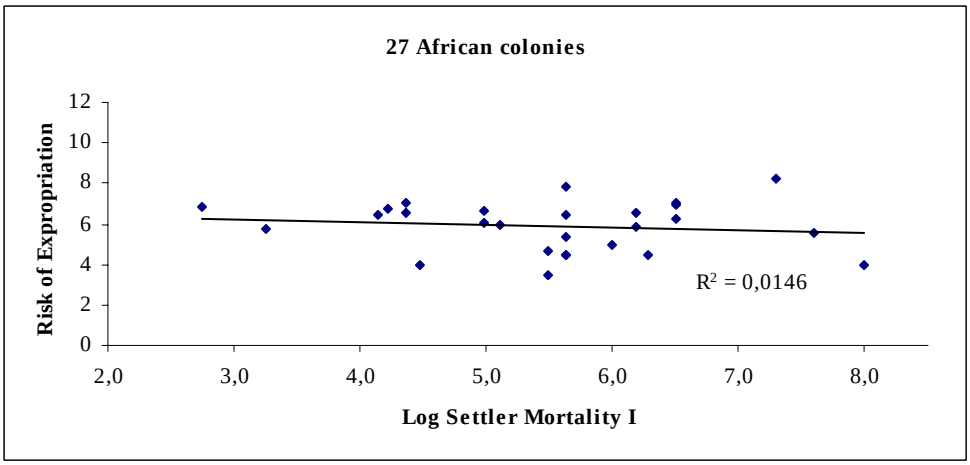
Note: The estimated coefficients for the regression equation above (with standard errors in parenthesis) is Log GDP per capita = 5.58 (0.63) + 0.30 (0.11) x Risk of expropriation.

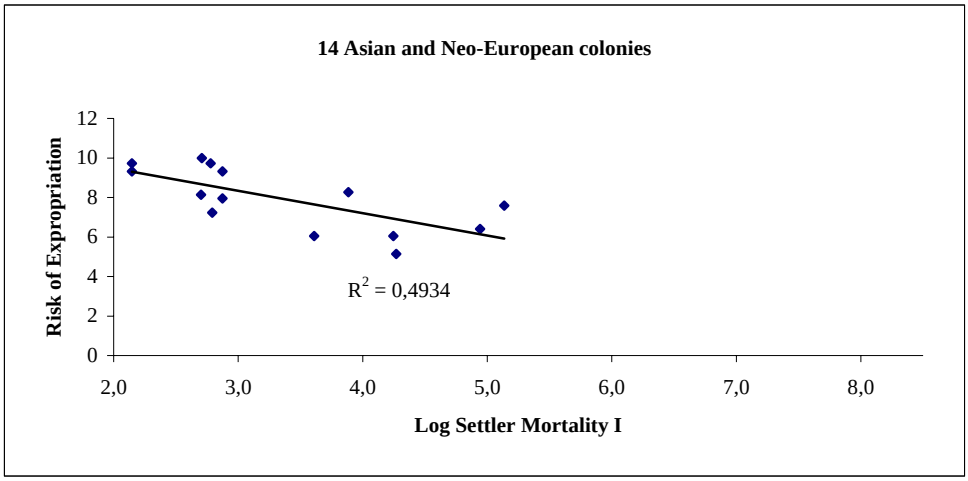


Note: The estimated coefficients for the regression equation above (with standard errors in parenthesis) is Log GDP per capita = 3.39 (1.01) + 0.68 (0.13) x Risk of expropriation.

Figure 3: OLS relationship between Risk of Expropriation and Log Settler Mortality for three subsamples.







Data Appendix

Country	Year of Colonization	Year of Independence	Source
Latin America			
Argentina	1516	1816	Grier (1999)
Bahamas	1647	1973	CIA (2003)
Barbados	1627	1966	Grier (1999)
Belize	1524	1991	CIA (2003)
Bolivia	1538	1825	Grier (1999)
Brazil	1532	1822	Grier (1999)
Chile	1541	1818	Grier (1999)
Colombia	1509	1819	Grier (1999)
Costa Rica	1521	1821	Grier (1999)
Dominican Rep	1492	1821	CIA (2003)
Ecuador	1530	1822	Grier (1999)
El Salvador	1524	1821	Grier (1999)
Guatemala	1523	1821	Grier (1999)
Guyana	1814	1966	Grier (1999)
Haiti	1697	1804	Grier (1999)
Honduras	1524	1821	Grier (1999)
Jamaica	1670	1962	Grier (1999)
Mexico	1521	1824	Grier (1999)
Nicaragua	1521	1824	Grier (1999)
Panama	1502	1821	Grier (1999)
Paraguay	1537	1811	Grier (1999)
Peru	1531	1821	Grier (1999)
Surinam	1667	1975	CIA (2003)
Trinidad	1592	1962	CIA (2003)
Uruguay	1516	1828	Grier (1999)
Venezuela	1498	1821	Grier (1999)
Asia and Neo-Europe			
Australia	1778	1995	Grier (1999)
Bangaladesh	1750	1947	CIA (2003)
Canada	1763	1914	Grier (1999)
Hong Kong	1898	1997	Grier (1999)
India	1750	1947	Grier (1999)
Indonesia	1816	1945	Grier (1999)
Laos	1904	1949	CIA (2003)
Malaysia	1895	1957	Grier (1999)
Myanmar	1886	1948	CIA (2003)
New Zealand	1840	1852	Grier (1999)
Pakistan	1750	1947	Grier (1999)
Phillipines	1565	1898	Grier (1999)
Singapore	1819	1963	CIA (2003)
Sri Lanka	1796	1948	Grier (1999)

USA	1620	1776	Grier (1999)
Vietnam	1884	1945	CIA (2003)
Africa			
Algeria	1830	1962	Grier (1999)
Angola	1583	1975	Grier (1999)
Benin	1904	1960	Grier (1999)
Burkina Faso	1898	1960	CIA (2003)
Burundi	1916	1962	Grier (1999)
Cameroon	1885	1960	CIA (2003)
Central African Republic	1890	1960	Grier (1999)
Chad	1910	1960	Grier (1999)
Congo-Brazzaville	1910	1960	Grier (1999)
Cote d'Ivoire	1843	1960	Grier (1999)
Egypt	1882	1922	Grier (1999)
Gabon	1839	1960	Grier (1999)
Gambia	1889	1965	Grier (1999)
Ghana	1898	1957	Grier (1999)
Guinea	1895	1958	Grier (1999)
Guinea-Bissau	1476	1974	Grier (1999)
Kenya	1895	1963	Grier (1999)
Madagascar	1895	1960	Grier (1999)
Mali	1898	1960	Grier (1999)
Mauritania	1903	1960	Grier (1999)
Mauritius	1810	1968	Grier (1999)
Morocco	1912	1956	CIA (2003)
Niger	1922	1960	Grier (1999)
Nigeria	1914	1960	Grier (1999)
Rwanda	1916	1963	Grier (1999)
Senegal	1895	1960	Grier (1999)
Sierra Leone	1896	1961	Grier (1999)
South Africa	1652	1910	CIA (2003)
Sudan	1898	1956	CIA (2003)
Tanzania	1920	1961	Grier (1999)
Togo	1915	1960	Grier (1999)
Tunisia	1914	1956	Grier (1999)
Uganda	1894	1962	Grier (1999)
Zaire	1885	1960	Grier (1999)