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Jacek Rostowski, Bogdan Stacescu

The Wig and the Pith Helmet – the Impact of "Legal School" versus Colonial Institutions on Economic Performance

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Abstract

Institutions are believed to play a crucial role in economic development and to explain a large share of the observed long-term variability in economic performance among countries. We try to find deep institutional variables which affect economic growth, but which are not themselves determined by economic performance. To this end, we test whether the "legal school" a country belongs to has an effect on its economic growth, as hypothesised by La Porta et al. Controlling for the standard environmental variables, we find that it does.

However, we also find that the impact of "colonial origin" on economic growth is statistically stronger than that of "legal school". Moreover, when "colonial origin" is controlled for, the impact legal school on growth is not statistically significant. This is important, as we only test for differences between former British and French "colonies of extraction". These are likely to be less important than those between "colonies of extraction" and "colonies of settlement" discussed by Acemoglu et al.

We also control for the incidence of malaria, and find that it does not affect our conclusions. Both malaria and institutional origin affect growth. However, there is quite strong evidence that the incidence of malaria is endogenous to economic development.

1. Economic performance and the role of institutions

Why different economies grow at different rates is one of the most important questions in economics. Barro's (1991) classical paper on economic growth across the world introduced dummies for sub-Saharan Africa and Latin America, and found that their coefficients were significant, but did not explain why this was the case. Many empirical studies show that so-called 'total factor productivity' accounts for most of the observed cross-country variations in income levels, yet, although it may well be more important than the accumulation of capital, population growth and even educational improvement, productivity is "the unexplained part of economic growth" (Easterly and Levine, 2002).

One of the reasons for the presence of this "residual" in cross-country comparisons may be that the neoclassical framework ignores institutions, "the humanly devised constraints that structure political, economic and social interaction". These include both "informal constraints (sanctions, taboos, customs, traditions, and codes of conduct), and formal rules (constitutions, laws, property rights)" (North 1991). Institutions are usually *stable* over time and they have a lasting effect that may explain the long-run persistence of discrepancies in economic performance. However, this institutional approach has been challenged by Gallup, Sachs and Mellinger (1998), who report that countries that are landlocked (apart from those in Europe) or situated in tropical areas are generally poor.

Our first aim is therefore to compare different groups of countries, so as to test whether differences in economic performance can be attributed to differences in institutions. For this, the countries within a given group must have sufficiently homogenous institutions. One way of classifying countries is according to the "school" to which their legal system belongs, and we first test for the impact of "legal school" on real GDP/capita growth rates (Section 2).

However, it is unclear *ex ante* which institutions or "complexes of institutions" are key to economic performance. It may be that institutions at a higher or lower level of aggregation than "legal school" determine economic performance[1]. In order to test the hypothesis that a wider set of institutions than just "legal school" determines performance, we next examine the impact of countries having been colonies of a particular European power (Section 3). Finally, we test our institutional explanations against the strongest non-institutional candidate for explaining growth differences, the incidence of malaria (Section 4).

2. Legal origin as a determinant of economic development

La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997) found that "countries with poorer investor protections, measured by both character of legal rules and the quality of law enforcement, have smaller and narrower capital markets." According to their study, countries belonging to the "French civil law school" have the weakest investor protection and the least developed financial systems. Ownership is more concentrated in such countries because of poor shareholder rights, while corporate valuation is lower. Anglo-saxon, "common law" countries tend to have the opposite characteristics. According to Posner, the efficiency of common law is due to the ability of judges to adapt old rules and create new ones suitable for new and difficult to predict circumstances.

[1] Many studies have already examined the impact of more narrowly (functionally) defined institutions (such as the progressiveness of taxation, or the restrictiveness of trade or labour market rules) on economic performance.

Although they point to the findings by King and Levine (1993) and subsequent authors indicating that financial development promotes economic growth, La Porta et al. do not examine whether the "school" a country's legal system belongs to influences its economic performance.

In order to test the supposed economic impact of "legal schools", we regressed GDP/capita growth rates (between 1960 and 1995) on whether countries belong to the common law or the "French civil law" legal school. We limit ourselves to these two schools, as common law is found by La Porta et al. to be the school that is most supportive of financial development, and the French civil law school the least supportive. Also, these are the two legal schools with the largest number of countries.

We constructed a dataset of 102 countries, for which we had growth rates of GDP/capita over the period 1960-1995[2]. We classified countries' legal school in much the same way as La Porta et al. with two caveats: (1) we reclassified some countries when we considered La Porta et al.'s classification to be mistaken, for instance we excluded Romano-Dutch law countries from the French school (see Appendix 1); (2) we extended our classification to those countries in our sample not covered by La Porta et al (2002). This was done on the basis of Wood (1995) the online CIA Factbook and searches for individual countries. The result is that we have 27 common law countries, 49 French civil law countries and 26 unclassified countries, which include German and Scandinavian civil law countries, Romano-Dutch law countries, ex-socialist countries and any other countries for which we have data regarding the other variables we use but not their legal school.

We also tested for a number of environmental and historical "control variables". Cross country, high population density in coastal areas is positively correlated with higher GDP per capita, while high population densities in interior regions have a negative correlation. The higher development of *coastal* areas is explained by the significant increase in transport costs for landlocked regions. To control for these effects we introduce the proportion of a country's territory within 100 kilometres of the coast as an explanatory variable[3].

Jared Diamond (1997) and Paul Bairoch (1992) argue that tropical regions have been unable to adopt modern crop technologies developed in temperate areas. Tropical regions are also severely affected by diseases (Dumett 1968). To control for this effect we have used the percentage of a country's territory that lies in the tropics.

It has been argued that one of the major causes of tropical underdevelopment is the high incidence of *malaria*. Sachs (2003) provides indicators for the proportion of a country's population that is exposed to *Malaria falciparum*, the most dangerous form of malaria[4]. Could initial incidence of malaria explain the differences in growth between countries in a subsequent period? Here one must be careful about the question of endogeneity, as richer countries can afford to fight malaria more effectively. We discuss the possible role of malaria in explaining growth differences between various groups of countries in Section 4.

We also use a variable indicating whether a country had suffered from war (the variable takes a value of 1 for each decade in which war occurred on the territory of the country, with the exception of the 1990s, for which we do not have information), and is taken from Easterly and Levine (1997)[5]. Finally, we used the natural log of

[2] All the variables we use are available only for countries with a population in excess of 1 million. We excluded Hong Kong and Singapore from the sample, as they were extreme outliers in terms of GDP/capita growth, and when we allowed for this by including a dummy for them we found their presence with the dummy added 14% to the adjusted R2 of the regression.

[3] This data and that for the share of the country's territory lying in the tropics are taken from Gallup, Mellinger and Sachs (1999). The data is available only for countries with over 1 million inhabitants, and is the main constraint on the size of our sample. To test for the robustness of our results we also used a dummy for a country being landlocked or for any part of its contiguous territory being in the tropics. The results of these alternative specifications are reported in Table 1.

[4] The data is once again available only for the same sample, which includes only countries with a population of over one million inhabitants.

[5] We do not include the degree of ethnic fractionalisation, which Hall and Jones (1999) have suggested hampers economic development. The reason for this is that the average degree of fractionalisation (using the World Bank index for 1960) is almost identical for former British and French colonies (0.58 and 0.57 respectively, with a p-value for the identity of means of 0.52). In sub-Saharan Africa British ex-colonies actually have a higher degree of frectionalisation than French ones (0.69 compared to 0.65).

GDP/capita in 1960 as a measure of the amount of GDP growth resulting from the convergence of GDP/capita growth levels[6].

We do not test for any of the other variables commonly used in cross-country growth regressions, such as the growth rates of physical and human capital (or their instruments, such as investment or education), or for the openness of the economy to international trade and the share of government expenditure in GDP. The reason is that we are testing for the impact of fundamental and exogenous geographical and institutional variables (with the exception of war), and if we find these variables to have an effect on economic growth, we would expect variables such as capital stock and openness to be at least partly endogenous, and indeed to provide some of the *channels* through which fundamental institutions affect growth. We examine the issue of transmission channels from institutions to growth further in Rostowski and Stacescu (2005).

The results indicate clearly that belonging to the "French civil law" school reduces a country's growth rate of per capita GDP both significantly and by a large amount, when we control for the incidence of war, the share of its territory located in the tropics, the share of its territory near the sea and the impact of convergence.

Growthrpc 6095 = 1.088 – 0.071 • War – 0.679 • Tropicar + 0.566 • Lnd 100km
(0.000) (0.113) (0.000) (0.002)
– 0.338 • Frenchcivil – 0.208 • Commonlaw – 0.155 • Convergence (1)
(0.003) (0.287) (0.012)

Adjusted R^2 = 0.467, 102 observations

Dependent variable = real per capita GDP growth between 1960 and 1995; War = an index which is equal to 1 for each decade in which the country was involved in foreign or civil war; Tropicar = the proportion of a country's land area between the Tropics (available only for countries with more than 1 million inhabitants); Lnd100km = proportion of a country's territory lying within 100 km of the sea. Frenchcivil, dummy = 1 for French legal origin (as classified in Appendix 1); Commonlaw, dummy = 1 for common law countries; Convergence = natural log of GDP/capita in 1960.

Unexpectedly, the impact of the common law is negative (though insignificantly so). Nevertheless, in regression (1) the p-value for the *difference* between French civil law and common law countries is fairly low (0.209), suggesting that there is some difference between the growth performance of the two groups of countries. Goodness of fit (as measured by adjusted R^2) is quite good, and all the control variables have the expected signs[7]. When we use cruder measures of our environmental variables (dummies for whether a country is landlocked or for whether any contiguous part of it lies in the tropics), the common law is found to significantly reduce growth, and by quite a large amount (by approximately 0.6% per annum)[8]. This is completely at variance with the hypothesis of La Porta et al.. The significance of the difference between the legal schools is significant in the two specifications in which we use the dummy variable for whether a country is landlocked (Table 1)[9].

[6] This level was divided by 1000, so as to prevent the coefficient from being absolutely very small, and the coefficient on it is expected to be negative.

[7] Growth should be lower for countries with more war, a larger proportion of their territory in the tropics and a higher initial level of GDP/capita, while it should be higher for those with a larger proportion of their territory close to the sea.

[8] Although we get lower goodness of fit.

[9] This occurs whether the "Landlock" dummy is used with the finer "Tropicar" variable, or with the cruder "Tropical" dummy.

3. The colonial heritage

A possible explanation for this rather disappointing result regarding the economic impact of "legal school", is that a more comprehensive set of institutions than just the legal system influences economic performance. But how could one find countries that shared a wider set of institutions than their legal system? We decided to explore the idea that a common colonial past might prove an important and statistically significant determinant of growth.

The fact of countries having been colonies of a single colonial power is a possible indicator of shared institutions between them, as the imperial powers tended to implant similar institutions across their colonies. This imposition of institutions was largely exogenous to the previous development of the territories concerned[10]. Furthermore, colonial borders often cut across ethnic communities and eco-systems and grouped together areas with different climate, traditions and religions. For example, British and French colonies alternated on the coast of West Africa.

Historical studies suggest that the differences between British and French colonies went well beyond legal origin. The patterns of colonization adopted by various European powers were different at many points[11]. In French colonies, the ideal of *assimilation* meant that a single body of legislation was used everywhere. In British colonies, not only was common law probably more suited to local needs than civil law, but also, although the principal law used was English law supplemented by the special laws of the colony, tribal law was applied for cases where both parties were natives, or where one party was a native and "the strict letter of the English law would involve injustice" (Asmis 1912) There also were *Native Tribunals* for minor offences and "all complaints as to ownership or possession of (native) land" (Asmis 1913).

In French colonies the official doctrine of "assimilation" meant that the administrative structure, civil liberties, taxes and tariffs were supposed to be identical and there was no separate colonial military. They were also ruled in a more centralised way than British colonies[12]. Furthermore, the French system of *direct rule* in the colonies meant that a hierarchical system of civil servants was organised (Isnard 1971:109). Native rulers could only maintain their authority at the village level, and they could be promoted, transferred and dismissed much like ordinary civil servants (Miles 1987)[13]. The French administration tried to speed up the setting up of modern infrastructure – such as railways – and to regulate native agriculture. However, its intervention was often disruptive and included forced labour, relocation of villages, and conscription[14].

The goal of British policy on the other hand was to ensure a cheap and flexible administration of the colonies (Isnard 1971:110). Local inhabitants were to preserve their autonomy and much of their traditional institutions, under a system known as ***indirect rule***. The ideas behind indirect rule were less idealistic than France's *mission civilisatrice*. While France offered the possibility of representation in the French Parliament (although this was extremely limited before the Second World War), Britain relied on *local* elected bodies – such as Town Councils

[10] Except that territories with well organized pre-existing states and with a higher level of technology were less likely to be colonized. The unified blocks of French West Africa and French Equatorial Africa.

[11] There are many facts that warn against sweeping generalisations. Indeed, some authors go as far as to deny the relevance of differences between colonial systems (M. Semakula Kiwanuka 1970). Still, the overall picture allows one to argue that differences between British rule and the rule of continental powers were significant enough to have important consequences.

[12] While the contiguous British territories in East and South Africa were organised as separate colonies and protectorates, the French preferred 13 The idea expressed in a directive was "to liberate the slaves, to ruin the great commands, to eradicate feudal vestiges."

[14] Conklin (1998) quotes a French civil service report arguing that "[f]or a long time yet it will be necessary for our subjects to be brought to progress against their will." The *prestation* was established at 12 days per year. In theory, the this work had to be remunerated at market rates.

and later on Legislative Councils for individual colonies (Goldberg 1986)[15]. While *schools* organised by British missionaries used native languages, French was used in schools supported by the French state (Conklin 1998)[16]. British loyalty to free trade policies meant that British colonial economies were more exposed to world competition than French ones[17]. In the case of institutions created upon and after the achievement of independence, these also have often been shaped after the model of the imperial power.

Finally, the suppositions in this Section are supported to some extent by Treisman's (1999) cross-country study of the determinants of perceived corruption, which found that countries with a history of British rule were perceived as less corrupt after GDP per capita, openness to trade, length of democratic tradition and Protestant tradition were controlled for.

Thus, it is possible that the institutions bequeathed before and upon independence by the colonial empires (or imported from the metropolis after independence) differed considerably across the imperial powers, just as the various legal schools seem to have different effects on financial development (la Porta et al, 1997) and on economic growth (regression 1 above). We therefore decided to test for whether having had a British or French colonial past[18] had a discernible impact on economic growth, when we controlled for the same environmental and historical variables as in regression (1):

$$\text{Growthrpc6095} = \underset{(0.000)}{1.012} - \underset{(0.085)}{0.085} \bullet \text{War} - \underset{(0.000)}{0.776} \bullet \text{Tropicar} + \underset{(0.001)}{0.530} \bullet \text{Lnd100km}$$

$$- \underset{(0.066)}{0.272} \bullet \text{Frenchcol} - \underset{(0.985)}{0.002} \bullet \text{Britcol} - \underset{(0.004)}{0.196} \bullet \text{Convergence} \qquad (2)$$

Adjusted $R^2 = 0.439$, 102 observations

Having been a French colony has a significant and large negative effect on growth, while having been a British colony has no such effect. Not surprisingly, the coefficients for British and French colonial origin are significantly different from each other (p-value: 0.077). Again, the control variables all have the expected signs, and the adjusted R2 is quite high (though slightly lower than for the regression using legal origin). On average, ex-British colonies real GDP/capita increased some 21% more than that of ex-French colonies during 1960-95, after controlling for environmental variables, War and convergence. This is equivalent to an annual difference in the growth rate of 0.7%. It is worth remembering that former British colonies had a much higher average income per capita in 1960 than did French ex-colonies, and this was true both of the total population and of the sub-Saharan African sub-sample (Rostowski and Stacescu 2005).

[16] A history textbook used in colonies in Africa and Indochina famously started with the line "*Nos ancçtres les Gaulois…*" ("Our ancestors the Gauls").

[15] Voting rights were quite severely restricted in the case of British territories, while the Senegalese towns and the French Caribbean had universal male suffrage.

[17] Perhaps the most tangible sign of the different effects of the two systems of colonial rule is the movement of population across borders. Asiwaju (1976) documents a steady migration of the population from the Ivory Coast to the Gold Coast. Geographic conditions are similar in the two territories and migrants often belonged to ethnic groups divided by the new border; thus the difference was due to the institutions introduced by colonial rulers. The main reasons for discontent on the French side seem to have been conscription into the army, forced labour, higher taxes and administrative intrusion into crop selection by peasants.

[18] We limited ourselves to these two imperial powers, as they had the largest number of colonies. To qualify as former British or French colonies in the regression, countries needed to have been under British or French rule continuously from 1910 to 1948. This excludes ex-colonies of settlement (Australia, Canada, USA, etc.) and countries that were colonies only in the inter-war period (Iraq, Syria, etc.). Countries in Africa that had been German colonies but continued as British or French colonies until 1960 (Tanzania, Togo, etc) were retained as British or French colonies.

As with the regressions using the "legal school" variables, when we use the cruder measures of our environmental variables, we again get lower goodness of fit. The colonial origin coefficients are of similar size to the baseline described in regression (2), and are either similarly or more significantly different from each other and from zero than in the baseline (Table 1). Also, in every specification of regression (2) the significance of the difference between the colonial origin dummies is much higher than the significance of the difference between the legal school dummies in the equivalent specification of regression (1).

When we test for the impact of legal school and colonial origin together, we again find that both the French civil law and the common law have a statistically significant and large negative impact on growth:

$$\begin{aligned} \text{Growthrpc6095} = {} & 1.119 - 0.091 \bullet \text{War} - 0.680 \bullet \text{Tropicar} + 0.533 \bullet \text{Lnd100km} \\ & \quad (0.000) \quad (0.062) \quad (0.000) \quad (0.000) \\ & - 0.297 \bullet \text{Frenchcivil} - 0.306 \bullet \text{Commonlaw} - 0.151 \bullet \text{Frenchcol} + 0.123 \bullet \text{Britcol} \\ & \quad (0.014) \quad (0.081) \quad (0.321) \quad (0.480) \\ & - 0.156 \bullet \text{Convergence} \\ & \quad (0.022) \end{aligned} \tag{3}$$

Adjusted $R^2 = 0.467$, 102 observations

What is more, this impact is now statistically completely indistinguishable as between the two legal schools (the p-value of the difference between the two coefficients is 0.959!). These results are totally at variance with La Porta et al.'s hypothesis.

The colonial origin dummies are not significantly different from zero. However, the coefficient on a French colonial past is negative and that on a British past is positive, and the *difference* between the coefficients (from each other) has a (just barely!) reasonable p-value (0.187)[19]. Since nothing changes between regression (1) and regression (3) except that we add the colonial dummies, and nothing changes between regressions (2) and (3) except that we add the legal school dummies, the deterioration in the significance of the difference between each pair of institutional dummy variables is the result of high multicolinearity between some of the legal school and colonial origin dummies[20].

We try find out where the problem lies by first adding each of the two colonial dummies *separately* to regression (1). When we do this, the significance of the difference between the two legal school dummies collapses (to a p-value of 0.943 when the British colonial dummy alone is added, and to a p-value of 0.814 when the French colonial dummy alone is added – Table 2). Thus, with either *one* of the colonial dummies added to regression (1) we get the same qualitative result as in regression (3) – *the difference between the two legal schools has no statistically significant effect on real per capita economic growth.* Next, we add the French civil law dummy to regression (2). The difference between the two colonial dummies again collapses into very high insignificance (p-value: 0.660), indicating a high level of multicolinearity between the impact of French colonial origin and French civil law on growth. However, when the common law dummy alone is added to regression (2), the significance of the difference between the two colonial origin dummies remains unchanged and quite high (p-value: 0.077). To summarise*, the difference between British and French colonial origin has a significant impact on growth* ***even when we control for common law legal origin****, while legal school has no significant impact when we allow for either colonial origin.*

[19] The control variables all have the expected signs and are significantly different from zero, and the adjusted R2 is the same as for regression (1).

[20] Given that we have 102 data points, the problem is not the loss of two degrees of freedom which occurs as a result of adding two exogenous variables.

When we use the cruder measures of our environmental variables in regression (3), we get lower goodness of fit as usual. The legal school coefficients are similar to, or larger than in regression (3), and their significance is either similar to or better than in regression (3) as regards their difference from zero. The same is true of the size and significance of the coefficients on French colonial origin. In the case of ex-British colonies, however, the coefficient turns very insignificantly different from zero when "Landlock" and "Tropical" alone are substituted for their finer environmental analogues, although significance improves somewhat when both the cruder measures are used together. More important, in all three "cruder" cases, the significance of the difference between the colonial origin coefficients is either similar to or much higher than in regression (3). Most important, however, in all three cases (as in the baseline regression) the significance of the *difference* between the colonial origin coefficients is much higher than that for the legal school ones (Table 1).

4. Institutions and Malaria

When we add the incidence of *malaria falciparum* as an explanatory variable to regressions (1) and (2), our results change dramatically[21]. The significance of the difference between ex-British and ex-French colonies is now much smaller (p-value: 0.209) than that for the difference between common law and French civil law countries (p-value: 0.092). When we add malaria to regression (3), the difference between both sets of institutional variables becomes very insignificant – see Table 3[22].

However, there are two important problems regarding the impact of malaria on economic growth. First, we must be careful about the issue of endogeneity. Rich countries can afford to fight malaria more effectively than poor ones. In the first half of the 20th century malaria was present in large parts of East Asia, Latin America and Europe, from which it subsequently disappeared[23]. The ex-British colonies in our sample are significantly (and much) richer than the ex-French colonies (Rostowski and Stacescu, 2005), so we would expect them to have reduced malaria more effectively. Second, we must be careful about how convincing it is that malaria reduces economic growth.

Gallup and Sachs (2000), claim that there is a fundamental difference between malaria in temperate and sub-tropical zones, which it has been possible to eliminate or reduce considerably, and tropical malaria. Previously endemic malaria has been cleared from Spain, Italy, Greece and the southern USA. On the other hand, Gallup and Sachs claim, malaria in tropical zones simply cannot be eliminated for physical reasons at reasonable cost, except on islands. There are just too many mosquitoes and mosquito breeding grounds, and too many human carriers. Furthermore, not only does incidence in 1964 significantly (and considerably) affect subsequent growth, but a reduction in incidence (where it can be achieved, as in temperate zones) boosts growth significantly.

We find the first claim very dubious. There are several examples of sharp reductions in tropical zone malaria incidence over the 1966-94 period. The Dominican Republic reduced incidence from 94% to zero, while Haiti, the other half of the tropical island of Hispaniola, failed to reduce its 100% incidence at all. Although Hispaniola is an island, it is a very large island, four- fifths the size of England. More important, the persistence of 100% incidence in Haiti, means that epidemiologically the Dominican Republic was not an island at all, as there was always a reservoir of malaria available across the border. Other examples of large reductions in tropical malaria are Brazil (from 40% to 19%) and Bangladesh (from 63% to 16%). Additionally, the large increases in incidence

[21] This is the most dangerous form of the disease, and we take the data for its incidence from Sachs (2003).

[22] Although the difference between the legal school dummies is somewhat *less* insignificant than that between the colonial origin dummies.

[23] Mussolini famously drained the Pontine Marshes south of Rome in the 1920s to eliminate the breeding ground for malaria there, something Julius Caesar had done in the first century B.C. The last person to die of malaria in England did so in 1928.

observed in India (from 13% to 28%) and Malawi (from 52% to 100%), also suggest that tropical incidence is not exogenous or exclusively determined by the environment.

When we regress the proportional change in *malaria falciparum* during 1966-94 on GDP in 1960, we get a strongly significant effect, indicating that wealth does help reduce malaria:

$$\text{Lnmalfal94-lnmalfal66} = 1.856 - 295 \bullet \text{lnrpcgdp60} \qquad (4)$$
$$(0.064) \quad (0.043)$$

Adjusted $R^2 = 0.049$, 64 observations

Although there is clearly a lot of noise, the coefficient has the expected sign, so that a lower level of real per capita GDP leads to a lower *reduction* in the incidence of *malaria falciparum* in the subsequent period. Moreover, this effect is much stronger than that of initial level of malaria on subsequent real per capita GDP growth:

$$\text{Lnrpcgdp95-lnrpcgdp60} = 0.318 - 0.051 \bullet \text{lnmalfal66} \qquad (5)$$
$$(0.000) \quad (0.137)$$

Adjusted $R^2 = 0.019$, 66 observations

Both the significance of the explanatory variable and the adjusted R2 is much higher in the regression explaining the fall in incidence of malaria by initial GDP level, than in the regression explaining growth by initial malarial incidence[24].

We have tried to calculate the two effects in a way that would allow us to compare their strength. An increase in initial real per capita GDP by one standard deviation (starting from the mean of the sample) results in malaria incidence decreasing by an additional 17.6% over the 29 years from 1966 to 1994. This is a continuously compounded annual rate of approximately 0.6%. This *additional* reduction is slightly above the mean reduction in malaria incidence. In other words, a one standard deviation increase in 1960 GDP from the mean of the sample, more than doubles the reduction in malaria in the subsequent period. An analogous increase in initial incidence of malaria by one standard deviation from the sample mean, decreases the growth rate over the subsequent 35 years by 2.6%, an annual reduction in growth of 0.07%, which is less than one twelfth of the mean growth rate. Thus, the effect of a one standard deviation increase in initial real per capita GDP on malaria is slightly more than *twelve times* as strong as a one standard deviation increase in initial malaria incidence is on subsequent real per capita GDP.

The second problem with the Gallup and Sachs hypothesis is *why* malaria should affect growth[25]. Apart from significantly increasing child mortality and disease in pregnant women, malaria has little apparent effect on the

[24] In a cruder version of the same approach we calculated the correlation between the incidence of *malaria falciparum* for 1966 (for those countries in which there was malaria) and real per capita GDP in 1960and 1970. We then repeated the exercise for real per capita GDP in 1990 and 1999 and malaria in 1994. The results were as follows:

corr(rpcGDP60,malfal66) = –0.59 corr(rpcGDP70,malfal66) = –0.52
corr(rpcGDP90,malfal94) = –0.54 corr(rpcGDP99,malfal94) = –0.59

suggesting that real per capita GDP may have "Granger caused" malaria in the 1960s and malaria may have "Granger caused" real per capita GDP in the 1990s.

[25] It is important to what follows that Gallup and Sachs do not find any significant effect of other tropical diseases on economic growth, so that malaria cannot be taken as an instrument for a general disease laden environment over and above what is identified by tropical location – something we control for independently in all our regressions.

workforce. The authors quote McGregor (1987, p.754) as typical of the standard medical view: "…in adult life…a host-parasite balance resembling commensualism is achieved. Despite sustained infectious challenge, adults constitute an economically viable workforce capable of coping with the strenuous physical activities that are required…in subsistence agricultural communities." Against this Gallup and Sachs only pit speculation[26].

Malaney (2003) provides somewhat more convincing illustrative evidence of the supposed economic impact of malaria: (1) families in areas affected by malaria in Paraguay, choose to grow food rather than cash crops, as they can lose up to 33% of the value of their tobacco crop if they are subject to malaria during harvesting; in Tigray in the 1990s, farmers declared themselves willing to pay 16% of their annual income for a (non-existent) vaccine which would protect them from malaria for a year; in Senegal (1974-7) and Bangladesh (1971-5) couples wasted 140-200 days bringing up children who subsequently died (though not necessarily of malaria); (4) in Malawi cca. 1990, low-income families spent about 20% of their earnings on avoiding or curing malaria.

Nevertheless, numerous studies based on the standard cost of illness (COI) methodology find that the costs of malaria are typically from 0.6% to 1% of GDP in African countries. Even this may be an overestimate, as a large part of the cost is the discounted present value of loss of earnings due to the premature death of both adults and children. This is something that would be gained were these people not to die, but it does not in itself prevent investment and growth[27]. It is unimaginable that constant costs of this size could account for the losses in real per capita GDP *growth* of about 1.3% *per annum* reported by Gallup and Sachs.

Finally, even if malaria did determine growth (rather than the other way round), this does not necessarily mean that legal school is more important for growth than colonial origin, despite the results we get when we include malaria in our regressions for the whole sample. When we split our sample into two parts, sub-Saharan Africa (SS-A) and the rest of the world (ROW), we get very different results, even with malaria in the regression.

We split the sample because malaria is above all a sub-Saharan African problem – as Gallup and Sachs point out, 90% of malaria occurs there. When we regress real per capita GDP growth on the share of territory within 100km of the sea, war, incidence of *malaria falciparum* in 1966 and whether the country had been a non-British colony[28], we find that both malaria *and* the institutional dummy are highly significant, with the institutional dummy far more significant than malaria (Table 3, Column 4)[29]. This regression is important, because it shows that even when we limit our sample to the most malaria-ridden region of the world, institutions do matter.

Unfortunately, however, because in SS-A all non-British ex-colonies also have French civil law legal systems, and all of our ex-British colonies (excepting Mauritius) use the common law, we are unable to determine *which* set of institutions, legal school or colonial origin are determining the difference in growth performance in Africa. However, when we repeat the same regression for the rest of the world, using the legal school dummies, we

[26] (1) Malaria *may* reduce children's learning abilities because it causes anaemia, and iron-deficiency induced anaemia (a different disease) does reduce cognitive skills (this is actually the strongest argument). (2) Malaria may reduce tourism, although it has not apparently done so in either Thailand (1994 incidence 47%) or Kenya (91%), and it seems more plausible that in West Africa it is extremely high levels of humidity and rainfall and a lack of attractive scenery that are to blame. (3) Malaria could reduce foreign direct investment (although Gallup and Sachs admit that incidence is far lower in cities, where FDI is likely to be concentrated) and the spread of ideas from less infected towns to the more infected countryside (this is totally speculative). In terms of direct medical evidence, they can only produce one article which finds that children of mothers with malaria in Tanzania have worse health than those of parents with aids, and one which found that: "…asymptomatic malaria may be the cause of chronic pains and lassitude among Europeans in East Africa (*sic!)*" (Wilkes and others, 1965 quoted in Gallup and Sachs).

[27] Unless it is assumed to represent the cost of wasted investment in education and other human capital accumulation, in which case it accounts for point (3) above. The costs of lost workdays due to morbidity are also, quite correctly, included.

[28] That is Belgian, French, Portuguese or Spanish.

[29] When we use French colonial origin in the SS-A specification and therefore limit ourselves to ex-French and ex-British colonies (instead of using all ex-colonies in SS-Africa), we have only 28 countries instead of 35, and none of the coefficients is significant, indicating that we have too few data points. Also, adjusted R2 collapses to 0.014 as compared to 0.175 with non-British colonies (Table 3). We exclude the share of a country's territory lying in the tropics in all SS-A only regressions, as this is almost the whole of every country. It is interesting that convergence is not significant in these regressions, and neither is Lnd100km, so that malaria and institutional origin (and to some extent War) alone explain growth differences (though with a low adjusted R^2).

find that they are not at all significantly different from each other (the p-value for the difference between them is 0.392 – see Table 3)[30]. Interestingly, the malaria coefficient also completely looses its significance in ROW (p-value: 0.456)

Clearly, it is improbable that, when we do *not* take the impact of malaria into account, differences in colonial origin outperform legal school (regressions 1-3), but that when we *do* take malaria into account, legal school determines growth in SS-A but not in ROW, even though malaria is significant in determining growth in SS-A, but not in ROW. A more plausible explanation of the data is that, when we take malaria into account in the SS-A sub-sample, the very significant impact of non-British v. British institutions that we find, is due to colonial origin rather than legal school.

5. Conclusions

Taken together, our results *fail* to confirm the hypothesis of La Porta et al. (*passim*) that having a legal system based on the English common law is more conducive to economic development than having one based on French civil law. However, they do support the view that a wider "complex" of institutions than just the legal system, such as that associated with having been a British or a French colony, *does* affect economic performance. In this, our results bear a similarity to those of Treisman (1999), who found that cross-country perceptions of corruption were negatively related to a history of British rule, but that after controlling for this, a common law tradition tended to increase the perception of a country's corruption.

Furthermore, we find that the institutions of former British colonies have been clearly superior to those of former French colonies as regards enabling economic development in the period covered[31]. This is the case also when we allow for the effect of convergence, and even when we take account of the initial level of incidence of malaria (see the SS-Africa and ROW regressions in Table 3). However, we also provide quite strong evidence that the incidence of malaria is endogenous to economic performance, and should therefore be ignored as a control variable when examining the relative importance of legal school and colonial origin as institutional variables influencing economic growth. We examine some of the *channels* through which institutions in former British colonies may lead to better economic performance than those in the former colonies of other imperial powers in Rostowski and Stacescu (2005).

Our results also contribute to the "geography v. institutions" debate, which has divided researchers in recent years. First, our preferred indicator of institutional differences ("colonial origin") is less subjective than those used by some researchers[32]. For instance, Acemoglu, Johnson and Robinson (2001) use subjective indices of expropriation risk and of constraints on executive authority, while Dollar and Kraay (2000) use indicators of property and political rights[33]. Furthermore, such indices also suffer from the fact that they may be endogenous, with the quality of institutions improving as GDP/capita increases.

Second, the debate between Acemoglu, Johnson and Robinson (AJR) on the one hand and Sachs and co-authors on the other, comes down to whether differences in economic performance between what AJR call "colonies of settlement" and "colonies of extraction" is due, at least in part, to geographical conditions directly,

[30] In this regression we also use Tropicar (the share of a country's territory lying in the tropics) to catch any non-malarial tropical effects. We do not use the colonial origin dummies, as we have too few non-British colonies in ROW.

[31] Or, in the case of sub-Saharan Africa, to those of non-British colonies.

[32] Even the "legal school" variable may involve a greater degree of subjectivity, as some countries have a number of sources for their legal tradition, as discussed in Section 2.

[33] Roderick, Subramanian and Trebbi (2002) use settler mortality in the initial period of settlement, but see the next paragraph.

or whether such conditions affect performance *only* to the extent to which they determine the (better) institutions the imperial powers decided to introduce in "colonies of settlement". Sachs (2003) points out that this choice is itself associated with geographical/environmental conditions that may be unhelpful for economic performance to this day. Furthermore, higher settler mortality is associated with lower levels of inherited human capital, as it is negatively correlated with migration from Europe, which was much richer than other parts of the world by the 19th Century, and thus had higher levels of human capital.

Our analysis excludes "colonies of settlement" from the "ex-colony" categories. It only compares what AJR call "ex-colonies of extraction" belonging to different empires. Nevertheless, it shows that the institutional differences reflected by this classification (which may be supposed to be finer than those reflected in the AJR distinction between "colonies of settlement" and "colonies of extraction") have a discernable impact on economic performance. Thus, our results show that exogenously determined institutions have an independent effect on economic performance, although unlike AJR we do not claim that geographical factors have no independent effect themselves.

TABLE 1

	BASELINE	LAND-LOCK	TROPICAL	TROPICAL + LANDLOCK*
Legal School				
– adj. R^2	0.467	0.414	0.369	0.322
– Common Law	–0.208	–0.219	–0.272	–0.222
(p-values)	(0.287)	(0.088)	(0.040)	(0.113)
– French Civil	–0.338	–0.396	–0.406	–0.468
(p-values)	(0.003)	(0.001)	(0.001)	(0.001)
– difference (legal) p-values	0.209	0.100	0.233	0.036
Colonial Origin				
– adj. R2	0.439	0.398	0.322	0.316
– ex-British	0.002	–0.004	–0.016	0.002
(p-values)	(0.985)	(0.971)	(0.904)	(0.989)
– ex-French	–0.272	–0.411	–0.300	–0.408
(p-values)	(0.066)	(0.007)	(0.068)	(0.019)
– difference (colonial) p-values	0.077	0.005	0.091	0.008
Legal School and Colonial Origin				
– adj. R2	0.467	0.430	0.369	0.341
– Common Law	–0.306	–0.329	–0.383	–0.400
(p-values)	(0.081)	(0.070)	(0.044)	(0.009)
– French Civil	–0.297	–0.320	–0.362	–0.390
(p-values)	(0.014)	(0.016)	(0.006)	(0.008)
– ex-British	0.123	0.136	0.150	0.232
(p-values)	(0.048)	(0.470)	(0.455)	(0.192)
– ex-French	–0.151	–0.282	–0.156	–0.270
(p-values)	(0.321)	(0.069)	(0.348)	(0.100)
– difference (legal) p-values	0.959	0.957	0.907	0.940
– difference (colonial) p-values	0.187	0.054	0.186	0.007

* For the sake of comparability, we limit ourselves to the same sample of 102 countries for which we have data on malaria and Ind100km (ex-Hong Kong and Singapore), although we could add 13 countries for this final specification.

TABLE 2

	LEGAL SCHOOL with French Colonial	LEGAL SCHOOL with British Colonial	COLONIAL ORIGIN with French Civil Law	COLONIAL ORIGIN with Common Law
Constant	1.125	1.086	1.068	1.022
	(0.000)	(0.000)	(0.000)	0.000)
War	–0.092	–0.073	–0.085	–0.088
	(0.057)	(0.105)	(0.082)	(0.079)
Lnd100km	0.535	0.558	0.537	0.528
	(0.001)	(0.000)	(0.000)	(0.000)
Tropicar	–0.670	–0.691	–0.702	–0.780
	(0.000)	(0.000)	(0.000)	(0.000)
Civillaw	–0.293	–0.336	–0.208	
	(0.015)	(0.003)	(0.057)	
Commonlaw	–0.217	–0.324		–0.119
	(0.074)	(0.063)		(0.463)
French colony	–0.174		–0.180	–0.277
	(0.243)		(0.240)	0.063)
British colony		0.167	–0.101	0.103
		(0.349)	(0.430)	(0.580)
LnRPCGDP60	–0.173	–0.136	–0.188	–0.184
	(0.007)	(0.036)	(0.005)	(0.008)
Adj. R sq.	0.470	0.467	0.455	0.437
Difference Legal	0.814	0.943		
Difference Colonial			0.660	0.077
Sample size	102	102	102	102

TABLE 3

	LEGAL SCHOOL	COLONIAL	LEGAL and COLONIAL	SS-AFRICA	ROW
Constant	1.193	1.074	1.193	0.746	1.261
	(0.000)	(0.000)	(0.000)	(0.006)	(0.000)
War	–0.077	–0.076	–0.079	–0.096	–0.068
	(0.062)	(0.147)	(0.100)	(0.156)	(0.290)
Lnd100km	0.430	0.435	0.429	0.239	0.313
	(0.002)	(0.004)	(0.003)	(0.631)	(0.032)
Tropicar	–0.449	–0.591	–0.453		–0.425
	(0.001)	(0.000)	(0.001)		(0.005)
Malfal66	–0.431	–0.374	–0.425	–0.430	–0.187
	(0.002)	(0.013)	(0.005)	(0.115)	(0.456)
Civillaw	–0.345		–0.341		–0.330
	(0.002)		(0.004)		(0.008)
Commonlaw	–0.176		–0.208		–0.214
	(0.129)		(0.116)		(0.133)
French colony		–0.168	–0.015		
		(0.278)	(0.924)		
British colony		–0.019	–0.044		
		(0.889)	(0.779)		
Non-British Colony				–0.354	
				(0.028)	
LnRPCGDP60	–0.213	–0.234	–0.208	–0.082	–0.236
	(0.000)	(0.001)	(0.001)	(0.601)	(0.003)
Adj. R sq.	0.504	0.456	0.494	0.175	0.328
Difference Legal	0.092		0.273		0.392
Difference Colonial		0.209	0.749		
Sample size	102	102	102	35	65

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Summary Statistics

Real per capita GDP in 1960:		
	Mean	Standard deviation
French civil law	1773.06	1165.00
British common law	2513.81	965.00
French colonies	906.687	797.50
British colonies	1138.08	842.40
Other countries	2609.61	1575.00
Real GDP per capita in 1995:		
	Mean	Standard deviation
French civil law	3355.36	2116.18
British common law	5126.25	1651.78
French colonies	1336.14	941.71
British colonies	2084.45	1324.03
Other countries	6796.66	3952.86
Share of the land area within 100 km of the coast:		
	Mean	Standard deviation
French civil law	0.3377	0.2446
British common law	0.3899	0.1929
French colonies	0.1309	0.0829
British colonies	0.3502	0.1749
Other countries	0.3718	0.1963
Share of the land area within the tropics		
	Mean	Standard deviation
French civil law	0.7116	0.4273
British common law	0.6298	0.4539
French colonies	0.8089	0.3787
British colonies	0.8083	0.3498
Other	0.2997	0.4447

List of countries in the sample

French civil law countries:

1. Algeria
2. Angola
3. Belgium
4. Benin
5. Bolivia
6. Brazil
7. Burkina Faso
8. Burundi
9. Central African Republic
10. Chile
11. Colombia
12. Democratic Republic of the Congo
13. Costa Rica
14. Cote d'Ivoire
15. Dominican Republic
16. Ecuador
17. Egypt
18. El Salvador
19. France
20. Gabon
21. Greece
22. Guatemala
23. Guinea
24. Guinea-Bissau
25. Haiti
26. Honduras
27. Italy
28. Mali
29. Mauritania
30. Mexico
31. Morocco
32. Mozambique
33. Nicaragua
34. Niger
35. Panama
36. Paraguay
37. Peru
38. Portugal
39. Rwanda
40. Senegal
41. Spain
42. Togo
43. Tunisia
44. Uruguay
45. Venezuela

Common law countries

1. Australia
2. Bangladesh
3. Botswana

4. Canada
5. Gambia
6. Ghana
7. *Hong Kong*
8. India
9. Ireland
10. Israel
11. Jamaica
12. Kenya
13. Lesotho
14. Malawi
15. Malaysia
16. New Zealand
17. Nigeria
18. Pakistan
19. Papua New Guinea
20. Sierra Leone
21. *Singapore*
22. Sri Lanka
23. Tanzania
24. Trinidad and Tobago
25. Uganda
26. United Kingdom
27. United States
28. Zambia
29. Zimbabwe

French colonies

1. Algeria
2. Benin
3. Burkina Faso
4. Central African Republic
5. Congo
6. Cote d'Ivoire
7. Gabon
8. Guinea
9. Mali
10. Mauritania
11. Morocco
12. Niger
13. Senegal
14. Togo
15. Tunisia

British colonies

1. Bangladesh
2. Botswana
3. Gambia
4. Ghana
5. *Hong Kong*
6. India
7. Jamaica
8. Kenya
9. Lesotho
10. Malawi
11. Malaysia
12. Nigeria
13. Pakistan
14. Papua New Guinea
15. Sierra Leone
16. *Singapore*
17. Sri Lanka
18. Tanzania
19. Trinidad and Tobago
20. Uganda
21. Zambia
22. Zimbabwe

Other countries

1. Austria
2. Cameroon
3. China
4. Czech Republic
5. Denmark
6. Ethiopia
7. Finland
8. Hungary
9. Indonesia
10. Japan
11. Jordan
12. Namibia
13. Nepal
14. Netherlands
15. Norway
16. Philippines
17. Romania
18. South Africa
19. Sudan
20. Sweden
21. Switzerland
22. Syrian Arab Republic
23. Taiwan
24. Thailand
25. Turkey