**Untangling the Quality of Governance from the Level of Income:
Are Sub-Saharan African Countries Governed Differently?***

by

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Abstract

We consider whether Sub-Saharan African (SSA) countries are mainly poor because they are governed worse than other countries, as suggested by recent studies on the supremacy of institutions. Our empirical results show that the supremacy of institutions does not hold. SSA countries appear to face specific development problems in addition to weak institutions. Given their geographic and economic constraints, we conclude that SSA countries are on average not governed worse than other comparable countries. Our finding supports the basic argument of a recent UN report (UN Millennium Project 2005).

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JEL Classification: O1, O4

1. Introduction

Sub-Saharan Africa is poorer than any other developing region in the world. Its average GDP per capita lags greatly behind the rest of the developing countries. What are the reasons for this asymmetric development? Are Sub-Saharan African (SSA) countries poor due to cultural or geographic factors, due to a lack of trade integration or mainly because they are governed worse than other regions? A report published by the United Nations and directed by Jeffrey Sachs (UN Millennium Project 2005) is based on the premise that being a poor country is by itself one of the major reasons for relatively weak governance. Hence large amounts of development aid may be necessary and at the same time sufficient to overcome poverty in SSA countries, despite an apparent lack of good governance.

The UN report calls for a new debate about the effectiveness of development aid. We focus on its basic underlying premise, which has been a contentious issue in the recent academic debate about the vast differences in the level of economic development. At present, the dominant view in mainstream economics appears to favor the hypothesis that the quality of governance is a causal factor for development that trumps all other factors. According to this view, it is the power of incentives generated by the institutional framework of a country that determines efficient investment. Following the alternative view envisaged by the UN report (UN Millennium Project 2005), it is large-scale investment that determines development by overcoming poverty traps and improving the quality of governance. Since the latter view may revoke memories of development approaches based on financing-gap models it has, unsurprisingly, not attracted much support in recent contributions to the development literature.

While the present consensus in mainstream economics emphasizes the relevance of good governance for growth and development, some disagreement has remained in the literature about the direction of causality and about the relevance for development of other factors besides the institutional framework of a country, such as geography or trade integration. Various recent papers, all published in leading economics journals, focus on the impact of property rights and the rule of law on the level of income and deny any significant direct effect of other factors than the quality of institutions (e.g. Hall and Jones (1999), Acemoglu et al. (2001), Acemoglu et al. (2002), Easterly and Levine (2003), and Rodrik et al. (2004)). Other studies claim to show the significance of geographic characteristics for long-run growth and development (Gallup and Sachs (2001), Sachs (2001), Hibbs and Olsson (2004), Carstensen and Gundlach (2006)). An even more fundamental critique of the present mainstream view that is in line with the basic premise of the UN report (UN Millennium Project (2005)), holds that good governance is a consequence rather than a cause of development (Glaeser et al. (2004)).

Taking the present dominant view at face value, it follows that SSA countries are poor due to the low quality of governance, which is in turn a consequence of an institutional infrastructure that does not provide sufficient incentives for investment in physical and human capital. In contrast, the dissenting view by Jeffrey Sachs and others suggests that Africa's development crisis is not *only* due to a government crisis. Based on empirical results by Radelet (2004), Sachs et al. (2004) and also the UN Millennium Report (2005) affirm that many SSA countries can actually be considered as relatively well governed once their low level of income is properly taken into account, thereby concluding that development is a complex interaction of institutions, policies and geography and not just a process solely determined by the supremacy of institutions.

The question whether SSA countries are not governed differently than other countries conditional on their low level of income is obviously relevant for an understanding of the determinants of development and growth in general and especially so for deciding about the allocation of development aid. It is common practice to allocate aid above all to countries with sound institutions. If SSA countries are perceived to be governed worse than they actually are, conditional on other factors, this would have far reaching consequences for the amount and the structure of the aid that SSA countries can expect to receive.[1]

Our paper is organized as follows. The next section briefly reviews the ongoing debate on the supremacy of institutions for development and the empirical evidence that claims to show that SSA countries are not governed worse than other developing countries. We think that this evidence is not entirely convincing because of the underlying empirical specification. Our own empirical analysis begins with a simple regression of income on institutions, which reproduces the well-known fact that SSA countries deviate systematically from the regression line. This result appears to be robust for using alternative measures of governmental quality, different instrumental variables and alternative samples of countries. However, the economic and statistical relevance of our SSA-dummy variable disappears once we consider measures of disease ecology as additional explanatory variables. We interpret our finding as suggesting that SSA countries face specific development problems which are not relevant for other countries. Hence given their economic and geography-specific constraints, we conclude that SSA countries are on average not governed worse than other countries.

2. Review of the Literature

In order to find answers to the question whether SSA countries are governed differently than other countries one has to take a closer look at the debate between advocates of the supremacy of institutions hypothesis and the alternative view of Jeffrey Sachs and others. The different hypotheses are backed by different empirical results. The literature on the supremacy of institutions provides empirical evidence that a measure of governmental quality is the only statistically and economically significant variable in cross-country regression models that

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[1] For recent accounts of the allocation of aid flows by characteristics of recipient countries, see Nunnenkamp (2004) and Nunnenkamp and Thiele (2006).

explain international income differences. Sachs and others emphasize the statistical and economic significance of geography-related variables besides measures of governmental quality. Thus, the debate does not question the importance of the quality of institutions for development but focuses on the deeper question whether income is affected directly or indirectly by additional variables, such as measures of geographic conditions like disease ecology.

Different answers are partly due to differences in samples, variables and estimation procedures used. For instance, Hall and Jones (1999) focus on the impact of so-called social infrastructure as the major explanatory variable for international income differences.[2] Social infrastructure influences capital accumulation, educational attainment, and total factor productivity, which in turn jointly influence output per worker. Social infrastructure is measured by the average of an index of government antidiversion policies and the Sachs-Warner index of trade openness. Acemoglu et al. (2001) use a different measure to proxy for governmental quality, namely the risk of expropriation that current and potential investors face. Their claim of the primacy of institutions is based on empirical results showing that other included explanatory variables turn out to be statistically insignificant. Rodrik et al. (2004) focus on measures of institutions, geography, and trade integration as simultaneous explanatory variables for international income differences, where the governance indicators of Kaufmann et al. (2003) are used to identify the quality of the institutional infrastructure. Rodrik et al. (2004) show that measures of geography, namely distance from the equator, are relevant in the sense that they have a strong indirect effect by influencing the quality of institutions, but do not have a strong direct effect on income and more probably no direct effect at all. Similar results are presented by Easterly and Levine (2003), who also deny any

[2] Social infrastructure is defined as “the institutions and government policies that determine the economic environment within which individuals accumulate skills and firms accumulate capital and produce output” (Hall and Jones 1999).

direct income effects of geographic factors such as a tropical location, the presence of germs, or the availability of cultivatable crops.

Using the same institutional variables as some of the above work (risk of expropriation and the Kaufmann indicator), Sachs and others reach a different conclusion by also taking into account the geographical variable malaria risk. Sachs (2003) shows that a measure of malaria risk has a statistically significant and economically important influence on income. The robustness of his results has been rejected by Acemoglu et al. (2001) and by Rodrik et al. (2004), mainly with regard to sample specification and the chosen instrument variables. However, Carstensen and Gundlach (2006) reopen the debate by revealing that the Sachs hypothesis cannot be dismissed on empirical grounds. Using various robustness tests they find that disease ecology appears to affect the level of development independent from the quality of institutions, but at the same time conjecture that the available instrumental variables may not identify enough exogenous variation in the explanatory variables to allow for clear-cut conclusions.

The general lack of appropriate instrumental variables is the major problem in identifying the dominant direction of causality in cross-country studies, and it is also the major reason for conflicting empirical results and an ongoing debate on the fundamental determinants of development. Institutions apparently influence the incentives for saving and investment, and thereby the productivity and the income level of a country. But at the same time richer countries have the resources available to afford good institutions, which are missing in poor countries. Hence the level of income of a country may also exert some influence on the quality of its institutions. The same problem of reverse causality may also old for other potential determinants of development, such as the prevalence of diseases, which may affect the level of income but also may be affected by it. To address the problem of reverse causality, appropriate instrumental variables for each endogenous explanatory variable are required. The instruments need to identify the exogenous variation of the explanatory variables (say, governmental quality and the prevalence of diseases) that may cause the observed variation in the level of income across countries. The instruments therefore have to be correlated with the measures of the endogenous explanatory variables, and at the same time have to be independent from the present level of income and without any direct effect on it, which are obviously very demanding conditions.

Different instrumental varaibles have been used in the recent literature to control for the endogeneity of governmental quality. Hall and Jones (1999) use distance from the equator, the fraction of the population speaking English or other Western European languages, and the (log of the) predicted trade share of a country as instruments for social infrastructure. The former three instruments are assumed to reflect the influence of Western European institutions on a country. The motivating assumption is that the more a country has been influenced by Western European institutions, the more likely it is that its present social infrastructure would support efficient production.

Acemoglu et al. (2001) question the validity of these instruments and introduce settler mortality in the early nineteenth century as a new instrumental variable for the quality of institutions. Their critique of Hall and Jones is directed at the possible endogeneity of the two measures of the language(s) spoken in a country, at a possible direct effect of distance from equator on income, and at the missing explanation for the different effect that Western European institutions had on countries in different climatic zones. By contrast, their new instrument settler mortality has obviously no direct effect on present output, and cannot be affected by present output. The reasoning behind this instrument is that about 200 years ago lower mortality rates in some colonies induced more settlements than in colonies with higher mortality rates, and more settlements in turn led to the creation of good institutions that protected the property rights of the settlers in places with favorable settling conditions.

Colonies with higher mortality rates were less favorable for settlements, which led to institutions that mainly focused on the extraction of resources and did not provide much protection for private property. Because of the high persistence of initial institutions, settler mortality in the early nineteenth century may be taken as a valid instrument for the quality of contemporary institutions.

The potential causality running from the level of income to the quality of institutions, which is held to be a second order effect in the mainstream economics literature, is held to be a first order effect in the recent UN report (UN Millennium Project 2005). As far as we are aware, the empirical support for this contrasting hypothesis comes from the appendix of a background study by Radelet (2004), who uses a nonlinear specification to derive an income-adjusted governance ranking of low-income countries. He regresses a measure of governmental quality on a measure of per capita income for a cross section of countries. The residuals of this estimated equation are used to see which countries display a measure of governmental quality that is below or above the estimated government score for a given level of per capita income, and it appears that SSA countries do not systematically deviate from the estimated regression line. This finding is held to indicate that SSA countries are not systematically governed worse than other countries, given their low level of per capita income.

One problem with this way of controlling for levels of income ignores the causality running from governmental quality and other factors to GDP, which is emphasized in the present mainstream literature. The point is that conclusions based on a regression of governmental quality on the level of income may suffer from a simultaneous equation bias and from an omitted variables bias. Following studies by Sachs and his coauthors and especially as emphasized in Sachs (2003), there appear to be geographic factors in addition to measures of institutions that influence the level of income in cross-country comparisons, such as the prevalence of malaria. If such geography-specific factors are indeed relevant for explaining the low relative income levels of SSA countries independent from measures of the quality of governance, then results based on a specification where governmental quality is regressed on the level of income as the only explanatory variable should actually indicate that the residuals for SSA countries significantly positively deviate from the estimated regression line.

This leaves us with two possibilities for the link between the quality of governance and the level of income. First, geography-specific factors may indeed be irrelevant for explaining the low relative income level of SSA countries, as the present majority of leading empirical studies would have it. Second, geography-specific factors may affect income levels independent from measures of the quality of governance as emphasized by Sachs (2003) and more recently by Carstensen and Gundlach (2006), but such an effect would not show up once a nonlinear estimation method is used to estimate the reverse causality. Our point is that the hypothesis favored by the UN report (UN Millennium Project 2005) can be tested by regressing a measure of income on *instrumented* measures of governmental quality and other variables (such as disease ecology) to see whether SSA countries systematically deviate from the regression line. If they do, it could be said that they are systematically governed differently than other comparable countries. If they do not, it would follow that the weak quality of governance is definitely not the only factor that explains the low relative income levels of SSA countries. Put differently, SSA countries may not be poorer than comparable countries only because they are governed worse, but they may be governed worse just because they are poorer than other countries.

3. Reconsidering the Impact of Institutions on Income: OLS Estimation

The following empirical analysis aims at untangling the observed quality of governance from the level of income in order to see whether SSA countries significantly deviate from an average pattern for a larger group of countries. Such an exercise would of course be meaningless if the hypothesis of the primacy of institutions were correct. But if this hypothesis is not correct, it makes sense to estimate a relation between a measure of governmental quality and the level of development that conditions for other potential determinants of development to see whether SSA countries would even then significantly deviate from the average pattern for a larger group of countries. Hence we begin our empirical analysis by reexamining the relationship between institutional quality and income. The most simplified specification reads

$$\ln GDPW_i = c + \alpha \ GQUAL_i + \varepsilon_i \quad , \tag{1}$$

where ln*GDPW* is a measure of real GDP per worker in country *i*, *GQUAL* is a measure of governmental quality, and ε_i is the residual.

This specification helps to identify the different implications that arise from the alternative interpretations of the link between income and institutions. The literature that favors the primacy of institutions hypothesis would suggest that the low income of SSA countries can be completely explained by their low scores of governmental quality. Therefore, the GDP per worker of SSA countries should be fairly well predicted by estimates based on equation (1). This should be reflected by statistically insignificant deviations of the residuals of SSA countries from the estimated regression line. In contrast to the primacy of institutions hypothesis, the Sachs et al. (2004) hypothesis would suggest that Sub-Saharan Africa's problem may not only be caused by the weak quality of its governance but by other factors as well. This hypothesis would imply that a regression of income on institutions systematically overestimates the income of SSA countries given their level of governmental quality. So if the Sachs hypothesis is right, then the GDP per worker of SSA countries should in fact be systematically lower than would be predicted by equation (1). Adding a dummy variable for SSA countries is a convenient way to check whether their GDP per worker is systematically overestimated by equation (1):

$$\ln GDPW_i = c + \alpha \, GQUAL_i + \beta \, SSA_i + \varepsilon_i \quad , \tag{2}$$

where a statistically significant negative coefficient β would support the Sachs hypothesis.

We use two alternative samples and five alternative governance indicators for the estimation of equation (2), and also in the subsequent analysis. Our larger sample includes 66 former colonies for which data on settler mortality are available. We exclude the colonizing European powers from the sample because only for the countries that have been colonized there is exogenous variation in the measure of governmental quality that can be used to estimate a causal relationship. Our smaller sub sample of 45 countries is obtained from the larger sample by deleting countries that are either small (less than one million inhabitants in 1990), or are mainly dependent on oil production, or are known for providing unreliable data.[3] We use the logarithm of GDP per worker (ln*GDPW*) as the dependent variable, which is taken from the Penn World Tables 6.1 revision of Heston et al. (2002). For the measurement of governmental quality, we use alternative indicators throughout the paper: social infrastructure (*SOCINF*), government antidiversion policies (*GADP*), risk of expropriation (*EXPROP*), rule of law (*RULELAW*), control of corruption (*CONCORR*), and an average value of the six aggregate governance indicators (*AVGGOV*) of Kaufmann et al. (2003).[4]

Table 1 presents the OLS estimates of equation (2); Table A1 in the appendix presents the estimates for the alternative sample with 45 countries. We find statistically and economically

[3] Rated as D-countries in Summers and Heston (1991).
[4] We provide a detailed description of all variables that are used in the empirical analysis and a list of sample countries in the appendix.

significant coefficients of the measures of governmental quality and of the SSA-dummy. The SSA-dummy clearly adds explanatory power to the model, as has been emphasized in earlier cross-country regressions that focused on measures of factor accumulation as explanatory variables.[5] This result is robust to using different institutional variables. Hence we find that SSA countries on average appear to have a statistically significantly lower GDP per worker than the other sample countries, even if the quality of their institutions is controlled for.

Given that the primacy of institutions view is right, our finding would suggest that SSA countries are systematically governed worse than the other sample countries. But if the Sachs hypothesis (and the UN) hypothesis is right, the SSA dummy may capture the income effects of an omitted variable, for instance disease ecology. Moreover, the problem with these OLS estimates is that they neglect the possible reverse causality from measures of income to measures of institutions, which may cause biased estimates of the coefficient of interest.

4. Controlling for the Endogeneity of Institutions: IV Estimation

The problem of reverse causality can be addressed by using instrumental variable (IV) estimation instead of OLS. That is, in addition to equation (2) we have the first stage regression:

$$GQUAL_i = \lambda + \gamma \cdot INSTRUMENT_i + \phi \cdot SSA_i + \mu_i \quad , \qquad (3)$$

where μ is the residual, and *INSTRUMENT* is a variable that is correlated with the measure of governmental quality, but does not directly affect and is not effected by the measure of income. As is self evident, finding appropriate instruments is the most challenging step of the IV estimation. Technically speaking, instruments must satisfy the conditions that they are

[5] For a review of this literature, see Collier and Gunning (1999).

uncorrelated with the error term ε_i of equation (2)) and that they influence the dependent variable *only* via the explanatory endogenous variable, in our case the measure of governmental quality. As mentioned in the previous section, several alternative instruments have been suggested in the recent literature on the cross-country empirics of growth. Partly a s a response to this emerging literature, more recent work has highlighted the pitfalls of using instrumental variables with little explanatory power.[6]

Using so-called weak instruments can lead to substantial bias in the estimated IV coefficients. Stock and Staiger (1997) use the F-statistics from the first-stage regression to test whether the selected instruments are weak. As a rule of thumb they suggest that for the case of a single equation endogenous regressor, an F-statistic below 10 is cause for concern. We have computed the first stage F-statistics for a number of instrument variables that have been used in the literature. Overall, we find that (the natural logarithm of) settler mortality (ln*MORT*) passes the Stock-Staiger test for all of our six measures of governmental quality. We have also considered the revised settler mortality data suggested by Albouy (2004), which perform less well in the Stock-Staiger test for most of our measures of governmental quality. Other instrumental variables like the fraction of the population speaking English as a mother tongue (*ENGFRAC*) and distance from the equator (*LAT*) also pass the Stock-Staiger test for some of our measures of governmental quality. Further variables that have been suggested in the literature as instruments do not pass the Stock-Staiger test for our sample of countries.[7] Hence in most of our specifications, we focus on our average measure of governmental quality (*AVGGOV*) and on the three preferred instrumental variables to identify the causal effects of institutions on income.

[6] See Hahn and Hausman (2002).
[7] Detailed results are available upon request.

Table 2 shows the results of our first set of IV estimates. After controlling for endogeneity, the estimated coefficients of the measure of governmental quality and of the SSA dummy variable remain statistically significant and economically important, independent of the instrumental variable(s) used. The first stage results indicate that there is no weak instrument problem since the F-test statistic is above 10 in all cases and the partial R^2 is never close to zero. With the exception of column (6), the results of the test for overidentifying restrictions indicate that the chosen instruments do not directly impact on the dependent variable. This finding confirms the importance both of institutions and of the SSA-dummy for explaining the cross-country variation in levels of income. The negative coefficient of the SSA-dummy highlights that institutions alone are not sufficient to explain the large development gap between the SSA countries and the other former colonies in the sample. The results for the small sample (Table A2) largely confirm this interpretation.

Our results in Table 2 (and in Table A2) also reveal that the IV coefficients for the measure of governmental quality are in most specifications larger than the OLS estimate for the same variable. There are several explanations for this finding, which has been noted before. Hall and Jones (1999) and Rodrik et al. (2004) claim that it indicates that the attenuation bias from measurement error in the institution variable crowds out the simultaneous equation bias. Another possible explanation could be that the IV estimates reflect omitted variable bias. An upward bias in the estimate of the coefficient of the institutional variable could be the result of an omitted variable that affects both the institutional variable and the dependent variable in the same direction. Therefore, as soon as we have an omitted variable that is positively correlated with the instruments and negatively affects the dependent variable, the coefficient of the institutional variable will be biased upward. At the same time, an omitted variable that is positively correlated with the SSA-dummy and negatively correlated with the dependent variable will lead to a downward bias of the SSA-dummy.

Up to this point it can be summarized that our regression results find more evidence in favor of the Sachs hypothesis than of the primacy of institutions hypothesis. The SSA-dummy is negative and statistically highly significant no matter which sample, which measure of governmental quality, or which instrumental variable is used. This suggests that even if the level of the quality of governance in SSA countries is poor, it may not be as bad as is widely assumed. This is because governmental quality should be assessed relative to the level of income, which in SSA countries is apparently conditioned by other factors than institutions as well. But if it is not only institutions that are responsible for Africa's poverty, what else plays a role? This question is tackled in the remaining section of the paper.

5. Extension of the Empirical Model: Adding Geography-Related Variables

5.1 IV Estimation

The finding of a statistically significant and economically important SSA-dummy together with a possible omitted variable bias suggests that there could be additional explanatory variables along with institutions that have a direct impact on income per worker. For understanding and fostering the African development process it is of great significance to investigate which factors might be captured by the SSA-dummy. We are looking for an omitted variable that lowers income significantly and that is particularly severe in Sub-Saharan Africa. This leads us to consider the impact of geography-related variables on Africa's low level of development, as already discussed in Section 2.

Among the geography-related factors that are discussed in the literature, a SSA-specific disease variable appears to be the most promising candidate. Sub-Saharan Africa's disease burden is unique. SSA countries are and always have been severely affected by tropical diseases and more recently have to deal with the highest percentage of HIV infections in the world, which according to new research findings appears to interact with malaria.[8] So it is tempting to conclude that an ecology that is particularly favorable for the biological evolution of diseases may provide an explanation for the economic relevance of the SSA dummy. To test this presumption, we extend our model by adding disease ecology (*DISEASE*) as an additional explanatory variable to equation (3):

$$\ln GDPW_i = c + \alpha\ GQUAL_i + \beta\ SSA_i - \delta\ DISEASE_i + \varepsilon_i \quad . \tag{4}$$

There are different possibilities to measure disease ecology. For instance, one could consider the prevalence of a range of tropical diseases like malaria, dengue fever, yellow fever or sleeping sickness, or one could consider the prevalence of HIV infections. HIV is not used to proxy for disease ecology because in our empirical benchmark year 1995 the HIV burden was still sufficiently small to cause only minor economic impacts. Among the prevailing tropical diseases, malaria seems to be particularly suitable for capturing the SSA-specific disease ecology. Malaria is not only a problem of the tropics in general, but as the so-called Index of Malaria Transmission[9] indicates, it is especially a burden in SSA countries. Therefore, a measure of the prevalence of malaria seems to capture particularly well the SSA-specific disease ecology.[10]

For an estimation of equation (4), we use two alternative disease variables that measure the risk of malaria transmission. The variable *MALRISK* reports the percentage of the population of a country at risk of transmission of three non-fatal species and the fatal species

[8] See The Economist (print edition), Aids and Malaria: A Vicious Circle, Dec 8th, 2006.
[9] See Kiszewski et al. (2004).
[10] For a further discussion of the economic impact of malaria see also Gallup et al. (1999), Gallup and Sachs (2001), Malaney et al. (2004), and Carstensen and Gundlach (2006).

of malaria[11]. The variable *MFALRISK* measures the percentage of the population at risk of transmission of the fatal species, Plasmodium Falciparum. This fatal species of malaria is particularly prevalent in Sub-Saharan Africa.

In order to identify the causal effect from disease ecology to income, we employ an additional instrument variable, namely malaria ecology (*MALECO*). The measure of malaria ecology was developed by Kiszewksi et al. (2004) and first used by Sachs (2003). As opposed to the actual prevalence of malaria, malaria ecology measures the biological potential for malaria transmission, not its actual transmission. It combines measures of temperature and vector conditions, such as breeding conditions for mosquitoes, their human biting behavior and daily survival rates, thereby creating a merely ecologically-based measure that is exogenous to the level of income and is predictive of malaria risk. We also use a proxy measure of humidity (*HUMID*) as an instrumental variable for malaria prevalence in some of our specifications.

A second endogenous explanatory variable as in equation (4) leaves us with two first stage regression equations, such that

$$\begin{aligned} GQUAL_i &= \psi + \omega\, INSTRUMENT1_i + \eta\, INSTRUMENT2_i + \pi\, SSA_i + \zeta_i \\ DISEASE_i &= \tau + \vartheta\, INSTRUMENT1_i + \rho\, INSTRUMENT2_i + \varphi\, SSA_i + \nu_i \end{aligned} \tag{5}$$

where *INSTRUMENT* stands for one or more instrumental variables, and ζ and ν are residuals. Table 3 (see also Table A3) shows the results of the IV estimation of equation (4) with the two first stage regression equations (5). When we include the disease variable

[11] The nonfatal species included are: Plasmodium Vivax, Plasmodium Malariae and Plasmodium Ovale, the fatal species is Plasmodium Falciparum.

together with the SSA-dummy, both coefficients turn out to be statistically insignificant (see columns (1) and (4)). This statistical insignificance appears to result from the apparent SSA-bias of the malaria variables, which creates a problem of multicollinearity. There is a high correlation between the SSA dummy and the two malaria measures *MALRISK* and *MALFALRISK*, with correlation coefficients of 0.86 and 0.71, respectively. Given the empirical model $\ln GDPW_i = c + \alpha\ GQUAL_i - \delta\ DISEASE_i + \varepsilon_i$, the additional inclusion of the SSA dummy would add little orthogonal variation, which results in the insignificance of both the disease variable and the dummy variable. Hence we exclude the SSA dummy from our regression equation (4) in order to avoid the multicollinearity problem.

With the revised specification without the SSA dummy, the estimated coefficients of the disease variables become statistically significant (see columns (2), (3), (5), and (6); also in Table A3). The results for the large and the small sample indicate that the point estimates of the coefficients of the measures of malaria risk are in the range of about –1.2 to about –1.9. The first stage regression results for the F-test, the partial R^2, and the Shea partial R^2 suggest that there is no serious weak instrument problem. The test for overidentifying restrictions (columns (3) and (6)) rejects the hypothesis that one of the instruments directly belongs into the estimation equation, whereas the Cragg-Donald test suggests the presence of weak instruments except for specifications (2) and (5), for both samples.

Overall, our estimates imply a quantitatively important negative effect of the measure of disease ecology on income per worker. Considering the range of statistically significant point estimates, countries with a 100 percent risk of malaria infection are predicted to have on average an income per worker that is lower by a factor in the range of 3.3-6.7 (exp(1.2)=3.3; exp(1.9)=6.7) as compared to countries with the same measure of governmental quality but zero malaria risk. Taking these results at face value it would follow that all other things being constant, a country with maximum malaria risk would only reach about 15-30 percent of the average income per worker of otherwise identical countries with no malaria risk.

However, these results must not be over interpreted. One reason is the weak instrument problem. Another reason is that there is probably too little discriminatory power among the available instrumental variables, which except for *ENGFRAC* are all based on geographic characteristics. For instance, the estimated coefficients of either the disease measure or the institutions measure sometimes become statistically insignificant once alternative measures of governmental quality are employed.[12] This outcome may result from the high correlation of the instrumental variables. For instance, the correlation coefficient between ln*MORT* and *MALECO* is 0.71 in the large sample and 0.59 in the small sample. Hence the statistical significance of the results reported in Table 3 and Table A3 should not be taken too literally.

Up to this point the results of the estimations including malaria risk nevertheless suggest that there is positive evidence that disease (malaria) prevalence directly affects income per worker and mainly explains the statistical significance of the SSA dummy. The caveat is, as just discussed, the difficulty to find independent instruments for institutions and malaria. In the case of highly correlated instruments no accurate interpretation of the results is possible. Therefore, we reconsider the previous results by estimating a conditional coefficient of the measure of governmental quality, which can be motivated by the finding of direct income effects of malaria prevalence as reported by Carstensen und Gundlach (2006). This is not to deny that there is trade off involved: either one has to accept that there are not enough independent instruments to allow for a clear-cut identification of independent causal effects of disease prevalence and governmental quality (as in this sub-section), or one has to give up on estimating independent coefficients of the measures of governmental quality and disease prevalence (as in the next sub-section).

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[12] Detailed results are not reported but available upon request.

5.2 Estimating Conditional Coefficients

Imposing the restriction that the quantitative effect of disease ecology on income per worker is known, our empirical model can be revised such that the variables *MALRISK* and *MFALRISK* are multiplied with the previously estimated coefficients and transferred to the left-hand-side of the estimation equation. The measure of governmental quality then remains as the only explanatory variable on the right hand side that has to be instrumented, which solves the problem that the instruments may not have enough discriminatory power to identify independent causal effects:

$$\ln GDPW_i + \delta \; DISEASE_i = c + \alpha \; GQUAL_i + \varepsilon_i \quad . \tag{6}$$

As a point of reference for the coefficient δ, we simply refer to Tables 3 and A3. We use the point estimates from our preferred specifications (2) and (5), where no weak instrument problem has been detected. So we impose the restriction that the coefficient on *MALRISK* equals 1.8 and the coefficient on *MFALRISK* equals 1.3 for our large sample of countries, and we restrict the respective coefficients to 1.5 and 1.2 for the small sample of countries. With these restrictions, we estimate equation (6) with our three preferred instrumental variables for alternative measures of governmental quality (*AVGGOV*, *EXPROP*; and *SOCINF*) that have been used in different previous studies. The restrictions imposed also solve the multicollinearity problem discussed for specifications (1) and (4) of Table 3. Hence we can re-introduce the SSA-dummy to see whether Sub-Saharan African countries differ from the other sample countries once we condition for disease ecology. The results are shown in Table 4 (and in Table A4).

A general finding is that the SSA-dummy turns out to be statistically insignificant in all specifications. The results for the coefficients of the alternative measures of governmental quality *AVGGOV*, *EXPROP*; and *SOCINF* are less uniform, especially when considered in combination with the first stage results, because in some specifications for the large sample of countries (Table 4) the coefficients are not statistically significant and in some specifications there may be a weak instrument problem. However, the results for the small sample (Table A4) and the results for the specifications where income is conditioned by the disease measure *MFALRISK* (specifications (4), (5), and (6)) provide fairly robust evidence for a statistically significant effect of governmental quality on income without a statistically significant SSA-dummy. This result suggests that once we control the level of income for a measure of the prevalence of diseases that is especially relevant for SSA countries, it remains no longer true that SSA countries have a lower level of income for a given level of governmental quality. Thus SSA countries are apparently not governed differently than other sample countries, as was initially indicated by the statistically significant SSA dummy.

Figure 1 summarizes our main empirical results. The upper panel shows the correlation between our measure of income (ln*GDPW*), here labeled as the level of development, and our preferred measure of governmental quality (*AVGGOV*). The SSA countries clearly dominate the area with the lowest scores of governmental quality *and* deviate in a statistically significant way from the sample correlation, such that the SSA dummy explains the vertical distance between the two parallel regression lines, as reported in column (6) of Table 1. According to the primacy of institutions hypothesis, which only allows for governmental quality as a determinant of development, this finding seems to suggest that SSA countries are systematically governed worse than the other sample countries: they get a lower income level from a given level of governmental quality.

The lower panel of Figure 1 shows that once we adjust our measure of income for the effects of disease prevalence, as proxied by the prevalence of malaria falciparum (*MFALRISK*), it is no longer true that SSA countries deviate in a statistically significant way from the (conditional) sample correlation, as reported in column (4) of Table 4. SSA countries still dominate the area with the lowest scores of governmental quality, but now they fit into the general pattern that can be observed for the other sample countries. Hence we do not deny that SSA countries are partly poor because they are not governed well, which is an obvious fact, but we find that they are not differently governed than other countries once their level of development is adjusted for the direct impact of disease prevalence.

6. Conclusion

A majority of recent empirical studies in leading economics journals concludes that poor governance is the most important if not the only reason for being a poor country. While there can hardly be any doubt that good government matters for economic development, being a poor country may in itself also be an important reason for poor governance. Hence the observed strong correlation between measures of development and institutional performance may prove to be misleading if country-specific constraints are ignored that also determine the level of development. We actually find that SSA countries do not appear to be governed differently than other sample countries once we take into account a specific determinant of their low level of income, namely the prevalence of diseases. Our empirical result stands up to using different measures of governmental quality, different instrumental variables, and different samples of countries.

Taken at face value, our result confirms the basic argument advanced by Sachs et al. (2004) and by a recent UN report (UN Millennium Project 2005). These studies claim that there are other factors besides the quality of institutions that can explain why some countries are much poorer than others. We find that measures of disease prevalence, which are especially relevant for SSA countries, affect the level of development *independent* from measures of institutions. We acknowledge that there is some debate in the literature about the empirical robustness of such a direct development impact of geography-related factors. But even if such factors were only marginally relevant for the level of development, they would have to be taken into account when attempting to derive conclusions about the appropriateness of alternative development policies. Thus the primacy of institutions hypothesis, which completely ignores other determinants of long-run growth besides good governance, is likely to lead to disappointing results when translated into actual development policies.

Nevertheless, it should be noted that a clear-cut quantitative assessment of the direct development effects of institutions versus disease ecology is restricted by the present lack of valid independent instrumental variables. Given the available data, we simply cannot judge whether the estimated coefficients correctly disentangle the web of causalities between institutions, disease ecology, and income. However, this limitation does not only apply to our paper but also to the other recent contributions to the literature on the development impact of institutions vs. geography. Taking into account the limitations of an accurate interpretation of (our) empirical results, we think that on balance some doubts arise on the primacy of institutions hypothesis. With a view on SSA countries, we show that the statistical insignificance of geography-related variables as claimed by the primacy of institutions hypothesis is not robust. Our paper supports the view that good institutions alone are no guarantee for economic development. For instance, an unfavorable disease ecology may hinder economic development even if countries are governed relatively well given the constraints they face. SSA countries are of course not generally governed well, but when considering Sub-Saharan Africa’s development problem it seems inapt to blame weak institutional quality alone.

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Appendix

I. Definitions and Sources of Variables:

AVGGOV	Average of 6 aggregate governance indicators for the year 1996: voice and accountability, political stability, political stability, government effectiveness, regulatory quality, rule of law and control of corruption. Source: Kaufmann, Kraay, and Mastruzzi (2003)
CONCORR	Control of corruption, aggregate governance indicator based on country-specific survey data for 1996. Source: Kaufmann, Kraay, and Mastruzzi (2003)
ENGFRAC	Fraction of the population speaking English as mother tongue. Source: Hall and Jones (1999)
EXPROP	Index of protection against expropriation 1985-1995, measured on a [0, 10] scale. Source: Acemoglu, Johnson, and Robinson (2001)
GADP	Index of government antidiversion policies from Political Risk Services (average 1986-1995). GADP is one component of the index of social infrastructure. Source: Hall and Jones (1999)
HUMID	Highest temperature during the month when average afternoon humidity is at its highest. Source: Parker (1997)
LAT	Distance from the equator as measured by the absolute value of country-specific latitude in degrees divided by 90 to place it on a [0,1] scale. Source: Hall and Jones (1999)
ln*GDPW*	Natural logarithm of real GDP per worker in 1995. Source: Heston, Summers, and Aten (2002)
ln*MORT*	Natural logarithm of an estimate of mortality rates, of British soldiers and of other populations (e.g. bishops in Latin America), from disease in the European colonies in the early 19th century. It is measured as the death rate among 1000 settlers. Source: Acemoglu, Johnson, and Robinson (2001) ln*MORTH* and ln*MORTL* are the high (*H*) and low (*L*) revisions of the mortality data according to Albouy (2004).
MALECO	Malaria ecology is an ecologically-based variable that combines measures of temperature and vector conditions, such as breeding conditions for mosquitoes, their human biting behavior and daily survival rates. MALECO is predictive of the extent of malaria transmission risk. Source: Kiszewksi et al. (2004)
MALRISK	MALRISK measures the proportion of each country's population that live with risk of malaria transmission, involving three largely non-fatal species of malaria (Plasmodium vivax, Plasmodium malariae, Plasmodium ovale) and the fatal species Plasmodium falciparum. Source: Sachs (2003)

MFALRISK MFALRISK multiplies the MALRISK index by an estimate of the proportion of national malaria cases that involve the fatal species Plasmodium falciparum.
Source: Sachs (2003)

RULELAW Rule of law, aggregate governance indicator based on country-specific survey data for 1996.
Source: Kaufmann, Kraay, and Mastruzzi (2003)

SOCINF Index of social infrastructure, defined as the average of an index of government antidiversion policies from Political Risk Services (average 1986-1995) and an index of trade openness. The index of trade openness is constructed by Sachs and Warner (1995) as a fraction of years in 1950-1994 that an economy has been open. Social infrastructure is measured on a [0,1] scale.
Source: Hall and Jones (1999)

SSA Sub-Saharan Africa dummy; equals 1 for Sub-Saharan countries and 0 otherwise.

II. List of Countries

1. Large Sample (n=66)
Angola, Argentina, Australia, Bangladesh, Barbados [a) b) c)], Bolivia, Brazil, Burkina Faso, Cameroon, Canada, Cent. African Rep.[a) b)], Chad[a) b)], Chile, Colombia, Congo, Costa Rica, Dom. Rep., Ecuador, Egypt, El Salvador, Ethiopia, Gabon, Gambia, Ghana, Guatemala, Guinea, Guyana, Haiti, Honduras, Hong Kong, India, Indonesia, Cote d'Ivoire, Jamaica, Kenya, Madagascar, Malaysia, Mali, Malta[c)], Mauritania[a)], Mauritius[a)], Mexico, Morocco, New Zealand, Nicaragua, Niger, Nigeria, Pakistan, Panama, Paraguay, Peru, Rwanda[a) b)], Senegal, Sierra Leone, Singapore, South Africa, Sri Lanka, Tanzania, Togo, Trinidad and Tobago, Tunisia, Uganda, Uruguay, USA, Venezuela, Zaire

2. Small Sample (n=45)
Angola, Argentina, Australia, Bangladesh, Bolivia, Brazil, Burkina Faso, Cameroon, Canada, Chile, Colombia, Costa Rica, Dom. Rep., Ecuador, El Salvador, Guatemala, Guinea, Honduras, Hong Kong, India, Indonesia, Cote d'Ivoire, Jamaica, Kenya, Madagascar, Malaysia, Mauritania[a) b)], Mexico, Morocco, New Zealand, Nigeria, Pakistan, Panama, Paraguay, Peru, Senegal, Singapore, South Africa, Sri Lanka, Tanzania, Trinidad and Tobago, Tunisia, Uruguay, USA, Venezuela

[a)] Not included in regressions with *EXPROP* as institutional variable

[b)] Not included in regressions with *AVGGOV* and *CONCORR* as institutional variables

[c)] Not included in regressions with disease ecology variables (*MALRISK/MFALRISK*)

III. Appendix Tables

Table A1: The Empirical Relevance of the SSA-Dummy (OLS, small sample)

	Dependent variable: ln*GDPW*					
	(1)	(2)	(3)	(4)	(5)	(6)
SOCINF	2.228 (0.417)					
GADP		3.231 (0.416)				
EXPROP			0.358 (0.063)			
RULELAW				0.643 (0.092)		
CONCORR					0.596 (0.083)	
AVGGOV						0.777 (0.108)
SSA-Dummy	-1.149 (0.203)	-1.400 (0.154)	-1.180 (0.200)	-1.009 (0.183)	-1.313 (0.169)	-1.000 (0.184)
Obs.	45	45	44	45	44	44
$\overline{R}^2$	0.708	0.798	0.712	0.774	0.774	0.774
s.e.e.	0.540	0.448	0.531	0.475	0.470	0.470

Standard errors in parentheses. All specifications include a constant term (not reported).

Table A2: IV-Estimates of the Empirical Relevance of the SSA-Dummy (small sample)

	Dependent variable: ln*GDPW*					
	(1)	(2)	(3)	(4)	(5)	(6)
AVGGOV	0.994 (0.167)	0.940 (0.271)	0.755 (0.190)	0.910 (0.143)	0.903 (0.167)	0.972 (0.141)
SSA-dummy	-0.830 (0.211)	-0.872 (0.268)	-1.018 (0.218)	-0.896 (0.197)	-0.901 (0.207)	-0.541 (0.249)
Instruments	ln*MORT*	*LAT*	*ENGFRAC*	ln*MORT, LAT, ENGFRAC*	ln*MORTH, LAT, ENGFRAC*	ln*MORTL, LAT, ENGFRAC*
No. of obs.	44	44	44	44	44	35
First stage results						
F-test	30.76	7.58	17.61	15.80	8.80	11.15
Partial R^2	0.429	0.156	0.301	0.549	0.404	0.527
Overident. test	-	-	-	1.409	3.160	7.181
p-value	-	-	-	0.494	0.206	0.028

Standard errors in parentheses. All specifications include a constant term (not reported) and the SSA-dummy as an instrument.

Table A3: IV-Estimates with Disease Ecology (small sample)

	Dependent variable: ln*GDPW*					
	(1)	(2)	(3)	(4)	(5)	(6)
AVGGOV	0.699 (0.275)	0.648 (0.222)	0.569 (0.192)	0.786 (0.193)	0.777 (0.165)	0.739 (0.134)
MALRISK	-1.179 (1.111)	-1.523 (0.419)	-1.560 (0.388)	-	-	-
MFALRISKk	-	-	-	-1.094 (0.945)	-1.205 (0.282)	-1.237 (0.251)
SSA-dummy	-0.243 (0.620)	-	-	-0.099 (0.688)	-	-
Instruments	ln*MORT*, *MALECO*	ln*MORT*, *MALECO*	ln*MORT*, *MALECO*, *ENGFRAC*, *HUMID*, *LAT*	ln*MORT*, *MALECO*	ln*MORT*, *MALECO*	ln*MORT*, *MALECO*, *ENGFRAC*, *HUMID*, *LAT*
No. of obs.	44	44	44	44	44	44
First stage results						
F-test						
AVGGOV	17.74	27.21	16.98	17.74	27.21	16.98
MALRISK	3.39	20.12	8.49	-	-	-
MFALRISK	-	-	-	6.83	41.81	16.04
Partial R^2						
AVGGOV	0.470	0.570	0.691	0.470	0.570	0.691
MALRISK	0.145	0.495	0.528	-	-	-
MFALRISK	-	-	-	0.255	0.671	0.679
Shea partial R^2						
AVGGOV	0.188	0.334	0.430	0.275	0.371	0.548
MALRISK	0.058	0.290	0.328	-	-	-
MFALRISK	-	-	-	0.149	0.436	0.539
Overident. test	-	-	2.495	-	-	1.287
p-value	-	-	0.476	-	-	0.732
Cragg-Donald	1.23	7.95	3.67	3.39	11.27	7.83
Critical value	7.03	7.03	19.45	7.03	7.03	19.45

Standard errors in parentheses. All specifications include a constant term (not reported). Specifications (1) and (4) include the SSA-dummy as an instrument. A Cragg-Donald test statistic below the critical value indicates the presence of weak instruments.

Table A4: IV-Estimates with Income Conditioned by Disease Prevalence (small sample)

	Dependent variable:					
	ln*GDPW + 1.5*MALRISK*			ln*GDPW + 1.2*MFALRISK*		
	(1)	(2)	(3)	(4)	(5)	(6)
AVGGOV	0.519 (0.141)	-	-	0.709 (0.123)	-	-
EXPROP	-	0.291 (0.075)	-	-	0.393 (0.072)	-
SOCINF	-	-	2.024 (0.524)	-	-	2.458 (0.511)
SSA-dummy	-0.163 (0.193)	-0.219 (0.174)	-0.157 (0.188)	-0.072 (0.169)	-0.157 (0.167)	-0.123 (0.183)
Instruments	ln*MORT, ENGFRAC, LAT*	ln*MORT, ENGFRAC, LAT*	ln*MORT, ENGFRAC, LAT*	ln*MORT, ENGFRAC, LAT*	ln*MORT, ENGFRAC, LAT*	ln*MORT, ENGFRAC, LAT*
No. of obs.	44	44	45	44	44	45
First stage results						
F-test	15.80	11.41	10.19	15.80	11.41	10.19
Partial R^2	0.549	0.468	0.433	0.549	0.468	0.433
Overident. test	2.047	2.454	1.311	0.741	1.863	5.129
p-value	0.359	0.293	0.519	0.690	0.394	0.077

Standard errors in parentheses. All specifications include a constant term (not reported).

Figure 1: The Unconditional and the Conditional Development Effects of Good Governance

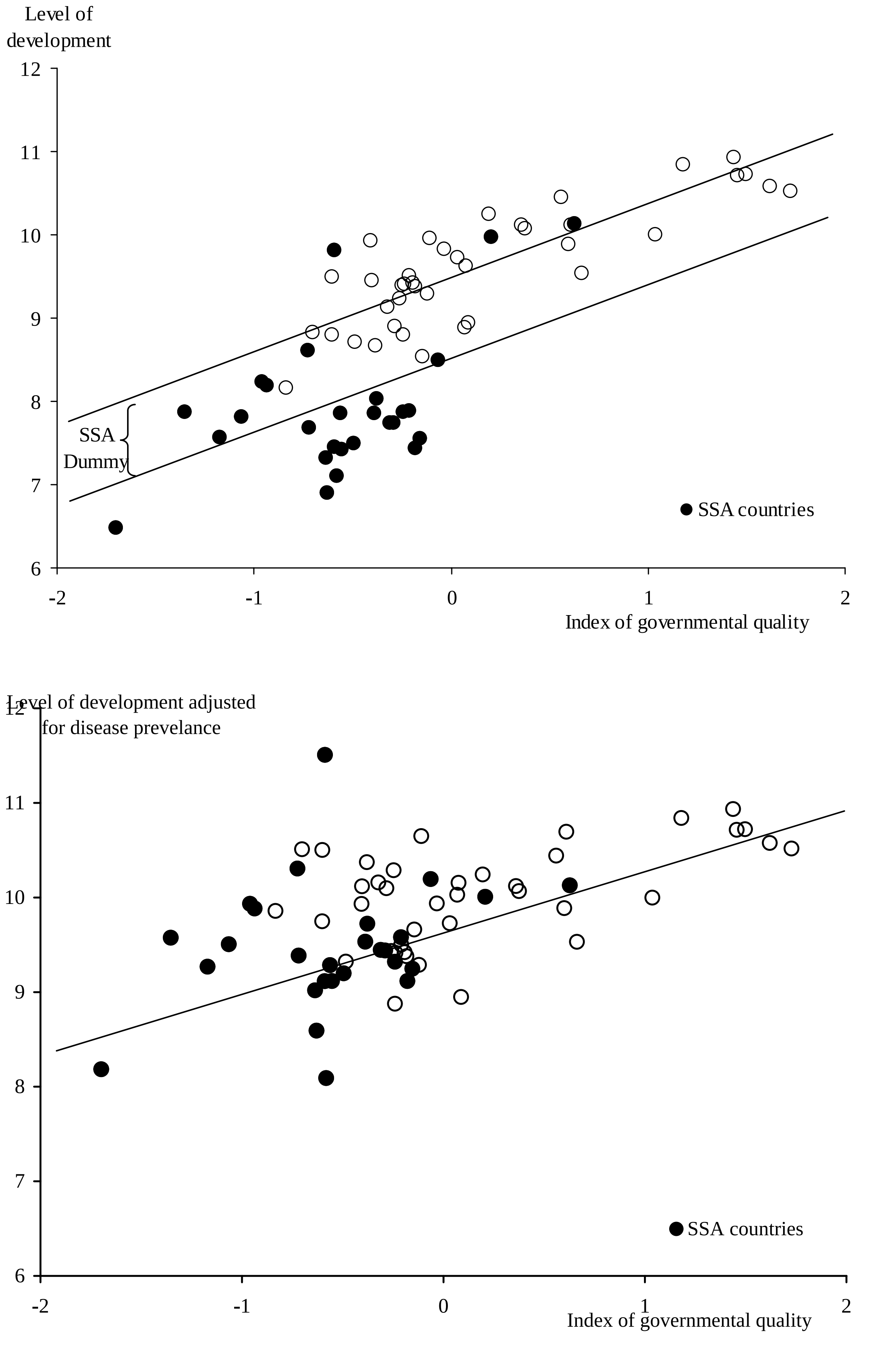

Table 1: The Empirical Relevance of the SSA-Dummy (OLS)

	Dependent variable: ln*GDPW*					
	(1)	(2)	(3)	(4)	(5)	(6)
SOCINF	2.632 (0.364)	-	-	-	-	-
GADP	-	3.731 (0.396)	-	-	-	-
EXPROP	-	-	0.374 (0.052)	-	-	-
RULELAW	-	-	-	0.683 (0.097)	-	-
CONCORR	-	-	-	-	0.627 (0.097)	-
AVGGOV	-	-	-	-	-	0.882 (0.114)
SSA-dummy	-1.135 (0.161)	-1.308 (0.131)	-1.270 (0.158)	-1.132 (0.164)	-1.222 (0.172)	-0.956 (0.171)
No. of obs.	66	66	60	66	61	61
$\bar{R}^2$	0.740	0.803	0.760	0.733	0.699	0.744
s.e.e.	0.573	0.500	0.544	0.581	0.609	0.561

Standard errors in parentheses. All specifications include a constant term (not reported).

Table 2: IV-Estimates of the Empirical Relevance of the SSA-Dummy

	Dependent variable: ln*GDPW*					
	(1)	(2)	(3)	(4)	(5)	(6)
AVGGOV	1.229 (0.227)	1.053 (0.276)	0.687 (0.241)	1.001 (0.169)	0.830 (0.187)	1.012 (0.144)
SSA-dummy	-0.700 (0.229)	-0.830 (0.251)	-1.099 (0.232)	-0.868 (0.192)	-1.046 (0.205)	-0.714 (0.232)
Instruments	ln*MORT*	*LAT*	*ENGFRAC*	ln*MORT*, *ENGFRAC*, *LAT*	ln*MORTH*, *ENGFRAC*, *LAT*	ln*MORTL*, *ENGFRAC*, *LAT*
No. of obs.	61	61	61	61	60	40
First stage results						
F-test	22.41	11.80	16.72	14.73	10.16	12.55
Partial R^2	0.279	0.169	0.224	0.441	0.357	0.518
Overident. test p-value	- -	- -	- -	4.068 0.131	1.262 0.532	8.714 0.013

Standard errors in parentheses. All specifications include a constant term (not reported) and the SSA-dummy as an instrument.

Table 3: IV-Estimates with Disease Ecology

	Dependent variable: ln*GDPW*					
	(1)	(2)	(3)	(4)	(5)	(6)
AVGGOV	0.610 (0.316)	0.465 (0.294)	0.379 (0.239)	0.739 (0.242)	0.726 (0.210)	0.666 (0.163)
MALRISK	-1.319 (0.816)	-1.842 (0.452)	-1.883 (0.400)	-	-	-
MFALRISK	-	-	-	-1.277 (0.754)	-1.349 (0.288)	-1.396 (0.252)
SSA-dummy	-0.302 (0.377)	-	-	-0.057 (0.491)	-	-
Instruments	ln*MORT*, *MALECO*	ln*MORT*, *MALECO*	ln*MORT*, *MALECO*, *ENGFRAC*, *HUMID*, *LAT*	ln*MORT*, *MALECO*	ln*MORT*, *MALECO*	ln*MORT*, *MALECO*, *ENGFRAC*, *HUMID*, *LAT*
No. of obs.	60	60	60	60	60	60
First stage results						
F-test						
AVGGOV	16.58	25.21	17.70	16.58	25.21	17.70
MALRISK	7.68	31.34	15.17	-	-	-
MFALRISK	-	-	-	10.09	54.00	23.50
Partial R^2						
AVGGOV	0.372	0.469	0.621	0.372	0.469	0.621
MALRISK	0.215	0.524	0.584	-	-	-
MFALRISK	-	-	-	0.265	0.655	0.685
Shea partial R^2						
AVGGOV	0.165	0.231	0.352	0.225	0.298	0.488
MALRISK	0.095	0.258	0.331	-	-	-
MFALRISK	-	-	-	0.160	0.416	0.539
Overident. test	-	-	1.080	-	-	0.449
p-value	-	-	0.782	-	-	0.930
Cragg-Donald	2.92	8.01	4.91	5.06	12.03	9.92
Critical value	7.03	7.03	19.45	7.03	7.03	19.45

Standard errors in parentheses. All specifications include a constant term (not reported). Specifications (1) and (4) include the SSA-dummy as an instrument. A Cragg-Donald test statistic below the critical value indicates the presence of weak instruments.

Table 4: IV-Estimates with Income Conditioned by Disease Prevalence

	Dependent variable:					
	ln*GDPW + 1.8*MALRISK*			ln*GDPW + 1.3*MFALRISK*		
	(1)	(2)	(3)	(4)	(5)	(6)
AVGGOV	0.303 (0.174)	-	-	0.657 (0.153)	-	-
EXPROP	-	0.171 (0.098)	-	-	0.357 (0.086)	-
SOCINF	-	-	1.376 (0.669)	-	-	2.501 (0.642)
SSA-dummy	-0.220 (0.196)	-0.268 (0.183)	-0.204 (0.185)	-0.100 (0.172)	-0.210 (0.162)	-0.134 (0.177)
Instruments	ln*MORT*, *ENGFRAC*, *LAT*	ln*MORT*, *ENGFRAC*, *LAT*	ln*MORT*, *ENGFRAC*, *LAT*	ln*MORT*, *ENGFRAC*, *LAT*	ln*MORT*, *ENGFRAC*, *LAT*	ln*MORT*, *ENGFRAC*, *LAT*
No. of obs.	60	59	64	60	59	64
First stage results						
F-test	14.25	6.78	7.36	14.25	6.78	7.36
Partial R^2	0.437	0.274	0.272	0.437	0.274	0.272
Overident. test	0.877	0.558	0.117	0.402	0.156	2.641
p-value	0.645	0.756	0.943	0.818	0.925	0.267

Standard errors in parentheses. All specifications include a constant term (not reported).