

HIV/AIDS and African Governance: An Empirical Contribution

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Abstract

Over the past ten years a political science literature has repeatedly predicted that the HIV/AIDS pandemic will fundamentally alter African Governance, with the most alarmist predictions arguing that democracy or even states themselves could collapse. This paper attempts to empirically investigate these claims and finds that there is no significant relationship and that the direction of any relationship is ambiguous at best. This paper also attempts to correct for an endogenous relationship between HIV and the quality of governance by using an instrumental variable, however doing so simply confirms the absence of any empirical relationship between Governance and AIDS.

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The HIV pandemic is a humanitarian crisis on a scale otherwise unprecedented in the modern world. As of 2010 an estimated 34 million people worldwide are living with the Human Immunodeficiency Virus (HIV), an incurable disease with practically universal mortality, and opportunistic diseases related to Acquired Immunodeficiency Syndrome (AIDS) have killed as many as 25 million since 1990.¹

In 2010 Sub-Saharan Africa, already home to most of the world's least developed economies, accounted for two thirds of HIV cases despite being home to just one-eighth of the world's population. As a result, HIV has become a top priority of international development institutions and departments in Western Governments, with initiatives such as the President's Emergency Plan for AIDS Relief (PEPFAR) commanding multi-billion dollar budgets.

This paper will offer an attempt to test the impact of the pandemic on the structure of Africa's political and economic institutions – particularly democracy and the existence of well enforced property rights, which have in recent years come to be regarded as among the most important determinants of economic development. Understanding the potential impact of AIDS on Africa's Governments is important if we are to understand the long run costs of the disease. This paper ultimately finds no significant, substantial or robust relationship between HIV and African Governance since 1980.

The rest of this paper is structured as follows. In section 1, I describe the relevant theoretical literature. In section 2, I give a brief overview of the data. In section 3 I motivate an instrumental variable for HIV. In section 4 I empirically test

¹ Source: UNAIDS

² C_M is the dummy for circumcision rate of 20-80% and similarly $>80\%$ for C_H

my hypotheses and analyse my results, check their robustness to alterations in my specification in section 5 and conclude in section 6.

1. Literature Review, Theory and Hypothesis

Institutions are the structures which govern social co-operation. In this project I will focus on a narrow definition of “political institutions”; that is, whether decisions are taken by democratic process or not; and on “economic institutions”; the structures which govern the operation of markets such as property rights.

1.1. HIV and Democracy

Much of the literature argues that HIV will harm democracy. Mattes (2003) identifies several reasons why this is the case, and gives primacy to the impact of AIDS on GDP in the tradition of the modernisation hypothesis (see Lipset (1959)), although the validity of this transmission mechanism is challenged both by Acemoglu, Johnson, Robinson and Yared, 2008 which rejects such a relationship and by the lack of convincing evidence concerning the impact of AIDS on income (Bloom and Mahal, 1997 for example).

De Waal (2003, 2006) argues that HIV leads to the disproportionate loss of human capital because the disease tends to infect those in their economic prime, an effect which is likely to be significant in the public sector because their labour market tends to be more inflexible (Barnett and Whiteside, 2006). Youde (2001), Strand (2005) and Pharaoh and Schonteich (2003) all conclude that Government structures will become less effective. Mattes (2003) argues that the resulting loss of human capital will decrease the constraints on the neo-patrimonial African elite; that is that HIV may

reduce the constraints on African executives and allow them to exercise authority and power beyond the legal-rational form which characterises democracies.

Social and cultural factors affect the demands from the population for democratic political institutions and De Waal (2006) notes that these behavioural changes are particularly important because HIV imposes a “virtual death sentence” with an exceptionally long incubation period.

Fourie and Schonteich (2001), Barnett and Whiteside (2002) and Pharaoh and Schonteich (2003) argue that Africa’s 15 million AIDS orphans could contribute to political instability, a view disputed by subsequent work from Bray (2003). A more conventional view of the impact on younger generations is that HIV the attention of youth from education and to caring for ill relatives (Burdsall and Hamaudi, 2006; Cuirambo, 2008) which could reduce human capital and literacy which could reduce political engagement.

Youde (2001) argues that the behavioural nature of HIV transmission could increase inter-group tensions in society which can harm civil society and democratic engagement. For example; the disease in Africa has some connotations as a “homosexual disease”, even in Africa’s most democratic states, including Botswana (see Iliffe, 2006).

Mattes (2003) argues that the burden of HIV and caring for HIV-positive individuals could undermine “civil society”, and this would reduce the relative power in society of organisations and groups conducive to maintaining or developing democratic institutions. However, Strand (2005) and Butler (2005) have argued the

opposite; that in fact HIV could politicise individuals and increase the pressure on political institutions to be democratic.

Overall, a significant number of authors predict that HIV will have a negative impact. Mattes (2003) argues that the pandemic will “*block or even reverse democratic development,*” a sentiment expressed by other authors including Fourie and Schonteich (2001), Whiteside et al (2003), Price-Smith and Daly (2004) and Youde (2009). On the other hand a smaller number of authors, including Butler (2005) have tended to be more sceptical given the persistence of Africa’s democratic transition in most countries.

As a result, my hypothesis is that HIV has an **adverse impact on democracy.**

1.2. HIV and Economic Institutions

The literature on HIV and economic institutions is less developed; although De Waal (2003) notes that the structure of the economy can change in such a manner as makes it more susceptible to rent-seeking. Given the literature is much more convincing on the link between economic institutions and economic development (the seminal contribution generally being seen as Acemoglu, Johnson and Robinson 2001) than on the link between democracy and economic development (Barro, 1996 finds no relationship), it is a worthwhile exercise to investigate whether the relationship between HIV and democracy is replicated in economic institutions. A key part of this theory is the link between political and economic institutions.

Acemoglu, Johnson and Robinson (2005) identify a number of schools of thought – or “meta-theories” regarding how economic institutions are formed and tend

to find the most evidence for a “social conflict” view where institutions are chosen to maximise the utility of a governing elite. They present a simple model of how political and economic institutions are linked theorising that state capacity and the design of political institutions are both important; the latter *de jure* choosing economic institutions and the former influencing the *de facto* ability of states to carry that through.

Given that my hypothesis is that political institutions are negatively impacted by HIV, and that there may be other exogenous shocks to the incentives of Governments (or other groups in society) to expropriate due to the HIV, I hypothesise that there is a **negative impact of HIV on the quality of economic institutions.**

2. Data: Origin and Descriptive Statistics

2.1. Institutional Variables

Data on political institutions comes from the following two sources (see appendix 1 for a detailed explanation of how the indices are derived):

1. The POLITYIV project, from which I use the Polity index, which is derived by subtracting the “autocracy” score from the “democracy” score in the dataset; these scores are derived based on expert judgements regarding the extent of democratic control over government. Ranges from -10 to +10, ascending in institutional quality.

2. Freedom House, which publishes an index of “Political Rights” based on the electoral process and political pluralism. Ranges from 1 to 7, descending in institutional quality. This is multiplied by -1 to make it ascending in institutional quality to aid comparison.

For economic institutions I use the World Bank’s “Rule of Law” index which aggregates various measures of judicial, contract and property right enforcement. Unfortunately, the index has only been published since 1996 and is not chain-linked and has acknowledged issues with cross-time comparisons. These are issues I will deal with in section 5.

An alternative measure I will use to check robustness is the “property rights and judicial enforcement” measure in the Economic Freedom of the World dataset. This index has a number of problems, not least that its availability cross-country is far too low to be able to draw valid conclusions relative to the other indices available. Table 1 shows a summary of these measures of institutions in 2010.

	Range (possible)	Range (sample)	Obs	Mean	Standard Deviation
Polity	-10, +10	-9, +9	39	2.00	4.989
Political Rights	-7, -1	-7, -1	37	-4.621	1.656
Rule of Law	-2.5, +2.5	-1.801, 0.663	39	-0.756	0.539
Prop. Rights	0, 10	2.57, 6.63	24	4.511	1.154

Table 1: Summary of Institutional Variables

2.2. HIV Data

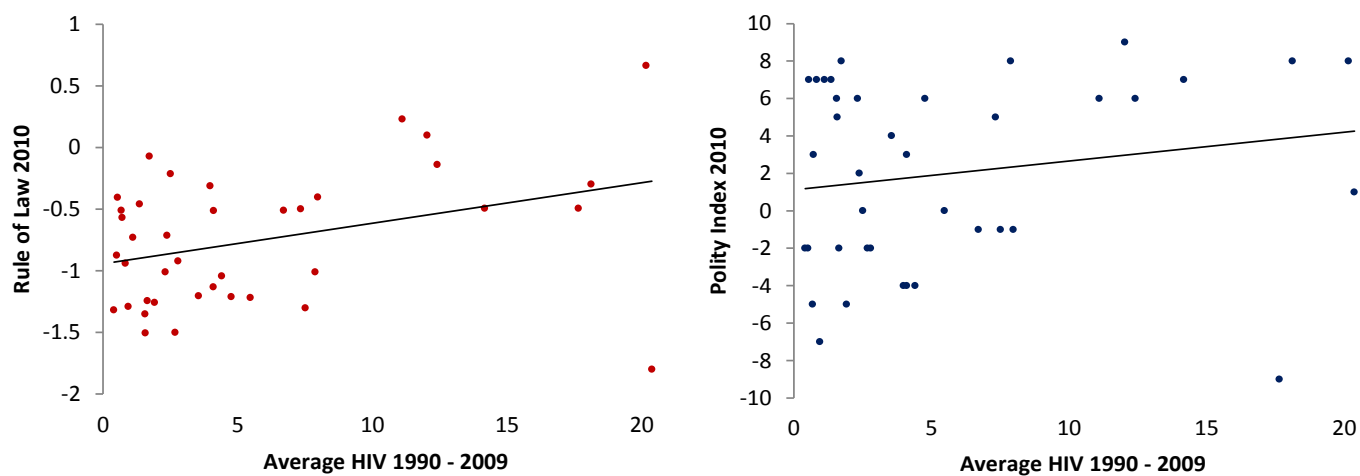
Data on HIV prevalence rates is compiled by UNAIDS based on epidemiological models. For most of this project I will deal average country HIV rates between 1990 and 2009. Table 3 gives summary statistics on HIV in sub-Saharan Africa.

	Range	Mean	Standard Deviation
HIV (% Average 1990 - 2009)	0.405, 20.38	5.693	5.825

Table 3: HIV in sub-Saharan Africa

2.3. HIV and Institutions: Preliminary Analysis

A preliminary analysis does not give any indication of a strong relationship between the chosen measures of political and economic institutions and average HIV prevalence rates since 1990; figures 2 and 3 show that there is certainly no negative association.



Figures 2 & 3: HIV and Institutions

2.3. Control Variables

The key control variable will be a lag of the institutional measurement in 1980 (or 1996 for the Rule of Law score, which begins in that year). This should account for “stickiness” in the movement of institutions and also help to control for unobservable factors which have exerted the same influence on institutions in 1980 as in 2010.

Thus, control variables are variables which I expect to have had an impact on institutions since 1980. After modernisation theory and based on Barro (1999), I include the natural log of GDP per capita and education expenditure as a proportion of GDP. Given the greater role for conditionality associated with development aid since the 1980s, I include foreign aid as a proportion of GDP.

In a second regression, I include additional controls which have problems associated with them such as concerns about their relationship with the HIV variable and data for fewer countries than the rest of the data, but which are important to test. These are the GINI coefficient, the urban population and the Muslim population.

Summary statistics for all control variables are available in table A1 of the appendix.

2.4. Methodology: Brief Overview

The estimation method used in this paper will be Ordinary Least Squares regression and Two-Stage Least Squares regression.

While a fixed effects method would be preferable to cross-sectional methods, this was not used due to the unavailability of an instrumental variable over time. Estimation methods for a bounded dependent variable were not used due to the difficulties associated with instrumental variable estimation, and OLS *should* be consistent as error terms appear to be distributed relatively normally and with constant variance (see section 5).

I have limited my analysis to mainland Sub-Saharan Africa for two reasons; first the theories and literature outlined have exclusively focussed on this region. Secondly, Sub-Saharan Africa's epidemic is exceptional by any standard of measurement and such exceptionality does not lend itself well to comparison with the rest of the world.

3. Establishing Causality

A simple OLS regression would not prove causality and could be biased due to the theorised existence of an endogenous relationship between HIV and institutions. It is not clear which direction this would bias the estimators on HIV. Table 4 summarises a potential cause of both positive and negative bias resulting from an endogenous relationship between the quality of institutions and HIV.

Given these potential sources of bias, it is important to try to find an exogenous source of variation to use as an instrument. However, as noted by Iliffe (2006), much of the spread of HIV across Africa is a story of geography more than anything else, with the disease beginning in Kinshasa, Congo and spreading to at least intermediate rates in almost every single Sub-Saharan African country. An instrument needs to

explain why the penetration of HIV was so much higher in certain countries but not others despite similar geographical properties.

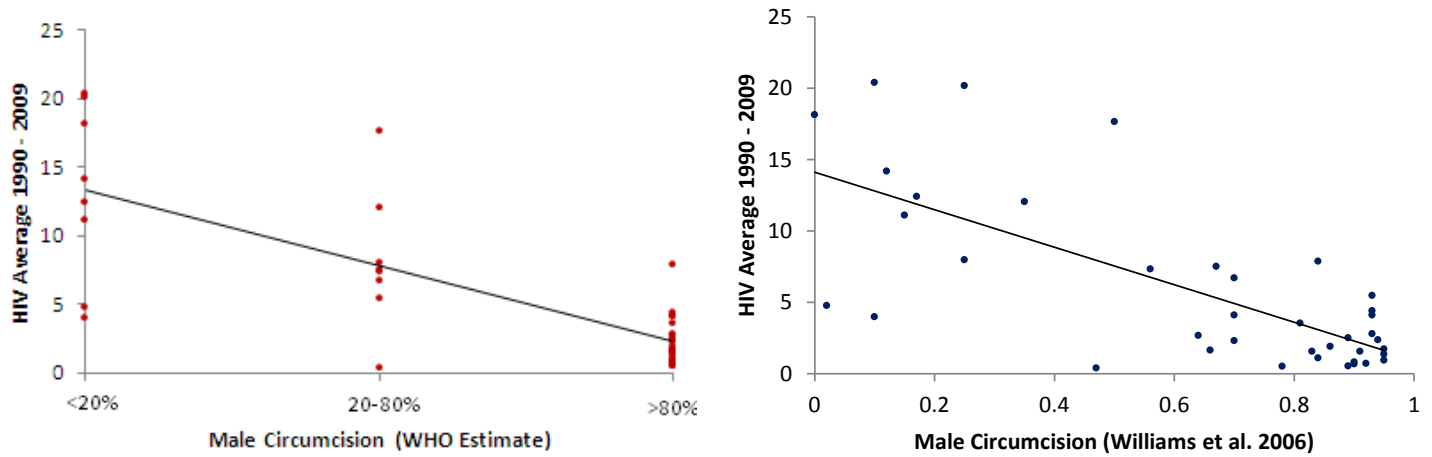
Cause of Negative Bias	Cause of Positive Bias
<ul style="list-style-type: none"> Democratic states are theoretically under more pressure to pursue policies which tackle causes of HIV; that is, countries with better institutions should have pursued better anti-HIV policies in the past. 	<ul style="list-style-type: none"> More democratic states may be more tolerant of higher-risk sexual behaviour, particularly homosexuality and extramarital intercourse.

Table 4: Potential Causes of endogeneity / simultaneity bias

A possible instrument is the prevalence of male circumcision which various medical trials demonstrate significantly reduces the probability of HIV transmission through sexual contact, its dominant infection route. Williams et al (2006) observe the significant statistical relationship cross-country and the World Health Organisation and UNAIDS today pursue it as an active intervention strategy to reduce rates of HIV, citing medical trials which find that it reduces the risk of HIV transmission by 60%.

There are two sources for estimates. The first are the latest figures from Williams et al (2006) which is based on updated and aggregated tribal data from Rodrick (1967), and is provided as a continuous bounded variable. The second are estimates based on Demographic and Health Surveys and other data sources and are published by the WHO but are provided only in dummy variable form with three categories (<20%, 20% - 80%, >80%).

Nevertheless there is a very clear statistical correlation between both measures and the average rate of HIV prevalence since 1990, as figures 4 & 5 show



Figures 4 & 5: HIV and circumcision rates in sub-Saharan Africa

A simple single-variable regression yields extremely large t-statistics with the expected sign, as shown in table 5.

	HIV	HIV
Circumcision (Williams Estimate)	-0.131*** (0.0206)	
20-80% Circumcision (WHO)		-5.001** (1.911)
>80% Circumcision (WHO)		-10.89*** (1.569)
Constant	14.11*** (1.475)	13.14*** (1.351)
Observations	39	39
R-squared	0.523	0.592

Table 5: Circumcision and HIV First Stage

It is natural to question whether, given that Iliffe (2006) notes the importance of geography in the spread of HIV, the large effect of circumcision is simply showing the effect of geographical distance or other geographical factors. Figure 6 shows the distribution of circumcision rates (WHO estimates) and HIV prevalence rates in Sub-Saharan Africa.

The distribution of low-circumcision countries is not broad across Africa. In fact, outside of effective micro-states, they are all concentrated in southern Africa. However, in this author's view that is not a reason to consider the effect of circumcision to be suspect; rather it appears a plausible explanation for HIV's extraordinary penetration into southern African populations but not northern African despite similar geographical distance.

The robustness and exogeneity of the instrument will be discussed in section 5.

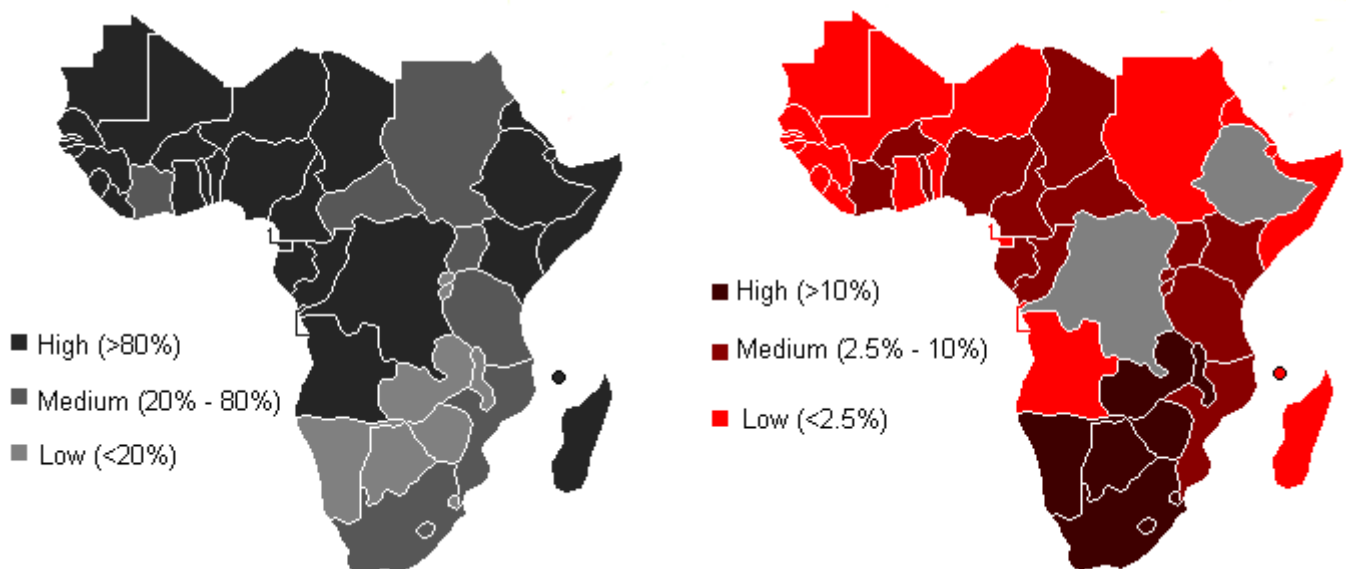


Figure 6: Geographical distribution of Circumcision (left) and HIV (right) in Sub-Saharan Africa

4. Empirical Results & Analysis

First I assume that there is a relationship as follows;

$$HIV = \delta_0 + \delta_1 \tilde{c} + \mu'Z + \varepsilon_1$$

And here, \tilde{c} is the estimate of the circumcision rate which is used to proxy average rates of circumcision over the whole period of the HIV pandemic. Then, there is the theorised causal relationship between institutions and HIV which takes the form

$$X_{2010} = \beta_0 + \beta_1 X_{1980} + \beta_2 \widehat{HIV} + \gamma'Z + \varepsilon_2$$

And HIV is instrumented in the first stage and takes the form of the fitted values, removing any reverse causality or simultaneity bias. Table 6 reports the OLS and 2SLS regression results for the Polity index and table 7 for the Rule of Law index.

Contrary to the predicted bias caused by the theorised endogenous relationship between HIV and institutions, the 2SLS estimators are very similar to the OLS estimators. The same is true for the difference between the restricted regressions and the ones with the full set of controls.

Most of the coefficients are of the opposite sign to predicted, but are all statistically indifferent from zero

	(1 - OLS)	(2 - OLS)	(1 - 2SLS)	(2 - 2SLS)
Dependent Variable	Polity 2010	Polity 2010	Polity 2010	Polity 2010
HIV	0.0618 (0.181)	0.0724 (0.223)	0.0597 (0.254)	0.110 (0.375)
Polity 1980	0.184 (0.158)	0.153 (0.169)	0.185 (0.147)	0.151 (0.148)
Ln(GDP pc)	0.0465 (1.186)	1.525 (2.293)	0.0452 (1.098)	1.520 (1.987)
Aid / GDP	0.0861 (0.062)	0.112 (0.0677)	0.0861 (0.0578)	0.112* (0.0587)
Education / GDP	0.725 (0.690)	0.167 (0.834)	0.729 (0.769)	0.125 (0.807)
Gini Coefficient		-0.0418 (0.150)		-0.0487 (0.143)
Urban %		-0.0147 (0.0928)		-0.0125 (0.0826)
Muslim %		-0.653 (3.124)		-0.438 (3.271)
Constant	-2.412 (8.396)	-7.446 (11.81)	-2.406 (7.743)	-7.325 (10.29)
Observations	39	36	39	36
R-squared	0.136	0.117	0.136	0.116

Table 6: Polity Index Regression Results

	(3 - OLS)	(4 - OLS)	(3 - 2SLS)	(4 - 2SLS)
Dependent Variable	RoL 2010	RoL 2010	RoL 2010	RoL 2010
HIV	0.0113 (0.0152)	-0.0122 (0.0152)	0.0344 (0.0218)	-0.00144 (0.0282)
RoL 1996	0.507*** (0.120)	0.547*** (0.115)	0.466*** (0.118)	0.516*** (0.123)
Ln(GDP pc)	0.125 (0.100)	0.545*** (0.156)	0.145 (0.0966)	0.559*** (0.140)
Aid / GDP	0.00762 (0.00508)	0.0140*** (0.00427)	0.00852* (0.00488)	0.0140*** (0.00374)
Education / GDP	0.00560 (0.0572)	-0.114** (0.0525)	-0.0423 (0.0640)	-0.123** (0.0506)
Gini Coefficient		0.00581 (0.00939)		0.00377 (0.00947)
Urban %		-0.0169** (0.00620)		-0.0168*** (0.00542)
Muslim %		-0.376 (0.222)		-0.297 (0.267)
Constant	-1.399* (0.744)	-3.114*** (0.843)	-1.546** (0.715)	-3.187*** (0.755)
Observations	39	36	39	36
R-squared	0.497	0.722	0.462	0.717

Table 7: Rule of Law Index Regression Results

However, just because these numbers are not statistically significant does not mean they are incorrect. Given the constraints on the sample size, it would be difficult to expect that a sample of just less than 40 would reliably give significant results. The problem could be one of large standard errors rather than a genuinely insignificant relationship.

For both the Polity index and the Rule of Law index this does not appear to be a plausible explanation, even if the coefficients are taken purely at face value. For the Polity index, at most nine countries would be measurably impacted by HIV and in the opposite direction to that predicted by theory, which does not lend faith that any observed relationship is causal.

Given this, this research cannot demonstrate any impact of AIDS on African Governance at all, but is able to say that the large, negative effect predicted in the literature has not come to pass. Given the almost overwhelming consensus in the theoretical literature that such a negative effect *should* be found, this is a surprise.

An obvious explanation is to follow the logic of Butler (2005) who argues that while the negative democratic forces may exist, they are at least offset by the fact that civil society is strengthened which puts positive pressures upon democracy and political institutions.

Another explanation is that political institutions themselves are just tremendously “sticky” and are not vulnerable to major change except in exceptional circumstances. The theoretical argument for this from an economic perspective is not controversial – institutions inevitably create “winners” and they will be willing to

expend effort and financial resources to maintain the existing institutional “state of the world”.

This author finds this argument problematic for a number of reasons. First of all, the sample itself shows little sign of “stickiness”, with countries in the sample displaying huge political transitions in both a positive and negative direction. Secondly, one has to question whether it is appropriate to consider the AIDS pandemic as anything *but* an exceptional circumstance.

De Waal (2006) argues that AIDS has been “politically domesticated” and that rampant AIDS denialism in politics and in society has facilitated apathy towards the issue. Butler’s (2005) positive effect on civil society is not observed because of this apathy, and the negative effect De Waal himself has in the past predicted has not been observed because there has been no change in the attitudes or actions of the various agents in the economy which together form institutions.

While this is an interesting argument, it is nonetheless difficult to view it in isolation of De Waal’s previous predictions of institutional degradation in Africa. And while the argument is plausible from the perspective of explaining why civil society’s actions and its attitudes towards democracy have not changed, it does not explain why the reduced capacity of the state to constrain political elites has not led to any change in political institutions.

Finally, one can simply argue that the theories summarised in the literature view are incorrect and that AIDS has no impact on institutions. While such an argument might appear intellectually unsatisfying, given the potentially uncountable factors in a country or society which can determine political institutions, it could also

be closest to the truth. One only needs to consider how big political transitions have begun in the past – most recently in the Arab Spring – to recognise that the most dramatic changes in political institutions are not necessarily the result of influences which lead to changes over time but rather sudden changes, creating their own momentum.

5. Robustness + Extensions

In this section I will perform a number of robustness checks to see how sensitive my results are to changes in the specification of the model. This is important because finding no support for my hypotheses is contrary to the general consensus in the theoretical literature. I will report only the HIV coefficient in the main body, with full regressions reported in the appendix.

In addition to these tests, a test was taken to ensure that the distribution of the error term was homoscedastic and I could not reject the null hypothesis that they are; thus regular rather than robust standard errors are reported.

5.1. Alternative Measures of Instrument

The measure of circumcision used is from Williams et al. (2006) which is based on aggregated tribal data from Murdock (1967). There is an alternative measure available, the estimates first compiled by Halperin and Bailey (1999) and published now by the WHO and based on a number of medical and demographic surveys, but are only published as dummy variables. Table 7 reports the 2SLS results using this

alternative circumcision measure with full results available in table A2 in the appendix. As the table shows, the results show only superficial differences.

	Polity Index		Rule of Law Index	
	(1)	(2)	(3)	(4)
2SLS	0.064	0.063	0.033	0.006
Coefficient	(0.234)	(0.302)	(0.022)	(0.023)

Table 7: IV-2SLS results using the WHO estimates of male circumcision rates

5.2. Is Circumcision Exogenous?

A key concern of any IV estimation is that the instrument chosen is not an exogenous process; that there is some omitted process which is influencing both the circumcision rate of males and the quality of institutions. There is a theoretical possibility here given the practice of near-universal circumcision among those of Muslim faith and various studies (again including Barro 1999) finding that Muslim countries are less democratic. Figure 7 graphically represents a possible endogenous relationship.

However, adding the Alesina et al (2003) estimates for the proportion of the population which is Muslim to the regressions did not fundamentally alter the results as shown in section IV. This implies that there should be little concern about an endogenous relationship biasing the results.

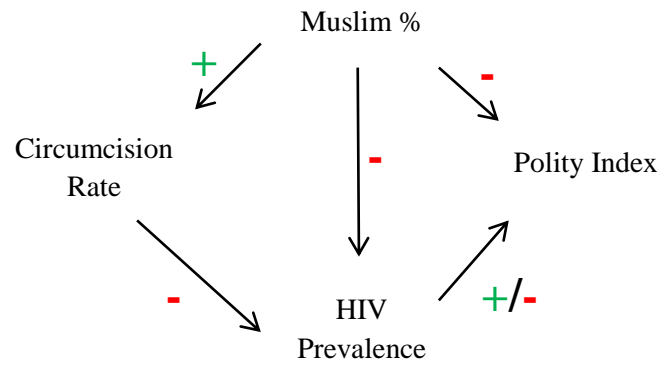


Figure 7: Possible sources of endogenous relationships between Muslim populations, HIV, circumcision and institutions

While it is not possible to test this with the continuous Williams estimates of circumcision, using the WHO estimates it is possible to perform a J-Test for whether the instruments are exogenous causes of variation and not themselves a function of institutions.

The J-Test is performed by running a regression of the residuals from the second stage regression (ε_2) as follows –

$$\varepsilon_2 = \rho_0 + \rho_1 C_M + \rho_2 C_H + \theta' X + \varepsilon_3^2$$

The joint significance of the instruments is then tested with a test statistic of $J = mF$ and a critical value of χ_1^2 . At the 5% significance level I cannot reject under any specification that the instruments are exogenous. See table A3 for the full results.

² C_M is the dummy for circumcision rate of 20-80% and similarly >80% for C_H

5.3. Economic Institutions: Alternative Measure

In this section I test the Rule of Law Index against the second measure of economic institutions, the “Property Rights” index from the Economic Freedom dataset.

The results in all specifications are somewhat different (table 9, and table A4 in the appendix). As the sign on both is the same, and the Property Rights measure does not invalidate the result obtained in the main regressions, one has to simply note that institutional measures are not perfect or in complete agreement and that given that the sample is not complete or randomly selected such differences are not unexpected.

	Rule of Law Index		Property Rights Index	
	(3)	(4)	(3)	(4)
OLS	0.011 (0.015)	-0.012 (0.015)	0.078 (0.049)	0.044 (0.052)
2SLS	0.034 (0.022)	-0.001 (0.028)	0.103 (0.054)*	0.032 (0.089)

Table 9: OLS and IV-2SLS Results across different institutional measures

5.4. Political Institutions: Alternative Measure

The alternative measure of political institutions, the “political rights” index from Freedom House was not the main measure for two reasons –

1. It had a smaller range than the Polity index
2. It excluded more countries from analysis than the Polity index

Further note that, as argued by Munck & Verkuilen (2002) it is not directly a measure of electoral democracy as the Polity index is, but rather of political rights which includes elements we might consider necessary in a liberal democracy such as individual rights to democratic participation and electoral competitiveness (practically as well as lawfully). Table 10 reports the coefficients estimated, with full results in table A5 of the appendix.

	Polity Index		Political Rights Index	
	(1)	(2)	(1)	(2)
OLS	0.062 (0.181)	0.072 (0.223)	0.003 (0.020)	-0.032 (0.084)
2SLS	0.060 (0.254)	0.110 (0.375)	-0.019 (0.080)	-0.079 (0.146)

Table 10: OLS and IV-2SLS Results across different institutional measures

Surprisingly, the two measures do not agree. This is concerning, but the origin of this appears to be the impact of the proportion of the population which is Muslim – its inclusion substantially decreases the HIV coefficient when the Political Rights index is used, but does not significantly alter the coefficient when the Polity index is used. The differences therefore, such as they exist, could be explainable in terms of differences in the factors which the indices measure, however given the differences are small and the coefficients statistically indifferent to zero anyway, it is hard to reach any conclusion about differences in these two indices.

5.5. Rule of Law: Controlling for early institutions

To check whether the results are significantly biased by excluding consideration of institutions before 1996 in the Rule of Law regression, I run the regressions using the Polity index in 1980 as the lag for institutions rather than the Rule of Law index in 1996. Table 11 shows that the results change only superficially. Table A6 in the appendix shows the regressions in full.

	Lag is Index in 1996		Lag is Polity in 1980	
	(3)	(4)	(3)	(4)
OLS	0.011 (0.015)	-0.012 (0.015)	0.022 (0.018)	0.013 (0.019)
2SLS	0.034 (0.022)	-0.001 (0.028)	0.035 (0.025)	0.028 (0.032)

Table 11: OLS and IV-2SLS results with Polity in 1980 as lag

5.6. Other Problems and Solutions

This section is not authoritative on the potential problems with the analysis, and in many cases there are not empirical tests which can be undertaken to test for their relevance. Here I identify two key problems which are unresolved.

One problem is with the dependent variables themselves. All are purely subjective judgements on whether a country is a democracy or whether it has a good judicial system. This presents a problem if there is a systematic bias to the measurements. It may be that it is simply a biased observation that wealthier countries in Africa have better property rights, and these countries simultaneously

have higher levels of HIV because economic development leads to urbanisation and a wider selection of sexual partners. In this case, the coefficients will be positively biased. Given the range of factors which could influence the creation of the indices used, it is not possible to accurately predict the direction of bias, although one has to be aware of the potential for its existence.

Another issue already touched upon is the restriction to cross-country data rather than panel data. There is no guarantee while using cross-sectional data that one can sufficiently control for unobserved heterogeneity which could bias the results. Some countries in Africa could just be fundamentally *different* and also have different levels of HIV – because these unobserved factors cause different levels of HIV, which seems unlikely, or through simple geographical coincidence. This is a concern given the small sample size which Sub-Saharan Africa provides; one can never be sure of the extent to which estimated coefficients are genuine relationships or coincidental constructs of geography, especially given that standard errors with such small samples are little help in discerning a relationship which genuinely exists from one which does not.

VI. Concluding Remarks

This paper has aimed to empirically test the claims made in the literature that the HIV pandemic poses a challenge to the democratic and good Governance of African nation states. In doing so it hypothesised that HIV has had a negative impact on democracy and economic institutions.

Despite these claims, the econometric estimations failed to yield any support for the theories explained in section 2. This remained the case even when correcting for

the fact that HIV may be endogenous to institutions by using an instrumental variable. Various robustness checks have failed to change this conclusion.

Despite the overwhelming pessimism of the political science literature therefore, it does not appear that the quality of institutions in Africa has suffered due to HIV. Democracy has not failed in Africa, and economic institutions have not become (any more) rent seeking or punitive.

There are two important points to make from the results of this research.

First, that democracy and political institutions in general may be far more resilient than we have previously believed. There is not apparent or widespread loss in confidence in or practice of democracy. This comes despite the huge welfare effects of the pandemic documented by Crafts (2003).

Second, this project should not be taken in any way to suggest that HIV could not feasibly lead to institutional regression in the future; even though HIV has not so far had any empirically evident impact on institutions *today*, there is every reason to be aware of the possible future challenges HIV poses to democratic Governments.

Finally, this project poses additional questions for further research. Finding an instrument which is available in panel data would allow for a more robust analysis of relationships across time, although this author is not confident that one exists which would not also be correlated with institutions. A within-country analysis would also remove most concerns about sample heterogeneity assuming that a suitable dependent variable and adequate data on HIV could be found.

Bibliography

- Acemoglu, D., Johnson, S., & Robinson, J. (2001). The Colonial Origins of Comparative Development. *American Economic Review*, 1369-1401.
- Acemoglu, D., Johnson, S., & Robinson, J. A. (2005). Institutions as a Fundamental Cause of Long-Run Growth. In P. Aghion, & S. N. Durlauf, *Handbook of Economic Growth Vol 1A* (pp. 385-472).
- Acemoglu, D., Johnson, S., Robinson, J. A., & Yared, P. (2008). Income and Democracy. *American Economic Review*, 808-842.
- Alesina, A., Devleeschauwer, A., Easterly, W., Kurlat, S., & Wacziarg, R. (2003). Fractionalization. *Journal of Economic Growth*, 155-194.
- Barnett, T., & Whiteside, A. (2002, 2006). *AIDS in the Twenty-First Century: Disease and Globalisation*. Basingstoke: Palgrave Macmillan.
- Barnette, T., & Dutta, I. (2008). HIV and state failure: is HIV a security risk? *AIDS, Security and Conflict Initiative*, Report 7.
- Barro, R. (1996). Democracy and Growth. *Journal of Economic Growth*, 1-27.
- Barro, R. J. (1999). Determinants of Democracy. *Journal of Political Economy*, 158-183.
- Bloom, D. E., & Mahal, A. S. (1997). Does the AIDS epidemic threaten economic growth? *Journal of Econometrics*, 105-124.
- Bray, R. (2003). Predicting the social consequences of orphanhood in South Africa. *African Journal of AIDS Research*, 39-55.
- Butler, A. (2005). The negative and positive impacts of HIV/AIDS on democracy in South Africa. *Journal of Contemporary African Studies*, 3-26.
- Crafts, N., & Haacker, M. (2003). Welfare Implications of HIV/AIDS. *IMF Working Paper*.
- Fourie, P., & Schonteich, M. (2001). Africa's New Security Threat. *African Security Review*, Issue 4.

- Freedom House. (2011). *Freedom in the World 2011*.
- Gwartney, J., Lawson, R., & Hall, J. (2011). *Economic Freedom of the World 2011*.
- Halperin, D. T., & Bailey, R. C. (1999). Male circumcision and HIV infection: Ten years and counting. *Lancet*.
- Heinecken, L. (2001). Living in Terror: The Looming Security Threat to Southern Africa. *African Security Review*, 7-18.
- Iiffe, J. (2006). *The African Aids Epidemic: A history*. Ohio University Press.
- Kauffman, D., Kraay, A., & Mastruzzi, M. (2009). Governance Matters VIII: Aggregate and Individual Governance Indicators, 1996-2008. *World Bank Policy Research Paper*.
- Kauffman, D., Kraay, A., & Mastruzzi, M. (2011). World Bank: World Governance Indicators 2011.
- Lipset, S. M. (1959). Some Social Requisites of Democracy: Economic Development and Political Legitimacy. *The American Political Science Review*, 69-105.
- Marshall, M. G., & Jaggers, K. (2011). Polity IV Project: Political Regime Characteristics and Transitions 1800-2010.
- Mattes, R. (2003). Healthy Democracies? The potential impact of AIDS on democracy in Southern Africa. *Institute for Security Studies*, Paper 71.
- Pharaoh, R., & Schonteich, M. (2003). AIDS, Security and Governance in Southern Africa: Exploring the Impact. *Institute for Security Studies*, Paper 65.
- Price-Smith, A. T., & Daly, J. L. (2003). Downward Spiral: HIV/AIDS, State Capacity, and Political Conflict in Zimbabwe. *United States Institute of Peace*.
- Sato, A. (2008). Is HIV/AIDS a Threat to Security in Fragile States? *AIDS, Security and Conflict Initiative*, Report 10.
- UNAIDS. (2010). HIV Prevalence Estimates 1990 - 2009.
- Waal, A. d. (2003). How will HIV/AIDS transform African governance? *African Affairs*, 1-23.

- Waal, A. d. (2006). *AIDS and Power: Why there is no political crisis - yet*. Zed Books Ltd .
- Whiteside, A. (2008). *HIV/AIDS: a very short introduction*. Oxford University Press.
- Williams, B. G., Lloyd-Smith, J. O., Gouws, E., Hankins, C., Getz, W. M., Hargrove, J., et al. (2006). The Potential Impact of Male Circumcision on HIV in Sub-Saharan Africa. *PLoS Medicine*.
- World Bank. (2011). World Development Indicators.
- World Health Organisation. (n.d.). *WHO: Male Circumcision for HIV prevention*. Retrieved 2012, from <http://www.who.int/hiv/topics/malecircumcision/en/index.html>
- Youde, J. (2001). "All the Voters Will Be Dead": HIV/AIDS and Democratic Legitimacy and Stability in Africa. *Unpublished*.

Appendix 1: Description of Institutional Variables

This appendix contains details adapted from the publishers of all political and economic institution variables used about how the variables are constructed.

Polity Index

The Polity Index is a -10 to +10 scale derived by subtracting a score for autocracy (0 – 10) from a score for democracy (0 – 10). Each score depends on similar characteristics and starts from zero; with points added (or in the case of an autocratic characteristic, subtracted) to reach a final score. The Polity index is constructed based on the following criteria:

- Competitiveness of Executive Recruitment
- Openness of Executive Recruitment
- Constraint on Chief Executive
- Competitiveness of Political Participation
- Regulation of participation

A more detailed outline of how the scores for each component of the indices can be found in the PolityIV project codebook.

Political Rights Index

Aggregation of positive or negative answers to each of the following questions, all of which are equally weighted -

A. ELECTORAL PROCESS

1. Is the head of government or other chief national authority elected through free and fair elections?
2. Are the national legislative representatives elected through free and fair elections?
3. Are the electoral laws and framework fair?

B. POLITICAL PLURALISM AND PARTICIPATION

1. Do the people have the right to organize in different political parties or other competitive political groupings of their choice, and is the system open to the rise and fall of these competing parties or groupings?

2. Is there a significant opposition vote and a realistic possibility for the opposition to increase its support or gain power through elections?
3. Are the people's political choices free from domination by the military, foreign powers, totalitarian parties, religious hierarchies, economic oligarchies, or any other powerful group?
4. Do cultural, ethnic, religious, or other minority groups have full political rights and electoral opportunities?

C. FUNCTIONING OF GOVERNMENT

1. Do the freely elected head of government and national legislative representatives determine the policies of the government?
2. Is the government free from pervasive corruption?
3. Is the government accountable to the electorate between elections, and does it operate with openness and transparency?

Rule of Law Index

Kauffman, Kraay & Mastruzzi (2010) define the Rule of Law index as –

“capturing perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence”

The Index itself is an aggregation of 31 perception-based indicators from various public and private sector databases. A full list can be found online at www.govindicators.org

Property Rights + Judicial Enforcement

Composite index of 6 measures of the independence and impartiality of the judicial process and the enforcement of property rights; the following is adapted from the Economic Freedom of the World Annual Report 2011 as a guide to the data sources.

A Judicial independence

This component is from the *Global Competitiveness Report* question: “Is the judiciary in your country independent from political influences of members of government, citizens, or firms? No—heavily influenced (= 1) or Yes—entirely independent (= 7).”

B Impartial courts

This component is from the *Global Competitiveness Report* question: “The legal framework in your country for private businesses to settle disputes and challenge the legality of government actions and/or regulations is inefficient and subject to manipulation (= 1) or is efficient and follows a clear, neutral process (= 7).”

C Protection of property rights

This component is from the *Global Competitiveness Report* question: “Property rights, including over financial assets, are poorly defined and not protected by law (= 1) or are clearly defined and well protected by law (= 7).”

D Military interference in rule of law and the political process

This component is based on the *International Country Risk Guide*, Political Risk Component G., Military in Politics.

E Integrity of the legal system

This component is based on the *International Country Risk Guide*, Political Risk Component I., for Law and Order:

F Legal enforcement of contracts

This component is based on the World Bank’s *Doing Business* estimates for the time and money required to collect a clear-cut debt.

G Regulatory restrictions on the sale of real property

This sub-component is based on the World Bank’s *Doing Business* data on the time measured in days and monetary costs required to transfer ownership of property that includes land and a warehouse.

Appendix 2: Summary Statistics (Control Variables)

Table A1: Summary Statistics

Variable	Mean	Std. Deviation
Polity Index 1980	-4.564	5.379
Rule of Law 1996	-0.808	0.648
Political Rights 1980	-5.432	1.659
Property Rights 1980	4.438	1.331
Circumcision Rate	64.077	32.049
LN(GDP Per Capita)	6.321	0.879
Aid % GDP	23.558	16.835
Education % GNI	3.558	1.577
GINI Coefficient	45.687	8.363
Urban Population %	33.225	16.008
Muslim %	32.754	35.166

Appendix 3: Robustness Regression Results

Table A2: Alternative Circumcision Measure (Dummies)

	(1)	(2)	(3)	(4)
Dependent Variable	Polity 2010	Polity 2010	RoL 2010	RoL 2010
HIV	0.0638 (0.234)	0.0625 (0.302)	0.0334 (0.0205)	0.00639 (0.0230)
Lag of X	0.184 (0.146)	0.154 (0.147)	0.467*** (0.117)	0.494*** (0.115)
Ln(GDP pc)	0.0477 (1.096)	1.527 (1.986)	0.145 (0.0961)	0.569*** (0.141)
Aid / GDP	0.0863 (0.0577)	0.112* (0.0587)	0.00848* (0.00485)	0.0140*** (0.00380)
Education / GDP	0.720 (0.735)	0.179 (0.768)	-0.0401 (0.0620)	-0.130*** (0.0493)
Gini Coefficient		-0.0399 (0.137)		0.00228 (0.00907)
Urban %		-0.0153 (0.0816)		-0.0168*** (0.00552)
Muslim %		-0.710 (3.015)		-0.239 (0.240)
Constant		-7.477 (10.26)		-3.239*** (0.760)
Observations	39	36	39	36
R-squared	0.136	0.117	0.465	0.707

Table A3: J-Test for Exogenous Instruments

	(1)	(2)	(3)	(4)
Dependent Variable	Residual of Polity 2010	Residual of Polity 2010	Residual of RoL 2010	Residual of RoL 2010
Lag of X	-0.0229 (0.158)	-0.0305 (0.168)	0.000332 (0.125)	-0.00665 (0.0112)
Ln(GDP pc)	-0.0418 (1.209)	0.288 (2.275)	0.000100 (0.108)	0.0151 (0.152)
Aid / GDP	-0.0178 (0.0638)	-0.0167 (0.0687)	5.16e-05 (0.00544)	-0.000757 (0.00458)
Education / GDP	-0.131 (0.647)	-0.200 (0.815)	0.000383 (0.0568)	-0.00859 (0.0544)
Gini Coefficient		-0.00685 (0.146)		0.000926 (0.00972)
Urban %		-0.00931 (0.0947)		-0.000490 (0.00632)
Muslim		0.234 (3.111)		0.0202 (0.207)
High Cir	-0.924 (2.411)	-1.347 (2.991)	0.00286 (0.211)	-0.0387 (0.199)
Mid Cir	-2.826 (2.717)	-3.582 (2.890)	0.00881 (0.234)	-0.0882 (0.193)
Constant	2.168 (8.609)	1.227 (12.13)	-0.00644 (0.789)	-0.0663 (0.809)
Observations	39	36	39	36
J-Stat	1.26	1.74	0.00	0.22

Critical value = 3.84

Table A4: Alternative Economic Institution Measurement

	(3 - OLS)	(4 - OLS)	(3 - 2SLS)	(4 - 2SLS)
Dependent Variable	Property Rights 2010	Property Rights 2010	Property Rights 2010	Property Rights 2010
HIV	0.0778 (0.0491)	0.0441 (0.0629)	0.103* (0.0539)	0.0316 (0.0893)
Property Rights 1980	0.137 (0.196)	0.196 (0.168)	0.109 (0.175)	0.200 (0.136)
Ln(GDP pc)	0.490 (0.335)	1.807*** (0.483)	0.504* (0.293)	1.808*** (0.382)
Aid / GDP	0.00485 (0.0171)	0.00607 (0.0145)	0.00512 (0.0150)	0.00577 (0.0116)
Education / GDP	-0.225 (0.193)	-0.351** (0.164)	-0.274 (0.180)	-0.343** (0.138)
Gini Coefficient		-0.00597 (0.0481)		9.47e-05 (0.0525)
Urban %		-0.0850*** (0.0261)		-0.0868*** (0.0231)
Muslim %		-0.346 (0.841)		-0.434 (0.845)
Constant	1.062 (2.375)	-3.552 (2.648)	1.117 (2.073)	-3.710 (2.298)
Observations	24	24	24	24
R-squared	0.294	0.598	0.284	0.597

Table A5: Alternative Democracy Measurement

	(1 - OLS)	(2 - OLS)	(1 - 2SLS)	(2 - 2SLS)
Dependent Variable	Political Rights 2010	Political Rights 2010	Political Rights 2010	Political Rights 2010
HIV	0.00339 (0.0603)	-0.0324 (0.0844)	-0.0188 (0.0798)	-0.0786 (0.146)
PR 1980	0.290 (0.177)	0.306 (0.202)	0.307* (0.168)	0.350* (0.212)
Ln(GDP pc)	0.0287 (0.397)	0.429 (0.761)	0.0103 (0.367)	0.409 (0.662)
Aid / GDP	0.0393* (0.0200)	0.0434* (0.0215)	0.0385** (0.0184)	0.0434** (0.0187)
Education / GDP	0.213 (0.239)	0.0398 (0.275)	0.265 (0.258)	0.0974 (0.286)
Gini Coefficient		-0.00701 (0.0563)		0.00687 (0.0619)
Urban %		-0.0104 (0.0302)		-0.0135 (0.0275)
Muslim %		-1.110 (1.039)		-1.369 (1.145)
Constant	-4.919 (3.136)	-5.484 (4.527)	-4.750 (2.910)	-5.489 (3.924)
Observations	37	35	37	35
R-squared	0.201	0.204	0.198	0.194

Table A6: Using Polity in 1980 as a Lag

	(3 - OLS)	(4 - OLS)	(3 - 2SLS)	(4 - 2SLS)
Dependent Variable	RoL 2010	RoL 2010	RoL 2010	RoL 2010
HIV	0.0225 (0.0180)	0.0133 (0.0189)	0.0348 (0.0254)	0.0283 (0.0321)
Polity 1980	0.0230 (0.0156)	0.0120 (0.0144)	0.0217 (0.0146)	0.0110 (0.0127)
Ln(GDP pc)	0.214* (0.117)	0.810*** (0.194)	0.221** (0.109)	0.808*** (0.170)
Aid / GDP	0.00845 (0.00617)	0.0128** (0.00574)	0.00889 (0.00576)	0.0129** (0.00503)
Education / GDP	0.0358 (0.0683)	-0.0914 (0.0707)	0.00797 (0.0766)	-0.108 (0.0692)
Gini Coefficient		-0.000291 (0.0127)		-0.00306 (0.0123)
Urban %		-0.0258*** (0.00787)		-0.0249*** (0.00708)
Muslim %		0.0828 (0.265)		0.169 (0.280)
Constant	-2.455*** (0.831)	-4.930*** (1.002)	-2.491*** (0.772)	-4.882*** (0.882)
Observations	39	36	39	36
R-squared	0.274	0.504	0.264	0.493