Do Prolonged Health Crises Weaken Civil Society? Evidence from the AIDS Epidemic in Sub-Saharan Africa

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1 Introduction

Throughout human history, the political evolution of societies has been a gradual one from a state of tyranny to a state of civil liberty, from unaccounted for autocratic rule to elected government, subject to periodic review. Achieving democracy in a closed society takes prolonged periods of strong civil pressure, and so democracy usually came to be as a result from large investments by means of civil activity in the institutions of what is commonly referred to as "civil society" (e.g. Putnam, [1992]). This process required efficient collective action, thus it hinged upon other phenomena, whose existence facilitated collective action, like a vibrant market, urbanization, etc.

There are several important observations, which will be key to the current analysis. First, civil society-building is a time intensive process, and thus it is only natural to analyze civil activity in the context of a more general framework, which focuses on the optimal alocation time in time-intensive activities (e.g., Becker, [1965]). Second, the benefits of having efficient citizen institutions are usually reaped by generations other than the ones who bore the cost of the initial investment. For that reason, this process has historically been very sensitive to exogenous shocks, like wars and health crises. It seems natural to expect that if those have made civil participation more problematic, then they will have reduced the speed of civil institution building and thus slowed down or even reversed the process of democratization. Thus, the framework of allocation of time to political activity may be able to explain why countries that have been traditionally plagued by epidemics and civil conflicts, have been slower in building a civil society and thus achieving a higher level of democracy.

The analysis will focus exclusively on the AIDS epidemic in Sub-Saharan Africa and the perceived effect it's had on civil society and the quality of

governance in the affected countries. It is important to note that there is an ongoing debate in the economic and political science on the direction of the causality: whether countries are sick and poor because they have bad governments, or they have bad governments because they are sick and poor. This paper will - through a theoretical model and supporting evidence - side with the second view, but the hypothesis that the Sub-Saharan countries that ended up with high AIDS prevalence rates did so because they had irresponsible non-democratic governments will also be paid attention to in the empirical part of the paper.

2 Related Literature

The literature concerning the link between, generally speaking, AIDS and democracy, goes along two distinct lines, depending on what channel of causality is being advocated. The literature, which asserts that more democratic countires have a better response to health crises, AIDS in particular, follows the influetial claim by Sen (1981) that democracy helped bring an end to famines in India. Sen's notion is that democracy allows for the existence of the institution of free press, and the latter always promptly alerts the population whenever a crisis is impending. Although Sen's argument has been accepted by most, there are some (Myhrvold-Hanssen, [2003]) who point out that there were food shortages in India even after 1947, which qualify as famines in Sen's terminology. Another argument used to hypothesize that having a democratic government will help mitigate an AIDS epidemic is that commitment by political leaders to combat the disease is more probable in a democracy than in a non-democracy (Patterson, [2000]). Finally, it is claimed that a sexually transmitted disease is more likely to be stigmatized and, hence, done little about in a non-free society (Mbali, [2004]).

The second type of research generally follows the observation of Barro (1999) that the propensity for democracy rises with per capita GDP and primary schooling. Homer-Dixon (2001) uses the argument directly in his claim that AIDS will have a tremendous capacity to weaken the state of government by destroying fiscal resources and human capital. Along the same line is Chirambo's (2003) observation that HIV/AIDS may undermine the capacity of government institutions to effectively perform by wiping out skilled human resources and reducing productivity and food security. And Caesar (2003) argues that AIDS will raise the cost of democracy, and thus lower the demand for it, by forcing numerous additional elctions to replace diseased elected officials. It needs to be noted though, that most of the

papers, investigating this line of causality between democracy and AIDS, have done so in a purely heuristic fashion, using anecdotic evidence and/or case studies of one country at a time.

Thus, this paper's contribution is to use an economic model to validate some of the above claims, and then use actual data to test whether the measured trend in the quality of governance over the last decade supports the claim that AIDS has affected the viability of the Sub-Saharan African civil societies. Our claim will be that by wiping out a large portion of the population, the AIDS epidemic has lowered the relative return to having civil institutions and raised the relative return to labor supply, especially for the educated urban population, which has traditionally been in the forefront of civil activity. In addition, by forcing the survivors to take care of sick relatives, AIDS has caused the total time endowment, available to both labor and civil activity, to shrink. Finally, by forcing many NGO's to shut down due to shortage of workers, the AIDS epidemic may have made the remaining institutions less productive, thus discouraging investment in them. The expected result of these three forces is optimal time allocation away from civil activity, which in time leads to the rapid depreciation of the stock of civil society capital and to deterioration in the quality of government.

3 The Model

Following the literature on human capital, we will assume that at any point in time the agent owns a stock of civil capital. The latter can be broadly defined as the amount of civil organizations and interest groups, political parties, press-outlets, etc., whose sole purpose is to exert pressure upon the government. Specifically, in each period t with a probability p the agents are taxed at a higher rate than the Ramsey tax, τ_t^H, and with a probability $1-p$ they are taxed at the Ramsey rate, τ_t^L; [1] furthermore, we will assume that $\frac{dp(I)}{dI} \leq 0$.[2]Agents are free to alter the amount of civil capital by investing

[1]We don't claim that democracies have lower taxes on income than non-democracies (in fact, the argument is usually made that the reverse is true because of higher income redistribution under democracies - Boix (2003)). We claim though that non-democracies levy higher taxes on full income, by, for example, taxing human capital accumulation (the Taliban regime not allowing girls to go to school would be a good example) or implicitly taxing free time (for instance, the communist regime's policy of forcing the citizens of Bulgaria to devote several hours of their time each Saturday to public work).

[2]Thus, we will define government simply as a function, which maps the stock of civil capital into probability of excessive taxation. The higher the stock of civil capital, the more difficult the government will find it to levy excessive taxes, thus the more "democratic"

in civil activity. The latter is time intensive, thus we can safely assume that the sole input in the production of civil capital is time. The investment technology has the shape of a standard neoclassical production function, $g(\cdot)$, with decreasing returns to scale, $g'(\cdot) > 0$, $g''(\cdot) \leq 0$, satisfying the Inada conditions, and the law of motion of civil capital is given by the familiar equation

$$I_{t+1} = I_t(1-\delta) + g(v_t), \tag{1}$$

where civil capital depreciates at the constant rate δ, v_t is time spend on civil activity, and I_0 is given.

In order to simplify the analysis, we assume that being engaged in political activity has no benefit other than democratization through reduction of the probability of unfair future taxation. (That is, agents stand to gain no direct monetary benefit from being members of a political party, for example). Thus, at any point in time t the agent derives utility from two non-durable goods: consumption of physical goods, c_t, and leisure, l_t. The discounted stream of future utilities at time 0 is

$$EU = \sum_{t=0}^{\infty} \beta^t S_t U(c_t, l_t), \tag{2}$$

where S_t denotes the probability of being alive at time t.

Following Rosen (1988), we assume that agents operate in an environment with perfect annuity markets, so that in the first period of their life they can buy annuities in a fashion consistent with their stream of survival probabilites. Then, the agent's lifetime budget constraint becomes

$$\sum_{t=0}^{\infty} R_t S_t c_t = \sum_{t=0}^{\infty} R_t S_t \left[p\left(I_t\right) \left(\tau_t^L - \tau_t^H \right) + 1 - \tau_t^L \right] \left(1 - v_t - l_t\right) w_t + A_0, \tag{3}$$

where w_t is the wage rate in period t. A_0 is initial asset holding, and $R_t = \prod_{i=0}^{t} \frac{1}{(1+r_{i+1})}$ is the market discount rate between period 0 and $t+1$, r_j being the between-period interest rate.

The agent's goal is to maximize (2) subject to (1) and (3) by a choice of sequences $\{c_t, l_t, v_t, I_{t+1}\}_{t=0}^{\infty}$. Denoting $[p\left(I_t\right)\left(\tau_{Lt} - \tau_{Ht}\right) + 1 - \tau_{Lt}]$ by Q_t, the first order conditions with respect to c_t, l_t, v_t, and I_{t+1} are

the government is. We are aware that this formulation deprives the model of all possible compexities of potential power struggle between different groups, and apparently future reserach will contribute a lot by addressing this issue.

$$\beta^t U_c(c_t, l_t) = \lambda R_t \tag{4}$$

$$\beta^t U_l(c_t, l_t) \geq \lambda R_t Q w_t \quad (= \text{if } l_t < 1) \tag{5}$$

$$\lambda R_t S_t Q_t w_t \geq \beta^t \mu_t g'(v_t) \quad (= \text{if } v_t > 0) \tag{6}$$

$$\lambda R_{t+1} S_{t+1} \frac{dP(I_{t+1})}{I_{t+1}} \left(\tau^L_{t+1} - \tau^H_{t+1}\right)(1 - v_{t+1} - l_{t+1}) w_{t+1} + \\ + \beta^{t+1} \mu_{t+1}(1 - \delta) = \beta^t \mu_t, \tag{7}$$

where λ and $\{\beta^t \mu_t\}$ are the Lagrange multipliers on the consolidated budget constraint and on the sequence of civil capital accumulation constraints respectively.

Assume that at time t it is optimal to invest a strictly positive amount in civil activity, so that (5) and (6) hold with equality. Combining them yields

$$S_t U_l(c_t, l_t) = \mu_t g'(v_t) \tag{8}$$

Also, combining (4) and (5) gives the familiar Euler equation

$$\frac{U_l(c_t, l_t)}{U_c(c_t, l_t)} = w_t Q_t \tag{9}$$

Now, if we solve (7) forward and use (8), we get

$$g'(v_t) \beta \sum_{j=0}^{\infty} \beta^j (1 - \delta)^j U_c(c_{t+1+j}, l_{t+1+j}) S_{t+1+j} \frac{dP(I_{t+1+j})}{dI_{t+1+j}} \times \\ \times \left(\tau^L_{t+1+j} - \tau^H_{t+1+j}\right)(1 - v_{t+1+j} - l_{t+1+j}) w_{t+1+j} = S_t U_l(c_t, l_t) \tag{10}$$

This is a familiar expression, equating the gain of increasing civil activity at time t with respect to the discounted stream of future consumption, holding future civil activity constant, to the cost of civil activity at time t, namely the marginal utility of leisure foregone.

4 Life Cycle and Health Implications

In this section, we shall be interested in how changes in the different parameters of the model - the survival probability at time t, the path of the wage rates, the tax schedule, etc. - affect the optimal allocation of time to political activity. We can divide (6) between periods and obtain

$$\frac{\mu_t}{\mu_{t+1}} = \frac{\beta g'(v_{t+1}) R_t S_t Q_t w_t}{g'(v_t) R_{t+1} S_{t+1} Q_{t+1} w_{t+1}} \tag{11}$$

Next, we divide by μ_{t+1} in (7), and use (4) and (8) to obtain

$$\begin{aligned} \frac{g'(v_{t+1}) R_t S_t Q_t w_t}{g'(v_t) R_{t+1} S_{t+1} Q_{t+1} w_{t+1}} &= \beta(1-\delta) + \\ &+ \frac{U_l(c_{t+1}, l_{t+1}) S_{t+1} \frac{dP(I_{t+1})}{dI_{t+1}} \left(\tau^L_{t+1} - \tau^H_{t+1}\right) (1 - v_{t+1} - l_{t+1})/Q_{t+1}}{S_{t+1} U_l(c_{t+1}, l_{t+1})/g'(v_{t+1}) Q_{t+1+j}} \end{aligned} \tag{12}$$

Finally, plug (10) in (12) to obtain:

$$\frac{g'(v_{t+1})}{g'(v_t)} = \Psi \left[\begin{array}{c} 1 - \delta + \frac{U_l(c_{t+1}, l_{t+1}) S_{t+1} \frac{dP(I_{t+1})}{dI_{t+1}}}{\beta \sum_{j=0}^{\infty} \beta^j (1-\delta)^j U_l(c_{t+1+j}, l_{t+1+j}) S_{t+1+j} \frac{dP(I_{t+1+j})}{dI_{t+1+j}}} \times \\ \times \frac{\left(\tau^L_{t+1} - \tau^H_{t+1}\right)(1 - v_{t+1} - l_{t+1})/Q_{t+1}}{\left(\tau^L_{t+1+j} - \tau^H_{t+1+j}\right)(1 - v_{t+1+j} - l_{t+1+j}) w_{t+1+j}/Q_{t+1+j}} \end{array} \right], \tag{13}$$

where $\Psi = \frac{R_{t+1} S_{t+1} Q_{t+1} w_{t+1}}{R_t S_t Q_t w_t}$.

Equation (13) is crucial in determining the path of the allocation of time to civil activity over the life cycle. It enables us to analyze how the optimal alocation of time to civil society-building changes for a number of exogenous shocks: a decrease in the survival probability (e.g., being diagnosed with cancer, or a prolonged AIDS-type epidemics), an unexpected increase in current and future wage rates (e.g., a swift Black Plague-type pandemic), or a change in the tax structure.

At this point, we can simplify the analysis by assuming that utility is separable in consumption and leisure, that the marginal productivity of civil institutions and the tax structure are constant over time, i.e. $U(c_t, l_t) = u(c_t) + v(l_t)$, $\frac{dP(I_{t+1})}{dI_{t+1}} = \alpha$, $Q_t = \eta$, $\forall t$. Using (9), equation (13) can be rewritten as

$$\frac{g'(v_{t+1})}{g'(v_t)} = \frac{R_{t+1} S_{t+1} w_{t+1}}{R_t S_t w_t} \left(\begin{array}{c} 1 - \delta + \\ \frac{v'(l_{t+1}) S_{t+1} t_{t+1}/Q_{t+1}}{\beta \sum_{j=0}^{\infty} \beta^j (1-\delta)^j v'(l_{t+1+j}) S_{t+1+j} t_{t+1+j}/Q_{t+1+j}} \end{array} \right), \tag{14}$$

where t_t denotes time spent working at time t.

5 General health results

An epidemic will generally affect the amount of time devoted to civil activity in terms of equation (14) through the survival probability S_t, through the wage rate w_t, and through time spend working, t_t. Assume that output is produced using a standard production technology, with only one input, namely labor. Assume that there are competitive labor markets, where M firms compete for N workers. Then, workers' wages will be determined by labor supply, $t_t = 1 - l_t - v_t$, and labor demand, n_t. Market clearing would then require that $Mn_t = Nt_t$. It is a usual prediciton of economic theory that

if the number of firms is not affected, but the number of workers available goes down, labor becomes scarce and equilibrium wages have to increase to clear the labor markets.

A disease, which only kills a large number of people without lowering the post-disease mortality rates, would have effect on the optimal allocation of time to civil activity through the wage rate. The same would apply to a disease, which lowers the survival probability for all future periods. Then from (14), civil activity should go up by the substitution effect. However, it also has a wealth effect through the decrease in future earnings, so the overall effect is ambiguous. Finally, a decrease in the survival probability this period only, unaccompanied by labor market adjustments, will tend to raise civil acitivity by the substitution effect, thus we would expect a lot of social unrest during the period of the epidemic.

5.1 Black plague-type epidemics

A swift epidemic, like the Black plague (1348-1350) or the Spanish flu (1918) kills a large number of people in a relatively short period. One of the effects of such a pandemic would be an increase in the effective market wage, as the supply of labor quickly decreases. Then the substitution effect would require that the agent work more and consume less leisure. Following Becker's (1993) observation that the ratio of leisure between adjacent periods follows the same path as the ration of non-physical capital acumulation, then it must be the case that both leisure and time devoted to civil activity should decrease. In terms of (14) then, the substitution effect will require that v_{t+1}

unambiguously goes down, thus agents invest less in civil activity in periods when the effective wage goes up.

The sensitivity of our analysis of the optimal time allocation in (14) to the movements in the relative wage can be illustrated by noticing that the wage rise in the aftermath of the Black plague was not immediate, because economic life was disrupted and most agricultural and guild activities took some time to get back on track. In our model, this would be reflected in an immediate period of low wages, thus we would expect work effort to decrease and civil activity to increase.

Indeed, the timing of the post-Black plague events is quite consistent with our analysis. Historical data tells us that most West-European cities took less than two decades to recover in terms of population and economic activity; the reason is that as there were functioning urban labor markets, wages adjusted quickly to reflect the human loss and instigated a large influx of "immigrants" from the country-side. Studies by Poos (1991) and Cantor (2002) have emphasized the positive role played by post-plague high wages in increased female labor participation and lower fertility, generating a self-reinforcing cycle of high income and labor scarcity, which lasted for almost a century. The farms, however, were hit harder, as many of the skilled laborers died, and the years of non-farming during the epidemics had made the land harder to toil, effectively raising the cost of staying for the survivors. Thus, the hard conditions in the countryside and the more abundant urban opportunities saw a large number of farm laborers leave for the urban. In short, the cities saw a swift economic recovery, and the countryside saw a prolonged stagnation, and in accord with the predictions of our model, civil unrest in the cities was limited to the immediate several years of the Black plague, but in the countryside it lasted for half a century.[3]

5.2 AIDS

In terms of the general health results, outlined above, AIDS will be expected to affect time allocation through the following properties:

(i) the HIV virus can lead or not to AIDS; if it does, it may take many years before the victim dies;

(ii) the HIV virus is sexually transmitted, so more promiscuous people initially have a higher chance of contracting it;

(iii) unlike avian flu, it is fairly easy to protect oneself against the HIV virus.

[3]Examples of civil unrest in the countryside would include the Jacquery in France in 1358, the Peasants' revolt in England in 1381, and the Catalonian rebellion in 1395. (Knox 2004)

The interplay of all those factors has enabled AIDS to have effects on civil society, somewhat different from the Black plague or the Spanish flu of 1918. In a study of the South African labor market, Young (2005) shows that by killing a lot of skilled people, the AIDS epidemic will raise the real wage by 15% more than if there were no AIDS epidemics, which, coupled with a elasticity of labor supply to wage equal to 17 implies a sharp increase of labor market activity. Also, an important implication abouth the value of knowledge is drawn from DeWalque (2003), who observes that in Uganda AIDS had a higher impact on educated people in the first 10-15 years of the epidemic (probably because the educated urban population is on average more promiscuous), but then the trend reversed because more educated people gradually learned to protect themselves as a result from information flows.

The last impact of the AIDS epidemic, relevant to the current analysis, is affecting the time constraint of the household by forcing the survivors to take care of sick relatives. It is generally aggreed upon that households have had to cope with considerable rates of increase in health fees (up to 400%) as a result from AIDS (Bechu, [1998]). A number of studies indicate that this has resulted in an increased home health care provision and - in the case of men falling sick - women have had to divide their time between tending for the sick and stepping into new labor roles to provide the family income (Dixon et al., [2002]).

In terms of our model, these observations enter the analysis in several different ways. For a population infected with AIDS, there will be a permanent reduction in S_{t+j} and w_{t+j}, all $j \geq 0$. (Real wages go down as an employers' reaction to the decreased marginal productivity of the infected worker; in the extreme case, the worker is simply laid off). For this population, the RHS of [14] will decline, so by the concavity of $g(\cdot)$, v_{t+1} should increase by the substitution effect. By the wealth effect, both the reduction in survival probability and the reduction in real wage would imply that v_{t+1} should decrease, so the overall effect is ambiguous. This analysis is identical to the Black death case, and historical analogy would imply that if the reduction is severe, it should result in an excess of political activity. It needs to be noted that essential for the logic of the analysis is Becker's (1993) observation that over the life-cycle leisure and non-human capital accumulation follow a similar path.

In another scenario, for an agent that has AIDS, but is able to conceal it, only S_{t+j} decreases, all $j \geq 0$, but not real wage. Such a scenario is no different from contracting any other protracted life-threatening disease, like cancer, for instance. Then, v_{t+1} should increase by the substitution effect, but less than in the previous case. Moreover, the increase will be smaller the higher δ is. By the income effect, civil activity should go down, so the overall

effect is again ambiguos.

However, for the surviving population, and especially for the educated population in the cities, which has learned how to protect itself against AIDS, S_{t+j} doesn change, all $j \geq 0$. Real wage goes up because of the labor scarcity, so equation [14] implies that v_{t+1} should decrease by the substitution effect. The wealth effect implies the opposite, so the overall effect is ambiguous. However, the shrinking of the time budget constraint (in our specification - from 1 to $1 - T$, for some $T \geq 0$) implies that there will be less time to be devoted to both labor market and civil activities. Although the overall efect on civil activity is still ambiguous, the fact that real wages increase implies that agents will probably react to the shrinking budget constraint by decreasing labor supply less than civil activity. And even if the budget constraint is unchanged, if the substitution effect dominates the wealth effect - as implied by the high elasticity of labor supply in Young (2003) - we will expect agents to react to the increased value of labor by allocating time away from civil activity.

The above analysis can be modified to assume that $\frac{d^2p(I)}{dI^2} \geq 0$ rather than $\frac{d^2p(I)}{dI^2} = 0$. (Figure 1). Then, the probability of excessive taxation decreases concavely with the stock of civil capital. In this case, if there is a reduction of the stock of civil capital in the wake of the AIDS epidemics (for instance, if some NGOs have to shut down due to the death of some of their employees), in [14] the RHS goes down as the return to today's civil activity increases, so by the concavity of the $g(\cdot)$ function v_{t+1} should increase. At the same time, by the wealth effect, agents will choose to consume their new productivity in terms of decreased civil activity, so the overall effect is unclear. However, there is no reason to assume that $\frac{d^2p(I)}{dI^2} \geq 0$ uniformly. It is more historically accurate to assume that civil activity is not very productive for a small stock of civil capital (total dictatorship), becomes very productive around some critical mass of civil capital I_t^*, and then again is not very productive on the margin when the stock of civil capital is very high (that is, adding one political party to 1000 already existing in a democracy won't change much). In this scenario, $p(I)$ should look more like in Figure 2. Then, if we assume that most of the Sub-Saharan countries are somewhere around the critical mass, I_t^*, it is possible that the AIDS epidemic would reduce the stock of civil capital from a productive to a non-productive portion of the graph. Then, if the substitution effect dominates, the AIDS epidemic's changing the stock of civil capital can result in discouraging civil activity by the logic of [13].

Figure 1

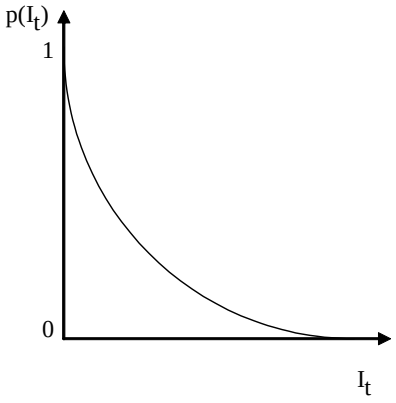
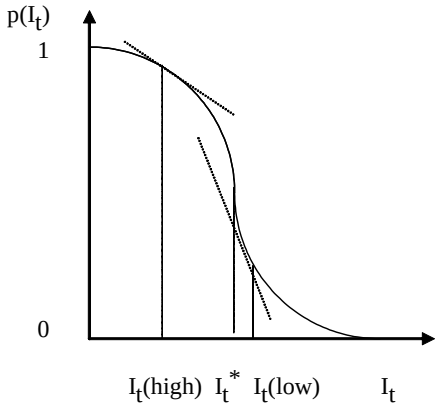


Figure 2



In conclusion, there is sufficient reason to expect that the interplay of the three effects of AIDS - increased real market wages, small effect on the survival probability due to information flow, and shrunk time budget constraint - combined with a possible movement towards a less productive portion of the civil capital function, will induce the population - and especially the educated urban population - to allocate time away from civil society building into the labor market. Our model will then predict that this should result in a rapidly depreciating stock of civil capital, and thus to the deterioration of the quality of governance and, ultimately, democracy. It is important to note that we are not considering here any kind of power struggle, but rather government as a mechanical function. In a richer model, in which political power is achieved through competition, as the stock of civil society depreciates, there will be larger rents from having power, and so opposition parties should find it more profitable to challenge the government. Such a model would explain why civil conflicts have recently become more frequent in some Sub-Saharan African countries, like Cote d'Ivoire, but the theoretical framework still needs to be laid.

6 Data

The empirical analysis of the predictions of the model capitalizes on the recent availability of several ratings of countries' level of democracy and government corruption. Freedom House provides annual ratings of each country's Civil Liberties and Political Rights, starting in 1972, on a 1 to 7 scale, 1 being

total democracy and 7 being total dictatorship. Transparency International constructs annual ratings of a country's perceived government corruption since 1997, on a 1 to 10 scale. 1 being most corrupt and 10 being least corrupt. The index used to denote "quality of governance" is constructed as the average of the two, on a 1 to 10 scale, with 10 being the maximum rating attainable. Consequently, "trend in quality of governance" was constructed using for a starting value the average FH value over the 1997-1999 period and the average TI rating over the 1997-99 period, and the respective 2004 values for an end value.

We need to note that the Transparency International (TI from now on) index was used although it is not available for the full sample of 2004 countries because of its higher discretion compared to the Freedom House (FH from now on) one. Namely, it involves business leaders' perception of government corruption, which we expect to give a more accurate picture of the current situation in a country, while the FH index ranking is based on actual rules guiding the political process, which may depict the situation in a country with a lag. Also, the TI index achieves better precision by assigning decimal ratings, whereas the FH rating is integer based, so what would be 4.6 and 5.4 for TI would in both cases be 5 for FH. Only where the TI index is missing, the average is constructed by using the FH index only.

WHO data on AIDS prevalance rates were taken for the 1997-1999 period. Data on AIDS prevalence rates in 2004 were taken from Avert Org. Data on GDP per capita, literacy rates, percentage of the population under the age of 24 and legal origin were taken from the 1997, 1998 and 1999 editions of the CIA Factbook, and averaged over the three years. Data on median marriage age for women and on usage of condoms came from the UN statistics division. Finally, data on whether there was an armed conflict in the country during the period 1980-1995 were taken from the University of Maryland's POLITY IV database.

Graphs 1, 2, and 3 show the correlation between trend in quality of governance index for the last decade and average AIDS prevalence rates in the mid-1990s for, respectively, all countries, the sample of non-democratic countries and the sample of Sub-Saharan African countries only. A best fitted line has been included. As can be seen, the magnitude of the trend is declining in AIDS prevalence rates, and with the exception of Djibouti, Rwanda, Tanzania and Kenya, it has been uniformly negative for the 15 countries with prevalence rates above 8.5%. Out of the 36 non-OECD countries, which have experienced a decrease in the quality of governance rating over the last decade, 13 are in Sub-Saharan Africa, and the region also accounts for 11 of the 20 largest decreases in quality of governance.

7 Econometric considerations

The implications of the model are tested by regressing, generally speaking, a) average AIDS prevalence rates now/in the 1990s on average democracy rating in the 1990s/1980s and other variables, and b) trend in quality of governance in the last decade on average AIDS prevalence rates in the mid-1990s. In both cases, we have to account for potential endogeneity, because the direction of the causality is intrinsically unclear. In case a), the form of the regression is

$$AIDS1990s = \alpha + \beta FH1980s + \gamma Q + \varepsilon,$$

where Q is a matrix of other explanatory variables. However, AIDS prevalence rates are probably serially correlated, thus

$$AIDS1990s = \widetilde{\alpha} + \sum_t \widetilde{\beta}_t AIDS_t + \widetilde{\varepsilon},$$

where t denotes all years prior to the mid 1990s. If the causality is reversed, then $FH1980s = \overline{\alpha} + \sum_s \overline{\beta}_s AIDS_s + \overline{\varepsilon}_s$, where s denotes all years prior to the mid 1980s. To account for this possible endogeneity, in some of the regressions we will instrument using a dummy variable denoting British legal origin. It has been argued (Mulligan and Sala-i-Martin, [2004]) that the origin of the legal system is correlated with the level of democracy of a country; however, there is no reason to expect that it will be correlated with AIDS prevalence rates.

The reverse problem occurs in the regressions of the type

$$Quality\ of\ governance2004 = \lambda + \mu AIDS2004 + \xi Q + \nu,$$

By the above argument, there is potential endogeneity, so we need to instrument using variables, which are correlated with AIDS prevalence rates, but not with the trend in quality of governance. Such instruments are health expenditures per capita as percent of GDP, percentage of the population using condoms in their sexual activity, and median marriage age for women. It is reasonable to think that the latter is correlated with the probability of contracting AIDS, as it is a in a way a measure of the level of sexual promiscuity - which should be lower in societies, where women marry early, as the pool of potential sexual partners is smaller. However, there is no reason to expect that there would be any correlation between trend in democracy or corruption, on the one hand, and median marriage age on the other. Also, health expenditures per capita should be correlated with AIDS incidence,

as countries that spend less on general health care should have populations with weaker immune system, thus more prone to AIDS. However, a democratic government and a corrupt dictator should have similar incentives to invest in the health of the population, thus health expenditures per capita needn't be correlated with an average index of political freedoms, civil liberties and government corruption. Finally, condom usage naturally fulfills the requirements for a good instrument in this case.

8 Empirical Results

The first set of empirical tests is aimed at establishing whether the hypothesis that AIDS prevalence rates ended up being lower in countries, which were more democratic at the time of the AIDS outbreak, is supported by evidence. Table 1 presents the results from a regression of average AIDS prevalence rates over the 1995-1997 period on average FH rating over the 1980-1990 period - the first decade of the AIDS outbreak. In the simple regressions in the full sample of countries there seems to be a strong negative correlation between level of democracy during the 1980s and AIDS prevalence rates in the late 1990s, albeit economically not large (a decrease of 4 points is needed to explain in increase of 1% in the prevalence rates). However, once measures of log GDP per capita, literacy rates and dummies for armed conflict and especially for Sub-Saharan Africa are added, the effect disappears. In the sample of the non-democratic countries (those with a standardized average rating of less or equal to 5 out of possible 10) and of the Sub-Saharan countries only the effect is non-existant even in the simple regression. Interestingly enough, levels of literacy are strongly positively correlated with AIDS prevalence rates, with 8 years more of schooling increasing prevalence rates by 1%. This is probably because more educated populations tend to be more promiscous, so they were harder hit in the beginning of the epidemic, when information was limited.

Table 2 shows a variation of the same regressions using an instrument for democracy, namely, British legal origin. Again the facts do not support the theory that more democratic countries fared better in terms of AIDS prevalence rates; rather, in the sample of the non-democratic countries, there is a significant negative correlation between democracy and AIDS prevalence rates. Finally, Table 3 shows a set of regressions of the trend in AIDS prevalence rates between 1995 and 2004 on the average level of democracy in the mid 1990s, controlling for other factors. The only time democracy is statistically significant is in the regression in the Sub-Saharan African sample only,

and the sign of the effect is positive, suggesting that a 2.5 higher democracy rating in 1995 led to a 1% higher positive trend in AIDS prevalence rates. Given the evidence, we would have to conclude that the spread of AIDS was facilitated not by lack of democracy, but by other factors, probably sexual practices and culture of condom usage, and there is no immediate reason to expect that less democratic countries will be in a worse position when it comes to those factors.

The second set of empirical tests investigates whether countries with higher AIDS prevalence rates around the mid-1990s performed worse in terms of trend in quality of governance over the next decade. Table 4 shows different sets of regression of the trend in the average quality of governance from the mid 1990s to 2004. Both in the full sample and in the sample of the non-democratic countries only, higher AIDS prevalence rates predict a lower trend in the quality of governance. Especially when we take out the OECD countries, from whom no apparent growth in the quality of governance can be expected, among the countries with a rating of less than 5 out of ten, and among the Sub-Saharan African countries only, AIDS seems to strongly influence negatively the growth in democracy and the fight with corruption, with a 1-point lower trend for anywhere between 8% and 20% higher AIDS prevalence rates.

Table 5 repeats the above exercise by including interaction terms between log GDP per capita, literacy rates, war conflict and the Sub-Saharan African dummy. AIDS prevalence rates still affect negatively and significantly the threnD in quality of governance, predicting on average a drop of 1 point in the 1-10 rating for a 10% increase in the prevalence of the disease. Also, there is some evidence that population income and literace reinforce each other's effect in a negative direction, which is improvement to the findings in the previous regressions that higher literacy rates, especially in the less democratic and African countries, imply higher AIDS incidence.

Table 6 gives the results of a set of probit regressions of the probability of having a decrease in the quality of governance index between 1995 and 2004, and average AIDS prevalence rate in the mid-1990s. This represents an empirically somewhat improved way to look at the question, as in the regressions of the trend of quality of governance on other variables we haven't yet accounted for the fact that some countries (the OECD ones) had already reached the almost maximum level of quality of governance by the mid-1990s. The AIDS variable again has a statistically significant negative effect in all regressions, for different combinations of explanatory variables. What is more important, in the sample of the non-democratic countries only, and in the sample of the non-democratic Sub-Saharan African countries only, AIDS prevalence rate is the only varaible that has a predictive power when it comes

to the probability of experiencing a decrease in the quality of governance index.

Table 7 is a repetitions of Table 4, but here average AIDS prevalence rates in the mid 1990s have been instrumented for by percentage of government expenditures spent on health, percentage of sexually active population using condoms, and median marriage age for women. The first instrument has been shown by Mulligan and Sala-i-Martin (2004) to be uncorrelated with the level of democracy in a country; specifically, they show that there is no empirical evidence that democracies and dictatorships differ in their public policies, including level of health spending. Condom usage can be argued to be correlated with AIDS incidence, although it is not clear what the causality would be. As for median marriage age for women, it is evidently a proxy for sexual promiscuity, as in most cultures the earlier a woman marries, the higher the probability that she will leave the pool of promiscuous sexual activity, but there is no reason to expect that in more democratic countries women will marry earlier or later. All regressions support our model again, suggesting that countries with 10% AIDS prevalence rates in 1995 would experience anywhere between 0.5 and 2-point lower trend in democracy than an AIDS-free country. However, none of the other variables is statistically significant, suggesting that maybe there are other variables with strong predictive power, unaccounted for in our work.

In Table 8, we show the results from various regressions of quality of government index for 2004 on AIDS prevalence rates for 2004. Column 1 presents the results from the simple regression. Column 2 shows the results from a regression, where AIDS prevalence rates in 2004 have been instrumented for by the same instruments as in the regressions in Table 7. Finally, the third column represents a Tobit regression of quality of governance on AIDS prevalence rates, accounting for the fact that quality of governance is a censored variable, with a minimum value of 1. Again, in an all regressions, AIDS prevalence rates significantly affect the quality of governance rating in a negative direction.

Finally, Table 9 repeats the above excercise, but using the Freedom House index only. Thus, we adress any potential criticism against the rating used by Transparency International. The third column is now a Tobit regression, where the variable has been both left- and right-censored. Excluding the IV regression, where the coefficient is 5 times larger, the regressions imply a reduction of 0.1 points in the FH rating for every 1% increase in AIDS prevalence rates. Put qualitatively, if the US in 2004 had the AIDS prevalence rates of Botswana (36% of the population), its predicted Freedom House rating would be 6.4 out of 10, the level of Albania - a country, which only became democratic 15 years ago, and has been torn by political scandals,

a short civil war and goverment corruption allegations ever since. Given the short period of time, over which our excercise has been carried out, and the ex-ante arguable nature of all democracy indices, this prediction is most probably exaggerated; however, based on the evidence we have, we can conclude that the AIDS epidemic has been able to have a large negative impact on the viability of the Sub-Saharan African civil societies, and thus on the quality of central governance.

9 Conclusion

This paper seeks to investigate both theoretically and empirically the link between the AIDS epidemics in Sub-Saharan Africa and the viability of the civil societies there, as measured by two indices of level of democratization and government corruption. A simple model of allocation of time has been developed, in which a prolonged large-scale epidemic affects the agents' optimal allocation of time to civil activity through changes in the survival probability, the real wage, and the stock of civil capital. It was shown that if the relative return to civil activity goes down, and the time budget constraint shrinks, agents will be expected to allocate less time to civil activity, contributing to a faster depreciation of the stock of civil capital. The AIDS epidemic has already been shown to have increased real wages for the survivors, decreased the stock of civil capital by killing many NGO workers, and shrunk the time budget constraint of most survivors by forcing them to care for a sick relative. The first of these factors has increased the absolute return to labor market activity, and the second one has arguably decreased the absolute return to civil activity by pushing the probability of non-Ramsey taxation function into the non-productive region. Hence, the relative return to civil activity has declined. The model has thus predicted that this effect, coupled with the shrinking of the time budget constraint, should lead to a decrease in civil activity and, consequently, a deterioration of civil society and the quality of governance.

Next, evidence was presented from the interplay of a set of variables. An index of quality of governance was constructed as an average of Freedom House's index of political freedoms and civil liberties, and Transparency International's index of government corruption. It was show that although there is no evidence that more democratic countries were on average more successful in controling the spread of AIDS, once the disease reached epidemic proportions, it has been able to affect the perceived quality of governance in the affected countries. Even in the presence of many different explanatory

variables, the AIDS prevalence rate in a country has been shown to have affected negatively the trend in quality of governance during the last decade. Both the magnitude of the trend has been shown to decrease, and the probability of experienceing a decrease in quality of governance has been shown to increase with the magnitude of the disease prevalence. Finally, the same results have been obtained using different econometric procedures, including simple OLS, 2SLS, and Tobit regressions, accounting for censored variables.

10 References:

[1] Barro, Robert, "Determinants of Democracy", *Journal of Political Economy*, Vol. 107(S6), pp. 158-29

[2] Becker, Gary, "A Theory of the Allocation of Time", *The Economic Journal*, Vol 75, No 299 (Sep.,1965)

[3] Becker, Gary, "Human Capital", The University of Chicago Press, 1993.

[4] Béchu, N., The impact of AIDS on the economy of families in Côte d 'Ivoire: Changes in consumption among AIDS-affected households. In: Ainsworth, Fransen and Over (eds) *Confronting AIDS: Evidence from the Developing World:* Selected background papers for the World Bank Policy Research Report. Brussels, EuropeanCommission (1998)

[5] Boix, Carles, "Democracy and redistribution". Cambridge University Press, 2003.

[6] Cantor, Norman, "In the Wake of the Plague: The Black Death and the World It Made", New York: Free Press, 2001

[7] Chirambo, Kondwani, "Will HIV/AIDS Reshape the Face of Politics?", *Democracy in Action*, v 11 (1), March 2003

[8] DeWalque, Damien, "How Does the Impact of an HIV/AIDS Information Campaign Vary with Educational Attainment? Evidence from Rural Uganda", University of Chicago Dissertation

[9] Dixon S., McDonald, S and Roberts J. (2002) "The impact of HIV and AIDS on Africa's economic development", *British Medical Journal,* 2002; 324:232-4.

[10] Hevia, Constantino, "On the Allocation of Time to Spirituality: Health, the Value of life and Other Results", University of Chicago Workshop presentation, 2004.

[11] Homer-Dixon, Thomas, Plague Upon Plague: AIDS and Violent Conflict in Africa, U.S. Institute of Peace, May 2001

[12] Mbali, Mandisa, HIV/AIDS Policy-Making in Post-Apartheid South Africa, in Daniel J., Habib, A. and R. Southal, "State of the Nation: South Africa 2003-2004", HRSC Publishers, Pretoria, 2003

[13] Mulligan, Casey, Sala-i-Martin, Xavier, and Gill, Richard, "Do Democracies Have Different Public Policies than Nondemocracies?", *Journal of Economic Perspectives*, 18(1), Winter 2004: 51-74

[14] Myhrvold-Hanssen, Thomas, "Democracy, News Media and Famine Prevention: Amartia Sen and the Bihar Famine of 1966-67", in SASNET 2003

[15] Nelufule, Maanda David, "AIDS and Democracy: What Do We Know?", Democracy, Governance and HIV/AIDS Roundtable, Pretoria, July 19-20 2004

[16] Paterson, David, Political Commitment, Governance and AIDS: A Discussion Paper, Interagency Coalition on AIDS and Development, December 2000

[17] Rosen, Sherwin, "The Value of Changes in Life Expectancy", *Journal of Risk and Uncertainty*, 1988, pp. 285-304

[18] Sen, Amartya, Poverty and Famines: An Essay on Entitlement and Deprivation. Oxford, Clarendon Press 1981

[19] Young, Alwyn, "The Gift of the Dying: The Tragedy of AIDS and the Welfare of Future African Generations," *Quarterly Journal of Economics*, forthcoming

Figure 1. Trend in quality of governance against AIDS prevalence rates for the full sample of 150 countries.

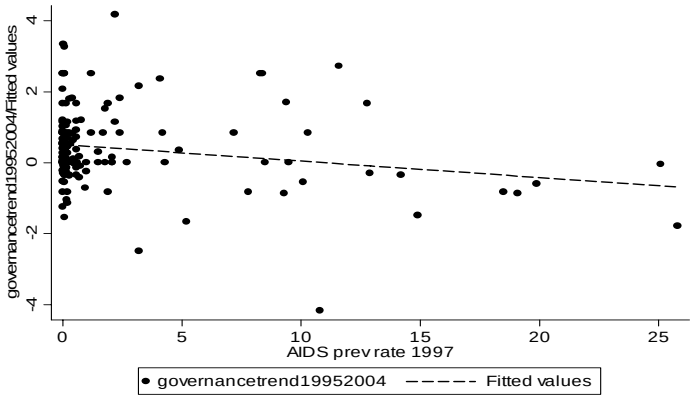


Figure 2. Trend in quality of governance against AIDS prevalence rates for the sub- sample of 86 non-democratic countries in the mid-1990s

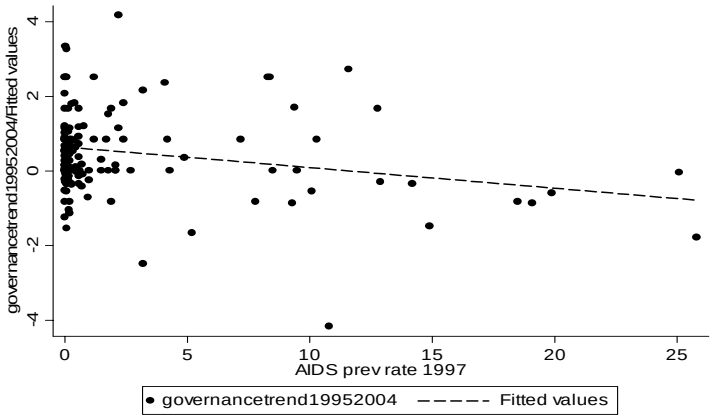


Figure 3. Trend in quality of governance against AIDS prevalence rates for the sub- sample of 39 Sub-Saharan African countries in the mid-1990s

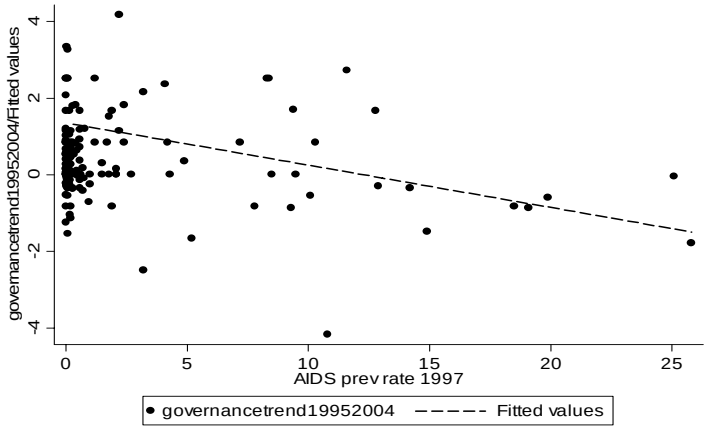


Table 1. Regressions of AIDS prevalence rates in 1997 on average democracy rating in the 1980s and other variables

Variable	I	II	III	IV	V	VI	VII
Constant	3.390	20.359	0.866	2.529	23.455	0.687	-2.377
	(0.631)***	(3.554)***	(3.253)	(0.961)***	(4.592)***	(4.494)	(10.27)
Average democracy	-0.253	0.052	0.005	0.269	0.469	0.433	-0.353
rating 1980s	(0.119)**	(0.133)	(0.099)	(0.409)	(0.408)	(0.307)	(0.903)
logGDP per capita in		-2.557	-0.632		-3.275	-0.674	1.091
1985		(0.579)***	(0.469)		(0.707)***	(0.625)	(1.696)
War in 1980s or 1990s		0.551	-3.433		0.337	-3.2	-5.489
		(1.206)	(0.976)***		(1.366)	(1.12)***	(1.989)***
Literacy		2.915	5.72		5.623	5.6	12.61
		(26.173)	(1.912)***		(3.012)*	(2.408)	(5.213)***
Sub-Saharan Africa			10.216			9.808	
dummy			(0.997)***			(1.24)***	
R^2	0.03	0.22	0.57	0.01	0.26	0.59	0.42
Observations	141	133	133	93	85	85	33

Note (i): Regressions I, II and II are for the whole sample.
Regressions IV, V and VI are for the non-democratic countries only (average democracy index in 1980s <=5)
Regression VII is for the sub-sample of Sub-Saharan Africa only.

Note (ii): Standard errors in brackets

Note (ii): *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

Table 2. 2SLS regression of AIDS prevalence rates in 1997 on average democracy rating in the 1980s, using British legal origin as an instrument

Variable	I	II	III
Constant	-5.081	-1.806	4.099
	(7.442)	(2.447)	(2.871)
Average democracy	1.816	2.504	2.014
rating 1980s	(1.809)	(1.221)**	(1.498)
R^2			0.12
Observations	141	93	34

Note (i): Regressions I is for the whole sample.
Regressions II is for the non-democratic countries only (average democracy index in 1980s <=5)
Regression III is for the sub-sample of Sub-Saharan Africa only.

Note (ii): Standard errors in brackets

Note (iii): *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

Table 3. Regressions of trend in AIDS prevalence rates between 1997and 2004 on average democracy rating in the 1980s and other variables

Variable	I	II	III	IV	V	VI	VII
Constant	0.33	0.549	-0.669	-0.046	0.849	0.905	-5.311
	(0.281)	(0.763)	(0.91)	(0.418)	(0.869)	(1.045)	(3.102)
Average democracy	0.006	0.06	0.04	0.19	-0.028	-0.026	0.422
rating 1980s	(0.047)	(0.049)	(0.049)	(0.153)	(0.09)	(0.094)	(0.234)*
logGDP per capita		-0.085	0.005		-0.077	-0.082	0.533
in 1985		(0.129)	(0.132)		(0.12)	(0.134)	(0.57)
War in 1980s or		0.3	-0.129		-0.1	-0.088	-0.141
1990s		(0.415)	(0.446)		(0.346)	(0.368)	(0.886)
Literacy		-0.000	0.005		-0.002	-0.003	0.024
		(0.008)	(0.008)		(0.007)	(0.007)	(0.024)
Sub-Saharan Africa			0.99			-0.038	
dummy			(0.422)***			(0.383)	
R^2	0.00	0.02	0.07	0.02	0.02	0.02	0.26
Observations	141	117	117	78	61	61	30

Note (i): Regressions I is for the whole sample.
Regressions II is for the non-democratic countries only (average democracy index in 1980s <=5)
Regression III is for the sub-sample of Sub-Saharan Africa only.

Note (ii): Standard errors in brackets

Note (iii): *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

Table 4. Regressions of the trend in quality of governance (1995-2004) on average AIDS prevalence rates in the mid 1990s and other variables

Variable	I	II	III	IV	V	VI	VII
Constant	0.510	0.771	0.374	0.643	1.206	0.278	2.317
	(0.099)***	(.542)	(0.593)	(0.165)***	(0.107)	(1.208)	(2.629)
AIDS prevalence	-0.046	-0.049	-0.078	-0.055	-0.065	-0.115	-0.122
rate in 1995	(0.018)***	(0.019)***	(0.026)***	(0.028)**	(0.033)**	(0.044)***	(0.069)*
logGDP per capita		-0.090	-0.071		-0.145	-0.087	-0.339
in 1995		(0.077)	(0.077)		(0.155)	(0.156)	(0.463)
War in 1980s or		0.107	0.159		0.201	0.042	0.073
1990s		(0.286)	(0.328)		(0.421)	(0.436)	(0.696)
Literacy rate		0.312	0.62		0.313	0.806	1.654
		(0.518)	(0.549)		(0.891)	(0.802)	(2.178)
Sub-Saharan Africa			0.654			1.000	
dummy			(0.408)			(1.209)	
R^2	0.04	0.06	0.08	0.05	0.06	0.11	0.16
Observations	150	122	122	81	63	63	30

Note (i): Regressions I, II and III are for the whole sample.
Regressions IV, V and VI are for the non-democratic countries only (quality of government index<=5)
Regression VII is for the sub-sample of Sub-Saharan Africa only.

Note (ii): Standard errors in brackets

Note (iii): *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

Table 5. Regressions of the trend in quality of governance (1995-2004) on average AIDS prevalence rates in the mid 1990s and other variables (including interaction terms)

Variable	I	II	III
Constant	-4.706 (3.286)	-10.018 (6.798)	-0.438 (7.289)
AIDS prevalence rate in 1995	-0.072 (0.034) **	-0.108 (0.054) **	-0.095 (0.057) *
logGDP per capita in 1995	0.678 (0.49)	1.497 (1.019)	0.163 (1.225)
War in 1980s or 1990s	-0.103 (2.306)	-0.554 (3.239)	5.65 (5.566)
Literacy rate	0.062 (0.035) *	0.133 (0.084)	-0.009 (0.129)
Sub-Saharan Africa dummy	2.79 (2.304)	6.241 (3.575) *	
logGDP per capita in 1995 * Sub-Saharan Africa dummy	-0.271 (0.334)	-0.808 (0.504) *	
Literacy * Sub-Saharan Africa dummy	-0.007 (0.017)	-0.005 (0.028)	
logGDP per capita in 1995 * war in 1980s or 1990s	0.065 (0.309)	0.169 (0.428)	-0.826 (0.82)
logGDP per capita in 1995 * literacy	-0.008 (0.005) *	-0.019 (0.013)	0.003 (0.022)
Literacy * war in 1980s or 1990s	-0.007 (0.019)	-0.008 (0.028)	-0.003 (0.031)
R^2	0.11	0.17	0.17
Observations	122	63	30

Note (i): Regressions I, II, and III are for the whole sample, for the sub-sample of non-democratic countries only (quality of government index<=5), and for the sub-sample of Sub-Saharan African countries only, respectively

Note (ii): Standard errors in brackets

Note (iii): *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

Table 6. Probit regressions of the probability that the trend in quality of governance (1995-2004) is negative on AIDS prevalence rates in 1995 and other variables. Probability is evaluated at the sample mean for a discrete change in the explanatory variable

Variable	I	II	III	IV	V	VI	VII
AIDS prevalence	0.014	0.009	0.022	0.02	0.024	0.054	0.043
rate in 1995	(0.005)***	(0.019)***	(0.009)***	(0.008)***	(0.012)**	(0.024)**	(0.024)*
logGDP per		-0.056	-0.064		0.016	0.005	-0.009
capita in 1995		(0.027***)	(0.027)***		(0.052)	(0.05)	(0.115)
War in 1980s or		-0.029	0.09		0.041	0.18	0.114
1990s		(0.077)	(0.147)		(0.151)	(0.206)	(0.172)
Literacy rate		0.001	0.001		0.003	0.002	0.003
		(0.002)	(0.002)		(0.003)	(0.003)	(0.005)
Sub-Saharan			-0.183			-0.377	
Africa dummy			(0.071)*			(0.168)	
Pseudo R^2	0.08	0.10	0.15	0.10	0.09	0.15	0.32
Observations	150	122	122	81	63	63	30

Note (i): Regressions I, II and III are for the whole sample.
Regressions IV, V and VI are for the non-democratic countries only (quality of government index<=5)
Regression VII is for the sub-sample of Sub-Saharan Africa only.

Note (ii): Standard errors in brackets

Note (iii): *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

Table 7. Regressions of the trend in quality of governance (1995-2004) on AIDS prevalence rates in 1995, where AIDS prevalence rate is instrumented for by **percentage condom usage, percentage of the population under 16 years** and **per capita expenditures on health.**

Variable	I	II	III	IV	V	VI	VII
Constant	-0.116	-0.246	-1.019	0.123	0.191	-0.357	-0.825
	(0.084)	(.481)	(0.644)	(0.114)	(1.042)	(0.972)	(1.183)
AIDS prevalence	-0.07	-0.05	-0.193	-0.073	-0.059	-0.165	-0.105
rate in 1995	(0.02)***	(0.025)**	(0.118)*	(0.023)**	(0.036)*	(0.106)*	(0.048)**
logGDP per		0.045	0.042		-0.014	-0.062	0.123
capita in 1995		(0.058)	(0.072)		(0.145)	(0.145)	(0.213)
War in 1980s or		-0.079	-1.031		0.245	-0.608	-0.545
1990s		(0.341)	(0.813)		(0.347)	(0.599)	(0.482)
Literacy rate		0.006	0.915		0.657	1.053	1.687
		(0.005)	(0.512)		(0.556)	(0.728)	(0.175)
Sub-Saharan			2.367			1.462	
Africa dummy			(1.893)			(1.368)	
R^2	0.13	0.19	0.21	0.32	0.34	0.22	0.35
Observations	129	114	114	71	59	59	28

Note (i): Regressions I, II and III are for the whole sample.
Regressions IV, V and VI are for the non-democratic countries only (quality of government index<=5)
Regression VII is for the sub-sample of Sub-Saharan Africa only.

Note (ii): Standard errors in brackets

Note (iii): *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

Table 8. OLS, IV and Tobit regression of Quality of Governance rating in 2004 on AIDS prevalence rates in 2004

Variable	OLS	IV	Tobit
Constant	5.126	9.083	5.81
	(0.226)***	(2.084)***	(0.386)
AIDS prevalence rate in 1995	-0.061	-1.421	-0.574
	(0.035)*	(0.692)**	(0.213)**
R^2	0.02		0.04
Observations	150	135	145 uncensored, 3 left-censored

Note (i): Regressions I is a simple OLS regression.

Regression II is a 2SLS, where the variable "AIDS prevalence rates in 1995" has been instrumented for using **percentage of government budget spent on health, percentage of sexually active population using condoms,** and **median marriage age for women**.

Regression III is a Tobit regression with left censoring at 1, accounting for the fact that the minimum QOG rating attainable is 1.

Note (ii): Standard errors in brackets

Note (iii): *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

Table 9. OLS, IV and Tobit regression of FH (political freedoms and civil liberties) rating in 2004 on AIDS prevalence rates in 1997

Variable	OLS	IV	Tobit
Constant	6.005	7.214	6.434
	(0.297)***	(0.436)***	(0.355)
AIDS prevalence rate in 1995	-0.098	-0.514	-0.12
	(0.548)*	(0.122)***	(0.069)*
R2	0.02		0.04
Observations	150	138	124 uncensored, 14 left-censored 26 right-censored

Note (i): Regressions I is a simple OLS regression.
Regression II is a 2SLS, where the variable "AIDS prevalence rates in 1995" has been instrumented for using **percentage of government budget spent on health, percentage of sexually active population using condoms,** and **median marriage age for women**.
Regression III is a Tobit regression with left censoring at 1, accounting for the fact that the minimum QOG rating attainable is 1.

Note (ii): Standard errors in brackets

Note (iii): *** significant at 1% level; ** significant at 5% level; * significant at 10% level.