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ARE COUNTRY REPUTATIONS FOR GOOD AND BAD LEADERSHIP ON AIDS DESERVED?: AN EXPLORATORY QUANTITATIVE ANALYSIS

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Are Country Reputations for Good and Bad Leadership on AIDS Deserved?: An Exploratory Quantitative Analysis

Abstract

Some countries, like Brazil, have good reputations on AIDS policy, whereas others, notably South Africa, have been criticized for inadequate leadership. Cross-country regression analysis suggests that most of the 'poster children' for AIDS leadership have indeed performed better or worse than expected given their economic and institutional constraints and the demographic and health challenges facing them. Regressions are run on HAART coverage (number on highly active antiretroviral therapy as % of total need) and MTCTP coverage (pregnant HIV+ women accessing mother-to-child-transmission prevention services as % of total need). Brazil, Burkina-Faso, Cambodia, Costa Rica, Mali, Namibia, Suriname, Thailand, Paraguay, and Uganda performed consistently better than expected. South Africa, Uruguay, and Trinidad and Tobago performed consistently and significantly worse than expected.

Introduction

The Acquired Immunodeficiency Syndrome (AIDS) remains a major challenge for global health. Despite an unprecedented mobilization of resources since 2003 (notably the Global Fund to Fight AIDS, Tuberculosis, and Malaria and the US President's Emergency Plan for AIDS Relief (PEPFAR)), the epidemic continues to outstrip attempts to rein it in. In 2007 2.1 million people died of AIDS and 2.5 million became infected with the Human Immunodeficiency Virus (HIV), bringing the global total living with HIV to an estimated 33.2 million.[1]

Part of the problem is that as foreign assistance flows into AIDS-affected countries, inadequacies at the national level have become painfully apparent. This, in turn, has placed the spotlight on national government 'leadership' on AIDS.[1-5] Some countries, notably Brazil, Cambodia, Thailand and Mexico have established reputations for quick and committed responses to condom promotion and the use of antiretrovirals for mother to child transmission prevention

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(MTCTP) and highly active antiretroviral therapy (HAART).[8-15] Other countries have more contested reputations. For example, Uganda's President Museveni is widely acclaimed for raising awareness about HIV,[16-18] but the country's image has been harmed recently by the cancellation of a Global Fund loan and reports of inefficiencies and confusion in AIDS prevention and treatment interventions.[3,5,18,19] Likewise, Botswana is recognized for its rollout of HAART, but has more recently been criticized for overly complex protocols.[5] Cuba, having initially been criticized for confining HIV-positive people to sanitaria,[20] is now seen as a role model for providing HAART[21] and MTCTP.[22] Countries with growing reputations on AIDS leadership include Rwanda, Haiti, Malawi, and Namibia.[1,5]

In short, there exists a group of countries which enjoys reputations as relatively good performers on AIDS policy. South Africa, by contrast, is infamous for President Mbeki's support for AIDS denialism and related reluctance to provide antiretrovirals for either MTCTP or HAART.[23] Russia and Ukraine have reputations for stigmatizing injecting drug users, China for human rights abuses, and Zambia and Zimbabwe for lack of commitment to HIV prevention and treatment.[3, 4, 5]

But are these reputations for (good or bad) AIDS leadership deserved, or do they simply reflect differential capacities and constraints? Consider the case of South Africa. In June 2006 a *New York Times* Op Ed blamed South Africa's reluctance to rollout HAART on President Mbeki's AIDS denialism.[24] The South African ambassador responded by arguing that as 134,473 people were receiving HAART through the public sector, this accusation was unfair.[25] Indeed, given that South Africa has the largest HAART program in the world (a point Mbeki himself likes to make)[26] and faces real economic and institutional constraints,[27] is it really appropriate to argue that South Africa's leadership has been inadequate?

A potentially useful way to approach this is to frame the question of leadership explicitly within the context of what was possible and reasonable to expect. This paper accordingly uses cross-country regression analysis to explore which countries demonstrate relatively good or bad outcomes given the challenges and opportunities open to them, and in light of international standards set by performance in other countries. The key policy indicator adopted here is HAART coverage – i.e. the number of people on HAART expressed as a percentage of the total number estimated to need it. MTCTP coverage is also explored, but to a more limited extent given that this data is less reliable and is available for fewer countries. The analysis was conducted on 82 AIDS-affected `countries (defined as countries with an adult HIV prevalence rates of 0.1% or

above). These are presented in Figure 1. Data was sourced from UNAIDS, the WHO and the World Bank.
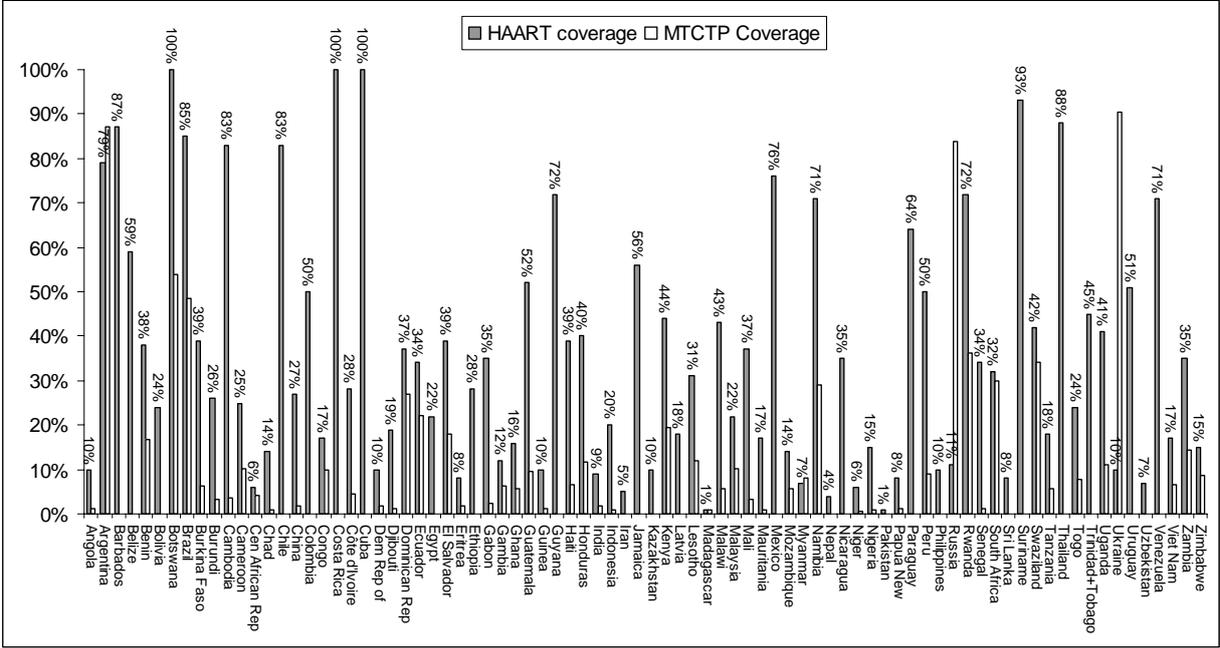

Figure 1. HAART Coverage and MTCTP Coverage

Methods

HAART coverage is a function of objective constraints/opportunities and political will on the part of governments to provide HAART to its citizens. Ideally, one should be measure political will directly, but attempts to do this have proved disappointing and limited in coverage.[28,29] Instead, this paper builds on previous work using regression analysis to explore the role of political will/leadership, indirectly taking into account 'objective' constraints/opportunities in the regression model, and then using the regression residual (the difference between actual and predicted HAART coverage) as an indicator of which countries are performing better or worse than expected.[29-32]

As the residual picks up the influence of *all* missing variables (i.e. not simply unmeasured political will), country performance assessments of this kind should be made only on the basis of consistently large residuals. Hence only those countries with residuals consistently greater than 15 (i.e. actual HAART coverage exceeds predicted coverage by 15 percentage points) are classified as performing above expectations. Those with residuals consistently between -15 and 15 are classified as performing 'as expected' and those with residuals below -15 are classified as performing 'below expectations'. Residuals are generated

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using three different plausible regression specifications. These are presented in Table 1 along with residuals for selected countries. Figure 3 displays the results for all countries using the main regression model (regression 1) and indicates which countries fall into the same classification for all regression specifications.
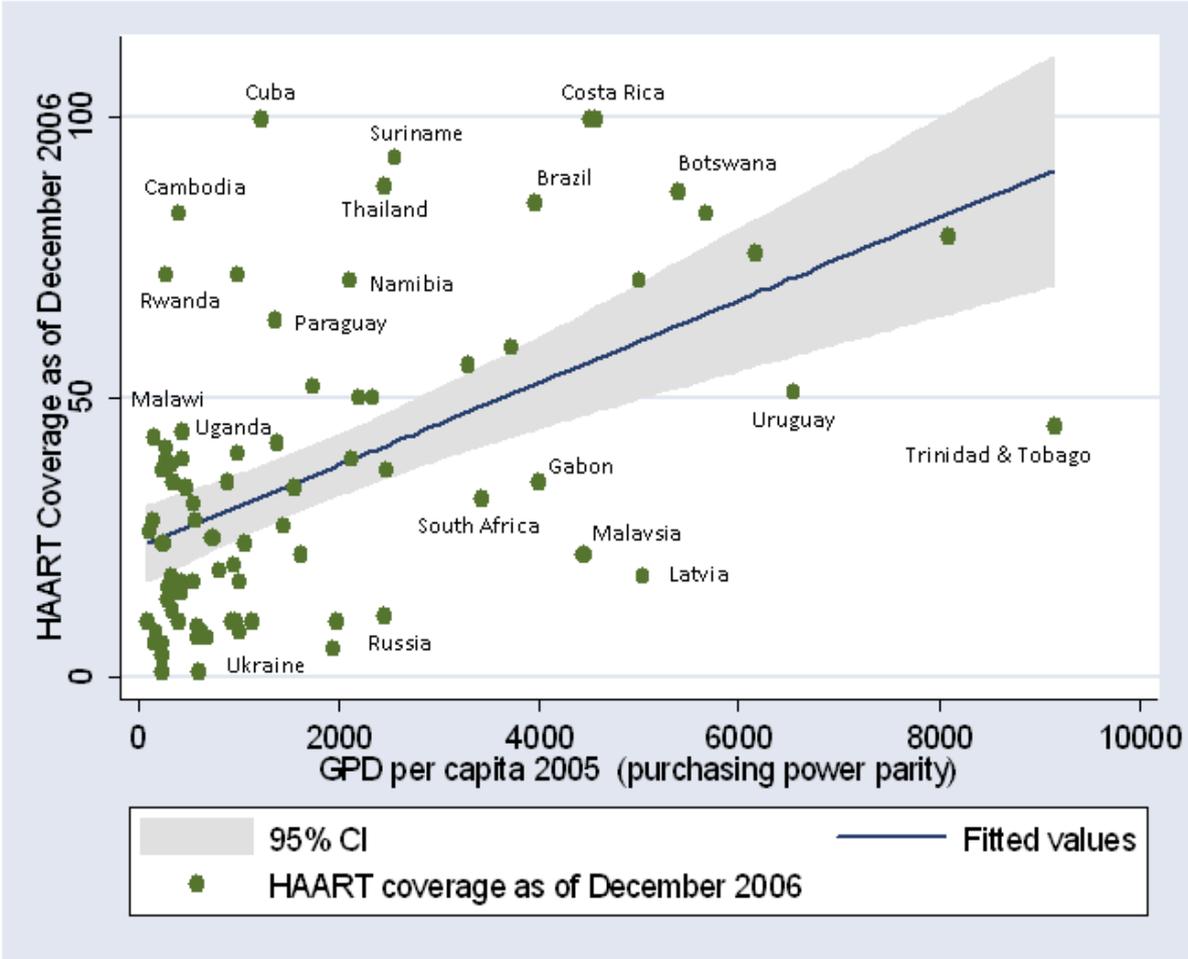

Figure 2. HAART Coverage and Per Capita Income

The key economic factor constraining governments in their attempt to rollout HAART is the amount of resources available. The most important indicator of domestic capacity in this regard is *per capita* income, i.e. the overall level of economic development. As can be seen in Figure 2, there is a positive (but weak) relationship between *per capita* income and the level of HAART coverage. Countries above the regression line are doing better in terms of HAART coverage than would be expected if *per capita* income was the only factor driving HAART coverage (and *vice versa* for those below the line). The recognized poor performers (e.g. Russia, Ukraine and South Africa) fall substantially below the line (suggesting that they should have achieved higher levels of coverage given their level of development), and the poster children for

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good performance (Cambodia, Cuba, Brazil, Malawi, Namibia, Rwanda, Thailand, Uganda) fall substantially above it.

Some countries started rolling out HAART almost entirely on the basis of their own resources (notably Brazil and Cuba), but most were assisted to do so by significant external funding from donors. Although engaging constructively at national level with foreign donors is in itself a sign of good leadership (as is recognized to be the case in Rwanda), foreign assistance to combat AIDS has been channeled through the Global Fund and PEPFAR to a wide variety of organizations and NGOs as well as different levels of government, not all of which are necessarily in agreement with national policy on AIDS. The impact of these additional resources thus needs to be taken into account. It is done so through the inclusion of dummy variables for whether a country is a PEPFAR focus country or was a recipient of a (first round) Global Fund grant.

Internal and external resources are crucial determinants of HAART coverage, but so too is the scale of the challenge facing governments. For this reason, both the (logged) total of HIV positive population and adult HIV prevalence rates are included as controls in the model. Similarly, to take into account the fact that it is easier to rollout HAART to concentrated urban populations rather than scattered, poorly resourced rural populations, we also include the percentage of HIV positive people living in urban areas as an explanatory variable. We also include the percentage of births in the presence of skilled health professionals (as an indicator variable of the capacity and reach of the health sector), and two political/institutional variables: political stability in 2005 and a dummy variable for whether a country is an established democracy or not. The reasoning here was that established democracies are likely to have better functioning administrations than new democracies and that political stability is more conducive to good administration and the prioritization of health than situations characterized by political instability.

HIV is, of course, not the only health challenge facing developing countries and it would be unreasonable to expect all national leaders to prioritize HIV to the same extent. Countries with a heavy burden of other diseases should not be expected to have as great a HAART rollout as countries with fewer competing health challenges. In order to account for this, we use the (log of) the number of disability adjusted life years (DALYs) lost due to non-AIDS related reasons as a proxy for non-AIDS related demands on the health budget.

Another challenge which we may consider accounting for explicitly has to do with the degree of language diversity within a country. Language diversity may well constrain a HAART rollout as it raises the costs and the difficulty of

providing the necessary information and services to all language groups. However, one of the problems with including such a variable is that it may also be accounting in part for an explicit policy choice. For example, if the government draws support disproportionately from one or a few language groups, then it may choose not to prioritize the needs of people from other language groups – especially if these are seen as being more infected with HIV.[33] If so, then any negative relationship between language fractionalization and HAART coverage may be reflecting a policy choice, rather than some objective difficulty involved in rolling out HAART to many different language groups. Hence, this variable is not included in the main regression (regression 1) but is added to regression 2 as part of the sensitivity analysis.

Finally, an important modeling decision is whether to take into account regional variation in HAART coverage – i.e. hold countries in different regions to slightly different standards based on aggregate regional differences. One could argue that regional dummies should be included on the grounds that they capture cultural or regional differences, which may have a bearing on the HAART rollout independent of any policy decision. However, regional dummy variables are very blunt instruments in this regard and were included only in regression 3 (as part of the sensitivity analysis) and not in the main regression.

Results

Table 1 reports the results of three (robust) regression models. The main regression (regression 1) controls for level of development (GDP *per capita*), external support (being a PEPFAR country or in receipt of Global Fund first round funding), the scale of the epidemic (HIV prevalence, the absolute size of the HIV-positive population and its distribution between urban and rural areas), other heath-related demands (non-AIDS DALY's *per capita*), and politico-institutional capacity (political stability, being an established democracy and percentage of births attended by skilled personnel). Four variables had statistically significant coefficients. The results indicate that controlling for the other variables in the model, being a PEPFAR focus country raises HAART coverage by 67%; for every one percent increase in HIV prevalence, HAART coverage is predicted to rise by 0.2%; for every one percentage point increase in the share of the HIV-positive population in urban areas, HAART coverage rises by 2.5 percent; and being an established democracy raises HAART coverage by 55%. [Note that for unlogged variables, these results reflect the antilog of the coefficients reported in Table 1]

Adding language fractionalization to the model (regression 2) does not affect the sign or significance of the key variables much and is itself significantly negatively correlated with HAART coverage (for every one percentage point increase in language fractionalization HAART coverage declines by 1.1 percent). Countries with diversified populations in terms of language do indeed have smaller HAART rollouts (but as noted above, we cannot be sure whether this is the result of objective results or policy choices).

Adding a set of regional dummies (regression 3) renders the stable democracy variable insignificant, results in first round funding from the Global Fund becoming marginally significant (controlling for the other variables, being a recipient of first round funding from the Global Fund raises HAART coverage by 50%) and increases the overall explanatory power of the model. However, to what extent regional dummies are capturing objective contextual factors or are picking up policy stances which are similar within regions, is unclear.

Table 1 reports the regression residuals for selected countries including those with reputations for relatively strong or weak leadership on AIDS. Figure 3 depicts the regression residuals for all countries using the main regression (regression 1). Recall that a negative residual indicates the extent to which the predicted value exceeds actual HAART coverage (and *vice versa* for a positive residual). As can be seen from the table, some country's residuals vary significantly across the different specifications. For example, Brazil's actual HAART coverage exceeds its predicted coverage by a massive 43.6 percentage points using regression 1. When language fractionalization is included, Brazil's residual falls to 31.6 (because Brazil is relatively homogenous in terms of language). When regional dummy variables are included as well (regression 3), Brazil's residual drops down to 16.2 because Latin American countries have higher HAART rollouts, and hence by including regional dummies, we are effectively holding Brazil to a higher standard simply because it is part of the region. This appears to be rather arbitrary, which is why the residuals from regression 1 are preferred.

Table 1. Regressions on HAART coverage and MTCTP coverage

	Log of HAART coverage: December 2006			Log of MTCTP coverage (2005)
	1.	2.	3.	4.
Constant	4.437 (2.961) 0.138	1.938 (2.613) 0.461	0.507 (2.080) 0.808	1.978 (4.692) 0.675
(Log) GDP per capita (PPP) (2005)	0.094 (0.208) 0.651	0.220 (0.181) 0.229	0.261 (0.171) 0.132	0.073 (0.303) 0.810
PEPFAR focus country	0.556** (0.209) 0.010	0.581*** (0.193) 0.004	0.512** (0.211) 0.018	0.487 (0.383) 0.210
Global Fund 1st round recipient	0.293 (0.236) 0.218	0.311 (0.234) 0.170	0.402* (0.218) 0.070	0.161 (0.304) 0.600
(Log) adult HIV prevalence (2005)	0.202** (0.084) 0.018	0.222*** (0.076 0.005	0.176* (0.095) 0.070	0.330** (0.142) 0.025
(Log) HIV+ population (2005)	-0.098 (0.070) 0.164	-0.075 (0.062) 0.234	-0.007 (0.052) 0.894	0.014 (0.140) 0.922
Proportion of HIV + people in urban areas	0.881** (0.342) 0.012	0.793** (0.321) 0.016	0.522* (0.316) 0.103	1.091** (0.538) 0.049
Political stability (2005)	0.107 (0.133) 0.424	0.072 (0.128) 0.577	0.105 (0.122) 0.391	0.086 (0.159) 0.593
Established democracy	0.483** (0.203) 0.020	0.438** (0.210) 0.041	0.062 (0.221) 0.781	0.132** (0.354) 0.711
% of births with skilled health professionals	0.004 (0.006 0.492	0.001 (0.005 0.825	0.002 (0.005 0.650	0.026*** (0.006 0.000
(Log) non AIDS DALYs per capita (2002)	-0.347 (0.315) 0.275	-0.011 (0.287) 0.968	-0.021 (0.242) 0.932	-0.598 (0.477) 0.216
Language fractionalization		-0.948*** (0.294) 0.002	-0.643 (0.427) 0.137	
Latin America & the Caribbean			0.982*** (0.318) 0.003	
Southern Africa			0.265 (0.424) 0.534	

			0.561*** (0.207) 0.009	
West Africa				
East Africa			0.215 (0.389) 0.583	
N	82	78	78	55
Adjusted R^2	0.5017	0.5697	0.6494	0.6097
F Prob>F	7.86 0.000	9.99 0.000	10.74 0.000	11.75 0.000
Botswana*	0	0	7.8	-50.2
Brazil	43.6	31.6	16.2	26.2
Burkina-Faso	27.1	27.7	24.3	3.2
Cambodia	59.3	48.5	60.4	-0.7
Cuba	73.9			
Gambia	-1.7	1.7	-1.8	3.6
Haiti	14.6			3.6
Latvia	-55.2	-35.6	-6.5	
Malawi	26.3	13.5	16.9	0.6
Mexico	56.2	52.6	38.5	
Namibia	18.6	24.9	25.1	1.0
Paraguay	42.0	48.3	35.4	
Russia	-8.6	-15.6	-9.8	67.5
Rwanda	33.3			29.9
South Africa	-36.1	-24.1	-42.6	-39.0
Thailand	48.8	56.8	66.1	
Uganda	16.7	19.9	18.2	5.8
Ukraine	-16.1	-15.4	-13.5	75.4
Zambia	-9.0	-1.2	6.8	3.0
Zimbabwe	-8.0	-10.3	-6.2	-7.9

Robust standard errors are in parentheses.
* Regression models 1 and 2 actually predicted negative residuals for Botswana – indicating relatively poor performance. However, as Botswana already has 100% HAART coverage, this is an unreasonable imputation, and hence the residual was rounded up to 0. This was the case in which any model predicted HAART coverage in excess of 100%.

Figure 3 displays the residuals from regression 1 for all 82 countries. Brazil's result is reported in a checked pattern to indicate that all three specifications produced a residual of greater than 15 (our cut-off point for a good performer). Ten other countries (Burkina-Faso, Cambodia, Costa Rica, Mali, Namibia, Suriname, Thailand, Paraguay and Uganda) also consistently obtained residuals of greater than 15. Four countries (Cuba, Haiti, El Salvador and Rwanda) have no predicted values for regressions 2 and 3 because of missing data on language fractionalization. If we consider the results for these countries from regression 1

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to be definitive, then Cuba and Rwanda would also be classified as relatively good performers.
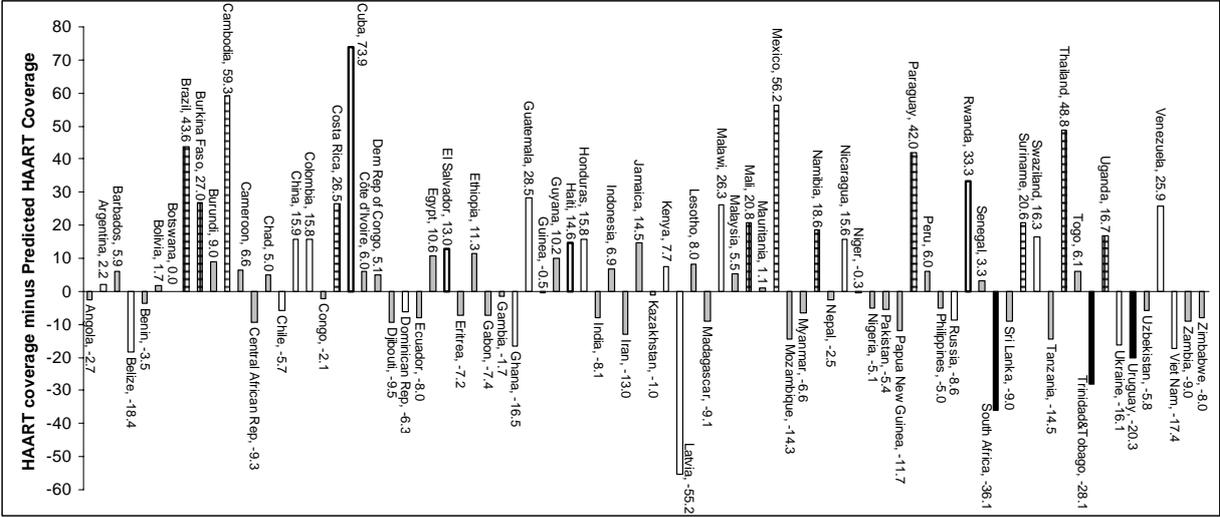
Figure 3: Regression Residuals for Regression 1.
Black bars indicate scores of below -15 for all three regressions. Checked bars indicate scores of above 15 for all three regressions. Grey bars represent scores >-15 and <15. White bars indicate that one of the regressions gave a different ranking to that of regression 1 (and those with darker borders indicate that missing data made it impossible to obtain predictions for these countries using regressions 2 and 3).

Out of the 82 AIDS-affected countries analyzed, 46 had residuals falling between -15 and 15 for all three regressions, and hence should probably be regarded as performing as expected (or at least as not performing significantly worse or better than predicted). Their regression 1 residuals are represented as grey bars in Figure 3. Eighteen countries in total had inconsistent classifications arising from different specifications. Their regression 1 residuals are depicted with a white bar. Three countries (South Africa, Uruguay, and Trinidad and Tobago), had predicted residuals of below -15 for all three regressions and thus we can be fairly confident in concluding that they probably could (and should) have achieved higher levels of HAART coverage. Figure 4 displays the ranking of those countries for which all three regressions predicted the same result (i.e. exceeding, meeting or below expectations).
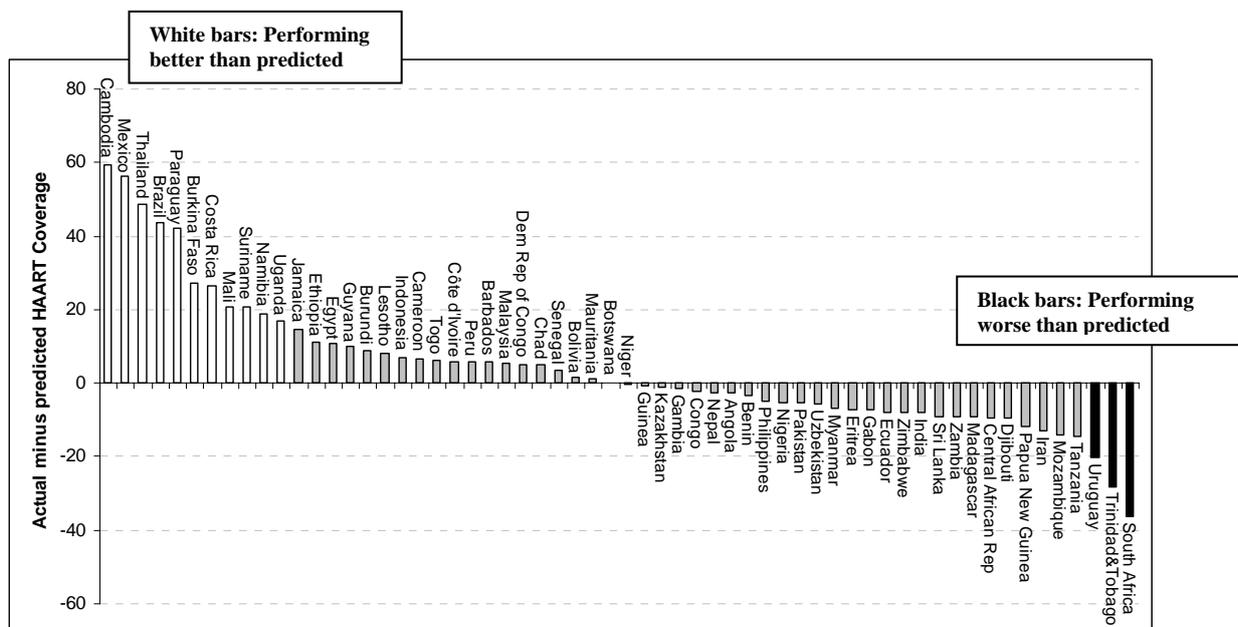
Figure 4: Country rankings

Table 1 also reports the results of a single regression (using the same explanatory variables as in regression 1) on (the log of) MTCTP coverage. As one would expect, MTCTP coverage is significantly (and substantially) positively associated with maternal health services (i.e. percentage of births attended by a skilled health professional). Like the HAART coverage regressions, it also varies significantly positively with the proportion of HIV positive people in urban areas, with HIV prevalence and being an established democracy. However, unlike the HAART regressions, support from the Global Fund and PEPFAR was an insignificant determinant of MTCTP coverage. Note that as the MTCTP coverage data was available for only 55 out of the 82 countries, these results should be treated with greater caution.

Discussion

This exploratory quantitative study provides some support for much of the conventional wisdom about AIDS leadership at country level. Using HAART coverage as the key indicator of commitment to combating AIDS, the data show that Brazil, Cambodia, Mexico, Namibia, Thailand, Uganda and probably also Cuba and Rwanda have indeed performed better than would be expected given their institutional characteristics, demographic challenges and level of development. Their reputation as poster children for good AIDS leadership is thus probably well deserved. Malawi performed above expectations in regression 1 and 3, but slipped below our +15 cut-off point for an above-expectations categorization with regard to regression 2. Botswana's results were

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more disappointing, with the country performing as expected with regard to HAART coverage and below expectations with regard to MTCTP coverage.

South Africa's reputation for poor AIDS leadership was strongly supported by the analysis. It suggests that South Africa had the resources and capacity to have achieved substantially higher levels of HAART coverage and MTCTP coverage. This is consistent with the argument that it was probably ideological reasons which constrained the use of antiretrovirals for MTCTP or HAART rather than economic or institutional constraints. Other countries with reputations for poor leadership on AIDS (Russia, Ukraine, Gambia, Zimbabwe, and Zambia) did not, however, meet our strict criteria for labeling a country as a poor performer (i.e. that all three regression residuals fall below -15). Ukraine's residuals were below -15 except for regression 3 and in Russia's case only in regression 2 did the residual fall below -15. It is, however, interesting to note the vast discrepancy between Russia and Ukraine's relative performance on HAART and on MTCTP. The fact that both countries were able to perform relatively well with regard to MTCTP – but not with regard to HAART – suggests that the government was indeed more prepared to devote resources to the needs of pregnant HIV-positive women and their children than they were to assisting people with AIDS (most of whom were stigmatized injecting drug users).

It is interesting to note that Latvia performed substantially worse than expected with regard to both regressions 1 and 2, but not once regional dummies were included. This case is probably also worth looking into in more detail, especially given that the few reports on HAART provision in Latvia are broadly positive.[34] Further research would also be useful into those countries which performed significantly better than expected, but which do not have established reputations for good AIDS leadership (notably Mali, Burkina-Faso, and Suriname). It is possible that in the general discourse about AIDS leadership, insufficient attention has been paid to the role that governments can play in facilitating the importation and distribution of generic antiretrovirals (as occurs in Burkina-Faso) [35] and in ensuring that the health system is well organized and efficient (as is the case in Suriname, but not in Trinidad and Tobago).[36, 37]

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