PEPFAR and Preventing HIV Transmission: Evidence from Sub-Saharan Africa

Daniel Barkley, PhD
Economics Instructor
International College of Beijing
China Agricultural University
No.17, Qingha Don Lu
Haidian District
Beijing, P.R. China

OpeyemiAdeniyi
Research Fellow
Economics on The Move
P.O. Box 5925
Irvine, California 92616 USA

Abstract

*President's Emergency Plan for AIDS Relief or PEPFAR is the US Government's global strategy for preventing AIDS/HIV. PEPFAR's main prevention program featured the controversial **ABC** strategy: **A**bstain, **B**e faithful, and correct and consistent use of **C**ondoms. This study uses the "difference-in-differences" (DID) estimator to assess impact of **ABC** on slowing the spread of HIV in PEPFAR's Sub-Saharan recipient countries. Applying DID analysis to a panel of 40 African countries in 2001 and 2009, we found PEPFAR's preventative measuresdid not reduce adult HIV rates. These results call into question the effectiveness of **ABC** as a HIV preventative strategy in Sub-Saharan Africa.*

Keywords:AIDS/ HIV Prevention, Sub-Saharan Africa, PEPFAR

1. Introduction

The President's Emergency Plan for AIDS Relief (PEPFAR) is the United States government's global strategy to fight the human immunodeficiency virus and acquired immune deficiency syndrome (- HIV/AIDS) pandemic. The U.S. government established PEPFAR through the U.S. Leadership against HIV/AIDS, Tuberculosis and Malaria Act of 2003. PEPFAR's main prevention program featured the controversial ABC strategy: Abstain, Be faithful, and the correct and consistent use of Condoms. This study uses the "difference-in-differences" (*DID*) estimator to assess impact of ABC on slowing the spread of HIV in PEPFAR's Sub-Saharan African (SSA) recipient countries. Applying *DID* analysis to a panel of African countries in 2003 and 2008 and in 2003 and 2009, we found no statistically significance difference in the adult HIV rates for PEPFAR-recipient countries and non-PEPFAR-recipients in SSA. Our results call into question the effectiveness of ABC as an HIV preventative strategy in Sub-Saharan Africa. President, George W. Bush initiated PEPFAR, and it is widely recognized as one of the most notable accomplishments of his presidency. An estimated 33.3 million people worldwide are infected. SSAremains the most seriously affected region the number of persons living with HIV accounts for roughly 67 per cent of all people living with HIV worldwide[i]. Figure 1 shows the adult (ages 15-49) HIV rates in SSA in 1990, 1996, 2002, and 2009.PEPFAR initially included 15 countries, which collectively represented around 50 per cent of the HIV infections worldwide: 12 countries in Africa, plus Vietnam, Haiti, and Guyana. The 12 PEPFAR "focus countries" in Africa are Botswana, Côte d 'Ivoire, Ethiopia, Kenya, Mozambique, Namibia, Nigeria, Rwanda, South Africa, Tanzania, Uganda, and Zambia. PEPFAR is one of the largest health plans ever initiated by country to address a disease. PEPFAR's first five-year fiscal budget (2003-2008) allocated $15 billion for HIV prevention, care, and treatment. Table 1 breaks down PEPFAR's first-phase funding in Africa by country. Table 2 shows PEPFAR's outreach programs promoting the "correct and consistent usages of condoms" and abstinence-based programs served tens of millions of people in fiscal year 2008 alone.

Moreover, PEPFAR distributed 698,205,000 condoms during its first-phase.SSA countries collectively received more than $9.4 billion funding or roughly 60 per cent of PEPFAR's $15 billion first-phase budget. Figure 2 shows PEPFAR funding for the years 2004 through to 2008.The Center for Disease Control (CDC) and the U.S. Agency for International Development (USAID) administers a majority of PEPFAR funds through competitively awarded grants, cooperative agreements and contracts with U.S. based non-governmental agencies (NGOs) and host-country governmental organizations. PEPFAR's first-phase strategy established policies for HIV/AIDS prevention, treatment and care. Roughly 20 per cent of PEPFAR's total budget was allocated to prevention, with the remaining 80 per cent going to care and treatment, laboratory support, antiretroviral treatment (ART), TB/HIV services, support for orphans and vulnerable children, infrastructure, training, and other related services. PEPFAR's preventative programs included the prevention of mother-to-child HIV/AIDS transmission during birth as well as programs for blood and injection safety. These prevention programs have been widely recognized as being effective in preventing HIV/AIDS transmission. By September 2007, PEPFAR programs had prevented mother-to-child transmission for ten million pregnancies and provided ART to 1.45 million individuals.[ii]

The cornerstone of PEPFAR's adult HIV prevention strategy is the ABC approach—Abstain, Be faithful, and correct and consistent use of Condoms—with a strong emphasis on A and B, over C. ABC is *abstinence-based* sex education program that stresses abstinence until marriage but includes information on safe-sex practices. ABC represents a compromise between *abstinence-only* sex education and comprehensive sex education.[iii] ABC programs urge participants to practice fidelity within their marriages and other sexual relationships. In addition to learning how to use a condom, ABC clients are taught that condoms do not protect against all forms of sexually transmitted diseases.A substantial proportion of PEPFAR's budget supports **ABC** activities. First-phase legislation stipulated that 33 per cent of funds for prevention must be spent on abstinence-until-marriage programs. Country teams could apply for an exemption to the 33 per cent rule, but overall funding across PEPFAR countries must meet the target so a waiver in one country requires compensatory increases in another.[iv]

In 2008, the United States Congress re-authorized PEPFAR for $48 billion over 2008-2013. The 33 per cent earmark was removed from the re-authorized legislation and replaced with a requirement that the Global AIDS Coordinator report to Congress if less than 50 per cent of funding to prevent sexual transmission of HIV is spent on abstinence and fidelity programs in countries with generalized epidemics.[v]There is considerable debate on the effectiveness of the ABC policy. Some critics charge that PEPFAR's ABC policies are the result lobbying by American political and social groups with moral rather than public health agendas.[5] Studies have called into question the effectiveness of abstinence as a long-term strategy for reducing HIV transmission[vi]. The general consensus among public health officials is that all three ABC elements are essential to reducing HIV incidence, but promoting "A" and "B" over "C" has been sharply contested[vii]. Furthermore, PEPFAR's "C" activities are directed at "high-risk" groups, such as commercial sex workers and not the general population.[viii]

Supporters of ABC contend that their approach is evidence-based and point to declines in the prevalence of HIV/AIDS in PEPFAR aided countries as proof of their method's effectiveness.[ix]Indeed, as implemented in Uganda and other places, the ABC approach has been effective in reducing the rate of new infection[x]. Zambia, for instance, has successfully increased both the age of sexual debut and abstinence among young people[xi]. However, the declines in the prevalence of adult HIV in SSA started before PEPFAR. Since 2001, four PEPFAR countries—Botswana, South Africa, Namibia, the United Republic of Tanzania, and Zambia,— have experienced significant declines in HIV prevalence among youngwomen or men in national surveys. Between 2001 and 2009, overall HIV incidence in Namibia decreased by more than 25%. In Zambia, HIV incidence declined by more than 25% between 2001 and 2009. Moreover, reductions in adult HIV prevalence in SSA have not been limited to PEPFAR aided countries. UNAIDS (2010, 28) estimates that the incidence of HIV has significantly fallen in 22 countries in SSA between 2001 and 2009. Table 3 estimates the *DID* between the mean adult HIV rates for PEPFAR eleven of the twelve recipients and 34 non-PEPFAR countries.[xii]Table 3 data shows that the incidence of HIV fell faster in PEPFAR recipient countries over the PEPFAR's first-phase, 2003-2008. In 2003, the average incidence of HIV between PEPFAR and non-PEPFAR countries differed by 0.603 (= 1.111 – 0.508). By the end of PEPFAR's first-phase (2008) the difference fell to 0.317 (= 0.761 – 0.445), yielding an HIV adult *DID* of 0.286. However, before concluding that PEPFAR's first-phase intervention reduced the incidence of HIV by nearly half in recipient countries, we must control for factors other than PEPFAR's ABC that might explain the *DID* in adult HIV rates.

One 2007 study, which looked at the five years (1997 to 2002) leading up to the start of the start of PEPFAR as well as the three years (2004 to 2007) following its launch, found that PEPFAR had reduced the death rate due to AIDS in Africa by ten per cent but had no appreciable effect on the prevalence of HIV/AID.[xiii] This study, however, did not include an assessment of the entire first-phase (2003-2008) of PEPFAR funding. The 2006-2008 years are especially important since PEPFAR funding more than doubled during this time. PEPFAR's 2009 budget continued the emphasis on ABC prevention; essentially requiring that least half of all prevention spending be done on abstinence-based activities.[xiv]

2. Method: Difference in Differences (DID)

The present study used two models of the *difference-in-differences* (*DID*) estimator econometrics technique to assess the impact of PEPFAR in slowing the spread of HIV in the twelve focus countries in Africa. The first *DID* model assesses PEPFAR's ABC by using the incidence of adult HIV (ages 15 – 49) as the dependent variable. In this model, the *DID* estimator is the difference between the average adult HIV rates in PEPFAR and non-PEPFAR countries *before* PEPFAR intervention minus the difference between the average adult HIV rates in PEPFAR and non-PEPFAR countries *after* PEPFAR's intervention. A statistically significant negative *DID* estimator implies that adult HIV rates are *lower* in PEPFAR countries because of the application PEPFAR's ABC policies in the focus countries.

The PEPFAR project in many ways resembles a natural experiment, with the PEPFAR focus countries forming the "treatment group" and the remaining Sub-Saharan African countries forming the "control group."A natural experiment occurs when some exogenous event, a change in government policy such as PEPFAR, changes the environment in which individuals operate. Unlike a true experiment, in which the control and treatment groups are randomly selected, the control and treatment groups in this case arise from implementation of PEPFAR policy. This complicates isolating the effect of the PEPFAR since the decline in HIV prevalence may be due to systematic difference between countries rather than PEPFAR policies. Two years of data are needed for controlling the systematic differences between the control and treatment groups: one year *before* the policy change and one year *after* the policy change.[xv] The years 2003, 2008 and 2009 were selected for the present study; with 2003 corresponding to the "before PEPFAR" period and 2008 and 2009 correspond to the "after PEPFAR" intervention period.[xvi] This particular arrangement permits us to arrive at more robust results by estimating two *DID* coefficients; one for *each* time periods: 2003-2008 and 2003-2009. The effectiveness of the PEPFAR's **ABC** policy is assessed using the following model:

$$HIV_{it} = \beta_0 + \beta_1 Y_t + \beta_2 PEPFAR_i + \beta_3 Y_t * PEPFAR_i + \beta_j Controls_{it} + \mu_{it} \qquad (1)$$

for *t* = 2003, 2008 and 2009

where HIV_{it} is the incidence of adults (15 – 49 years old) living with HIV in county *i* in year *t* in; Y_{2008} and Y_{2009} are a dummy variables equaling 1 for the year 2008 and 2009 respectively and are zero otherwise; $PEPFAR_i$ is a dummy variable equaling 1 if country *i* was a PEPFAR "focus country" and is zero otherwise. The parameter β_1 captures changes in adult HIV rates for *all* SSA countries before and after PEPFAR. The coefficient on *PEPFAR*, β_2 measures the change in the adult HIV rates in PEPFAR countries *not* due to PEPFAR's ABC activities. The parameter of interest is coefficient of the interaction term *Y* PEPFAR:* β_3 measures the change in adult HIV rates due to PEPFAR's ABC policy. The parameter β_3 is the*difference-in-differences*estimator and when the control variables are not included in equation (1) it can be expressed as:

$$\hat{\beta}_3 = (\overline{HIV}_{2009,P} - \overline{HIV}_{2009,NP}) - (\overline{HIV}_{2003,P} - \overline{HIV}_{2003,NP}) \qquad (2)$$

Where the subscript *"P"* stands for PEPFAR focus countries and the subscript *"NP"* stands for non-PEPFAR countries. In this case, $\hat{\beta}_3$ is the difference over 2003-2009 in the average incidence of adult HIV between PEPFAR and non-PEPFAR countries. Similarly, the difference over 2003-2008 in the average incidence of adult HIV between PEPFAR and non-PEPFAR countries is

$$\hat{\beta}_3 = (\overline{HIV}_{2008,P} - \overline{HIV}_{2008,NP}) - (\overline{HIV}_{2003,P} - \overline{HIV}_{2003,NP}) \qquad (3)$$

Four independent variables are included to control for the intervening characteristics across SSA countries: *DEATH*, the crude death rate per 100 in country *i* in year *t*; *LIFE*, life expectancy in country *i* in year *t*; *HEALTH*; public health expenditures as a percent of GDP in country *i* in year *t*; and *CHRISTIAN*, the percentage of the

population that is Christian in country i in year t.The reduction in HIV rates might be as result of the death of HIV positive adults rather than from implementing PEPFAR'sABC measures. The variable *DEATH* is added to the specification to control for this possible effect. The elevated HIV rates in PEPFAR countries may be due to PEPFAR treatment and care programs that have extended the lives of HIV positive adults. The variable *LIFE* controls for difference in life expectancy between PEPFAR and non-PEPFAR recipients. Similarly, the variable *HEALTH*, (health expenditures are a percentage of GDP) controls for the effect of government expenditures public healthcare might help in extend the lives of HIV positive adults, thereby increase the incidents of HIV. The abstinence-based approach to slowing the spread of HIV did not begin with PEPFAR and is not exclusively practiced in PEPFAR's focus countries.[xvii] Findings from pre-PEPFAR Kenya and Zimbabwe show an association between declines in HIV prevalence and behavior changes consistent with abstinence and being faithful.[xviii] Many Christian denominations have strong prohibitions against the use of condoms to prevent the spread of HIV/AIDS (Caldwell, 1999).[xix] Accordingly, members of these faiths are more inclined to practice the "A" and "B" (**A**bstinence and **B**eing faithful), PEPFAR policy notwithstanding. The variable *CHRISTIAN* controls for the extent to which "abstinence and being faithful" and *not* using condoms affects adult HIV rates.When the control variables are included in equation (1) the OLS estimate of $\hat{\beta}_3$ no longer has the simple form of equation (2) and equation (3) but its interpretation is similar (Woolridge, 2009).

4. Data Sources

The HIV incidence (15-49) is compiled by the UNAIDS Data and the Joint United Nations Programme on HIV/AIDS and retrieved from http://data.un.org/Data.aspx?q=hiv&d=UNAIDS&f=inID%3a32. The *CIA World Fact Book* provided data for the variables *CHRISTIAN*, the percentage of the population that is Christian. The World Bank Catalog Data (http://data.worldbank.org/data-catalog) was the source for the remaining variables: *DEATH,* crude death rate per 100 in country i in year t; *LIFE*, life expectancy at birth in years in country i in year t; and *HEALTH*, health expenditures per capita, PPP (in constant 2005 international dollars) country i in year t. Table 4 presents the summary statistics for the dependent and independent variables.

5. Discussion

Tables 5A and 5B present eight the ordinary least-squares estimates of equation (1). Model 1's difference-in-the-differences estimator (the coefficient of the interaction term) implies the average HIV difference between PEPFAR and non-PEPFAR countries in 2008 and 2009 was not significantly different from the average HIV differences between PEPFAR and non-PEPFAR countries in 2003. Model 1's and Model 3's results are particularly striking since they do not include the control variables. Serial correlation does not undermine our conclusion that *DID* estimator is statistically insignificant. In fact, serial correlation provides further evidence that our estimated *DID*coefficients are statistically insignificant. *Durban-Watson* (*D-W*) statistics indicate positive serial correlation (e.g. *D-W* less than 2), the residuals for all eight models. Serial correlation does not affect the unbiasedness or consistency of OLS estimators, but it does affect their efficiency. With *positive* serial correlation in the error term the OLS estimates of the standard errors will be *smaller* than the true standard errors making the *trueDID t-statistics* smaller that reported in Tables 5A and 5B. Table 6, presents the two-stage least squares (2SLS) estimations of Model 2 and Model 4 assuming *DEATH, LIFE, HEALTH* are endogenous variables.[xx]The signs and significance of all of the coefficients in Model 5 and Model 6 are consistent with least-squares estimations of Model 2 and Model 4 respectively. Most importantly, the coefficients of the interaction terms in the 2SLS models are consistent with the OLS results: PEPFAR's intervention had no statistically significant impact on adult HIV rates recipient countries.
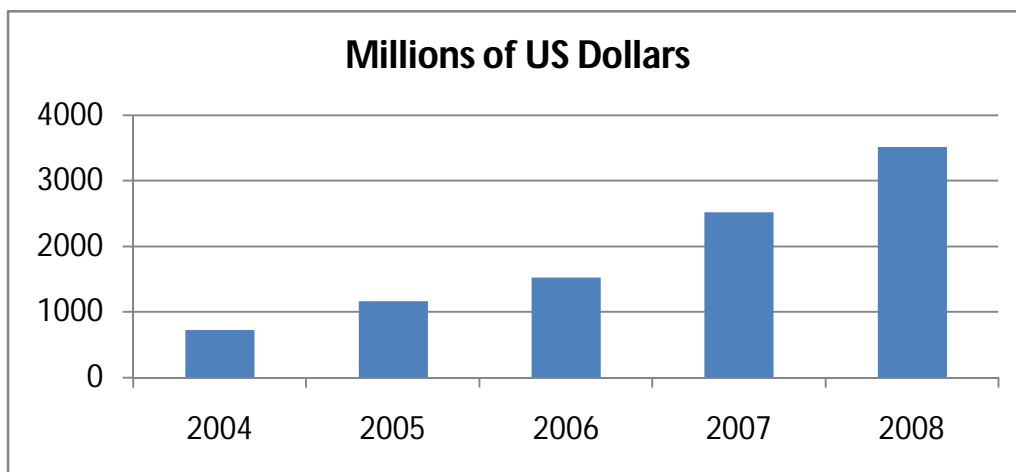
Conclusion

The fall in adult HIV rates in Sub-Saharan Africa is a welcome development. This reduction in the HIV incidence likely reflects the natural trends in the epidemic as well as the result of prevention programs resulting in behavioral change in different contexts (UNAIDS, 2007). This analysis shows that these improvements, however, cannot be attributed to PEPFAR's abstinence-based prevention programs. These results call into question the continued use of ABC as a HIV preventative policy in Sub-Saharan Africa.

Figure 1: Adult HIV Rates in Sub-Saharan Africa 1990, 1996, 2002, and 2009
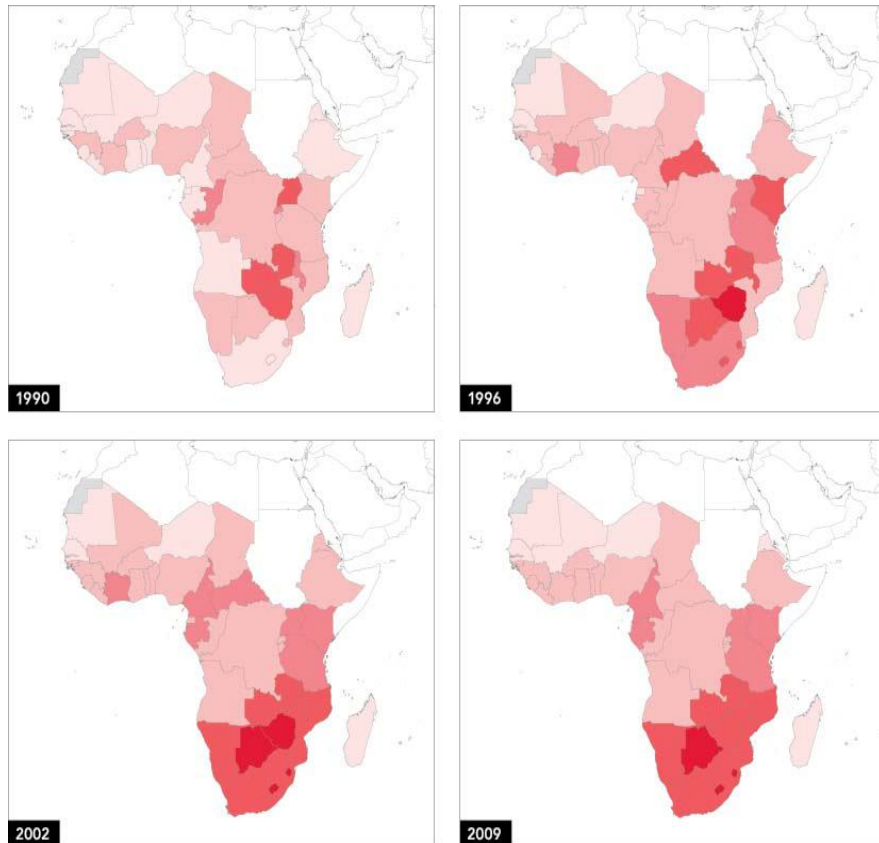
1%– <5%   5% – <10% 10% – <20% 20% – 28%
Source: UNAIDS: 2010 Global AIDS Report

Figure 2: PEPFAR Funding, 2004 – 2008

Source: PEPFAR Country Profiles   http://www.pepfar.gov/press/countries/profiles/index.htm

Table 1: PEPFAR First-Phase Budget Funding by Country

Countries	2004	2005	2006	2007	2008
Botswana	24.3	51.8	54.9	76.2	93.2
Ivory Coast	24.3	44.4	46.6	84.4	120.5
Ethiopia	48.0	87.7	123.0	240.	354.5
Kenya	92.5	142.9	208.3	368.1	534.8
Malawi	14.5	15.2	16.4	18.9	23.9
Mozambique	37.5	60.2	94.4	162.0	228.6
Namibia	24.5	42.5	57.3	91.2	108.9
Nigeria	70.9	110.2	163.6	304.9	447.6
Rwanda	38.2	56.9	72.1	103.0	123.4
South Africa	89.3	148.2	221.5	397.8	590.9
Tanzania	70.7	108.8	130.0	205.5	313.4
Uganda	90.8	130.1	149.0	236.6	283.3
Zambia	81.6	148.4	169.9	216.0	269.9
Zimbabwe	16.8	20.6	22.0	23.5	26.4
Total	723.9	1,167.9	1,529.0	2,528.1	3,519.3

Figures are in millions of current USD. Malawi and Zimbabwe are not PEPFAR "focus countries"
Source: PEPFAR Country Profiles http://www.pepfar.gov/press/countries/profiles/index.htm

Table 2: ABC Activities in PEPFAR Countries

	"AB" Abstinence and/or Being Faithful (FY2008) Number of People Served	"C" Outreach Promoting Condoms (FY2008) Number of People Served	Condoms Shipped (FY2004-2008)
Botswana	212,900	38,100	17,367,000
Ivory Coast	633,100	671,600	8,136,000
Ethiopia	6,970,900	5,416,500	165,978,000
Kenya	4,574,300	5,941,000	40,002,000
Mozambique	2,389,700	2,019,800	125,922,000
Namibia	321,200	400,400	0
Nigeria	4,670,700	1,506,600	9,705,000
Rwanda	717,200	776,900	50,724,000
South Africa	1,178,700	3,030,500	3,330,000
Tanzania	2,814,600	2,692,200	72,559,000
Uganda	4,519,800	1,737,000	133,911,000
Zambia	1,487,400	1,182,100	69,707,000
Total	30,490,500	25,412,700	689,205,000

Source: PEPFAR Country Profiles http://www.pepfar.gov/press/countries/profiles/index.htm

Table 3: Difference-in-Differences (*DID*) of Mean Adult HIV Rates for PEPFAR and Non-PEPFAR Recipient Countries in Sub-Saharan Africa, 2003-2008

	PEPFAR	NON-PEPFAR	PEPFAR – NON-PEPFAR
2003	1.111	0.508	0.603
2008	0.761	0.445	0.317
Difference-in-Differences (*DID*)	---	---	0.286

Sources: UNAIDS Data and the Joint United Nations Programme on HIV/AIDS

Table 4: Descriptive Statistics: Mean and Standard Deviation

Variable	Definition	Mean (Std Dev.) 2003	Mean (Std. Dev.) 2008	Mean (Std. Dev.) 2009
HIV	Incidence of HIV (ages 15-49) in country i in year t.	0.66 (0.84)	0.53 (0.63)	0.52 (0.61)
DEATH	crude death rate per 100 in country i in year t.	13.82 (3.58)	12.43 (3.22)	12.17 (3.13
LIFE	Life expectancy at birth in years in country i in year t.	52.44 (7.09)	54.74 (6.93)	55.22 (6.84)
HEALTH	Health expenditures per capita, PPP (in constant 2005 international dollars) country i in year t.	117.67 (176.99)	169.61 (240.59)	183.32 (267.46)
CHRISTIAN	Percent Christian in country i in year t.	42.71 (30.05)	42.71 (30.05)	42.71 (30.05)

Table 5A: Difference-in-Difference (*DID*) Estimation: Ordinary Least Squares (OLS) Dependent Variable is log (HIV)

OLS	Model 1: 2003-2008	Model 2: 2003-2008	Model 3: 2003-2009	Model 4: 2003-2009
$YEAR_{2008}$	-0.03 (0.24)	-0.18 (0.16)	---	---
$YEAR_{2009}$	---	---	-0.03 (0.24)	-0.19 (0.17)
PEPFAR	1.14* (0.33)	0.35 (0.23)	1.14* (0.33)	0.36 (0.24)
YEAR *PEPFAR	-0.37 (0.46)	-0.15 (0.31)	-0.37 (0.46)	-0.12 (0.31)
DEATH (log)	---	-4.35* (1.16)	---	-4.39* (1.16)
LIFE(log)	---	-14.11* (2.76)	---	-14.04* (2.76)
HEALTH (log)	---	0.57* (0.08)	---	0.55* (0.08)
CHRISTIAN	---	0.01* (0.002)	---	0.01* (0.002)
CONSTANT	-1.37* (0.16)	63.08* (13.80)	-1.37 (0.17)	62.97* (13.84)
Adjusted-R^2	0.15	0.63	0.15	0.62
Observations	86	84	86	84
Durbin-Watson	0.92	1.18	0.91	1.20
F-Statistic	5.98*	20.97*	6.03*	20.13*

*$p< 0.01$; **$p< 0.01$; ***$p< 0.10$; standard errors are in parenthesis

Table 5B: Difference-in-Difference (*DID*) Estimation: Ordinary Least Squares (OLS) Dependent Variable is log (HIV)

OLS	Model 5: 2003-2008	Model 6: 2003-2008	Model 7: 2003-2009	Model 8: 2003-2009
$YEAR_{2008}$	-0.11(0.17)	-0.12 (0.19)	---	---
$YEAR_{2009}$	---	---	-0.11 (0.19)	-0.10 (0.18)
PEPFAR	0.32 (0.26)	0.34 (0.27)	0.36 (0.28)	0.34 (0.26)
YEAR *PEPFAR	-0.29 (0.35)	-0.33 (0.37)	-0.34 (0.37)	-0.29 (0.35)
DEATH (log)	---	1.45* (0.32)	1.35* (0.32)	---
LIFE(log)	-4.17* (0.72)	---	---	-3.97* (0.72)
HEALTH (log)	0.53* (0.09)	0.49* (0.09)	0.46* (0.09)	0.50* (0.09)
CHRISTIAN	0.01* (0.002)	0.01* (0.003)	0.01* (0.003)	0.01* (0.002)
CONSTANT	12.63* (2.78)	-7.48* (1.006)	-7.09* (0.99)	11.93* (2.83)
Adjusted-R^2	0.56	0.49	0.49	0.55
Observations	84	84	84	84
Durbin-Watson	1.14	1.09	1.15	1.05
F-Statistic	18.64*	14.82*	14.18*	17.66*

*$p < 0.01$; **$p < 0.05$; ***$p < 0.10$; standard errors are in parenthesis

Table 6: Difference-in-Difference (*DID*) Estimation: Two-Stage Least Squares (2SLS). Dependent Variable is log (adult HIV rates)

2SLS	Model 5: 2003-2008	Model 6: 2003-2009
$YEAR_{2008}$	-0.30(0.18)	---
$YEAR_{2009}$	---	-0.34*** (0.18)
PEPFAR	0.20 (0.29)	0.11 (0.29)
YEAR*PEPFAR	-0.03 (0.34)	0.06 (0.35)
DEATH (log)	-6.08** (1.75)	-5.07** (1.86)
LIFE (log)	-17.10* (4.37)	-16.11* (4.30)
HEALTH (log)	0.71* (0.15)	0.78* (0.16)
CHRISTIAN	0.01* (0.003)	0.01* (0.003)
CONSTANT	80.83* (21.40)	72.10* (21.33)
Adjusted-R^2	0.60	0.60
Observations	84	83
Durbin-Watson	1.17	1.19
F-Statistic	9.30*	9.40*

*p < 0.01; **p < 0.01; ***p < 0.10; standard errors are in parenthesis

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[iv]Dietrich, 2007.

[v] PEPFAR Watch, 2012

[vi] Di Censo, et al. 2002; Caldwell, 2002; and Dailard 2003.

[vii] "HIV PreventionPolicyNeedsUrgentCare" TheLancet, 367, No. 9518(April 2006) 1213-1215 ,April 2006 http://www.thelancet.com/journals/lancet/article/PIIS0140-6736%2806%2968513-9/fulltext (accessed 27 March 2012).

[viii]Thedistribution of condomstargetedonlyspecifichigh-riskpopulations, such as commercial sex workers and theirclientssero-discordantcouples, menwhohave sex withmen, substanceabusers and mobilemalepopulations (Dietrich 2007, 289).

[ix]Kamwi, et al., 2006.Congress Donald M. Payne, the chairman of the Africa and Global Health Subcommittee Hearing before the Committee on Foreign Affairs House of Representative One Hundred and Tenth Congress First Session April 24, 2007.

[x]Sinding, 2005.

[xi]UNAIDS, 2010. Central Statistical Office, Ministry of Health, Tropical Diseases Research Centre, University of Zambia, and Macro International Inc. Zambia Demographic and Health Survey 2007 (Calverton, MD: CSO and Macro International Inc., 2009).

[xii]Incidence of HIV (ages 15–49) data forEthiopiawasunavailablefortheyears 2003, 2008 and 2009. Accordingly, Ethiopiaisnotincluded in theanalysisinvolvingtheincidence of HIV eventhoughitis a PEPFAR focus country.

[xiii] Sepulveda, J. (2007). "PEPFAR implementation: progress and promise." Washington, D.C.: National Research Council. (accessed November 20, 2012)

[xiv] PEPFAR Watch "FindingRestrictions" available at:
http://www.pepfarwatch.org/the_issues/abstinence_and_fidelity/ (accessed 27 March 2012).

[xv]Woolridge, 2009.

[xvi]AlthoughtheLeadershipAct, whichcreated PEPFAR passed in May 2003, fundswerenotappropriateduntilJanuary 2004, and themajority of thefirstyear'sfundingwasnotfullyobligateduntilSeptember 2004 (Sepulveda 2007). HIV prevalencepeaked in Sub-SaharanAfrica in 2000 (UNAIDS 2007, 5). The UNAIDS (2010) has published comparable (updated) estimatesadult HIV for 2001 and 2009..

[xvii]Dailard, 2003.

[xviii]Cheluget, et.al, 2006; Mahomva, et.al, 2006.

[xix]Vatican: condoms don't stop AIDS, Guardian, Oct. 9, 2003 available at:
http://www.guardian.co.uk/international/story/0,,1058966,00.html (accessed 27 March 2012).

Archbishop Gabriel Charles Palmer-Buckle of Accra has stated that "the Catholic Church [offers] three methods to help solve this problem of AIDS in Africa: "A", abstain; "B", be faithful; "C", chastity, which is in consonance with traditional African values. Those Planned Parenthood people are only talking about condoms. By the way, they know full well that the condoms devoted to Africa are Sub-standard."

"Ghanaian archbishop says church has failed Africa." National Catholic Reporter available at:
http://ncronline.org/news/vatican/ghanaian-archbishop-says-church-has-failed-africa (accessed 27 March 2012).

[xx]The 2SLS modelassumesthe variables LIFE (lifeexpectancy), DEATH (deaths per 1000) and HEALTH (healthexpenditures as a percentage of GDP) are endogenous variables. Instruments for LIFE and DEATH include ELDER (thepercentage of populationolderthan 65) and ELDER^2, SANITATION (theproportion of thepopulationusingimprovedsanitation) and WATER (theproportionthepopulationusingimprovedwatersources). Theinstrumentfor HEALTH is MILITARY (militaryexpenditures as a percentage of GDP, assumesthatgovernmentsface a ' guns-vs-butter ' tradeoffbetweenexpendituresonhealth versus expendituresonthemilitary).

Data Source: World Bank Catalog Data available at: (http://data.worldbank.org/data-catalog) (accessed 28 July 2012).