Medication Against Conflict

Andrea Berlanda, Matteo Cervellati, Elena Esposito,
Dominic Rohner, Uwe Sunde

UPF
October 5, 2023

Motivation

Determinants of Economic Development

- proximate determinants (capital, schooling, technology)
- deep determinants (institutions, geography, climate, culture, ...)

Motivation

Determinants of Economic Development

- proximate determinants (capital, schooling, technology)
- deep determinants (institutions, geography, climate, culture, ...)

Two "apocalyptic horsemen" of development

- civil conflict
  - majority of warfare events (civil conflicts in more than 80 countries since 1945), account for most of war-related casualties
  - vicious cycles

Motivation

Determinants of Economic Development

- proximate determinants (capital, schooling, technology)
- deep determinants (institutions, geography, climate, culture, ...)

Two "apocalyptic horsemen" of development

- civil conflict
  - majority of warfare events (civil conflicts in more than 80 countries since 1945), account for most of war-related casualties
  - vicious cycles
- precarious health conditions
  - low life expectancy, high child mortality
  - low future orientation, drag on investment

Violence and Health

How are conflicts and precarious health conditions related?

The conventional view:

- violence leads to worse health conditions
  - conflict-related casualties
  - break-down of infrastructure, refugee movements
  - epidemics
  - ...

Violence and Health

How are conflicts and precarious health conditions related?

The conventional view:

- violence leads to worse health conditions
  - conflict-related casualties
  - break-down of infrastructure, refugee movements
  - epidemics
  - ...

Then what drives violence?

The Drivers of Violence

The conventional view:

- "deep" factors
  - weak institutions
  - natural resources
  - ethnicity-related grievances
  - ...

The Drivers of Violence

The conventional view:

- "deep" factors
  - weak institutions
  - natural resources
  - ethnicity-related grievances
  - ...
- triggers
  - income shocks (e.g., rain-fed agriculture)
  - commodity price shocks
  - ...

The Drivers of Violence

The conventional view:

- "deep" factors
  - weak institutions
  - natural resources
  - ethnicity-related grievances
  - ...
- triggers
  - income shocks (e.g., rain-fed agriculture)
  - commodity price shocks
  - ...
- policy options?

Health and Violence

A different view: **Health as driver of violence?**

Health and Violence

A different view: **Health as driver of violence?**

health affects

- income (lower labor productivity, particularly during labor intensive periods like harvesting)

Health and Violence

A different view: **Health as driver of violence?**

health affects

- income (lower labor productivity, particularly during labor intensive periods like harvesting)
- resources and living conditions (health expenditures)

Health and Violence

A different view: **Health as driver of violence?**

health affects

- income (lower labor productivity, particularly during labor intensive periods like harvesting)
- resources and living conditions (health expenditures)
- opportunity costs (recruiting of fighters)

Health and Violence

A different view: **Health as driver of violence?**

health affects

- income (lower labor productivity, particularly during labor intensive periods like harvesting)
- resources and living conditions (health expenditures)
- opportunity costs (recruiting of fighters)
- future orientation (patience) and risk aversion

Violence, Diseases, and Development

Determinants of social violence

- economic hardship (related to weather or commodity prices)
- weak institutions
- ethnic tensions
- ...

Violence, Diseases, and Development

Determinants of social violence

- economic hardship (related to weather or commodity prices)
- weak institutions
- ethnic tensions
- ...
- health?

Violence, Diseases, and Development

Determinants of social violence

- economic hardship (related to weather or commodity prices)
- weak institutions
- ethnic tensions
- ...
- health?

Containment of social violence

- economic and institutional development
- ...

Violence, Diseases, and Development

Determinants of social violence

- economic hardship (related to weather or commodity prices)
- weak institutions
- ethnic tensions
- ...
- health?

Containment of social violence

- economic and institutional development
- ...
- health interventions and policy?

What we do

Research Question:

What we do

Research Question:

- Do health-related policy interventions reduce social violence?

What we do

Research Question:

- Do health-related policy interventions reduce social violence?

This project:

- investigates (secondary) consequences of Antiretroviral Therapy (ART) interventions in context of the African HIV/AIDS epidemic

HIV/AIDS and Social Violence

HIV/AIDS and Social Violence

- around 2000: bleak outlook regarding the social, economic and political consequences of the HIV/AIDS epidemic in Africa
- dramatic HIV/AIDS-imposed hardship on (groups of) society:
  - decline of labor productivity (absenteeism, higher turnover, loss of skills, ...)
  - drain of resources (health expenditures, funerals, ...)
  - decline in education (orphanage, quality of teachers, ...)

HIV/AIDS and Social Violence

- around 2000: bleak outlook regarding the social, economic and political consequences of the HIV/AIDS epidemic in Africa
- dramatic HIV/AIDS-imposed hardship on (groups of) society:
  - decline of labor productivity (absenteeism, higher turnover, loss of skills, ...)
  - drain of resources (health expenditures, funerals, ...)
  - decline in education (orphanage, quality of teachers, ...)
- increased worries about implications for social violence

HIV/AIDS and Social Violence

HIV/AIDS and Social Violence

Welcome to the United Nations. It's your world.

SECURITY COUNCIL >

SC/6781
10 JANUARY 2000

SECURITY COUNCIL HOLDS DEBATE ON IMPACT OF AIDS ON PEACE AND SECURITY IN AFRICA

Press Release
SC/6781

SECURITY COUNCIL HOLDS DEBATE ON IMPACT OF AIDS ON PEACE AND SECURITY IN AFRICA

20000110

The Security Council met this morning in an open debate on the impact of AIDS on peace and security in Africa. The debate marked the first time that the Council has discussed a health issue as a threat to peace and security. The meeting, which lasted for more than seven hours, was addressed by over 40 speakers.

HIV/AIDS and Social Violence

Welcome to the United Nations. It's your world.

SECURITY COUNCIL >

SC/6781
10 JANUARY 2000

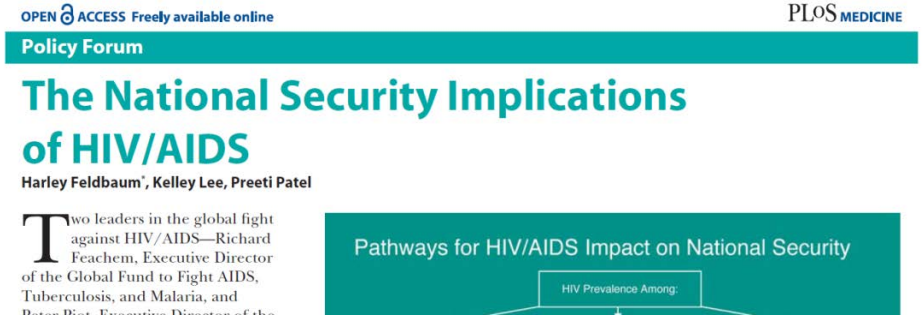
SECURITY COUNCIL HOLDS DEBATE ON IMP... AIDS ON PEACE AND SECURITY IN AFRICA

Press Release SC/6781

SECURITY COUNCIL HOLDS DEBATE ON IMPACT OF AIDS ON PEACE AND SECURITY IN

20000110

The Security Council met this morning in an open debate on the impact of AIDS on peace and security in Africa. The debate marked the first time that the Council has discussed a health issue as a threat to peace and security. The meeting, which lasted for more than seven hours, was addressed by over 40 speakers.



OPEN ACCESS Freely available online

PLoS MEDICINE

Policy Forum

The National Security Implications of HIV/AIDS

Harley Feldbaum*, Kelley Lee, Preeti Patel

Two leaders in the global fight against HIV/AIDS—Richard Feachem, Executive Director of the Global Fund to Fight AIDS, Tuberculosis, and Malaria, and

HIV/AIDS and Social Violence

News | Published: February 2000

UN acknowledges HIV/AIDS as a threat to world peace

Karen Birmingham

Nature Medicine **6**, 117(2000) | Cite this article

15 Accesses | **5** Citations | **0** Altmetric | Metrics

HIV/AIDS and Social Violence

HIV/AIDS and Social Violence

HIV/AIDS and Social Violence

HIV/AIDS and Social Violence

HIV/AIDS and Social Violence

HIV/AIDS and Social Violence

- around 2000: bleak outlook regarding the social, economic and political consequences of the HIV/AIDS epidemic in Africa
- dramatic HIV/AIDS-imposed hardship on (groups of) society:
  - decline of labor productivity (absenteeism, higher turnover, loss of skills, ...)
  - drain of resources (health expenditures, funerals, ...)
  - decline in education (orphanage, quality of teachers, ...)
- increased worries about implications for social violence

HIV/AIDS and Social Violence

- around 2000: bleak outlook regarding the social, economic and political consequences of the HIV/AIDS epidemic in Africa
- dramatic HIV/AIDS-imposed hardship on (groups of) society:
  - decline of labor productivity (absenteeism, higher turnover, loss of skills, ...)
  - drain of resources (health expenditures, funerals, ...)
  - decline in education (orphanage, quality of teachers, ...)
- increased worries about implications for social violence
- In 2001: ART prices dropped dramatically,
  by 2005 massive and rapid roll-out of campaigns with treatment provision in all Africa

HIV/AIDS and Social Violence

- around 2000: bleak outlook regarding the social, economic and political consequences of the HIV/AIDS epidemic in Africa
- dramatic HIV/AIDS-imposed hardship on (groups of) society:
  - decline of labor productivity (absenteeism, higher turnover, loss of skills, ...)
  - drain of resources (health expenditures, funerals, ...)
  - decline in education (orphanage, quality of teachers, ...)
- increased worries about implications for social violence
- In 2001: ART prices dropped dramatically,
  by 2005 massive and rapid roll-out of campaigns with treatment provision in all Africa
- Since then: dramatic increase in life expectancy and productivity of HIV positive *and negative* individuals due to ART

What we find

- expansion of ART coverage in the context of the HIV/AIDS epidemic in Africa led to a reduction in social violence
- (indirect) evidence for the role of health for social violence
- effects work through improved trust in (and identification with) institutions

Related Literature I

- Deprivation and hardship linked to conflict – bad income shocks
  - Adverse price shocks (Bazzi and Blattman, 2014; McGuirk and Burke, 2017; Berman et al., 2019)
  - Adverse weather shocks (Miguel et al., 2004; Koenig et al., 2017; Harari and La Ferrara, 2018; Eberle et al., 2020)

Related Literature I

- Deprivation and hardship linked to conflict – bad income shocks
  - Adverse price shocks (Bazzi and Blattman, 2014; McGuirk and Burke, 2017; Berman et al., 2019)
  - Adverse weather shocks (Miguel et al., 2004; Koenig et al., 2017; Harari and La Ferrara, 2018; Eberle et al., 2020)
- So far only small literature on health and social violence, and focusing on exposure or shocks, not policy
  - Disease exposure (country-level): Cervellati et al. (2017)
  - Malaria exposure (cross-cell): Cervellati et al. (2018)
  - Epidemic shocks related to malaria outbreaks: Cervellati et al. (2022)

Related Literature II

- Growing literature on impact of particular policies on peace
  - Food Aid (Nunn and Qian, 2014), Reconciliation (Cilliers, 2016), Employment (Blattman Annan, 2016), Education (Rohner and Saia, 2019) ...

Related Literature II

- Growing literature on impact of particular policies on peace
  - Food Aid (Nunn and Qian, 2014), Reconciliation (Cilliers, 2016), Employment (Blattman Annan, 2016), Education (Rohner and Saia, 2019) ...
- Small literature on impact of HIV treatment on economic outcomes
  - Habyarimana et al., 2010; Bor et al., 2012; Baranov et al., 2015; Tompsett, 2020.

Related Literature II

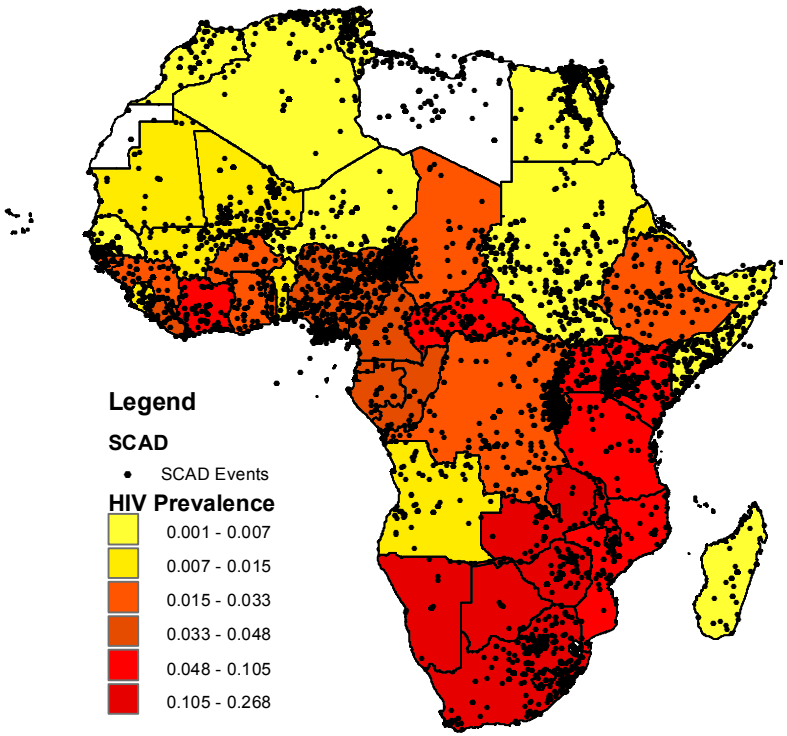
- Growing literature on impact of particular policies on peace
  - Food Aid (Nunn and Qian, 2014), Reconciliation (Cilliers, 2016), Employment (Blattman Annan, 2016), Education (Rohner and Saia, 2019) ...
- Small literature on impact of HIV treatment on economic outcomes
  - Habyarimana et al., 2010; Bor et al., 2012; Baranov et al., 2015; Tompsett, 2020.
- Contribution of current project:
  - impact of ART treatment on social violence
  - indirect evidence for the role of health for social violence
  - investigation of channels

Data I

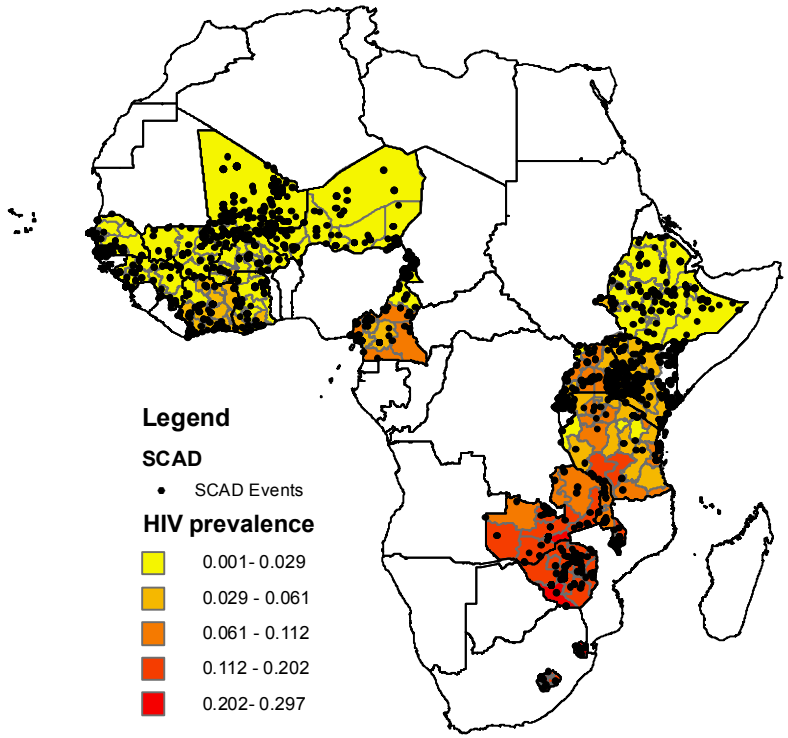
- Social Violence: Social Conflict Analysis Database (SCAD) ▸ SCAD
- HIV prevalence in adult population: ▸ HIV
  - UNAIDS (country)
  - DHS (region)
- ART coverage: UNAIDS ▸ ART

▸ Other Data

Data II

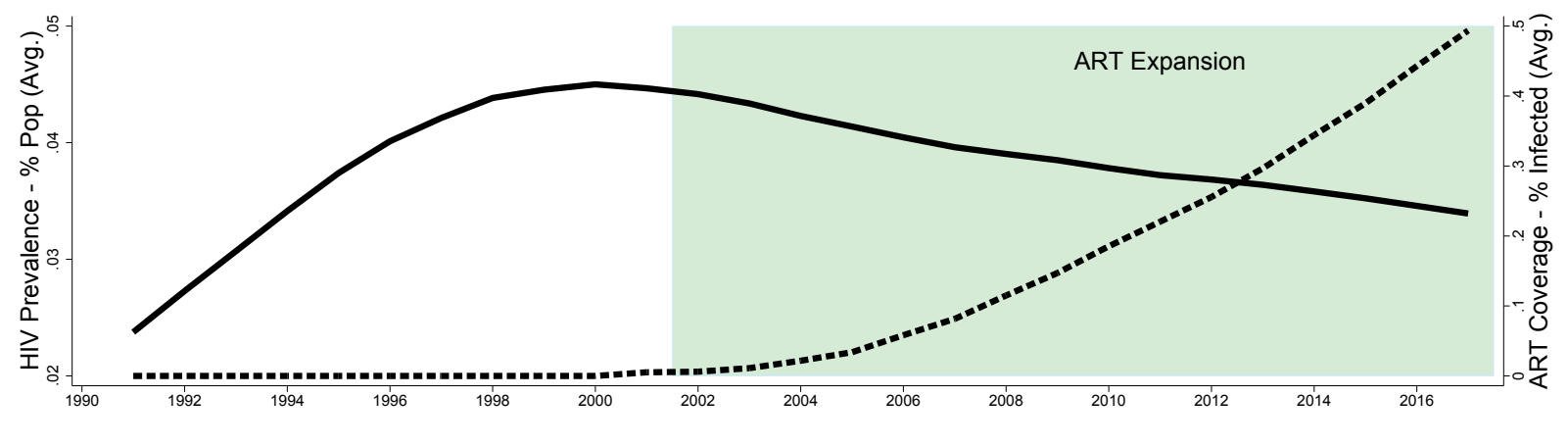


(a) Country Sample

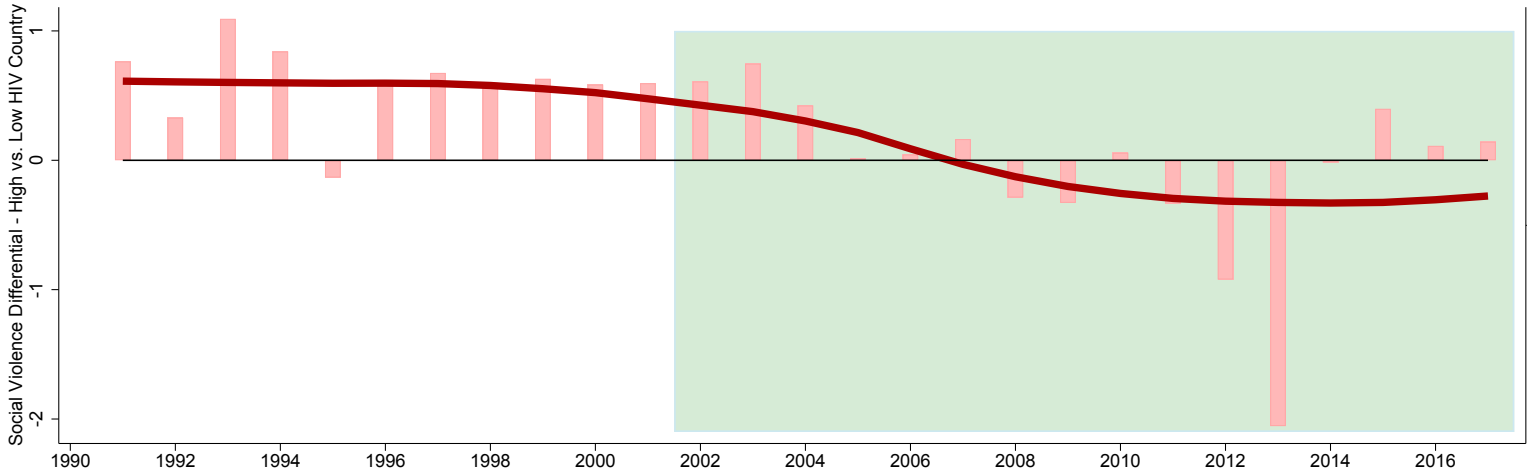


(b) Sub-National Regions Sample

The Paper in One Figure

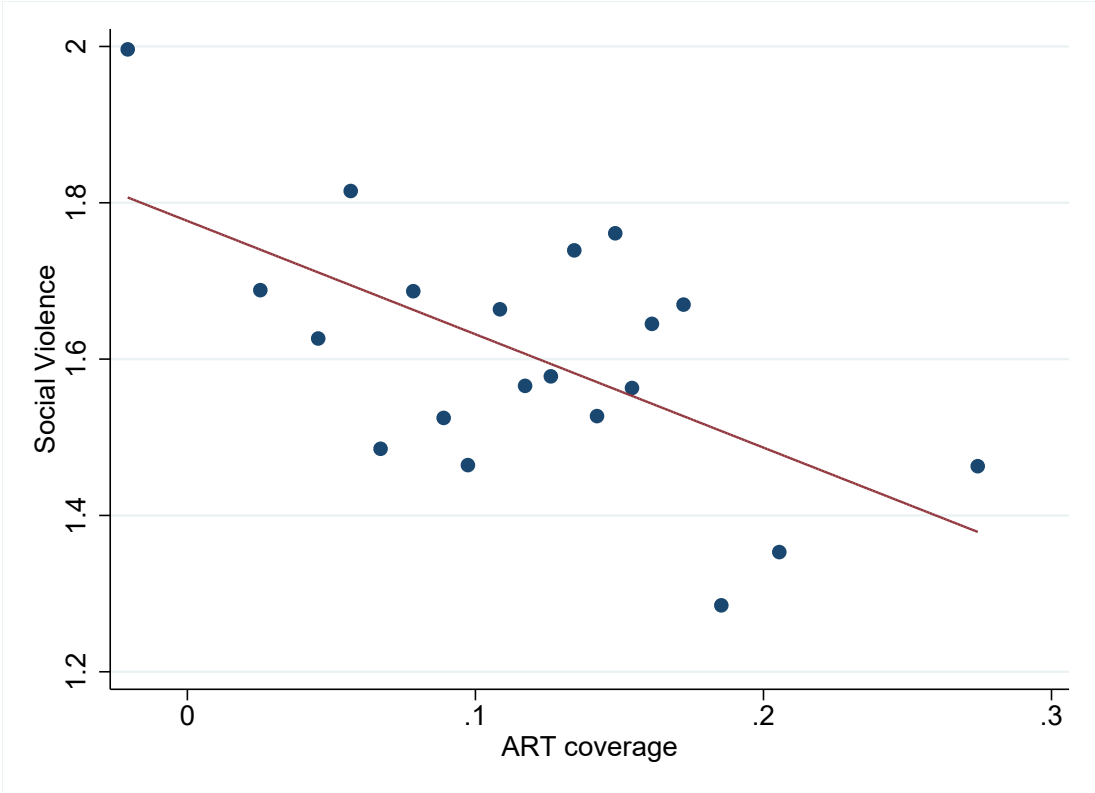


(a) HIV prevalence and ART coverage



(b) Difference in social violence in high *vs.* low HIV countries

ART Coverage and Social Violence



Binned scatter plots of the relationship between social violence on antiretroviral therapy coverage across African countries between 1990 and 2017, accounting for country, year fixed effects and macro-region linear time trends.

Empirical Strategy

Endogeneity problem:

- HIV prevalence
- ART coverage

might both be related to factors driving social violence.

Empirical Strategy

Endogeneity problem:

- HIV prevalence
- ART coverage

might both be related to factors driving social violence.

Empirical Strategy: use predicted ART coverage by combining

- regional variation in HIV prevalence pre-ART expansion and
- time variation in national ART coverage levels

to isolate effect on social conflict variation within regions over time

Empirical Strategy

2SLS approach:

$$Conflict_{c,t} = \beta \cdot ARTcoverage_{c,t} + \gamma X_{c,t} + \delta_c + \zeta_t + \rho_c \cdot t + \varepsilon_{c,t}$$

Empirical Strategy

2SLS approach:

$$Conflict_{c,t} = \beta \cdot ARTcoverage_{c,t} + \gamma X_{c,t} + \delta_c + \zeta_t + \rho_c \cdot t + \varepsilon_{c,t}$$

First stage:

$$ARTcoverage_{c,t} = Z_{c,2001} \cdot ART_{IV,t} + ...$$

Identification:

- $Z_{c,2001}$ scope for ART (HIV prevalence pre-ART roll-out)
- $ART_{IV,t}$ global variation in access to ART (reflecting ART availability)
- logic similar to Acemoglu and Johnson (2007), Acemoglu et al. (2020), Tompsett (2020)

▸ Illustration

Results: ART Coverage and Social Violence in Africa

Table: Effect of ART Expansion on Social Violence

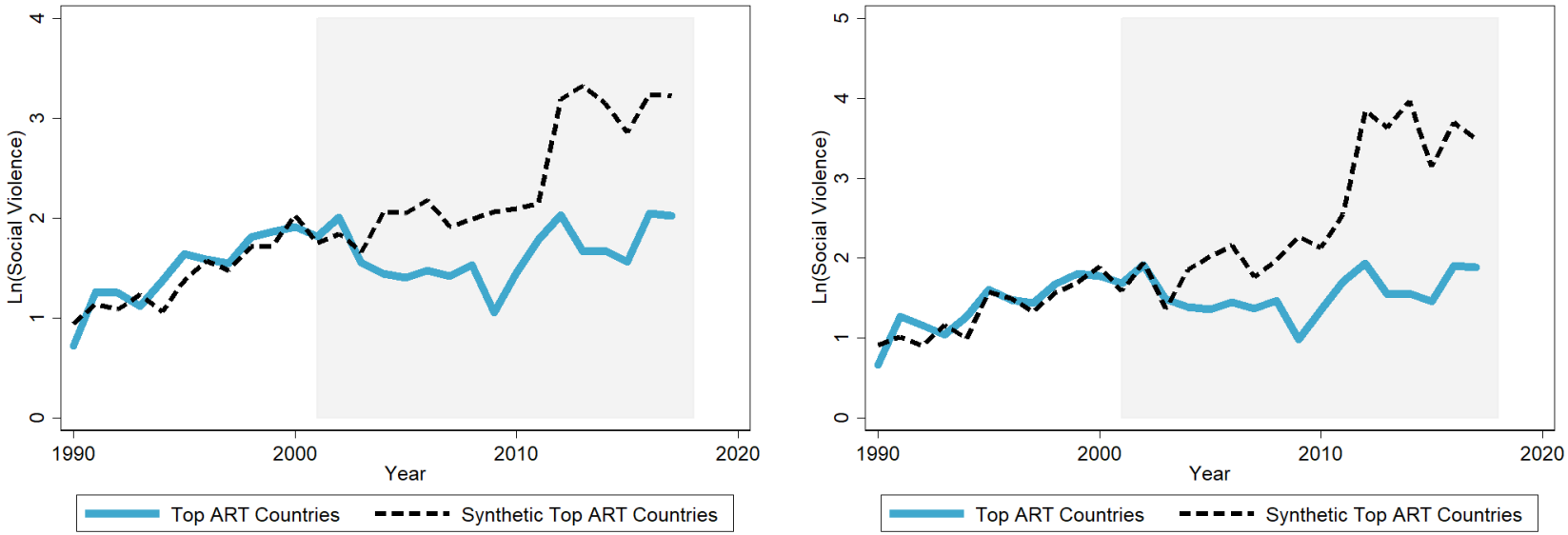
	Events of Social Violence			
	OLS	2SLS	ITT	
	(1)	(2)	(3)	(4)
ART	-0.316**	-0.966**		
	(0.157)	(0.362)		
$Z_{i,2001} \times ART_{IV,t}$			-0.163***	-0.166***
			(0.060)	(0.034)
Instrument				
$Z_{i,2001}$		$HIV_{c,2001}$	$HIV_{c,2001}$	$HIV_{r,2001}$
$ART_{IV,t}$		ART Price	ART Price	ART Price
Observations	1,394	1,394	1,394	4,760
Clusters	50	50	50	170
Adj-R2	0.23	0.17	0.23	0.09
Kleibergen-Paap		33.77		
Country f.e.	√	√	√	√
Year f.e.	√	√	√	√
Time Trend	√	√	√	√
HIV Trend	√	√	√	√
Population	√	√	√	√
Region f.e.	×	×	×	√

Robustness

Table: Effect of ART Expansion on Social Violence – Alternative Instrumentation

	Social Violence (log events) - SCAD Data					
	2SLS	2SLS - Alternative IV Constructions				
	(1)	(2)	(3)	(4)	(5)	(6)
ART	-0.966**	-0.954**	-0.922**	-0.999**	-1.197**	-1.227**
	(0.362)	(0.361)	(0.356)	(0.388)	(0.578)	(0.575)
Instrument						
$Z_{i,2001}$	$HIV_{c,2001}$	$HIV_{c,2001}$	$HIV_{c,2001}$	$HIV_{c,2001}$	$HIV_{geo,16K}$	$HIV_{geo,16K}$
$ART_{IV,t}$	ART Price	ART Cost	ART Synth. Price	ART Cov	ART Price	ART Synth. Price
Observations	1,394	1,394	1,394	1,394	1,366	1,366
Clusters	50	50	50	50	49	49
Adj-R2	0.17	0.18	0.18	0.17	0.08	0.07
Kleibergen-Paap	33.77	31.42	38.12	34.69	11.40	11.14
Country f.e.	√	√	√	√	√	√
Year f.e.	√	√	√	√	√	√
Time Trend	√	√	√	√	√	√
HIV Trend	√	√	√	√	√	√
Population	√	√	√	√	√	√

Synthetic Control Approach



(a) Top 25% vs. Bottom 25%

(b) Top 25% vs. Bottom 10%

Figure: ART Expansion and Social Violence: Synthetic Control Approach

Note: Results based on the synthetic control method. For each treated unit, the incidence of social violence is computed under the average treatment and for the synthetic counterfactual. The graph plots averages across all treated units. With the intervention period beginning in 2001, the synthetic control is computed for each treated unit by minimizing the mean squared prediction error (MSPE) relative to the treated units during the pre-intervention period 1990 to 2000. As predictor variables for the construction of the weighted counterfactual of each treated unit, the procedure uses the average log number of conflict events, population and HIV prevalence (all measured between 1990 to 2000), the fraction of the country area within 100 km from the coast, the fraction of desert and of tropical forest, latitude and longitude.

Channels: Types of Violence

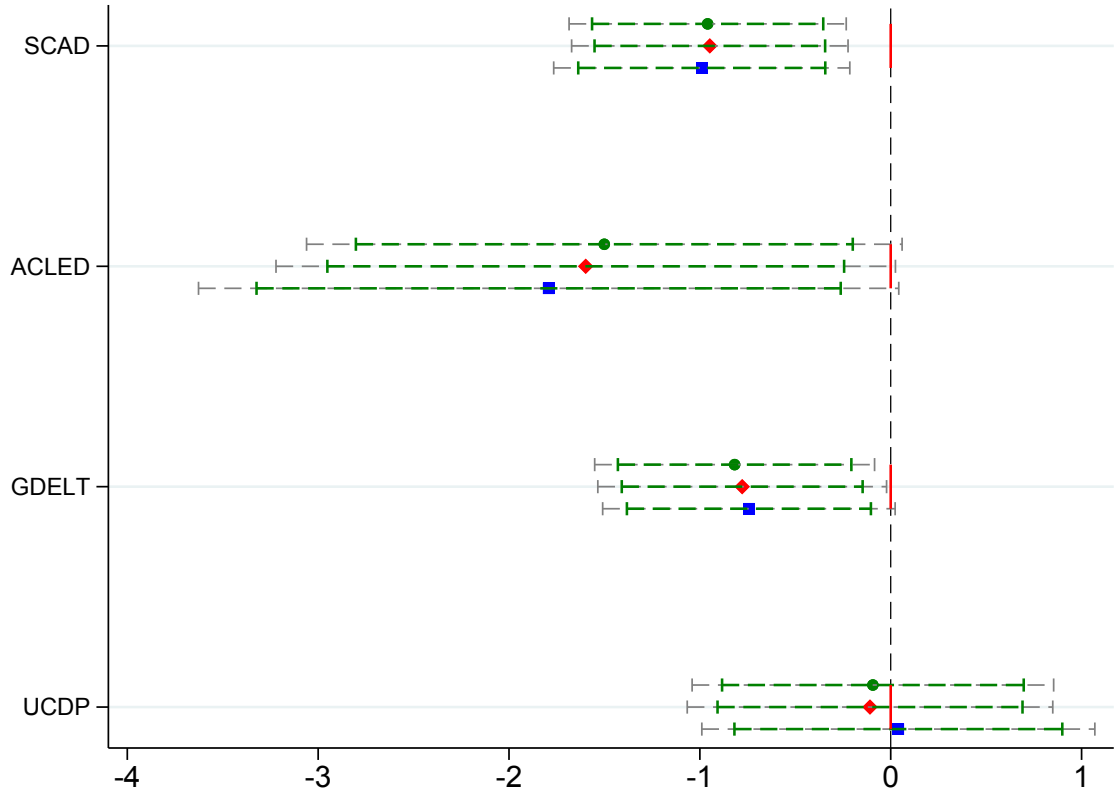


Figure: Mechanisms: Types of Social Violence

Note: 2SLS estimates of β, country level. Instrument: interaction between cross-sectional variation in the potential for ART treatment, $Z_{i,2001}$ (measured by HIV prevalence at country level, 2001), and a time-varying measure of ART expansion, $ART_{IV,t}$ (measured by the global variation in the median world price of ART treatment regimens, ART Price, or, alternatively, by the cost of ART treatment regimens, ART Cost, or global ART coverage outside Africa, ART Cov); the interaction term has been standardized. Coefficients are based on the same specification as in Table 1 Column (2). Dependent variable is log events of social violence from the different data sets (SCAD, ACLED, GDELT, UCDP).

Mechanisms: Motives for Violence

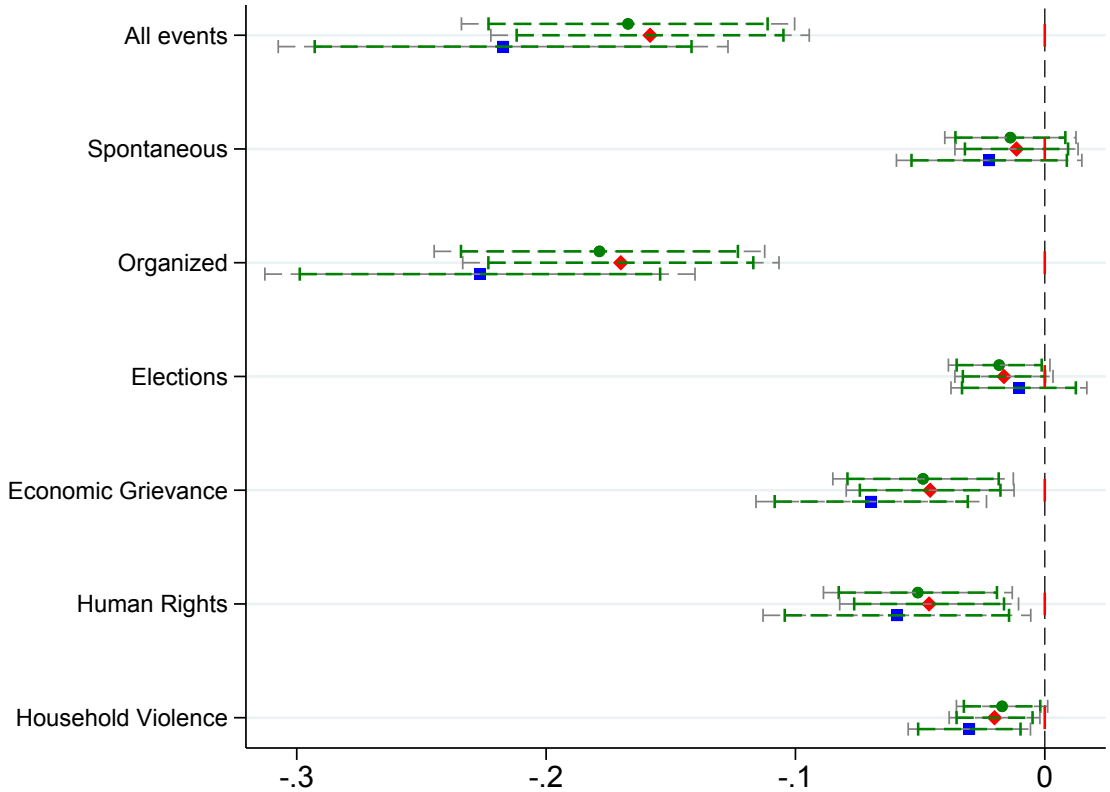


Figure: Mechanisms: Motives for Social Violence

Note: Intention-to-treat estimates of ϕ, regional level. Instrument: interaction between cross-sectional variation in the potential for ART treatment, $Z_{i,2001}$ (measured by HIV prevalence at region level, 2001), and a time-varying measure of ART expansion, $ART_{IV,t}$ (measured by the global variation in the median world price of ART treatment regimens, ART Price, or, alternatively, by the cost of ART treatment regimens, ART Cost, or global ART coverage outside Africa, ART Cov); the interaction term has been standardized. Coefficients are based on the same specification as in Table 1 Column (4).

Mechanisms: Approval of Government

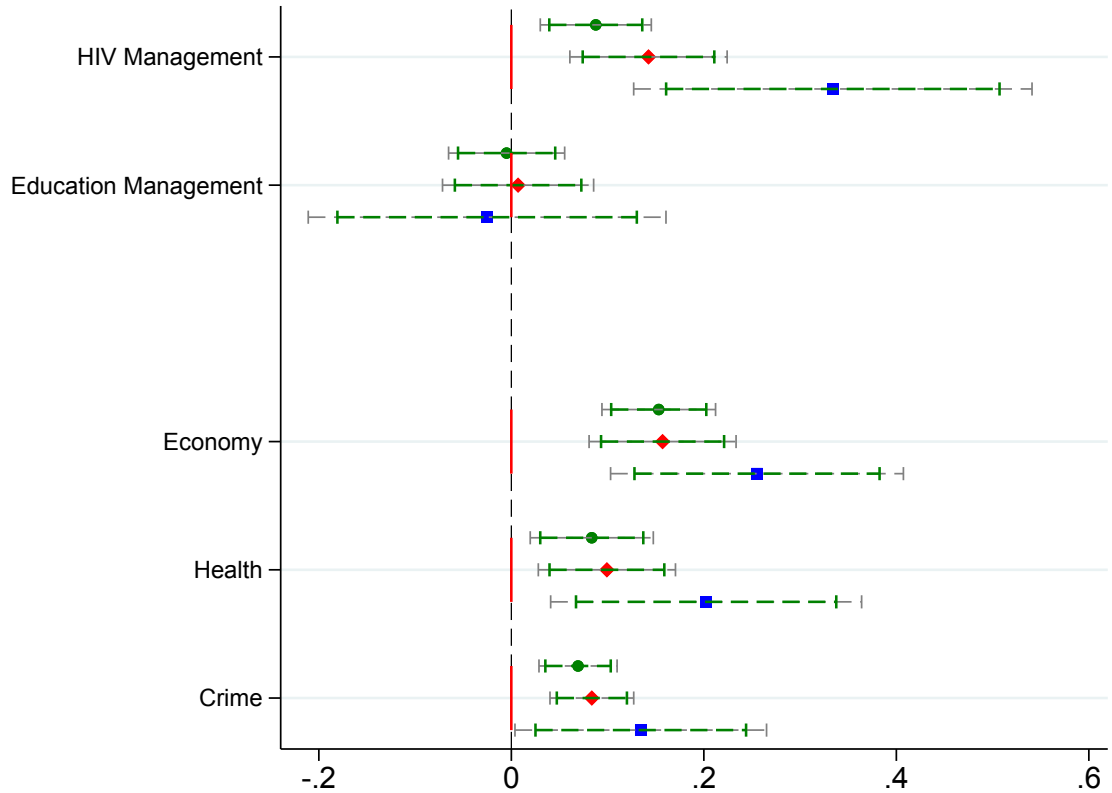


Figure: Mechanisms: Approval of Government Policy

Note: Intention-to-treat estimates of ϕ, regional level. Instrument: interaction between cross-sectional variation in the potential for ART treatment, $Z_{i,2001}$ (measured by HIV prevalence at region level, 2001), and a time-varying measure of ART expansion, $ART_{IV,t}$ (measured by the global variation in the median world price of ART treatment regimens, ART Price, or, alternatively, by the cost of ART treatment regimens, ART Cost, or global ART coverage outside Africa, ART Cov); the interaction term has been standardized. Coefficients are based on the same specification as in Table 1 Column (4). Dependent variables: survey responses to questions how well the current government handles various policy issues (HIV/AIDS, basic health provision, the economy, and crime). Data are from Afrobarometer.

Mechanisms: Trust in Institutions

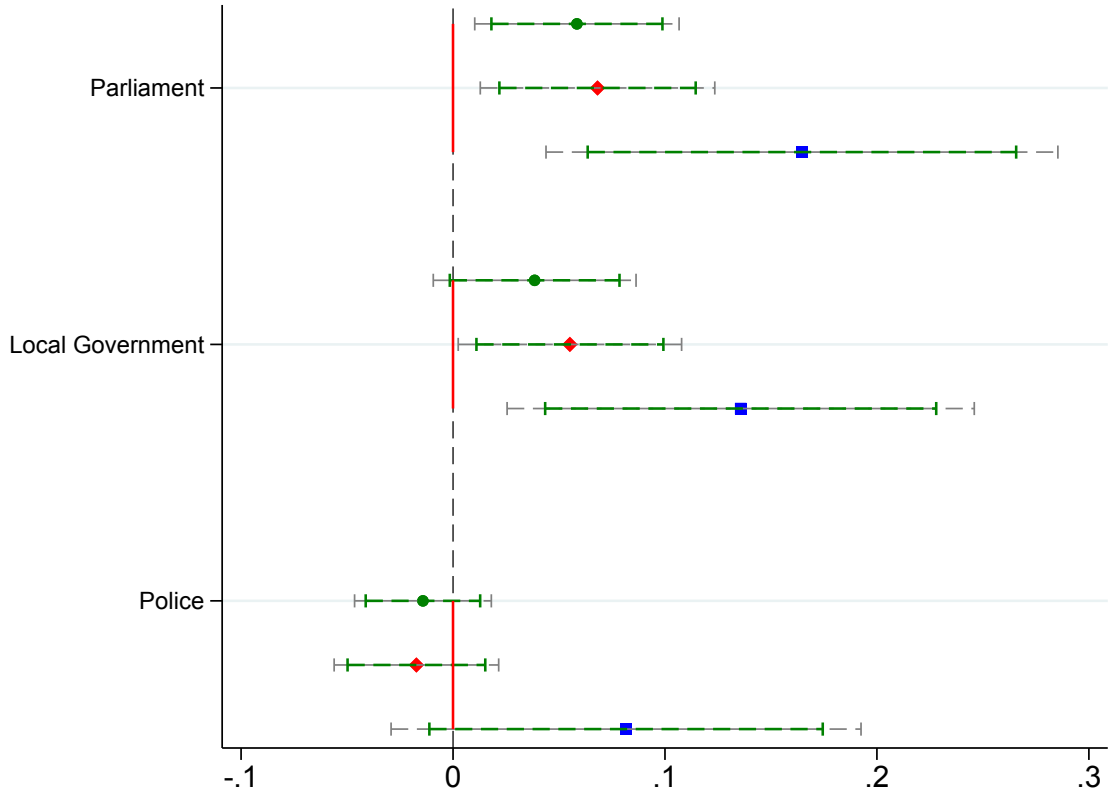


Figure: Mechanisms: Trust in Institutions

Note: Intention-to-treat estimates of ϕ, regional level. Instrument: interaction between cross-sectional variation in the potential for ART treatment, $Z_{i,2001}$ (measured by HIV prevalence at region level, 2001), and a time-varying measure of ART expansion, $ART_{IV,t}$ (measured by the global variation in the median world price of ART treatment regimens, ART Price, or, alternatively, by the cost of ART treatment regimens, ART Cost, or global ART coverage outside Africa, ART Cov); the interaction term has been standardized. Coefficients are based on the same specification as in Table 1 Column (4). Dependent variables: survey responses to questions about trust in institutions (parliament, local government, police). Data are from Afrobarometer.

Relevance: Counterfactual Scenario

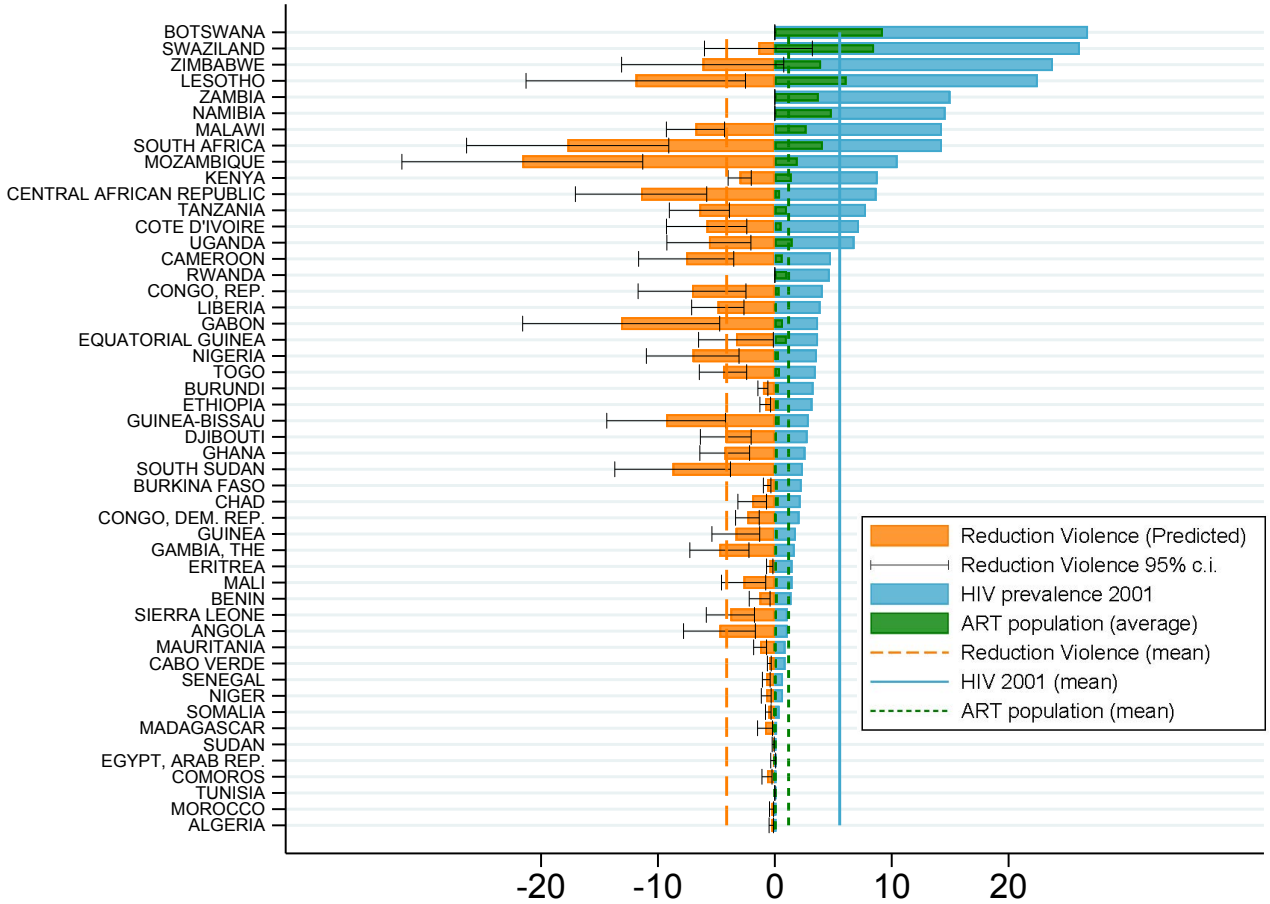


Figure: Quantification and Policy Implications

Note: Reduction in Social Violence: Counterfactual % reduction in violent events between 2000 and 2017 based on a simulation of country-specific ART coverage set to the level of ART coverage of the 10% countries with the highest ART coverage in a given year. Simulation based on same specification as baseline model estimates, changes relative to observed values. Vertical lines indicate the average of each respective variable.

Conclusions

- expansion of ART coverage in the context of the HIV/AIDS epidemic in Africa led to a reduction in social violence
- (indirect) evidence for the role of health for social violence
- effects work through improved trust in (and identification with) institutions

Thank You!

Data: Social Violence

Social Conflict Analysis Database (SCAD) ▸ Data

- geolocalized compilation of events reported by AP and AFP
- 10 different types of events: Demonstrations (Organized/Spontaneous), Violent Riots (Organized/Spontaneous), Strikes (General/Limited), Pro-Government Violence, Anti-Government Violence (like Riots but with semi-permanent or permanent militant wing or organization), Extra-Government Violence (like Riots but with at least one actor with semi-permanent or permanent militant wing or organization), Intra-government Violence
- sample covers all countries in Africa with population > 1 million
- latitude and longitude
- measures
  - total number of violent events in the country/region in the year
  - binary indicator if at least one violent event took place in the country/region in the year
- Robustness: Armed Conflict Location & Event Data Project (ACLED)

Data: HIV Prevalence

- UNAIDS model estimates, comparability across region and countries over time ensured by Strategic Information and Monitoring Division
- *high-level HIV epidemic countries*: estimates are based on data from surveillance among pregnant women and from nationally representative population-based surveys
- *low-level HIV epidemic countries*: estimates are based on data among sub-populations at high risk of HIV infection
- HIV prevalence at regional level (administrative level 1) constructed using DHS survey data (waves up to 2006)
- coverage: 18 African countries, 170 regions

▸ Data

Data: Antiretroviral Therapy (ART) Coverage

- UNAIDS, based on registers compiled by local facilities administering antiretroviral therapy and sent to national authorities on a routine basis
- UNAIDS requests countries to submit these data online by 31 March each year
- several quality checks to validate data and avoid reporting errors

▸ Data

Data: Other Sources

Country level

- GDP (in constant 2010 US$) from World Bank
- Population from United Nations Population Division, Census reports, Eurostat, United Nations Statistical Division, U.S. Census Bureau and Secretariat of the Pacific Community (midyear estimates of all residents regardless of legal status or citizenship)
- Life expectancy at birth from United Nations Population Division and Census reports

Region level

- anemia prevalence
- malaria prevalence
- trust in institutions

Data

ART Coverage in Population and Social Violence

	Social Violence (log events)					
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS		First Stage		IV	
ART coverage (population)	-7.120***	-10.138***			-6.446**	-11.803***
	(2.282)	(3.624)			(2.527)	(4.312)
Predicted ART:						
$HIV_{2001,c} * ART_{LMC,t}$			1.592***	1.858***		
			(0.182)	(0.176)		
Observations	1,394	1,394	1,394	1,394	1,394	1,394
Countries	50	50	50	50	50	50
Adj-R2	0.23	0.23			0.23	0.23
Kleibergen-Paap					76.42	111.49
Country fixed effects	√	√	√	√	√	√
Year fixed effects	√	√	√	√	√	√
Region Time Trend	√	√	√	√	√	√
HIV prevalence 2001 Trend	×	√	×	√	×	√

▸ Back

ART Coverage and Types of Social Violent Events

Country-Level	Type of Event		Main Motive		
Dependent Variable	(1) Spontaneous	(2) Organized	(3) Elections	(4) Economic grievance	(5) Human rights
ART coverage	0.570	-6.223***	-1.373*	-2.798**	-1.806
	(1.002)	(1.784)	(0.739)	(1.211)	(1.560)
Observations	1,394	1,394	1,394	1,394	1,394
Countries	50	50	50	50	50
Adj-R2	0.12	0.08	-0.02	0.03	0.02
Kleibergen-Paap	36.01	36.01	36.01	36.01	36.01
Subnational Level	Type of Event		Main Motive		
Dependent Variable	(1) Spontaneous	(2) Organized	(3) Elections	(4) Economic grievance	(5) Human rights
Predicted ART:					
$\overline{HIV}_r * ART_{LMC,t}$	-0.446	-10.424***	-1.005	-4.705***	-4.004**
	(1.009)	(2.112)	(0.864)	(1.323)	(1.581)
Mean	0.14	0.18	0.04	0.09	0.07
Observations	4,760	4,760	4,760	4,760	4,760
Regions	170	170	170	170	170
R2	0.05	0.08	0.02	0.03	0.03
Country/Region fe	√	√	√	√	√
Year fixed effects	√	√	√	√	√
Regions/Country Trend	√	√	√	√	√
HIV prevalence Trend	√	√	√	√	√

The Role of Trust in Institutions

	Share of positive answers: Subnational ITT			
Trust in	(1) President	(2) Parliament	(3) Ruling Party	(4) Oppositions
Predicted ART: $\overline{HIV}_r * ART_{LMC,t}$	24.867***	16.346***	11.524	8.112
	(6.997)	(6.051)	(7.873)	(9.234)
Mean	0.78	0.83	0.77	0.73
Observations	349	294	300	303
Regions	112	112	112	112
R2	0.64	0.62	0.66	0.78
Trust in	(5) Elect. Comm.	(6) Justice	(7) Army	(8) Police
Predicted ART: $\overline{HIV}_r * ART_{LMC,t}$	23.187***	1.820	11.757	8.106
	(6.077)	(4.352)	(10.177)	(5.556)
Mean	0.77	0.80	0.83	0.73
Observations	380	381	260	381
Regions	112	112	99	112
R2	0.63	0.78	0.63	0.80
Region fixed effects	√	√	√	√
Year fixed effects	√	√	√	√
Country Trend	×	×	×	×
HIV prevalence Trend	√	√	√	√

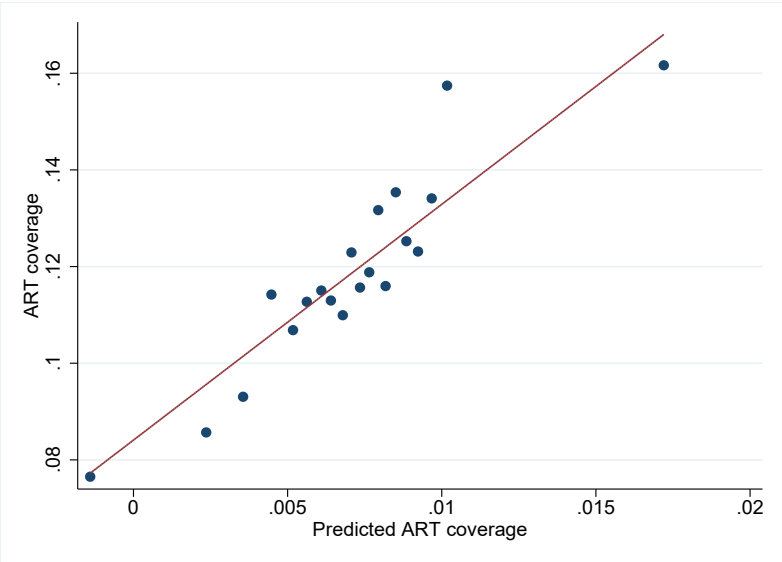
▸ Back

Development: ART Coverage, Life Expectancy and GDP

	Life expectancy (log)			GDP growth		
	(1)	(2)	(3)	(4)	(5)	(6)
ART coverage	0.322***		1.410***	0.061		0.223**
	(0.104)		(0.202)	(0.044)		(0.101)
Predicted ART:						
$HIV_{2001,c} * ART_{LMC,t}$		7.080***			1.065**	
		(0.624)			(0.486)	
Observations	1,394	1,394	1,394	1,306	1,306	1,306
Countries	50	50	50	50	50	50
Adj-R2	0.61	0.65	-0.09	-0.00	-0.00	-0.02
Kleibergen-Paap			36.01			32.05
	OLS	OLS	IV	OLS	OLS	IV
Country fixed effects	√	√	√	√	√	√
Year fixed effects	√	√	√	√	√	√
Region Time Trend	√	√	√	√	√	√
HIV prevalence 2001 Trend	√	√	√	√	√	√

▸ Back

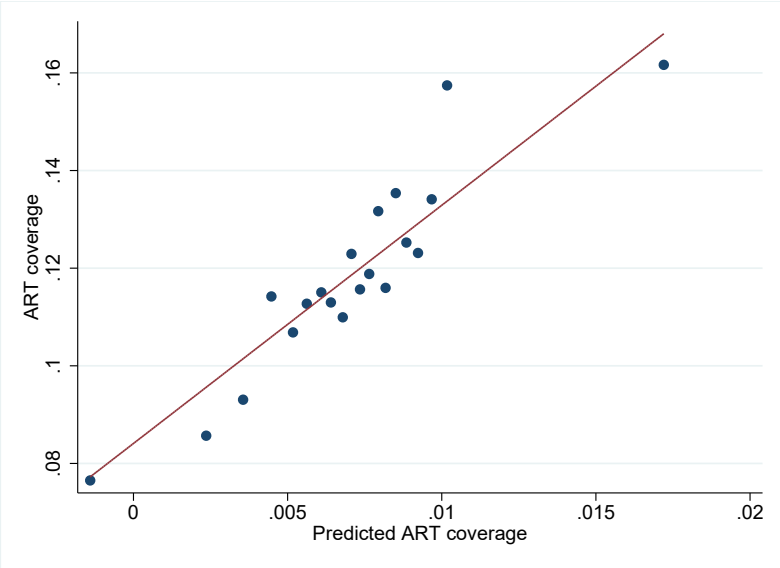
Illustration: Empirical Strategy



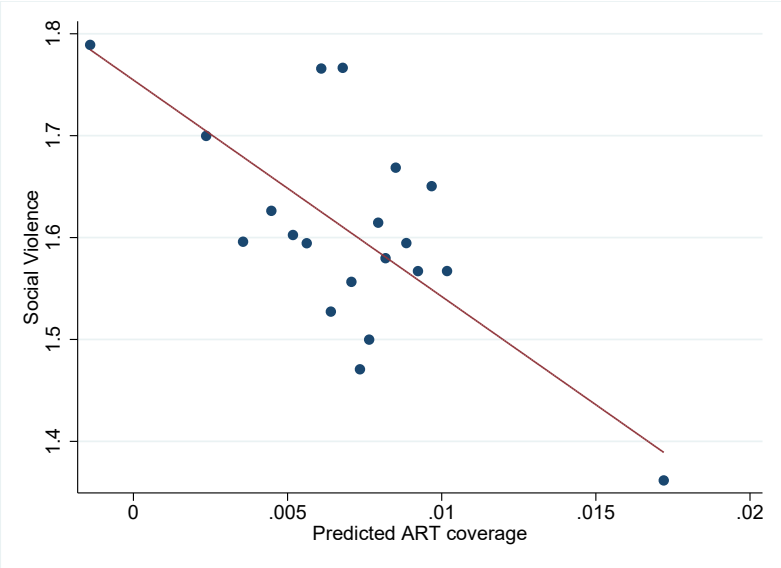
(a) First Stage (b) Reduced Form

Binned scatter plots of the relationship between social violence on antiretroviral therapy coverage (*left panel*), predicted and actual antiretroviral therapy coverage (*right panel*); across African countries between 1990 and 2017, accounting for country, year fixed effects and macro-region linear time trends.

Illustration: Empirical Strategy



(a) First Stage



(b) Reduced Form

Binned scatter plots of the relationship between social violence on antiretroviral therapy coverage (*left panel*), predicted and actual antiretroviral therapy coverage (*right panel*); across African countries between 1990 and 2017, accounting for country, year fixed effects and macro-region linear time trends.

▸ Back