ONLINE APPENDIX:

DELIBERATE DISENGAGEMENT: HOW EDUCATION
CAN DECREASE POLITICAL PARTICIPATION IN
ELECTORAL AUTHORITARIAN REGIMES

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1   Introduction

This Online Appendix provides additional information and results not reported in the main text of the article "Deliberate disengagement: How education can decrease political participation in electoral authoritarian regimes." In the second section we provide detailed variable definitions and summary statistics for all variables used in the analysis. In the third section we provide additional information on our balance checks. In the fourth section we present the results of additional robustness checks noted in the main paper. The fifth section provides a graphical representation of the testable implications results, while the final section presents results from analysis of education's effect on participation in a range of other African countries surveyed by Afrobarometer.

2   Variable definitions

The following variables come from the 1999-2013 Afrobarometer rounds. These definitions cover all the variables used in our analysis. Table 2 presents summary statistics for the main sample used in the paper. Figure 1 shows how Zimbabwe compares to other nations surveyed in the Afrobarometer, both before and after 2008. In general, participation ranks at around the Afrobarometer median.

Participation scale. Summative rating scale combining Voted, Contact local councilor, Attended community meeting, and Raised issue at meeting (all defined below). Cronbach's alpha of 0.62 in our five bandwidth sample, and 0.65 in the full sample. The pairwise correlation matrix is shown in Table 1.

Voted. Indicator coded 1 if respondent voted in most recent federal election. This question was not asked in the 2001 or 2007 survey waves. Missing, refused, and don't know responses were coded as missing.

Contacted local councilor. Indicator coded 1 if the respondent contacted a local government councilor at least once in the last year. Missing, refused, and don't know responses were coded as missing.

Attended community meeting. Indicator coded 1 if the respondent attended a community meeting at all in the last year. Missing, refused, and don't know responses were coded as missing.

Raised issue at meeting. Indicator coded 1 if the respondent raised an issue at a community meeting in the last year. Missing, refused, and don't know responses were coded as missing.

Economic scale. Summative rating scale combining Employed, Good living conditions and Poverty scale (defined below). Cronbach's alpha of 0.41 in our five bandwidth sample, and 0.32 in

Table 1: Pairwise correlation matrix of participation measures

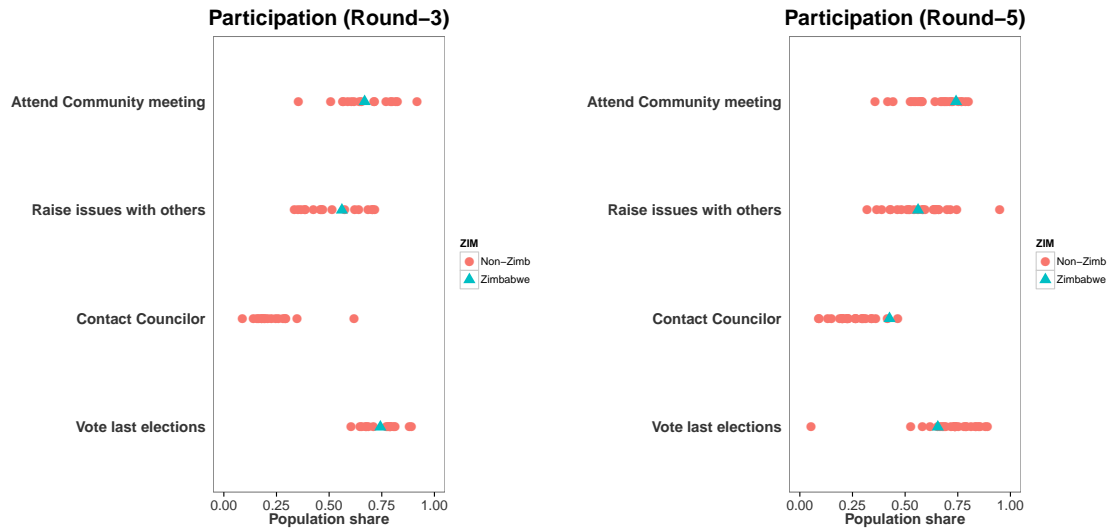|	Voted	Contacted local councilor	Attended community meeting	Raised issue at meeting
Voted	1			
Contacted local councilor	0.23	1		
Attended community meeting	0.26	0.30	1	
Raised issue at meeting	0.24	0.34	0.53	1

Figure 1: Zimbabwean participation in cross-national context

the full sample.

Employed. Indicator coded 1 if respondent is employed. Missing, refused, and don't know responses were coded as missing.

Good living conditions. Indicator coded 1 if respondent says that his or her living conditions are fairly or very good. Missing, refused, and don't know responses were coded as missing.

Poverty scale. Summative rating scale combining three indicator variables asking respondents whether they have gone with food, medicine or cash in the last year (for each variable, missing, refused, and don't know responses were coded as missing). Cronbach's alpha of 0.63 in our five bandwidth sample, and 0.64 in the full sample.

News scale. Summative rating scale combining indicators for respondents that get news from radio, television and newspapers at least once a week (for each variable, missing, refused, and don't know responses were coded as missing). Cronbach's alpha of 0.74 in our five bandwidth sample, and 0.73 in the full sample.

Interest in public affairs. Indicate coded 1 for respondents that follow what is happening in government and public affairs some or almost all the time, or are somewhat or very interested in government and public affairs. Missing, refused, and don't know responses were coded as missing.

Support democracy. Indicator coded 1 if the respondent professes to support democracy. Missing and refused responses were coded as missing, while don't know responses were coded as 0s.

Support liberal institutions. Summative rating scale combining the following indicator variables: parties are needed for democracy; reject one party rule, reject one man rule, against government bans on organizations, against government closing news outlets, and against Presidential discretion (for each variable, missing, refused, and don't know responses were coded as missing). Cronbach's alpha of 0.74 in our five bandwidth sample, and 0.72 in the full sample.

View government scale. Summative rating scale combining Close to ZANU-PF, Close to MDC, Incumbent trust and performance, and Perceived government corruption (defined below). Cronbach's alpha of 0.62 in our five bandwidth sample, and 0.62 in the full sample.

Close to ZANU-PF. Indicator coded 1 for respondents that feel they are close to ZANU-PF. Missing, refused, and don't know responses were coded as missing.

Close to MDC. Indicator coded 1 for respondents that feel they are close to MDC. Missing, refused, and don't know responses were coded as missing.

Incumbent trust and performance. Summative rating scale combining three indicators defined by respondent trust of the President, ruling party and MPs, and three indicators whether the President, MPs and local government have performed well in office (for each variable, missing, refused, and don't know responses were coded as missing). Cronbach's alpha of 0.84 in our five bandwidth

sample, and 0.83 in the full sample.

Perceived government corruption. Summative rating scale combining four indicator variables asking whether the respondent believes the President, MPs, local councillors and government officials to be corrupt (for each variable, missing, refused, and don't know responses were coded as missing). Cronbach's alpha of 0.80 in our five bandwidth sample, and 0.77 in the full sample.

Education. Seven-point scale of education level, ranging from 0 to 6. The levels are: no schooling, incomplete primary education, complete primary education, incomplete secondary education, complete secondary education, incomplete college, and complete college. Missing, refused, and don't know responses were coded as missing.

Secondary access. Defined in the main text.

Survey year. Year in which the survey was conducted.

Shona/Ndebele. Indicator coded 1 if respondent is from a Shona/Ndebele tribe. Missing, refused, and don't know responses were coded as missing.

Male. Indicator coded 1 if respondent is male. Missing, refused, and don't know responses were coded as missing.

Age. Respondent's stated age. Missing, refused, and don't know responses were coded as missing.

Received gift. Indicator coded 1 if respondent ever received a gift for in return for his or her vote at the last election. Missing, refused, and don't know responses were coded as missing.

Freedom to choose vote. Indicator coded 1 if respondent believes that they are somewhat or completely free to vote for the candidate they choose. Missing, refused, and don't know responses were coded as missing.

Vote monitored. Indicator coded 1 if respondent believes it is somewhat or very likely that their vote can be monitored. Missing, refused, and don't know responses were coded as missing.

Fear repression. Indicator coded 1 if respondent somewhat fears or fears a lot becoming a victim of political intimidation or violence during election campaigns. Missing, refused, and don't know responses were coded as missing.

Only national identity. Indicated coded 1 for respondents that only identify by their national identity. Missing, refused, and don't know responses were coded as missing.

Some national identity. Indicated coded 1 for respondents that only identify by their national identity or mostly by their national identity. Missing, refused, and don't know responses were coded as missing.

Events. Number of incidents of violence against civilians by ZANU-PF between 1997 and 2013. From Armed Conflict Location and Event Data (ACLED) Project.

Table 2: Summary statistics

	Obs.	Mean	Std. dev.	Min.	Max.	Waves not asked
Dependent variables						
Participation scale	1,842	0.65	0.35	0	1	
Voted	1,532	0.77	0.42	0	1	2004
Contacted local councilor	1,328	0.42	0.49	0	1	2005, 2010
Attended community meeting	1,589	0.70	0.46	0	1	2010
Raised issue at meeting	1,242	0.66	0.47	0	1	1999, 2010
Economic scale	1,842	0.33	0.30	0	1	
Employed	1,840	0.38	0.49	0	1	
Good living conditions	1,480	0.24	0.43	0	1	1999
Poverty scale	1,842	0.67	0.35	0	1	
News scale	1,840	0.36	0.37	0	1	
Interest in public affairs	1,586	0.64	0.48	0	1	2010
Support democracy	1,840	0.72	0.45	0	1	
Support liberal institutions	1,824	0.74	0.28	0	1	
View government scale	1,839	0.40	0.26	0	1	
Close to ZANU-PF	1,699	0.27	0.45	0	1	
Close to MDC	1,699	0.24	0.43	0	1	
Incumbent trust and performance	1,822	0.48	0.36	0	1	
Perceived government corruption	1,715	0.93	0.21	0	1	
Education variables						
Education	1,842	2.87	1.48	0	6	
Incomplete primary education	1,842	0.94	0.24	0	1	
Complete primary education	1,842	0.80	0.40	0	1	
Incomplete secondary education	1,842	0.62	0.49	0	1	
Complete secondary education	1,842	0.34	0.47	0	1	
Reform variable						
Secondary access	1,842	0.57	0.45	0	1	
Other and control variables						
Survey year	1,842	2006.53	4.70	1999	2012	
Survey since 2009	1,842	0.50	0.50	0	1	
Shona	1,842	0.69	0.46	0	1	
Ndebele	1,842	0.14	0.35	0	1	
Male	1,842	0.50	0.50	0	1	
Age	1,842	40.91	5.96	28	53	
District incumbent vote share	1,842	0.52	0.20	0.14	0.95	
District turnout	1,842	0.52	0.09	0.25	0.80	
Received gift	720	0.18	0.38	0	1	1999, 2004, 2009, 2010
Freedom to choose vote	903	0.59	0.49	0	1	1999, 2004, 2005
Vote monitored	900	0.19	0.39	0	1	1999, 2004, 2005
Fear repression	914	0.68	0.47	0	1	1999, 2004, 2005
Events	1,842	220.76	385.27	0	1186	
Only national identity	1,185	0.47	0.50	0	1	1999, 2005
Some national identity	1,185	0.76	0.43	0	1	1999, 2005
Distance to rebel border	1,842	0.74	0.60	0	1.92	
Distance to ZANLA border	1,842	1.38	1.15	0	3.94	
Distance to ZIPRA border	1,842	1.69	1.02	0	3.76	

District incumbent vote share. The vote share for the incumbent party in an individual's district at the most recent national legislative election. Missing districts were coded as missing.

District turnout. The turnout rate in the individual's district at the most recent national legislative election. Missing districts were coded as missing.

Distance to rebel border/ZANLA/ZIPRA. Distance in degrees to the nearest rebe/ZANLA/ZIPRA border during the war of independence.

3 Balance checks

Table 3 formally presents the balance tests shown graphically in the main paper. Figure 2 shows graphically no substantive difference in height across cohorts around the reform using data from the Demographic and Health Surveys (DHS). As noted in the main text, Table 4 demonstrates that missing observations are uncorrelated with access to secondary schooling.

4 Robustness checks

Figure 3 shows how the results change when the number of cohorts either side of the reform changes. (The zero bandwidth includes only partially treated cohorts.) The results indicate that our findings are highly robust to the choice of "bandwidth". The point estimates are consistently negative across all bandwidths and variables. Only when the sample size becomes very small, for the small bandwidths, do our estimates become statistically insignificant.

Table 5 shows the reduced form estimates from specifications including age fixed effects. Although the standard errors unsurprisingly increase substantially, given we remove considerable cross-cohort variation, the point estimates are similar if not larger than those reported in our main analysis. The inclusion of age fixed effects weakens the first stage, and thus cannot produce meaningful IV estimates.

Tables 6-8 interact secondary access and education with the post-2008 dummy for the testable implications specifications. The results clearly show that, in contrast to political participation, economic outcomes, political interest, support for democracy and criticism of the regime do not consistently change after 2008. As noted in the main text, this supports our argument since such fixed or slow-moving variables—especially economic outcomes—should not change in a new political environment.

Table 3: Balance tests

	(1) Shona	(2) Ndebele	(3) Male	(4) District incumbent vote share	(5) District turnout	(6) Distance to rebel border	(7) Distance to ZANLA border	(8) Distance to ZIPRA border
Panel A: Balance tests								
Secondary access	0.037*	-0.030	0.051**	0.006	0.003	0.001	-0.056	-0.016
	(0.020)	(0.020)	(0.023)	(0.009)	(0.004)	(0.032)	(0.055)	(0.051)
Observations	1842	1842	1842	1842	1842	1842	1842	1842
Panel B: Balance tests (without partially treated)								
Secondary access	0.042*	-0.034	0.057**	0.011	0.004	-0.001	-0.051	-0.032
	(0.021)	(0.021)	(0.023)	(0.009)	(0.004)	(0.032)	(0.055)	(0.052)
Observations	1467	1467	1467	1467	1467	1467	1467	1467

Notes: All specifications are estimated using OLS, include survey fixed effects, and cluster standard errors by district. All specifications include five cohorts either side of the cohorts that were fully affected or fully unaffected by the reform (Panel A), or five cohorts either side of the first cohort to receive any treatment (Panel B). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
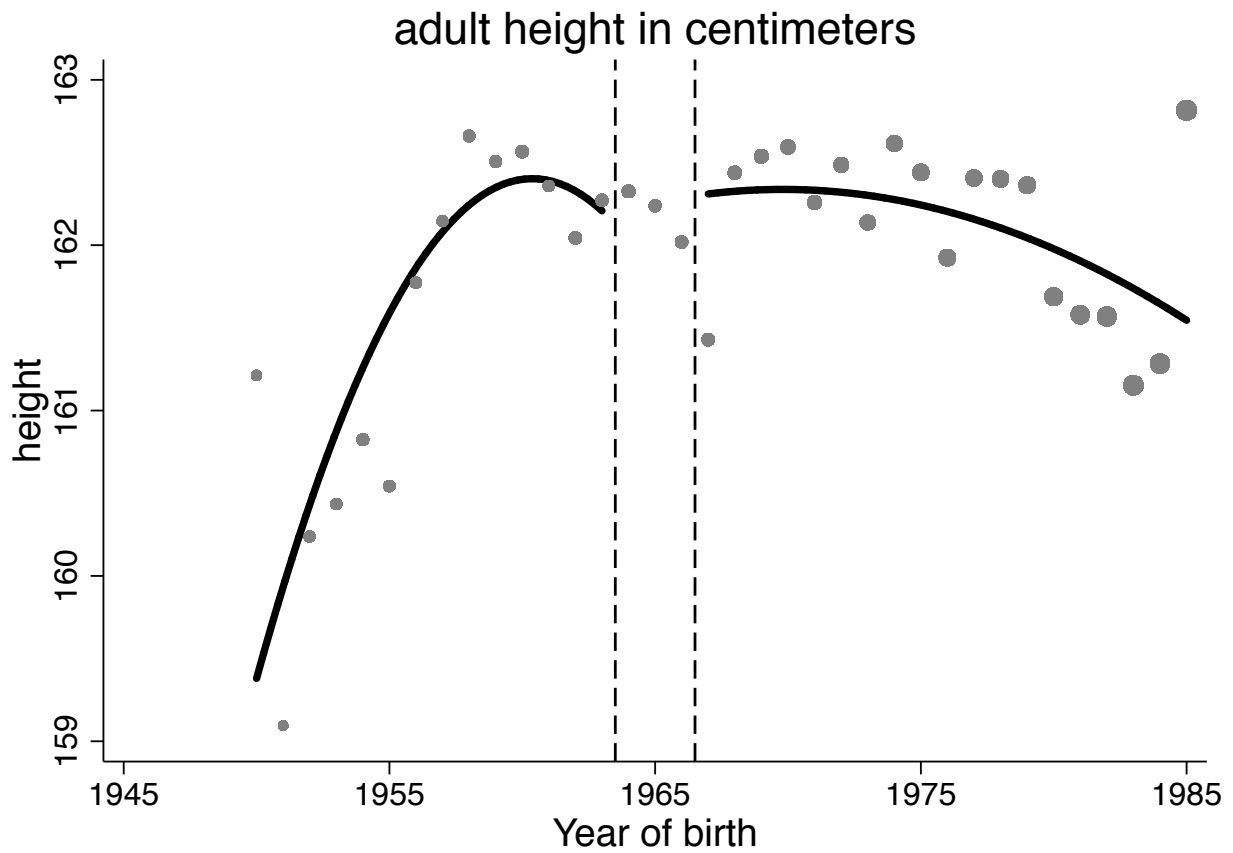
Figure 2: No difference in height around the reform

Notes: Data from 1994, 1999, 2005-06 and 2010-11 Demographic and Health Survey rounds in Zimbabwe. Adult height in centimeters variable is taken from the household member recode file. The relationship between birth year and adult height is modeled using a second degree local polynomial. All respondents under 20 at survey date are dropped to ensure that the comparison is restricted to those who have reached full adult height.

Table 4: Estimates of the effect of education on missing responses

	(1)	(2)	(3)	(4)
		Missing values of...		
	Voted	Contacted local councilor	Attended community meeting	Raised issue at meeting
Panel A: Reduced Form				
Secondary access	0.001	-0.002	0.009	-0.002
	(0.007)	(0.002)	(0.006)	(0.003)
Observations	1555	1329	1606	1246
Panel B: Reduced Form (without partially treated)				
Secondary access	0.002	-0.002	0.007	-0.004
	(0.007)	(0.002)	(0.007)	(0.003)
Observations	1247	1059	1278	985

Notes: All specifications are estimated using OLS, and include survey and age fixed effects. Specifications in Panels B exclude partially treated cohorts born between 1964 and 1966. Standard errors are clustered by district in all specifications. * denotes $p < 0.1$, ** denotes $p < 0.05$, *** denotes $p < 0.01$.
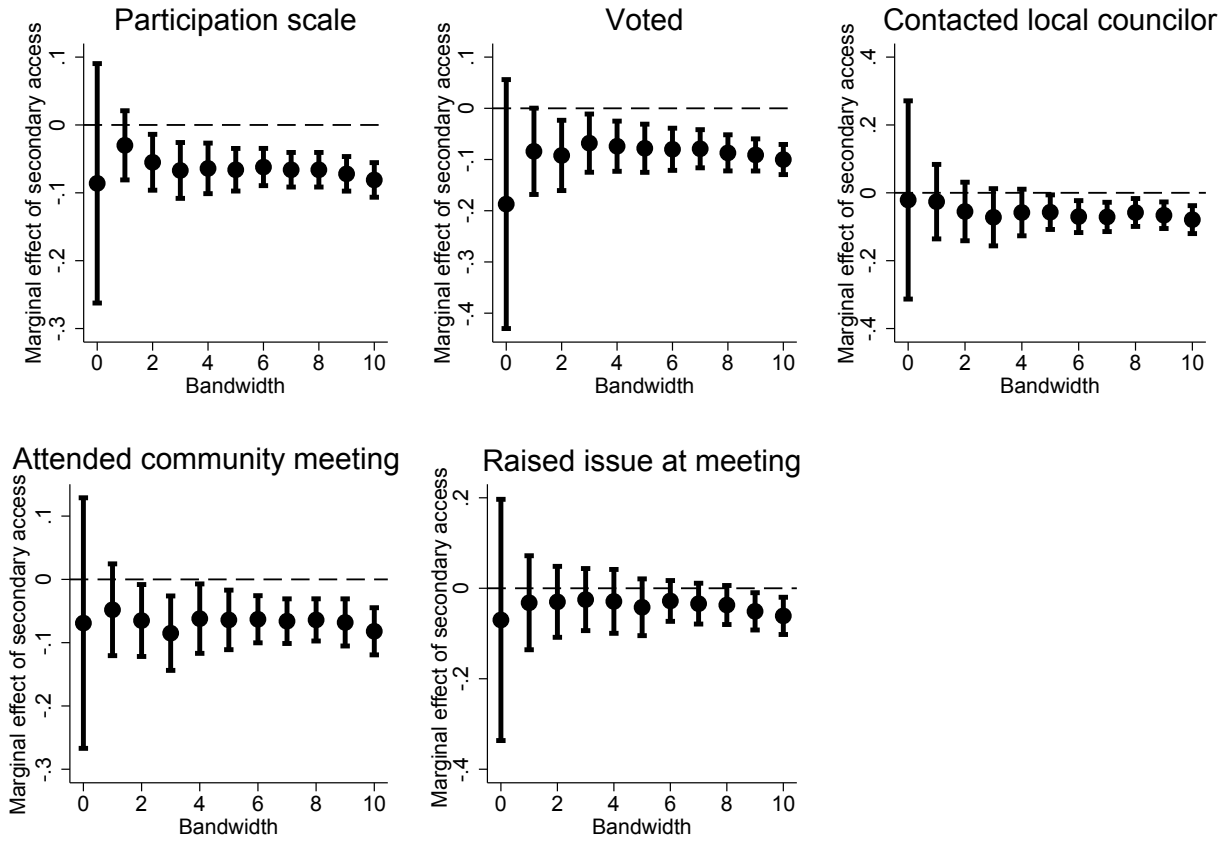
Figure 3: Reduced form estimates by bandwidth (95% confidence intervals)

Table 5: Estimates of the effect of education on political participation, including age fixed effects

	(1) Participation scale	(2) Voted	(3) Contacted local councilor	(4) Attended community meeting	(5) Raised issue at meeting
Panel A: Reduced form					
Secondary access	-0.080	-0.096	-0.116	-0.144**	-0.110
	(0.057)	(0.087)	(0.125)	(0.065)	(0.095)
Observations	1842	1532	1328	1589	1242
Panel B: Reduced form (without partially treated)					
Secondary access	-0.049	-0.036	-0.073	-0.129*	-0.084
	(0.055)	(0.065)	(0.142)	(0.065)	(0.090)
Observations	1296	1070	933	1120	877

Notes: All specifications are estimated using OLS, and include survey and age fixed effects. Specifications in Panels B exclude partially treated cohorts born between 1964 and 1966. Standard errors are clustered by district in all specifications. * denotes $p < 0.1$, ** denotes $p < 0.05$, *** denotes $p < 0.01$.

Table 6: Estimates of the effect of education on economic outcomes and political interest, before and after 2008

	Economic scale	Employed	Good living conditions	Poverty scale	News in public affairs	Interest
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Reduced form						
Secondary access	0.048***	0.102***	-0.053*	-0.034	0.074***	0.011
	(0.016)	(0.033)	(0.031)	(0.025)	(0.021)	(0.027)
Secondary access	0.017	-0.001	0.114**	-0.002	-0.024	0.054
× Survey since 2009	(0.027)	(0.046)	(0.048)	(0.033)	(0.031)	(0.042)
Observations	1842	1840	1480	1842	1840	1586
Panel B: Instrumental variables						
Education	0.069***	0.146***	-0.077*	-0.049	0.105***	0.017
	(0.021)	(0.046)	(0.046)	(0.033)	(0.027)	(0.039)
Education	0.032	0.008	0.171**	-0.006	-0.027	0.083
× Survey since 2009	(0.042)	(0.077)	(0.071)	(0.045)	(0.040)	(0.063)
Observations	1842	1840	1480	1842	1840	1586
First stage F statistic	38.1	38.0	33.2	38.1	38.2	30.2
Panel C: Reduced form (without partially treated)						
Secondary access	0.058***	0.125***	-0.046	-0.033	0.074***	0.009
	(0.016)	(0.031)	(0.030)	(0.026)	(0.022)	(0.029)
Secondary access	0.017	-0.017	0.114**	-0.015	-0.018	0.061
× Survey since 2009	(0.027)	(0.043)	(0.048)	(0.034)	(0.031)	(0.044)
Observations	1467	1465	1172	1467	1465	1262
Panel D: Instrumental variables (without partially treated)						
Education	0.084***	0.179***	-0.067	-0.047	0.104***	0.013
	(0.021)	(0.046)	(0.046)	(0.034)	(0.027)	(0.041)
Education	0.030	-0.017	0.172**	-0.026	-0.019	0.090
× Survey since 2009	(0.042)	(0.073)	(0.073)	(0.046)	(0.039)	(0.064)
Observations	1467	1465	1172	1467	1465	1262
First stage F statistic	39.6	39.5	35.0	39.6	39.9	33.5

Notes: All specifications in Panels A and C are estimated using OLS, and include survey fixed effects. All specifications in Panels B and D are estimated using 2SLS where access to schooling is used to instrument for education, and include survey fixed effects. All specifications include five cohorts either side of the cohorts fully affected or fully unaffected by the reform; Panels C and D exclude partially treated cohorts born between 1964 and 1966. Standard errors are clustered by district in all specifications. * denotes $p < 0.1$, ** denotes $p < 0.05$, *** denotes $p < 0.01$.

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Table 7: Estimates of the effect of education on support for democracy, before and after 2008

	(1) Support democracy	(2) Support liberal institutions
Panel A: Reduced form		
Secondary access	0.056*	0.021
	(0.033)	(0.024)
Secondary access	-0.010	0.002
× Survey since 2009	(0.043)	(0.033)
Observations	1840	1824
Panel B: Instrumental variables		
Secondary access	0.081*	0.031
	(0.045)	(0.034)
Secondary access	-0.010	0.004
× Survey since 2009	(0.056)	(0.047)
Observations	1840	1824
First stage F statistic	38.1	37.7
Panel C: Reduced form (without partially treated)		
Secondary access	0.062*	0.012
	(0.034)	(0.024)
Secondary access	-0.025	0.004
× Survey since 2009	(0.045)	(0.034)
Observations	1466	1455
Panel D: Instrumental variables (without partially treated)		
Education	0.088*	0.018
	(0.045)	(0.034)
Education	-0.033	0.008
× Survey since 2009	(0.058)	(0.049)
Observations	1466	1455
First stage F statistic	39.7	39.8

Note: See Table 6.

Table 8: Estimates of the effect of education on support for the government, before and after 2008

	(1) View of government scale	(2) Close to ZANU-PF	(3) Close to MDC	(4) Government trust and performance	(5) Perceived government corruption
Panel A: Reduced form					
Secondary access	-0.042	-0.085*	0.068*	-0.035	0.037**
	(0.030)	(0.047)	(0.038)	(0.032)	(0.017)
Secondary access	-0.011	0.037	0.041	0.005	-0.017
× Survey since 2009	(0.037)	(0.063)	(0.053)	(0.035)	(0.024)
Observations	1839	1699	1699	1822	1715
Panel B: Instrumental variables					
Education	-0.062*	-0.118**	0.094**	-0.051	0.049**
	(0.036)	(0.052)	(0.044)	(0.041)	(0.022)
Education	-0.021	0.039	0.085	0.004	-0.017
× Survey since 2009	(0.044)	(0.070)	(0.069)	(0.046)	(0.031)
Observations	1839	1699	1699	1822	1715
First stage F statistic	37.6	33.8	33.8	37.4	34.0
Panel C: Reduced form (without partially treated)					
Secondary access	-0.043	-0.090*	0.072*	-0.036	0.035*
	(0.030)	(0.048)	(0.040)	(0.032)	(0.018)
Secondary access	-0.003	0.054	0.031	0.019	-0.015
× Survey since 2009	(0.039)	(0.064)	(0.057)	(0.038)	(0.024)
Observations	1466	1356	1356	1452	1368
Panel D: Instrumental variables (without partially treated)					
Education	-0.062*	-0.122**	0.098**	-0.051	0.046**
	(0.036)	(0.051)	(0.045)	(0.042)	(0.023)
Education	-0.007	0.066	0.065	0.025	-0.014
× Survey since 2009	(0.047)	(0.072)	(0.073)	(0.051)	(0.031)
Observations	1466	1356	1356	1452	1368
First stage F statistic	39.4	36.0	36.0	39.6	36.0

Notes: See Table 6.

5 Mechanisms and testable implications in graphical form

Education increases economic outcomes and political interest
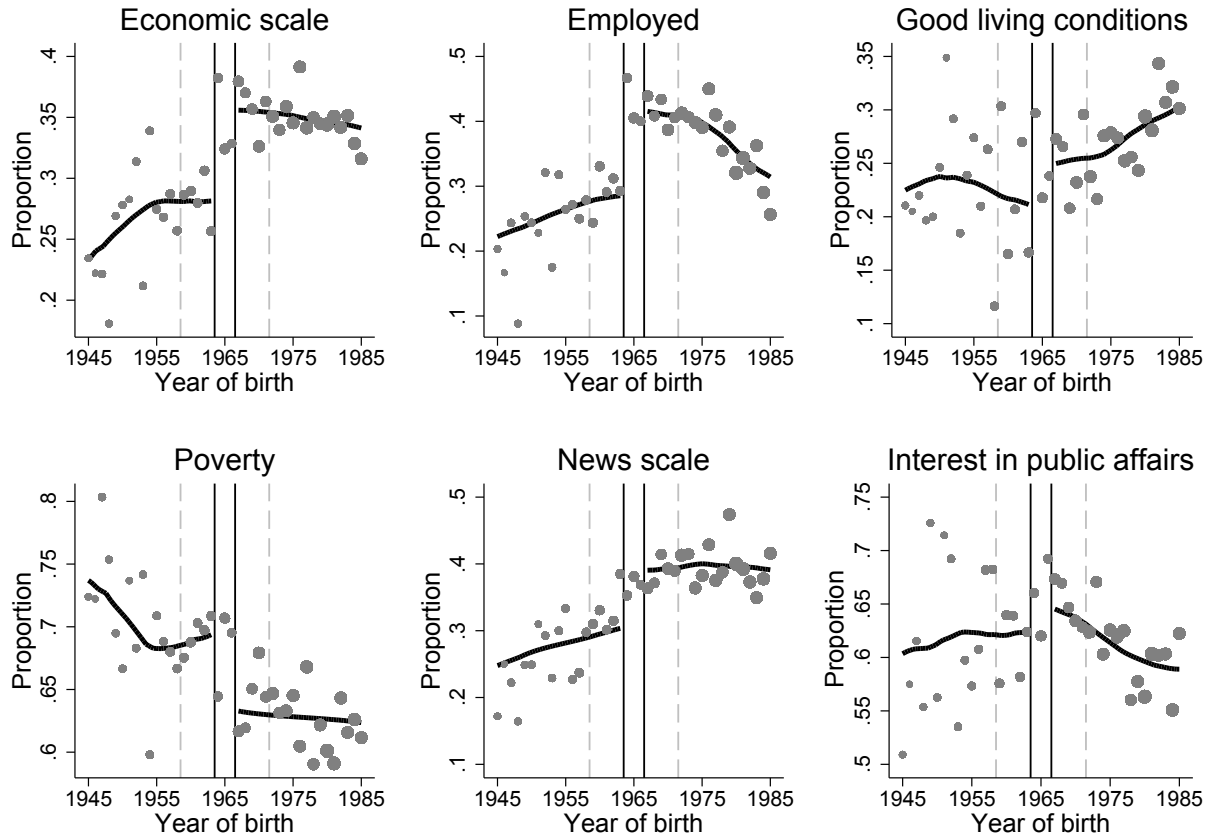

Figure 4: Trends in economic outcomes and political interest by cohort

Notes: Each grey dot represents the outcome mean for a given cohort (birth year). Large dots reflect larger samples sizes. Black lines are local polynomials fitted either side of the reform (indicated by the vertical dashed line). The vertical grey dashed lines indicate the bandwidth used for our main analysis.

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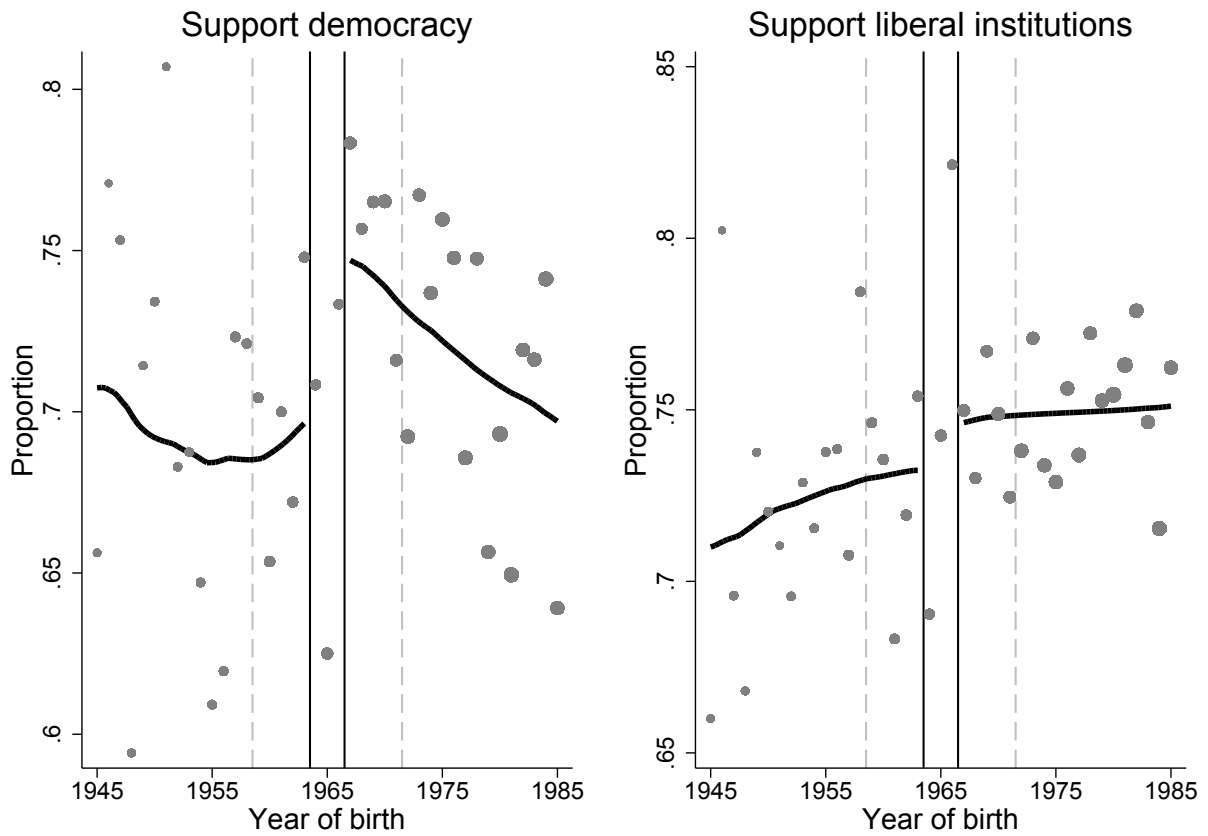**Education increases support for democratic institutions**

Figure 5: Trends in support for democracy in Zimbabwe by cohort

Notes: Each grey dot represents average education for a given cohort (birth year). Large dots reflect larger samples sizes. Black lines are local polynomials fitted either side of the reform (indicated by the vertical dashed line). The vertical grey dashed lines indicate the bandwidth used for our main analysis.

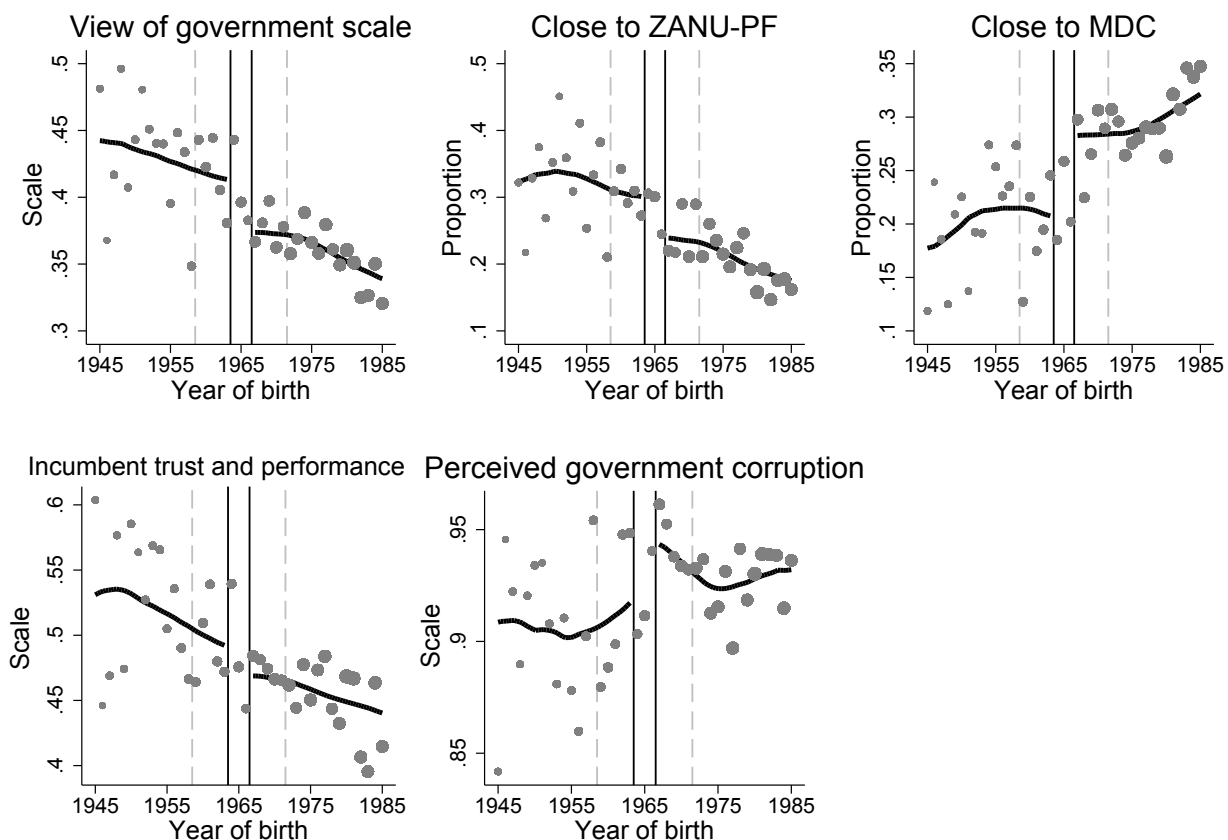# Education increases criticism of the incumbent regime

Figure 6: Trends in support for the government by cohort

Notes: Each grey dot represents average education for a given cohort (birth year). Large dots reflect larger samples sizes. Black lines are local polynomials fitted either side of the reform (indicated by the vertical dashed line). The vertical grey dashed lines indicate the bandwidth used for our main analysis.
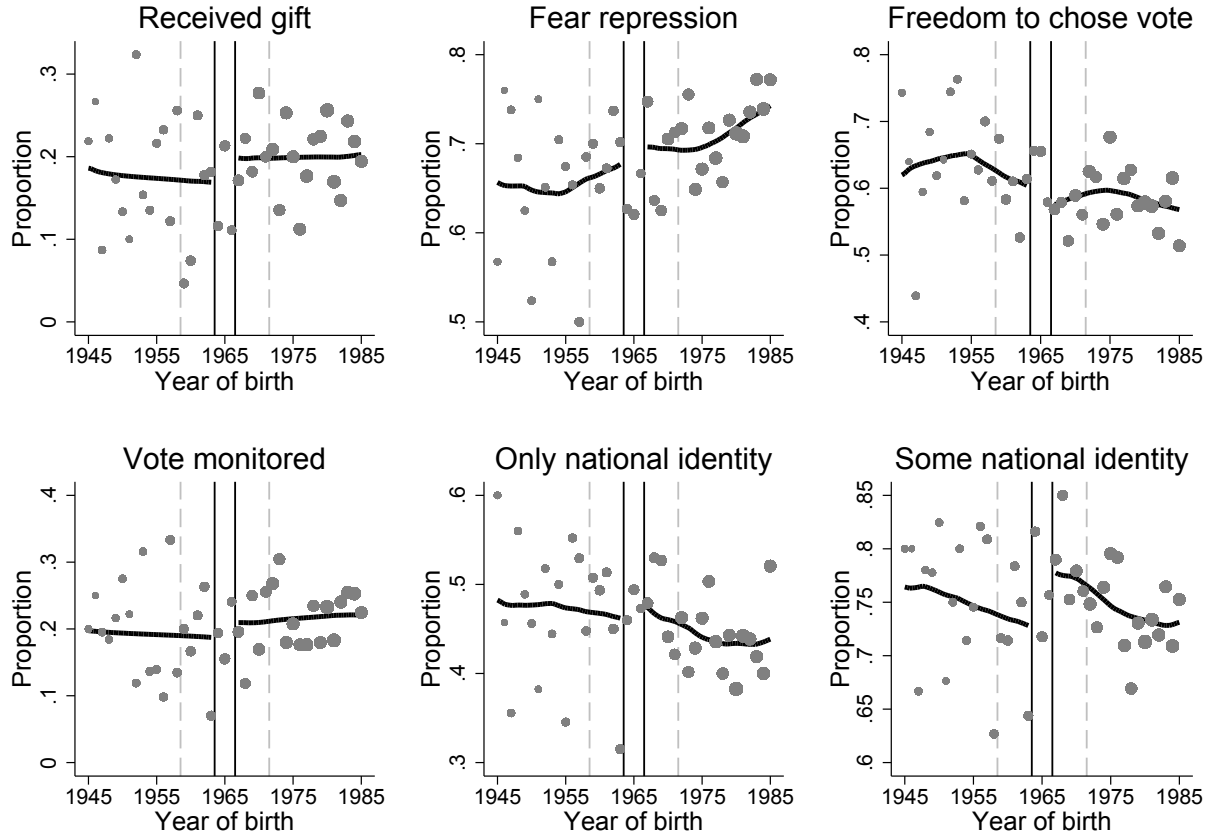
Alternative explanations

Figure 7: Trends in alternative explanations

Notes: Each grey dot represents average education for a given cohort (birth year). Large dots reflect larger samples sizes. Black lines are local polynomials fitted either side of the reform (indicated by the vertical dashed line). The vertical grey dashed lines indicate the bandwidth used for our main analysis.

6 Education and Turnout in Sub-Saharan Africa

Table 9 provides tentative evidence that our findings generalize to other Sub-Saharan African countries. In particular, we focus on anocracies, as defined by the Polity Project: closed anocracies are defined as countries with negative Polity V scores, while open anocracies are countries with Polity V scores between 1 and 5. We document a negative and significant correlation between schooling and respondent turn out in closed anocracies, but no correlation—almost precisely zero—in open

Table 9: Estimates of the effect of educational attainment on turnout across anocracies in Sub-Saharan Africa

	Closed Anocracies (1)	Open Anocracies (2)	Closed Anocracies (3)	Open Anocracies (4)
Schooling	-0.013**	0.001		
	(0.005)	(0.004)		
Secondary			-0.029*	0.010
			(0.016)	(0.012)
Observations	19,938	23,603	19,938	23,603

Notes: All specifications are estimated using OLS, include country and year fixed effects, and cluster standard errors by country. The samples in columns 1 and 3 are those of closed anocracies, and in columns 2 and 4 are open anocracies. Closed anocracies are those countries who have a Polity V score lower or equal than zero. In rounds 1 to 4 of the Afrobarometer, these are Burkina Faso (2008), Tanzania (2001, 2003, 2005, 2008), Uganda (2000, 2002, 2005, 2008) and Zimbabwe (1999, 2004, 2005). Open anocracies are those countries that have a Polity V score between 1 and 5. In rounds 1 to 4 of the Afromarometer, these are Ghana (1999), Lesotho (2000), Malawi (2003), Mozambique (2002, 2005, 2008), Nigeria (1999, 2003, 2005, 2008), Zambia (1999, 2003, 2005), and Zimbabwe (2009). Schooling is a scale of school completion that spans from 1 to 6: no or informal education (1), some primary schooling (2), primary school completed (3), some secondary schooling (4), secondary school completed (5), and some university education and above (6). Secondary is an indicator for whether an individual completed secondary school. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

anocracies. This findings closely mirror those in Zimbabwe, where education's effect on turnout was negative until the democratic opening in 2008. However, unlike our results for Zimbabwe, we should treat causal interpretations of the cross-country results with caution because the simple correlation between education and voter turnout could be confounded by other variables.