Getting out the Vote with Voting Advice Applications

Supplementary Information

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Contents

Appendix A: Figure 2

All estimates of VAA usage shown in Figure 2 in the paper are drawn from national and, in the case of the 2009 EU elections, from supranational election studies (Irwin, Holsteyn & Ridder 2003, Centraal Bureau voor de Statistiek (CBS), Stichting Kiezersonderzoek Nederland (SKON), Brinkman, Kolk, Aarts & Rosema 2007, Stichting Kiezersonderzoek Nederland (SKON), Centraal Bureau voor de Statistiek (CBS), Kolk, Aarts & Tillie 2012, Stichting Kiezersonderzoek Nederland (SKON), Centraal Bureau voor de Statistiek (CBS), Kolk, Tillie, Erkel, Velden & Damstra 2012, Paloheimo 2007, Borg & Grnlund 2011, Selects 2008, Selects 2012, Selects 2016, Egmond, Brug, Hobolt, Franklin & Sapir 2013, Rattinger, Roßteutscher, Schmitt-Beck & Weßels 2011, Rattinger, Roßteutscher, Schmitt-Beck, Weßels & Wolf 2014, Stubager, Hansen & Andersen 2014, Fournier, Cutler, Soroka & Stolle 2011, NZES 2014, Andreadis, Chadjipadelis & Teperoglou 2016, Marantzidis, Dinas, Konstantinidis, Gemenis, Nezi, Rori, Zafeiropoulos, Georgiadou, Kafe & Siakas 2017).

We provide data from all countries where election surveys allowed us to calculate (supra-)nationally representative estimates of the number of VAA users. We did not generally include data from other surveys, even if they included an item on VAA use. For example, we do not include an estimate from the 2010 Swedish election study because the VAA item was part of an additional mail-in survey with a response rate of a mere 50%. We made an exception to this general rule for the 2011 Canadian election study. This study had a pre- and post-election panel structure, and only the first wave was fully randomized. The VAA item was asked in the second, not fully randomized wave. However, the response rate for the second wave was 75%, which we considered sufficient for inclusion. Still, the Canadian estimate is clearly of comparatively low quality. We consistently weight estimates using survey weights where they are provided in the respective election studies. A caveat that has to be mentioned is that in the 2007 and 2011 Finnish election studies, respondents were not directly asked about VAA usage, but rather "how much attention" they paid to VAAs. We assumed that a respondent used a VAA if she indicated to have paid at least a "fair" amount of attention to VAAs.

Appendix B: Summary Statistics

Table A1: Variable descriptions and descriptive statistics (Selects 2007)

Variable	Selects	N	Min	Max	Item wording or description
Main model					
Turnout	f11100	4389	0	1	Usually about half of eligible voters turn out in federal elections. What about you, did you participate in the federal election of October 21, 2007? (Y/N/NA)
Smartvote usage	f13667	4377	0	1	In the weeks prior to the elections, did you use any of the following resources to inform yourself about the parties and candidates? The online election aid "smartvote". (Y/N/DK/NA)
Age	age	4392	18	96	Could you please indicate your age?
Education	educ_rr	4352	1	8	Which is the highest level of education you have attained?
Student	f21400	4368	0	1	What is your current job situation? In training (student, apprentice)
Female	sex	4392	0	1	Classified according to first name; if unclear the interviewer is asked to inquire.
Name of Swiss president	f16000	4380	0	1	What is the name of this years Federal President?
Number of signatures for initiative	f16100	4378	0	1	How many signatures are needed for a federal citizens' initiative?
Signed referendum	f12601	4309	0	1	Aside from elections and referendum votes, there are also other political activities. I am going to read a few to you. Could you please indicate each time whether you carried out the given activity within the last five years? Signing a citizens initiative or referendum. (Y/N/DK/NA)
Attended convention	f12602	4382	0	1	Aside from elections and referendum votes, there are also other political activities. I am going to read a few to you. Could you please indicate each time whether you carried out the given activity within the last five years? Participating in a political convention. (Y/N/DK/NA)

Collected signatures	f12603	4383	0	1	Aside from elections and referendum votes, there are also other political activities. I am going to read a few to you. Could you please indicate each time whether you carried out the given activity within the last five years? Collecting signatures. (Y/N/DK/NA)
Donated	f12604	4380	0	1	Aside from elections and referendum votes, there are also other political activities. I am going to read a few to you. Could you please indicate each time whether you carried out the given activity within the last five years? Donating to a political organisation. (Y/N/DK/NA)
Active in party	f12605	4386	0	1	Aside from elections and referendum votes, there are also other political activities. I am going to read a few to you. Could you please indicate each time whether you carried out the given activity within the last five years? Being active in a political party. (Y/N/DK/NA)
Active in PAC	f12606	4372	0	1	Aside from elections and referendum votes, there are also other political activities. I am going to read a few to you. Could you please indicate each time whether you carried out the given activity within the last five years? Being active in a political action committee. (Y/N/DK/NA)
Protested	f12607	4386	0	1	Aside from elections and referendum votes, there are also other political activities. I am going to read a few to you. Could you please indicate each time whether you carried out the given activity within the last five years? Participating in a demonstration. (Y/N/DK/NA)
Party identification	f14000	4360	0	1	How do you evaluate yourself: do you normally feel close to a political party? (Y/N/DK/NA)
Urban/rural	stla	4392	0	1	Whether respondents lives in urban or rural area.
Canton	f10000	4392	1	26	In what canton are you eligible to vote?
Lagged turnout	f10200	3843	0	1	There are federal elections every four years. The last election was in October 2003. Can you recall whether you participated in this election? (Y/N/not eligible to vote/DK/NA)
Referendum participation rate	f12500	4247	0	10	Apart from elections there are also votes on issues. Let us suppose there are 10 federal referendums in a year. In how many would you normally participate?
Sensitivity analysis					

Cantonal VAA		4392	0	1	Indicates the availability of a voting advice application for the last cantonal election in the canton where the respondent is eligible to vote.
Household income	f28910	3759	1	11	Could you indicate your rough household income?
Turnout in last cantonal election	f10500r	4025	0	1	Last spring/year/two years ago/three years ago, there were elections to the cantonal parliament in your canton. Could you tell me whether you participated in these elections? (Y/N/not eligible to vote/moved/DK/NA)
Political interest	f10100	4383	1	4	In general, how interested are you in politics? Are you "very interested", "rather interested", "rather not interested", or "not interested at all"?
Number of parties in national executive	f15900	4372	0	1	Could you indicate how many parties are represented in the Federal Council?
Number of seats in respondents constituency	f16200	4358	0	1	How many representatives (seats) has your canton in the National Council?
Party with most seats in lower chamber	f16300	4371	0	1	Prior to the election, which party used to have the most seats in the National Council?
Political discussions	f13305	3396	1	3	During the electoral campaign, did you discuss the elections of October 21 with somebody close to you, that is, with family, friends, or colleagues? (Y/N/DK/NA) How often did you do this? Would you say you discussed the elections "often", "sometimes", or "seldom"?
TV news	f13321	4383	0	7	How many days a week do you usually watch the news on TV?
Radio news	f13323	4374	0	7	How many days a week do you usually listen to the news on the radio?
Newspapers	f13322	4355	0	7	How many days a week do you usually read the political part of a newspaper?
Effective number of parties		4392	1	5.261	Effective number of parties elected to the National Council in 2007, by canton (Laakso/Taagepera index).
Additional variables					
Total survey weight	weightto	4389	.02	9.358	Accounts for survey design (canton & household oversampling), non-voter under-representation and party choice bias.

Appendix C: Additional Covariates

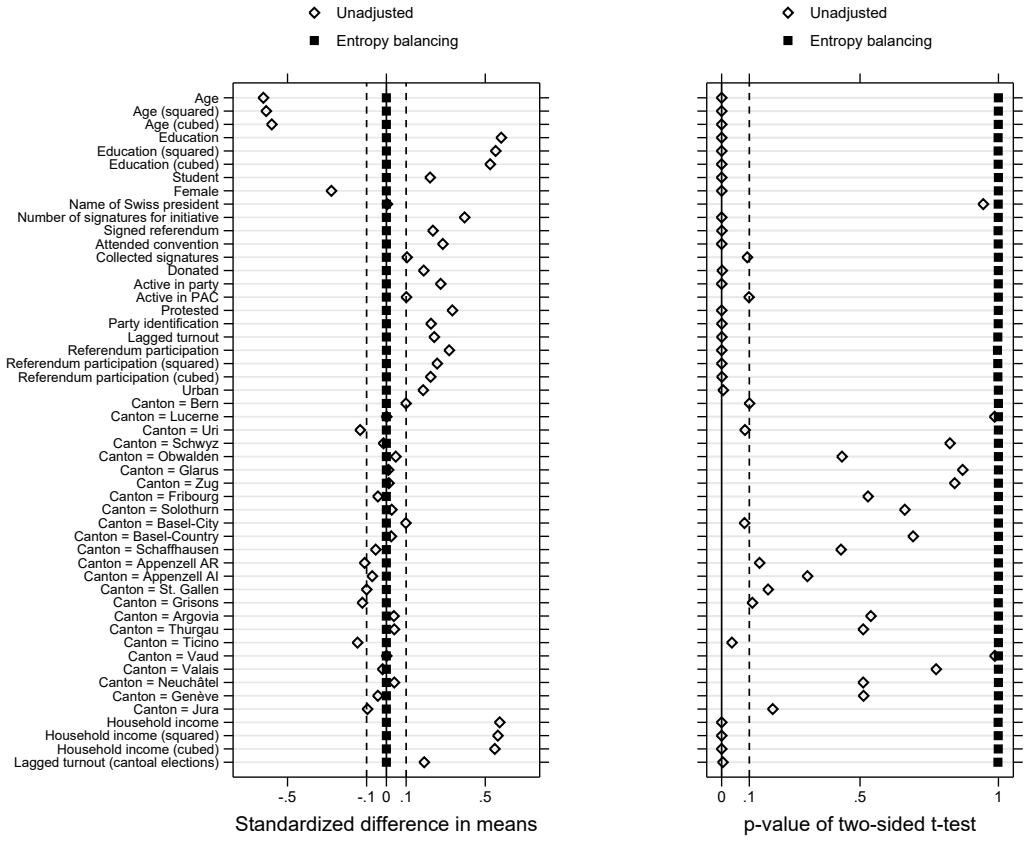
As reported in the paper, we added several additional covariates to our model to check whether our result still holds. The following covariates were added to the standard model: the standard political interest scale, the three previously excluded political knowledge items, turnout in the previous cantonal election, household income, the frequency a respondent engages in political discussions, and the frequency a respondent consumes political news on TV, in the radio, and in newspapers. Refer to Appendix B for variable descriptions. Analogously to the main model, we included squared and cubed terms of all polytomous and continuous variables to balance on the second and third moments, respectively, except for the cubed political discussions item, which is omitted due to collinearity problems. Note that the inclusion of the original political interest scale, the previously excluded political knowledge items, the frequency of political discussions, and the frequency of news consumption may induce (downward) post-treatment bias (PTB) because these variables could be affected by VAA use. The effect estimates remains almost unchanged if only those variables are added that are unproblematic regarding PTB (model 1), whereas it drops by 2.5 percentage points if all covariates are added (model 2). Covariate balance (which is excellent) is shown in Figures A1 and A2 and Table A2 gives the estimated treatment effects.

Table A2: Additional covariates

		ATT	
	N	Odds ratio	Δ probability of voting (pp)
Model 1	3009	1.818***	7.569***
(no PTB)		[1.212, 2.727]	[3.064, 12.074]
Model 2	2384	1.6**	5.295**
(PTB possible)		[1.025, 2.497]	[.72, 9.87]

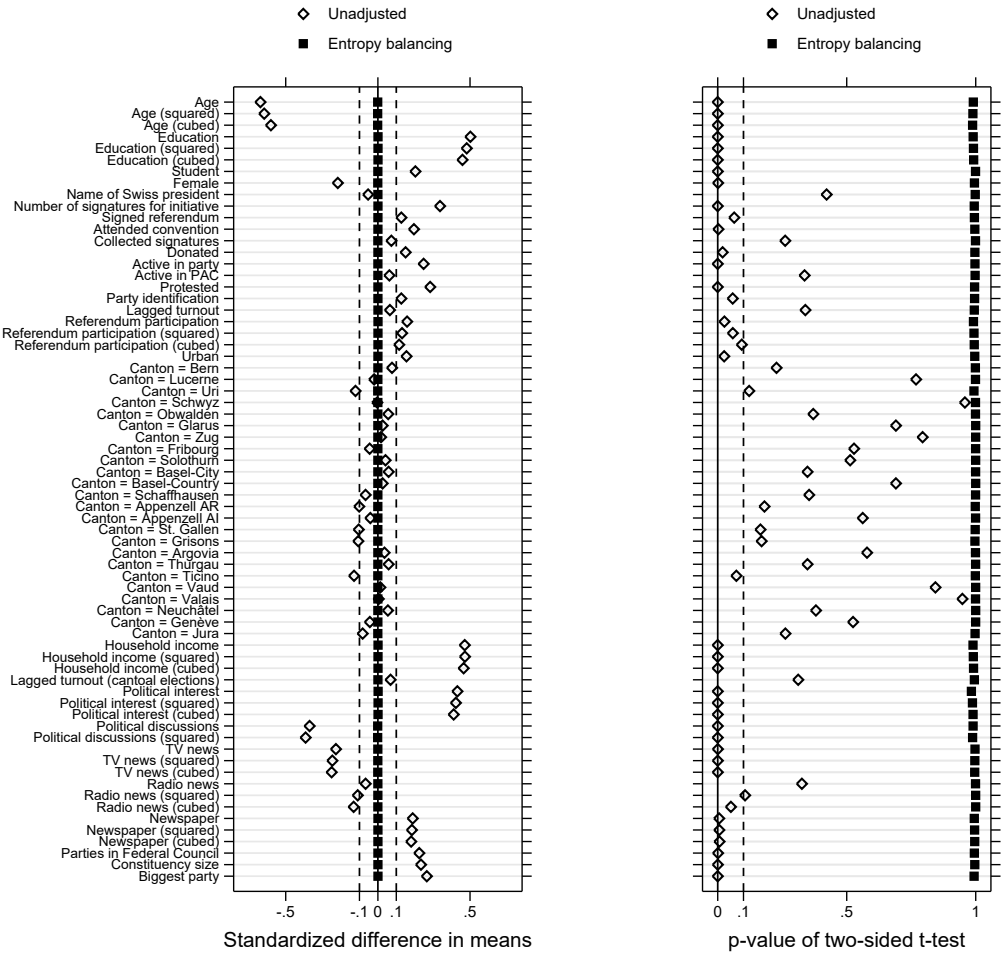
Note: The table shows the average treatment effect on the treated (ATT) of *smartvote* usage on turnout in the 2007 federal election if additional covariates are added to the specification. The ATT is given in both odds ratio and the implied change in the probability of voting (in percentage points). N stands for the number of observations. 95% confidence intervals are given in square brackets. *$p < .1$, **$p < .05$, ***$p < .01$.

Figure A1: Covariate balance in model 1



Note: The left panel gives the covariate-by-covariate standardized difference in means between the treatment and the control group before and after entropy adjustment. A zero standardized difference in means indicates identical means; negative/positive scores indicate a lower/higher mean in the treatment group. A standardized difference of less than | .1 | means acceptable balance (Austin 2011, 412). The right panel gives the p-value of covariate-by-covariate two-sided difference in means tests (t-tests) before and after entropy adjustment.

Figure A2: Covariate balance in model 2



Note: The left panel gives the covariate-by-covariate standardized difference in means between the treatment and the control group before and after propensity score weighting. A zero standardized difference in means indicates identical means; negative/positive scores indicate a lower/higher mean in the treatment group. A standardized difference of less than | .1 | means acceptable balance (Austin 2011, 412). The right panel gives the p-value of covariate-by-covariate two-sided difference in means tests (t-tests) before and after entropy adjustment.

Appendix D: Alternative Matching Estimators

Nearest neighbor matching: We re-ran the main model using both nearest neighbor matching based on the Mahalanobis distance metric (Cochran & Rubin 1973, Rubin 1980) and nearest neighbor matching based on the propensity score (Rosenbaum & Rubin 1983). The propensity score bases on a logistic regression of the treatment on the full set of covariates employed in the main model. To minimize selection bias, we matched treated units to control units 1:1 with replacement (Caliendo & Kopeining 2008, 41–42). For propensity score matching we imposed common support; all treated units turned out to be on common support. Figures A3 and A4 show the levels of covariate balance before and after matching. Covariate balance is clearly insufficient for Mahalanobis matching but better for propensity score matching, though not as good as after entropy adjustment. The ATT estimate (see Table A3) represents the difference in means between the control and treatment groups after matching. Following Abadie & Imbens (2006), we adjusted the variance estimate using heteroskedasticity-consistent standard errors. The five closest neighbors were used to calculate the conditional variance.

(Partial) exact matching: Exact matching of treated and control units in many ways constitutes the ideal matching method because it maximizes covariate balance. However, in many cases, including the present application, sufficient exact matches cannot be found, given the often large number of covariates and limited sample sizes (Stuart 2010). Therefore, we focus on a selection of crucial confounders, perform exact matching on these, and then use 1:1 nearest neighbor matching based on the Mahalanobis distance metric (with replacement) to account for remaining imbalances. The following variables—all important determinants of VAA use and/or turnout—were matched on exactly: age (divided into young (18–39 years old), middle-aged (40-64 years old), and old (above 65 years))[1], education, sex, party identification, and lagged turnout. As can be seen from Figure A5, covariate balance improves over Mahalanobis matching without exact matching, but remains inferior to entropy adjustment. The ATT estimate is reported in Table A3. Again, we employ heteroskedasticity-consistent standard errors, drawing on the five closest neighbors for calculating the conditional variance.

Coarsened exact matching: Coarsened exact matching (CEM) allows to perform a variant of exact matching on a broader range of covariates. Rather than performing exact matching directly on the covariates, the CEM routine first transforms the data into bins, as in a histogram, and then performs exact matching on the coarsened variables. Refer to Iacus, King & Porro (2012) for additional details. Following the recommendation in Blackwell, Iacus, King & Porro (2009, 527), we automatically coarsened dichotomous variables and manually coarsened ordinal and continuous variables (in our case: age, education, and participation rate in past referendums). We used four categories for age (22–30, 31–45, 46–65, and 65+); three categories for education (no education–secondary education, vocational training–high school, and higher vocational training–university education); and three categories for participation in past referendums (participation in 0–2 out of past 10 referendums; 3–9/10; and 10/10). We did not coarsen on squared/cubed

[1]Continuous age was included in the subsequent nearest neighbor matching to account for remaining imbalances.

age and education and the region dummies, but we adjust for them when estimating the treatment effect. Coarsened exact matching removes 199/299 treated units from the sample and 3,020/3,279 untreated units. Figure A6 shows the covariate balance before and after coarsened exact matching. Balance increases but remains imperfect. The ATT was estimated using OLS regression (with robust standard errors) weighted by the coarsened exact matching weights and adjusted for all covariates to remove remaining imbalances. We used OLS regression instead of logistic regression because some control variables perfectly explain the outcome after coarsening, leading to problems with quasi-separation. The estimated effect remains significant-positive if logistic regression is used instead. See Table A3 for the results.

Propensity score weighting: Propensity score weighting constitutes a re-weighting scheme similar to entropy adjustment. The ATT estimate (see Table A3) bases on a logistic regression of turnout on VAA usage weighted by the inverse of the propensity score and adjusted for all covariates to correct for remaining imbalances (with robust standard errors). Again, the propensity score was predicted using logistic regression. The inverse of the probability of treatment was calculated according to the formula in Austin (2011, 409). Figure A7 shows the covariate balance before and after propensity score weighting. The level of covariate balance is good but not as good as after entropy adjustment. Refer to Hirano & Imbens (2001) for an introduction to propensity score weighting.

Kernel matching: Kernel matching constitutes a re-weighting scheme similar to entropy adjustment. The ATT estimate (see Table A3) results from a logistic regression of turnout on VAA usage weighted by a non-parametric kernel weight based on the propensity score and adjusted for all covariates to correct for remaining imbalances (with robust standard errors). Again, the propensity score was predicted using logistic regression. Following Heckman, Ichimura & Todd (1997, 632), we employed an Epanechnikov function with .06 bandwidth for the estimation of the kernel weight. We imposed common support (all treated units turned out to be on common support). Figure A8 indicates the covariate balance before and after kernel matching. Again, the level of covariate balance is good but not as good as after entropy adjustment. See Heckman, Ichimura & Todd (1997) for additional details regarding kernel matching.

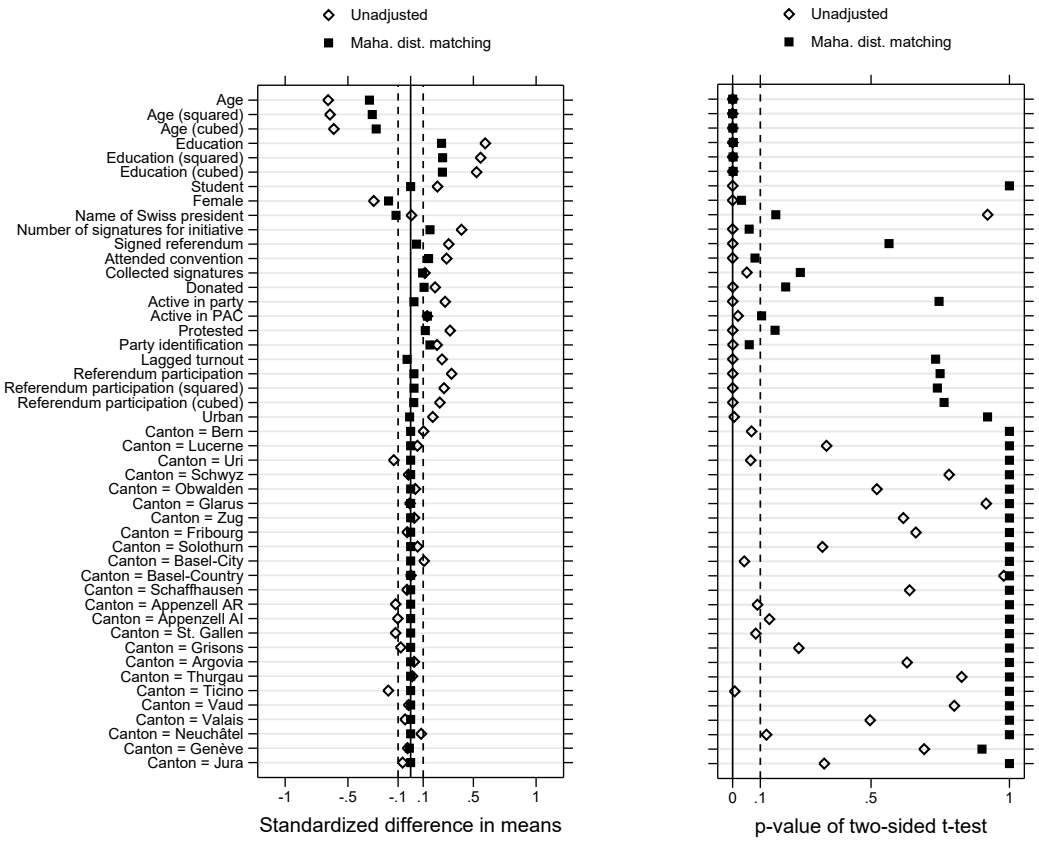
Local linear matching: Local linear matching constitutes a re-weighting scheme similar to entropy adjustment. The ATT estimate (see Table A3) bases on a logistic regression of turnout on VAA usage weighted by a non-parametric local linear regression weight based on the propensity score and adjusted for all covariates to correct for remaining imbalances (with robust standard errors). Again, the propensity score was estimated with logistic regression. Following Heckman, Ichimura & Todd (1997, 632), we employed the Tricube function with .06 bandwidth for the estimation of the local linear regression weight. We imposed common support (all treated units turned out to be on common support). Figure A9 indicates the covariate balance before and after local linear matching. Once more, the level of covariate balance is good but not as good as after entropy adjustment. See Heckman, Ichimura & Todd (1997) for additional details regarding local linear matching.

Table A3: Alternative matching estimators

		ATT	
	N	Odds ratio	Δ probability of voting (pp)
Mahalanobis distance matching	561	-	10.702*** [5.185, 16.219]
Propensity score matching	550	-	12.04*** [5.239, 18.841]
(Partial) exact matching	554	-	10.535*** [4.55, 16.521]
Coarsened exact matching	359	-	9.79*** [2.712, 16.868]
Propensity score weighting	3578	2.385*** [1.51, 3.766]	7.586*** [4.112, 11.061]
Kernel matching	3578	2.368*** [1.503, 3.73]	7.552*** [4.055, 11.05]
Local linear matching	3578	2.342*** [1.481, 3.703]	7.382*** [3.879, 10.867]

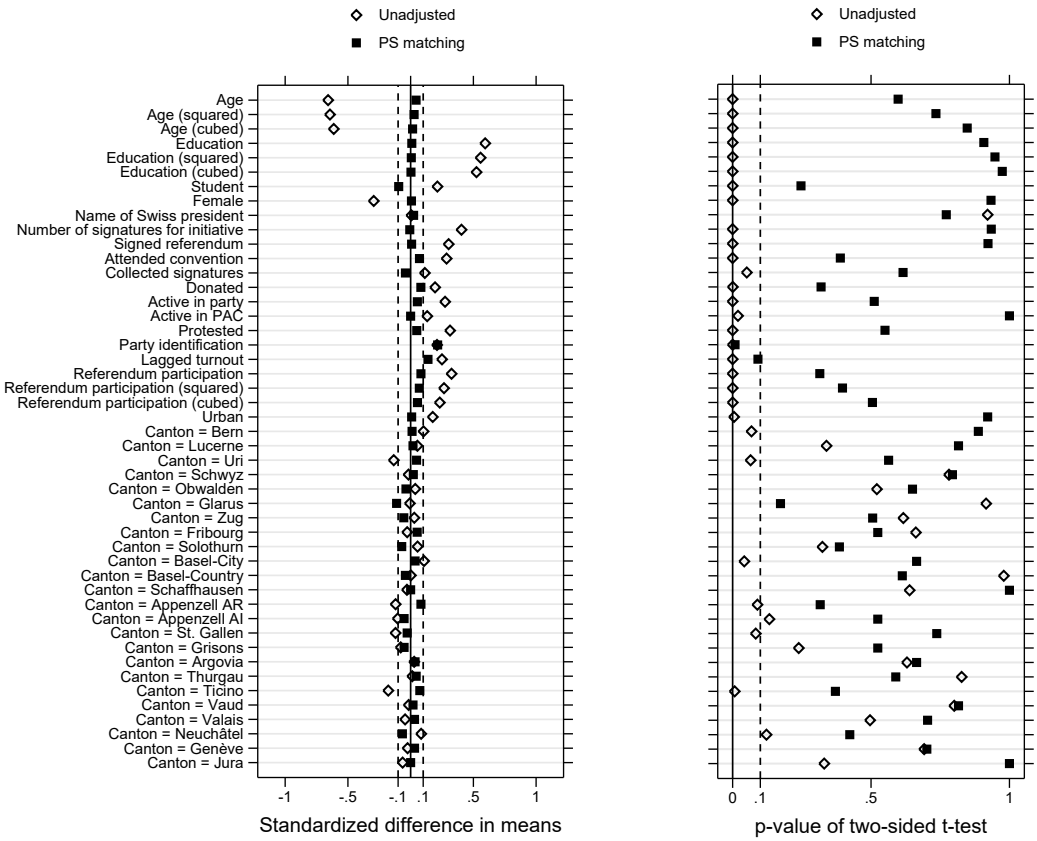
Note: The table shows the average treatment effect on the treated (ATT) of *smartvote* usage on turnout in the 2007 federal election after several alternative pre-processing techniques. Where available the ATT is given in both odds ratio and the change in the probability of voting (in percentage points). N stands for the number of observations. 95% confidence intervals are given in square brackets. *$p < .1$, **$p < .05$, ***$p < .01$.

Figure A3: Covariate balance after Mahalanobis distance matching



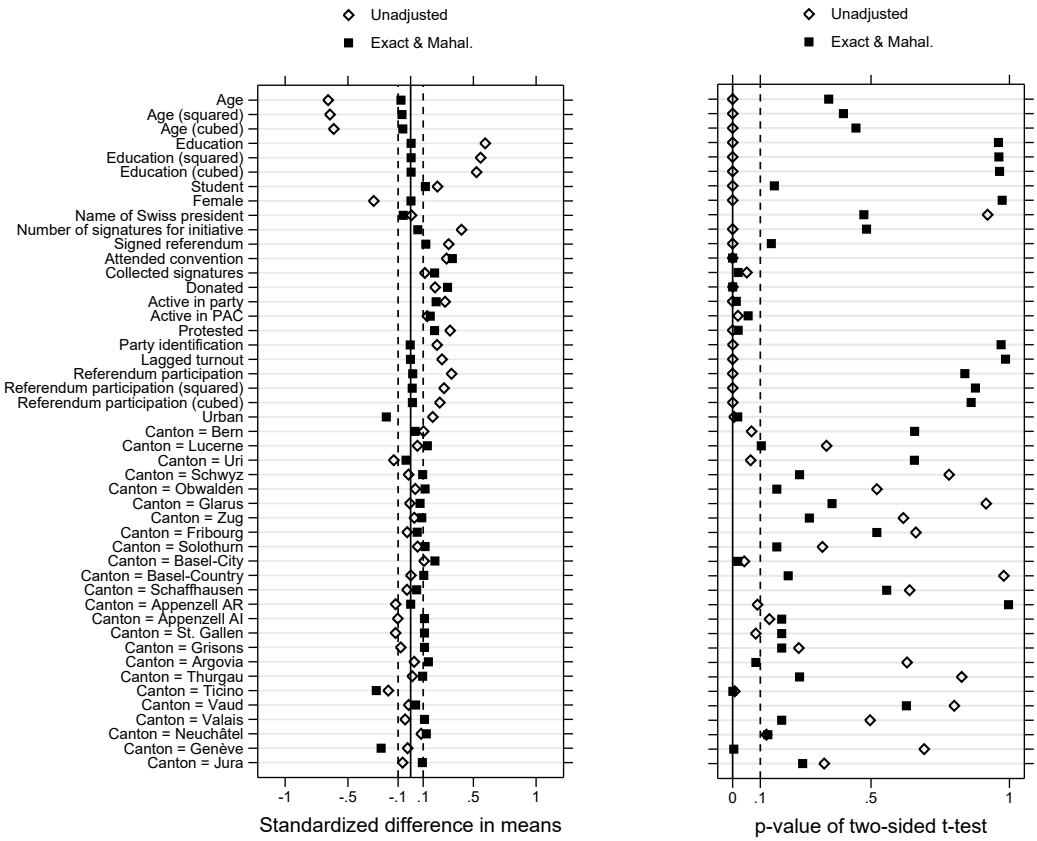
Note: The left panel gives the covariate-by-covariate standardized difference in means between the treatment and the control group before and after Mahalanobis distance matching (1:1 with replacement). A zero standardized difference in means indicates identical means; negative/positive scores indicate a lower/higher mean in the treatment group. A standardized difference of less than | .1 | means acceptable balance (Austin 2011, 412). The right panel gives the p-value of covariate-by-covariate two-sided difference in means tests (t-tests) before and after matching.

Figure A4: Covariate balance after propensity score matching



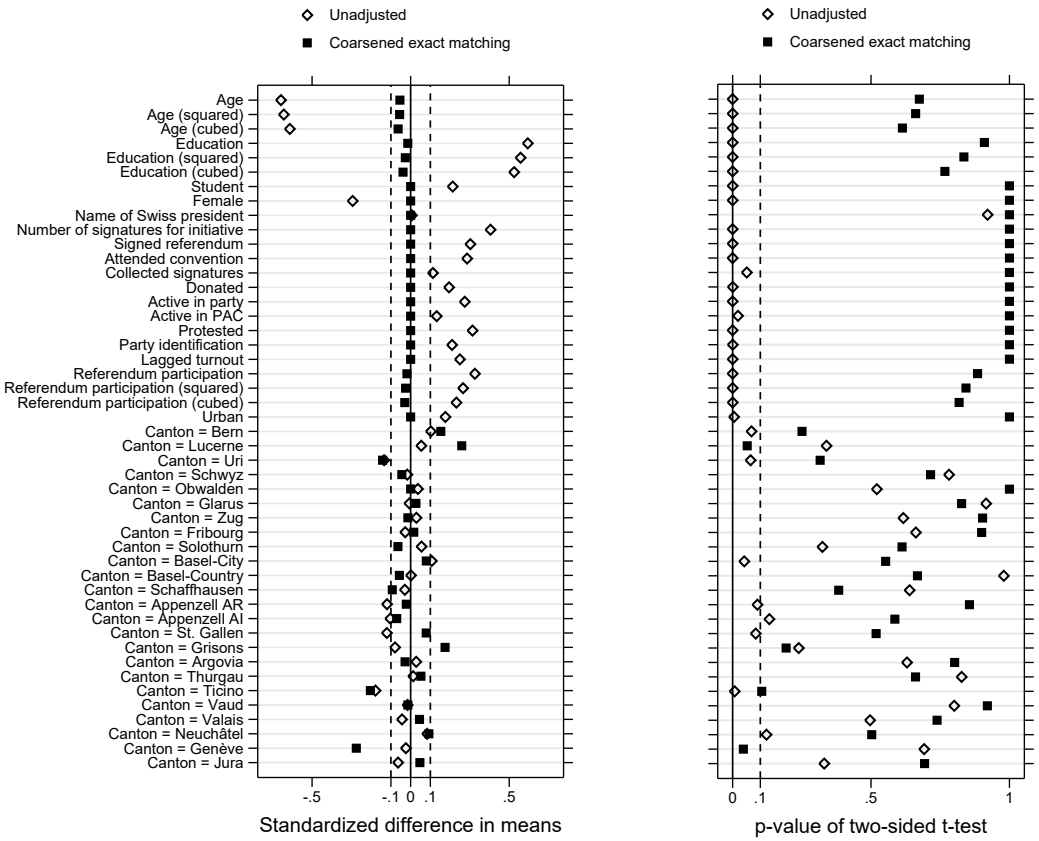
Note: The left panel gives the covariate-by-covariate standardized difference in means between the treatment and the control group before and after propensity score matching (1:1 with replacement). A zero standardized difference in means indicates identical means; negative/positive scores indicate a lower/higher mean in the treatment group. A standardized difference of less than | .1 | means acceptable balance (Austin 2011, 412). The right panel gives the p-value of covariate-by-covariate two-sided difference in means tests (t-tests) before and after propensity score matching.

Figure A5: Covariate balance after partial exact matching



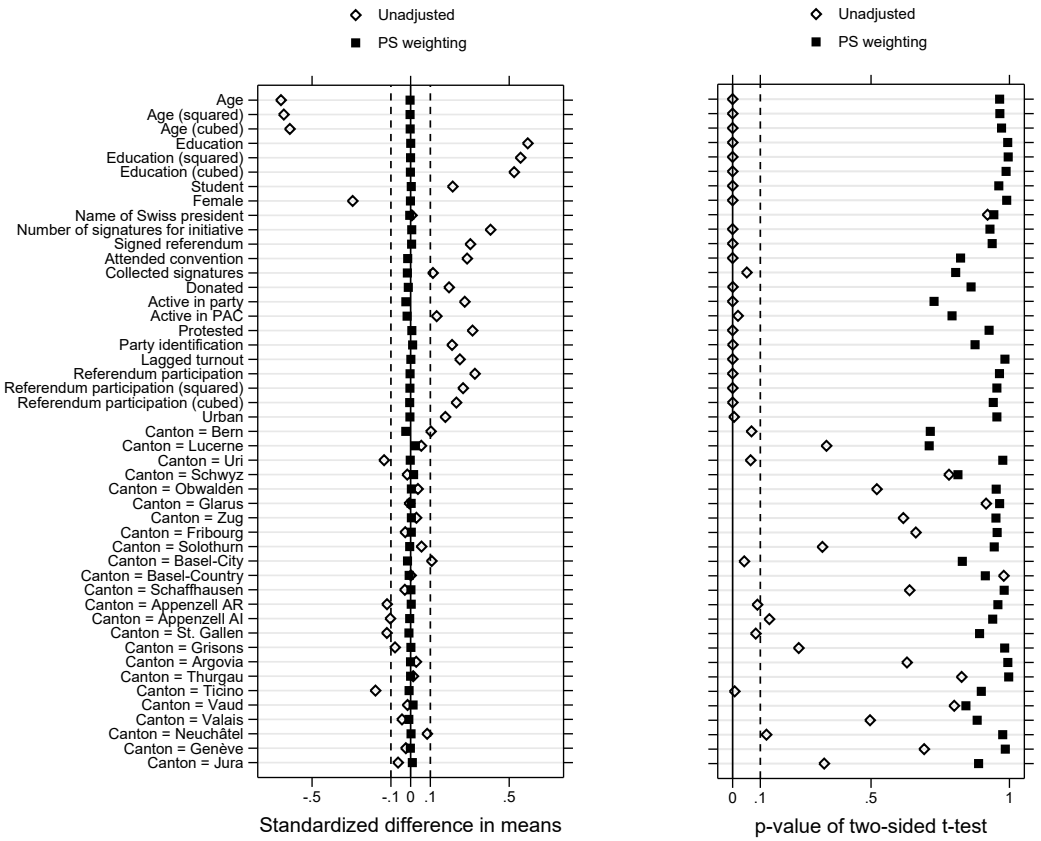
Note: The left panel gives the covariate-by-covariate standardized difference in means between the treatment and the control group before and after partial exact matching. A zero standardized difference in means indicates identical means; negative/positive scores indicate a lower/higher mean in the treatment group. A standardized difference of less than | .1 | means acceptable balance (Austin 2011, 412). The right panel gives the p-value of covariate-by-covariate two-sided difference in means tests (t-tests) before and after partial exact matching.

Figure A6: Covariate balance after coarsened exact matching



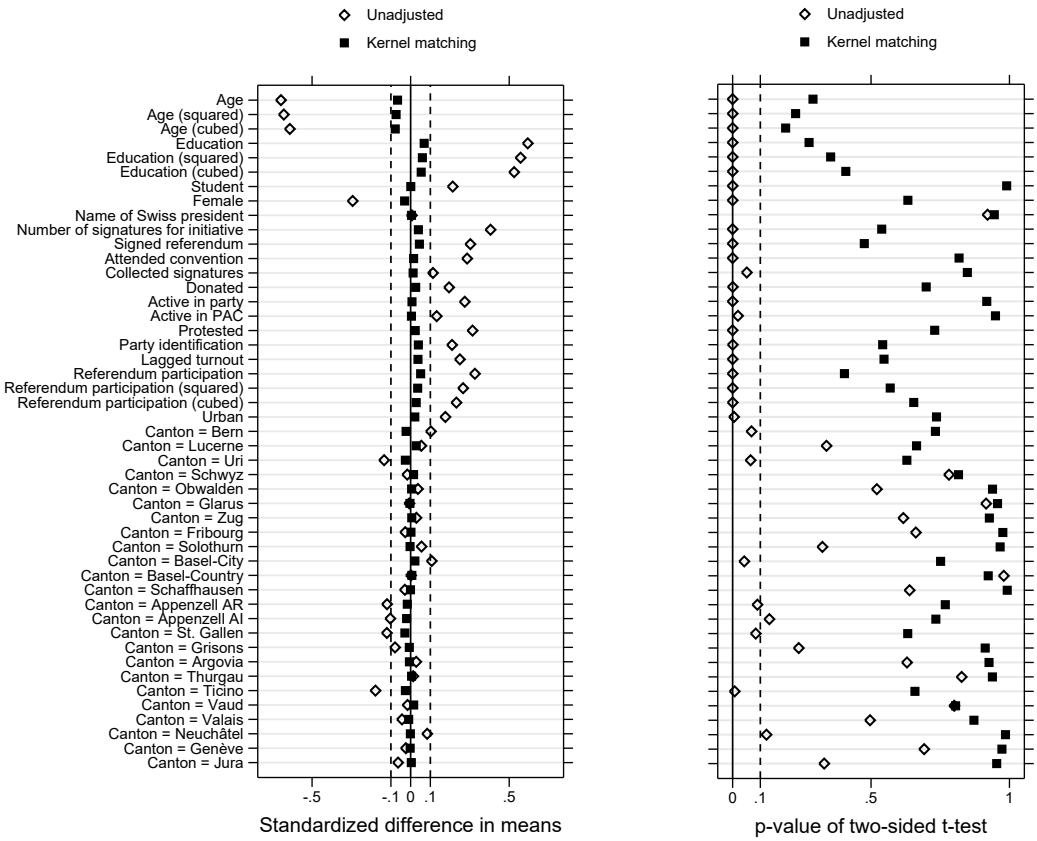
Note: The left panel gives the covariate-by-covariate standardized difference in means between the treatment and the control group before and after coarsened exact matching. A zero standardized difference in means indicates identical means; negative/positive scores indicate a lower/higher mean in the treatment group. A standardized difference of less than | .1 | means acceptable balance (Austin 2011, 412). The right panel gives the p-value of covariate-by-covariate two-sided difference in means tests (t-tests) before and after coarsened exact matching.

Figure A7: Covariate balance after propensity score weighting



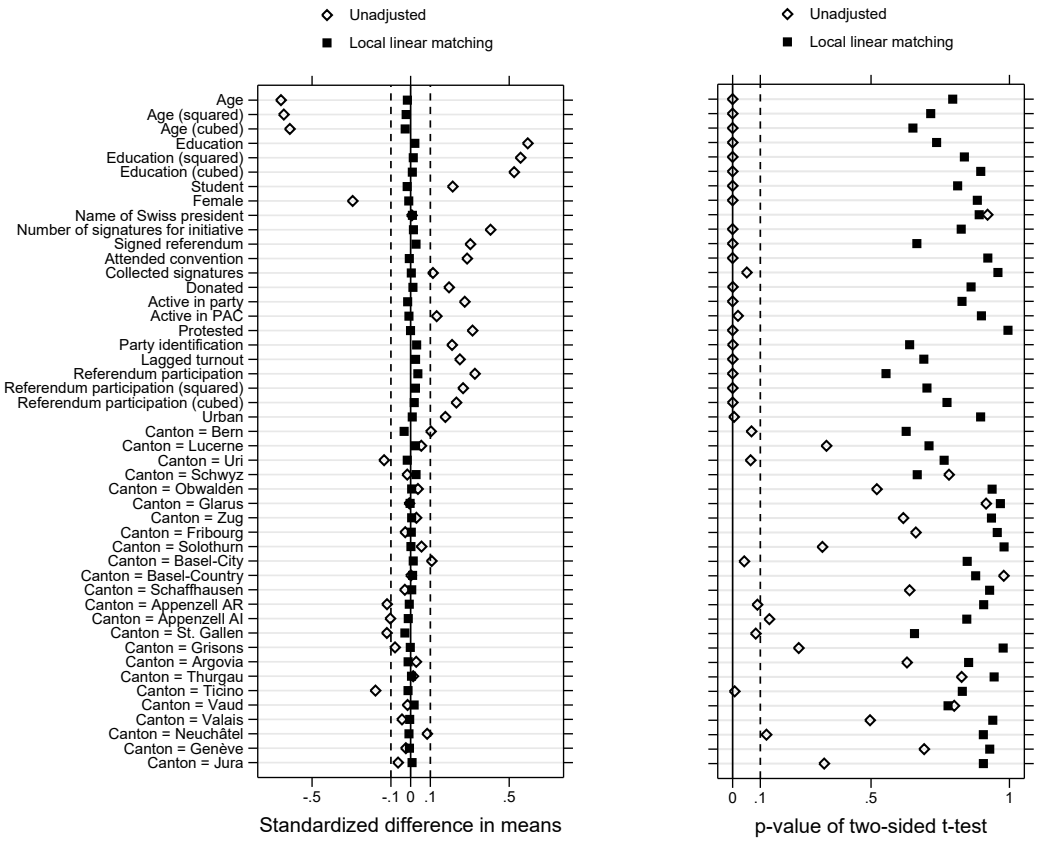
Note: The left panel gives the covariate-by-covariate standardized difference in means between the treatment and the control group before and after propensity score weighting. A zero standardized difference in means indicates identical means; negative/positive scores indicate a lower/higher mean in the treatment group. A standardized difference of less than | .1 | means acceptable balance (Austin 2011, 412). The right panel gives the p-value of covariate-by-covariate two-sided difference in means tests (t-tests) before and after propensity score weighting.

Figure A8: Covariate balance after kernel matching



Note: The left panel gives the covariate-by-covariate standardized difference in means between the treatment and the control group before and after propensity score weighting. A zero standardized difference in means indicates identical means; negative/positive scores indicate a lower/higher mean in the treatment group. A standardized difference of less than | .1 | means acceptable balance (Austin 2011, 412). The right panel gives the p-value of covariate-by-covariate two-sided difference in means tests (t-tests) before and after propensity score weighting.

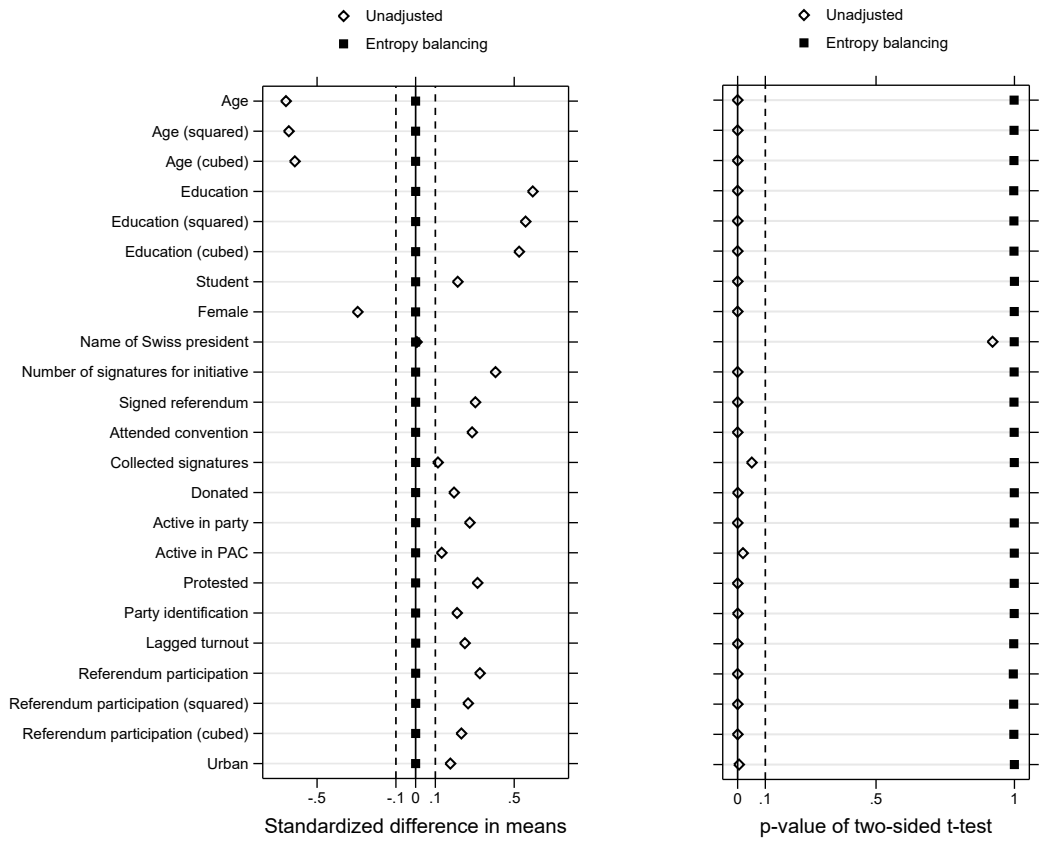
Figure A9: Covariate balance after local linear matching



Note: The left panel gives the covariate-by-covariate standardized difference in means between the treatment and the control group before and after propensity score weighting. A zero standardized difference in means indicates identical means; negative/positive scores indicate a lower/higher mean in the treatment group. A standardized difference of less than | .1 | means acceptable balance (Austin 2011, 412). The right panel gives the p-value of covariate-by-covariate two-sided difference in means tests (t-tests) before and after propensity score weighting.

Appendix E: Plausibility Check

Figure A10: Covariate balance for Figure 4 in the paper (interaction with effective number of parties)



Note: The left panel gives the covariate-by-covariate standardized difference in means between the treatment and the control group before and after entropy adjustment. A zero standardized difference in means indicates identical means; negative/positive scores indicate a lower/higher mean in the treatment group. A standardized difference of less than | .1 | means acceptable balance (Austin 2011, 412). The right panel gives the p-value of covariate-by-covariate two-sided difference in means tests (t-tests) before and after entropy adjustment.

Table A4: Regression output for Figure 4 in the paper (interaction with effective number of parties)

Variable	Odds ratio
VAA usage	.962
	[.335, 2.765]
Effective number of parties	1.103**
	[1.008, 1.206]
VAA usage*effective number of parties	1.202
	[.914, 1.582]
N	3578

Note: The table shows the odds ratios from a logistic regression (with robust standard errors and adjusted by entropy weights) of turnout on VAA usage conditional on a proxy for electoral complexity (effective number of parties). The constant is not shown. 95% confidence intervals are given in square brackets. *$p < .1$, **$p < .05$, ***$p < .01$.

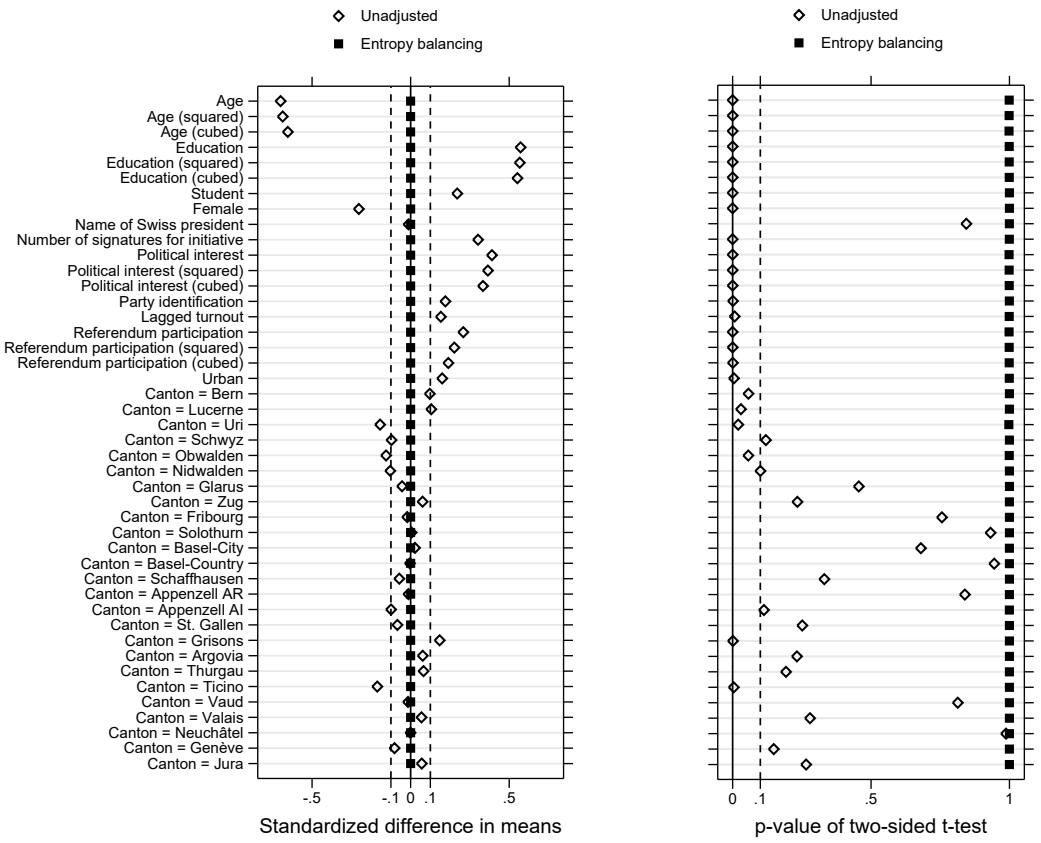
Table A5: Second differences for the effect of *smartvote* usage conditional on the number of effective parties

Effective no. of parties	$\Delta\Delta$ (pp)	95% CIs (pp)	90% CIs (pp)
1 → 5	7.681	[-7.474, 25.233]	[-5.157, 22.092]
1 → 4	6.784	[-5.826, 22.163]	[-3.993, 19.425]
1 → 3	5.276	[-4.041, 17.237]	[-2.747, 15.024]
1 → 2	3.029	[-2.105, 9.852]	[-1.411, 8.610]
2 → 5	4.651	[-5.389, 15.521]	[-3.774, 13.662]
2 → 4	3.755	[-3.738, 12.441]	[-2.579, 10.859]
2 → 3	2.246	[-1.943, 7.419]	[-1.338, 6.464]
3 → 5	2.405	[-3.424, 8.272]	[-2.428, 7.263]
3 → 4	1.509	[-1.798, 5.062]	[-1.259, 4.438]
4 → 5	0.897	[-1.636, 3.241]	[-1.168, 2.867]

Reading example: The effect of *smartvote* usage increases by 7.681 percentage points when the effective number of parties shifts from 1 to 5, but the (second) difference is not statistically significant, with the 95% confidence interval stretching from -7.474 points to 25.233 points.

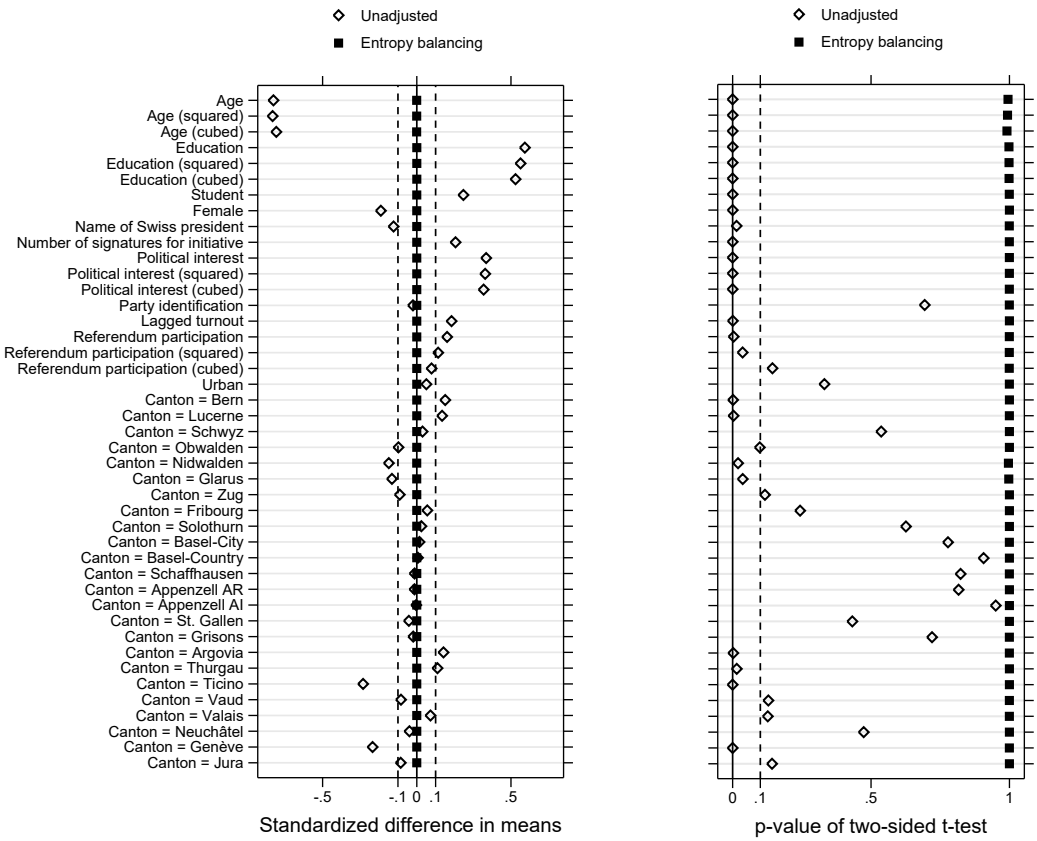
Appendix F: Replication 2011 and 2015 federal elections

Figure A11: Covariate balance (Selects 2011 model reported in Table 3 in the paper)



Note: The left panel gives the covariate-by-covariate standardized difference in means between the treatment and the control group before and after entropy adjustment. A zero standardized difference in means indicates identical means; negative/positive scores indicate a lower/higher mean in the treatment group. A standardized difference of less than | .1 | means acceptable balance (Austin 2011, 412). The right panel gives the p-value of covariate-by-covariate two-sided difference in means tests (t-tests) before and after entropy adjustment.

Figure A12: Covariate balance (Selects 2015 model reported in Table 3 in the paper)



Note: The left panel gives the covariate-by-covariate standardized difference in means between the treatment and the control group before and after entropy adjustment. A zero standardized difference in means indicates identical means; negative/positive scores indicate a lower/higher mean in the treatment group. A standardized difference of less than | .1 | means acceptable balance (Austin 2011, 412). The right panel gives the p-value of covariate-by-covariate two-sided difference in means tests (t-tests) before and after entropy adjustment.

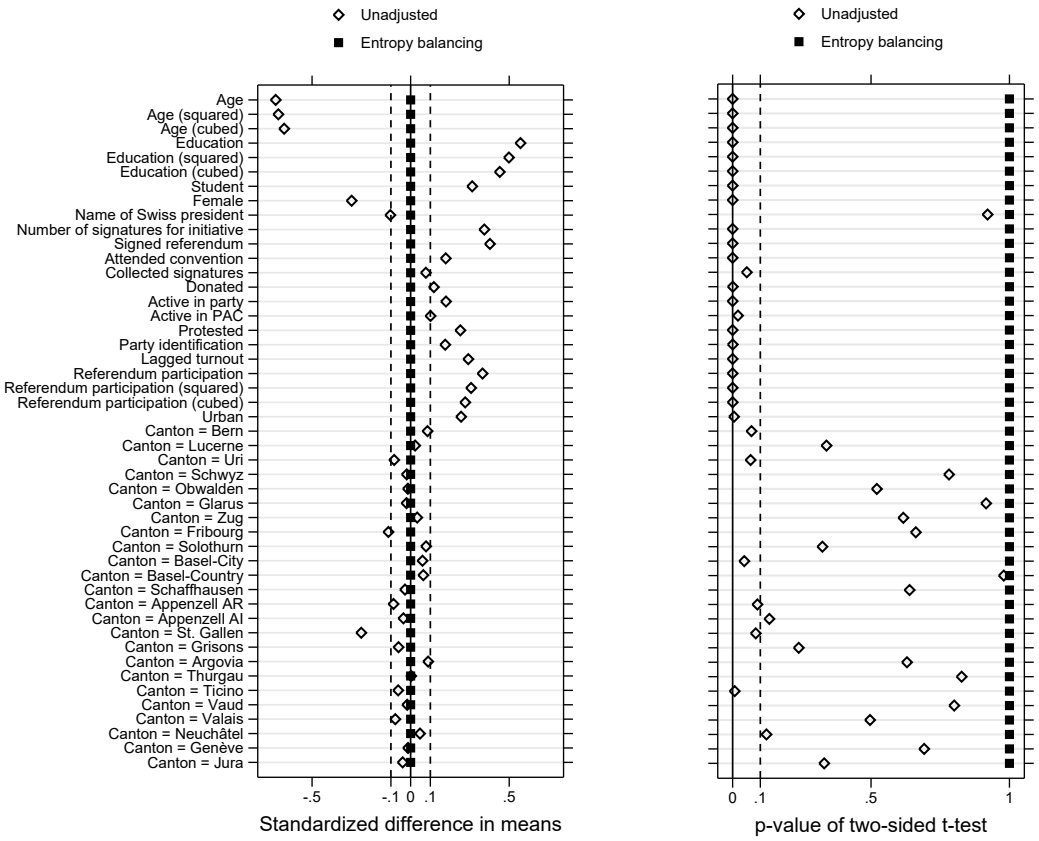
Appendix G: Representative Effect Estimate

Table A6: Nationally representative VAA mobilization effect

		ATT	
	N	Odds ratio	Δ probability of voting (pp)
Entropy balancing	3578	1.881** [1.118, 3.163]	13.578*** [3.452, 23.704]

Note: The table shows the average treatment effect on the treated (ATT) of *smartvote* usage on turnout in the 2007 federal election, based on a logistic regression weighted by entropy balancing weights and the Selects survey weight (with robust standard errors). The ATT is given in both odds ratio and the change in the probability of voting (in percentage points). 95% confidence intervals are given in square brackets. * $p < .1$, ** $p < .05$, *** $p < .01$.

Figure A13: Covariate balance (model with survey weights)



Note: The left panel gives the covariate-by-covariate standardized difference in means between the treatment and the control group before and after entropy adjustment. A zero standardized difference in means indicates identical means; negative/positive scores indicate a lower/higher mean in the treatment group. A standardized difference of less than | .1 | means acceptable balance (Austin 2011, 412). The right panel gives the p-value of covariate-by-covariate two-sided difference in means tests (t-tests) before and after entropy adjustment.

Appendix H: VAA Use X Age/Education

Table A7: Interactions with age and education (regression output for Figure 5 in the paper)

	N	Odds ratio
Age interaction	3578	
VAA usage		2.101 [.576, 7.656]
Age		1.037*** [1.027, 1.046]
VAA usage*age		.997 [.966, 1.028]
Education interaction	3578	
VAA usage		1.259 [.512, 3.092]
Education		1.142*** [1.078, 1.211]
VAA usage*education		1.078 [.911, 1.275]

Note: The table shows the odds ratios from two entropy-adjusted logistic regressions (with robust standard errors) on turnout in the 2007 federal election wherein VAA usage is interacted with age and education, respectively. The constant is not shown 95% confidence intervals are given in square brackets. *$p < .1$, **$p < .05$, ***$p < .01$.

Table A8: Second differences for the effect of *smartvote* usage conditional on age

Age			ΔΔ (pp)	95% CIs (pp)	90% CIs (pp)
30	→	90	-9.801	[-22.114, 0.141]	[-19.332, -1.407]
30	→	75	-8.509	[-19.965, 1.568]	[-17.710, -0.123]
30	→	60	-6.468	[-15.949, 2.877]	[-14.345, 1.252]
30	→	45	-3.557	[-9.602, 3.026]	[-8.680, 1.873]
45	→	90	-6.244	[-12.684, -2.004]	[-10.704, -2.629]
45	→	75	-4.952	[-10.356, -1.056]	[-9.003, -1.635]
45	→	60	-2.910	[-6.440, -0.042]	[-5.704, -0.497]
60	→	90	-3.333	[-6.348, -1.450]	[-5.135, -1.729]
60	→	75	-2.041	[-4.001, -0.802]	[-3.325, -0.982]
75	→	90	-1.292	[-2.374, -0.514]	[-2.000, -0.636]

Reading example: The effect of *smartvote* usage decreases by 8.509 percentage points when age shifts from 30 to 75. The second difference misses the 5% threshold of statistical significance [95% confidence interval: -19.965, 1.568], but it is significant at the 10% level [90% confidence interval: -17.710, -0.123].

Table A9: Second differences for the effect of *smartvote* usage conditional on education

Education			ΔΔ (pp)	95% CIs (pp)	90% CIs (pp)
1	→	8	1.943	[-13.790, 19.313]	[-11.374, 16.409]
1	→	5	2.468	[-9.099, 16.283]	[-7.443, 13.844]
1	→	3	1.798	[-4.919, 10.172]	[-3.992, 8.685]
3	→	8	0.145	[-8.880, 9.604]	[-7.379, 7.904]
3	→	5	0.670	[-4.165, 6.176]	[-3.435, 5.221]
5	→	8	-0.525	[-4.722, 3.457]	[-3.966, 2.825]

Reading example: The effect of *smartvote* usage increases by 1.943 percentage points when a respondent's level of education shifts from 1 (compulsory education only) to 8 (university education), but the (second) difference is not statistically significant, with the 95% confidence interval stretching from -13.790 points to 19.313 points.

References

Abadie, Alberto & Guido W. Imbens. 2006. "Large sample properties of matching estimators for average treatment effects." *Econometrica* 74:235–267.

Andreadis, Ioannis, Theodore Chadjipadelis & Eftichia Teperoglou. 2016. "Hellenic Voter Study 2012." Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], doi: 10.3886/E100022V6.

Austin, Peter C. 2011. "An introduction to propensity score methods for reducing the effects of confounding in observational studies." *Multivariate Behavioral Research* 46:399–424.

Blackwell, Matthew, Stefano Iacus, Gary King & Giuseppe Porro. 2009. "cem: Coarsened exact matching in Stata." *Stata Journal* 9:524–546.

Borg, Sami & Kimmo Grnlund. 2011. "Finnish National Election Study 2011 [computer file]. FSD2653, version 2.1 (2013-01-22)." Helsinki: Taloustutkimus [data collection]. Election Study Consortium [producer]. Tampere: Finnish Social Science Data Archive [distributor].

Caliendo, Marco & Sabine Kopeining. 2008. "Some practical guidance for the implementation of propensity score matching." *Journal of Economic Surveys* 22:31–72.

Centraal Bureau voor de Statistiek (CBS), Stichting Kiezersonderzoek Nederland (SKON), Martha Brinkman, Henk van der Kolk, Kees Aarts & Martin Rosema. 2007. "Nationaal Kiezersonderzoek, NKO 2006." DANS. `http://dx.doi.org/10.17026/dans-x7h-hmh5` [July 1, 2014].

Cochran, William G. & Donald B. Rubin. 1973. "Controlling bias in observational studies: A review." *Sankhya* 35:417–446.

Egmond, Marcel van, Wouter van der Brug, Sara Hobolt, Mark Franklin & Eliyahu V. Sapir. 2013. "European Parliament Election Study 2009, Voter Study." GESIS Data Archive, Cologne. ZA5055 Data file Version 1.1.0, doi:10.4232/1.11760.

Fournier, Patrick, Fred Cutler, Stuart Soroka & Dietlind Stolle. 2011. "The 2011 Canadian Election Study. [dataset]." Kingston: Canadian Opinion Research Archive (CORA), Queen's University. [distributor].

Heckman, James J., Hidehiko Ichimura & Petra E. Todd. 1997. "Matching as an econometric evaluation estimator: Evidence from evaluating a job training programme." *Review of Economic Studies* 64:605–654.

Hirano, Keisuke & Guido W. Imbens. 2001. "Estimation of causal effects using propensity score weighting: An application of data on right hear catherization." *Health Services and Outcomes Research Methodology* 2:259–278.

Iacus, S.M., Gary King & G. Porro. 2012. "Causal inference without balance checking: Coarsened exact matching." *Political Analysis* 20:1–24.

Irwin, Galen A., Joop J.M. van Holsteyn & Josje M. den Ridder. 2003. "Nationaal Kiezersonderzoek, NKO 2002 2003." DANS. http://dx.doi.org/10.17026/dans-zk3-7d56 [July 1, 2014].

Marantzidis, Nikos, Elias Dinas, Iannis Konstantinidis, Kostas Gemenis, Roula Nezi, Lamprini Rori, Kostas Zafeiropoulos, Vasiliki Georgiadou, Anastasia Kafe & Giorgos Siakas. 2017. "Collective Action of Indignant Citizens in Greece." GESIS-Leibniz Institute for the Social Sciences [dis- tributor], doi: 10.7802/1594.

NZES. 2014. "2014 New Zealand Election Study." http://www.nzes.org/exec/show/index May 25, 2017].

Paloheimo, Heikki. 2007. "Finnish National Election Study 2007 [computer file]. FSD2269, version 1.1 (2012-01-05)." Helsinki: Taloustutkimus [data collection]. The Political Participation and Modes of Democracy: Finland in a Comparative Perspective Research Group [producer]. Tampere: Finnish Social Science Data Archive [distributor].

Rattinger, Hans, Sigrid Roßteutscher, Rüdiger Schmitt-Beck & Bernhard Weßels. 2011. "Post-election Cross Section (GLES 2009)." GESIS Datenarchiv, Cologne. ZA5301 Datenfile Version 4.0.0, doi:10.4232/1.10998.

Rattinger, Hans, Sigrid Roßteutscher, Rüdiger Schmitt-Beck, Bernhard Weßels & Christof Wolf. 2014. "Post-election Cross Section (GLES 2013)." GESIS Data Archive, Cologne. ZA5701 Data file Version 1.0.0, doi:10.4232/1.11875.

Rosenbaum, Paul R. & Donald B. Rubin. 1983. "The central role of the propensity score in observational studies for causal effects." *Biometrika* 70:41–55.

Rubin, Donald B. 1980. "Bias reduction using Mahalanobis-metric matching." *Biometrics* 36:293–298.

Selects. 2008. "Swiss Electoral Studies (Selects) 2007: Post-Election Survey." Distributed by FORS, Lausanne, 2009. www.selects.ch [January 18, 2016].

Selects. 2012. "Swiss Electoral Studies (Selects) 2011: Post-Election Survey." Distributed by FORS, Lausanne, 2012. www.selects.ch [January 18, 2016].

Selects. 2016. "Swiss Electoral Studies (Selects) 2015: Post-Election Survey." Distributed by FORS, Lausanne, 2012. www.selects.ch [July 21, 2016].

Stichting Kiezersonderzoek Nederland (SKON), Centraal Bureau voor de Statistiek (CBS), Henk van der Kolk, Jean N. Tillie, P. van Erkel, M. van der Velden & A. Damstra. 2012. "Dutch Parliamentary Election Study 2012 – DPES 2012." DANS. http://dx.doi.org/10.17026/dans-x5h-akds [July 1, 2014].

Stichting Kiezersonderzoek Nederland (SKON), Centraal Bureau voor de Statistiek (CBS), Henk van der Kolk, Kees Aarts & Jean N. Tillie. 2012. "Nationaal Kiezersonderzoek, 2010 – NKO 2010." DANS. http://dx.doi.org/10.17026/dans-xvh-tghy [July 1, 2014].

Stuart, Elizabeth. 2010. "Matching methods for causal inference: A review and a look forward." *Statistical Science* 25:1–21.

Stubager, Rune, Kasper M. Hansen & Jørgen G. Andersen. 2014. "Election Study 2011. [dataset]." http://www.valgprojektet.dk/default.asp [July 1, 2014].