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Working Paper

Voting Advice Applications and Elections

CESifo Working Paper, No. 8868

Provided in Cooperation with:

Ifo Institute – Leibniz Institute for Economic Research at the University of Munich

Suggested Citation: Benesch, Christine; Heim, Rino L.; Schelker, Mark; Schmid, Lukas D. (2021) : Voting Advice Applications and Elections, CESifo Working Paper, No. 8868, Center for Economic Studies and Ifo Institute (CESifo), Munich

This Version is available at:

<https://hdl.handle.net/10419/232465>

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Impressum:

CESifo Working Papers

ISSN 2364-1428 (electronic version)

Publisher and distributor: Munich Society for the Promotion of Economic Research - CESifo GmbH

The international platform of Ludwigs-Maximilians University's Center for Economic Studies and the ifo Institute

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Editor: Clemens Fuest

<https://www.cesifo.org/en/wp>

An electronic version of the paper may be downloaded

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Voting Advice Applications and Elections

Abstract

We analyze how the introduction of the voting advice application (VAA) *smartvote* affects voter turnout, voting behavior and electoral outcomes. The Swiss context offers an ideal setting to identify the causal effects of online information with aggregate real world data because *smartvote* was introduced in different cantons at different points in time. In contrast to previous experimental studies, we find that *smartvote* did not affect turnout but that voters more actively select candidates instead of parties by splitting their ballot. Our findings suggest that no specific parties seem to benefit from the change in voting behavior and we find no effects on aggregate electoral outcomes.

JEL-Codes: D700, D720.

Keywords: elections, information, internet.

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We thank Andrea de Angelis, Micha Germann, Stefan Marschall, and Daniel Schwarz for helpful comments. We are grateful to Daniel Schwarz (Politools) for valuable information and data on the introduction of *smartvote*. Funding for this research was generously provided by the Swiss National Science grant #100017 163135 and by the WiPol Fund of the University of St. Gallen.

1 Introduction

The advancement of the internet has sparked a debate over its impact on politics (Boxell, Gentzkow, and Shapiro 2017; Gavazza, Nardotto, and Valletti 2019). While the internet has displaced other media with more news content, such as newspapers, television and radio, it also helps voters gather political information. In the context of elections and referendums, Voting Advice Applications (VAAs) have become popular in almost all democratic countries over the last decade. VAAs are internet-based applications that help voters find candidates and parties that are closest to their own policy positions. Early studies have documented that citizens who use VAAs are more likely to participate in elections (Ladner, Fivaz, and Pianzola 2012; Dinas, Trechsel, and Vassil 2014) and also adapt their political behavior more often than voters who do not use VAAs (Israel, Marschall, and Schultze 2017). The literature, however, has pointed out that it is unclear whether VAAs make voters more active or whether active voters are more likely to use VAAs. More recent studies have thus explored the impact of VAAs using experiments (Pianzola et al. 2019). These experimental studies can help us understand the mechanisms at the voter level but remain silent on the overall impact of VAAs in large elections because they focus on a small set of the electorate, mostly students, and rely on self-stated survey answers.

This paper estimates the causal effect of VAAs on voter turnout, voting behavior, and electoral outcomes in real-world elections using a difference-in-differences design. We use data on Swiss cantons that introduced the exact same VAA technology, *smartvote*, at different points in time between 1995–2018. Furthermore, we use individual level data from the federal elections 2007, 2011 and 2015 for a characterization of the *smartvote* user and a detailed analysis of their voting behavior. A comparison of *smartvote* users and non-users shows that turnout is 16.9 percentage points higher among *smartvote* users than among non-users. The typical *smartvote* user tends to be male, young, with a university degree, lives in an urban region, supports the left parties, has a high political knowledge and a strong interest in politics. Our causal findings provide evidence that the introduction of *smartvote* does not lead to higher turnout but affects voting behavior. In particular, voters include significantly more candidates from other parties. This effect is more pronounced among voters of parties whose supporters modify their ballot less often. The main findings are robust when we control for selective treatment timing and dynamic treatment effects. Even though, the VAA *smartvote* gives an information advantage to small parties, individual candidates and challengers relative to the situation without *smartvote*, we do not find a statistically significant

effect on the vote share of incumbents nor on the electoral outcomes of the four main political parties. Finally, the results of the individual data help us understand why we do not observe effects on electoral outcomes. The exchange of votes between the main four political parties is a zero-sum game in which no party has a substantial net benefit from modified ballots.

Our paper contributes to the literature on the effects of VAAs on turnout and electoral outcomes. Early studies in this literature found a positive correlation between VAAs usage and voter turnout (Ladner, Fivaz, and Pianzola 2012; Dinas, Trechsel, and Vassil 2014). However, these papers suffer from methodological problems, such as sampling bias and selection bias (see Pianzola (2014a) and Gemenis and Rosema (2014) for a detailed discussion). To account for differences in observable characteristics between voters who use VAAs and those who do not, scholars have used matching estimators and selection models (Gemenis and Rosema 2014; Pianzola 2014b; 2014a; Germann and Gemenis 2019). These studies find smaller effects of VAAs on voter turnout or voting behavior. The recent literature on VAAs has conducted experiments to address possible differences in unobservables between users and non-users of VAAs. Garzia, Trechsel, and De Angelis (2017) use data on Italy and find that self-stated turnout rates are 10.7 percentage points higher for VAA users. Pianzola et al. (2019) explore the impact of VAAs using data on Switzerland and document that VAAs increase the intention to vote for the most preferred party and also increases the number of parties considered as potential vote options. Our paper advances this literature by focusing on observed, rather than self-reported, voting behavior in real-world large elections.

Our paper also contributes to the literature on the impact of technological change on elections (Card and Moretti 2007; Fujiwara 2015). Studies in this literature find that the two most recent changes in the media landscape, the introduction of the television and the internet, had a negative effect on turnout (Gentzkow 2006; Falck, Gold, and Heblich 2014). Economists and political scientists have debated whether the introduction of the internet also affects voting behavior. Sunstein (2001) has expressed the concern that the internet will increase ideological polarization and threaten democracy. For the United States, however, Gentzkow and Shapiro (2011) show that ideological segregation on the internet is lower than face-to-face interactions in social networks but higher than in newspaper consumption. This finding is consistent with Boxell, Gentzkow, and Shapiro (2017) who show that ideological polarization has increased the most among the demographic groups least likely to use the internet and social media. Our findings indicate that VAAs, an important internet-based technological advance in recent years, do not increase ideological polarization but rather lead voters to choose candidates from a more diverse set of parties.

The remainder of the paper is organized as follows. Section 2 explains the features of *smartvote* in the context of Swiss cantonal elections and presents the data. Section 3 introduces the empirical strategy. Section 4 presents our main results and robustness checks. Section 5 concludes.

2 Theory

When voters chose parties and candidates, information is an important driver of both turnout and electoral choice (Feddersen and Pesendorfer 1996; Lassen 2005). If voters are uncertain about politicians' policy positions and want to avoid electing a bad candidate in terms of ideology and competence (Feddersen and Pesendorfer 1996; Degan and Merlo 2011; Krishna and Morgan 2011), additional information on candidates reduces uncertainty, increases turnout, and facilitate the electoral choice. However, collecting information on candidate attitudes is costly and time-consuming. In order to reduce information costs, party labels provide cues and information shortcuts (Lupia 1992; 1994). However, in many electoral systems, particularly in multiparty systems, political attitudes of candidates are not perfectly separated along party lines (Calvo and Hellwig 2011). Therefore, additional information on candidate attitudes are valuable for voters. VAAs provide such information in a condensed form.

VAAs are online tools that provide voters with voting advice based on an algorithm that compares a voter's responses to issue questions with candidates' responses to the same issue questions. Our VAA of interest, *smartvote*, gives a detailed list of candidates that are closest to a voter's political attitudes, independent of party affiliation. Of course, aggregate party attitudes are correlated with the party's individual candidate attitudes, but the party affiliation itself does not play a role in the voting advice algorithm. However, the voting advice is costly. First, voters have to fill out a lengthy questionnaire — in the context of *smartvote* it includes at least 35 questions — on contemporary politics. This requires time. Second, voters also have to be able to state their personal attitudes on these issues which requires substantial knowledge of the issues at hand. In what follows, we make conjectures about the impact of the introduction of a VAA on turnout, voting behavior, and electoral outcomes.

The impact of VAA on turnout is a priori unclear. On the one hand, additional information on candidates reduces voters' uncertainty. Filling out the VAA questionnaire is less costly than finding the same detailed information in traditional media, particularly for citizens who do not regularly follow politics in the media. Thus, a VAA increases turnout if these citizens decide to

participate in elections. On the other hand, using the voting advice still comes at a cost in terms of time and knowledge of the questionnaire’s issues. These costs are relatively low for well-informed voters who tend to have high education (Wolfinger and Rosenstone 1980; Hodler, Luechinger, and Stutzer 2015; Bechtel and Schmid 2020). This set of voters is likely to turn out independent of the voting advice. The costs, however, are relatively high for citizens who are less politically knowledgeable because they are less familiar with the political issues in the questionnaire. If these costs are too high, less knowledgeable citizens will not use the VAA. As a consequence, it may be that only core voters use the VAA, in which case we expect no impact of VAAs on turnout. Overall, the effect of VAAs on turnout remains ambiguous.

How may the introduction of a VAA affect voting behavior? As the voting advice is based on measures of voters attitudes matched with the same measures of candidate attitudes, the information is more specific and precise in comparison to party cues and traditional information sources, such as the media. It is thus likely that a VAA increases a voter’s set of politically close candidates with candidates from other parties, a result that has been documented in experimental studies (Pianzola et al. 2019). For this reason, we expect voters using VAAs in open list proportional elections to modify their ballots more often.¹ In the Swiss electoral system, there are two forms of modifying a ballot, panache votes and cumulative votes, which we present in Section 3.1. In this regard, we can distinguish the extensive and intensive margin of modifications. The extensive margin is the relative number of voters who modify a ballot, measured by the share of modified ballots in terms of total ballots. The intensive margin is the relative number of votes from modified ballots in relation to the total number of votes.² If voters who have previously not modified their ballot use the VAA to find ideologically close candidates, we expect an increase of the extensive margin which should also lead to an effect on the intensive margin. However, it may be that predominantly voters who have already modified their ballot before the introduction of the VAA use the voting advice. In this case, we expect no effect on the extensive margin but a positive effect on the intensive margin.

This change in voting behavior might also affect electoral outcomes. In more traditional media outlets, such as the newspapers, television, and the radio, incumbents have an advantage over challengers because publication space is limited and because incumbents generate more attention

1. In closed list elections, the influence of VAAs might be much more limited, as the voting advice would have to disclose new information on the aggregate match between voter and party preferences that goes beyond what could already be inferred from traditional information sources.

2. Note that voters can cast as many votes as there are seats in a district. For example, if a district has 10 seats, a voter can cast up to 10 candidate votes in this district.

than challengers (Prior 2006). A similar mechanism is at work for news coverage of big and established parties versus small and more recent parties, particularly if competition is weak (Petrova 2011). In contrast to traditional media, a VAA treats all candidates the same, independent of incumbency status and the size of a party. Thus, we expect that the introduction of a VAA reduces the incumbency advantage and the vote share of big parties.

3 Institutional Background and Data

3.1 Cantonal Elections in Switzerland

Switzerland is a highly federalist country. The 26 Swiss cantons are not only responsible for the provision of many public goods, such as education and health care, but also levy and set their own taxes. In the year 2017 the cantons accounted for 24.6% of the total tax revenue, which is 7% of the GDP.³ Cantonal politics and elections are therefore highly relevant. Cantonal parliaments are usually elected every four years in a proportional system⁴ and they have between 46 and 200 members. Depending on the size of the parliament and the number of voting districts in a canton, local voters can elect between one and 100 members of a parliament. A particularity of the Swiss voting system is that voters can not only choose among parties but also among individual candidates. Legislative elections are organized as open lists. Voters can modify their ballot in two ways. The first option is that voters delete candidates on a party list and fill in the names of candidates from other parties (panache votes).⁵ The second option is that voters can put up to two votes on particularly preferred candidates (cumulative votes).

3. Data from the OECD.

4. Exceptions are three-year election cycles in Aargau (since 2009) and Graubünden (until 2006), and five-year election cycles in Fribourg and Vaud (since 2002). Appenzell Ausserrhoden and Appenzell Innerrhoden switched from shorter cycles to a four-year cycle in the 1990s. In the canton of Graubünden the parliament is elected by a majoritarian system and some smaller cantons (Schwyz, Uri, Zug, Schaffhausen up to 2004) apply mixed systems where a majoritarian system is in place in smaller voting districts.

5. Alternatively, voters can also fill in a blank list with candidates from several parties.

3.2 The Voting Advice Application *smartvote*

3.2.1 The Introduction of *smartvote*

The online platform *smartvote* is a voting advice application developed and maintained by Poli-tools, a non-profit and non-partisan network of researchers who are associated with the University of Berne. At the federal level, voters can use *smartvote* for all elections since 2003. At the cantonal level, *smartvote* has become available at different points in time, but is still missing for some parliamentary elections.

Figure 1: The Availability of *smartvote* for Cantonal Elections

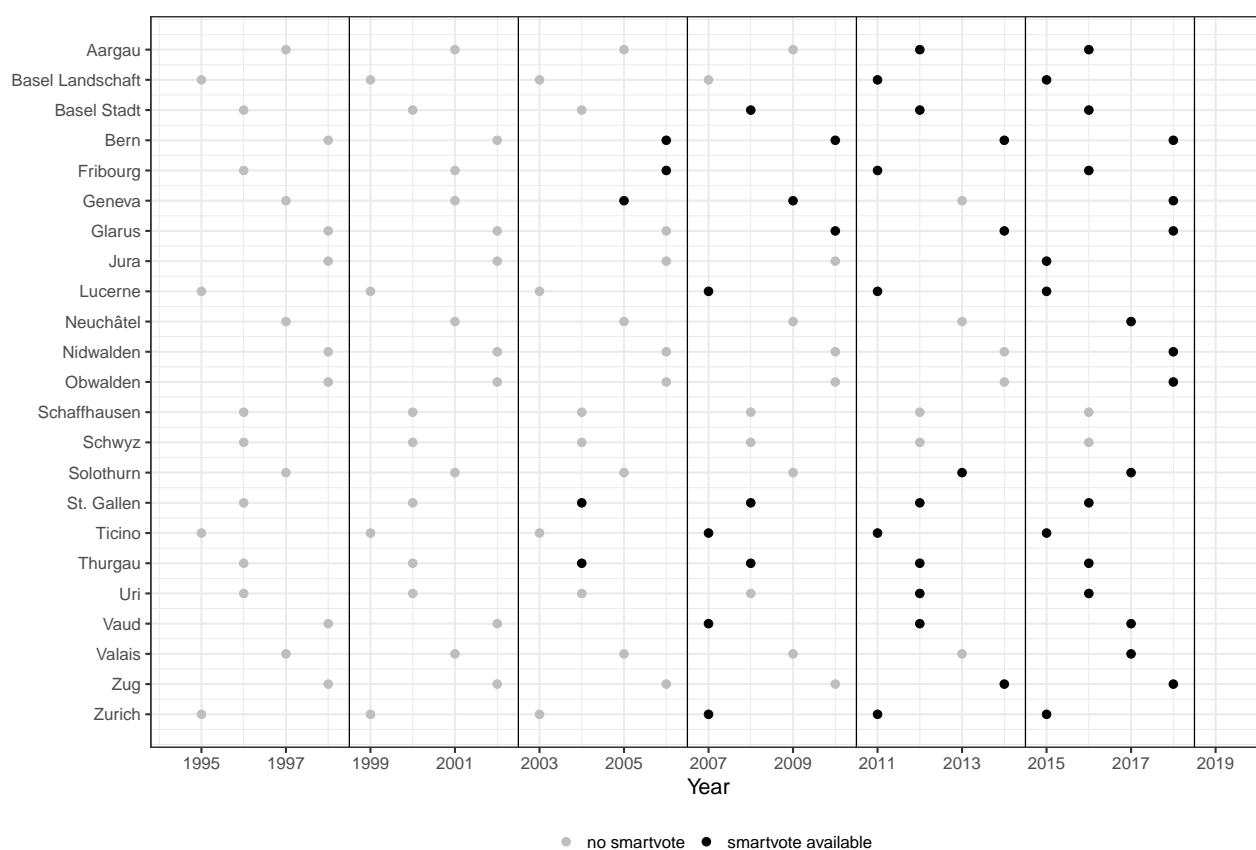


Figure 1 shows an overview of the availability of *smartvote* in cantonal parliamentary elections. The vertical lines separate the election periods that are defined according to federal elections.⁶ For the election period 2003-2006, *smartvote* was available for five cantonal parliamentary elections and

6. Federal elections took place in November 1995, 1999, 2003, 2007, 2011 and 2015.

in 2007-2010 for twelve cantonal elections. In the period 2011-2014, five more cantons introduced *smartvote*. In the last sample period 2015-2018, a total of 21 cantons provided the VAA *smartvote*.

3.2.2 The Voting Advice from *smartvote*

The VAA *smartvote* is based on an online survey of candidates and voters.⁷ In a first step, all candidates of a specific election receive an invitation to answer a survey on their political attitudes. In a second step, voters can answer the exact same online survey. Voters can choose between the complete survey of about 70 issue statements in twelve political domains and a shorter version of a subset of about 35 statements from all political domains. Candidates and voters can indicate whether they agree, rather agree, rather disagree or disagree with the statements. Voters can also indicate if they have no opinion towards a statement and give different weights to different statements. Figure A.2 in the Appendix shows the voter survey for the 2012 election in the canton of Aargau. In a third step, *smartvote* calculates the match between a voter’s attitudes and each candidate’s attitudes. The voter receives a voting advice in the form of a list of candidates ordered by the highest congruence of political attitudes, independently of the candidates’ party. Figure A.3 in the Appendix provides an example of a voting advice for the 2012 election in Aargau.

Table 1: The Usage of *smartvote* in Cantonal Elections

Voting Period	Elections with <i>smartvote</i>	Elections without <i>smartvote</i>	Candidate Participation			Voting Advices as Share of Electorate		
			Mean	Min.	Max.	Mean	Min.	Max.
2003-2006	5	18	68.48	62.90	75.10	18.40	15.80	24.97
2007-2010	10	13	68.00	49.00	85.00	15.99	10.53	22.13
2011-2014	15	8	70.93	52.00	89.00	16.39	4.86	29.06
2015-2018	19	4	73.32	47.00	92.00	17.55	4.71	33.98

Note: The cantons Appenzell Innerrhoden, Appenzell Ausserrhoden and Graubünden are excluded from the sample because elections take place in open community assemblies.

Table 1 presents summary statistics on the usage of *smartvote* during cantonal legislative elections for the 23 cantons in our sample. The data comes from the provider Politools. The average candidate participation increased from 68% to 73% over the last four voting periods. The average number of voting advices as share of the electorate varies between 16% and 18%.⁸

7. For a detailed description see Fivaz and Schwarz (2007).

8. These numbers may slightly overestimate the actual share of voters who make use of *smartvote* because voters might consult *smartvote* several times.

3.3 Data

We have collected data from the cantonal chancelleries and cantonal statistical offices. The administrative data is available at the district level and thus we first aggregate it to the cantonal level for comparability.⁹ We distinguish three categories of outcome variables: voter turnout, voting behavior, and electoral outcomes. In the first category, our dependent variable “Turnout” is the share of number of ballots cast relative to the number of eligible voters. In the category of voting behavior, the variable “Modified Ballots” captures the share of modified ballots relative to the number of valid ballots. The variables “Votes from Modified Ballots”, “Panache Votes”, “Cumulative Votes”, and “Votes Incumbents” are expressed relative to the total of candidate votes. Finally, all variables in the category of electoral outcomes are party votes divided by the total number of party votes. For the years from 1995 to 2018, we split the data into six election periods according to the federal election cycles because cantonal elections do not take place on a yearly basis. For the cantons Appenzell Innerrhoden, Appenzell Ausserrhoden and Graubünden, no data is available because the elections were held in open community assemblies. This leaves us with data on 135 elections in 23 cantons.¹⁰

The individual-level survey data for the federal elections 2007, 2011, and 2015 are provided by the Swiss Election Study (Selects). It is based on a random sample of individuals representing the eligible population. The post-electoral survey mainly focuses on who participates in elections, who votes for a certain party and why. The survey asks respondents about their turnout, voting behavior, and electoral choice. It also includes a question on the usage of *smartvote* and detailed sociodemographic variables. This data helps us understand who uses *smartvote* and whether *smartvote* users differ from non-users in their voting behavior.

3.4 Descriptive Statistics

Table 2 presents summary statistics of all outcome and control variables. The average voter turnout in our sample is 43.4%. In the category voting behavior, the share of modified ballots is 64.6%. At the level of votes, 58.0% of all votes are modified, 21% are panache votes and 34.8% are cumulative

9. For the cantons of Geneva and Ticino the whole canton is just one district

10. The cantons of Vaud and Fribourg have only four elections in the period 1995-2018 because these two cantons have five-year election cycles.

Table 2: Swiss Cantonal Elections

	Mean	SD	Min	Max	Observations
Turnout	43.43	9.54	27.34	71.86	133
Modified Ballots	64.62	14.01	35.64	94.21	98
Votes from Mod. Ballots	58.04	15.31	17.27	92.21	93
Panache Votes	20.96	10.29	2.01	44.79	102
Cumulative Votes	34.76	11.19	5.11	61.20	88
Votes Incumbents	26.54	8.29	8.69	50.71	134
Votes SP	19.36	6.27	3.45	34.54	133
Votes CVP	19.77	12.50	0.41	50.95	132
Votes FDP	21.88	6.40	8.95	37.96	133
Votes SVP	19.15	8.84	0.10	37.37	127
Votes Others	19.80	10.82	0.00	46.18	135
Parliament Size	109.27	39.51	55.00	200.00	135
Candidates	597.87	458.62	90.00	2110.00	135
Lists	10.46	5.57	1.00	44.00	135
Eligible Voters	198367.63	199175.13	18286.00	879262.00	133
Concurrent Vote	0.23	0.42	0.00	1.00	135
Postal Voting	0.93	0.25	0.00	1.00	135
Voting Age 16	0.02	0.15	0.00	1.00	135
Pukelsheim	0.10	0.30	0.00	1.00	135
Observations	135				

Note: This table reports descriptive statistics for outcome and control variables. Columns 2 to 5 report mean, standard deviation, minimum and maximum value. Column 6 reports the available number of observations. One observation is a cantonal election. The variable “Modified Ballots” measures the share of modified ballots relative to the number eligible ballots. “Votes from Mod. Ballots” is the share of votes from modified ballots relative to all votes. “Panache Votes” and “Cumulative Votes” capture the panache and cumulative votes relative to the total votes, respectively and the “Votes”-variables measure the share of votes of incumbents and of the big four parties relative to the total number of votes. The control variables “Postal Voting”, “Voting Age 16”, and “Pukelsheim” are dummy variables for the cantonal availability of postal voting, the legal voting age of 16 (instead of 18), and the use of the proportional seat allocation mechanism Pukelsheim. All these institutional variables have at least one change in our sample period.

votes.¹¹ In our sample, the average relative vote share of incumbents is 26.5%. In the category electoral outcomes, the average party strength of the four main political parties, Social Democratic Party (SP), Christian Democratic People’s Party (CVP), Free Democratic Party (FDP), and Swiss People’s Party (SVP), varies between 19.2% and 21.9%.¹² The share of votes from all the other political parties is 19.8%.¹³ In our analysis we control for the number of parliamentary seats and the number of eligible voters. Furthermore, we use dummy variables for concurrent federal votes and for changes in cantonal voting systems, namely the introduction of postal voting or the new proportional seat allocation mechanism Pukelsheim, and the legal voting age 16. The average size of the parliament is 109.3 and the average of eligible voters in our sample is 198,367.6. For 23% of the elections in the sample, national referendums take place on the same day. 90 percent of all cantonal elections allow for postal voting. There are only six cantons where postal voting was not possible in the first election periods of the sample.¹⁴ The dummy variables “Voting Age 16” and “Pukelsheim” have mean values of 0.02 and 0.1, respectively, because the voting threshold of 16 years exists only in the canton of Glarus and the voting system Pukelsheim was only introduced in five cantons.¹⁵

3.5 Characterization of *smartvote*-Users

Before discussing the econometric analysis at the aggregate level, we briefly describe the sociodemographic background of *smartvote* users and how usage has developed over time using individual-level data for federal elections in the years 2007, 2011, and 2015. Figure 2 documents that *smartvote* users tend to be predominantly male and young compared to the average voter. In addition, *smartvote* users are more likely to live in big and urban municipalities, but these differences are

11. The panache and cumulative votes are slightly different from the modified ballots because of missing data for the cumulative votes.

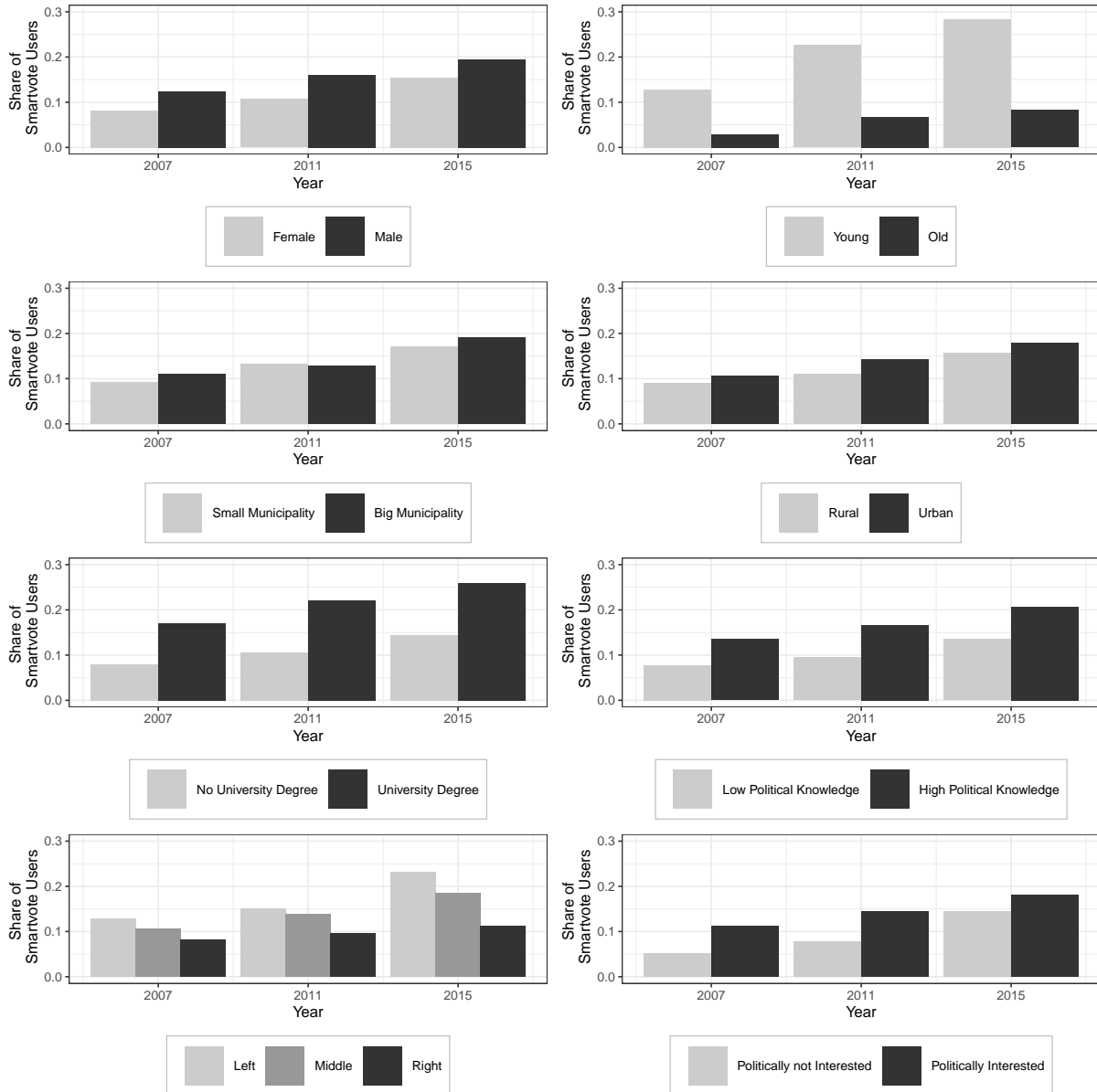
12. The four parties SP, CVP, FDP, and SVP are considered the major political parties in Switzerland. At the national level, these parties combine between 69% and 82% of the votes in our sample period. In addition, they have exclusively formed the federal council (*Bundesrat*) except for the years 2008-2015, when only six of the seven council seats were allocated to the four main political parties. At the cantonal level, SP and FDP are present in all parliaments. CVP did not receive a seat in the following elections: Berne 2014 and 2018 as well as Neuchâtel 1997, 2001, 2005, and 2009. SVP did not run in the following elections: Geneva 1997, Neuchâtel 1997 and 2001, Nidwalden 1998, Obwalden 1998, Uri 1996, and Valais 1997.

13. The set of the other parties includes the Green Party, the Green Liberal Party, the Evangelical People’s Party, and the Federal Democratic Union, among many others.

14. Postal Voting was only introduced later in the following cantons: Schwyz(2001), Ticino(2006), Vaud(2002), Valais(2005), Neuchâtel(2001), and Jura(2002).

15. Pukelsheim was introduced in the following cantons: Zurich (2007), Nidwalden (2014), Zug (2014), Schaffhausen (2008), and Aargau (2009).

Figure 2: Share of *smartvote* Users



Note: The graph depicts the share of *smartvote* users relative to the electorate for different subgroups for the federal elections in 2007, 2011, and 2015. Someone is classified old when the person older or equal 50 is and as young below. A municipality is considered as big when there are more than 50000 inhabitants, all below is considered as a small municipality. High political knowledge means that someone has been able to answer more than half of some political questions such as the name of the president of the Confederation or the number of the parties in the Federal Council. Someone is politically interested if a person considers herself as rather or very interested in politics.

less pronounced. Yet, there are substantial differences in *smartvote* usage between educational groups. While 26% of voters with a university degree used *smartvote* in 2015, only 14% of voters with no such degree did so. In absolute terms, this gap is relatively constant over time. We also find that voters with high political knowledge and those who are politically interested are more likely to use *smartvote* compared to voters with low political knowledge and those who are less politically interested. Finally, left-wing voters are most likely to use *smartvote*, followed by middle and then right-wing voters. This gap has increased in absolute terms over time.

4 Identification and Empirical Strategy

It is difficult to identify the causal effect of VAAs on voting behavior and electoral outcomes. At the individual level, the use of *smartvote* is correlated with observable and unobservable characteristics as documented in the previous section. If these characteristics also correlate with the outcome variable, a simple regression of the outcome on *smartvote* usage would yield biased estimates. Therefore, to convincingly estimate the causal effect of *smartvote*, we exploit the fact that it was introduced in different cantons at different points in time (and in some cantons not at all so far) and compare cantons with and without *smartvote* before and after the introduction of *smartvote*.¹⁶ Our difference-in-differences approach has two major advantages over the existing literature. First, we use real observation data and not self-reported data. Second, our data covers the entire population of voters and not just a selection of self-selected voters. Our basic estimation equation is

$$Y_{it} = \mu_i + \delta_t + \omega_i t + \tau \text{smartvote}_{it} + X'_{it} \beta + \varepsilon_{it}. \quad (1)$$

In equation (1), Y_{it} is the outcome of interest in canton i in election period t , smartvote_{it} is a dummy variable indicating the availability of *smartvote* in a canton in a given election, μ_i are canton specific fixed effects, δ_t election period dummies, ω_i are canton specific linear time trends, X'_{it} is a matrix of control variables, β is a vector of coefficients, and ε_{it} is the error term. Our coefficient of interest is τ that measures how *smartvote* affects the outcome variable. The control variables include parliament size and the number of eligible voters. Additionally, we include dummies for concurrent national elections and referendums, voting age 16, postal voting, and the Pukelsheim

16. For federal elections, *smartvote* is available since 2003 and thus some cantons in the control group for cantonal elections are in the treatment group for federal elections. However, we expect no or small spillover effects from the usage of the federal *smartvote* on cantonal outcomes because the candidates differ and federal and cantonal elections take place at different dates (except for the canton Jura).

seat allocation method.

By including canton fixed effects we control for unobserved and time-invariant heterogeneity at the cantonal level that might be related to the adoption of *smartvote*. Furthermore, it might be possible, that some citizens in some cantons have become more or less interested in politics over time, and this growing or diminishing interest could be correlated with the introduction of *smartvote*. We address this concern by using canton-specific linear time trends. The crucial assumption to estimate the causal effect of *smartvote* in a difference-in-differences setting is that the timing of the introduction is not related to time varying factors that affect our outcomes of interest. According to Politools, the first wave of the introduction of *smartvote* was rather random in the sense that, after they had introduced *smartvote* in the 2003 federal elections, Politools planned to launch their online tool also in cantonal and local elections. Hence, at the cantonal level, *smartvote* was used for the first time in St.Gallen and Thurgau, the cantons that held the first parliamentary elections after the 2003 federal election. The next cantons that introduced *smartvote* were midsized to large cantons that held elections after 2003, although in some of the larger cantons (e.g., Aargau, Valais) *smartvote* was not introduced due to capacity constraints. Since 2007, Politools has required material and non-material support from parties from the entire ideological spectrum to ensure a balanced representation of candidates on *smartvote*. The political parties have to pay a certain amount relative to their vote share, the party with the highest vote share pays the highest amount.

As discussed before, we include election period fixed effects and one election period consists of four years. As Figure 1 indicates, the introduction of *smartvote* is staggered. Therefore, the treatment effect might be misleading when applying a difference-in-differences model with two-way fixed effects. Recent literature has shown that the two-way fixed effects estimator is generally biased if (i) the data includes more than two time periods, and (ii) the introduction of the treatment is staggered

(see Borusyak and Jaravel (2017), Chaisemartin and D’Haultfoeuille (2019), Goodman-Bacon (2018), Abraham and Sun (2020), and Athey and Imbens (2018)). De Chaisemartin and D’Haultfoeuille (2019) show that such an estimator identifies a weighted sum of the average treatment effects in each group and period with weights that may be negative, where a group is defined by the time period when units are first treated. These negative group and period specific weights might cause some misleading treatment effects, because the linear regression estimand may be negative while all the ATEs are positive. To explore whether this is a problem for our analysis, we compute the

weights of the group and time ATEs as suggested by Chaisemartin and D’Haultfoeuille (2019). In our analysis of the main outcomes we find that one unit has a negative weight in 10 of our 11 estimations. This unit is the election in Geneva in election period 6 with standardized weights ranging from -0.026 to 0.003. Because of the few and relatively small negative weights, the linear regression estimand should not be misleading. Nevertheless, in the robustness section, we apply a different estimator, introduced by Callaway and SantAnna (2019), to address the problem of negative weights.

5 Results

5.1 Main Results

We begin our empirical analysis by estimating the effect of the VAA *smartvote* on voter turnout, voting behavior and electoral outcomes. Tables 3 and 4 present the results of estimating equation (1) with standard errors clustered at cantonal level and p -values based on a T -distribution with $C-1$ degrees of freedom (with C being the number of clusters). We also report p -values based on the wild cluster bootstrap procedure by Cameron, Gelbach, and Miller (2008) because we have only 19 to 23 clusters depending on data availability of the respective dependent variable.

5.1.1 Effect of *smartvote* on Voter Turnout and Voting Behavior

Table 3 presents the results on voter turnout and voting behavior. The result in column (1) indicates that *smartvote* has no effect on voter turnout, the point estimate of 0.18 percentage points is very close to zero and statistically not significant. Column (2) presents the effect of *smartvote* on the share of modified ballots. We estimate an effect of 2.1 percentage points with a wild clustered bootstrap p -value of 0.066. Column (3) indicates that the introduction of *smartvote* increases the relative vote share from modified ballots by 2.9 percentage points. This effect is statistically significant with a wild clustered bootstrap p -value of 0.087. Columns (4) and (5) help us understand whether the effect in column (3) primarily comes from voters who modify their ballots by adding candidates from other lists (panache votes) or by substituting candidates from the same party list (cumulative votes). The estimated effect of *smartvote* on panache votes is 2.4 percentage points and statistically significant with a wild clustered bootstrap p -value of 0.074. We find no statistically significant effect on cumulative votes.

These results indicate that *smartvote* causes voters to replace candidates on their ballots more

Table 3: Effect of *smartvote* on Voter Turnout and Voting Behavior

VARIABLES	(1) Turnout	(2) Modified Ballots	(3) Votes from Mod. Ballots	(4) Panache Votes	(5) Cumulative Votes	(6) Votes Incumbents
Smartvote	0.176 (0.656)	2.106 (1.244)	2.870* (1.400)	2.393* (1.175)	1.941 (1.348)	0.675 (2.227)
Bootstrap p-value	.752	.069	.085	.077	.162	.756
Observations	133	98	93	102	88	132
R-squared	0.650	0.824	0.809	0.528	0.808	0.376
Number of Cantons	23	19	21	20	20	23

Note: For all six columns we include ID and time fixed effects, so as cantonal specific linear time trends and control variables. The robust standard errors are in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

often with candidates from other ballots than with candidates from the same ballot. To find out whether this change in electoral behavior affects the election success of incumbents relative to challengers, we estimate the effect of *smartvote* on the votes of incumbents relative to all votes in column (6). We find no statistically significant effect of *smartvote* on the vote share of incumbents with a point estimate of 0.7 percentage points. We conclude that the introduction of *smartvote* does not affect turnout but it does cause voters to modify their ballots more often and voters include more candidates from different political parties.

5.1.2 Effect of *smartvote* on Party-Level Voting Behavior

In a next step, we explore whether some parties are more affected by changes in the voting behavior induced by *smartvote* and how they gain and lose votes. Table 4 presents the effect of *smartvote* on panache votes and on votes from unmodified ballots, separately for the four big parties. Panel (A) presents the effect of *smartvote* on the relative votes from external ballots. The results indicate that all parties receive more votes from external ballots but especially the right-wing SVP and the center-right FDP benefit. We estimate a statistically significant effect of 2.4 percentage points on panache votes from the political party FDP, the coefficient for the SVP is not statistically different from zero. Panel (B) shows how many votes the parties lose, when the voters modify their ballot. It shows the effect of *smartvote* on the vote share from unmodified ballots. All four effects are negative or very close to zero but statistically insignificant. Nevertheless, it appears

Table 4: Effect of *smartvote* on Party Level Outcomes

Panel (A): Votes from External Ballots (Panache Votes)				
VARIABLES	(1) SP	(2) CVP	(3) FDP	(4) SVP
Smartvote	0.352 (2.058)	1.163 (1.714)	2.373* (1.296)	1.593 (1.350)
Bootstrap p-value	.881	.488	.092	.226
Observations	97	97	97	94
R-squared	0.474	0.536	0.530	0.581
Number of Cantons	19	19	19	19
Panel (B): Votes from Unmodified Ballots				
VARIABLES	(1) SP	(2) CVP	(3) FDP	(4) SVP
Smartvote	0.208 (3.219)	-0.297 (3.279)	-1.842 (2.640)	-0.340 (2.867)
Bootstrap p-value	.946	.930	.494	.899
Observations	96	96	96	93
R-squared	0.820	0.813	0.851	0.824
Number of Cantons	20	20	20	20

Note: Panel A presents the effect on party-specific votes from external ballots relative to all votes and Panel B presents the effect on party-specific votes from unmodified ballots relative to all votes. For all five columns we include ID and time fixed effects, so as canton-specific linear time trends and control variables. The robust standard errors are in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

that especially the rather center-right parties (mainly the FDP) do lose votes from unmodified ballots due to *smartvote*. These results indicate that there are some small differences between the four main political parties in Switzerland. It seems like particularly the FDP and SVP gain votes from external ballots but, on the other hand, they also lose a lot of votes from unmodified ballots because voters tend to modify their ballots more often.

5.1.3 Effect of *smartvote* on Electoral Outcomes

In a further step, we explore whether the introduction of *smartvote* affects electoral outcomes. We expect that *smartvote* decreases information asymmetries between small and big parties as it reveals information on political attitudes for a large set of candidates. In general, traditional media outlets, such as newspapers, television, and radio, tend to focus more on candidates from more established and bigger parties. Table 5 presents the estimated impact of *smartvote* on the

Table 5: Effect of *smartvote* on Electoral Outcomes

VARIABLES	(1) SP	(2) CVP	(3) FDP	(4) SVP	(5) Others
Smartvote	-0.142 (0.834)	0.215 (0.466)	0.0843 (0.825)	-1.250 (1.098)	0.983 (1.449)
Bootstrap p-value	.851	.614	.903	.246	.543
Observations	131	130	131	125	133
R-squared	0.650	0.880	0.784	0.873	0.646
Number of Cantons	23	23	23	23	23

Note: This Table presents the effect of *smartvote* on the relative share of party votes. For all five columns we include ID and time fixed effects, so as canton-specific linear time trends and control variables. The robust standard errors are in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

party shares of all big four parties, defined as those represented in the federal coalition government. Columns (1) to (4) present the individual results for each of the four main political parties and column (5) reports the results for the aggregate vote share of all the other parties. The effects at the party level are very close to zero and statistically insignificant, except for the right-wing party SVP. The introduction of *smartvote* decreases the vote share of the SVP by 1.3 percentage points but this effect is statistically insignificant. Therefore, it seems like the loss in votes from unmodified ballots outweighs the gains in votes from external lists for the political party SVP. We find no statistically significant effect of *smartvote* on the aggregate electoral outcomes for the other

parties than the four major political parties. These results indicate that the change in election behavior, due to the introduction of *smartvote*, does not cause any statistically significant effects on electoral outcomes.

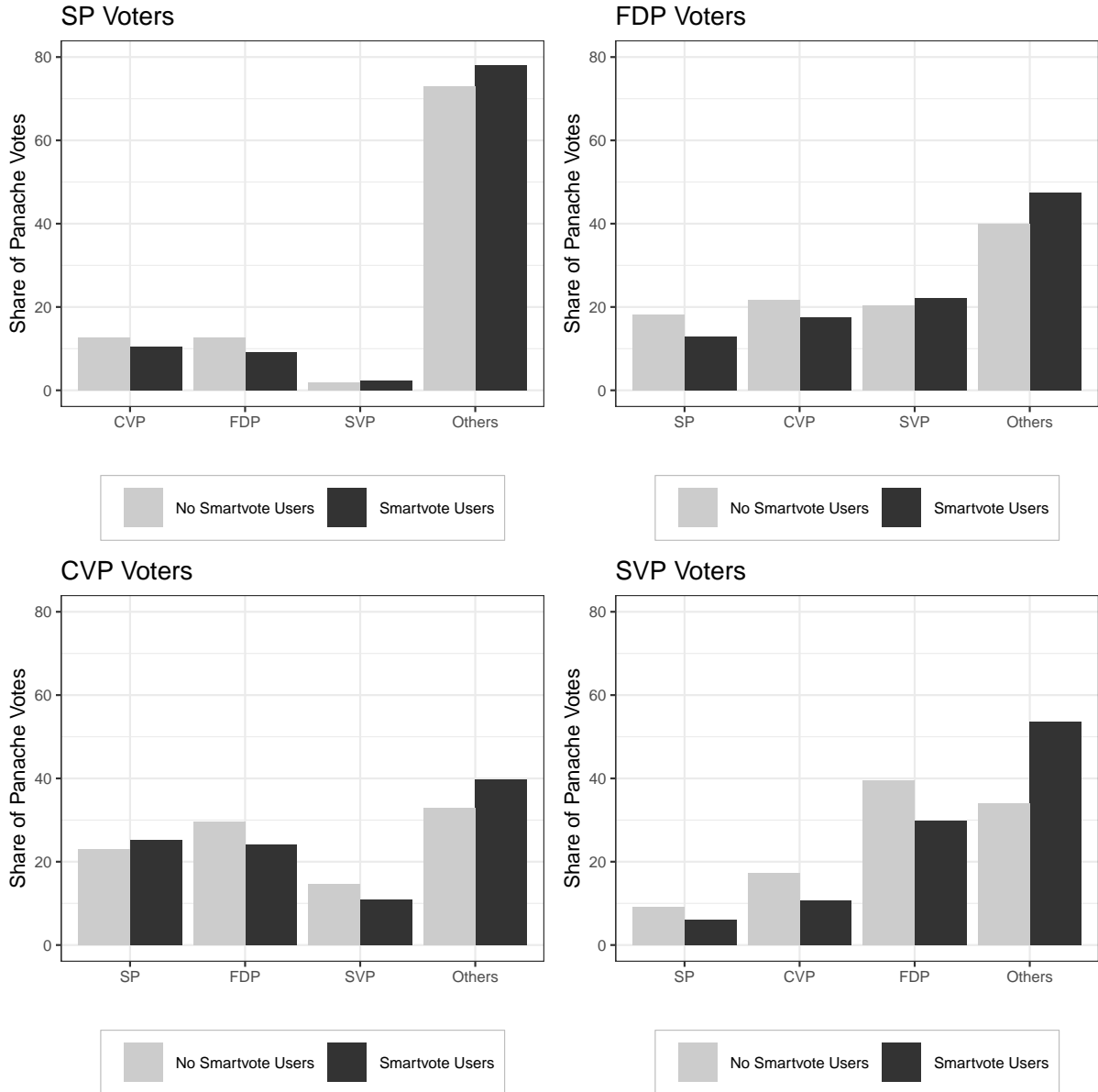
5.2 Individual Data Evidence

In this section we analyze how the party voters of the four main political parties actually modify their ballots. As described in Table 5, we do not observe any statistically significant effects on electoral outcomes. Nevertheless, in Table 3 we present a statistically significant positive effect on panache vote. In an attempt to understand why this does not cause any effects on electoral outcomes, we analyze the panache votes at the individual level. For this purpose we use individual-level survey data for the federal parliamentary elections in 2007, 2011 and 2015. This data allows us to analyze how voters split their ballots and which candidates benefit or suffer most when voters modify their ballot.

Figure 3 presents the relative panache votes of 853 SP, 662 FDP, 461 CVP and 599 SVP party voters. It shows which parties benefit when a party voter modifies the list of his preferred party. The upper left panel presents the SP's relative loss of panache votes from SP voters. The histogram indicates that most SP voters who modify their ballots replace the SP candidates with candidates from other party lists than the big four parties. This means that the other main parties do benefit only modestly when SP voters modify their ballots and that this benefit is even smaller when voters use *smartvote*. The upper right panel presents the relative panache votes of FDP voters. The histogram indicates that the FDP loses votes of split voters to all three parties CVP, SP and SVP equally but most to other parties. The lower left panel indicates that the CVP loses votes mainly to the SP and FDP but only to a minor degree to the SVP and most to other parties. The lower right panel indicates that SVP voters do especially prefer candidates from the FDP when they modify their ballots. The SP and CVP do relatively profit less from SVP voter than the FDP and mostly benefit other parties.

These results indicate that no party has a substantial net benefit from panache votes. The key finding of Figure 3 is the different voting behavior between *smartvote* users and non-users. It appears that *smartvote* users who modify their ballot are more likely to support other parties compared to voters who do not use the VAA. This empirical pattern is present for all parties. Therefore, the small political parties should be able to gain more votes with the introduction

Figure 3: Panache Votes of the Big Four Parties



Note: The upper left panel shows the relative loss in panache votes of the SP party voters who modified their ballots, distinguished by *smartvote* users and non-users. The other panels present the same but for FDP, CVP and SVP party voters. In the upper left panel we have 853 observations, in the upper right panel 662 observations, in the lower left panel 461 and in the lower right panel 599 observations.

of *smartvote*. These findings are in line with the results in Table 5. Nevertheless, it does not have a statistically significant effect on election outcomes. The reasons for this are probably the small differences in voting behavior between *smartvote* users and non-users combined with the still relatively low penetration rate of *smartvote* among voters.

5.3 Robustness

5.3.1 Dynamic Treatment Effects

As discussed in Section 4, we use time fixed effects for six election periods. Borusyak and Jaravel (2017), Chaisemartin and D’Haultfoeuille (2019), Goodman-Bacon (2018), Abraham and Sun (2020) and Athey and Imbens (2018) point out that the estimated treatment effect might be misleading when applying a two-way fixed effects model for data with more than two time periods and a staggered introduction of the treatment. In that case, the two-way fixed effects estimator is generally biased. Therefore, we apply a weighted average of the group-time average treatment effects on the treated, which was introduced by Callaway and Sant’Anna (2019). They define the group-time average treatment effect for group g in period t as the following:

$$ATT(g, t) = E[Y_t - Y_{g-1} | G_g = 1] - E[Y_t - Y_{g-1} | C = 1] \quad (2)$$

The aggregation of group-time average treatment effects, allows us to control for selective treatment timing and for dynamic treatment effects. Table 6 shows the results when we control for selective treatment timing and dynamic treatment effects. We set the focus on the following three outcome variables: turnout, votes from modified ballots and panache votes. These are the most important variables to test the robustness of our main findings in Table 3.

Column (1) presents the aggregated ATT of treatment groups with at least four post-treatment periods, where a group is defined by the time period when units are first treated. This includes only the cantons with the first treatment in period $t = 3$. In column (2), we present the results from the sample where we exclude the treatment groups with less than three post-treatment periods. This means that we have only one treatment group in column (1) but over four time periods, two different treatment groups over three time periods in column (2), and three different treatment groups but only over two treatment periods in column (3). Panel (A) presents the effect of *smartvote* on voter turnout. We do not find a statistically significant effect on turnout, independent of how many treatment periods and treatment groups we include. The effect of *smartvote* on votes from

Table 6: Selective Treatment Timing and Dynamic Treatment Effects

	(1)	(2)
	Treatment Periods	
	Three	Two
Panel (A): Voter Turnout		
Smartvote	1.15 (2.97)	0.23 (3.76)
Panel (B): Modified Ballots		
Smartvote	5.06 (5.77)	5.71 (8.87)
Panel (C): Votes from Mod. Ballots		
Smartvote	7.67 (4.76)	2.93 (4.79)
Panel (D): Panache Votes		
Smartvote	5.60 (3.81)	6.62 (7.44)
Panel (E): Cumulative Votes		
Smartvote	-0.35 (3.24)	-0.98 (3.51)
Panel (F): Votes Incumbents		
Smartvote	-0.38 (1.17)	0.25 (2.27)

Note: Column (1) contains only those treatment observations with at least four post-treatment periods. In column (2) are only those two treatment groups with at least three post-treatment periods and in columns (3) those with three treatment groups with at least two post-treatment periods. The standard errors are in parentheses: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

modified ballots is shown in panel (B). We estimate a positive effect which varies with the number of treatment periods and treatment groups between 5.2 and 7.1 percentage points. The estimated effect in column (2) is statistically significant at the 10% level and the other effects are not, with p -values of 0.11 and 0.22. Panel (C) presents the effect of *smartvote* on panache votes. This effect varies between 3.3 and 3.8 percentage points and it is statistically not significant, but marginal.

These robustness results support the findings in Table 3. We do not find a statistically significant effect on voter turnout. Furthermore, the positive effect of *smartvote* on votes from modified ballots and on panache votes is robust. Therefore, the negative weights in our main estimation using OLS do not cause problems because they are only a small fraction of all weights in absolute and relative terms.

5.3.2 Pre-Treatment-Group-Specific Linear Time Trends

In our main analysis in Section 5.1 we include canton-specific linear time trends to allow for treatment and control groups to follow different trends. Goodman-Bacon (2018) argues, that these trends might over control by absorbing time-varying treatment effects that are larger at the end of the panel. He shows that counterfactual trends can be addressed by estimating pre-treatment trends in the outcome variable and extrapolate them. Therefore, we first estimate the pre-treatment-group-specific linear time trends and partial them out in the following way:

$$Y_{it} = \mu_i + \delta_t + \omega t \hat{v}_g + \tau \text{smartvote}_{it} + X'_{it} \beta + \varepsilon_{it}. \quad (3)$$

In equation 3, Y_{it} is the outcome of interest in canton i in election period t , smartvote_{it} is a dummy variable indicating the availability of *smartvote* in a canton in a given election, μ_i are canton specific fixed effects, δ_t election period dummies, ω includes treatment group specific linear time trends, \hat{v}_g are the estimated pre-treatment trends per treatment group, X'_{it} is a matrix of control variables, β is a vector of coefficients, and ε_{it} is the error term. Table 7 presents the coefficients of the regressions in equation 3. We do not estimate a statistically significant effect of *smartvote* on turnout in column (1). Column (2) presents an effect of 3.4 percentage points on modified ballots with a bootstrap p -value of 0.006. Column (3) presents the effect of *smartvote* on the share of votes from modified ballots. We estimate a statistically significant effect of 5.6 percentage points with a p -value of 0.003. The effect of *smartvote* on panache votes is 3.2 percentage points with a p -value of 0.076 and the effect on cumulative votes 2.1 percentage points but statistically not

significant. We do not find any statistically significant effect on the share of votes of incumbents. These results support our main findings in Section 5.1, although the effects are slightly stronger. This reason for this might be time-varying treatment effects.

Table 7: Effect of *smartvote* on Voter Turnout and Voting Behavior with Pre-Treatment-Group-Specific Time Trends

VARIABLES	(1) Turnout	(2) Modified Ballots	(3) Votes from Mod. Ballots	(4) Panache Votes	(5) Cumulative Votes	(6) Votes Incumbents
Smartvote	0.582 (0.725)	3.435** (1.193)	5.558*** (1.508)	3.243* (1.522)	2.136 (1.552)	1.648 (1.709)
Bootstrap p-value	.505	.008	.004	.077	.211	.366
Observations	127	67	72	72	67	126
R-squared	0.456	0.761	0.695	0.293	0.803	0.131
Number of Cantons	22	13	15	14	14	22

Note: For all six columns we include ID and time fixed effects, so as pre-treatment-group-specific linear time trends and control variables. The robust standard errors are in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

5.3.3 District-Level Data

One of our main findings in section 5.1 is that the VAA *smartvote* does not have a statistically significant effect on voters turnout. Since we only use 133 observations, it is rather unclear whether we do not observe an effect due to a lack of statistical power, or if in fact there is no effect. To overcome the problem of missing statistical power, we use district level data with 674-942 observations depending on the outcome variable¹⁷. Each canton consists of between 1-19 districts. Table 8 presents the effect of *smartvote* on voter turnout and voting behavior at district level. The results in column (1) indicate that *smartvote* has no effect on voter turnout, the point estimate is even closer to zero than in Table 3 with cantonal level data. The results in columns (2)-(5) are as well very similar to the results we present in Table 3 at cantonal level. These findings support our main results in Section 5.1. The lack of statistical power is clearly not the reason why we do not find any statistically significant effect of *smartvote* on voters turnout.

17. We exclude the canton Bern and Vaud from the sample because of changes in district boundaries in our sample period. Furthermore, we exclude the cantons Appenzell Innerrhoden, Appenzell Ausserrhoden, and Graubünden, because the elections were held in open community assemblies.

Table 8: Effect of *smartvote* on Voter Turnout and Voting Behavior (District-Level Data)

VARIABLES	(1) Turnout	(2) Modified Ballots	(3) Votes from Mod. Ballots	(4) Panache Votes	(5) Cumulative Votes	(6) Votes Incumbents
Smartvote	0.626 (0.687)	1.299 (1.061)	2.555* (1.353)	2.025** (0.830)	1.524 (1.167)	0.294 (2.307)
Bootstrap p-value	.320	.240	.143	.035	.248	.893
Observations	894	662	633	710	618	886
R-squared	0.652	0.676	0.688	0.506	0.727	0.228
Number of Districts	153	124	139	136	136	153

Note: For all six columns we include ID and time fixed effects, so as district specific linear time trends and control variables. Additionally, we use inverse probability weights to adjust for the different number of districts per canton. The clustered standard errors on cantonal level are in parentheses: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

6 Conclusion

The internet has transformed how voters inform themselves about politics. One important technological advance in recent years are VAA that allow to obtain detailed information on the political attitudes of candidates at relatively low costs. Although there is a experimental literature on the impact of VAAs, so far no other study has explored the impact of VAAs in real-world large elections using a quasi-experimental approach. Our paper shows that the online voting advice application *smartvote* in Switzerland does not affect voter turnout, which is in contrast to the existing VAA literature. In addition, we find that voters change their voting behavior and are more likely to modify their ballot, primarily by including candidates from other parties. We find no effect on electoral outcomes in terms of party shares of the four main political parties. Our analysis of the individual data indicates that vote modification between these political parties is a zero-sum game. However, we find that *smartvote* users are more likely to include candidates from other, rather smaller parties.

Our finding that *smartvote* does not affect voter turnout is in contrast to previous experimental evidence on the impact of VAAs. One reason for this difference is that in an experiment, subjects usually have no other voting costs because they can vote at the spot. In real elections, voters have to fill in the ballot and bring it to the voting booth or to the mailbox. It appears, thus, that voters first decide whether to turn out or not and then decide for which party and candidate they vote. Our findings provide evidence that VAAs only matter for voters who already decided to turn out

and thus only for the vote choice. This is consistent with the idea Degan and Merlo (2011) who study participation and model voting as a two-step process. An alternative reason why *smartvote* might not affect turnout is that subjects in experimental studies, who are often young and highly educated, react differently to VAAs compared with other voters in the general population.

Our results are specific to Switzerland, so it is important to consider the external validity of the results for other countries. Switzerland traditionally has a relatively low turnout for elections because all major decisions are taken in popular votes. For countries with higher turnout, the potential impact of VAAs on turnout is even lower because a high share of the eligible voting population already votes. Switzerland also has a fragmented party system with a large number of parties. This could be one reason why the effects of *smartvote* on voting behavior do not translate into effects on electoral outcomes. It may be that in countries with fewer parties VAAs also affect electoral outcomes. Future research could focus on the question whether and how changes in the voting behavior induced by VAAs cause changes in electoral outcomes.

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A Appendix

Figure A.1: Event Study

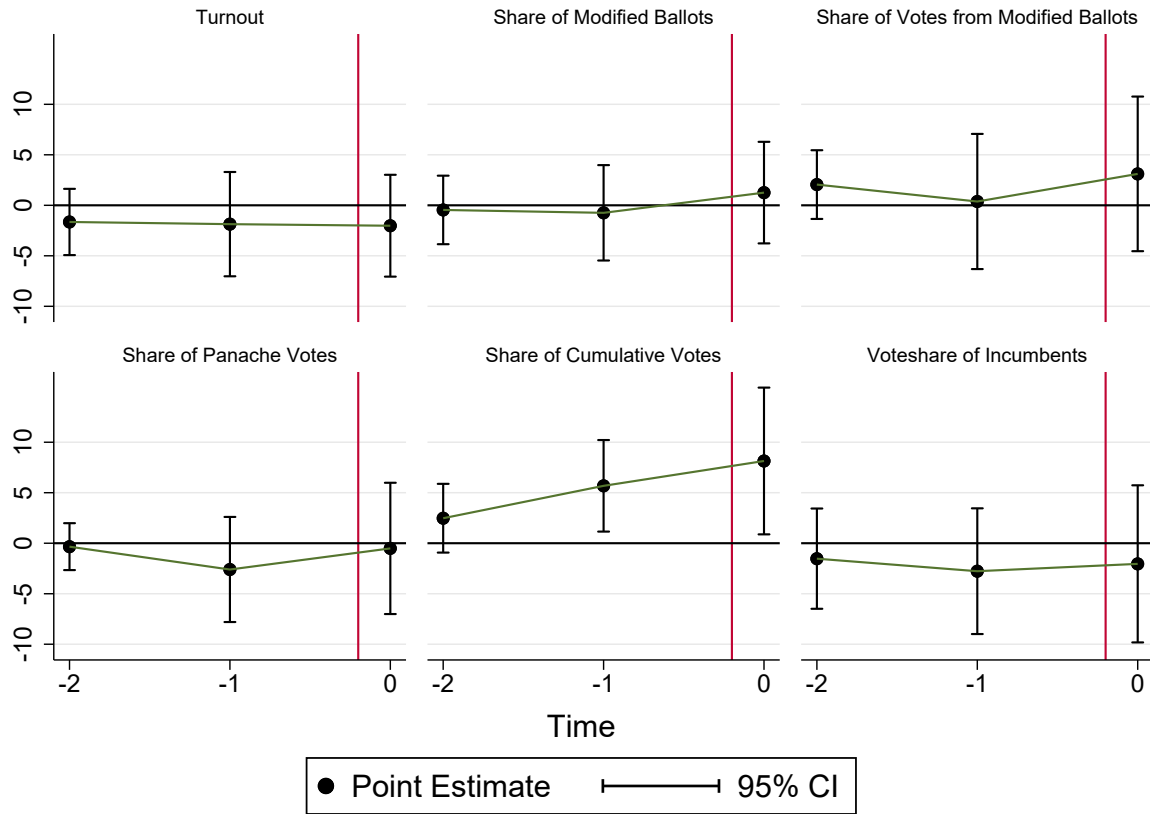


Figure A.2: Screenshot of the *smartvote* Voter Survey in Aargau 2012

smartvote

Home Parliamentary elections canton of Aargau 21.10.2012

Start **Voting advice** Candidates Lists smartmap

Questionnaire

1. Welfare state & family

1. Do you support increasing the retirement age for women and men (e.g. to 67 years)?

Yes Rather yes **Rather no** No No answer Priority

2. With a popular initiative, the unions are demanding that the canton of Aargau support the unemployed with more money. Do you support this request?

Yes Rather yes **Rather no** No No answer Priority

3. A cantonal popular initiative calls for the canton and municipalities to provide supplementary childcare structures (day care centers, day schools, lunchtimes) throughout the country. Do you support this demand?

Yes Rather yes **Rather no** No No answer Priority

4. Should state support for low-income families be expanded?

Yes Rather yes **Rather no** No No answer Priority

Back Show voting advice Save and continue

Figure A.3: Screenshot of a *smartvote* Voting Advice in Aargau 2012

smartvote voting advice











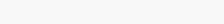

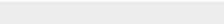

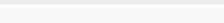

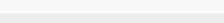

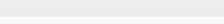

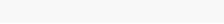

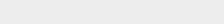



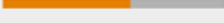









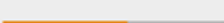

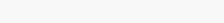

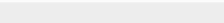

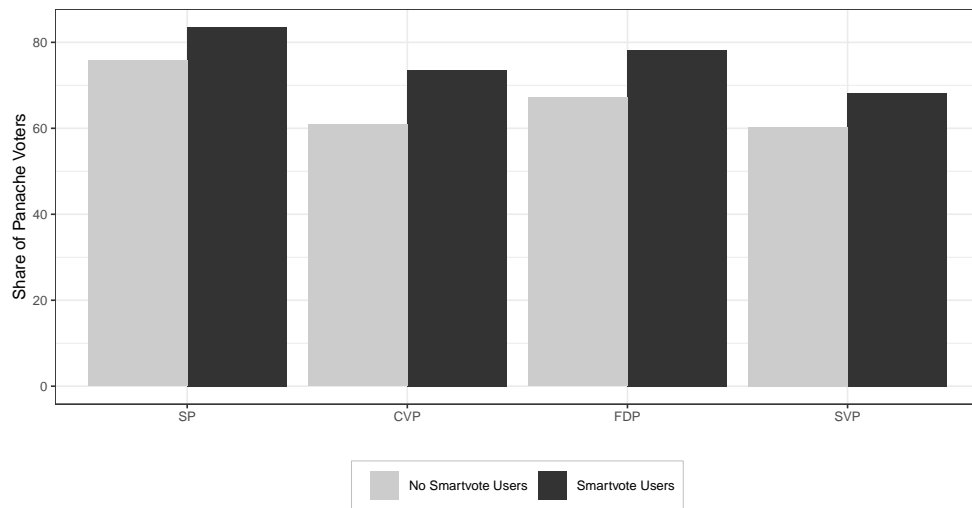
Candidate	Match	
1. Susanna Heuberger 1962, SVP	 68.6%	
2. Clemens Hochreuter 1980, SVP, bisher, gewählt	 68.3%	 
3. Markus Lüthy 1963, SVP, gewählt	 67.6%	 
4. Markus Müller 1964, EDU	 67.1%	
5. Daniel Kopp 1964, SVP	 66.4%	
6. Dominik Portmann 1984, EDU	 63.7%	
7. Roland Haldimann 1961, EDU	 63.4%	
8. Silvia Grand 1954, EDU	 61.9%	
9. Peter Wehrli 1954, SVP, bisher, gewählt	 61.7%	
10. Brigitte Siegenthaler-Kyburz 1965, SVP	 59.6%	
11. Martin Haberstich 1958, SVP	 59.5%	
12. Ueli Kohler 1956, FDP	 58.0%	
13. Ueli Frey 1964, EVP	 57.8%	
14. Daniel Leuthardt 1956, FDP	 57.6%	 
15. Antonio Tomamichel 1965, EDU	 56.3%	
16. Joel Blunier 1974, EVP	 56.1%	 
17. Annelise Schnyder 1965, BDP	 55.5%	
18. Daniel Wehrli 1968, SVP, gewählt	 53.6%	
19. Nadja Kohler 1978, SVP	 53.2%	

Figure A.4: Relative Panache Voters of the Big Four Parties



Note: The histogram presents the share of voters who modify their ballots with candidates from other parties distinguished by *smartvote* users and non-users. The graph compares the share of panache voters between the four main parties SP, CVP, FDP and SVP.