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## Complex ballot propositions, individual voting behavior, and status quo bias

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# Complex ballot propositions, individual voting behavior, and status quo bias

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*This paper analyzes how the complexity of ballot propositions influences individual voting behavior in direct-democratic elections. We combine micro-data from representative post-referendum surveys in Switzerland with unique data on a novel measure of proposition complexity which relies on a word count of information provided in official booklets. Using Heckman estimations to correct for participation bias, we provide evidence that proposition complexity leads to rejection-biased voting (status quo bias). An increase of one standard deviation in our complexity measure is associated with an average increase in the rejection rate by 5.3 percentage points. However, correcting for the participation bias reduces the effect by 2.3 percentage points highlighting the importance of selection effects in determining vote outcomes. Further evidence suggests cognitive overburdening as the transmission channel and excludes alternative explanations.*

**JEL codes:** D71, D72, D81

**Keywords:** *Voting behavior, proposition complexity, direct democracy, status quo bias, Heckman probit model*

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## I. Introduction

Direct legislation provides citizens with the opportunity to directly determine policy outcomes. This advantage over representative democracy comes at a cost, however. Constituents are confronted with ballot propositions on a broad variety of issues. Often several propositions are at stake on the same day.<sup>2</sup> In each case, voters choose between the status quo (reject the proposition) and the ballot measure (accept the proposition). As Lupia (1994) states “a defining characteristic of many propositions is complexity” (p. 63). Constituents therefore face considerable difficulties in estimating the personal consequences of accepting or rejecting a proposition. The extent to which voters have a hard time deciding on a proposition varies across individuals but also across ballot propositions, i.e. individual ballot questions that are at stake. To evaluate whether information costs are a serious impediment to the realization of the benefits of direct democracy, we investigate how constituents respond to complex propositions, i.e. propositions that put particularly high information demands on voters.

The theoretical literature on the decision to participate in an election stresses the role of information. In particular, it has been argued that the severity of low information and high uncertainty about the consequences of ballot measures varies from issue to issue (Matsusaka 1992). More complex propositions impose higher information costs on citizens which may affect both their participation as well as their vote decision. We hypothesize a negative correlation between proposition complexity and the probability that the voter accepts a proposition, i.e. complexity gives rise to a status quo bias (Kahneman, Knetsch, and Thaler 1991; Quattrone and Tversky 1988; Samuelson and Zeckhauser 1988).

Even though various authors have pointed out that ordinary voters may not be competent enough to make certain choices (Cronin 1999; Magleby 1984), evidence on the role of complexity in direct legislation is scarce. The key difficulty lies in providing a suitable measure of complexity. Empirical studies typically resort to a convenient measure of ballot complexity which counts the number of propositions that were at stake on the same day.<sup>3</sup> Ballots with many propositions have been found to be associated with (i) a lower awareness of the propositions at stake (Kriesi 2008; Nicholson 2003); (ii) an interference with the pre-referendum deliberative process (Frey 1994); difficulties to translate political preferences into policy choices (Selb 2008); (iii) lower turnout or higher roll-off<sup>4</sup> (Bowler and Donovan 1998; Bowler, Donovan, and Happ 1992; Reilly and Richey 2011); (iv) a stronger inclination to reject propositions (Bowler and Donovan, 1998) and (v) a stronger reliance on parliamentary recommendations (Stadelmann and Torgler 2013).<sup>5</sup> These results provide a first indication that voters do respond to variation in complexity. However, the complexity measure that the existing literature uses is a rough measure of complexity and does not measure complexity at the proposition level. Most

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<sup>2</sup> Crowded ballots have been subject to criticism for many decades (see for instance Lapalombara and Hagan (1951)).

<sup>3</sup> The literature also refers to this as a measure of voter fatigue.

<sup>4</sup> The roll-off rate – also referred to as the drop-off rate – captures the share of incomplete ballots that are submitted. Ballot roll-off indicates that voters choose to skip some of the ballot questions for instance due to high complexity of single propositions or crowded ballots.

<sup>5</sup> Reilly and Richey (2011) study the effect of the readability of propositions in terms of language and find that voter fatigue has no independent effect on aggregate drop-off rates once readability is included in the regression model. This provides evidence that the individual complexity of propositions has effects that go beyond ballot-specific complexity measures.

importantly, the existing literature is based on data at the aggregate level which does not allow for a more detailed investigation into the channels for changes in voter behavior due to complexity.

This paper makes three important contributions to the literature. Our first contribution is to develop a new measure for proposition complexity. Conceptually, we take a different approach than the existing literature by constructing a measure of the *underlying* complexity of ballot propositions. Previous studies have resorted to two measures of complexity that measure the complexity of ballots or propositions in two ways: (i) the number of propositions on a ballot, i.e. a measure of *ballot complexity*, or (ii) the number of words or number of lines devoted to a proposition on a ballot, i.e. a measure of *proposition prolixity* (Bowler, Donovan, and Happ 1992; Frey 1994; Kriesi 2008; Nicholson 2003; Selb 2008; Stadelmann and Torgler 2013). The first measure takes into account how many propositions voters have to deal with on the same day, i.e. it does not capture the complexity of an individual proposition. The second measure refers to a point in time where a voter has already taken a first decision – when a constituent has already turned out and is sitting in front of the ballot. This approach ignores voters who decide to stay at home in the first place. The complexity of a proposition that voters are exposed to *prior* to a referendum is the variable of interest.

Our measure of proposition complexity is based on an extensive data collection effort for 276 federal referenda in Switzerland over the time period from 1981 to 2010. We use information provided in official pre-referendum booklets. In constructing this measure, we follow the literature which regards complex propositions as those that are “lengthy (...) and technical” (Lupia 1994, 65). While the level of technicality is difficult to measure and is subjective, the length of propositions can be measured. Since 1978, the Swiss government is obliged by law (Schweizer Bundesrat 1978) to disseminate a written information booklet before each national referendum to all eligible voters. We count the number of words in the information and debate section for each proposition. Highly complex propositions are associated with a longer description.

The second contribution of our paper is to apply an econometric specification that allows us to deal with sample selection. For any proposition constituents face two decisions. First, they have to decide whether to cast their vote. If they do participate in the referendum, they face a second choice: the status quo (reject the proposition) versus the ballot measure (accept the proposition). Since the vote decision is only observable for citizens that participate in the referendum, the classic *sample selection problem* arises (Heckman, 1978; 1979). In our case, the selection bias is a participation bias which can be quite substantial. For propositions on immigration issues, Krishnakumar and Müller (2012) find a participation bias of 17 percentage points. Previous studies that investigate the role of complexity in direct legislation use aggregated data at the proposition level where the dependent variable is the turnout rate or the share of yes- or no-votes ignoring sample selection. We apply a structural approach based on two estimation equations resembling a Heckman selection model (Heckman 1978; Heckman 1979). We solve the endogeneity problem by means of an exclusion restriction, i.e. we include a variable that influences the participation decision but which is orthogonal to the vote decision.

Our third contribution is to provide evidence on the transmission channel for status quo bias due to proposition complexity. This has not been investigated in previous studies. Samuelson and Zeckhauser (1988) list a wide variety of explanations and channels for status quo bias but the empirical literature across different fields within economics has so far rarely attempted to provide evidence on underlying channels. It can be argued that status quo bias is generally a concept that is ubiquitous but not well understood. Our individual-level data on voting behavior allows us to dig deeper than the previous literature.

Our baseline estimation results provide evidence that voters that have to decide on more complex propositions are more likely to reject them. An increase in our complexity measure by 1 standard deviation is associated with an average increase in the rejection rate of 5.3 percentage points. The participation bias reduces this effect by roughly 2.3 percentage points. We explain this with the use of simple heuristics – in our case the reliance on the status quo – by voters who are overwhelmed by complex decision tasks. Further results suggest that voters with a lower ability to understand complex issues may not vote in line with their preferences. Less educated voters are more than 10% more likely than highly educated voters to abstain from voting and to reject propositions. Furthermore, voters with a university degree are associated with a 3 percentage points lower rejection rate for relatively easy propositions. This gap *more than doubles* for complex propositions. In that sense, our results point out that information costs are higher for less educated than for more educated voters making them more vulnerable to proposition complexity. This provides evidence on an important and neglected transmission channel for status quo bias – lack of cognitive skills. One may reconcile this source of status quo bias with the existence of uncertainty that arises due to a poor understanding of the proposition which is one of the channels that is emphasized in the literature (Samuelson and Zeckhauser 1988). We additionally investigate whether campaign intensity as measured by campaign ad space may help reduce this heterogeneity through lower information costs.<sup>6</sup>

Our results are robust to various sensitivity tests. A first concern may be that the length of the description in the official booklets is endogenous. In particular, one may suspect that the government manipulates the information text to be particularly short or long to influence voter's decisions. A first response to this concern is to point out that the office in charge of writing the information booklet ("Bundeskanzlei") has to follow strict legal rules in composing the booklets. The federal court has explicitly forbidden to use the booklets to influence the decision-making process of voters towards accepting the proposition (Bundesgericht 2008). Since the strict legal framework requires a short and balanced booklet text, the length of text is determined solely by the necessity to provide longer descriptions of more complex propositions to fulfill the legal requirements. In addition, we provide empirical evidence which shows that the length of the information text is not correlated with parliament's support for a proposition.

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<sup>6</sup> The mitigating role of campaign intensity has been discussed in previous literature Gerber and Lupia (1999; Selb (2008).

Another concern might be that our complexity measure is rather a measure of proposition importance. The Bundeskanzlei might devote more pages to propositions that are more important for the country. This may in turn induce voters to be more willing to participate in the referendum or to abstain due to the overwhelming responsibility that they face. We use a data on a survey question that asks voters about their perception of how important a proposition is for them personally or for the country as a whole. When we control for subjective proposition importance, our estimates for the effect of proposition complexity on individual voting behavior are hardly affected.

A third concern with our complexity measure may be of a more conceptual nature. We argue that our complexity measure captures the underlying complexity of a proposition. If our measure captures complexity at a more superficial level, it would only affect those voters who have read the information booklet prior to the referendum, i.e. the estimates should only be significant for this subgroup. We do not find differences for readers and non-readers of the information booklet. This makes us confident that our complexity measure is indeed a measure of underlying proposition complexity and therefore provides a new approach to measuring complexity in the context of direct-democratic elections.

Some readers may prefer a more direct measure of proposition complexity that asks voters about their perception of the proposition. There is one question in the VOX survey which is far from perfect but which may at least partially capture subjective complexity. It is, however, a very rough measure on a 0/1 scale that captures very little of the variation in complexity. People were asked: “Did you find it rather easy (0) or rather difficult (1) given the provided information to imagine the impact of a yes- or no-vote on yourself with regard to this proposition?” We additionally ran regressions using this alternative measure of proposition complexity. We find that the estimates are slightly smaller/larger than in the baseline estimations based on our preferred complexity measure. This provides additional support to the validity of our complexity measure.

There may also be concerns about the survey data that is used in our analysis. A general and often stated concern is that survey data may suffer from survey bias because respondents may not answer truthfully, i.e. in our context misrepresent their participation and voting decisions (Funk 2015). We investigate whether our results are driven by survey bias by excluding propositions that fall into policy areas where survey bias has been identified by Funk (2015) such as issues on gender, race, and gay rights. We find that for the subsample of remaining propositions, our estimates are similar to the baseline estimates.

Our results have important implications for our understanding of the optimal use of direct democracy. Direct democracy is often criticized as an elitist instrument that provides certain socioeconomic groups or powerful interest groups with disproportionate power. Our findings suggest that less educated citizens, i.e. citizens with weaker cognitive abilities, are discouraged from casting their vote when propositions are highly complex. As Lijphart (1997, 1) states such “unequal participation spells unequal influence” and thereby especially calls the legitimacy of referenda on such complex issues into question. Second, our findings provide a new perspective on the question which issues should be

delegated to representatives and which issues that voters should decide on directly. Previous literature has for instance pointed out that representative democracy is best suited for Pareto-comparable efficiency issues, while direct democracy is needed for divisive issues that have distributional consequences (Matsusaka 1992). We complement this literature by underlining that highly complex issues should not be put to a direct-democratic vote as certain groups within society are in principle systematically excluded from decision-making. Third, we find that campaign intensity as captured by ad space in newspapers helps reduce participation bias and status quo bias. An obvious implication of our findings is therefore that the government should invest more resources in providing this kind of low-cost information when propositions are unusually complex.

## II. Empirical Strategy

### A. Participation bias and endogeneity

For any proposition that is at stake, constituents face two decisions. First, they have to decide whether to cast their vote. If they do participate in the referendum, they face a second choice: the status quo (reject the proposition) versus the ballot measure (accept the proposition). Since the vote decision is only observable for the subpopulation of citizens that participate in the referendum, the classic *sample selection problem* arises (Heckman 1978; Heckman 1979). In our case, the selection bias is a participation bias.

We hypothesize that the participation and the vote decision are both influenced by our main explanatory variable: the complexity of a proposition. The two decisions can be represented by binary choice models as follows:

$$(1) \quad \textit{Participate}^* = \alpha \textit{Complexity} + \boldsymbol{\beta}'\mathbf{X} + u, \quad \textit{Participate} = 1 \text{ if } \textit{Participate}^* > 0, \\ \textit{Participate} = 0 \text{ otherwise.}$$

$$(2) \quad \textit{Yes-vote}^* = \alpha \textit{Complexity} + \boldsymbol{\beta}'\mathbf{X} + \epsilon, \quad \textit{Yes-vote} = 1 \text{ if } \textit{Yes-vote}^* > 0, \\ \textit{Yes-vote} = 0 \text{ otherwise.}$$

where vector  $\mathbf{X}$  includes a set of control variables<sup>7</sup>.

Building on the literature on status quo bias (Samuelson and Zeckhauser 1988), one could argue that the specification above suffers from omitted variable bias which gives rise to endogeneity. In particular, an unobserved characteristic of respondents such as their level of risk aversion may influence whether they are willing to bear the participation costs and whether they are biased towards supporting the status quo. This implies  $u = \gamma \textit{Unobserved} + \mu$  and  $\epsilon = \xi \textit{Unobserved} + \omega$ . If this unobserved variable is correlated with proposition complexity, the coefficient for complexity  $\alpha$  suffers from bias.

Several solutions to this problem may come to mind. A first idea would be to restrict the sample to the voting population, i.e. ignore the first equation. This would, however, cause either an upward or

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<sup>7</sup> For notational convenience, we use the same Greek letters indicating the coefficients to be estimated in equation (1) and (2). However, they can represent different estimates in each equation. We keep this convention throughout the paper.

downward bias in alpha depending on how voters and non-voters differ in their response to complexity. For example, if an increase in complexity causes citizens, which otherwise would have voted against the proposition, to abstain from voting, then  $\alpha$  (a measure of the magnitude of the status-quo bias) would be upward biased, i.e.  $\alpha$  would be less negative. A second potential solution might be to control for participation in the vote decision equation and to use an instrument for participation. However, the voting decision is only observable for participants and therefore an IV approach is not feasible.

In the next section, we describe how we solve the endogeneity problem by means of an exclusion restriction, i.e. we include a variable in the first equation that influences the participation decision but which is orthogonal to the vote decision. In this way, we can control for the selection bias.

### B. *Exclusion restriction and Heckman selection approach*

Without an exclusion restriction in equation (1), identification would solely rely on the bivariate normality assumption regarding the functional form of the error terms. As Wooldridge (2010) shows, identification on this assumption alone can be misleading and produce spurious results. A valid exclusion restriction in our setting is a variable that influences participation but has no direct effect on the vote decision.

Based on a sizable literature on the relationship between contested elections and turnout, we propose to include the ex-post approval share of a proposition, i.e. the share of yes-votes among all valid votes that are cast, as a valid exclusion restriction. A positive correlation between a close election and the individual likelihood to cast one's vote can be explained in different ways. It has been argued in the seminal literature that the benefit of voting increases with the probability of casting the decisive vote (Downs, 1957; Riker and Ordeshook, 1968). This probability is clearly higher when an election is contested. This has been denoted in the literature as the *Downsian Closeness Hypothesis* (Matusaka and Palda 1993). A second prominent explanation for this positive relationship relies on more mobilization efforts (lowering participation costs) by stakeholders in contested elections which affects the individual probability to participate in the referendum (Cox and Munger 1989; Denver and Hands 1974; Key and Heard 1984).<sup>8</sup> On the other hand, there is no reason why a close election would make it more likely that voters support or reject propositions, i.e. there is no correlation between the vote decision and contested elections.

Our Heckman selection approach can be described by the two equations below where  $Z$  is the share of yes-votes:<sup>9</sup>

$$(3) \quad \text{Participate}^* = \alpha \text{ Complexity} + \beta' \mathbf{X} + \delta Z + u, \quad \text{Participate} = 1 \text{ if } \text{Participate}^* > 0, \\ \text{Participate} = 0 \text{ otherwise.}$$

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<sup>8</sup> In principle, the share of yes-votes depends on the individual decision of the voter and seems to be an invalid exclusion restriction. However, the absolute number votes for each proposition in the time interval covered in our sample (1981-2011) was on average 2,000,000 votes. Therefore the individual voting decision has an ignorable influence on the share of yes-votes. Another thought experiment illustrating the validity of our exclusion restriction is that we could compute a new vote share variable where we subtract the one vote of the corresponding individual. It is easy to see that the value of the vote share would change only by one millionth, which would not affect our results.

<sup>9</sup> To be more precise, we will include the approval share as well as its square since there is an inversely U-shaped relationship.



$$(4) \quad \begin{aligned} \text{Yes-vote}^* &= \alpha \text{ Complexity} + \boldsymbol{\beta}'\mathbf{X} + \epsilon, \text{ Yes-vote} = 1 \text{ if } \text{Yes-vote}^* > 0, \\ \text{Yes-vote} &= 0 \text{ otherwise.} \end{aligned}$$

As suggested by (Freedman and Sekhon 2010), we solve the two-equation model in equations (3) and (4) with maximum likelihood estimation instead of the two-step procedure which was originally introduced by (Heckman 1978; Heckman 1979).

As mentioned before, our estimations also include a number of control variables. Since, proposition complexity is exogenous from the viewpoint of an individual citizen, the sole purpose of including controls is to gain precision in the estimation of our coefficient of interest  $\alpha$ . We include a number of standard voter characteristics that have been included in previous studies: female dummy, age, education level, knowledge about the proposition, married dummy, Protestant dummy, employed dummy.<sup>10</sup> We additionally include dummies for the canton in which the respondent is living, for the year in which a referendum is held and for the policy area in which a proposition falls. Status quo bias and the willingness to participate in referenda may differ across cantons for cultural reasons. Year dummies allow us to capture common shocks in specific time periods as well as trends in participation and vote decisions. Policy area fixed effects allow us to reduce the variation in proposition complexity by the amount that is exclusively due to the policy area which may be inherently more or less complex than other policy areas. All estimations use standard errors that are clustered at the proposition level.

### III. Data Description

#### A. Post-referendum survey data

We use data from standardized and representative polls conducted after each national referendum since 1981. The GfS Research Institute in Berne conducts the surveys on behalf of the Institutes of Political Science at the Universities of Berne, Geneva, and Zurich. A random sample of 700 to 1000 eligible voters stratified by language area (German-, Italian, French-speaking) is selected from the Swiss telephone book and surveyed within two weeks after the elections.<sup>11</sup>

The main objective behind these surveys is to understand motives for individual voting behavior and how it is related to individual's knowledge about the issues at stake. What is most important for our purposes is that the VOX survey asks citizens about their participation in each referendum as well as their individual voting decisions. These are our dependent variables in equations (3) and (4). The respondent is also asked about his knowledge about the proposition, the kind of media consulted prior to the referendum, the perceived importance of the vote, and an extensive set of individual characteristics (age, gender, education, marital status, profession, etc.).

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<sup>10</sup> Brunner, Ross, and Washington (2011) show that economic conditions shape preferences on direct-democratic legislation. In our estimations, this would at least be partially captured by the employed dummy. Funk and Gathmann (2015) provide evidence that female voters make different choices on direct-democratic propositions in Switzerland than male voters.

<sup>11</sup> The interviews are conducted as follows. The interviewer calls, introduces himself and asks whether there is an eligible voter in the household. If there are several eligible voters in a household, the one who has his birthday on the earliest in the year is interviewed.

### B. *Official information booklets and complexity measure*

Since 1978, the Swiss government is obliged by law (Schweizer Bundesrat 1978) to send out a written information booklet before each national referendum to all eligible voters. The office in charge of writing the information booklet (“Bundeskanzlei”) has to follow strict legal rules regarding the content of the information materials. The booklets are required to be short, objective and transparent, and have to be in line with the principle of proportionality (Bundesgericht 2008). It is explicitly forbidden by law to influence the decision-making process of voters towards accepting the proposition.

Each proposition has a separate chapter in the booklet. Depending on the number of proposition per ballot, as well as on the length of the text for each proposition, the booklets usually have a size of around 50 pages. Each chapter usually consists of four sections, a short summary, a detailed information section, a debate section comparing arguments against and in favor of the proposition, and a legal section in which parts of the wording of the law are published that would change if the referendum is successful.

We construct a novel proposition complexity measure based on the information booklets. We use standard office software that transfers the booklets into a machine-readable format that allows us to count the number of words in the information and debate section for each proposition. Highly complex propositions are associated with a more detailed and therefore longer description in the information booklet. As described in the last subsection, the strict legal framework requires a short and balanced booklet text and prohibits that the government agency in charge of writing the information booklets influences voters by exaggerating the view of the government. We therefore believe that the length of the information text is determined solely by the necessity to provide longer descriptions of more complex propositions to ensure that the content of the information booklets complies with legal requirements<sup>12</sup>.

Several mechanisms may cause the degree of complexity of a proposition to be positively associated with the number words used in its information text. First, the content of the proposition itself is difficult to understand. In that case, one would expect a more extensive description in the information text section. Second, a proposition concerning a large number of stakeholders in potentially opposite directions makes it difficult to balance the pros and cons.

[Figure 1 goes here]

Figure 1 illustrates the large variation for the booklet-based complexity measure. The median length of the information text is around 1,500 words; roughly 80 percent of the observations lie between 900 and 2,300 words.

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<sup>12</sup> An alternative measure could be based on the actual legal text on which is voted upon. Each proposition gives rise to a change in the constitution. In addition propositions are often related to changes in laws on different legislative levels. Comparing the length of legal texts from different legislative levels seems unreasonable, because legal text from a lower legislative level is probably more detailed. Furthermore, Huber and Shipan (2002) have argued that the detailed language and therefore the length of the legal text might be driven by politicians’ incentive to delegate policy making to other policymaking authorities like bureaucrats.

## IV. Estimation Results

### A. Probit estimations for the participation and vote decision

Table 1 presents the regression results for the participation decision (models (1) to (4)) and the voting decision (models (5) to (8))<sup>13</sup>. We report the average marginal effects instead of the probit coefficients. We use the log of the number of words for the information text of a proposition since we expect that the same absolute increase in the number of words of the information text has a stronger effect on voting behavior in case of an increase from 100 to 200 words than in case of an increase from 1000 to 1100 words. In other words, we assume that relative rather than absolute changes in our word-based complexity measure have a constant effect on voting behavior.

[Table 1 goes here]

With respect to the effect of complexity on turnout, we find that the (average marginal effect) coefficients of all complexity measures are negatively related with the probability of participating in the referendum and significant at the 1 percent level<sup>14</sup>. The magnitude of the negative effect of complexity on participation is economically significant. Based on our estimates in model (4) in table 1, we find that citizens confronted with a ballot with a one standard deviation higher complexity, have a 8.1 percentage points lower probability to participate in the referendum than citizens reporting no difficulties. The results are robust with respect to the inclusion of fixed effects for cantons, referenda type, and years. In general including fixed effects for different proposition topics has no major influence on the participation results as the results marginal effects increase only slightly.

The control variables *education*, and *proposition knowledge* have the expected signs and are highly significant. More educated people are more likely to participate in elections, because they have to invest fewer resources to estimate the consequences of their voting decision. Citizens who report a higher average personal knowledge of all propositions of the referendum and a higher political interest are more likely to participate.

Models (5) to (8) in table 1 present the estimates with respect to the probability of voting in favor of proposition. Higher proposition complexity is associated with a lower probability to vote in favor of a proposition. The estimates are statistically significant at the 5%, respectively 10% level. Adding fixed effects increases the precision and the size of the estimated marginal effect slightly. The results from model (8) suggest that voters confronted with a more complex proposition (e.g. an increase by one standard deviation) have a 4.6 percentage points lower probability to vote in favor of a proposition. On

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<sup>13</sup> The summary statistics for the variables used in the regressions are provided in table A.1 in the appendix.

<sup>14</sup> The high significance levels in our statistical tests are not driven by the very large sample size used in the regression analysis. Our complexity objective complexity measure varies only at the proposition, respectively ballot level. Therefore, we correct our standard errors by clustering at the ballot level, allowing observation within a ballot to be correlated. The power of our statistical tests is therefore determined by the number of independent observations (ballots) in our estimation sample. With respect to the relatively low number of ... ballots, high significance levels cannot be attributed to the size of the entire sample, but rather to a large quantitative effect (as we will illustrate later in this section) and maybe to relatively low noise in our estimates regarding to the effect of complexity on voting behavior.

average this effect translates in to an increase in the predicted absolute rejection rate from 45.9% to 50.5%<sup>15</sup>.

Voters with higher education are significantly more likely to vote in favor of the proposition. One explanation might be that these voters are better informed and more capable to understand the consequences of the proposition. Since heuristics are primarily used in situations where people have to trade-off the effort related to a decision with the decision accuracy (Gigerenzer and Gaissmaier 2010), better informed voters may have to invest less additional effort and are less likely to rely on heuristics in their decision making process. One can expect that these voters will be less likely to exhibit a status-quo bias and exaggerated conservatism in their voting behavior.

To allow the reader to get comprehensive understanding of the estimates effect size, we plot our main results in figure 2<sup>16</sup>. Figure 2 panel (a) plots the predicted probability of participation against the complexity measure and illustrates the statistical and economic significance of the negative effect of different complexity measures on voters' participation. Figure 2 panel (b) plots the negative relationship between the predicted probability of voting in favor of a proposition and the complexity measure. The shaded area represents the 95 percent confidence interval band. The vertical dotted lines illustrate the distribution of the complexity measure by illustrating the 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, and 90<sup>th</sup> percentiles of the complexity measure.

[Figure 2 goes here]

The predicted participation rate for a simple ballot (10<sup>th</sup> percentile of complexity measure) is around 65% and falls below 50% for highly complex ballot (90<sup>th</sup> percentile). The predicted probability of voting in favor of a proposition, drops by slightly less than 10 percentage points when comparing a simple proposition (10<sup>th</sup> percentile) with a highly complex proposition (90<sup>th</sup> percentile). Both results suggest that the negative effect of complexity on participation and approval voting is quantitatively substantial.

Note that our sample size for the estimation of the voting decisions has only about half of the size ( $N \approx 107,000$ ) of the sample used for the estimation of the participation decision in table 1 ( $N \approx 204,000$ ). This drop can be explained by the fact that we are only able to observe the voting behavior of citizens who in fact participated in the referendum. Therefore, we lose about 50 percent of our sample in the estimations in table 2.

We find strong evidence for a status-quo bias in voting behavior. Both – turnout and approval votes – are negatively and significantly related with complexity. Supporting hypothesis 2, the (average

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<sup>15</sup> These results derived from our objective, information text-based complexity measure are quantitatively in the same region as the results derived with a subjective, survey-based measure. For comparison, we report the results based on our subjective complexity measure in table A3.2 in the appendix. We find that citizens who reported difficulties to form an opinion have a 12.3 percentage points lower probability to participate in the election and a more than 5 percentage points lower probability to vote in favor of a proposition than citizens reporting no difficulties. The results of both, objective and subjective complexity measures provide strong empirical evidence for the existence of a status-quo bias in the behavior of participating voters. However, the subjective survey based complexity measure might be confounded with observable and unobservable individual characteristics. We discuss this point in detail in section VI.A

<sup>16</sup> We follow McCloskey and Ziliak (1996; Ziliak and McCloskey (2008), suggesting that meaning and the representation of the size of the estimate is at least as important as the statistical significance. The following graphical representation of the nonlinear relationship relies on comments in Wooldridge (2004; Greene (2010).

marginal effect) coefficients of all complexity measures are negatively related with the probability of participating in the referendum.

The results in this subsection provide evidence for our hypotheses. While concentrating only on the direct effects of complexity on participation and on the voting decision, we neglected the indirect effect of proposition complexity – via altering the participation decision – on the vote outcome.

This might be valid if only the subset of voters in the entire population is of interest (Funk and Gathmann 2015). However, it is incomplete if one is interested in the overall outcome of the election. In the next subsection, we explicitly take this indirect effect into the account.

### B. Heckman estimations to correct for the participation bias

As described in section II.B, the exclusion restriction denoted by  $\delta$  in equation (3) is the *approval share* of a proposition. We include the variable *approval share* and *approval share squared* as explanatories<sup>17</sup>. Before estimating the Heckman selection model, we illustrate the validity of our exclusion restriction by estimating a probit, in which we regress the participation decision on our measure for the voter's expectation of a narrow voting decision. Table 2 provides the regression results on the link between the probability to participate and the approval share. In line with the *Downsian Closeness Hypothesis* (Matusaka and Palda 1993) we find a statistical significant hump-shaped relationship. Based on the regression results in table 2 columns (1) to (4), Figure 3 depicts the hump-shaped relationship of the probability to participate and the proxy measure for the voter's expectation of a narrow voting decision. The highest participation rate is indeed associated with a close election outcome denoted by a share of yes-votes around 50%.

[Table 2 goes here]

As argued in section II.B, the expectation of a narrow voting decision measured by the approval share should have no direct effect on the decision to vote in favor or against a proposition, which does not exclude the probability of an indirect effect via the decision to participate, which does not violate the assumptions regarding to a valid exclusion restriction in the Heckman selection model.

[Figure 3 goes here]

Table 3 presents the estimated coefficients for the Heckman selection model specified in equations (3) and (4). The coefficients associated with the complexity of the ballot and proposition have the expected negative sign. They are all individually significant at the 1 percent level. Our exclusion restrictions *approval share* and *approval share squared* also have the expected signs. The variable *approval share squared* is significant at the 5, respectively 1 percent level.

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<sup>17</sup>Instead of relying on the quadratic specification, an alternative specification would rely on a measure describing the distance of the share of yes from 50%. Our approach has several advantages. It allows the effect to be nonlinear, thereby we do not impose a hump-shaped relationship with a peak around 50, it is a result of the estimation. We therefore not only test whether the share of yes votes turns out to be a statistical significant regressor, but also whether the implied quadratic functional form is (i) indeed hump-shaped (negative coefficient of the *approval share squared* variable) and (ii) has its peak around 50% (see figure 3Figure 3) as theory would predict.

The estimated coefficient  $\rho$  measures the correlation between the error terms of the selection and the outcome equation.  $\rho$  can be interpreted as measure of unobserved factors affecting both, the participation and outcome decision at the same time. The estimate of  $\rho$  is positive and statistical significant in all specifications, indication that unobserved factors affect the probability to participate and the probability to vote in favour of the proposition in the same direction. The size of the correlation decreases as we enter controlling for different fixed effects. This is expected, because controlling for more observable determinants, decreases the role unobserved factors play in determining the participation and voting decision. However, even in model (4) in table 3, where we control for canton, referenda, year, and policy area differences (as well as socio-economic factors, which are included in all specifications in table 3), the correlation coefficient  $\rho$  is still quantitatively large and precisely measured. With respect to the effect of complexity on the participation and voting behaviour, the positive correlation indicates that the indirect effect of complexity via affecting participation – on the probability to vote in favour of a proposition is positive, because more complex topics increase the probability that confused eligible voter's stay at home, which otherwise would have voted – in line with the status quo bias – against the proposition.

[Table 3 goes here]

The participation bias arises due to observed and unobserved factors which affect both participation and voting decision. Table 4 reports estimates for the resulting participation bias based on regression results in column (4) in table 3. Whereas on average only 47.5 percent of no-voters participated in the elections, 68.1 percent of the yes-voters participated. The resulting participation bias in the electoral outcome equals therefore roughly 10 percentage points.

[Table 4 goes here]

Since the coefficients in nonlinear index models, and especially in the case where they are associated with variables appearing in both, the selection (participation) and outcome (Yes-vote) equation of a Heckman selection model, we report the average partial effects for our main variables of interest in table 5. We also compare them with the respective results from single equation probit specifications as described in equations (1) and (2). As previously explained, the indirect effect of complexity on the vote outcome, ( $v = 1 | \pi = 1$ ) – that can only be identified with the Heckman approach – is positive. An increase of one standard deviation in the complexity measure of the ballot increases the average probability of voting in favor of a proposition by 2.3 percentage points (5<sup>th</sup> column in table 5), because a higher ballot complexity reduces the turnout rate of potential no-voters stronger than the respective turnout rate of potential yes-voters. However, the indirect effect is quantitatively not large enough to offset the opposing negative direct effect of proposition complexity on the voting decision (-5.3 percentage points).

[Table 5 goes here]

Based on the estimates in table 5, one might be tempted to accept the probit estimate for the average effect of complexity on voting behavior (-4.4 ppts.) as reasonable approximation for the Heckman estimates consisting of both direct (.5.3 ppts.) and indirect (2.3 ppts.) effect of complexity. Unfortunately the direction of the bias of the probit estimates is systematically related to the complexity of the ballot. Figure 4 illustrates this phenomenon by comparing the predictions for the vote outcome of the probit and the Heckman approach. Since probit estimates based only on the sample of voters neglect the participation decision of potential voters, they underestimate the probability of voting in favor of a proposition in cases in which the ballot complexity is very high leading to lower participation and the neglected positive indirect effect is strong, whereas they overestimate the probability of voting in favor of a proposition, when ballot complexity is low quantitatively very low. The difference in the predictions is quantitatively large, and in some cases in low complex ballots the probit model predicts an approval rate above 50%, where the Heckman model would predict a rejection of the proposition. Whereas the opposite can happen in highly complex ballots.

[Figure 4 goes here]

The last column in table 5, provides the estimate of the effect of proposition complexity on the voting behavior of the entire population of the country ( $\Pr(v = 1)$ ), including voters and non-voters. This estimate can be interpreted as the effect of complexity on the preference in favor of an approval of a proposition of the country's population. In table 4, the difference between the average probability of voting in favour of a proposition ( $\Pr(v = 1|\pi = 1) = 52.5\%$ ) and the average probability of preferring an approval of a proposition ( $\Pr(v = 1) = 41.7\%$ ) becomes evident. As denoted in the last column in table 5, an increase of proposition complexity by one standard deviation increases reduces the average preference in the population for an approval of the proposition by 5.1 percentage. This effect can be interpreted as the status-quo bias in the entire population of a country, independently of the turnout decision<sup>18</sup>.

In summary, the results from the estimation of the Heckman selection models provide additional empirical support for a negative effect of complexity on participation as claimed in hypothesis 1 and for a status-quo bias in the voting decision.

## **V. Cognitive Overburdening / Heterogeneity of Information Costs as the Transmission Channel**

In section IV, we analyzed the role of ballot and proposition complexity on the magnitude of the status-quo bias. In this section we show that a status-quo bias in the voting decision is more pronounced for specific groups of citizens. We find that more educated voters respond less to increasing ballot and proposition complexity and exhibit a lower status-quo bias. We further find that higher campaign intensity – by lowering information costs – increases participation rates, however may only create the illusion of competence and therefore has an ambiguous effect on the status-quo bias.

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<sup>18</sup> With a single equation regression model (like the probit model in equation (2)), which focusses on the behavior of voters, these results could not be obtained.

### A. Effect heterogeneity across education levels

The availability of having an objective complexity measure which is uncorrelated with individual characteristics turns out to be major advantage when analyzing the interaction between the effect of proposition complexity and individual characteristics like education. Let  $c_s(c_o, \mathbf{i}_{\text{obs}}, \mathbf{i}_{\text{uno}})$  denote the subjective complexity of a proposition which depends on the objective complexity of the proposition  $c_o$ , a vector of observable individual characteristics  $\mathbf{i}_{\text{obs}}$  and an vector of unobservable individual characteristics denoted by  $\mathbf{i}_{\text{uno}}$  like cognitive skills of the voters.

Highly educated people may differ in their ability to deal with complex topics which causes differences in voters' reaction to complex propositions. Furthermore, voter's education is likely to be correlated with unobservable characteristics  $\mathbf{i}_{\text{obs}}$  like intelligence or cognitive skills. We could write the corresponding interaction term between subjective complexity and education as  $c_s(c_o, \text{edu}, \mathbf{i}_{\text{obs}}, \mathbf{i}_{\text{uno}}) \times \text{edu}$ . Interpreting this interaction term as the effect of a fixed level of complexity for varying levels of education is problematic, because as education changes, the perceived subjective complexity  $c_s$  changes as well since it is also affected by the change in education. It is therefore not clear what kind of effect one identifies estimating this interaction term<sup>19</sup>. If we instead use our objective text-based measure of complexity which is uncorrelated with individual characteristics of the voter, we estimate  $c_o \times \text{edu}$ .

Since, educated people are more likely to be able to understand the consequences of complex propositions, we formulate the following hypothesis: With a higher complexity of a proposition, less educated voters are more likely to use heuristics leading to a status-quo bias. We therefore expect that less educated respond stronger to an increasing level of complexity. In this section we use a university dummy which equals 1 for citizens with a university degree and 0 otherwise<sup>20</sup>.

We again estimate the Heckman selection model described in section II.B with an additional term interacting the corresponding complexity measure with our university dummy.

Table 6 presents the results. The upper part of the table reports regression coefficients of the Heckman model including an interaction as described in equations (5) and (6).

$$(5) \quad \begin{aligned} \text{Participate}^* &= \alpha \text{Complexity}_p + \delta \text{edu} + \gamma \text{complexity}_p \times \text{edu} + \boldsymbol{\beta}'\mathbf{X} + \delta Z + u, \\ \text{Participate} &= 1 \text{ if } \text{Participate}^* > 0, \text{Participate} = 0 \text{ otherwise,} \end{aligned}$$

$$(6) \quad \begin{aligned} \text{Yes-vote}^* &= \alpha \text{Complexity}_B + \delta \text{edu} + \gamma \text{complexity}_B \times \text{edu} + \boldsymbol{\beta}'\mathbf{X} + \epsilon, \\ \text{Yes-vote} &= 1 \text{ if } \text{Yes-vote}^* > 0, \text{Yes-vote} = 0 \text{ otherwise.} \end{aligned}$$

We also report the marginal effect for variables of main interest in the lower part of table 6, however by definition no meaningful single coefficient representing the marginal effect of the interaction term exists in nonlinear models (Greene 2010).

<sup>19</sup> The only way how the level of subjective complexity can stay constant w.r.t. to a change of complexity is if we assume a simultaneous change in unobservable characteristics offsetting the effect of education on the level of subjective complexity.

<sup>20</sup> Distinguishing citizens' education levels only w.r.t to university and non-university degree keeps the analysis tractable and ensures that we can interpret our education unambiguously w.r.t. high and low education.



[Table 6 goes here]

Model (1) in Table 6 provides results without controlling for citizen's education. A university dummy is introduced in model (2), (3) and (4). Citizens with a university degree have an ~11 ppt. higher probability to participate in election and ~6 ppt. higher probability to vote in favor of proposition. The interaction term between our booklet complexity measure and the interaction effect is positive but not significant. However, neither the size nor the sign nor the statistical significance can be interpreted w.r.t. to the presence of an interaction effects<sup>21</sup> (Ai and Norton 2003; Greene 2010). To quantify the size and statistical significance of the interaction effect and therefore the political significance we follow the suggestion by Greene (2010) and analyze the predicted probabilities of participation and voting yes for citizens with and without a university degree to investigate the heterogeneous response. Figure 5 and Figure 6 presents the corresponding graphs.

By plotting the predicted probability of voting yes against the proposition complexity, figure 5 illustrates the average marginal effect the complexity of the proposition measured by the length of the information text conditional on different levels of education. As illustrated in panel (a) in figure 5, the status quo bias is present for all education groups. Voters with lower education levels seem to vote against a proposition more often than the higher educated ones, even in relatively easy proposition. However, the effect increasing complexity on voting for the status-quo is less pronounced for voters with a university degree.

[Figure 5 goes here]

As denoted figure 5, the difference in the expected probability of voting in favor of a relatively easy proposition is lower than 3 percent. This gap increases to about 8 percent for more complex propositions. Figure 6 plots the difference in the predicted probability of voting in favor of a proposition for university and non-university educated citizens, as well as the 95% confidence intervals. The predicted difference becomes statistical indifferent from zero for relatively easy propositions and increases to a statistical significant difference of more than 8 percent for more complex propositions. The gap between university and non-university citizens *more than doubles* if propositions (and ballot) complexity increases.

[Figure 6 goes here]

#### *B. Do campaign ad spaces reduce information costs and thereby reduce status-quo bias?*

In this subsection we analyze the hypothesis that the status-quo bias should be less pronounced if costs for getting information regarding the proposition are lower. Lowering costs to access information – for instance due to more intensive information campaign – is inspected to mitigate perceived complexity and should therefore reduce proposition complexity. Our proxy for information costs is related to the campaign intensity measured by the number of ads related to a given proposition in the 6

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<sup>21</sup> Hence, using a t-test to access statistical significance of the coefficient of the interaction term is also invalid.

major Swiss newspapers before the voting day<sup>22</sup>. We estimate the following equations of the Heckman model:

$$(7) \quad \begin{aligned} \text{Participate}^* &= \alpha \text{Complexity}_P + \delta \text{campaignIntensity} + \gamma \text{complexity}_P \times \\ &\text{campaignIntensity} + \beta' \mathbf{X} + \delta Z + u, \\ \text{Participate} &= 1 \text{ if } \text{Participate}^* > 0, \text{Participate} = 0 \text{ otherwise,} \end{aligned}$$

$$(8) \quad \begin{aligned} \text{Yes-vote}^* &= \alpha \text{Complexity}_B + \delta \text{campaignIntensity} + \gamma \text{complexity}_B \times \text{campaignIntensity} + \\ &\beta' \mathbf{X} + \epsilon, \\ \text{Yes-vote} &= 1 \text{ if } \text{Yes-vote}^* > 0, \text{Yes-vote} = 0 \text{ otherwise.} \end{aligned}$$

In model (1) in table 7, we reproduce our main results for the subsample for which data on information costs is available.

[Table 7 goes here]

In model (2) and (3), we introduce the campaign intensity measure as well as an interaction term. A higher campaign intensity measured by an absolute increase in ads by 100 is associated with a statistically significant increase of 4 to 5.2 percentage points in the participation rate. However the effect of complexity on approval voting is quantitatively low and insignificant. The results suggest that higher campaign intensity mitigates the negative effect of complexity on participation. This result is supported by Figure 7, in which the effect of complexity on participation rates for a representative low (25th percentile in campaign intensity distribution) proposition is compared to proposition characterized by high proposition complexity (75<sup>th</sup> percentile in campaign intensity distribution).

[Figure 7 goes here]

When ballot complexity increases, participation rates decrease stronger in case of relatively low campaign intensity, which suggests that a high campaign intensity is able to weaken the negative effect of complexity on participation. Figure 8 plots the corresponding the predicted probability of voting in favor of a proposition. The estimates in the figure illustrate that the status quo bias is arising in roughly similar size in proposition with low and high campaign intensity, when proposition complexity increases. The intersection of both surface in figure 8 along the ballot complexity axis illustrates the difference in the indirect effect transmitted through the heterogeneous response w.r.t. to participation illustrated in figure 7. The indirect effect of complexity reduces the status-quo bias in the vote outcome, because biased voters are more likely to stay at home. This effect is lower if campaign intensity is high, which can be seen by a lower slope of the blue surface w.r.t. to ballot complexity in figure 8. Even the quantitative effect is fairly small, still our result suggest that lower information cost not necessarily decrease the status-quo bias because a higher share of relatively uninformed or uneducated voters is participating in the elections. This effect may somewhat be surprising, however it is within the range of possible expected results, if one includes the indirect effect of the participation decision on the vote

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<sup>22</sup> We thank Hans-Peter Kriesi for kindly providing access to this data.

outcome. Exposed to a higher campaign intensity citizens may overestimate their competence, which would explain the increase in turnout, whereas higher campaign intensity seem to be unable to mitigate increase in the status-quo bias for complex propositions.

[Figure 8 goes here]

## VI. Concerns with our proposition complexity measure

Section VI. discusses alternative transmission channels explaining the effects of our complexity measure on citizens voting behavior. We compare our results to an alternative specification relying on a subjective survey measure to identify proposition complexity. We also rule out that perceived proposition importance drives our results. We are further able to identify citizens who actually read the information booklets and find that our results qualitatively and quantitatively hold even for citizens not using the booklet.

### A. Subjective proposition complexity measure as robustness test

To check the consistency of our results, we use an alternative subjective complexity measure obtained from individual perceptions of Swiss citizens and compare them with our main results. In the post-election VOX survey, eligible citizens were asked whether it was difficult to form an opinion about the proposition (the survey question is: “Did you find it rather easy or rather difficult given the provided information to imagine the impact of a yes- or no-vote on yourself with regard to this proposition?”). The binary variable difficulty to form an opinion is a straightforward indicator for higher subjective complexity of the proposition.

In appendix A.3, we provide the results based on the alternative subjective complexity. All results are qualitatively in line with the results in our main specification indicating that our booklet-based objective measure is indeed a valid measure of the underlying complexity of a proposition.

The subjective complexity has several shortcomings compared to the measure, we rely in the main specifications. First, it is potentially endogenous, because citizens who participated in the election may report the voting decision to be *after* they actually voted. Whereas, non-participants may ex post justify their absenteeism with the excuse that it was difficult to decide. A second shortcoming arises due to the correlation of a subjective complexity measure with citizen’s characteristics. While the difficult to form an opinion about a proposition is clearly associated with the objective complexity of a proposition ( $c_o$ ), the subjective measure is most likely confounded with observable ( $i_{obs}$ ) and unobservable ( $i_{uno}$ ) individual characteristics like education and income or intelligence, which determine the individual ability to understand the content of complex propositions. Therefore, the survey measure gives rise only to a subjective measure of complexity, which we denote by  $c_s(c_o, i_{obs}, i_{uno})$ . The confoundedness with variables such as education will make it difficult to use the subjective measure to identify heterogeneity in voters’ response to complexity with respect to education, since interacting education with the subjective measure is problematic as we discussed in section V.A. A problem we do not face when using our objective booklet-based complexity measure, which is independent of individual characteristics.

B. *Underlying complexity versus complexity directly exposed to: Does reading the information booklet in the decision making process matter?*

In the paper we argue that the length of the text describing a proposition in the official information booklet serves as proxy for the complexity of the proposition, independently of whether the voter has actually seen and read the information text or not. The booklets provide a reputable and widely used information source for a majority of voters (Rohner 2012).

An alternative mechanism which would explain the link between the length of the information text and the complexity of the proposition can be formulated as follows: If voters read a complex description of the proposition in the information booklet they might get confused by the length of the information text itself. This would open the possibility that a voter is confused not because the underlying proposition is complex, but rather by the way the information text is formulated. If this would be the driving mechanism, controlling for the use of information booklets should affect our estimates. Furthermore the length of the information text would alter behavior only if the voter actually relies on the information booklet as information source. Voters who are not relying on the booklet information should not be affected by the text-based complexity measure in their voting decision. We can empirically test this mechanism by estimating the following Heckman model:

$$(9) \quad Participate^* = \alpha Complexity_P + \delta usingBooklet + \gamma complexity_P \times usingBooklet + \beta'X + \delta Z + u,$$

$$Participate = 1 \text{ if } Participate^* > 0, Participate = 0 \text{ otherwise,}$$

$$(10) \quad Yes-vote^* = \alpha Complexity_B + \delta usingBooklet + \gamma complexity_B \times usingBooklet + \beta'X + \epsilon,$$

$$Yes-vote = 1 \text{ if } Yes-vote^* > 0, Yes-vote = 0 \text{ otherwise.}$$

Table 9 presents the results. Adding the binary measure for booklet use does not affect the point estimated coefficient for the booklet complexity variable (column (2)). The model estimates in column (3) include the interaction term. The lower part of table 8 denotes the average marginal effects of the variables of interest. As denoted in columns (2) - (3), Voters reading the information booklet are 2 percentage points more likely to vote in favor of proposition and almost 18 percentage points more likely to participate. These effects are independent of the proposition complexity, and are therefore not directly linked to the effect of proposition complexity on the vote outcome<sup>23</sup>.

[Table 8 goes here]

As previously mentioned and in contrast to the analysis of interaction terms in linear models, an insignificant point estimate of the interaction term does not rule out the possibility of a nonlinear interaction effect between proposition complexity and booklet use (Greene 2010). To check this possibility, we plot the predicted probability of voters and nonvoters in figure 10.

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<sup>23</sup> The role of the media – official sources and private media sources like television and newspapers – in the decision process in direct democracies and the relation between proposition complexity and media use by citizens is left for further research.

[Figure 10 goes here]

As can be seen in figure 10, for both, voters who are reading the booklet and nonreaders, proposition complexity measured by the booklet text has a similar effect on voting behavior.

*C. Is the length of proposition description rather a measure of proposition importance?*

Voters are more likely to participate in the elections if they find the proposition content important. It could be the case that our objective complexity measure is confounded with the importance of a proposition in a sense that more important propositions are described with a longer booklet texts. If so, the question arises whether importance and not complexity is the mechanism behind the link between the text measure and voting behavior.

The importance of a proposition would mitigate the status quo bias because voters would be more likely to invest resources in understanding complex propositions which increases the probability of voting yes for proposition associated with long texts in the information booklet. If our text-based complexity measure would be somehow confounded with the importance of the proposition than our estimates should be biased towards being too conservative. To check for this possibility we estimate

$$(11) \quad \begin{aligned} \text{Participate}^* &= \alpha \text{Complexity}_P + \delta \text{Importance} + \beta' \mathbf{X} + \delta Z + u, \\ \text{Participate} &= 1 \text{ if } \text{Participate}^* > 0, \text{Participate} = 0 \text{ otherwise,} \end{aligned}$$

$$(12) \quad \begin{aligned} \text{Yes-vote}^* &= \alpha \text{Complexity}_B + \delta \text{Importance} + \beta' \mathbf{X} + \epsilon, \\ \text{Yes-vote} &= 1 \text{ if } \text{Yes-vote}^* > 0, \text{Yes-vote} = 0 \text{ otherwise.} \end{aligned}$$

We use self-reported importance measures related to the personal importance and the importance for the entire country in general<sup>24</sup>. Since data is available only for a subset of the data, we re-estimate our baseline model in column (1) in table 9. After controlling for importance the negative effect of (objective) complexity increases only slightly (column (2) and (3)) suggesting that complexity, and not importance, of the proposition is the driving force behind the negative effect.

[Table 9 goes here]

The average marginal effect of importance on the probability of voting in favor of a proposition is positive and highly significant, suggesting that the importance of a proposition has an effect on voting behavior, which is however not related to our complexity measure.

*D. Endogeneity: Strategic manipulation of proposition complexity by the government?*

Another possibility related to the text-based complexity measure is the potential opportunity of the government to manipulate the information text of a proposition to alter voters' behavior. From the results in the previous subsection, we know that the possibility to influence behavior by changing the booklet text is limited due to the absence of systematic differences in the response of voters to complexity between voters reading the booklet and non-readers. However, we investigate the potential

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<sup>24</sup> Both importance measures are scaled from 0 to 10, where 0 = unimportant, 5 = medium importance, 10 = high importance.

objection that the government is manipulating the complexity of a proposition strategically by checking, whether systematic differences in the complexity of a proposition exist in which the Government prefers a certain election outcome. We use the official government recommendation as measure for the preference of the government regarding the outcome of the vote. In the following, we regress the government recommendation on our subjective and objective complexity measure.

Since our subjective, text-based complexity measures words, we rely on a standard OLS regression to check for a potential relation between the recommendation of the government and the length of the proposition text.

$$(13) \quad \text{complexity}_{obj.} = \alpha \text{ government} + \beta' \mathbf{X} + u .$$

As denotes in column (1) to (5) in table 10, we do not find evidence for any correlation between government recommendation and the length of our text suggesting that our objective measure is not confounded by any attempts of the government to influence the voting decision. One would have expected, that the government, if it wants to exploit the status-quo bias, it should have increased the complexity of the proposition in cases where it prefers the rejection (federal council advice = No) of proposition. The results in table 10 provide no evidence, in terms of the information text complexity measure the point estimates are insignificant and have the opposite sign as one would expect if the government would have tried to use the status quo bias strategically.

[Table 10 goes here]

Our results in this subsection do not prove that the Government has no power to influence the voter decision in a referendum in a direct democracy. However, our results show that this influence is unlikely to happen via influencing the complexity of the proposition.

## VII. Concerns with post-referendum survey data

### A. Concern about survey data: Survey bias in post-referendum polls?

A general concern regarding post-election surveys is the accuracy of these polls. However these post-election polls are the only source to obtain individual level data on voting decisions<sup>25</sup>. Comparing the aggregate results of the VOX survey (FORS - Swiss foundation for research in social sciences 2012) and official election data (University of Bern, Institute of Political Science 2013), Funk (2015) finds a significant difference of in the share of approval votes in the VOX survey compared to the official data in half of the votes. The aim of our paper is explain voting behavior on the individual level, rather than predicting exact aggregate vote outcomes. Whenever, we rely on aggregate data in our estimations we use official election data<sup>26</sup>. Furthermore, our objective complexity measure is constructed from the

<sup>25</sup> VOX surveys are conducted as telephone interviews after the election day. In contrast to exit polls voters do not have the incentive to misreport their behavior to strategically influence the voting decision of other voters on the election day.

<sup>26</sup> In the estimations in table 2, we rely on the share of approval votes to identify the Heckman selection model, where we took the data from the official election data from the University of Bern, Institute of Political Science (2013). Funk (2015) also shows that the survey bias varies across for specific proposition topics. We include topic fixed effects meaning we rely on differences in the probability of voting yes within each topic category. Our point estimates usually increase and get more precise with topic fixed effects, maybe due to control for biases mentioned in Funk (2015).

official information booklet, therefore it is unlikely that a systematic relationship between proposition complexity and survey bias reported in (Funk 2015) exists.

The results in our paper complement findings in Funk (2015) in a sense that we identify another potential bias in analyzing voting data, namely the participation bias. In section IV.B we show that neglecting non-voting citizens can lead to systematic biases in the analyses of voting outcomes. To get an impression on how biased survey data may affect our results we re-estimate our baseline Heckman model for different subsamples, in which we systematically exclude propositions with the highest survey bias as identified in Funk (2015). Table 11 provides the results.

[Table 11 goes here]

In columns (1) to (4), we report estimates for different subsamples excluding the 5%, 10%, 25%, and 50% of the propositions with the highest survey bias as reported in appendix table 2 in Funk (2015). Even if we exclude 50% of the propositions with the highest survey bias (based on the sample analyzed in Funk (2015)) our results stay fairly constant indicating that our analysis is not affected by a potential survey bias.

### **VIII. Policy Implications and Conclusion**

This paper has investigated how the complexity of direct-democratic propositions affects the individual turnout and the direction of the voting decision. The estimations are based on probit estimations in a Heckman selection framework that take into account that the decision to participate and the actual vote decision are interrelated. Our novel data-set combines a new complexity measure based on objective information booklets at the proposition-level with post-referendum survey data at the individual level.

We find that the more complex propositions are, the less likely are citizens to cast their vote and the more votes are cast to reject a proposition. These findings are consistent with the idea of a status-quo bias when issues are too complex. If the costs involved in acquiring the necessary information to take a meaningful decision at the ballot-box are excessively high, citizens refrain from voting.

These results have important implications for the optimal use of direct-democratic institutions. When issues are too complex, the turnout rate declines. This may lead to non-representative voting outcomes in direct-democratic elections. We have discussed in section IV.B the mechanism how low turnout drives a wedge between the preference of the entire population of citizens and the vote outcome determined by the subgroup of voters. Our results also suggest that voters with a lower ability to understand complex issues may not vote in line with their preferences.

The ability of direct democratic institutions to represent the preferences of the voters – biased or not – are limited in votes on more complex propositions compared to easier ones due to the decrease in low participation rate. However, this result may not hold for the ability to trigger the utility maximizing vote outcome. In line with Swing Voter's Curse (Feddersen and Pesendorfer 1996), less informed voters

may rationally prefer to abstain from the vote even when they have a strict preference in favor or against a proposition. Based on our Heckman estimation we find strong empirical support for the *mitigating effect of absenteeism on the status-quo bias* in the vote outcome.

The policy implications of our study depend on the ability of alternative voting mechanism on complex topics. Comparing the vote decisions in a direct democracy and a representative democracy can shed more light on the questions which institutions might be best suited to first, represent the preferences of the citizens and second, lead to utility maximizing vote outcome. Our study may serve as a benchmark to compare with for further studies on different institutions in the light of complex voting topics.



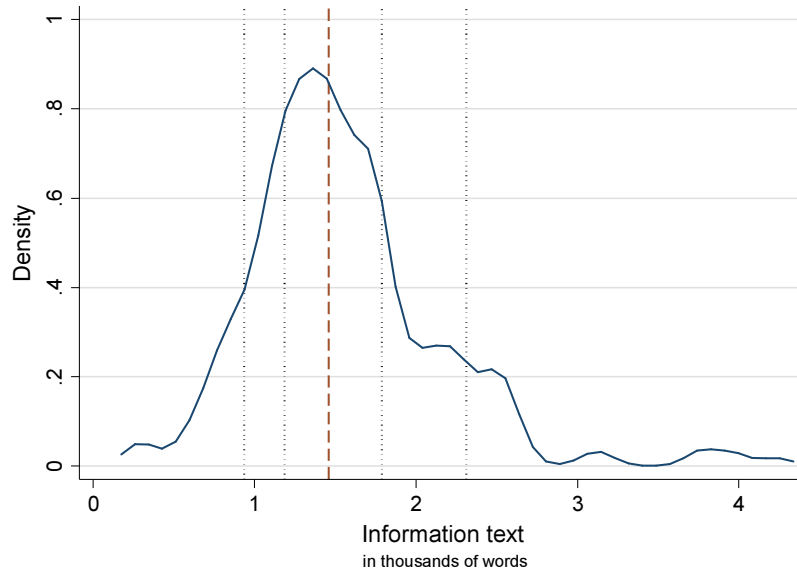


FIGURE 1. DISTRIBUTION OF THE BOOKLET-BASED COMPLEXITY MEASURE

*Notes:* This figure depicts the variation in the booklet-based objective complexity measure which is used to identify the complexity of the proposition. It is based on a Gaussian kernel density plot with a kernel bandwidth of 100 words. The dashed red line represents the median of the complexity measure. The dotted grey lines correspond to the 10<sup>th</sup>, 25<sup>th</sup>, 75<sup>th</sup>, and 90<sup>th</sup> percentile. For better readability, the information text axis is restricted to values below the 99<sup>th</sup> percentile.

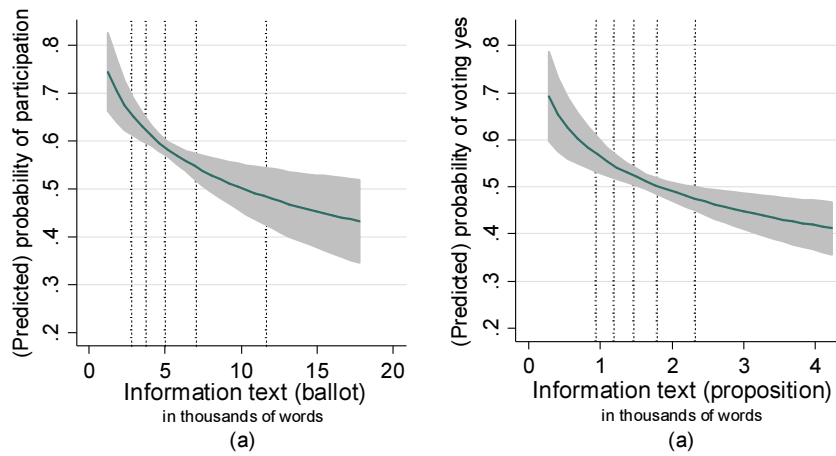


FIGURE 2. EFFECT OF THE OBEJECTIVE COMPLEXITY MEASURE ON PARTICIPATION AND YES-VOTES

*Notes:* This figure depicts the statistically and economically significant negative effect of complexity on voters' participation and voters' probability to vote in favor or against a proposition. It plots the average predicted probability against the complexity of the ballot (proposition). It plots the average predicted probability against the complexity of the ballot. The estimates in panel (a), and (b) are calculated using regressions (4) and (8) in table 1. The shaded area in panel (a) and (b) represents the 95 percent confidence interval band of the predicted probability of voting yes. The dotted vertical lines correspond to the 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, and 90<sup>th</sup> percentile of the proposition information text measure. For better readability, the information text axis is restricted to values below the 99<sup>th</sup> percentile is plotted.

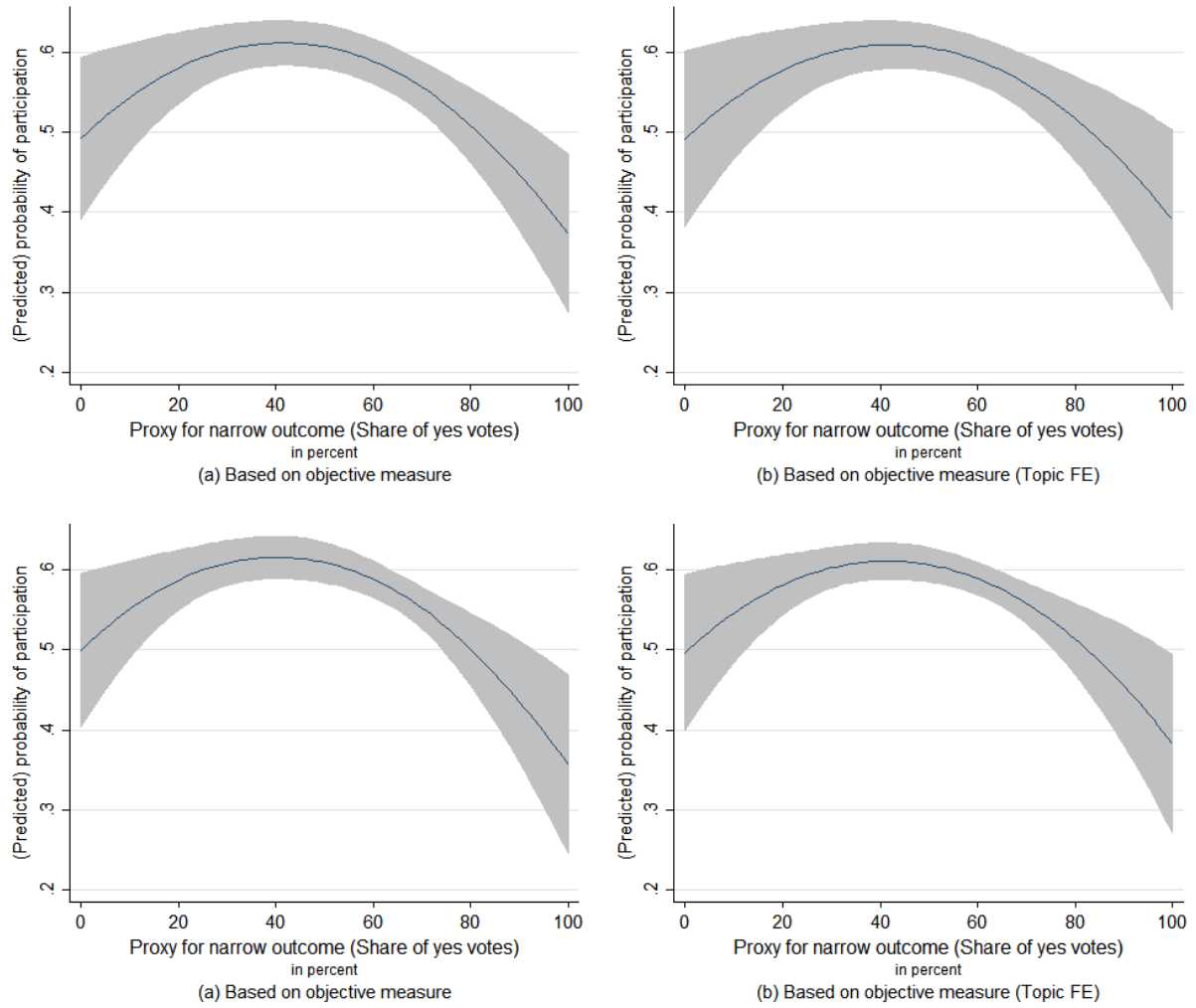


FIGURE 3. (EXPECTED) NARROW OUTCOME ON YES VOTE

*Notes:* This figure illustrates the hump-shaped relationship between an (expected) narrow outcome and the probability to turnout in the elections. It plots the average predicted probability against share of yes votes. The estimates in panel (a), (b), (c) and (d) are calculated using Probit regressions (1) to (4) in table 2. The shaded area represents the 95 percent confidence interval band of the predicted probability of participation.

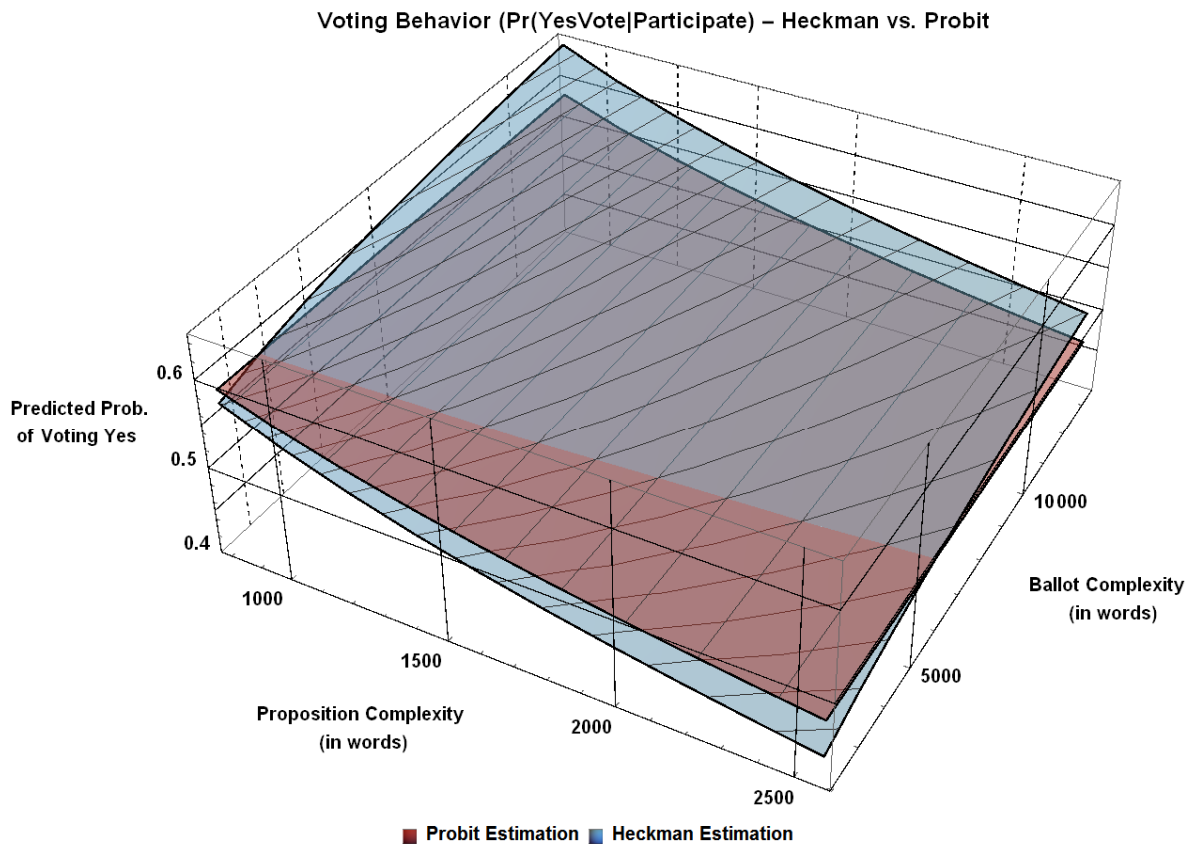


FIGURE 4. COMPARISON OF THE PREDICTED PROBABILITY OF „YES-VOTE“ FOR VOTERS BY PROBIT AND HECKMAN ESTIMATIONS

*Notes:* This figure illustrates the effect of neglecting the participation decision in the estimation of the predicted probability of voting yes. The figure plots the average predicted probability against the complexity of the proposition (direct effect) and the complexity of the ballot (indirect effect). The probit estimation neglects the indirect effect, therefore the probit estimations are independent of the ballot complexity. The estimates in ... are based on the estimates of model (4) in .... The dotted vertical lines correspond to the 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, and 90<sup>th</sup> percentile of the respective complexity measure. For better readability, the information text axes are restricted to values between the 5<sup>th</sup> and 95<sup>th</sup> percentile.

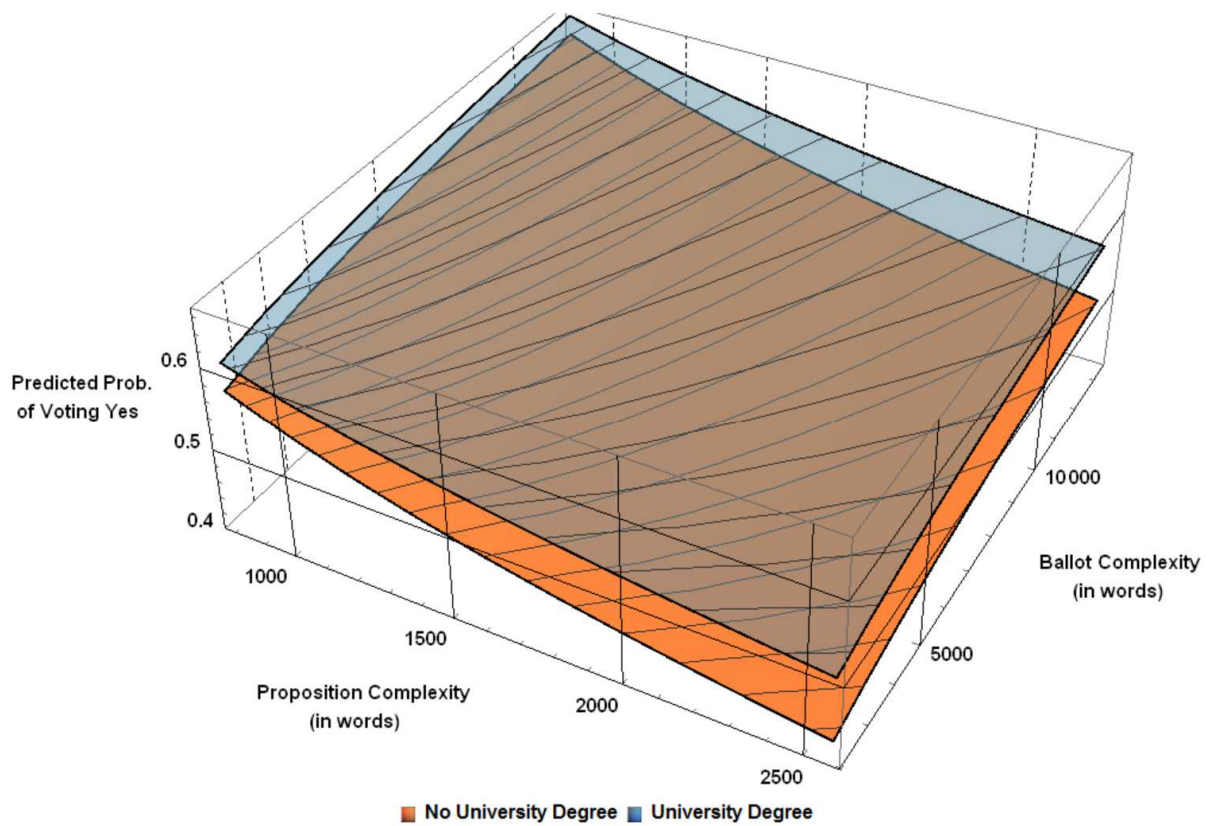


FIGURE 5. PREDICTED PROBABILITY OF „YES-VOTE“ FOR VOTERS WITH & WITHOUT UNIVERSITY DEGREE

*Notes:* This figure illustrates the heterogeneous effect of complexity on voters' probability to vote in favor or against a proposition for voters with respect to different education levels. Voters without a university degree change their voting behavior stronger towards the status-quo as complexity rises. The figure plots the average predicted probability against the complexity of the proposition (direct effect) and the complexity of the ballot (indirect effect). The estimates in figure 5 are based on the estimates of model (4) in table 6. The dotted vertical lines correspond to the 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, and 90<sup>th</sup> percentile of the respective complexity measure. For better readability, the information text axes are restricted to values between the 5<sup>th</sup> and 95<sup>th</sup> percentile.

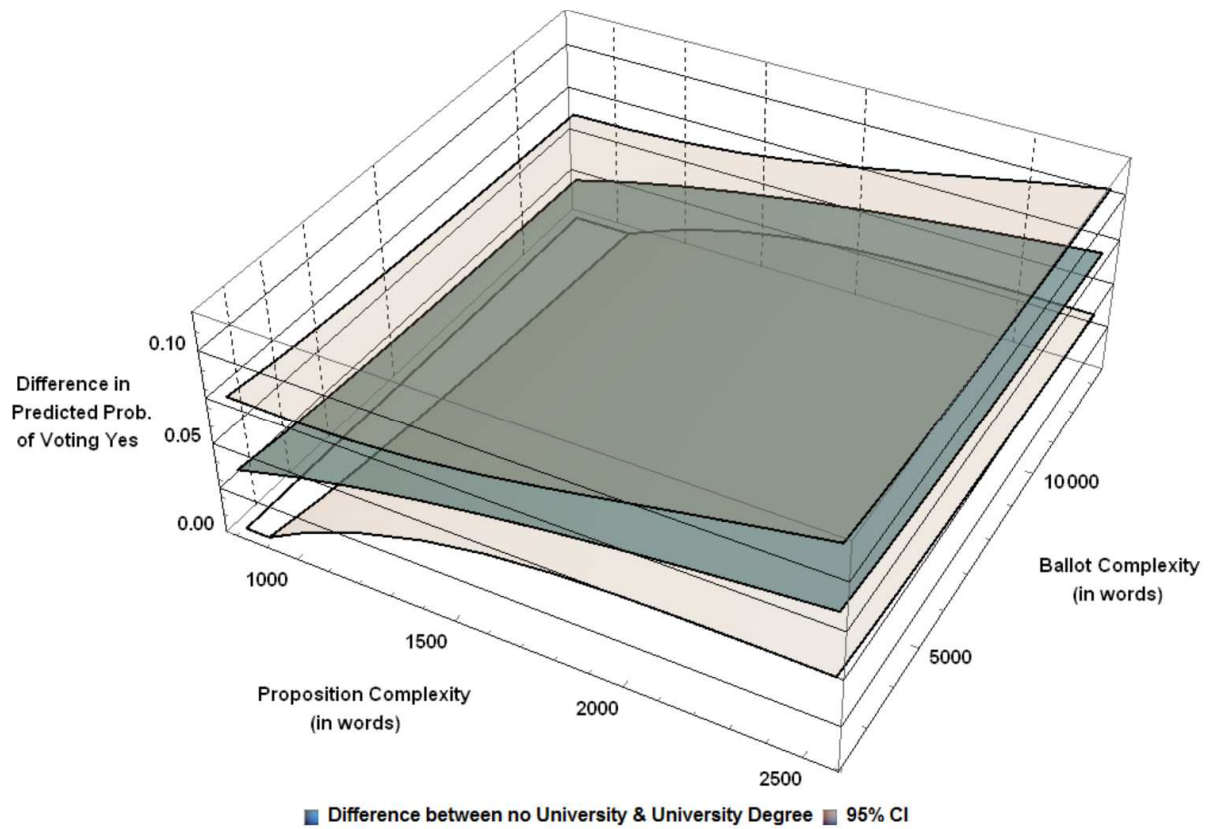


FIGURE 6. DIFFERENCE IN THE PREDICTED PROBABILITY OF „YES-VOTE“ BETWEEN VOTERS WITH & WITHOUT UNIVERSITY DEGREE

*Notes:* This figure illustrates the “difference in difference” w.r.t. the response to complexity of citizens with and without a university degree. The estimates in figure 6 are based on the estimates of model (4) in table 6. The dotted vertical lines correspond to the 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, and 90<sup>th</sup> percentile of the respective complexity measure. For better readability, the information text axes are restricted to values between the 5<sup>th</sup> and 95<sup>th</sup> percentile.

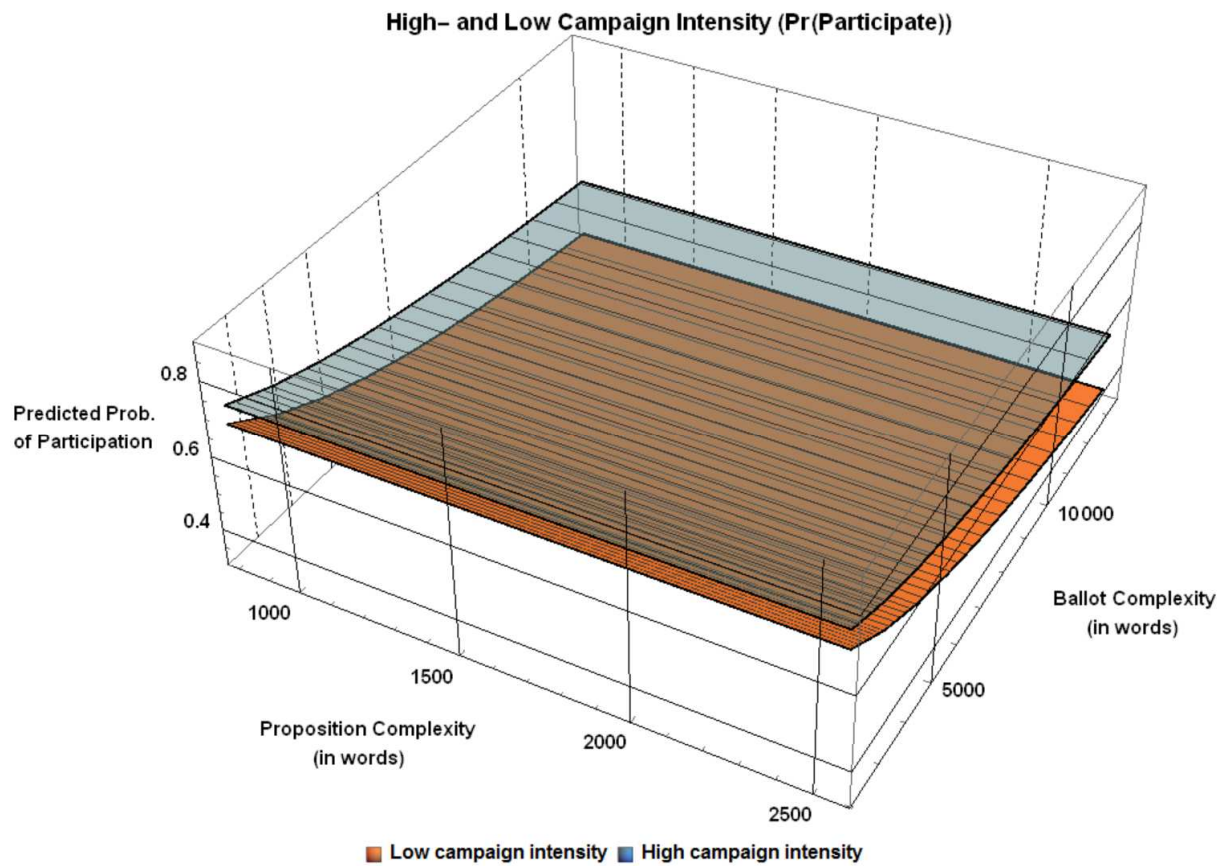


FIGURE 7. PREDICTED PROBABILITY OF PARTICIPATION W.R.T. CAMPAIGN INTENSITY

*Notes:* This figure illustrates the heterogeneous effect of complexity on voters' probability to participate in an election with respect to different levels of campaign intensity. Low (high) campaign intensity is represented by the value at the 25<sup>th</sup> (75<sup>th</sup>) percentile in the campaign intensity measure. As ballot complexity increases, citizens' participation rate decreases less, if campaign intensity is high. The figure plots the average predicted probability against the complexity of the proposition (direct effect) and the complexity of the ballot (indirect effect). The estimates in figure 7 are based on the estimates of model (4) in table 7. The dotted vertical lines correspond to the 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, and 90<sup>th</sup> percentile of the respective complexity measure. For better readability, the information text axes are restricted to values between the 5<sup>th</sup> and 95<sup>th</sup> percentile.

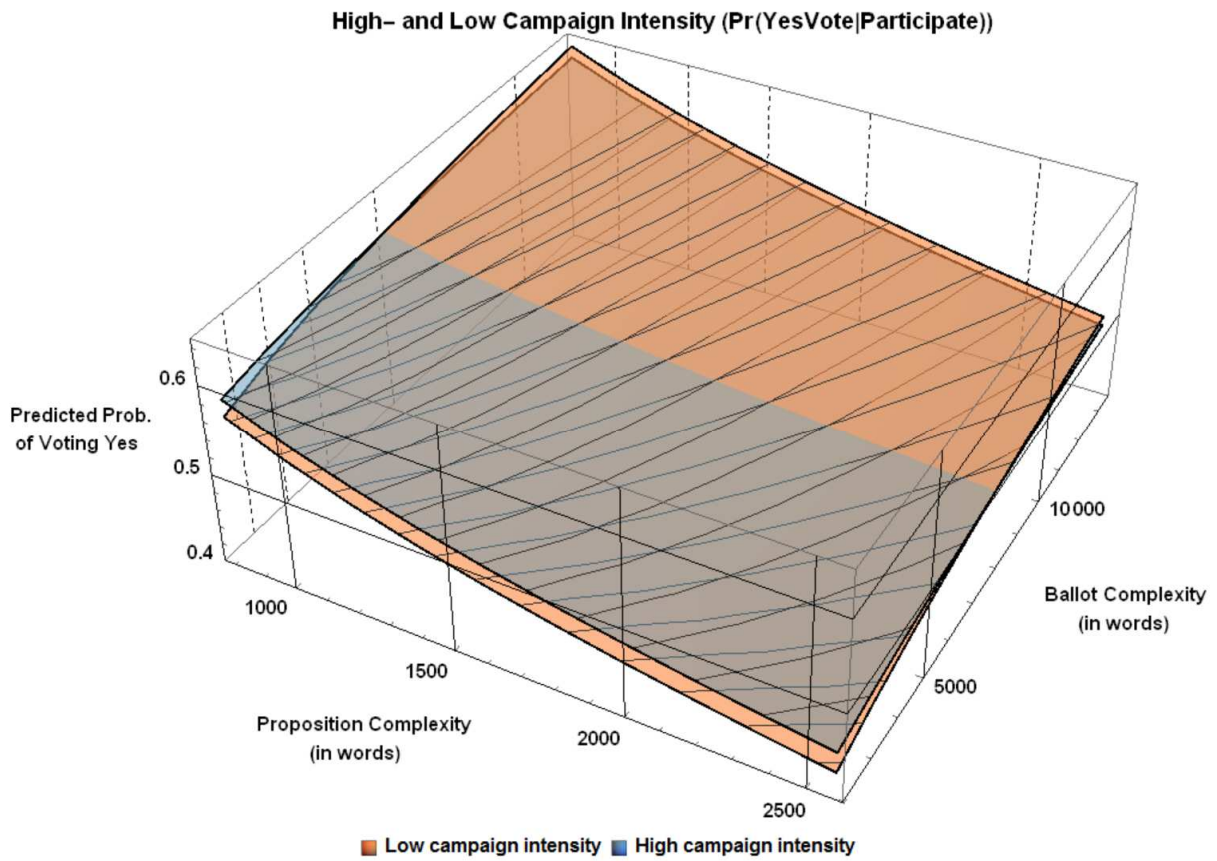


FIGURE 8. PREDICTED PROBABILITY OF „YES-VOTE“ W.R.T. CAMPAIGN INTENSITY

*Notes:* This figure illustrates the heterogeneous effect of complexity on voters' probability to vote in favor of a proposition in an election with respect to different levels of campaign intensity. Low (high) campaign intensity is represented by the value at the 25<sup>th</sup> (75<sup>th</sup>) percentile in the campaign intensity measure. The figure plots the average predicted probability against the complexity of the proposition (direct effect) and the complexity of the ballot (indirect effect). The estimates in figure 7 are based on the estimates of model (4) in table 7. The dotted vertical lines correspond to the 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, and 90<sup>th</sup> percentile of the respective complexity measure. For better readability, the information text axes are restricted to values between the 5<sup>th</sup> and 95<sup>th</sup> percentile.

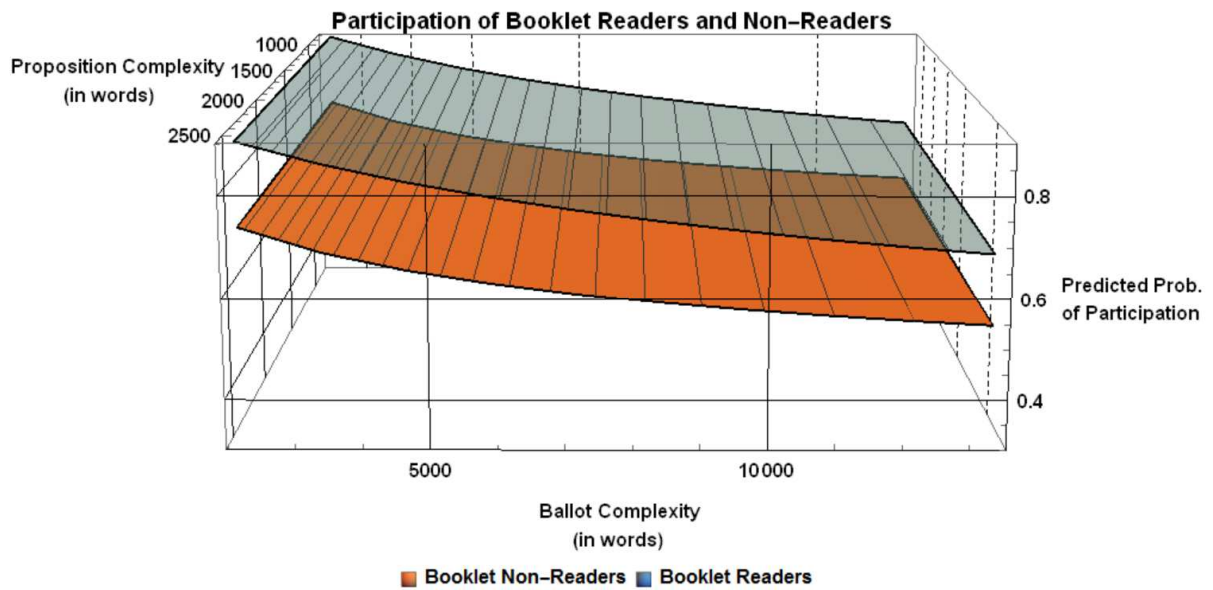


FIGURE 9. PREDICTED PROBABILITY OF PARTICIPATION W.R.T. AND THE BOOKLET READING CHANNEL

*Notes:* This figure illustrates the heterogeneous effect of complexity on voters' probability to vote in favor of a proposition in an election with respect to different levels of campaign intensity. Low (high) campaign intensity is represented by the value at the 25<sup>th</sup> (75<sup>th</sup>) percentile in the campaign intensity measure. As ballot complexity increases, citizens' participation rate decreases less, if campaign intensity is high. The figure plots the average predicted probability against the complexity of the proposition (direct effect) and the complexity of the ballot (indirect effect). The estimates in figure 9 are based on the estimates of model (3) in table 8. The dotted vertical lines correspond to the 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, and 90<sup>th</sup> percentile of the respective complexity measure. For better readability, the information text axes are restricted to values between the 5<sup>th</sup> and 95<sup>th</sup> percentile.



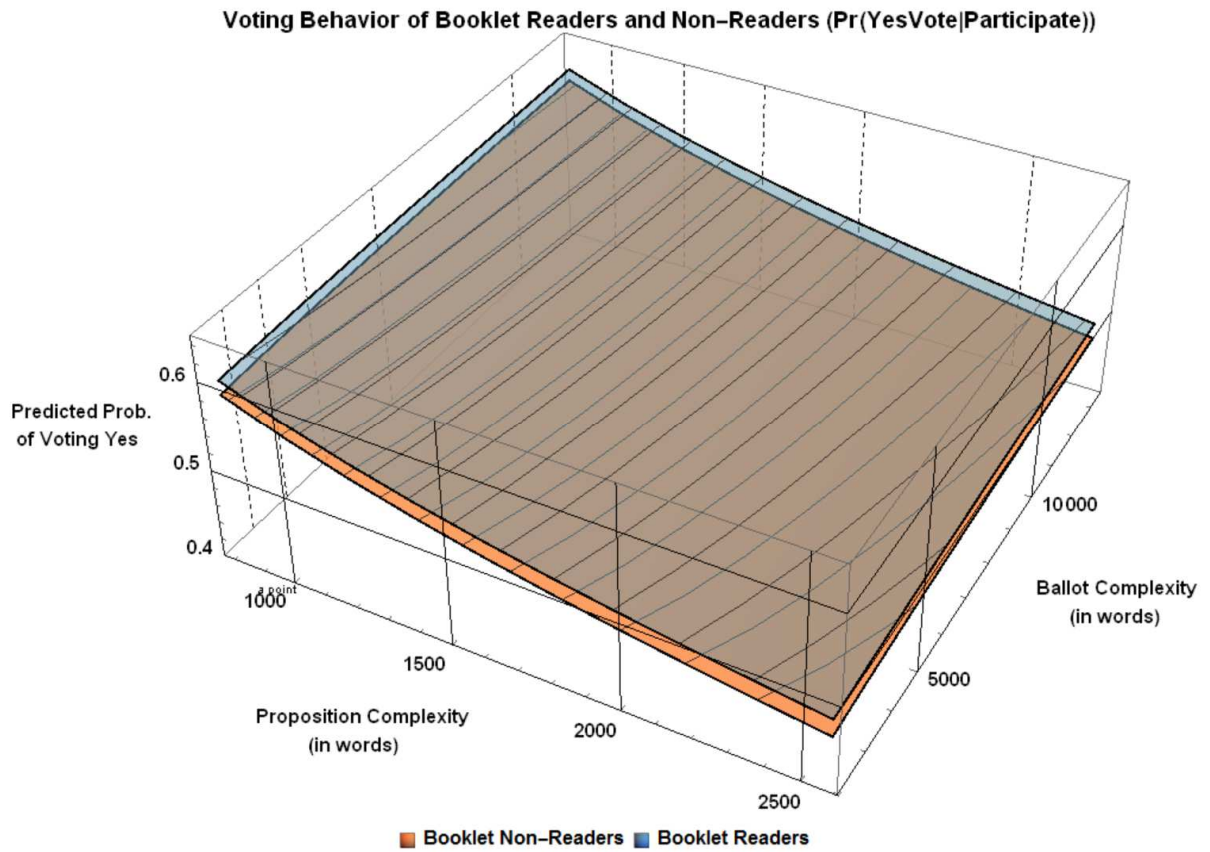


FIGURE 10. BOOKLET READING, OBJECTIVE COMPLEXITY AND VOTING BEHAVIOR

*Notes:* This figure illustrates that booklet readers and non-readers voting behavior is fairly similar w.r.t. their reaction to complexity. The figure plots the average predicted probability against the complexity of the proposition (direct effect) and the complexity of the ballot (indirect effect). Figure 10 is based on the estimates of model (3) in table 8. The dotted vertical lines correspond to the 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, and 90<sup>th</sup> percentile of the respective complexity measure. For better readability, the information text axes are restricted to values between the 5<sup>th</sup> and 95<sup>th</sup> percentile.

TABLE 1—COMPLEXITY AND OTHER DETERMINANTS OF PARTICIPATION AND VOTE OUTCOME

<i>Avg. Marginal Effects reported</i>	Dep. Var.: Participation				Dep. Var.: Yes-Vote			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log Information Text (Ball.)	-0.098*** (0.036)	-0.104*** (0.036)	-0.115*** (0.043)	-0.122*** (0.036)				
Log Information Text (Prop.)					-0.085** (0.040)	-0.081** (0.035)	-0.093*** (0.034)	-0.105*** (0.030)
Rural	-0.003 (0.005)	-0.010** (0.004)	-0.008* (0.005)	-0.008 (0.005)	-0.040*** (0.007)	-0.035*** (0.007)	-0.036*** (0.007)	-0.037*** (0.007)
Female	-0.003 (0.006)	-0.004 (0.006)	-0.004 (0.006)	-0.002 (0.006)	0.020*** (0.008)	0.023*** (0.007)	0.024*** (0.006)	0.024*** (0.006)
Age	0.005*** (0.000)	0.005*** (0.000)	0.005*** (0.000)	0.005*** (0.000)	-0.001** (0.000)	-0.000* (0.000)	-0.000 (0.000)	-0.000 (0.000)
Education	0.044*** (0.003)	0.044*** (0.003)	0.036*** (0.002)	0.035*** (0.002)	0.016*** (0.005)	0.017*** (0.004)	0.018*** (0.003)	0.018*** (0.003)
Prop. Knowledge	0.056*** (0.005)	0.056*** (0.005)	0.065*** (0.005)	0.068*** (0.004)	0.027** (0.012)	0.031*** (0.008)	0.028*** (0.007)	0.028*** (0.006)
Married	0.071*** (0.007)	0.069*** (0.006)	0.073*** (0.006)	0.072*** (0.006)	-0.012* (0.006)	-0.012** (0.006)	-0.013*** (0.005)	-0.013*** (0.005)
Protestant	0.017*** (0.005)	0.011* (0.006)	0.021*** (0.005)	0.020*** (0.005)	-0.006 (0.007)	-0.009* (0.005)	-0.007 (0.004)	-0.007 (0.005)
Employed	-0.002 (0.006)	-0.006 (0.006)	-0.005 (0.006)	-0.005 (0.005)	0.003 (0.006)	0.001 (0.006)	-0.001 (0.006)	-0.001 (0.006)
Canton dummies	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Referenda type dummies	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year dummies	No	No	Yes	Yes	No	No	Yes	Yes
Policy area dummies	No	No	No	Yes	No	No	No	Yes
Pseudo R <sup>2</sup>	0.140	0.149	0.164	0.172	0.009	0.058	0.070	0.087
Observations	204818	204818	204818	204818	107420	107420	107420	107420

*Notes:* The table establishes the negative and significant effect of complexity on eligible voter's probability to turn-out and to vote in favor of a proposition. Average marginal effects based on Probit regression are reported in all specifications. The marginal effect of Age is based on age and its squared term. Heteroskedasticity-robust standard errors clustered at the ballot level are reported in parentheses. Appendix A.1 provides a table with summary statistics.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.

TABLE 2—(EXPECTED) NARROW ELECTION DECISION AND PARTICIPATION

<i>Probit coefficients reported</i>	Dep. Var.: Participation			
	(1)	(2)	(3)	(4)
Log Information Text (Ball.)	-0.322*** (0.110)	-0.326*** (0.111)	-0.404*** (0.124)	-0.412*** (0.109)
<i>Exclusion Restriction</i>				
Approval Share	1.721*** (0.593)	1.677*** (0.636)	1.785*** (0.658)	1.709*** (0.656)
Approval Share square	-2.076*** (0.579)	-1.980*** (0.617)	-2.223*** (0.678)	-2.058*** (0.668)
Canton dummies	No	Yes	Yes	Yes
Referenda type dummies	No	Yes	Yes	Yes
Year dummies	No	No	Yes	Yes
Policy area dummies	No	No	No	Yes
Pseudo R-squared	0.140	0.149	0.164	0.172
Observations	204818	204818	204818	204818
<i>p-value for joint significance of linear and quadratic terms in:</i>				
Approval Share	0.000	0.003	0.001	0.003

*Notes:* The table illustrates the significant hump-shaped effect of the approval share and the probability to turnout in the elections. Regression coefficients based on Probit regression are reported in all specifications. The variable approval share measures the share of yes-votes obtained from the official Swiss election data (University of Bern, Institute of Political Science 2013). The table also reports the p-value for the joint significance of the variable approval share and its squared term. All equations are estimated with individual controls as reported in table 1. Heteroskedasticity-robust standard errors clustered at the ballot level are reported in parentheses.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.

TABLE 3—HECKMAN SELECTION MODELS

Dep. Variable:	Heckman (1)		Heckman (2)		Heckman (3)		Heckman (4)	
	(1-1)	(1-2)	(2-1)	(2-2)	(3-1)	(3-2)	(4-1)	(4-2)
Log Information Text (Prob.)		-0.266*** (0.054)		-0.282*** (0.082)		-0.331*** (0.082)		-0.341*** (0.079)
Log Information Text (Ball.)	-0.357*** (0.106)		-0.384*** (0.121)		-0.479*** (0.134)		-0.502*** (0.119)	
<i>Exclusion Restriction</i>								
Approval Share	0.750 (0.542)		1.185 (0.774)		1.260* (0.761)		1.428* (0.733)	
Approval Share square	-1.918*** (0.506)		-2.026*** (0.646)		-2.208*** (0.763)		-2.149*** (0.755)	
<i>Unobserved Factors</i>								
rho	0.892		0.555		0.517		0.395	
Wald test ( <i>p-value</i> )	0.000		0.033		0.005		0.001	
Canton dummies	No		Yes		Yes		Yes	
Referenda type dummies	No		Yes		Yes		Yes	
Year dummies	No		No		Yes		Yes	
Policy area dummies	No		No		No		Yes	
Observations	191669		191669		191669		191669	

*Notes:* The table provides the estimated coefficients of the Heckman selection model and establishes the negative and significant effect of complexity on voter's probability to participate and vote in favor of a proposition. The table also reports the correlation  $\rho$  between the error terms of both equations, as well as the corresponding p-values. All equations are estimated with individual controls as reported in table 1, fixed effects for the ballot year, referenda type and the canton in which the eligible voter lives. Heteroskedasticity-robust standard errors clustered at the ballot level are reported in parentheses.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.

TABLE 4— PARTICIPATION BIAS OF THE VOTING OUTCOME

<i>Voting Preferences and Behavior</i>		
Voting Yes	Pr(v=1  $\pi=1$ )	0.525
Preferring Yes	Pr(v=1)	0.417
Participation Bias	Pr(v=1  $\pi=1$ ) - Pr(v=1)	0.108
<i>Participation Behavior</i>		
Participation	Pr( $\pi=1$ )	0.555
Participation of Yes-Voters	Pr( $\pi=1$  v=1)	0.678
Participation of No-Voters	Pr( $\pi=1$  v=0)	0.468

Notes: The table establishes the resulting participation bias of 10.8 percentage points and illustrates that potential yes-voters are more likely to participate than potential No-voters. The estimates are based on the model estimates in column (4) of table 3.

TABLE 5— PARTIAL EFFECTS OF HECKMAN MODELS

APE of $\pm$ 0.5 SD	Probit		Heckman		
	$\pi=1$	v=1  $\pi=1$	$\pi=1$	v=1  $\pi=1$	v=1
Log Information Text (Prob.)		-0.044*** (0.012)		-0.053*** (0.013)	-0.051*** (0.011)
Log Information Text (Ball.)	-0.081*** (0.019)		-0.082*** (0.019)	0.023*** (0.007)	

Notes: The table summarizes the average marginal effects of complexity on participation and voting behavior based on the single equation models (column (4) and column (8) in table 1) and the Heckman selection model (column (4-1) and (4-2) in table 3). The Heckman model allows for an indirect effect of the variable Log Information Text (ball.) on the vote outcome via altering the participation decision. This indirect effect increases the probability of voting in favor of a proposition by 2.3 percentage points if complexity changes by 1SD (centered around the mean). Even quantitatively important the indirect effect is outweighed by the negative direct effect of complexity on the probability of voting in favor of a proposition of -5.3 percentage points.

TABLE 6— STATUS QUO BIAS AND THE INTERACTION BETWEEN COMPLEXITY AND EDUCATION

Dep. Variable:	Heckman (1)		Heckman (2)		Heckman (3)		Heckman (4)	
	(1-1)	(1-2)	(2-1)	(2-2)	(3-1)	(3-2)	(4-1)	(4-2)
	Participation	Yes-Vote	Participation	Yes-Vote	Participation	Yes-Vote	Participation	Yes-Vote
Log Information Text (Prop.)		-0.316*** (0.090)		-0.334*** (0.086)		-0.343*** (0.082)		-0.353*** (0.082)
Log Information Text (Ball.)	-0.501*** (0.122)		-0.493*** (0.136)		-0.517*** (0.120)		-0.516*** (0.121)	
University degree			0.349*** (0.026)	0.241*** (0.040)	0.341*** (0.025)	0.217*** (0.035)	0.390 (0.399)	-0.521 (0.537)
Log Info Text (Prop.) x Uni								0.100 (0.073)
Log Info Text (Prop.) x Uni							-0.006 (0.047)	
<i>Marginal Effects</i>	Pr( $\pi=1$ )	Pr(v=1  $\pi=1$ )	Pr( $\pi=1$ )	Pr(v=1  $\pi=1$ )	Pr( $\pi=1$ )	Pr(v=1  $\pi=1$ )	Pr( $\pi=1$ )	Pr(v=1  $\pi=1$ )
Log Information Text (Prob.)		-0.115*** (0.033)		-0.131*** (0.036)		-0.128*** (0.032)		-0.128*** (0.032)
Log Information Text (Ball.)	-0.157*** (0.038)	0.015 (0.009)	-0.158*** (0.042)	0.055*** (0.016)	-0.164*** (0.037)	0.041*** (0.013)	-0.164*** (0.037)	0.041*** (0.013)
University degree			0.110*** (0.009)	0.057*** (0.011)	0.106*** (0.008)	0.055*** (0.011)	0.106*** (0.008)	0.053*** (0.011)
Topic dummies	Yes		No		Yes		Yes	
Observations	191669		191669		191669		191669	

Notes: The table reports the estimates of the interaction effect between the objective complexity measure and education (university degree vs. no university degree) and therefore indicates heterogeneity in the response to complexity for voters with different education levels. Probit coefficients are reported in the upper half of the table. Average marginal effects for the variables of interest are reported in the lower half of the table. The average marginal effect associated with the interaction term is illustrated in figure 5. All regressions are estimated with fixed effects for year, canton and referenda type and controls for individual characteristics. Heteroskedasticity-robust standard errors clustered at the ballot level are reported in parentheses.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.

TABLE 7—STATUS QUO BIAS AND THE INTERACTION BETWEEN COMPLEXITY AND CAMPAIGN INTENSITY

Dep. Variable:	Heckman (1)		Heckman (2)		Heckman (3)	
	(1-1) Participation	(1-2) Yes-Vote	(2-1) Participation	(2-2) Yes-Vote	(3-1) Participation	(3-2) Yes-Vote
Log Information Text (Prop.)		-0.325*** (0.082)		-0.341*** (0.101)		-0.341*** (0.125)
Log Information Text (Ball.)	-0.493*** (0.120)		-0.571*** (0.097)		-0.660*** (0.126)	
Campaign Intensity (Number of Ads x 100)			0.167*** (0.032)	0.035 (0.023)	-0.485 (0.319)	0.010 (0.170)
Log Info Text (Prop.) x Campaign						0.003 (0.020)
Log Info Text (Ball.) x Campaign					0.072** (0.035)	
<i>Marginal Effects</i>	Pr( $\pi=1$ )	Pr( $v=1 \pi=1$ )	Pr( $\pi=1$ )	Pr( $v=1 \pi=1$ )	Pr( $\pi=1$ )	Pr( $v=1 \pi=1$ )
Log Information Text (Prob.)		-0.121*** (0.032)		-0.126*** (0.038)		-0.125*** (0.042)
Log Information Text (Ball.)	-0.155*** (0.037)	0.041*** (0.013)	-0.178*** (0.030)	0.041*** (0.013)	-0.184*** (0.034)	0.042*** (0.013)
Campaign Intensity (Number of Ads)			0.052*** (0.010)	0.001 (0.008)	0.040*** (0.009)	0.002 (0.011)
Observations	180337		180337		180337	

This table illustrates that the intensity of the coverage of the campaign regarding to a proposition in the media does not change the general tendency of the effect of complexity on voter's probability to participate and vote in favor of a proposition. The variable *campaign intensity* is a measure of the number of ads related to a given proposition in the 6 major Swiss newspapers. All regressions are estimated with fixed effects for year, canton and referenda type and controls for individual characteristics. Heteroskedasticity-robust standard errors clustered at the ballot level are reported in parentheses.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.

TABLE 8—STATUS QUO BIAS AND THE INTERACTION BETWEEN COMPLEXITY AND USE OF INFORMATION BOOKLET

Dep. Variable:	Heckman (1)		Heckman (2)		Heckman (3)	
	(1-1) Participation	(1-2) Yes-Vote	(2-1) Participation	(2-2) Yes-Vote	(3-1) Participation	(3-2) Yes-Vote
Log Information Text (Prob.)		-0.317*** (0.088)		-0.311*** (0.087)		-0.317*** (0.081)
Log Information Text (Ball.)	-0.697*** (0.148)		-0.614*** (0.141)		-0.551*** (0.154)	
Using Information Booklet			0.864*** (0.049)	0.088*** (0.028)	2.060*** (0.694)	0.022 (0.308)
Log Info. Text (Prob.) x Booklet						0.009 (0.040)
Log Info. Text (Ball.) x Booklet					-0.139* (0.082)	
<i>Avg. Marginal Effects</i>	Pr( $\pi=1$ )	Pr( $v=1 \pi=1$ )	Pr( $\pi=1$ )	Pr( $v=1 \pi=1$ )	Pr( $\pi=1$ )	Pr( $v=1 \pi=1$ )
Log Information Text (Prob.)		-0.114*** (0.032)		-0.111*** (0.031)		-0.112*** (0.031)
Log Information Text (Ball.)	-0.142*** (0.029)	0.017** (0.008)	-0.114*** (0.026)	0.011* (0.006)	-0.115*** (0.025)	0.011* (0.006)
Using Information Booklet			0.177*** (0.010)	0.016** (0.007)	0.177*** (0.010)	0.016** (0.007)
Observations	128101		128101		128101	

This table establishes the robustness of the negative and significant effect of complexity on voter's probability vote in favor of a proposition when controlling for the actual use of the booklet by the voter. The variable *using information booklet* is binary and equals one if the voter reports the use of the information booklet. All regressions are estimated with fixed effects for year, canton and referenda type and controls for individual characteristics. Heteroskedasticity-robust standard errors clustered at the ballot level are reported in parentheses.

- \*\*\* Significant at the 1 percent level.
- \*\* Significant at the 5 percent level.
- \* Significant at the 10 percent level.

TABLE 9—THE IMPORTANCE CHANNEL

Aver. Marginal Effects reported	Personal Importance				Country Importance			
	Heckman (1)		Heckman (2)		Heckman (3)		Heckman (4)	
	(1-1) Participation	(1-2) Yes-Vote	(2-1) Participation	(2-2) Yes-Vote	(3-1) Participation	(3-2) Yes-Vote	(4-1) Participation	(4-2) Yes-Vote
Log Information Text (Prob.)	-0.140*** (0.048)		-0.157*** (0.047)		-0.137*** (0.048)		-0.161*** (0.047)	
Log Information Text (Ball.)	-0.158*** (0.035)	0.026** (0.013)	-0.136*** (0.028)	0.027** (0.013)	-0.155*** (0.035)	0.028** (0.014)	-0.155*** (0.034)	0.027** (0.013)
Personal Importance			0.033*** (0.002)	0.018*** (0.003)				
Country Importance							0.013*** (0.001)	0.022*** (0.003)
Observations	132022		132022		127439		127439	

Notes: This table establishes the robustness of the negative and significant effect of complexity on voter's probability vote in favor of a proposition when controlling for the perceived importance of the proposition. Both importance measures are measured on a scale from 0 to 10, where 0 = unimportant, 5 = medium importance, 10 = high importance. All regressions are estimated with fixed effects for year, canton and referenda type and controls for individual characteristics. Heteroskedasticity-robust standard errors clustered at the ballot level are reported in parentheses.

- \*\*\* Significant at the 1 percent level.
- \*\* Significant at the 5 percent level.
- \* Significant at the 10 percent level.

TABLE 10—GOVERNMENT RECOMMENDATION AND COMPLEXITY

Objective Complexity (OLS)
Dep. Var.: Information text

	(1)	(2)	(3)	(4)	(5)
Government Recommendation (Federal Council Advise = No)	-0.197 (0.151)	-0.163 (0.129)	-0.370 (0.729)	-0.455 (0.572)	-0.140 (0.713)
Individual Controls	No	Yes	Yes	Yes	Yes
Canton dummies	No	Yes	Yes	No	Yes
Referenda type dummies	No	No	Yes	Yes	Yes
Year Dummies	No	No	Yes	Yes	Yes
Topic dummies	No	No	No	Yes	Yes
R-squared	0.006	0.102	0.109	0.217	0.329
Observations	205175	205175	205175	205175	205175

*Notes:* This table shows the absence of a statistically significant relationship between government recommendation and the objective complexity measure. The results suggest that the government does not strategically manipulate the information text of a proposition. OLS coefficients are reported in columns (1) to (5). The variable *government recommendation* is binary and equals one if the government advises to vote against a proposition. Heteroskedasticity-robust standard errors clustered at the ballot level are reported in parentheses.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.

TABLE 11—EXCLUSION OF PROPOSITIONS THAT ARE LIKELY TO SUFFER FROM SURVEY BIAS

Dep. Variable:	Heckman (1) exclude 5%		Heckman (2) exclude 10%		Heckman (3) exclude 25%		Heckman (4) exclude 50%	
	(1-1) Participation	(1-2) Yes-Vote	(2-1) Participation	(2-2) Yes-Vote	(3-1) Participation	(3-2) Yes-Vote	(4-1) Participation	(4-2) Yes-Vote
Log Information Text (Prop.)		-0.315*** (0.079)		-0.312*** (0.078)		-0.298*** (0.070)		-0.280*** (0.074)
Log Information Text (Ball.)	-0.536*** (0.115)		-0.526*** (0.117)		-0.523*** (0.117)		-0.597*** (0.113)	
<i>Exclusion Restriction</i>								
Approval Share	1.605** (0.669)		1.537** (0.696)		2.293*** (0.821)		2.871*** (0.895)	
Approval Share square	-2.494*** (0.698)		-2.450*** (0.736)		-3.145*** (0.850)		-3.808*** (0.901)	
<i>Avg. Marginal Effects</i>								
Log Information Text (Prob.)	Pr( $\pi=1$ )	Pr( $v=1 \pi=1$ )	Pr( $\pi=1$ )	Pr( $v=1 \pi=1$ )	Pr( $\pi=1$ )	Pr( $v=1 \pi=1$ )	Pr( $\pi=1$ )	Pr( $v=1 \pi=1$ )
Log Information Text (Ball.)		-0.119*** (0.032)		-0.118*** (0.031)		-0.111*** (0.027)		-0.104*** (0.029)
Log Information Text (Ball.)	-0.167*** (0.035)	0.049*** (0.014)	-0.164*** (0.036)	0.045*** (0.013)	-0.163*** (0.036)	0.043*** (0.011)	-0.186*** (0.035)	0.051*** (0.016)
<i>Unobserved Factors</i>								
rho		0.420		0.398		0.381		0.394
Wald test ( <i>p-value</i> )		0.000		0.001		0.000		0.002
Observations	183755		176675		154548		112335	

*Notes:* The table establishes the robustness of the main results in table 1 with respect to a potential survey bias as described in Funk (2015). In columns (1) to (4), estimates for different subsamples excluding the 5%, 10%, 25%, and 50% of the propositions with the highest survey bias as reported in appendix table 2 in Funk (2015). Heckman coefficients are reported in the upper half of the table. Average marginal effects for the variables of interest are reported in the lower half of the table. All regressions are estimated with fixed effects for year, canton and referenda type and controls for individual characteristics. Heteroskedasticity-robust standard errors clustered at the ballot level are reported in parentheses.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.

## Appendix

### A.1 Descriptive Statistics

TABLE A.1—DESCRIPTIVE STATISTICS

	Voters and Non-Voters (N=191669)				only Voters (N=106817)		
	Mean	SD	Median		Mean	SD	Median
Log Information Text (Ball.)	8.58	0.52	8.5	Log Information Text (Prop.)	7.33	0.44	7.3
Rural	1.35	0.48	1	Rural	1.35	0.48	1
Female	0.50	0.50	1	Female	0.47	0.50	0
Age	47.00	17.39	44	Age	49.85	16.79	49
Education	2.71	1.54	2	Education	2.93	1.61	2
Prop. Knowledge (Ball.)	4.80	2.98	4	Prop. Knowledge	1.62	0.60	2
Married	0.59	0.49	1	Married	0.65	0.48	1
Protestant	0.43	0.49	0	Protestant	0.45	0.50	0
Employed	0.61	0.49	1	Employed	0.60	0.49	1

Notes: The table reports the descriptive statistics for the estimation sample used in regressions in table 3.

### A.2 Distribution of booklet-based complexity measure on the ballot level

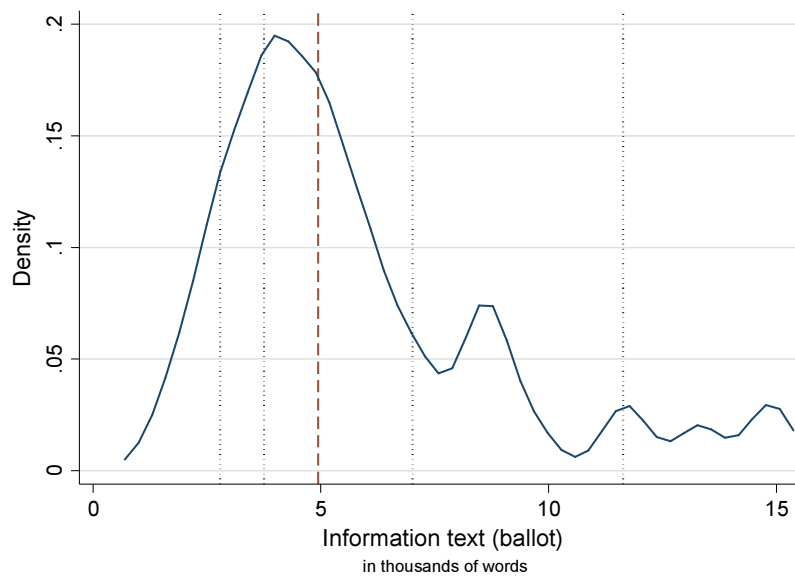


FIGURE A2. VARIATION IN THE BOOKLET-BASED COMPLEXITY MEASURE

Notes: This figure depicts the variation in the booklet-based objective complexity measure aggregated on the ballot level which is used to identify the complexity of the ballot. It is based on a Gaussian kernel density plot with a half-width of 500 words. The dashed red line denotes the median of the complexity measure. The dotted grey lines correspond to the 10<sup>th</sup>, 25<sup>th</sup>, 75<sup>th</sup>, and 90<sup>th</sup> percentile. For better readability, the information text axis is restricted to values below the 99<sup>th</sup> percentile.

### A.3 Results for Subjective complexity measure

TABLE A3.1—DESCRIPTIVE STATISTICS (SUBJECTIVE COMPLEXITY MEASURE)

	Voters and Non-Voters (N=166787)				only Voters (N=94823)		
	Mean	SD	Median		Mean	SD	Median
Diff. to Form an Opinion (Ball.)	0.48	0.50	0	Diff. to Form an Opinion	0.28	0.45	0
Rural	1.35	0.48	1	Rural	1.34	0.47	1
Female	0.50	0.50	0	Female	0.46	0.50	0
Age	47.14	17.22	45	Age	49.96	16.73	49



Education	2.74	1.55	2	Education	2.94	1.61	2
Prop. Knowledge (Ball.)	4.77	2.84	4	Prop. Knowledge	1.63	0.59	2
Married	0.60	0.49	1	Married	0.65	0.48	1
Protestant	0.43	0.50	0	Protestant	0.45	0.50	0
Employed	0.62	0.49	1	Employed	0.60	0.49	1

Notes: The table reports the descriptive statistics for the estimation sample used in regressions in table A3.2.

TABLE A3.2—SUBJECTIVE PERCEIVED COMPLEXITY AND OTHER DETERMINANTS OF PARTICIPATION AND VOTE OUTCOME

<i>Avg. Marginal Effects reported</i>	Dep. Var.: Participation				Dep. Var.: Yes-Vote			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Diff. to Form an Opinion (Ball.)	-0.123*** (0.006)	-0.116*** (0.006)	-0.109*** (0.005)	-0.106*** (0.005)				
Diff. to Form an Opinion (Prop.)					-0.051*** (0.012)	-0.068*** (0.010)	-0.065*** (0.009)	-0.058*** (0.008)
Rural	-0.004 (0.005)	-0.011** (0.005)	-0.009* (0.005)	-0.008* (0.005)	-0.035*** (0.007)	-0.029*** (0.007)	-0.031*** (0.006)	-0.033*** (0.006)
Female	0.002 (0.006)	0.001 (0.006)	0.002 (0.006)	0.004 (0.006)	0.021*** (0.008)	0.026*** (0.007)	0.027*** (0.007)	0.027*** (0.007)
Age	0.005*** (0.000)	0.005*** (0.000)	0.005*** (0.000)	0.005*** (0.000)	-0.001** (0.000)	-0.001** (0.000)	-0.000* (0.000)	-0.000* (0.000)
Education	0.038*** (0.003)	0.038*** (0.003)	0.031*** (0.002)	0.030*** (0.002)	0.015*** (0.005)	0.015*** (0.004)	0.017*** (0.003)	0.017*** (0.003)
Prop. Knowledge	0.045*** (0.005)	0.045*** (0.005)	0.055*** (0.004)	0.059*** (0.003)	0.017 (0.011)	0.020** (0.008)	0.014* (0.008)	0.017*** (0.006)
Married	0.069*** (0.006)	0.068*** (0.006)	0.070*** (0.006)	0.069*** (0.006)	-0.012* (0.007)	-0.013** (0.006)	-0.015*** (0.005)	-0.015*** (0.005)
Protestant	0.016** (0.006)	0.009 (0.006)	0.018*** (0.005)	0.018*** (0.005)	-0.004 (0.006)	-0.007 (0.005)	-0.007 (0.004)	-0.007 (0.005)
Employed	-0.002 (0.006)	-0.005 (0.006)	-0.004 (0.006)	-0.005 (0.006)	0.003 (0.006)	0.001 (0.006)	-0.001 (0.006)	-0.001 (0.006)
Canton dummies	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Referenda type dummies	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year dummies	No	No	Yes	Yes	No	No	Yes	Yes
Policy area dummies	No	No	No	Yes	No	No	No	Yes
Pseudo R <sup>2</sup>	0.135	0.142	0.159	0.166	0.006	0.057	0.069	0.087
Observations	181747	181747	181747	181747	103031	103031	103031	103031

Notes: The table establishes the negative and significant effect of perceived (subjective) complexity on eligible voter's probability to turn-out and to vote in favor of a proposition. Average marginal effects based on Probit regression are reported in all specifications. The marginal effect of Age is based on age and its squared term. Heteroskedasticity-robust standard errors clustered at the ballot level are reported in parentheses. Appendix A3.1 provides a table with summary statistics.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.

TABLE A3.3—(EXPECTED) NARROW ELECTION DECISION AND PARTICIPATION (SUBJECTIVE COMPLEXITY MEASURE)

<i>Probit coefficients reported</i>	Dep. Var.: Participation			
	(1)	(2)	(3)	(4)
Diff. to Form an Opinion	-0.362*** (0.018)	-0.345*** (0.017)	-0.334*** (0.016)	-0.325*** (0.016)
<i>Exclusion Restriction</i>				
Approval Share	1.757*** (0.638)	1.697** (0.678)	1.554** (0.625)	1.975*** (0.585)
Approval Share square	-1.944*** (0.629)	-1.819*** (0.659)	-1.718*** (0.628)	-2.001*** (0.582)
Canton dummies	No	Yes	Yes	Yes
Referenda type dummies	No	Yes	Yes	Yes
Year dummies	No	No	Yes	Yes

Policy area dummies	No	No	No	Yes
Pseudo R-squared	0.138	0.143	0.161	0.168
Observations	181747	181747	181747	181747
<i>p-value for joint significance of linear and quadratic terms in:</i>				
Approval Share	0.005	0.018	0.020	0.003

*Notes:* The table illustrates the significant hump-shaped effect of the approval share and the probability to turnout in the elections. Regression coefficients based on Probit regression are reported in all specifications. The variable approval share measures the share of yes-votes obtained from the official Swiss election data (University of Bern, Institute of Political Science 2013). The table also reports the p-value for the joint significance of the variable approval share and its squared term. All equations are estimated with individual controls as reported in table A3.2. Heteroskedasticity-robust standard errors clustered at the ballot level are reported in parentheses.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.

TABLE A3.4—HECKMAN SELECTION MODELS (SUBJECTIVE COMPLEXITY MEASURE)

	Heckman (1)		Heckman (2)		Heckman (3)		Heckman (4)	
	(1-1)	(1-2)	(2-1)	(2-2)	(3-1)	(3-2)	(4-1)	(4-2)
<i>Dep. Variable:</i>	Participation Yes-Vote		Participation Yes-Vote		Participation Yes-Vote		Participation Yes-Vote	
Difficulty to Form an Opinion (Prop.)		-0.188*** (0.020)		-0.211*** (0.030)		-0.194*** (0.024)		-0.176*** (0.023)
Difficulty to Form an Opinion (Ball.)	-0.327*** (0.033)		-0.376*** (0.021)		-0.365*** (0.019)		-0.355*** (0.018)	
<i>Exclusion Restriction</i>								
Approval Share	1.091* (0.632)		1.460* (0.833)		1.236 (0.786)		1.962*** (0.748)	
Approval Share square	-2.153*** (0.603)		-1.961*** (0.747)		-1.683** (0.809)		-2.151*** (0.749)	
<i>Unobserved Factors</i>								
rho	0.879		0.388		0.299		0.233	
Wald test ( <i>p-value</i> )	0.000		0.048		0.005		0.011	
Canton dummies	No		Yes		Yes		Yes	
Referenda type dummies	No		Yes		Yes		Yes	
Year dummies	No		No		Yes		Yes	
Policy area dummies	No		No		No		Yes	
Observations	166787		166787		166787		166787	

*Notes:* The table provides the estimated coefficients of the Heckman selection model and establishes the negative and significant effect of complexity on voter's probability to participate and vote in favor of a proposition. The table also reports the correlation  $\rho$  between the error terms of both equations, as well as the corresponding p-values. All equations are estimated with individual controls as reported in table A3.2, fixed effects for the ballot year, referenda type and the canton in which the eligible voter lives. Heteroskedasticity-robust standard errors clustered at the ballot level are reported in parentheses.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.

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