The effect of a 'None of the above' ballot paper option on voting behavior and election outcomes*

Attila Ambrus, Ben Greiner and Anita Zednik†

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Abstract

We investigate how an explicit blank vote option "None of the above" (NOTA) on the ballot paper affects voting behavior and election results in political elections where non-establishment candidates are on the ballot. We report evidence from two online field experiments conducted in the weeks preceding the 2016 U.S. Presidential Election and the 2016 Austrian run-off election for President. The two elections are special because in the U.S. election one firmly establishment candidate (Hillary Clinton) was facing a self-declared non-establishment candidate (Donald Trump), while in the Austrian election, both candidates were from outside the traditional political establishment. In our experiments we subjected participants either to the original ballot paper or to a manipulated ballot paper where we added a NOTA option. We find that participants with a protest motive, who are either unhappy with the candidate set or with the political establishment in general, choose NOTA. Introducing a NOTA option on the ballot increases participation and reduces the vote shares of non-establishment candidates.

Keywords: protest voting, expressive voting

JEL Classification: D72, C99

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†Ambrus: Duke University, Department of Economics, Durham, NC 27708, e-mail: aa231 AT duke.edu. Greiner: Wirtschaftsuniversität Wien, Institute for Markets and Strategy, Welthandelsplatz 1, 1020 Vienna, Austria, e-mail: bgreiner AT wu.ac.at, and University of New South Wales, School of Economics. Zednik: Wirtschaftsuniversität Wien, Institute for Markets and Strategy, Welthandelsplatz 1, 1020 Vienna, Austria, e-mail: anita.zednik AT wu.ac.at.

I Introduction

In a significant and increasing number of countries around the world, election ballot papers at different levels include a 'None of the Above' option (henceforth NOTA, in other contexts called 'None of these candidates' option or 'blank vote'). For example, in the U.S. state of Nevada, since 1976 all election ballot papers have had to feature a NOTA option.[1] An explicit 'blank vote' option is available on the ballot in Colombia, India, and Ukraine. The consequences of a NOTA vote differ across countries and elections. In most cases where such an option is offered, NOTA votes are reported separately from invalid votes, but do not affect the election outcome. In Colombia, if the blank vote attracts the most votes, the election has to be repeated, sometimes excluding the previous candidates from the new ballot paper (Superti, 2014). A NOTA vote is distinct from a null vote, that is, a purposefully or accidentally spoiled ballot. In some countries, such as in Italy, Sweden, or Spain where there is no official blank vote option, blank ballots (empty ballot papers) are recorded separately from null votes (spoiled ballot papers).[2]

The primary *political* motivation for introducing a NOTA option on the ballot is to offer an explicit protest choice to voters, a way to express dissatisfaction with the available set of candidates, or more generally, with the political discourse and establishment. A large number of explicit protest votes can affect the perceived legitimacy of the winning candidate and can convey important information to political parties, potentially influencing their policy choices. In the absence of a NOTA option on the ballot, protest may take the form of abstention, nullification of the ballot, or a vote for a non-establishment candidate even when the voter does not like the candidate or her proposed policies. However, these behaviors are blurry signals of protest as they may also result from other motives or, in the case of nullification, simply be involuntary mistakes. NOTA may also be a preferred choice for voters who lack enough information about the candidates and do not want to influence the election outcome, but out of citizen duty feel obliged to show up at the election and cast a valid vote (e.g. Ambrus, Greiner and Sastro, 2017).[3] Finally, a NOTA option may also be necessary for *legal* reasons, in particular when voting is electronic. In 2013, the Supreme Court of India ruled that electronic voting deprives voters of the option to reject all candidates without giving up their right to vote, and thus all electronic ballots have to include a NOTA option (see Ujhelyi, Chatterjee and Szabó, 2018, for details).

Understanding protest votes and how NOTA channels them has gained greater relevance recently, with rising popularity of populist anti-establishment candidates, as well as candidates from the political extremes, around the world. The main questions that we address in this paper are (i) what are the motivations of voters to select NOTA; (ii) who are the voters who switch from voting for a candidate

[1] In four elections in Nevada, the NOTA option even received the highest number of votes, including a 1976 Republican primary for a House seat and a 1978 Republican congressional primary.

[2] Relatedly, blank and null votes were counted together in France for a long time, but a political movement achieved that since 2015 null votes are counted and announced separately.

[3] The idea that asymmetric information affects willingness to participate at an election was developed in Feddersen and Pesendorfer (1996) and Feddersen and Pesendorfer (1999), see also Ghirardato and Katz (2002).

to the NOTA option (as opposed to switching from abstention or invalid votes to NOTA); and (iii) what types of candidates lose disproportionately when the NOTA option is offered on the ballot paper.

In order to investigate these questions, we conducted online field experiments in two settings: in the U.S. before the 2016 Presidential Election, and in Austria before the run-off round of the 2016 Presidential Election. In the U.S. context the two main candidates on the ballot were Donald Trump, a self-declared anti-establishment candidate despite running as a candidate of the Republican party (one of the two major political parties), and Hillary Clinton, the candidate of the Democratic party, coming from the heart of the political establishment. In the Austrian election, neither of the traditional parties' candidates made it to the run-off, so both candidates in the final round were from the political extremes, outside the traditional political establishment: Norbert Hofer from the far-right Freedom Party FPÖ, and Alexander Van der Bellen from the far-left Green Party.

In our experiments, we presented eligible voters with ballot papers that closely resembled the actual ballots they would face at the given election in the respective state, and asked them for their voting choice. We introduced three treatment conditions. In the first condition, the ballot paper only contained the respective presidential candidates. The second condition, which we will refer to as the 'weak NOTA' condition, additionally included a "None of these candidates" option without further explanation. In the third, 'strong NOTA' condition, we additionally included a short text that explained the function of the NOTA option, interpreting it as dissatisfaction with any of the candidates. We added this text as a substitute for the print and social media discussions about the function and consequences of a NOTA option that would have taken place if it were introduced in an electoral system.[4] In addition to the ballot choice, subjects were also asked to complete a survey on basic demographic information, subjects' attitudes towards various politicians, voting choices in previous Presidential Elections, the degree to which subjects felt a sense of duty to participate at the election, self-assessed amount of knowledge about the candidates, as well as satisfaction with the set of candidates on offer.

The resulting data allows us to formally test predictions of different explanations for choosing the NOTA option, and to identify which type of voters choose the NOTA option and what their choices would be in its absence. In particular, we identify a voter as uninformed if she self-reports low familiarity with the running candidates; unhappy about the set of candidates if she has a negative opinion on all the selectable candidates; non-establishment if she has not (before the experiment) voted for one of the major political parties in previous elections; and dutiful if she self-reports a strong sense of duty to participate at an election. NOTA as a protest vote against the current set of candidates implies that unhappy voters should select NOTA, while NOTA as a protest vote against the more general political establishment implies that non-establishment voters should select NOTA. The informational theory of voting implies that voters who are both uninformed and dutiful should select NOTA.

[4] Ujhelyi et al. (2018) report that the introduction of the NOTA option in India's national elections was accompanied by heavy media coverage and widespread public discourse on its role and potential electoral effects.

In both the US and the Austrian contexts, a significant fraction of voters in our online experiments selected the NOTA option. Its vote share was particularly high in Austria (15% and 23% in the two treatment conditions, respectively), where centrist voters were faced with two relatively extreme candidates in the run-off. Also in both contexts the NOTA option increased voter participation, consistent with the empirical findings of Ujhelyi et al. (2018) from India.

With respect to our main questions of interest, whether NOTA diverts votes from extreme candidates, in the U.S. context we find that the (strong) NOTA option would have significantly decreased the fraction of voters voting for Trump, but it would have had no impact on the fraction of votes for Clinton or for third party candidates. In Austria we find that NOTA would have decreased votes for both candidates, in similar magnitudes.

To investigate the driving forces behind the above effects, we examine the associations between various voter types and choosing NOTA. In the US context we find a significant positive correlation both between being unhappy with the set of candidates and selecting NOTA, and between being a non-establishment voter and selecting NOTA. This suggests that both types of protest votes, against the available set of candidates and against the political establishment more generally, are important factors for NOTA votes. Dutiful voters are less likely to vote NOTA, but consistent with an informational theory of voting, this effect is offset if the dutiful voter is uninformed.

In Austria, unhappiness with the set of candidates is the only characteristic that is (significantly) positively correlated with voting NOTA, suggesting that the primary source of NOTA votes in that context would have been dissatisfaction with the menu of candidates. As in the U.S., dutifulness is negatively correlated with the use of NOTA voting, though in Austria this is effect not mitigated for uninformed voters.

While some NOTA voters simply abstain if the NOTA choice was not on the ballot, some of them vote for a candidate. In the US, as discussed above, mainly for Trump. To identify who the voters are that change their choice this way, we look at the interaction term between the availability of a NOTA option and voter type characteristics on voting for candidates. We find that NOTA does not change the voting behavior of voters who previously voted for Republicans or Democrats, but only the voting behavior of those who did not previously vote for the establishment parties. This is consistent with Trump being a protest candidate in the eyes of some voters. A significant number of non-establishment voters not previously affiliated with the Republican party would vote for him in the absence of NOTA, but if NOTA was present, they would switch to the latter choice. In Austria, a lot of unhappy voters already do not vote for a candidate in the absence of NOTA, instead they abstain or invalidate their votes. But we see some evidence that introducing NOTA would cause unhappy voters further moving away from voting for either non-establishment candidate.

To summarize, we only find some mixed evidence for informational reasons to play a role in choosing the NOTA option in the US setting. In the Austrian setting our data is clearly not consistent with the informational theory. Data collected from both settings are consistent with the hypothesis that NOTA votes are inspired by protest motives. We find that the introduction of NOTA would change

vote shares of candidates relatively moderately, but it pulls more votes away from non-establishment candidates, who in the absence of an explicit NOTA option would collect more (protest) votes. Hence the introduction of NOTA does have the potential to affect electoral outcomes at close elections involving one major candidate credibly establishing herself from outside the establishment and another major candidate from inside the traditional establishment, such as in the 2016 U.S. presidential election. Our findings parallel those of Pons and Tricaud (2018), who show that the presence of an extra candidate in a run-off parliamentary election in France increases participation at the election and disproportionately harms the candidate closer to the extra candidate. The presence of a NOTA option on the ballot has similar effects on participation, and disproportionately hurts candidates who are imperfect substitutes for an explicit protest vote option.

Our paper complements a small but growing theoretical and empirical literature on the role of voting as communication and protest, and on the related literatures on ballot paper invalidation and on the explicit NOTA option. Protest voting is typically thought to be a form of expressive voting. The idea that the act of voting could serve purposes other than to elect a preferred candidate, including the voter's desire to express her own political preference, goes back to the seminal paper of Downs (1957). A more recent overview on expressive voting is provided by Schuessler (2000), and for a recent paper with empirical evidence for expressive voting see Robbett and Matthews (2018).[5] Many of the votes for extreme candidates are commonly interpreted as protest votes by dissatisfied and disillusioned voters. Golder (2003), Boya and Malizard (2015), Doležalová (2015), and Funke, Schularick and Trebesch (2016) provide empirical evidence on the impact of immigration, economic depression, and unemployment on the vote share of extremist and non-establishment candidates.

In the theoretical literature, there have been several models proposed to explain apparent protest votes for more extreme candidates. McMurray (2017) proposes a model in which voters choose extreme parties that are unlikely to win office, in order to communicate their policy views. A similar theory of voting as communication is proposed by Piketty (2000), where voters use a first round of voting in order to coordinate in the second round. Kedar (2005) develops a theory of voter choice where voters anticipate that their intended policy direction will get watered down by power sharing and thus strategically support parties with positions more extreme than their own. Bursztyn, Egorov and Fiorin (2017) feature a model of communication of social norms and empirically identify a causal effect of Donald Trump's rise in political popularity on individuals' willingness to publicly express xenophobic views. Myatt (2017) proposes a theory where protest voting is negatively affected by the expectation of others' enthusiasm for the protest issue.

Ballot paper invalidation may be another way for voters to express protest. At an informal level, distinguishing between informational reasons and protest motives for blanking or invalidating votes goes back to Stiefbold (1965). Knack and Kropf (2003) analyze invalid votes from the 1996 US presidential election and find evidence for both intentional and unintentional invalidation. The literature

[5] However, see Spenkuch (2018) for findings that cannot be explained by either the strategic voting paradigm or a theory of expressive voting postulating that (some) voters get a direct utility for voting for their most preferred candidate.

on the effects of NOTA options and different motives for choosing NOTA is almost exclusively based on field data, comparing aggregate electoral outcomes of different elections. It provides mixed evidence. Brown (2011), Damore, Waters and Bowler (2012) and Driscoll and Nelson (2014), in different contexts, all find evidence for both lack of information and dissatisfaction as motivations behind NOTA votes. Superti (2014) finds indirect evidence for protest motives being more relevant for blank (NOTA) and null (invalid) votes than informational reasons, by showing that blank and null voters are more educated and more informed about the candidates than other voters. Weinberg, Robert and Kawar (1982) and more recently Ujhelyi et al. (2018) both do not find a a significant effect of a NOTA option on vote shares among candidates. While Weinberg et al. (1982) find no evidence that NOTA affects turnout, Ujhelyi et al. (2018) provide evidence from India for increased participation due to NOTA, and Brown (2011) finds that the NOTA option reduces rolloff (voters casting a vote for some ballots but leaving other ballots invalid at the same election).

We complement the above literature with a study of choices in an *experimental* setting with randomly assigned ballot paper designs, where causality can be clearly attributed and individual choices can be observed. This facilitates the investigation of questions that cannot be addressed using aggregate election data.

II Theoretical considerations

Participating at an election and choosing the NOTA option (or deliberately casting a blank or invalid vote) can only be explained by direct benefits other than influencing the current election outcome, since showing up to vote is costly, and a NOTA (or an invalid/blank vote) at the elections we consider does not influence the outcome of the election. We consider three theories of direct costs and benefits associated with choosing the NOTA option: motivation to explicitly express dissatisfaction with the available list of candidates, motivation to express dissatisfaction with the political establishment, and citizen duty to participate at the election even though the voter is uninformed about the candidates and would rather let more informed voters to decide the outcome of the election. We will refer to these theories as protest against the candidates, protest against the establishment, and the informational theory. While choosing the NOTA option can have an effect on future political outcomes, for example when a large number of NOTA votes decreases the legitimacy of the winning candidate, or when it has an impact on who runs for office in future elections, as the impact of one additional NOTA vote is negligible, we mainly interpret the direct costs or benefits associated with choosing NOTA to be psychological. All three theories can be embedded into a model framework extending the calculus of voting model of Riker and Ordeshook (1968), presented below.

Assume the set of voters is $\{1, ..., n\}$ and the set of candidates is $X = \{x_1, ..., x_k\}$. Voting is simultaneous and each voter i can choose among the following actions: abstaining, voting for one of the candidates in X, casting an invalid vote if technically feasible,[6] and choosing NOTA if it is

[6] While with paper ballots invalidation is always an option, this is typically not the case with electronic voting. Since

offered on the ballot. We denote these choices by $\emptyset$, $x_1, ..., x_k$, inv, and n, respectively, and denote the set of available actions by A. We denote voter i's action choice by a_i. We also assume that there is a set of states of the world Ω with generic element denoted by ω that might influence the utility of voters differently for different election outcomes, although this only plays a nontrivial role in the informational theory. Let P denote the prior probability distribution of states over Ω.

Voter i's utility function is $U_i(x, \omega) - c_i I_{a_i \neq \emptyset} + B_i(a_i)$, where x is the candidate winning the election, and $I_{a_i \neq \emptyset}$ is an indicator function of not abstaining, and $c_i > 0$. The first term, U_i, is voter i's benefit from the political outcome. The second term represents the physical cost of participation: it is 0 if voter i abstains, and c_i otherwise. The third term represents the psychological benefit or cost from choosing a certain action.[7]

The three theories mainly differ in how the benefit function B_i is defined. Additionally, for simplicity, for the two protest theories we abstract away from the influence of the state of the world and assume that $U_i(x, \omega) = U_i(x, \omega') \equiv U_i(x)$ for any $x \in X$ and $\omega, \omega' \in \Omega$. This simplifying assumption is without loss of generality if the probability of a voter being pivotal is negligible, which is argued to be the case in large elections by Riker and Ordeshook (1968), since that renders the influence of the action choice on the U_i term negligibly small, and the optimal action choice boils down to comparing c_i with the B_i terms associated with actions involving participating at the election.

For simplicity we do not vary assumptions on $B_i(\emptyset)$ across theories, we just require $B_i(\emptyset)$ to be nonpositive.[8] A strictly negative psychological cost for abstaining can be interpreted as a citizen duty to participate at the election, which can induce a voter to turn up even when the probability of being pivotal is negligible and when the voter lacks further psychological motives to cast a certain vote.

Theory 1. We define the 'protest against the set of candidates' theory such that if for a voter i the term $\max_{x \in X} U_i(x)$ is less than a certain threshold $\overline{u}$, then $B_i(n) > 0$ and $B_i(inv) \in [0, B_i(n))$. It is natural to normalize this acceptability threshold to zero: $\overline{u} = 0$. Independently of U_i the theory renders $B_i(x) = 0$ for all $x \in X$. Moreover, when $\max_{x \in X} U_i(x) \geq 0$ then $B_i(y) = 0$ for every $y \in A/\{\emptyset\}$. In words, the theory postulates that if a voter dislikes all of the candidates enough, then she gets a strictly positive psychological utility when she expresses protest against the set of available candidates by choosing the NOTA option. We allow the voter to receive some psychological benefit from casting an invalid vote as well, but assume that the psychological benefit is higher in case of choosing NOTA, since the latter is an explicit statement of dissatisfaction.

many U.S. states use electronic voting machines but Austria exclusively uses paper ballots, our experimental subjects in Austria were allowed to choose invalidation as an option while the subjects in the U.S. were not.

[7] In our model this benefit only depends on the chosen action. There are other theories, like voters getting a benefit from being on the winner's side, that allow this benefit to also depend on the election outcome (see Callander, 2007, 2008; Hinich, 1981). However, these theories do not provide motivations for voting NOTA, hence we are not considering this greater level of generality.

[8] In some of the theories, considered abstention could be associated with a positive psychological benefit for those with a protest motive, but this would not change our conclusions below as long as voting NOTA gives sufficiently higher benefit to these voters than abstaining.

In this 'protest against the set of candidates' specification of the model those 'unhappy' voters are predicted to choose NOTA (when the latter is on the ballot) who value each candidate less than 0 and receive a high enough psychological benefit from voting NOTA. If the probability of being pivotal is negligible then voter i chooses NOTA if and only if $\max_{x \in X} U_i(x) < 0$ and $c_i \leq B_i(n)$.[9] In the absence of a NOTA option these voters can either abstain, cast an invalid vote (if the latter is an option), or vote for the candidate they value least negatively, depending on the values of c_i, $B_i(\emptyset)$ and $B_i(inv)$.

Theory 2. We define the 'protest against the establishment' theory the following way. A fraction $p \in (0,1)$ of the voting population, labeled non-establishment, is against the political establishment. The remaining voters are not. Similarly, candidates are partitioned into two subgroups, those coming from the traditional political establishment, labeled by X_e, and those coming from outside it, labeled by X_a. For establishment voters, $B_i(y) = 0$ for every $y \in A/\{\emptyset\}$. For a non-establishment voter i, we assume $B_i(n) > 0$ and $B_i(inv) \in [0, B_i(n))$. Moreover, $B_i(x) > 0$ for $x \in X_a$ and $B_i(x) = 0$ for $x \in X_e$. In words, non-establishment voters receive a psychological benefit when they vote NOTA or for a non-establishment candidate.

In this model specification, assuming that the probability of being pivotal is negligible, a non-establishment voter chooses NOTA when $B_i(n) > \max(c_i, \max_{x \in X} B_i(x))$.[10] That is, NOTA is chosen when it provides a higher psychological benefit to the voter than voting for any of the non-establishment candidates, and when this benefit exceeds the voting cost. In the absence of the NOTA option these voters would either abstain, cast an invalid vote or vote for a non-establishment candidate, depending on the values of c_i, $B_i(\emptyset)$, $B_i(inv)$ and $\max_{x \in X} B_i(x)$. Establishment voters never choose NOTA.

Theory 3. The informational theory model we consider is taken from Ambrus et al. (2017), which we briefly summarize here. For simplicity, we focus attention to having only two candidates, x_1 and x_2. In this model specification all voters have the same preferences, but which of the two candidates voters prefer depends on the state of the world. The state can be either 1 or 2, and in the former case $U_i(x_1) = 1$ and $U_i(x_2) = 0$ for all $i = 1, ..., n$, while in the latter case $U_i(x_1) = 0$ and $U_i(x_2) = 1$ for all $i = 1, ..., n$. The prior probabilities of both states are 1/2. Voters are partitioned into types along two dimensions: information and psychological benefits. Along the first dimension, a voter can be either informed or uninformed. The informed voters receive conditionally independent signals about the state, with the realization of the signal matching the true state with probability $p \in (0.5, 1)$. Uninformed voters don't receive such an informative signal before the election. For psychological utilities, voters are divided into types according to what action choices they regard consistent with fulfilling citizen duty. Voters incur psychological costs when choosing an action they consider not consistent with citizen duty. On one extreme of the type distribution are standard economic agents who do not face psychological costs for any action: $B_i(y) = 0$ for every $y \in A$. On the other extreme are the voters who only consider voting for a candidate to be consistent with citizen duty.

[9] Here we assume that if a voter is exactly indifferent between voting and abstaining then she breaks the indifference towards the former.

[10] If $B_i(n) = \max_{x \in X} B_i(x)$ then i might choose n or one of the candidates giving the maximal psychological benefits, depending on U_i and i's beliefs about pivotal events.

The type of voters driving the differences in election outcomes between election with and without NOTA on the ballot are uninformed voters who consider both voting for a candidate and voting for NOTA as fulfilling their civil duty. The reason is that in this model in equilibrium uninformed voters face the swing voter's curse (Feddersen and Pesendorfer, 1996) in that when voting for a candidate they are more likely to shift the election outcome adversely. Hence uninformed voters prefer not influencing the election outcome if there is a way for them to do so without incurring psychological costs. NOTA provides that option for the above voter type, and it is their choice when NOTA is on the ballot, while in the absence of it they vote for a candidate. For more detailed analysis of the model, see Ambrus et al. (2017).

The predictions of the different models can be summarized as follows.

Hypothesis 1 (Prediction of Theory 1): Voters unhappy with the set of candidates on the ballot are the ones choosing NOTA. In the absence of the NOTA option, they vote for a candidate or cast an invalid vote or abstain.

Hypothesis 2 (Prediction of Theory 2): Non-establishment voters are the ones choosing NOTA. In the absence of the NOTA option, they vote for a non-establishment candidate or cast an invalid vote or abstain.

Hypothesis 3 (Prediction of Theory 3): Uninformed voters with strong citizen duty to participate at the election are the ones choosing NOTA. In the absence of the NOTA option, they vote for one of the candidates.

III Study 1: 2016 U.S. Presidential Elections

III.A Data and Experimental Design

We conducted an online experiment in the two weeks leading up to the U.S. Presidential elections 2016. The experiment ran simultaneously in five U.S. states: Florida and Ohio, two battle states; Maryland, a strongly Democratic state; Tennessee, a strongly Republican state; and Nevada, a state that has featured a NOTA vote option in all elections since 1976. In order to match our sample as closely as possible to the Voting Eligible Population (VEP), we used stratified sampling with proportional allocation of the sample to the individual strata. Stratas were generated using population data from the US Census Bureau on gender, age and education for each of the five states. We cooperated with Survey Sampling International (SSI), a survey panel hosting company. SSI sent email invitations to panel members who matched the strata criteria. Three screener questions on state, age and voting eligibility for the upcoming election ensured that all respondents were members of the VEP of the election. Fifteen respondents were excluded from the analysis,[11] resulting in a final sample of 1967 observations.

[11] We excluded 2 observations because participants completed the experiment in less than a third of the median time it took respondents to complete the survey, and 13 respondents who picked the wrong answer in an attention control question in the survey.

After answering the screener questions, all participants saw an election ballot that resembled the actual ballot paper of the 2016 U.S. Presidential Election for their state (see Figure 5 in Appendix A for the example of a ballot including NOTA option used for Maryland). The ballot contained only those Presidential Candidates that were running in the respective state. We implemented three experimental conditions: (1) in the baseline condition 'without NOTA', the ballot showed only the respective Presidential Candidates; (2) in condition 'weak NOTA', the ballot showed the candidates as well as a "NONE OF THESE CANDIDATES" option on the bottom of the ballot; and (3) in condition 'strong NOTA', participants saw the same ballot as in the weak NOTA condition, but in addition a short text explained the function of the NOTA option and how votes for NOTA are interpreted and counted.[12] The text was identical in all states, and represents the information that would emanate from the public discussion and the media if NOTA were introduced in a particular state or country.

Respondents were randomly assigned to the different treatment conditions, and were asked to state how they would vote if the shown ballot were the one they would be presented with on Election Day. In particular, they were asked whether they would abstain or vote, and if they vote which candidate/option they would vote for.[13,14] After the ballot choice, we asked participants a set of survey questions (identical across conditions) about their attitudes towards a set of political candidates, their voting motivations, past voting behavior, and socio-demographic variables. Table 1 shows the final number of participants for each of the five U.S. states and three ballot paper conditions.

III.B Effect of NOTA on voting behavior

Table 2 shows what fraction of participants choose which voting option in the three conditions. The three columns on the left-hand side show data for all participants, while the three columns on the right show the outcomes for 'likely voters' only.[15] Figure 1 presents the data from the left panel of Table 2 graphically.

[12]The text read: "Note that, in addition to the candidates, you have a NONE OF THESE CANDIDATES option on this ballot. If you choose this option, your vote will be counted as valid. In determining the election winner, it will be treated like an abstention, but it will be published alongside election results and will be interpreted as dissatisfaction with any of the candidates."

[13]Different to the Austrian study reported below, we did not allow for an explicit option to invalidate the vote in the U.S. survey. Many U.S. states employ electronic voting systems that do not allow for invalidation, such that we cannot reasonably allow for that option in all 5 states. Nevada has a Direct Recording Electronic (DRE) system but with an accompanying paper trail, in Ohio there is voting on paper and DRE with a paper trail, Florida and Tennessee have paper and DRE ballots without paper trail, and Maryland only has paper ballots.

[14]As an additional within-subject treatment variation, after completing their initial vote choice we also presented subjects with the respective other ballot paper (strong/weak NOTA if the original ballot was without NOTA, and without NOTA if the original ballot paper was weak or strong NOTA). However, we observe strong order effects. In particular, we observe a significantly higher share of NOTA votes if we present that ballot second (9.9% and 15.3% in weak and strong NOTA) rather than first (6.2% and 8.9%, respectively), probably due to the salience of the variation in the ballot paper and thus experimenter demand effects. In our analysis we thus conservatively only focus on the original choices, and in our Austrian survey reported below we did not elicit second voting choices at all.

[15]We identify a 'likely voter' as someone who had either already submitted a vote (27.6 % of participants) or who indicated a very high likelihood to vote in the upcoming Presidential Elections (8 or higher on a 10-point scale). 86% of participants classify as likely voters. Since the threshold is 80% likelihood, when asked about their actual voting behavior some of the likely voters said they would abstain.

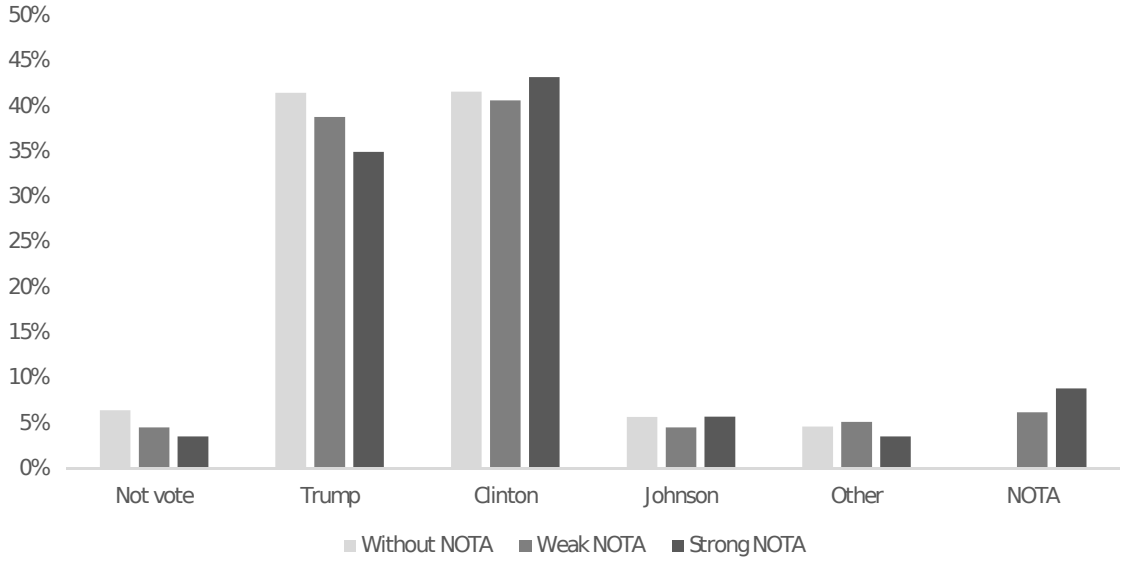
TABLE 1: Number of participants in each state and experimental condition in the US experiment

	Without NOTA	Weak NOTA	Strong NOTA	Total
Florida	130	140	127	397
Maryland	133	131	136	400
Nevada	128	126	122	376
Ohio	133	134	130	397
Tennessee	141	128	128	397
Total	665	659	643	1,967

TABLE 2: Voting choices of all participants/likely voters in the U.S. in the three experimental conditions, in percent

	All participants			Likely voters		
	Without NOTA	Weak NOTA	Strong NOTA	Without NOTA	Weak NOTA	Strong NOTA
Abstain	6.5	4.6	3.6	1.4	0.9	0.4
Trump	41.5	38.9	35.0	43.6	42.9	38.2
Clinton	41.7	40.7	43.2	44.8	43.6	48.1
Johnson	5.7	4.6	5.8	5.5	4.8	5.8
Other	4.7	5.2	3.6	4.8	4.8	3.0
NOTA	–	6.2	8.9	–	3.0	4.6
N	665	659	643	583	566	539

FIGURE 1: Voting choices in the three experimental conditions in the U.S.



Participants had the following behavioral options: abstaining or voting for one of the candidates or, in the two NOTA conditions, voting NOTA. As Table 2 and Figure 1 show, a non-trivial portion of voters used the NOTA option when it was available: 6.2 % of participants in the weak NOTA condition and 8.9 % in the strong NOTA condition. Figure 1 suggests a clear downward trend in votes for Trump when a NOTA option is introduced (significant at p=0.017, two-sided Fisher's exact test for the strong NOTA condition, n.s. for weak NOTA condition), while for all other candidates there is no clear trend emerging. We formally investigate how the availability of a NOTA option changes voting behavior by running Multinomial Logit Regressions (MNL), including the data from all three conditions. Since the NOTA option was not available in the 'without NOTA' condition, we subsume abstention and NOTA votes into one category, in order to be able to estimate the model. Abstentions decrease by 3.6% in the weak NOTA condition and 6.5% in the strong NOTA condition, the changes being statistically significant for the strong NOTA condition (two-sided Fisher's Exact test, p=0.022) but not for the weak NOTA condition (p=0.148). As a consequence, any *positive* changes in the combined Abstain/NOTA category estimated in the MNL regressions represent a lower bound for moves of votes from candidates towards NOTA. Further, we subsume all candidates other than Clinton or Trump as well as write-in candidates into one 'Other' category for the analysis.

Table 3 shows the average marginal effects and their standard errors for four different Multinomial Logit regression models. Models (1) and (2) are estimated with the full sample and Models (3) and (4) for likely voters only. In Models (2) and (4) we include state fixed effects. In all models we observe a significant increase in our NOTA/Abstention category (2.5-4.0% in the weak NOTA condition, 3.6-6.0% in the strong NOTA condition). Given the decrease in abstentions documented above, this implies that the NOTA option significantly draws votes from candidates. The other estimates show that while in the weak NOTA condition we cannot determine from which of the candidates these votes come, in the strong NOTA condtion the only candidate who loses a significant proportion of votes towards NOTA is Trump (between 5-6%). This effect is significant in all models.

III.C Voter motivations

We are interested in (a) whether different voters types (classified by their motivations) behave differently in the experimental conditions, and (b) who the NOTA voters are. To elicit voter motivations, we asked participants about their political attitudes, as well as their behavior in the previous Presidential election in 2012. For attitudes, participants were asked for their level of agreement or disagreement on a 7-point Likert Scale on 7 statements. These statements were transformed into three binary variables. The variable 'uninformed' took the value of 1 for the 35% of participants (29% of likely voters) who did not tick *strongly agree* or *agree* on all of the three statements "I feel well informed about the presidential candidates," "I know what each candidate stands for,"and "I know each presidential candidate's stance on at least three major issues,"and 0 otherwise. The variable 'unhappy with candidate set' was 1 for 27% of participants (23% of likely voters) who ticked *strongly agree* on either of the two

TABLE 3: Average marginal effects (dy/dx) of Multinomial Logit Regressions of the likelihood of choosing different ballot options on treatment conditions, U.S. sample

	Abstain/ NOTA	Trump	Clinton	Other
Model 1: All participants, N=1967, no State FE				
Weak NOTA	0.043**	-0.027	-0.010	-0.007
	(0.015)	(0.027)	(0.027)	(0.017)
Strong NOTA	0.060***	-0.065**	0.016	-0.010
	(0.016)	(0.027)	(0.027)	(0.016)
Model 2: All participants, N=1967, with State FE				
Weak NOTA	0.044**	-0.026	-0.013	-0.005
	(0.015)	(0.027)	(0.027)	(0.016)
Strong NOTA	0.060***	-0.063**	0.013	-0.010
	(0.016)	(0.026)	(0.027)	(0.016)
Model 3: Likely voters, N=1688, no State FE				
Weak NOTA	0.025**	-0.006	-0.011	-0.008
	(0.009)	(0.029)	(0.029)	(0.018)
Strong NOTA	0.036***	-0.053*	0.033	-0.016
	(0.011)	(0.029)	(0.030)	(0.017)
Model 4: Likely voters, N=1688, with State FE				
Weak NOTA	0.025**	-0.004	-0.016	-0.005
	(0.009)	(0.029)	(0.029)	(0.017)
Strong NOTA	0.036***	-0.050*	0.028	-0.014
	(0.010)	(0.029)	(0.030)	(0.017)

Notes: Baseline is condition without NOTA option. Robust standard errors in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

statements "All the candidates in this year's election are garbage" and "There is no candidate in this year's election that is suited for presidency." Finally, the variable 'dutiful' represents with a value of 1 those 39% of participants (45% of likely voters) who ticked *strongly agree* on both statements "It is important to me to fulfill my civil duty to vote" and "It makes me feel good to cast a valid vote." Further, we identify 28% of participants (21% of likely voters) as being 'non-establishment' if they did not vote for either the Democratic or the Republican candidate in the past US Presidential Election 2012.[16,17] NOTA as a protest vote against the currently running candidates implies that unhappy voters should select NOTA. NOTA as a protest vote against the more general political establishment implies that non-establishment voters should select NOTA. Finally, the informational theory of voting implies that voters who are both uninformed and dutiful should select NOTA.

Table 4 displays the marginal effects of a similar MNL model as the one presented as Model (4) in Table 3, only that now we also include the motivation dummies as well as their interactions with the two treatment conditions as explanatory variables. The average marginal effects for the motivational variables unhappy, non-establishment, uninformed, and dutiful give insight into participants' motivations in the 'without NOTA' condition. Voters who are happy with the set of candidates and non-establishment are significantly more likely to vote for Trump, while non-establishment voters are substantially less likely to vote for Clinton. Unhappy, non-establishment, and those voters with low sense of duty to vote are significantly more likely to vote for other candidates than Trump or Clinton, including write-in candidates.

For the strong NOTA treatment, we find that non-establishment participants are 16% less likely to vote for Trump if offered a strong NOTA option, compared to the without NOTA condition. Unhappy participants steer away from other candidates (-7.8%) when a strong NOTA option is available (with their votes seeming to go to either abstention/NOTA or Clinton, but these effects being nonsignificant), and dutiful voters are less likely to cast their vote in the abstention/NOTA category in this condition (benefitting Clinton, but statistically insignificantly). We do not find significant interaction effects for motivations in the weak NOTA condition in this regression.

In Figure 2 we look at votes for Trump and Clinton only, separately for our three treatment conditions and three types of voters: those who have voted for the Democrat ticket in the 2012 Presidential election, those who have voted for the Republican ticket, and those who did not vote for one of the two major parties. The distributions of Trump/Clinton votes of those who voted for Democrats or Republicans previously are remarkably stable across treatment conditions, they do not change much when introducing the NOTA option. In contrast, for those who did not vote for one of the major parties in 2012 (our 'non-establishment' voters), 61% would vote for Trump in the without

[16] Non-establishment voters here are participants who ticked "I wasn't eligible," "I was eligible but I did not register," "I was eligible and registered, but I did not vote," "I voted for some other candidate" or "I don't remember." Excluding those participants from non-establishment voters who ticked "I wasn't eligible" does not change the qualitative conclusions.

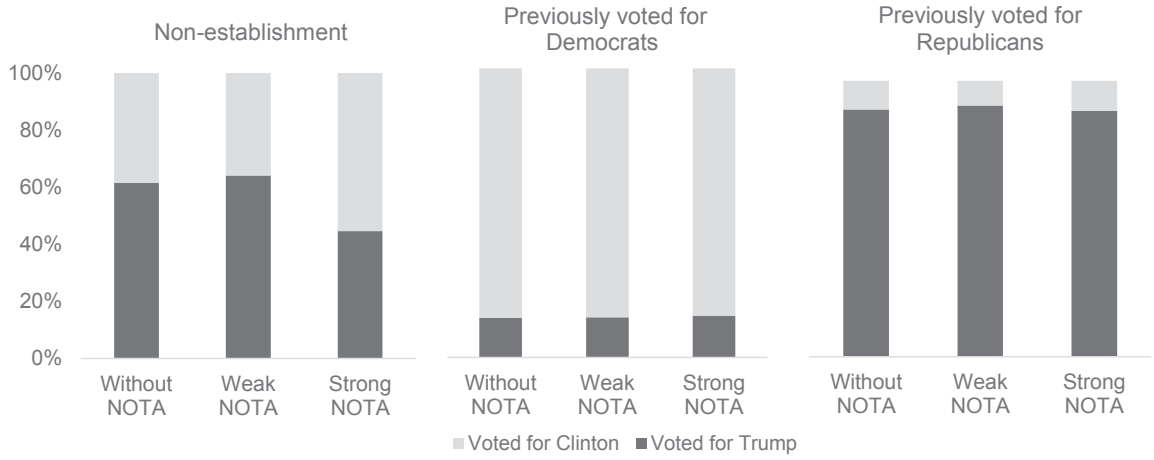
[17] We note that our random treatment assignment succeeded in that there are no significant differences in the distributions of these voter types across treatment, both in the U.S. and in Austria. We also ran robustness checks controlling for the day the survey was taken (to control voter information shocks), with no significant effects on our estimates.

TABLE 4: Average marginal effects (dy/dx) of Multinomial Logit Regressions of the likelihood of choosing different voting options on treatment conditions and voter motivations, U.S. sample

	Abstain/ NOTA	Trump	Clinton	Other
Weak NOTA	0.022	0.039	-0.082	0.021
	(0.022)	(0.060)	(0.061)	(0.038)
Strong NOTA	0.027	0.030	-0.091	0.033
	(0.021)	(0.061)	(0.062)	(0.042)
Unhappy	0.034	-0.083*	-0.062	0.110***
	(0.021)	(0.045)	(0.046)	(0.023)
Unhappy × Weak NOTA	-0.002	0.066	-0.038	-0.025
	(0.025)	(0.067)	(0.068)	(0.034)
Unhappy × Strong NOTA	0.028	-0.051	0.101	-0.078**
	(0.024)	(0.072)	(0.071)	(0.038)
Non-establishment	0.017	0.120**	-0.188***	0.051*
	(0.024)	(0.046)	(0.050)	(0.026)
Non-establishment × Weak NOTA	0.014	0.054	-0.042	-0.026
	(0.027)	(0.070)	(0.074)	(0.040)
Non-establishment × Strong NOTA	0.023	-0.155**	0.108	0.023
	(0.028)	(0.071)	(0.073)	(0.037)
Uninformed	0.001	-0.027	-0.004	0.030
	(0.025)	(0.043)	(0.043)	(0.025)
Uninformed × Weak NOTA	0.000	0.022	-0.010	-0.013
	(0.029)	(0.063)	(0.063)	(0.037)
Uninformed × Strong NOTA	0.001	-0.022	0.006	0.015
	(0.029)	(0.063)	(0.063)	(0.037)
Dutiful	0.025	0.010	0.008	-0.043*
	(0.022)	(0.039)	(0.040)	(0.026)
Dutiful × Weak NOTA	-0.034	-0.024	0.044	0.014
	(0.027)	(0.056)	(0.057)	(0.037)
Dutiful × Strong NOTA	-0.052*	0.011	0.050	-0.009
	(0.027)	(0.057)	(0.058)	(0.040)

Notes: Only includes likely voters, N=1688. The regression also includes state fixed effects and controls for gender, university-education, age, and race. Baseline is condition without NOTA option. Robust standard errors in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

FIGURE 2: Relative shares of Trump and Clinton votes among likely voters who voted for either Trump or Clinton, conditional on treatment and previous voting behavior



NOTA condition, 64% in the weak NOTA condition, and only 45% in the strong NOTA condition (two-sided Fisher's Exact Test significant at p=0.034).

In order to study what types of voters choose the NOTA option, we run a set of Probit models where we regress the likelihood of a NOTA vote on voter motivations. We report the results in Table 5. Naturally, we rely on data from the two NOTA treatments only. Models (1) and (2) are based on all participants, Models (3) and (4) only include data from likely voters. Models (1) and (3) only include strong NOTA and voter motivation dummies, while Models (2) and (4) additionally control for some demographic characteristics, such as gender, having a university degree or not, being older than the median age of 45 or not, and being non-white or not.

Consistent with our findings above, we find that unhappiness with the set of candidates and being a non-establishment voter are significant predictors of choosing the NOTA option when it is available. The informational voting theory predicted that candidates who are both uninformed and dutiful are more likely to choose the NOTA option, because they feel the obligation to vote but do not want to spoil the result. We find mixed evidence for this hypothesis. Not predicted by the theory, dutiful voters are in general less likely to vote NOTA, but consistent with the theory amongst likely voters this effect is offset if the dutiful voter is uninformed.

IV Study 2: 2016 Austrian Presidential Elections

IV.A Data and Experimental Design

The Austrian President is elected directly by eligible voters. The Presidential Candidate who wins at least 50 percent of valid votes is elected Federal President for a period of six years. If no candidate gains the majority of votes in the first election round, a run-off between the two candidates with the highest number of votes takes place.

TABLE 5: Average marginal effects (dy/dx) of Probit regressions of likelihood to vote NOTA on voter motivations, U.S. sample

	All participants		Likely voters	
	Model (1)	Model (2)	Model (3)	Model (4)
Strong NOTA	0.028**	0.027**	0.018*	0.018*
	(0.013)	(0.013)	(0.011)	(0.011)
Unhappy	0.100***	0.100***	0.058***	0.058***
	(0.014)	(0.014)	(0.012)	(0.012)
Non-establishment	0.041**	0.041**	0.029**	0.032**
	(0.014)	(0.015)	(0.012)	(0.011)
Uninformed	0.023	0.022	-0.012	-0.012
	(0.015)	(0.015)	(0.013)	(0.013)
Dutiful	-0.075***	-0.077***	-0.039**	-0.040**
	(0.022)	(0.022)	(0.015)	(0.015)
Uninformed × Dutiful	0.029	0.031	0.052**	0.053**
	(0.038)	(0.038)	(0.026)	(0.026)
Female		0.01		0.001
		(0.013)		(0.010)
University degree		-0.011		0.003
		(0.016)		(0.011)
Older than 45		0.003		0.003
		(0.005)		(0.004)
Non-white		-0.006		-0.003
		(0.017)		(0.013)
N	1302	1302	1105	1105

Notes: Only includes data from the two NOTA treatments. Baseline is weak NOTA condition. All regressions include state fixed effects. Robust standard errors in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

We conducted a second online experiment in the two weeks leading up to the run-off for the 2016 Presidential Elections in Austria which took place on 4 December 2016.[18] This run-off election was unique in that the two candidates who emerged after the first election round were both candidates at the fringes of the political spectrum. Norbert Hofer is a member of the Freedom Party FPÖ, a far-right party that has gained increasing political power in Austria in the last years. Alexander Van der Bellen (previously a professor of economics and econometrics at the University of Vienna) is a member of the Green Party on the left of the political spectrum in Austria. Neither of the candidates of the two traditional major parties in Austria (the Social-Democratic Party SPÖ and the Christian-Conservative Party ÖVP) had gained enough votes in the first round to make the run-off. Since the establishment of the Republic of Austria after World War II in 1945 up until 2016, every elected President in Austria had been a member or at least a favored candidate of one of these two major parties. Thus, the unusual situation of the 2016 Austrian Presidential election allows to study the effect of introducing a NOTA option on a ballot where all candidates are considered extreme.

As in the US, we used stratified sampling with proportional allocation of the sample to the individual strata. Stratas were generated using population data from Statistik Austria (2014) on gender, age, and education for each of the nine Austrian states. We cooperated with *talkonline*, an Austrian panel company, which sent email invitations to participate in the experiment to their panel on our behalf. The final sample size for our analysis is 2,999 observations. We implemented the same three treatment conditions as before: without NOTA, in which case participants were shown a mock-up of the standard ballot, weak NOTA, where the ballot also included an additional NOTA option ("Keinen dieser Kandidaten") as last option on the ballot, and strong NOTA, where an additional short text (a translated version of the text used in the U.S. experiment) was added to the ballot paper to explain how a vote for the NOTA option will be counted and interpreted. Participants were randomly assigned to one condition. In total we had 2,999 participants, with 1000, 994, and 1005 participants in the experimental treatments without NOTA, weak NOTA, and strong NOTA, respectively.

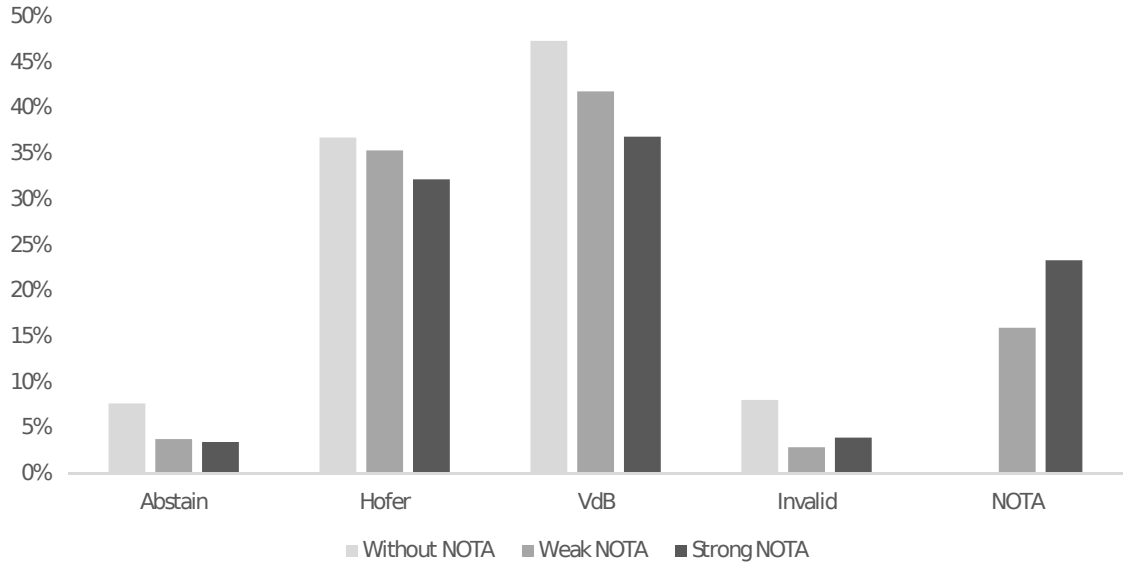
Participants were first shown a screen with a mock-up of the ballot paper, depending on the treatment condition, with or without NOTA. Then they were asked whether they would abstain, invalidate, vote for Hofer, vote for Van der Bellen (henceforth VdB) or, in conditions 2 and 3, vote NOTA, if the presented ballot paper were the ballot used in the upcoming election. Different to the U.S. survey, in the Austrian survey we allowed participants to state that they would 'invalidate' their ballot paper since in Austria all ballots are on paper, which makes invalidation possible. As in the U.S. experiment, we also asked participants a set of survey questions (identical across conditions) about their attitudes towards a set of political candidates, their voting motivations, past voting behavior, and socio-demographic variables.

[18] A first run-off between the two candidates had been held in May 2016 but had to be repeated because one party complained about minor irregularities in counting postal votes. The repeated run-off was first planned for October 2016 but then postponed to December 2016 because of problems with the glue on envelopes used by postal voters.

TABLE 6: Voting choices of all participants/likely voters in Austria in the three experimental conditions, in percent

	All participants			Likely voters		
	Without NOTA	Weak NOTA	Strong NOTA	Without NOTA	Weak NOTA	Strong NOTA
Abstain	7.7	3.8	3.5	1.5	0.4	0.3
Hofer	36.8	35.4	32.2	40.0	36.9	32.2
VdB	47.4	41.9	36.9	50.8	45.5	41.6
Invalid	8.1	2.9	4.0	7.7	2.0	3.2
NOTA	–	16.0	23.4	–	15.1	22.8
N	1000	994	1005	727	734	729

FIGURE 3: Voting choices in the three experimental conditions in Austria



IV.B Effect of NOTA on voting behavior

Table 6 shows what fraction of participants chose which voting option in the three conditions. The three columns on the left-hand side of the table show data for all participants, while the three columns on the right-hand side show data for likely voters only.[19] Figure 3 presents data from the left panel of Table 6 graphically.

The number of NOTA voters in Austria is much higher than in the U.S. experiment. 15% of participants in the weak NOTA condition and 23% of participants in the strong NOTA condition

[19] In Austria we asked participants how likely they are to vote in the upcoming election on a scale from 0 to 100%. We identify a likely voter as someone who indicates an 80% or higher likelihood to vote in the election. 73% of respondents qualify as likely voters. Since the threshold is 80% likelihood, when asked about their actual voting behavior some of the likely voters said they would abstain.

state that they would choose the NOTA option. We hypothesize that the greater popularity of the NOTA option in Austria is due to a combination of the following three reasons: 1) In elections, the number of spoiled or blank votes increases when the number of candidates decreases (Damore et al., 2012; Zulfikarpasic, 2001). There were only two candidates on the Austrian ballot, but four or more candidates on the U.S. ballots. 2) The ballot paper's shortness may have increased the salience of the additional NOTA option on the Austrian ballot, compared to the U.S. where more candidates and more information (vice-presidents, party names) were listed. 3) The candidates for the run-off were from the fringes of the political spectrum.

Figure 3 suggests that the vote shares of both candidates decreased with the introduction of a NOTA option on the ballot paper. The decrease in votes for Hofer is significant in the strong NOTA condition (two-sided Fisher's exact test, p=0.035) and for VdB in both conditions (p=0.013 in the weak NOTA condition, p=0.000 in the strong NOTA condition). We investigate the robustness of these changes with a Multinomial Logit regression model, including the data from all three treatments. As in the US case, for the analyses we subsume votes for NOTA, Abstention, and Invalidation into one category. We find a significant drop of abstentions in the weak NOTA and the strong NOTA condition (two-sided Fisher's Exact tests, both p-values equal to 0.000). At the same time, the relative number of invalidations drops significantly in both NOTA conditions (two-sided Fisher's exact tests, both p-values equal to 0.000). Thus, a positive treatment effect on the category NOTA/Abstention/Invalidation will indicate the lower bound of the reduction of votes for candidates due to NOTA.

Table 7 shows the estimated average marginal effects and their standard errors of the weak and strong NOTA option on a vote being NOTA/Abstention/Invalidation, for Hofer, or for VdB. Models (1) and (2) are based on data from all participants, Models (3) and (4) include only likely voters. For the weak NOTA condition we find a significant increase of 7-8 % in the NOTA/Abstentions/Invalidations category. Given the results on abstentions and invalidations above, this implies that NOTA draws significantly from votes for candidates. However, only candidate VdB is statistically significantly negatively affected. In the strong NOTA condition, the total likelihood of a vote to be in the category NOTA/Abstention/Invalidation increases by 15-17%, again implying a significant draw from candidate votes. Here, both candidates significantly lose vote shares (Hofer 5-8% and VdB 9-10%, depending on model).[20]

IV.C Voter motivations

In order to investigate whether different voter types behave differently in the experimental conditions and who the NOTA voters are, we define voter motivations in the same manner as in the U.S. sample. We asked participants for their agreement/disagreement on a 7-point Likert Scale on the same 7 statements as used in the U.S. study (translated into German). We applied the same categorization rules,

[20]Figure 6 in Appendix A includes detailed sankey charts showing how participants voted in the run-off election conditional on how they voted in the first election round, both when NOTA was available or was not available in the run-off election. The graphs visually support the observations made here.

TABLE 7: Average marginal effects (dy/dx) of Multinomial Logit Regressions of the likelihood of choosing different voting options on treatment conditions, Austrian sample

	Abstain/ NOTA/ Invalid	Hofer	VdB
Model 1: All participants, N=2999, no State FE			
Weak NOTA	0.069***	-0.014	-0.055**
	(0.018)	(0.022)	(0.022)
Strong NOTA	0.150***	-0.046**	-0.105***
	(0.019)	(0.021)	(0.022)
Model 2: All participants, N=2999, with State FE			
Weak NOTA	0.069***	-0.015	-0.054**
	(0.018)	(0.022)	(0.022)
Strong NOTA	0.150***	-0.047**	-0.103***
	(0.019)	(0.021)	(0.022)
Model 3: Likely voters, N=2190, no State FE			
Weak NOTA	0.084***	-0.031	-0.053**
	(0.018)	(0.025)	(0.026)
Strong NOTA	0.170***	-0.078**	-0.092***
	(0.020)	(0.025)	(0.026)
Model 4: Likely voters, N=2190, with State FE			
Weak NOTA	0.083***	-0.030	-0.053**
	(0.018)	(0.025)	(0.026)
Strong NOTA	0.169***	-0.078**	-0.091***
	(0.020)	(0.025)	(0.026)

Notes: Baseline is condition without NOTA option. Robust standard errors in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

yielding 48% of voters being classified as 'uninformed', 23 % as 'unhappy with the set of candidates', 49% as 'dutiful', and 69% as 'non-establishment' voters.[21] For likely voters, these numbers are 43%, 21%, 56%, and 68%, respectively.

Table 8 shows the average marginal effects of the same MNL Regressions as in Model 4 of Table 7 but with motivations and their interactions with treatment conditions added. The coefficients for the variables unhappy, non-establishment, uninformed and dutiful show the effects of different motivations when there is no NOTA option available. If not given a NOTA option, unhappy voters are significantly less likely to vote for VdB and significantly more likely to abstain/invalidate, as compared to voters who are happy with the set of candidates on the ballot. Non-establishment voters are far more likely to vote for Hofer and less likely to vote for VdB. Both voters who are uninformed or with a strong sense of duty are less likely to abstain or invalidate and more likely to vote for Hofer.

In terms of treatment effects for different voter types, the introduction of NOTA leads to a stronger shift of votes towards the NOTA/Abstain/Invalid category among unhappy voters than among voters happy with the set of candidate. This came at the expense of mostly votes for the right-wing candidate Hofer (significant only in the weak NOTA condition). For the other voter motivation types, differences in treatment effects are less clear. For non-establishment voters, we observe a lesser vote shift towards the NOTA/Abstain/Invalid category in the weak NOTA condition, but no significant interaction effects on candidate votes. For uninformed voters, the baseline effects when there is no NOTA discussed above (less abstentions, more Hofer votes) are basically offset when a NOTA option is on the ballot, making these voters undistinguishable from informed voters. We find no significantly different treatment effect on dutiful voters.

Figure 4 displays the distribution of votes for Hofer and VdB, separately for those participants who voted for Social-Democrats in the previous parliamentary election in 2013, those who voted for the Conservatives, and those who did not vote for one of these two establishment parties. While there is no clear trend emerging for non-establishment voters, it seems that the introduction of NOTA slightly increases the relative share of Van der Bellen among social-democratic voters (significant at p=0.069, Fisher's exact test for the weak condition, n.s. for the strong condition) and slightly increases the relative share of Hofer among conservatives (significant at p=0.077, Fisher's exact test for the weak condition, n.s. for the strong condition). That is, those social-democrats who vote right-wing without NOTA, because they do not see VdB as a viable candidate, switch to NOTA if available; and correspondingly conservatives who vote left-wing without NOTA because of their dislike of Hofer, switch to NOTA when available.

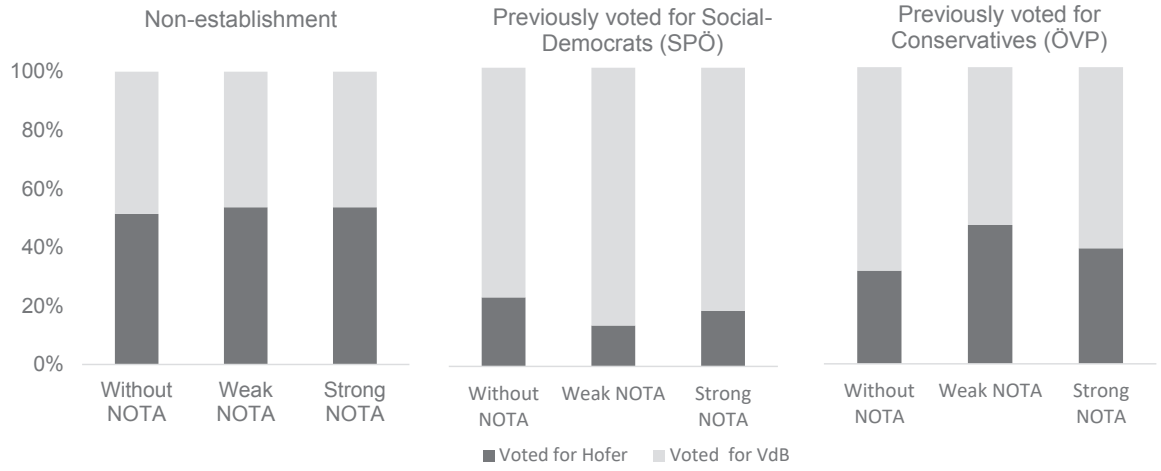
[21] Since in the previous *Presidential* Election 2010 the acting President Heinz Fischer received 79% of votes, we use the previous *Parliamentary* Election 2013 for classification of 'non-establishment' voters, and identify a voter as 'non-establishment' if she did not vote for one of the two traditional parties SPÖ and ÖVP in the past parliamentary election. This has to be kept in mind when interpreting the results. In Austria, there are many more parties present in the parliament than in the U.S., such that the share of voters categorized as 'non-establishment' is relatively high. In addition, in this particular run-off election, neither of the two candidates represented an establishment party, such that establishment voters may be attracted to the NOTA option, too.

TABLE 8: Average marginal effects (dy/dx) of Multinomial Logit Regressions of the likelihood of choosing different voting options on treatment conditions and voter motivations, Austrian sample

	Abstain/ NOTA/ Invalid	Hofer	VdB
Weak NOTA	0.057	-0.017	-0.040
	(0.049)	(0.078)	(0.077)
Strong NOTA	0.096*	0.006	-0.102
	(0.052)	(0.074)	(0.076)
Unhappy	0.187***	-0.051	-0.136**
	(0.026)	(0.045)	(0.047)
Unhappy × Weak NOTA	0.102**	-0.177**	0.075
	(0.036)	(0.074)	(0.074)
Unhappy × Strong NOTA	0.111**	-0.089	-0.021
	(0.034)	(0.074)	(0.076)
Non-establishment	0.029	0.216***	-0.244***
	(0.031)	(0.040)	(0.040)
Non-establishment × Weak NOTA	-0.095**	0.074	0.020
	(0.040)	(0.058)	(0.057)
Non-establishment × Strong NOTA	-0.016	0.011	0.004
	(0.038)	(0.057)	(0.057)
Uninformed	-0.033	0.071**	-0.038
	(0.027)	(0.034)	(0.036)
Uninformed × Weak NOTA	0.062*	-0.054	-0.008
	(0.036)	(0.049)	(0.051)
Uninformed × Strong NOTA	0.028	-0.069	0.041
	(0.034)	(0.049)	(0.052)
Dutiful	-0.116***	0.071**	0.045
	(0.030)	(0.035)	(0.037)
Dutiful × Weak NOTA	0.017	-0.022	0.005
	(0.039)	(0.051)	(0.053)
Dutiful ×Strong NOTA	0.016	-0.017	0.001
	(0.037)	(0.050)	(0.053)

Notes: Only includes likely voters, N=2190. The regression also included state fixed effects and controls for gender, university-education and age. Baseline is condition without NOTA option. Robust standard errors in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

FIGURE 4: Relative shares Hofer and VdB votes among likely voters who voted for Hofer or VdB, conditional on treatment and voting behavior in previous parliamentary election



Once again, in order to study NOTA choosers in detail, we run Probit models where we regress the likelihood of a NOTA vote on voter motivations. The estimated average marginal effects results are reported in Table 9. Models (1) and (2) are based on all participants, while Models (3) and (4) only include data from likely voters. Models (1) and (3) only include treatment and voter motivation dummies, while Models (2) and (4) additionally control for demographic characteristics. Consistent with our previous results, we find that unhappiness with the set of candidates is a very strong predictor for voting NOTA in the Austrian experiment. Previous establishment voters are slightly more likely to choose NOTA (significant only for likely voters), which most likely roots in the particular election setup and definition of non-establishment voters (see our discussion in footnote 21). Consistent with the U.S. results, dutiful voters are less likely to vote NOTA. However, in Austria we do not find an (interaction) effect of uninformedness on the likelihood to vote NOTA, whether voters are dutiful nor not.

V Concluding remarks

Existing scholarly research hypothesizes that voters who take up the NOTA option on a ballot are voters who are unhappy with the current set of election candidates, who have a political orientation outside of the mainstream political establishment, or who are uninformed but feel a duty to vote. We find that adding a NOTA option has significant effects on voting behavior, and possibly on election outcomes. In the U.S., adding the option increased voter participation and additionally drew votes from the non-establishment candidate Trump, while the establishment candidate Clinton was not significantly affected. The effects were mainly driven by voters who did not vote for either main party in the previous election or were unhappy with the current set of candidates. In the Austrian election with two extreme candidates, the NOTA option was used more often than in the United

TABLE 9: AVERAGE MARGINAL EFFECTS (DY/DX) OF PROBIT REGRESSIONS OF LIKELIHOOD TO VOTE NOTA ON VOTER MOTIVATIONS, AUSTRIAN SAMPLE

	All participants		Likely voters	
	Model (1)	Model (2)	Model (3)	Model (4)
Strong NOTA	0.062***	0.062***	0.051**	0.053**
	(0.015)	(0.015)	(0.017)	(0.017)
Unhappy	0.300***	0.301***	0.313***	0.312***
	(0.012)	(0.012)	(0.012)	(0.012)
Non-establishment	-0.022	-0.026	-0.031*	-0.035*
	(0.016)	(0.016)	(0.018)	(0.018)
Uninformed	0.013	0.010	0.003	0.003
	(0.020)	(0.021)	(0.024)	(0.024)
Dutiful	-0.081***	-0.080***	-0.069**	-0.069**
	(0.021)	(0.022)	(0.023)	(0.023)
Uninformed Dutiful	0.003	0.004	0.002	0.003
	(0.031)	(0.031)	(0.034)	(0.034)
Female		0.004		0.009
		(0.015)		(0.017)
University degree		-0.008		0.014
		(0.019)		(0.021)
Older than 45		-0.020		-0.003
		(0.016)		(0.017)
N	1993	1993	1463	1458

Notes: Only includes data from the two NOTA treatments. Baseline is weak NOTA condition. All regressions include state fixed effects. Robust standard errors in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

States. Here, it also increased participation, and additionally drew votes from both candidates. In Austria, the effects were mainly driven by voters unhappy with the set of candidates. With respect to an informational theory of voting that postulates that NOTA voters are mainly people who are uninformed but feel a duty to vote, in the U.S. we only find mixed evidence, and our Austrian data is clearly not consistent with the theory.

An important takeaway from the above is that a NOTA option may help channelling the communication of protest, and reduce the risk that candidates not actually supported by a majority got elected because of voters with a protest motive channeling their votes towards them.

Introducing a NOTA option on the ballot can have further reaching consequences that we do not investigate in the current paper and leave to future research. One is that it might change the list of candidates running, for example by making it less likely that one of the major parties select a non-establishment candidate. Similarly, it might have an impact on campaign rhetoric and the style of the political discourse (and, through this, on social norms, see e.g. Bursztyn et al., 2017). Our paper investigates the effect of a NOTA option on voter behavior with a fixed set of candidates and campaign environment, understanding which is a necessary step in assessing further impacts of this institutional change on the political environment. One possible way to investigate these further, dynamic changes would be via laboratory experiments.

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A Additional figures

FIGURE 5: An example of a mock-up ballot used in the experiment (Maryland, with NOTA option)

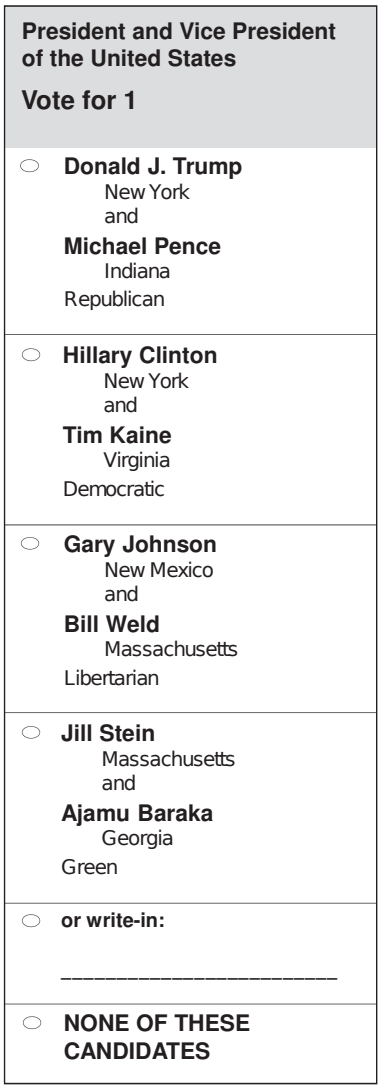

FIGURE 6: First round voting choices and choices in the experiment with no vs. weak/strong NOTA ballot