THE EFFECT OF A 'NONE OF THE ABOVE' BALLOT PAPER OPTION ON VOTING BEHAVIOR AND ELECTION OUTCOMES[*]

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ABSTRACT

We study how an explicit blank vote option "None of the above" (NOTA) on the ballot paper affects the behavior of voters and political candidates as well as election results. In a series of survey and laboratory experiments we identify a tradeoff regarding making NOTA an explicit voting option. On the one hand it can reduce the vote share of candidates who voters consider as protest candidates, who often come from the extremes of the political spectrum, making it less likely that such a protest candidate wins the election. On the other hand, anticipating the above effect, establishment candidates may care less about the electorate when NOTA is on the ballot. Evidence on voters' reaction to NOTA comes from two online survey experiments conducted in the weeks preceding the 2016 U.S. Presidential Election and the 2016 Austrian run-off election for President. Participants were subjected to either the original ballot paper or to a ballot paper where we added a NOTA option. We investigate the dynamic response of politicians to the presence of NOTA in a laboratory experiment in which an establishment candidate can decide between selfish and fair policy proposals and voters can choose between the establishment candidate and an inefficient protest option.

Keywords: protest voting, expressive voting

JEL Classification: D72, C99

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 add a NOTA option. Other countries that have an explicit 'blank vote' option on the ballot include Colombia, India, and Ukraine. In most of these countries, NOTA votes are reported separately from empty ballots or invalid votes, giving them a distinct interpretation of being purposefully chosen, but do not affect the actual election outcome.[1] In some countries such as France, Italy, Sweden, and Spain where there is no official NOTA option, empty ballot papers are recorded separately from spoiled ballot papers.

The primary political motivation for introducing a NOTA option on the ballot is to combat voter apathy and to offer an explicit protest choice to voters, a way to express dissatisfaction with the available set of candidates or the policies these candidates put forward. The argument put forward is that explicit protest votes can convey important information to political parties, potentially influencing their policy choices. Additionally, a large number of such votes may also affect the perceived legitimacy of the winning candidate. In the absence of a NOTA option on the ballot, protest may take other forms such as abstention, ballot invalidation, or a vote for a fringe 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 from involuntary mistakes.[2] 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 on the ballot 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 since then all electronic ballots have to include a NOTA option (see Ujhelyi, Chatterjee and Szabó, 2021, for details).

In this paper we investigate the effect of NOTA on election outcomes through a series of experiments. We use survey experiments in two settings in order to understand the motives that drive voters to choose the NOTA option, and we complement this evidence with a laboratory experiment that models the dynamic response of candidates to the way the NOTA option affects voter behavior. Our findings reveal a tradeoff regarding making NOTA an explicit option on the voting ballot. It can

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[1] One exception is Colombia, where the election has to be repeated if the blank vote attracts the most votes, sometimes excluding the previous candidates from the new ballot paper (Superti, 2014).

[2] In the U.S., another substitute for NOTA as a protest vote may be the use of the write-in candidate option. However, the use of this option is typically relatively scarce and a similarly blurry signal of protest, since it may also represent ingenious preferences for a candidate not on the ballot for various reasons, and candidates have to pre-register as write-ins for the votes to be published under their name.

[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). Uninformed voters may also be more susceptible to other non-instrumental reasons of voting, such as partisanship or overconfidence (Bayer, Faravelli and Pimienta, 2023).

reduce the likelihood of protest motives helping a candidate to win the election who would otherwise not be supported by a majority (for example because of coming from the political extremes), but at the potential cost of establishment candidates caring less about the electorate, knowing that they are less likely to be voted out of office.

Empirical investigation of voter behavior faces particular challenges. Voting is secret, and research interventions in the field may face ethical and legal challenges. The small existing empirical literature on the effects of NOTA options and different motives for choosing NOTA is almost exclusively based on aggregate data, i.e., electoral outcomes of different elections, which makes drawing inferences on voters' motivations to choose NOTA difficult, requiring strong structural assumptions. To our best knowledge, this paper is one of the first to use experimental methods to study the effects of NOTA on electoral outcomes. We follow a methodologically multi-pronged approach. Similar to other prominent studies examining voter intentions in electoral settings (e.g., Gerber and Rogers, 2009; Harbridge and Malhotra, 2011; Horiuchi, Imai and Taniguchi, 2007; Samuels and Zucco Jr, 2014), we conduct surveys with representative samples, and we embed a hypothetical choice experiment with randomly assigned ballot paper designs, where causality can be clearly attributed and individual choices can be observed.[4] In addition, we study the effect of NOTA on the strategic interaction between voters and candidates in a laboratory experiment with monetary subject payments, that focuses on a protest motive behind NOTA votes.

We conducted the online survey 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 centrist establishment parties' candidates made it to the run-off, so both candidates in the final round were from the political extremes: Norbert Hofer from the far-right Freedom Party FPÖ, and Alexander Van der Bellen from the far-left Green Party.

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.

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[4]Such surveys with embedded hypothetical choice experiments are also popular across many other applications in political science (see, for example Corbacho, Gingerich, Oliveros and Ruiz-Vega, 2016; Hainmueller and Hiscox, 2010; Lyall, Blair and Imai, 2013) and economics (Card, Mas, Moretti and Saez, 2012; Cavallo, Cruces and Perez-Truglia, 2017; Coffman, Coffman and Ericson, 2016; Cruces, Perez-Truglia and Tetaz, 2013; Kuziemko, Norton, Saez and Stantcheva, 2015), partly because of their cost effectiveness. While surveys may be prone to biases, as long as these biases have the same effect in our randomly assigned treatment and control groups, our treatment effects are still identified and do not suffer from selection bias. Our overall respondent pool, albeit proportionally stratified based on gender, age, and education, may still not be representative for the voting population, as participation in the survey is voluntary. It is more representative of politically active voters, who are also more likely to participate in the real election. We note, however, that Mullinix, Leeper, Druckman and Freese (2015) find that survey experiments with voluntary participation exhibit similar magnitudes of treatment effects as survey experiments with representative compulsory respondent pools, and Mummolo and Peterson (2019) find that survey experiments are robust to experimenter demand effects.

We introduced three treatment conditions. In the first condition, the ballot paper only contained the respective presidential candidates. The second condition ('weak NOTA') additionally included a "None of these candidates" option without any further explanation. In the third condition ('strong NOTA'), we additionally included a short text that explained the NOTA option, interpreting it as dissatisfaction with any of the candidates.[5] In addition to the ballot choice, subjects were also asked to complete a survey on basic demographic information, subjects' political attitudes, and voting choices in previous Presidential Elections. The resulting data allows us to formally test predictions of two basic 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 voters who are relatively uninformed, unhappy about the set of candidates, and those feeling a strong sense of duty to participate at an election. NOTA as a protest vote against the current set of candidates, or more broadly about the current policy discourse, implies that unhappy voters should select NOTA. An informational theory of voting implies that voters who are both uninformed and dutiful should select NOTA.

In both the U.S. and the Austrian contexts, in our online experiments the existence of a NOTA option increases voter participation, and a significant fraction of voters selects the NOTA option (6.2%/8.9% and 15%/23% in the weak/strong treatment conditions in the U.S. and in Austria, respectively). 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 voter types and choosing NOTA. In both the U.S. and Austria we find a significant positive correlation with the likelihood to select NOTA and being unhappy with the set of candidates. Dutiful voters are less likely to vote NOTA. For likely voters in the U.S. but not in Austria, this effect is offset if the dutiful voter is uninformed, consistent with an informational theory of voting.

For the U.S. we also find that voters not yet affiliated with establishment parties (by having voted for them before) are attracted to NOTA, and that it is these voters who drive NOTA treatment effects on relative shares of major candidates.[6] This is consistent with Trump being a protest candidate in the eyes of some voters. In Austria, on the other hand, where both candidates are not from the establishment parties, NOTA effects are mostly driven by voters who have voted for establishment parties before and thus do not have an own candidate on the ballot, moving their votes to NOTA.

To summarize, in our survey experiments we find limited evidence for uninformedness being the reason for choosing the NOTA option. Data collected from both settings are consistent with NOTA

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[5]Using a weak and strong condition allows us to get a grasp of the range of possible reactions to NOTA. The strong condition resembles 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. Ujhelyi et al. (2021) report on such heavy media coverage and widespread public discourse when the NOTA option was introduced in India in 2013.

[6]The result is robust to the inclusion or exclusion of first time voters.

votes being driven by protest motives. The introduction of NOTA changes vote shares of candidates moderately, but pulls more votes away from non-establishment candidates. Hence a NOTA option does have the potential to affect electoral outcomes, in particular in close elections where one major candidate represents the traditional political establishment and another credibly establishes himself as being from outside the establishment, such as in the 2016 U.S. presidential election. Our observations parallel those of Pons and Tricaud (2018), who find 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.

Introducing a NOTA option on the ballot can have dynamic consequences in terms of strategic choices of the candidates and their interaction with voter behavior, which our survey experiments are not able to capture. Thus, to investigate these questions, we complement the survey evidence with results from a laboratory experiment featuring an environment that facilitates the possibility of protest motives towards an establishment candidate. In particular, subjects were allocated to groups of six, with one subject allocated to the role of being a candidate, and the others to being voters. They play a sequential game, with the candidate moving first, making either a fair proposal (equal division) or unfair proposal (keeping a large share for herself) on how to allocate a budget. The unfair proposal represents a selfish policy that benefits the candidate if implemented, and it gives voters a reason to protest if they have a preference for fairness rather than just for money. After observing the proposal, voters can vote for either accepting the proposal or for a protest option (which can be interpreted as a protest candidate). The winner is determined by plurality. The protest option yields low payoffs for both the candidate and the voters, the latter receiving an even lower payoff than what an unfair proposal would give them. In the treatment sessions, a NOTA option was added to the ballot, with NOTA votes not influencing the outcome of the voting. In one treatment, NOTA votes did not have any direct payoff consequences, while in an additional treatment, each NOTA vote deducted a minor amount from the candidate's payoff in case of elected, a penalty representing a smaller mandate for a winner in case of a larger number of NOTA votes.[7]

The experimental design facilitates the possibility of an unfair proposal triggering a protest motive in some voters towards the candidate. In the theoretical framework with such protest motives, NOTA diverts votes from the protest option following an unfair proposal, making it more likely that the unfair proposal gets accepted (receives more votes than the protest option). But this makes giving an unfair proposal more attractive to candidates, and therefore more likely to be proposed in the first place.

[7]Our laboratory study is related to two literatures in experimental economics. First, there is the literature on non-monetary vs. monetary punishment (here NOTA vs. protest votes). They find both monetary and informal sanctions to similarly increase cooperation (Masclet, Noussair, Tucker and Villeval, 2003), and their combination to be particularly effective (Noussair and Tucker, 2005). Second, there is a small literature with mixed evidence on Ultimatum games with groups as responders. Noussair and Tucker (2005) find groups to be less lenient as responders, while Elbittar, Gomberg and Sour (2011) find that they simply aggregate individual preferences. With respect to allocators, Messick, Moore and Bazerman (1997) find them not to be responsive to the decision rule imposed on the responder group, while Elbittar et al. (2011) report that allocators react to such rules.

We find that voters do protest unfair policy proposals, but do so significantly less when a NOTA option is on the ballot paper. The effect is stronger when NOTA additionally carries small penalties on election winners (representing effects of NOTA votes on an election winner's legitimacy). Politicians, on the other hand, anticipate this shift and become more likely to put an unfair rather than fair proposal on the ballot. As a result of both effects, a NOTA option on the ballot paper (slightly) increases the efficiency of election outcomes (lower probability of an inefficient protest outcome winning) but also significantly increases the inequality implied by election outcomes (fewer fair policies are proposed).

Thus, our results combining theoretical considerations, experimental surveys, and laboratory experiments draw a multifaceted but relatively consistent picture. While our survey experiments provide evidence that NOTA indeed increases election participation, captures protest votes, and hurts non-establishment or protest candidates, the findings in our laboratory experiments caution that any debate about putting a NOTA option on the ballot paper should also take into account the strategic reaction of the political establishment. By decreasing the likelihood of protest candidates/policies to win, NOTA mitigates their 'bite' to establishment politicians, and thus may also affect the distribution of society's resources.

Our paper complements a small but growing theoretical and empirical literature on the role of voting as communication and protest, and the related literatures on ballot paper invalidation and an 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 such voting motivations see Robbett and Matthews (2018).[8] 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), Funke, Schularick and Trebesch (2016), and Berman (2021) 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) discusses a model in which voters (in order to communicate their policy views) choose extreme parties that are unlikely to win office. A similar theory of voting as communication is proposed by Piketty (2000), where voters use a first round of voting to coordinate behavior 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 (2020) feature a model of communication of social norms and empirically identify a causal

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[8]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.

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. More recently, Levy, Razin and Young (2022) show that populism and extreme policy choices can be recurrent in political systems in which there is misspecified learning by a subset of the voters on policy outcomes.

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 on the effects of NOTA options and different motives for choosing NOTA 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. (2021) both rely on aggregate voting data and 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. (2021) 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 in the context of NOTA options by investigating different proposed motives for voting for the NOTA option in a survey experiment setting with randomly assigned ballot paper designs, where causality can be clearly attributed and individual choices can be observed, and studying the effect of NOTA on the strategic interaction between voters and candidates in a laboratory experiment that focuses on one possible motivation behind NOTA votes. The experimental designs thus facilitate investigating questions that are difficult to address using aggregate election data.

II   THEORETICAL CONSIDERATIONS FOR VOTER MOTIVATIONS

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, 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. We consider two standard theories of direct costs and benefits associated with choosing the NOTA option: motivation to explicitly express dissatisfaction with the available list of candidates (or more generally, with the state of political discourse or the 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, 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. Both 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,[9] and choosing NOTA if it is 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.[10]

The two theories mainly differ in how the benefit function B_i is defined. Additionally, for simplicity, for the protest theory 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.[11] 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.

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

[10]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.

[11]In principle, 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.

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 $B_i(inv) \leq B_i(n)$. 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.

In this 'protest against the set of candidates' specification of the model those 'unhappy' voters who value each candidate less than 0 and receive a high enough psychological benefit from voting NOTA are predicted to choose NOTA (when the latter is on the ballot). 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 $c_i \leq B_i(n)$.[12] In the absence of a NOTA option, depending on the values of c_i, $B_i(\emptyset)$ and $B_i(inv)$, these voters can either abstain, cast an invalid vote (if the latter is an option), or vote for a candidate strategically in case abstaining and casting an invalid vote are psychologically costly enough.[13]

We note that the above model could be generalized to incorporate broader protest motives, such as dissatisfaction with the mainstream political establishment. We do not pursue these directions here, as in our survey we focused on how participants relate to the currently running set of candidates.

Theory 2. 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.

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

[13] A $B_i(\emptyset) < 0$ and $B_i(inv) < 0$ could be interpreted as some kind of citizen duty to cast a proper vote. See also Theory 2 below.

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 a 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): 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   Survey Study 1: 2016 U.S. Presidential Elections

III.A   Data and Experimental Design

We conducted an experimental online survey 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,[14] resulting in a final sample of 1967 observations.

After answering the screener questions, all participants saw an election ballot. The ballot resembled the actual ballot paper of the 2016 U.S. Presidential Election for their state (see Figure 9 in Appendix A for the example of a ballot including NOTA option used for Maryland), and contained only those

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[14]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.

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.[15] This text was identical in all states. While the 'weak NOTA' condition does not impose any interpretation of the NOTA option and allows us to estimate a lower bound of possible NOTA effects, the 'strong NOTA' condition is more realistic in that it incorporates the information setting and interpretation that would likely emanate from the public discussion and the media if NOTA were introduced in a particular state or country.[16]

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.[17,18] 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.[19] Figure 1 presents the data from the left panel of Table 2 graphically.

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[15]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."

[16]We document some examples from the media discussion on NOTA in Nevada and India in Appendix B.

[17]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.

[18]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.

[19]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	129	137	118	384
Maryland	131	128	135	394
Nevada	125	125	120	370
Ohio	132	129	129	390
Tennessee	138	128	126	392
Total	655	647	628	1,930

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	6.3	4.6	3.7	1.4	0.9	0.4
Trump	41.7	39.1	35.4	43.6	43.2	38.6
Clinton	41.5	40.2	43.2	44.6	43.2	47.9
Other	10.5	9.9	9.1	10.4	9.7	8.8
NOTA	–	6.2	8.8	–	2.9	4.4
N	655	647	628	576	555	526

FIGURE 1: VOTING CHOICES IN THE THREE EXPERIMENTAL CONDITIONS IN THE U.S.
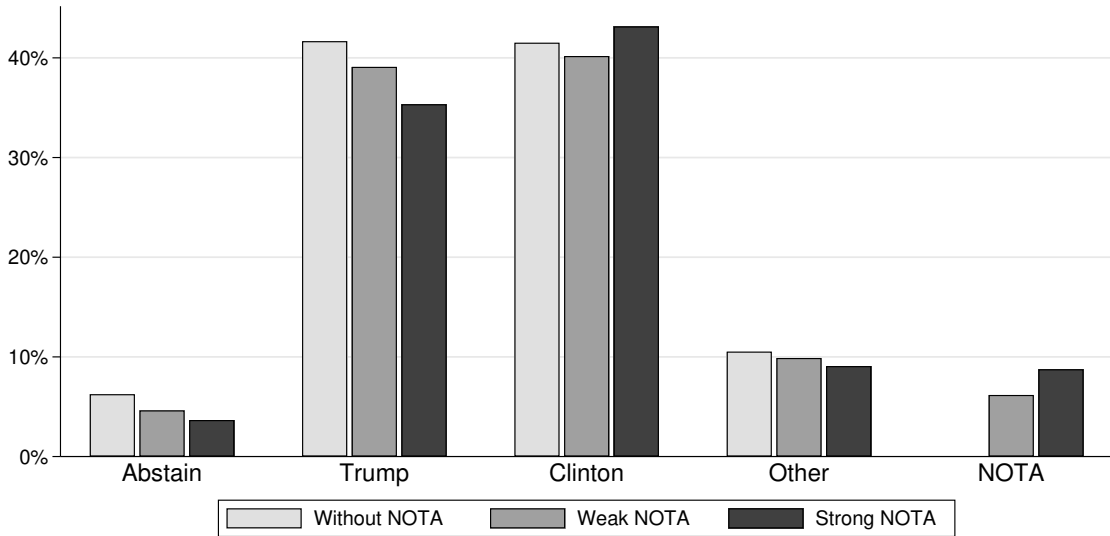
Participants had the following behavioral options: abstaining or voting for one of the candidates or, in the two NOTA conditions, voting NOTA. As Table 2 and Figure 1 show, a non-trivial portion of voters used the NOTA option when it was available: 6.2 % of participants in the weak NOTA condition and 8.8 % 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=0.022, 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 to 4.6% in the weak NOTA condition and to 3.6% in the strong NOTA condition, the changes being statistically significant for the strong NOTA condition (two-sided Fisher's Exact test, p=0.040) but not for the weak NOTA condition (p=0.223). 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 condition the only candidate who loses a significant proportion of votes towards NOTA is Trump (about 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 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 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

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=1930, no State FE				
Weak NOTA	0.046***	-0.026	-0.013	-0.006
	(0.015)	(0.027)	(0.027)	(0.017)
Strong NOTA	0.062***	-0.063**	0.016	-0.015
	(0.016)	(0.027)	(0.028)	(0.017)
Model 2: All participants, N=1930, with State FE				
Weak NOTA	0.046***	-0.025	-0.016	-0.005
	(0.016)	(0.027)	(0.027)	(0.017)
Strong NOTA	0.061***	-0.061**	0.015	-0.015
	(0.016)	(0.027)	(0.027)	(0.016)
Model 3: Likely voters, N=1657, no State FE				
Weak NOTA	0.024**	-0.003	-0.014	-0.007
	(0.009)	(0.029)	(0.030)	(0.018)
Strong NOTA	0.034***	-0.050*	0.033	-0.017
	(0.010)	(0.030)	(0.030)	(0.018)
Model 4: Likely voters, N=1657, with State FE				
Weak NOTA	0.024**	-0.002	-0.018	-0.005
	(0.009)	(0.029)	(0.029)	(0.018)
Strong NOTA	0.033***	-0.046	0.029	-0.016
	(0.010)	(0.029)	(0.030)	(0.018)

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

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."[20]

We further identify 28% of participants (21% of likely voters) as 'non-establishment-affiliated', i.e., voters who did not vote for either the Democratic or the Republican candidate in the past US Presidential Election 2012.[21]

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[20]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, where we use the same classification rules. We also ran robustness checks controlling for the day the survey was taken (to control for potential voter information shocks), with no significant effects on our estimates.

[21]Non-establishment-affiliated 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 first-time voters (i.e., participants who ticked "I wasn't eligible") from non-establishment-affiliated voters does not change the qualitative conclusions below.

NOTA as a protest vote against the currently running candidates implies that unhappy voters should select NOTA. The informational theory of voting implies that voters who are both uninformed and dutiful should select NOTA. Additionally, non-establishment-affiliated voters may be more attracted to NOTA.

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	0.015	-0.012	-0.009	0.007
	(0.009)	(0.050)	(0.052)	(0.024)
Strong NOTA	0.017*	0.003	-0.031	0.009
	(0.010)	(0.051)	(0.051)	(0.025)
Unhappy	0.012	-0.084*	-0.079	0.151***
	(0.013)	(0.046)	(0.049)	(0.038)
Unhappy × Weak NOTA	0.025	0.061	-0.043	-0.043
	(0.028)	(0.067)	(0.070)	(0.052)
Unhappy × Strong NOTA	0.116**	-0.044	0.056	-0.128***
	(0.054)	(0.070)	(0.076)	(0.048)
Uninformed	0.000	-0.029	0.004	0.024
	(0.004)	(0.044)	(0.045)	(0.022)
Uninformed × Weak NOTA	0.003	0.026	-0.021	-0.007
	(0.013)	(0.064)	(0.065)	(0.032)
Uninformed × Strong NOTA	0.006	-0.036	0.009	0.021
	(0.013)	(0.064)	(0.065)	(0.036)
Dutiful	0.007	0.006	0.01	-0.023
	(0.007)	(0.041)	(0.041)	(0.015)
Dutiful × Weak NOTA	-0.010	-0.026	0.030	0.007
	(0.011)	(0.058)	(0.059)	(0.024)
Dutiful × Strong NOTA	-0.021*	0.008	0.024	-0.011
	(0.011)	(0.059)	(0.06)	(0.025)
Non-establishment-affiliated	0.003	0.125***	-0.175***	0.046*
	(0.006)	(0.048)	(0.047)	(0.027)
Non-est.-affiliated × Weak NOTA	0.035	0.016	-0.031	-0.020
	(0.024)	(0.069)	(0.067)	(0.038)
Non-est.-affiliated × Strong NOTA	0.030	-0.174**	0.092	0.051
	(0.026)	(0.073)	(0.070)	(0.048)

Notes: Only includes likely voters, N=1657. 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.

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, uninformed, and dutiful give insight into participants' motivations in the 'without NOTA' condition. Voters unhappy with the set of candidates are less likely to vote for Trump and more likely to vote for other candidates than Clinton or Trump, including write-in candidates. Non-establishment-affiliated voters are substantially more likely to vote for Trump and less likely to vote for Clinton.

For the strong NOTA treatment, we find for unhappy voters that the presence of a strong NOTA option decreases the probability of voting for third party candidates (-12.8%), with almost all of these votes captured by NOTA. Dutiful voters are less likely to cast their vote in the abstention/NOTA category (benefitting Clinton, but statistically insignificantly). For non-establishment participants, the likelihood to vote for Trump is reduced by 17% if offered a strong NOTA option, compared to the without NOTA condition. 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: non-establishment-affiliated voters who did not vote for one of the two major parties in the 2012 Presidential election, and those who had voted for the Democrat or Republican ticket. 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 the non-establishment-affiliated voters, 62% would vote for Trump in the without NOTA condition, 58% in the weak NOTA condition, and only 46% in the strong NOTA condition (two-sided Fisher's Exact Test p=0.046 across all three conditions, and p=0.598 and p=0.016 for Without NOTA vs. Weak NOTA and Strong NOTA, 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
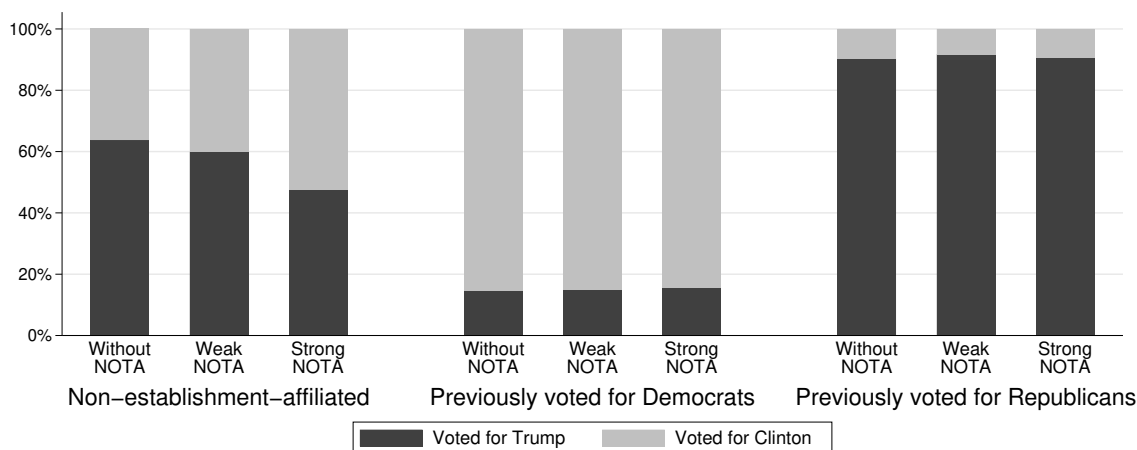
In order to study what types of voters choose the NOTA option, we run a set of Probit models where we regress the likelihood of a NOTA vote on voter motivations. We report the results in Table 5. Naturally, we rely on data from the two NOTA treatments only. Models (1) and (2) are based on all

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 is a significant predictor of choosing the NOTA option when it is available. Non-establishment-affiliated voters are also more likely to choose NOTA. 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 (statistically only weakly significantly) offset if the dutiful voter is uninformed.

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	0.026*	0.025*	0.016	0.016
	(0.014)	(0.013)	(0.011)	(0.01)
Unhappy	0.122***	0.121***	0.073***	0.071***
	(0.020)	(0.020)	(0.019)	(0.019)
Uninformed	0.032	0.032	-0.015	-0.014
	(0.019)	(0.019)	(0.015)	(0.015)
Dutiful	-0.057***	-0.058***	-0.036***	-0.036***
	(0.015)	(0.014)	(0.012)	(0.012)
Uninformed × Dutiful	0.004	0.004	0.053*	0.054*
	(0.033)	(0.032)	(0.029)	(0.029)
Non-est.-affiliated	0.035**	0.035**	0.022	0.025*
	(0.015)	(0.016)	(0.014)	(0.014)
Female		0.011		0.002
		(0.013)		(0.010)
University degree		-0.010		0.004
		(0.015)		(0.011)
Older than 45		0.012		0.003
		(0.014)		(0.010)
Non-white		-0.013		-0.014
		(0.016)		(0.011)
N	1275	1275	1081	1081

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.

IV   Survey 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.

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.[22] 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 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 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. survey 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, with 1000, 994, and 1005 participants ending up in the experimental treatments without NOTA, weak NOTA, and strong NOTA, respectively.

Participants were shown a screen with the ballot paper, depending on the treatment condition, with or without NOTA. 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

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[22]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 faulty glue used on envelopes provided to postal voters.

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 subsequently 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.

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.[23] Figure 3 presents data from the left panel of Table 6 graphically.

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

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 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) Both candidates for the run-off were from the fringes of the political spectrum.

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[23]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.

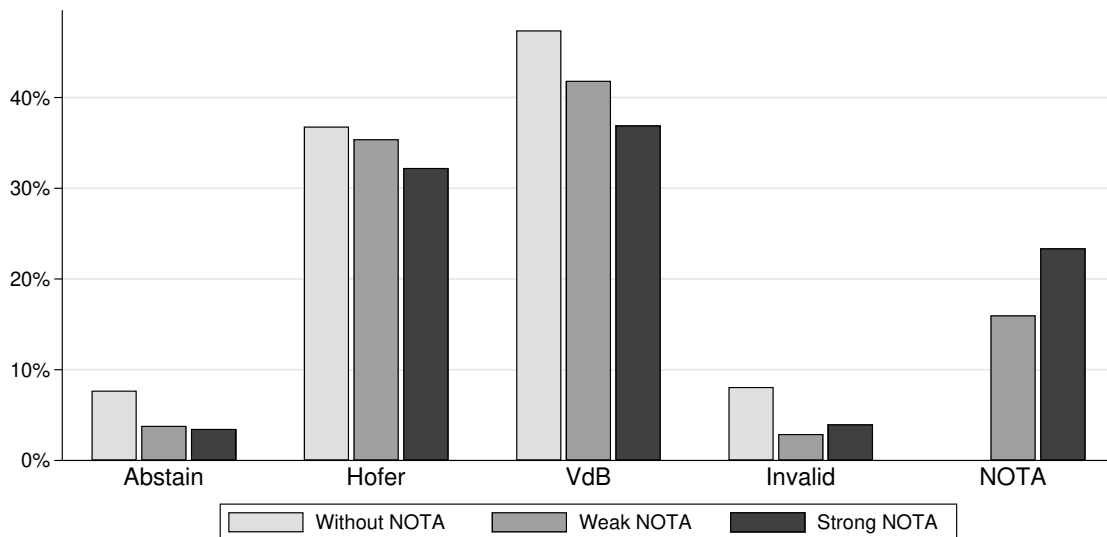FIGURE 3: VOTING CHOICES IN THE THREE EXPERIMENTAL CONDITIONS IN AUSTRIA

Figure 3 suggests that the vote shares of both candidates decrease 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 U.S. 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 conditions 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).[24]

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[24]Figure 10 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.

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, yielding 48% of voters being classified as 'uninformed', 23 % as 'unhappy with the set of candidates', and 49% as 'dutiful'. For likely voters, these numbers are 43%, 21%, 56%, respectively. To classify

69% of all voters (68% of likely voters) as 'non-establishment-affiliated' voters, we use votes for/against the two traditional parties SPÖ and ÖVP in the previous *Parliamentary* Election 2013, since in the previous *Presidential* Election 2010 the acting President Heinz Fischer received 79% of votes.[25]

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	0.075*	0.007	-0.082
	(0.041)	(0.053)	(0.062)
Strong NOTA	0.085**	0.007	-0.092
	(0.042)	(0.050)	(0.061)
Unhappy	0.285***	-0.046	-0.239***
	(0.066)	(0.034)	(0.061)
Unhappy × Weak NOTA	0.324***	-0.118**	-0.205***
	(0.079)	(0.047)	(0.079)
Unhappy × Strong NOTA	0.360***	-0.111**	-0.249***
	(0.075)	(0.045)	(0.074)
Uninformed	-0.017	0.060**	-0.043
	(0.017)	(0.028)	(0.033)
Uninformed × Weak NOTA	0.056	-0.052	-0.005
	(0.039)	(0.040)	(0.052)
Uninformed × Strong NOTA	0.018	-0.057	0.039
	(0.033)	(0.040)	(0.050)
Dutiful	-0.047**	0.030	0.017
	(0.020)	(0.027)	(0.033)
Dutiful × Weak NOTA	-0.039	0.002	0.037
	(0.034)	(0.040)	(0.049)
Dutiful × Strong NOTA	-0.046	0.005	0.041
	(0.034)	(0.040)	(0.051)
Non-establishment-affiliated	0.028	0.223***	-0.252***
	(0.021)	(0.034)	(0.037)
Non-est.-affiliated × Weak NOTA	-0.095***	0.078	0.017
	(0.036)	(0.050)	(0.055)
Non-est.-affiliated × Strong NOTA	0.007	0.001	-0.008
	(0.039)	(0.050)	(0.055)

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.

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[25] 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-affiliated' is relatively high. Candidates of SPÖ and ÖVP have been president in all prior elections since WWII, while in this particular run-off election, neither of the two candidates represented an establishment party. We will revisit this observation when interpreting the results.

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, uninformed, dutiful, and non-establishment-affiliated 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. Voters who are uninformed are more likely to vote for Hofer, and voters with a strong sense of duty are less likely to abstain or invalidate. Non-establishment-affiliated voters are more likely to vote for Hofer and less likely to vote for VdB.

For the baseline voter, introducing the NOTA ballot paper option shifts votes towards NOTA. The size of treatment effects vary by voter types. Among unhappy voters, the introduction of NOTA leads to an even stronger shift of votes towards the NOTA/Abstain/Invalid category, and the expense of both candidates. For the other voter motivation types, differences in treatment effects are less clear. For uninformed and dutiful voters, we do not observe significant interactions of treatment effects with these kind of voter motivations. For non-establishment-affiliated voters, the effect of the Strong NOTA condition is not different as compared to establishment-affiliated voters. In the weak NOTA condition, however, non-establishment voters do not shift from candidates towards the NOTA/Abstain/Invalid category.[26]

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
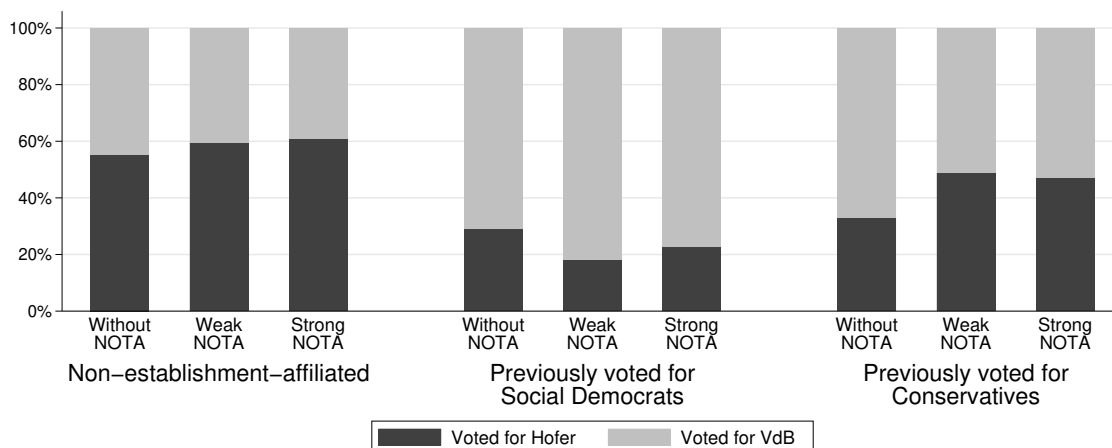
Figure 4 displays the distribution of votes for Hofer and VdB, separately for those who did not vote for either Social-Democrats or Conservatives in the previous parliamentary election in 2013 (non-establishment-affiliated voters), those participants who voted for Social-Democrats, and those who voted for the Conservatives. While there is no clear trend emerging for non-establishment-affiliated

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[26]The combined effect of Weak NOTA + Non-establishment × Weak NOTA is statistically not significantly different from zero (p=0.452).

voters, it seems that the introduction of NOTA slightly increases the relative share of Van der Bellen among social-democratic voters (significant at p=0.035, 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=0.043, Fisher's exact test for the weak condition, p=0.101 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.

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***	0.053***	0.053***
	(0.015)	(0.015)	(0.017)	(0.017)
Unhappy	0.433***	0.435***	0.495***	0.495***
	(0.025)	(0.025)	(0.030)	(0.030)
Uninformed	0.015	0.013	0.003	0.004
	(0.023)	(0.018)	(0.027)	(0.027)
Duty	-0.080***	-0.077***	-0.071***	-0.071***
	(0.022)	(0.017)	(0.024)	(0.024)
Uninformed × Dutiful	-0.001	-0.003	-0.002	-0.002
	(0.031)	(0.004)	(0.035)	(0.035)
Non-establishment-aff.	-0.022	-0.027	-0.034*	-0.036*
	(0.017)	(0.017)	(0.019)	(0.019)
Female		0.004		0.010
		(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	1458	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.

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 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. 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. Establishment-affiliated 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 25).

V NOTA and politician choices: A laboratory experiment

V.A Experimental design

Our experimental surveys investigate the effect of NOTA on election outcomes in a static setting. We investigate reactions of voters to the presence of a NOTA option on a ballot paper, but cannot study the strategic choices of politicians in such an environment, prior to an election that does or does not feature a NOTA ballot paper option. Thus, to complement our previous analysis, in this section we report results from a laboratory experiment involving a voting game allowing for strategic interaction between a politician and a group of voters.

Our most general version of our setup involves a number of politicians and a number of voters, engaged in a two-stage game. In the first stage, politicians propose policies/platforms and put them on the ballot paper. A policy is represented by a distribution of payoffs among all involved individuals, e.g., a politician may decide to divert resources to his benefit. (This may represent a cause the politician cares about more than the voters, or a purely private benefit to the politician.) In the second stage, voters vote by simple majority. The ballot paper contains the politicians' policy proposals, a protest policy option (representing an inferior protest candidate), and – conditional on the game version – a NOTA option. NOTA votes count as abstentions for calculating the voting outcome but may have additional consequences for the election winner.

In the experiment, we implement the simplest version of this game. We set the interaction to be a one-shot sequential game, and use anonymous random matching (but with constant roles) between rounds of the experimental session. We have one politician who can either make a fair policy proposal (an equal distribution of a budget between all players) or an unfair proposal (where the politician receives a much higher payoff at the cost of the electorate). Five voters then decide between the politician's proposal, a protest option that hurts the politician as well as voters (in particular, it gives voters even lower payoffs than the unfair proposal), and – if present – a NOTA option, which is separately recorded but does not count towards the election result.[27] We investigate two different versions of NOTA. In the *NOTA* treatment, there are no direct payoff consequences of NOTA votes. In the second version, *pNOTA*, we model possible negative effects of NOTA votes on the credibility and perceived legitimacy of an election winner by substracting a small penalty per NOTA vote from the politician's payoff in case his policy got elected.

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[27]We do not allow for abstention, since differently to the real world, in the laboratory environment an abstention would be too close a substitute to a NOTA vote. A tie (including the case where all voters vote NOTA) is resolved by random draw between the proposed and the protest policy.

V.B   Hypotheses

If voters do not receive a psychological benefit from the act of voting, then the game is akin to an Ultimatum game in a voting context. In the trembling-hand-perfect equilibrium, voters should cast a vote for the proposed policy as long as their payoff from that policy exceeds their payoff from the protest policy. Consequently, the politicians will propose the policy that benefits them most conditional on giving the voters a higher or equal payoff than the protest policy – in our configuration this means that the politician will propose the unfair policy. The existence of a NOTA option should not affect this outcome.

However, unfair proposals potentially create protest motives among some voters, for which Theory 1, discussed in Section 2, provides a theoretical framework. Here, voters with a protest motive suffer a psychological cost when voting for accepting the politician's unfair proposal, and thus may vote for the protest policy when a NOTA vote is not available. This prediction implies that inclusion of the NOTA on the ballot should pull votes away from the protest option following an unfair proposal, as some voters might consider voting NOTA as a valid protest option (just like voting for the explicit protest option), which at the same time is less likely to decrease their monetary payoffs. We would also expect this decrease to be more pronounced in the penalty NOTA design, since there NOTA votes directly hurt the politician's payoff, hence more voters might regard it as a valid protest option.

These predictions for voter behavior imply that in the NOTA treatments, politicians should expect or learn over time that unfair proposals are more likely to be accepted (more pronouncedly so in the penalty NOTA design) than when a NOTA option is not available. As a consequence, politicians should be more likely to make unfair proposals in the NOTA designs, in particular as the dynamic interaction between electorate and politician progresses.[28]

V.C   Experimental procedures

We conducted our laboratory experiments at the experimental laboratory of the Vienna University for Economics and Business (WULABS). Participants were recruited via the recruitment software ORSEE (Greiner, 2015), and the experiment was programmed in the software zTree (Fischbacher, 2007). In total, we conducted 16 experimental sessions with 414 student participants, with 18 to 30 participants in each session. 61% of participants were female, and the average age was 23.3 years. Sessions lasted about 40-50 minutes, and participants received on average EUR 13.20 (plus a show-up fee of EUR 5, StdDev 11.20).

We parameterized the voting game described above as follows. The "fair policy" assigns a payoff of EUR 15 to each group member. Under the "unfair policy", the politician receives EUR 50 and each other group member receives EUR 8. The (Pareto-dominated) protest option assigned EUR 13

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[28]Subjects presumably have heterogeneous preferences as politicians, both in terms of other-regarding preferences and risk attitudes. By politicians being more likely to make an unfair proposal we mean that a more likely acceptance of an unfair proposal makes some politician types, who are more risk averse or care a bit more about fairness than the previous cutoff types, want to switch from making a fair proposal to making an unfair proposal.

to the politician an EUR 5 to each other group member. The penalty per NOTA vote in the *pNOTA* treatment was set to EUR 2.

The experiment ran for 20 rounds, one of which was randomly selected for payoff at the end. At the beginning of the experiment, participants were randomly assigned to the role of politician or voter and kept their role throughout the experiment.[29] In each round, groups of six were randomly rematched. In the first stage of each round, politicians decided to put either the fair or the unfair policy proposal on the ballot paper. Treatments differed in the subsequent voting stage. In the baseline version of the game, the five voters were presented with a ballot paper consisting of two options: the policy proposal put up by the politician and the protest policy. Voting was compulsory. Each voter had one vote, and the proposal with the most votes won the round (with random tie-breaking). At the end of each round, voters and politician were informed about the outcome and a new round began.

In the *NOTA* treatment, the ballot paper contained a third option named "None of these proposals". Participants were informed that votes for the NOTA option would be counted and reported alongside voting results, but that NOTA votes would not be relevant for determining the election result. In the third treatment *pNOTA* the small penalty of EUR 2 for each received NOTA vote had to be paid by the politician in case her proposal got elected.

V.D   Experimental results

We start by analyzing voter behavior in the three treatments, after being confronted with a fair or unfair policy. We then turn our attention to politicians' behavior. Finally, we examine treatment effects on efficiency (total payoffs) and inequality (distribution of payoffs).

Voter behavior. When a politician in our experiment made a fair policy proposal, that offer always won the election. In particular, 98.7% (98.0%, 94.6%) of voters voted for the fair policy if it was tabled in the *noNOTA* (*NOTA*, *pNOTA*) treatment, respectively, without much change over time. The focus of our voter behavior analysis is on reactions to unfair proposals. Figure 5 displays voter behavior over time in our three treatments, conditional on an unfair policy proposal.

In the baseline *noNOTA* condition, we observe a significant share of votes for the Pareto-dominated protest option (on average 41.6% over all rounds), leading to the protest policy being elected in 22.4% of elections. This shows a considerable willingness among our laboratory voters to punish unfair policy proposals. The introduction of a NOTA option on the ballot paper reduces the frequency of protest votes, with many of these voters now choosing the NOTA option. This change in behavior can be observed already in early rounds. Compared to the *NOTA* treatment (where a NOTA vote is inconsequential financially), this shift is even stronger in the *pNOTA* treatment (where a NOTA vote carries an additional penalty on the politician), where the NOTA option even crowds out some acceptances of unfair policy proposals. As a consequence, the protest policy was less likely to be elected in the NOTA condition (in 19.5% and 16.3% of the elections in *NOTA* and *pNOTA*, respectively).

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[29]Instructions used neutral language ("participant of type A, B") and are available in the Appendix C.

FIGURE 5: Participants' votes when an unfair policy proposal is on the ballot
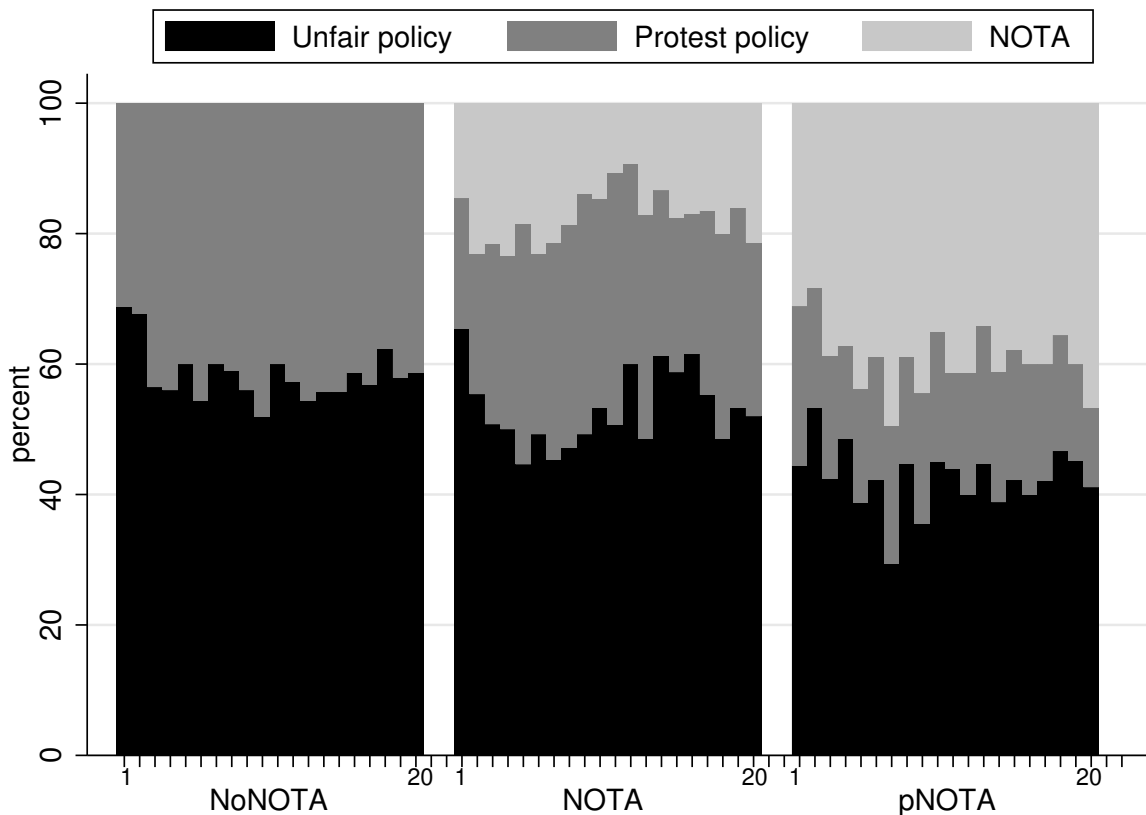
The linear probability regressions reported in columns (1) and (2) of Table 10 provide statistical support for these observations.[30] In the *NOTA* treatment, voters are less likely to choose the protest vote, but there is no change in votes accepting the unfair policy proposal, compared to the baseline treatment where the NOTA option is not on the ballot. In the *pNOTA* treatment, the presence of the NOTA option significantly reduces both the frequency of protest votes and the frequency on unfair policy acceptances. We do not observe statistically significant time trends for these outcomes.

Politician behavior. Figure 6 displays the frequency of unfair policy proposals over time in our three treatments. In the first rounds, proposer behavior does not differ much between treatments, with 58%–66% of proposals being unfair. In the two NOTA treatments, we observe a steadily increasing likelihood of unfair policy proposals, with a frequency of 77%-79% in the last rounds. In the *noNOTA* treatment, no such time trend occurs, and the frequency of unfair policy proposals is still 64% unfair in the last rounds.

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[30]Since we are mostly interested in politicians' and voters' behavior after they gained some experience with the electoral system and ballot paper design, in our regressions we code Round* as Round-20, such that direct treatment effects are estimated for Round=20 (rather than Round=0). We note that we do not observe any strong end-game effects in our data, neither for politicians nor for voters. Also, using Probit models instead of OLS does not affect any conclusions.

TABLE 10: OLS REGRESSIONS OF VOTER AND POLITICIAN BEHAVIOR
AND ELECTION OUTCOMES IN THE LABORATORY EXPERIMENT

Model Dependent	(1) Protest after unfair proposal	(2) Vote for unfair proposal	(3) Propose unfair proposal	(4) Unfair proposal wins	(5) Group obtains high payoff	(6) Gini coefficient in group
NOTA	-0.140**	-0.018	0.214**	0.127	0.020	0.087*
	(0.056)	(0.071)	(0.084)	(0.125)	(0.071)	(0.044)
pNOTA	-0.268***	-0.143**	0.226**	0.164*	0.048	0.086**
	(0.042)	(0.060)	(0.086)	(0.092)	(0.052)	(0.033)
Round*	0.002	-0.002	-0.003	-0.004	-0.001	-0.002*
	(0.002)	(0.002)	(0.003)	(0.005)	(0.003)	(0.001)
NOTA	-0.002	0.004	0.012**	0.004	-0.001	0.004**
× Round*	(0.003)	(0.003)	(0.004)	(0.007)	(0.005)	(0.001)
pNOTA	-0.004	0.002	0.016***	0.004	-0.001	0.006***
× Round*	(0.002)	(0.003)	(0.003)	(0.005)	(0.003)	(0.001)
Const	0.437***	0.563***	0.602***	0.608***	0.763***	0.184***
	(0.036)	(0.036)	(0.043)	(0.091)	(0.051)	(0.021)
N	4735	4735	1380	947	1380	1380

Notes: Baseline is condition without NOTA option. Round* is coded as 20-Round, such that treatment effects are estimated for Round=20. Standard errors are clustered at the session level and given in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

FIGURE 6: POLITICIAN BEHAVIOR: PROPORTION OF UNFAIR POLICY PROPOSALS OUT OF ALL
PROPOSALS MADE BY POLITICIANS
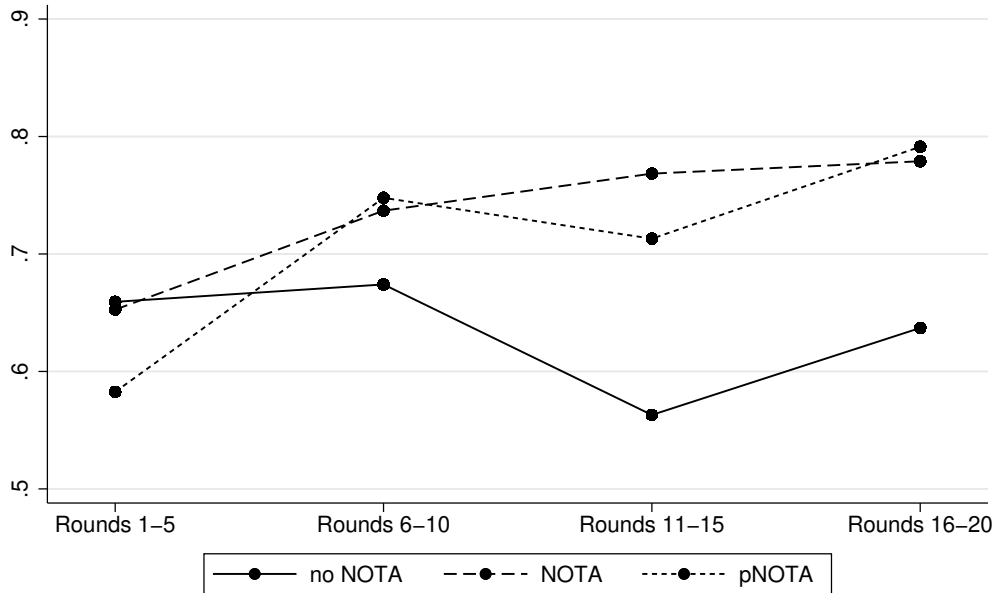
The regression in model (3) of Table 10, with the likelihood to propose an unfair policy as the dependent, provides statistical support. Consistent with the eyeball examination of Figure 6, while the time trend is not different from zero in the baseline treatment, it is significantly positive in the two NOTA treatments. As a result, there is a significant overall treatment effect for treatments NOTA and pNOTA.

Efficiency and inequality. The distribution of overall group payoffs is highly bi-modal. Groups either obtained a low total payoff when the protest option was elected (EUR 38), or a high total payoff when the fair or unfair policy proposal was elected (EUR 90, minus a few Euros for NOTA penalties in the *pNOTA* treatment). Figure 7 displays the proportion of election groups with high total group payoffs over time.

While there are no clear time-trends visible, overall efficiency appears somewhat higher in the *pNOTA* condition than in the *NOTA* condition than in the *noNOTA* baseline treatment. Regressions reported in models (4) and (5) of Table 10 show positive effects of the presence of a NOTA option on both the likelihood that an unfair policy proposal wins (and thus is not rejected with welfare loss) and that the group obtains an overall high (rather than low) group payoff. However, these effects are statistically not significant (except for treatment pNOTA with respect tot the acceptance of an unfair policy proposal).

FIGURE 7: EFFICIENCY: PROPORTION OF ELECTION GROUPS THAT OBTAIN HIGH GROUP PAYOFF
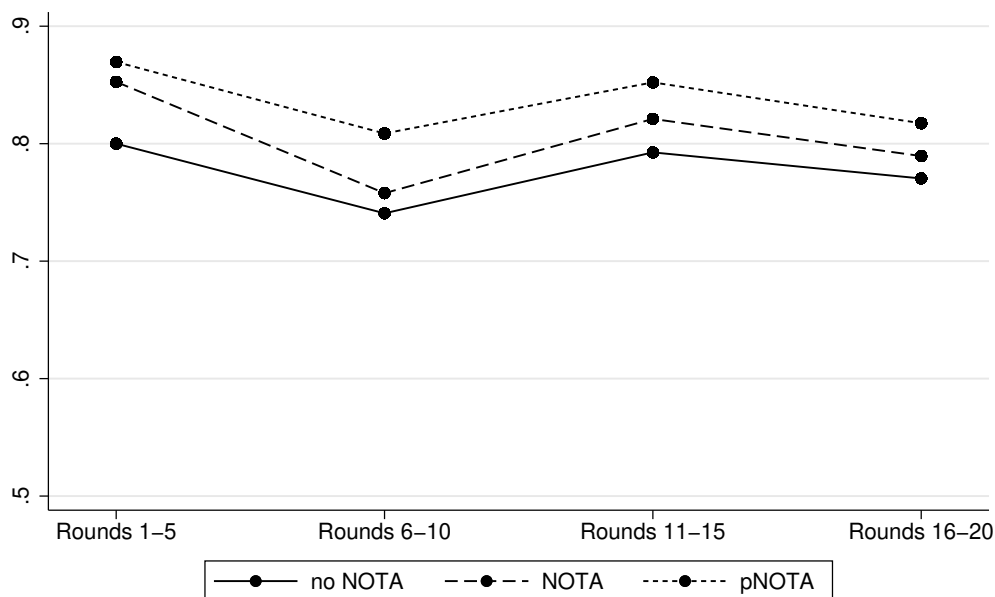
To investigate the impact of NOTA on inequality, we calculated the Gini coefficients for each election outcome in our experiment. Figure 8 displays average Gini coefficients over treatments and rounds, along with trend lines. In model (6) of Table 10 we report results from OLS regressions investigating treatment effects on the Gini coefficient of a group. We find that inequality of election

FIGURE 8: INEQUALITY: DEVELOPMENT OF GINI COEFFICIENTS
IN EACH TREATMENT OVER ROUNDS, WITH ADDED LINEAR FIT LINES
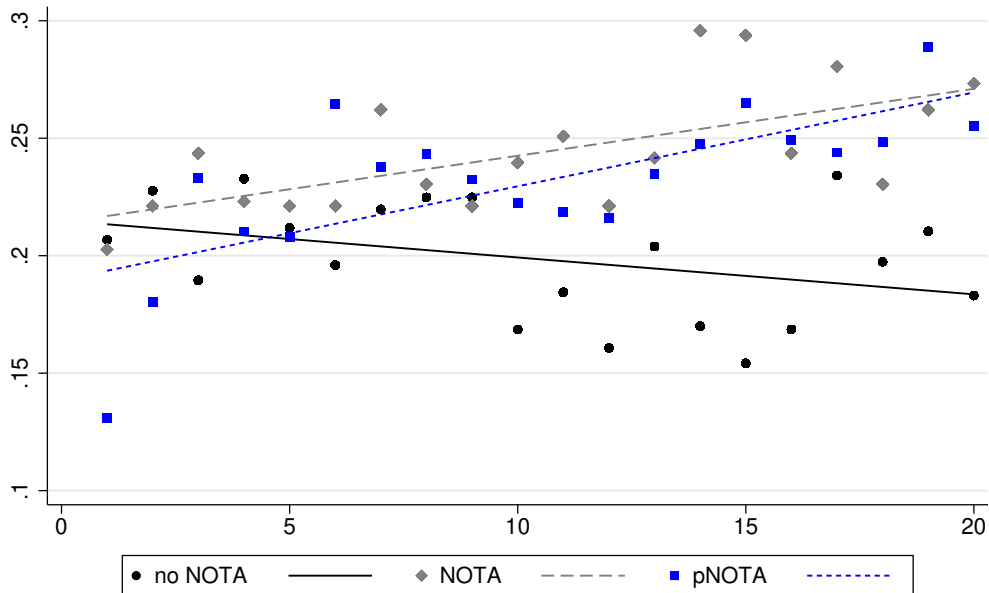
outcome decreases over time in the baseline treatment but increases in the two NOTA treatments. As a result, in the later rounds of the experiment we observe a significant increase of inequality when a NOTA option is present. That is, the increase in unfair policy proposals and increased acceptance of such proposals lead to higher inequality of elected policy outcomes when a NOTA option is present.

VI   CONCLUDING REMARKS

In this paper, 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 to the ballot paper 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 are unhappy with the current set of candidates and those who were previously unaffiliated with either major party (i.e., did not vote for them in the previous election). In the Austrian election with two extreme candidates, the NOTA option was used more often than in the United 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.

Our experimental surveys could not explore the effect of a NOTA option on the strategic choices of the candidates and how this interacts with voter behavior. As a first step towards exploring this issue, we ran a laboratory experiment featuring an environment that facilitates the possibility of protest motives towards an establishment politician. Consistent with the survey experiment, having the NOTA option on the ballot pulls votes away from the protest option. But foreseeing this, politicians

are more likely to make unfair proposals. This suggests a tradeoff regarding making NOTA an explicit option on the voting ballot: it can reduce the likelihood of protest motives helping a candidate who would otherwise be not supported by a majority to win, but at the cost of establishment candidates caring less about the electorate, knowing that they are less likely to be voted out of office. A further avenue of research is how the NOTA's role changes over time in a dynamic setting in which politicians compete, and the same set of politicians and voters interact repeatedly, in subsequent elections.

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Appendix

A Additional figures

Figure 9: An example of a mock-up ballot used in the experiment
(Maryland, with NOTA option)

**President and Vice President
of the United States**

Vote for 1

○ **Donald J. Trump**
New York
and
Michael Pence
Indiana
Republican

○ **Hillary Clinton**
New York
and
Tim Kaine
Virginia
Democratic

○ **Gary Johnson**
New Mexico
and
Bill Weld
Massachusetts
Libertarian

○ **Jill Stein**
Massachusetts
and
Ajamu Baraka
Georgia
Green

○ **or write-in:**

_____

○ **NONE OF THESE
CANDIDATES**
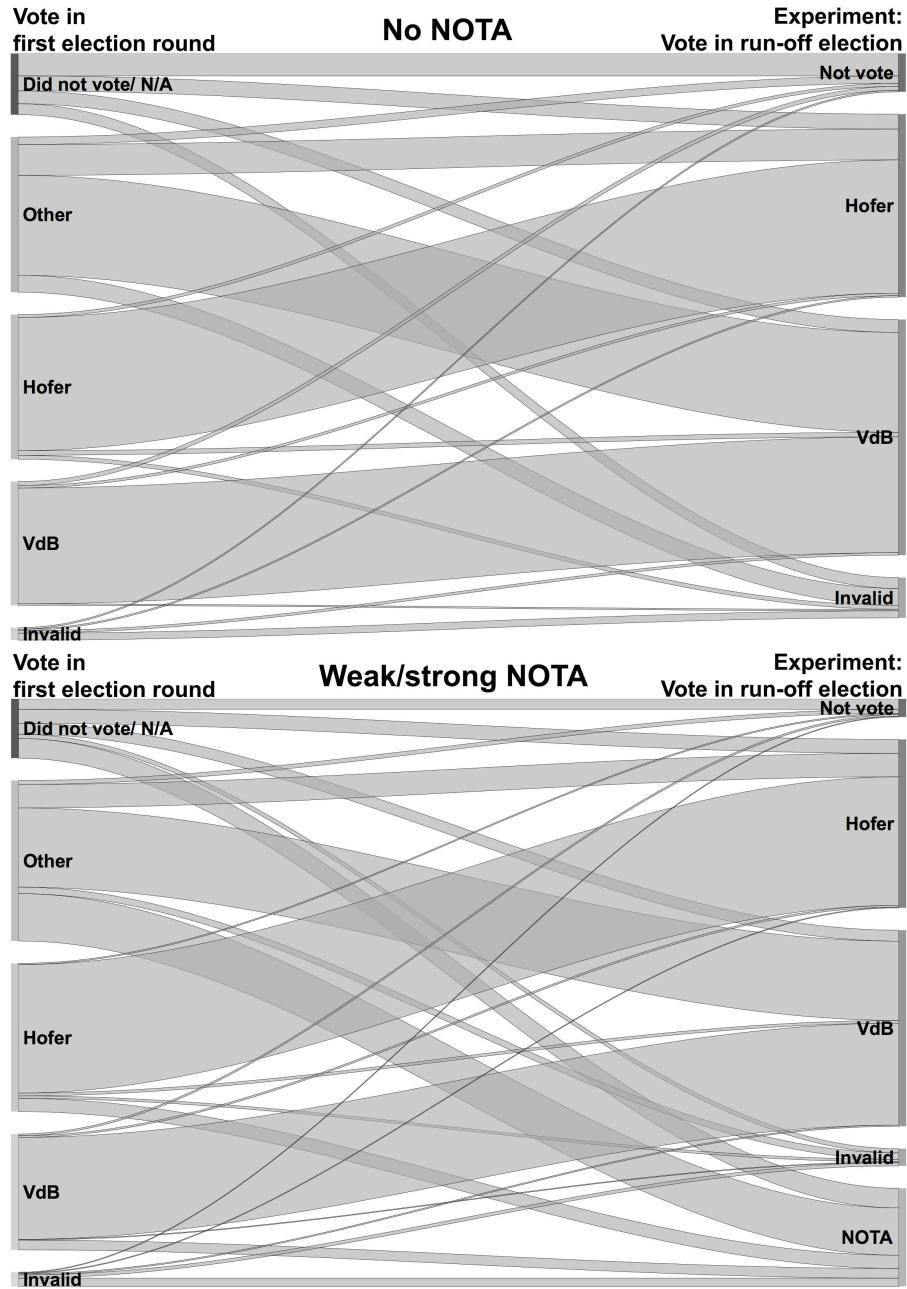
B   Media discussion of NOTA options

In our experimental surveys, we employed a *weak NOTA* and a *strong NOTA* condition in order to explore the range of possible effect sizes. While in the *weak NOTA* condition the NOTA option is simply added to the ballot paper without any explanation, in the *strong NOTA* condition we added a statement that explained the NOTA option and serves as a proxy for the discussion in the media that is likely to ensue in case a NOTA option were introduced:

> "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."

Below we document some quotes from media outlets discussing the NOTA option in India and the U.S. State of Nevada.

B.A   *India*

> "Disillusioned by the political set-up, you do not want to choose any candidate in the fray or support any political party, but still want to exercise your right to vote. In such a situation, does the ballot paper or electronic voting machine (EVM) offer any option? Yes, they do — 'None of the Above' (NOTA) option."
> The Hindu Business Line, 29 April 2019
> https://www.thehindubusinessline.com/opinion/columns/nota-as-a-right/article26983554.ece

> "The Supreme Court through an order in 2013 directed the Election Commission to give the voters an option of None of the Above or Nota in the electronic voting machine. This was introduced to give voters a right to reject the candidates put up by the political parties."
> India Today, 15 May 2019
> https://www.indiatoday.in/elections/lok-sabha-2019/story/lok-sabha-election-rising-cult-of-nota-the-silent-kingmaker-in-indias-elections-1525420-2019-05-15

B.B   *Nevada*

> "It was enacted as a way to combat voter apathy after the Watergate scandal that brought down President Richard Nixon and give voters a way to register disdain for the political environment."

CBS News, 5 September 2012

https://www.cbsnews.com/news/nevadans-to-keep-none-of-the-above-ballot-option/

"But other voters, especially those who might consider it their patriotic duty to vote, might wish for a more affirmative way to register their displeasure with their choices. In Nevada, they have that option — the ability to cast a literal protest vote."
FiveThirtyEight, 27 August 2010

https://fivethirtyeight.blogs.nytimes.com/2010/08/27/in-nevada-no-one-is-someone-to-watch/

C Instructions for Laboratory Experiment

The text in square brackets [] indicates that this text was only included in the NOTA and/or the pNOTA treatment condition.

Welcome and thank you for participating in the experiment. The following instructions, which are the same for all participants, explain the rules of the experiment. You can refer back to them during the experiment. Please read these instructions carefully, as they will explain how you will earn money and how your earnings will depend on the choices that you make.

Please do not speak, exclaim or communicate with other participants and keep quiet during the entire experiment. If you have any questions during the experiment, please raise your hand and an experimenter will to come to your place and answer your question. Also, please make sure that phones and other electronic devices are turned off and put away. If you do not follow these rules, we may have to exclude you from any payments.

In this experiment, you can earn money according to the rules outlined below. The exact amount will depend on your own decisions and on the decisions of other participants. You will not know the identity of the other participants you are interacting with, and the other participants will not know your identity. In this sense, your decisions are anonymous. Your earnings will be paid to you in cash at the end of the experiment.

The experiment consists of **20 rounds**. At the end of the experiment, **one** out of these 20 rounds will be randomly selected and paid out.

At the start of the experiment the computer will randomly form groups of one A-participant and 5 B-participants. Throughout the experiment, A-participants will always be A-participants and B-participants will always be B-participants. In each round, groups of A- and B-participants will be newly randomly matched. In each round, they will be randomly matched with a new A-participant.

Every round consists of **two stages**: a "proposal stage" and a "voting stage". In the proposal stage, the A-participant decides which proposal to put on the ballot paper for the voting stage. A "proposal" states how many EUR each participant in the group receives. In the voting stage,

the B-participants in the group vote over the proposal from the A-participant as well as other proposals.

1. Proposal stage

In the proposal stage of each round, only A-participants take part. The A-participant proposes how to divide an amount of EUR 90 between the six participants. The A-participant decides between a proposal of

1. "I receive EUR 50, and each B-participant receives EUR 8"

   and a proposal of

2. "I receive EUR 15, and each B-participant receives EUR 15"

The proposal the A-participant decides for will be put on the ballot in the voting stage.

2. Voting Stage

At the beginning of the voting stage, the five B-participants in the group will be informed about the proposal of the A-participant made in the proposal stage. Then each of the five B-participants will cast a vote. Each voter can choose from the following options:
Vote for

- Proposal of A-participant (from proposal stage)

- Proposal "The A-participant receives EUR 13, and each B-participant receives EUR 5"

- [**NOTA, pNOTA:** "None of these proposals"]

[**NOTA, pNOTA:** Votes for the option "None of these proposals" will be counted and displayed with the voting results, but are not relevant for the determination of the voting outcome.]

The proposal which receives the highest number of votes will be elected and implemented. If two proposals receive the same (highest) number of votes, the election outcome will be determined by a random draw between these proposals.
[**pNOTA:** If the proposal of the A-participant is elected then for each B-participant who voted for "None of these proposals" EUR 2 will be deducted from the round payment of the A-participant.]

At the end of the round, all group members will be informed about how many votes each of the voting options received, which proposal got elected, and their respective payoff. Then the next round begins, with the same roles but newly randomly formed groups.

At the end of the experiment, the computer will randomly select one out of the 20 rounds. Your payoff will be the amount you earned in this round.