Ballot Design and Split Ticket Voting in Multiparty Systems: Experimental Evidence on Information Effects and Vote Choice

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Abstract: This article presents the results of a large-scale e-vote experiment, conducted during the 2005 Congressional Election in Argentina, measuring the effect of different e-vote designs on split ticket voting. The experiment demonstrates that ballot design and e-vote technology significantly affect split ticket voting and the overall outcome of elections in multiparty settings. We explain these differences by analyzing the information cues used by voters when searching for their preferred parties and candidates. We show that cues that reinforce party-centric information on the ballot, such as the party name or the party logo, significantly decrease split ticket voting. By contrast, priming on candidate-centric features in the ballot significantly increases split ticket voting. We test for biases that result from selectively disclosing information on candidates or parties among voters with different levels of information.

1. Introduction

Do ballot design and information asymmetries influence the decision of citizens to split their vote in multiparty elections? In this paper, we present the results of a large e-vote experiment in Argentina and provide an affirmative answer to this question. We show that citizens are very receptive to information cues in ballot designs and significantly alter their vote in response to the demands of different e-vote technologies. The experiment shows that ballot design and e-vote technology significantly affect the outcome of elections at a time in which many countries are testing these technologies or introducing new electronic vote legislation.[1] In spite of its importance, there is almost no comparative research analyzing the effect of ballot design and e-vote technology on voters' behavior. This is particularly noteworthy in multiparty electoral systems, where the proliferation of parties and candidates imposes higher cognitive demands on voters and increases their vulnerability to manipulation (Reynolds and Steenbergen, 2006).

The results of the Argentine e-vote experiment reinforce recent research by Kimball & Kropf (2005) and Miller & Krosnick (1998) on the importance of integrating information effects to study vote choice (Althaus, 1998; Bartels, 1996; Jerit et al, 2006). By information effects, we understand the process that translates differences in education and political knowledge among voters into biased aggregate public opinion or electoral data. In public opinion, information effects describe biases that result from non-responses

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[1] At least 30 countries around the world have already implemented electronic voting or are conducting pilots to implement it in the future. Brazil and India, two of the most populous democracies, have already eliminated manual voting and use electronic voting for all national and local elections. All Venezuelan voters, ninety percent of the Dutch and Paraguayan voters, and close to half of Belgian voters use electronic voting for all local and national elections. While only 42 percent of the registered voters used electronic voting in the 2000 US presidential election, this figure increased to 87 percent in the 2006 election. Argentina, Australia, Canada, Costa Rica, Estonia, France, Germany, Italy, Ireland, Japan, Mexico, Norway, UK, Spain and Switzerland have already implemented electronic voting for some elections or are conducting pilots to test different e-vote technologies.

from voters with different cognitive ability, e.g. different levels of education and political knowledge (Althaus, 1998; Bartels, 1996; Sniderman, Brody, Tetlock, 1991; Stimson, 1975). In the case of an election, by contrast, information effects describe how differences in education and political knowledge affect how voters select their preferred party or candidate on Election Day. If voters with different cognitive ability display different propensity to identify and properly vote for their preferred party on Election Day, the aggregate result will be biased towards the preferences of more educated and well-informed voters. Voting systems that require higher/lower cognitive ability on the part of voters, therefore, will result in different aggregate electoral results when ability correlates with party choice. While significant attention has been devoted to the way in which information effects distort voters' preferences in public opinion data, we are not aware of prior research measuring information effects in multiparty elections.

Of particular interest is an assessment of whether ballot design and information effects shape split-ticket voting in multiparty races. As we discuss in the second section, almost all previous research explains split tickets in multiparty elections as the result of strategic calculations on the part of voters (Alvarez and Nagler, 2000; Baum, 2000; Duverger, 1957; Benoit et al 2004). By contrast, our experimental design provides ample evidence of unintentional split-ticket in multiparty elections, the result of how voters perceive and process information cues presented to them when casting their vote. Our findings suggest that how information is presented to voters matters. More specifically, e-vote technologies that direct voters to search for their prefer option by browsing the candidate's name result in higher split ticket rates. By contrast, e-vote devices that emphasize party centric cues, such as the party label or the party logo, reduce the amount of split ticket voting. Our findings suggest that future research on split ticket voting in multiparty elections should control for the intentional and unintentional determinants of the split ticket decision.

To assess the effect of candidate centric and party centric cues on split ticket voting, we conducted a large experiment with over 14,000 voters in 43 voting places during the Argentine 2005 Congressional elections. We tested four different e-vote prototypes, with random assignments of voters to each device. Holding other election-specific confounding factors constant, we tested for information effects in the use of different e-vote technologies.[2]

In the next two sections, we provide a general discussion of the nature of split ticket voting in multiparty settings. We describe the more stringent cognitive demands imposed on voters in multiparty elections, when voters have to select among a large number of parties and candidates for two or more electoral arenas. Under significant time constraints, voters primed with information about parties will be less likely to split their vote than those who are primed with information about race specific features such as the candidate's name. In the fourth section, we describe the most salient characteristics of a large e-vote pilot conducted in the City of Buenos Aires during the national Congressional election of November 2005. In section 5, we emphasize the party-centric or candidate-centric cues introduced by different e-vote technologies and, in section 6, explore its expected effect on voters. In the seventh section, we analyze the experimental data from the e-vote prototypes. We measure the effect of ballot design and e-vote

[2] While voters may have substantive reasons to chose different parties for each race, our experimental design seeks to isolate the *unintentional* split ticket vote. That is, a split ticket vote that is induce by how information is disclose to voters.

technologies on split ticket voting. We conclude by discussing future extensions of this research.

2. Split Ticket Voting in Multiparty Races: Intentional and Unintentional Determinants of the Split Ticket Decision

In the last two decades, a considerable body of research has emerged analyzing the behavioral and institutional factors that drive citizens to cast votes for different political parties on one ballot. Rather than converging into a single explanatory model, prior research has found a multiplicity of factors that propel citizens to split their vote, such as the lack of strong party identification, incumbency effects, ballot design effects, and strategic voting. These different factors are generally grouped into two different types, emphasizing the *intentional* or *unintentional* sources of split-ticket voting. The former, intentional split ticket voting, explains the conscious decision to cast a vote for different parties for strategic reasons. Unintentional split ticket voting, by contrast, occurs when a voter either displays sincere preferences for two different parties across different races or fails to cast properly a vote for the same preferred party in at least one of the races.[3]

A clear division of labor has taken place in the discipline, with most comparative scholars focusing on intentional sources of split ticket voting (Baum, 2000; Benoit et.al. 2004; Calvo and Abal, 2002), and most scholars of US politics focusing on *unintentional* split ticket voting (Beck, Baum, Clausen and Smith, 1992; Born, 2000; Burden and

[3] A common problem leading to unintentional split ticket voting in the US occurs when a voter, after selecting the "straight ticket" option, browses through the remainder of the ballot and enters a new vote for a particular race. The new entry often overrides the straight ticket option in the system and, if the voter failed to cast votes for every race, it would result in significant under-votes. In a recent paper, Frisina et.al. (2006) show that the introduction of touch screen technology in the 2006 election significantly reduced the number of over- and under votes. They also provide compelling evidence that failure to prevent undervotes in the Florida 13th Congressional District, may have resulted in a different candidate elected into office.

Kimball, 2002; Jacobson, 1990; McAllister and Darcy, 1992; Petrocik and Doherty, 1996).[4] Much of this different emphasis is because intentional (strategic) split ticket voting is arguably more relevant in multiparty settings, where differences in district magnitudes across races or tiers generate incentives to cast "useful" votes for likely winners rather than sincere votes for the ideologically closer alternative (Alvarez and Nagler, 2000; Baum, 2000; Duverger, 1957; Benoit, 2002). By contrast, in the absence of relevant third parties, a narrower definition of intentional split ticket in the US usually describes voters with policy balancing goals that cast a Republican/Democratic vote for president and a Democratic/Republican vote for Congressional candidates (Alessina and Rosenthal, 1995; Fiorina, 1996).

Since the 2000 presidential election in the US, a growing body of research has been redirected to explain split ticket occurrences that result from information failures or technological problems (Brady, 2005; Frisina et.al., 2006; Kimball and Kropf, 2005; Miller and Campbell, 1957; Miller and Krosnick, 1998; Rusk, 1970). In the comparative literature, however, there is no research that we are aware of, explaining the type of unintentional split-ticket voting that is induced by information failures or technological problems when there are more than two competitive parties. It is not clear, however, that the ballot effects detected in the US translate well to multiparty elections. As we will argue, there are good reasons to expect significant differences when analyzing ballot and information effects in two-party and multiparty races. In the remainder of this section, we discuss three problems that increase the salience of information effects in multiparty races: (i) the higher cognitive demands imposed on voters, (ii) the more complex nature

[4] An exception is Benoit, Giannetti, and Laver (2006), who study split ticket when there is a restricted menu of party choices that forces voters to split their vote in the Italian mixed member electoral system.

of the ballot interpretation, and (iii) the different expected distribution of non-responses in multiparty settings.

3. Cognitive demands and Split Ticket Voting in Multiparty Races

As already indicated, we are interested in explaining the type of *unintentional* split-ticket voting that occurs when voters select different parties, either because they fail to cast a vote in one of the races (i.e. under or over-votes) or are prompted by technology to vote for different parties across races. Such unintentional split ticket voting, we argue, plays a very significant role in elections with a large number of competing parties, where considerably more information needs to be communicated to voters to facilitate the identification of their preferred option (Baker et. al. 2006). As we will show in the third section, time constraints on election day make voters more sensitive to priming by different e-vote technologies. Therefore, ballots that highlight candidate-centric information induce higher split ticket rates than ballots reinforcing party centric information. In what follows, we describe substantive and logistic problems that increase the importance of information effects in multiparty systems. This higher cognitive demands make voters more dependent on information cues and, therefore, more sensitive to priming by different e-vote technologies.

(i) General Cognitive Demands on Voters

In multiparty races, the information that voters need to process in order to cast a vote for their preferred option is considerably higher than in two party systems. Voters need considerably more information to identify the spatial location of more than two parties, usually overlapping each other within narrower regions of the policy space. As is also the case in the Republican and Democratic primaries in the US, candidates in multiparty elections introduce more subtle differences on issues to allow voters to discriminate among alternatives that are comparatively closer. In multiparty races, however, relatively uninformed voters select candidates among all parties competing in the general election, in contrast with the relatively small number of relatively well informed voters that participate in US primaries. Voters, in consequence, need considerably more political knowledge to understand the policy orientation of multiple parties on a broad range of issues to identify their ideologically proximate candidates. Such substantive differences require voters to consider a wider range of information also on election day. As we will show, difficulties in recalling information about the political party of a preferred candidate will then increase the likelihood of split ticket voting in less visible elections.

A different problem results from parties not presenting candidates for all races. In multiparty elections, it is common for smaller parties to present candidates only for some races. These parties, however, generally do not publicize that they are only presenting candidates in a limited number of races. Voters of parties that present candidates for only some races will have no choice but to split their vote (Benoit, Giannetti, and Laver, 2006).

(ii) Locating the preferred candidates in the ballot

Once voters know for whom they will vote, they also need considerably more information to be able to select their preferred alternative on Election Day. A Brazilian voter in Rio de Janeiro, for example, will have to browse through hundreds of candidates in order to cast a vote for her preferred alternative. Each open list in Rio includes over 70 names and, in any given election, there can be over two dozen parties presenting candidates. It is also common for parties that compete for the same constituency to use closely related party labels that cue voters about the party platform. In several countries of Latin America, words like “Federal”, “Center”, “People”, “Socialist”, appear in the label of multiple parties. Moreover, different types of nomenclatures identify parties such as “*Partido*”, “*Alianza*”, “*Union*”, etc. In any given election, therefore, voters must distinguish between the “Partido Federal”(PF) and the “Alianza Federal”(AF), the “Workers’ Party”(PT) and the “Brazilian Labor Party”(PTB), the “Authentic Socialist Party”(PSA) and the “Argentine Socialist Party”(PSA).[5] To distinguish among parties, therefore, voters usually cross-reference information such as the name of the first candidate, the party label, the party logo, etc. The political knowledge required to identify such features on a ballot, however, varies considerably among groups of voters.

An important logistic problem in conducting the electoral process is, therefore, how to make available enough information on the ballot for voters to identify their preferred choice without overwhelming them with unnecessary information. If there is not enough information readily available on the ballot to distinguish clearly among the different alternatives, a percent of voters will fail to select their preferred choice on election day. On the other hand, if too much information is displayed, voters will either

[5] An interesting exercise for a novice comparativist is to distinguish among the following Brazilian parties: Workers' Party, Brazilian Labor Party, Democratic Labor Party, Social Labor Party, Democratic Socialist Party, Party of the Brazilian Social Democracy, Social Democratic Christian Party, Christian Social Party, Socialist Peoples' Party, Socialism and Freedom Party, Social Liberal Party and the Brazilian Socialist Party. This is not an exhaustive list of all possible parties.

require an excessive amount of time to vote or they will select based on only some cues which may not be unique to their preferred choice.

As we will show in the experiment, when priming on different cues, voters change their behavior, adjusting their search patterns according to the information that is readily available to them. Priming on candidate centric or party centric information, therefore, will affect the search patterns of voters and, consequently, the expected tally for the different races.

(iii) Expected distribution of failed votes in multiparty systems

In two-party systems, different information and/or technological problems can result in three different failures that can distort the voter revealed choice: failure to mark a vote in any of the races will result in (i) roll-off votes that express no-preference for some candidates and/or parties.[6] Secondly, failure to recognize a prior selection could result in (ii) over-count ballots that nullify the stated preference for a particular party or candidate. Thirdly, difficulties in interpreting the ballot could result in (iii) votes that favor an unwanted candidate.[7] In low visibility races, for example, voters usually lack substantive information about the candidates and lean more heavily on informational shortcuts such as the party name or logo. Ballots that do not include information on the party name fail to provide voters with enough information. Information effects will bias

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[6] Note that roll-off votes could also be a conscious strategy by voters to express "no preference" on a particular race. It is often difficult to distinguish between intentional and unintentional *no-votes*.

[7] The most famous example of this type of "interpretation" problem occurred in the 2000 presidential election when large numbers of senior citizens incorrectly interpreted the order of the candidates in a ballot (butterfly ballot), giving candidate Paul Buchanan far more votes than those registered in any other county in the state of Florida.

the vote totals if the rate of wrongly cast votes for one party were considerably higher than wrongly cast votes for the other party.

In multiparty races, however, information failures could lead to votes uniformly distributed among all parties or, more likely, clustered among a few of them. For example, party labels that are not randomly rotated will induce order effects (Miller and Krosnick, 1998), benefiting candidates or parties that appear early in the ballot (primacy effects) or late in the ballot (recency effect). Parties with names that resemble well-established majority parties will also benefit from spillovers; capturing a more significant number of votes than minority parties with distinctive names, logos, and candidates.

The higher cognitive demands described here, make voters in multiparty settings more sensitive to information cues embedded in the ballot design. In the particular case of split ticket voting, we argue, this higher information demands will increase the sensitivity of voters to candidate-centric and party-centric cues. As we will show, split ticket rates increase when voters are primed by candidate centric cues, and decrease when voters are primed by party centric information. In the next section we describe an experiment design to test for the presence of such effects.

4. The 2005 E-Vote Pilot in Buenos Aires, Argentina.

To test for the presence of information and ballot effects we use experimental data from a large e-vote pilot conducted in the City of Buenos Aires, Argentina, during the 2005 national election. The e-pilot included 14,800 participants in 43 polling stations randomly distributed throughout the city. After voting in the official election, randomly chosen participants voted in a second non-compulsory election. In each polling site, we tested at least three different e-vote devices with voters randomly assigned to only one of the machines.[8] The prototypes were located next to each other and each participant voted for both national and local candidates.[9]

In the national election of 2005, citizens in the City of Buenos Aires voted for a list of national *Diputados* and local Legislators. Seats are allocated using a PR-D'Hont formula with closed party lists of magnitude 13 for *diputados* and 30 for legislators. Thirty (30) parties presented candidate lists for national *diputados* while forty one (41) parties presented lists for the state legislature.

In the last three elections, the City of Buenos Aires had very competitive races with an effective number of parties ranging between 5 and 10. In 2005, however, three lists gathered a majority of the vote: President Nestor Kirchner's *Frente para la Victoria (FPV)*, the center-left opposition party *Alianza para una Republica de Iguales (ARI)*, and the center-right *Propuesta Republicana (PRO)*. In the 2005 election, these parties captured close to ≈66% of the valid votes for *diputados* and ≈64% for state legislators. The campaign for national *diputados* was very intense, with high spending in support of Rafael Bielsa (FPV), Elisa Carrio (ARI), and Mauricio Macri (PRO). By contrast, candidates to the local legislature spent almost no money during the campaign.

The Four E-Vote Prototypes

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[8] One of the four prototypes, using off-the-shelf technology, was tested in 14 locations.

[9] We collected the experimental data in five different datasets: two individual voter surveys, one file containing the technical logs of the prototypes, qualitative data collected by observers at each station, and individual level votes by device. A short, self-administered survey (six questions) conducted immediately after the vote, included 13,902 respondents. Half of the questions were identical across prototypes, dealing with general perceptions about the e-vote experience. The remaining questions tested usability issues specific to each device. A fourth of the participants also answered a longer exit poll, inquiring on their opinions and attitudes towards electronic voting, their familiarity with technology, political participation, education, and political knowledge. Detailed information about the design of the e-vote experiment is available at www.__.edu (REFERENCE OMMITTED).

The *Dirección Electoral* of the Government of the City of Buenos Aires designed the software and hardware of the e-vote devices. Four machines were tested, two *Direct Record Electronic (DRE)* prototypes and two *optical scan (OS)* prototypes:

Prototype 1: The first e-vote prototype was a *DRE* design with two separate modules. The first module looked like an ATM machine, with a screen that allowed voters to review the lists of candidates and a numerical keypad to register their vote. [10]

Prototype 2: The second prototype was a touch-screen *DRE* with a paper trail. Voters could scroll and select party lists directly by tapping onto the screen.

The other two prototypes were optical scan systems. Optical scanners require considerably more physical space to set the paper ballots. Optical scans were favored by some politicians because of their proximity to current electoral logistics.

<Insert Figure 1>

Prototype 3: Voters placed each paper ballot into a rolling scanner that displayed the selected choice on the screen. This prototype required separate ballots for each race, facilitating both comparisons across races and split ticket voting.[11]

Prototype 4: The fourth and final prototype was an optical scan device with a single ballot listing the names and numbers of all parties for each race. The voter marked her preferences for each race with a pencil and then introduced the ballot into a scanner located next to the election desk.

[10] Authorities assign different list numbers to each party. Candidates and Parties advertise this number during the campaign, together with the party and candidate's name.

[11] Political parties in Argentina are responsible for printing ballots, which have to comply with official ballot guidelines. After receiving an empty envelope from the election authorities, each voter enters a room to select their preferred ballot. Voters deposit the envelope into an urn, under the supervision of the election authorities. Dotted lines on the paper show voters how to split their vote.

5. Party Centric and Candidate Centric Features in the Ballot Design

How does ballot design affect split ticket voting? The four e-vote prototypes tested in this experiment highlighted different features of the ballot. In particular, they vary in regards to (i) the information displayed on the ballot, (ii) the accessibility to the different components of the ballot, and (iii) the default no-choice alternative presented to voters.

***(i) Information identifying candidates and parties*:** A central concern of this research was whether priming voters with different information changed their behavior. Each of the four prototypes, therefore, disclosed different information at different levels of navigation.

<Insert Table 1>

The first prototype reinforced party centric cues, displaying fifteen labels with party names on each screen and including information about the party number and party logo. In order to view the list of candidates, however, the voter needed to enter the three-digit party number. If the voter did not know the name of the party, she would need to access each list until finding a recognizable candidate name. One of the most interesting results extracted from the survey was that in this first prototype, young voters had more problems identifying their preferred list than older voters. Lack of information about the party name or number overwhelmed other limitations such as lack of familiarity with keypads.[12]

[12] The survey data shows that 23% of voters under 25 found it difficult or very difficult to locate the party of their choice in prototype 1. Fewer than 10% of voters over 45 experienced similar difficulties.

Prototype 2 highlighted candidate centric features on the ballot, prominently displaying the name of the first candidate under the party label. The party number and logo information were also visible on the screen and voters could access the complete list of candidates on a second navigation level. Voters could easily identify parties with prominent congressional candidates, such as the pro-Kirchner Rafael Bielsa from the FPV or Mauricio Macri of the center-right PRO, but gathered very little information that would help them when casting a vote for local election. Therefore, priming on candidate centric features in prototype 2 should induce higher split ticket rates.

The information displayed by the optical scan systems also directed voters to different features of the ballots. Prototype 3 used the official paper ballots used in the Argentine congressional election, which included all the relevant information such as party name, party number, logo, and the complete list of candidates. The general election ballot in Argentina uses a different paper ballot for every party and features the name of the first candidate in larger print than the party name, number, and logo. Prototype 3, therefore, primed voters on candidate centric features.

Finally, Prototype 4 provided voters with a separate booklet that included all relevant information. The ballot introduced in the rolling scanner, however, listed only the party name, number and logo. Survey data showed that voters had considerable difficulty finding information in the official booklet but could easily find their preferred party on the paper ballot, reducing the rate of split tickets in the fourth prototype.

In summary, Prototypes 1 and 4 highlighted information about the parties while prototypes 2 and 3 highlighted information about the candidates.

(ii) Other confounding factors: The DRE and OS prototypes required voters to search parties or candidates in different ways. Differences in search patterns, the amount of information displayed, and difficulties in voting also affect split ticket rates. We describe here the most important confounding factors that we needed to address to estimate unintentional split ticket voting. In the DRE prototypes, party labels were randomly rotated on the screen to prevent order effects.[13] Because of space restrictions, each screen displayed a limited number of labels, with two screens displaying party labels for *diputados* in prototype 1 and three screens in prototype 2. Navigation over multiple screens could be challenging for some voters and induce unintentional split ticket voting.

Prototype 1 also had a separate button on the keyboard to cast a blank vote. In prototype 2, by contrast, the blank vote option was a label randomly placed on the screen together with all other party choices. The separate blank vote button in prototype 1 resulted in significantly more blank votes than those registered in prototype 2.

In prototype 3, poll workers sorted the paper ballots in increasing order by the party number. According to the information obtained from observers, however, ballots rapidly mixed in the voting booth. Difficulties in finding the ballot and mechanical problems with the rolling scanner resulted in Prototype 3 displaying higher rates of blank votes and the highest reported rate of voting problems.

Finally, the fourth and last prototype listed party names in order by their official party number, increasing the likelihood of order effects but also facilitating the recognition of parties across races.

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[13] If a voter cancelled her selection and started the process all over again, she would still see ballot labels in the original location of her first try.

6. Candidate- and Party Centric Search Patterns by the Voters: Survey Evidence

The survey data illustrates how voters interacted with each prototype and the type of cues they used to find their preferred option. Asked about the ballot features used to identify their preferred party or candidates, close to half of the voters selected the name of the party, closely followed by the name of the first candidate. However, it is worth noticing that party name was a less relevant cue in prototype 3 and was particularly important in prototype 4. This is consistent with a ballot design with prominently displayed candidate names in Prototype 3. Meanwhile, in prototype 4, the candidate name was not listed in the paper ballot but could be found in a separate booklet.

<Insert Table 2>

Featuring the first candidate's name significantly affected voting in DRE prototypes. As shown on Table 2, featuring the first candidate's name to identify the preferred choice was more salient among voters in prototype 2. By contrast, 17% fewer respondents in Prototype 1 used the name of the first candidate as a cue to find their preferred choice. It is worth noticing that the party number was particularly important to identify the prefer alternative in Prototype 1, which required voters to punch the number into the keypad to access the complete list of candidates. Such information allowed voters, as we will show in the fourth section, to reduce their propensity to split their vote. Finally, the party logo was a secondary feature used by close to 25% of voters.

Younger voters had considerable difficulty finding their preferred list of candidates in prototype 1, which did not feature the name of the first candidate. Meanwhile, voters over the age of 30 were almost twice as likely to search for their preferred party by using the list number, and 10% less likely to select their vote based on the name of the first candidate than voters under the age of 30. Finally, retirees had considerably more trouble finding their preferred candidates in touch-screen devices (prototype 2), which displayed smaller labels.

Asked whether they were able to vote for their preferred choice, 90 per cent of the voters said they were able to do so. Prototype 3 had the lowest score, almost 8 points lower than the other three voting machines (82.6 per cent), due to problems with the organization of the ballots in the dispenser and technical difficulties with the rolling scanner. The touch-screen machine scored highest, with 93.4 per cent of voters stating that they found their preferred choice.

<Insert Table 3>

Finally, the level of voter education significantly influenced whether voters were able to find their preferred choice. While 90% of voters with a college education were capable of casting a vote for their preferred option, this figure was eight points lower (82,3 per cent) among those with a high school education or less. Education, however, interacted with the information provided by the different devices. While prototypes 1, 3, and 4 showed differences of ten points among the low and high education groups, the effect was much lower in prototype 2, where only a three-point difference was recorded.

7. Estimating the Effect of E-vote Technology on Split Ticket Voting

The descriptive data of the previous section provides interesting information about the significance of split ticket, with 41% of voters selecting different parties for each race. However, split-ticket varied dramatically across devices, from a minimum of 20% in prototype 4 to over 50% in prototype 3. As shown in Figure 2, we observe significantly lower rates of split ticket voting in prototype 4, which used pencil marks on a single ballot, and in prototype 1, which required voters to enter the list number in the keypad and to review the full list of candidates.

Split-ticket was considerably higher in prototype 2, which provided up front information about the first candidate of the party, minimizing the need to use the other information cues such as party name and party number. Voters, therefore, were not exposed to information that was relevant to identify the same party in the second race. The lack of search cues that facilitated the recognition of the party ballot induced higher split ticket voting that favored party switching in the less visible election for local legislators. We observed the highest split ticket rates in prototype 3, arguably the result of using two separate paper ballots that were not readily available to voters and technical difficulties with the optical scanner.

<Insert Figure 2>

<Insert Table 4>

It is worth noting the high and variable transfers of votes to the smaller parties ("others") in the less visible local legislature race. The number of blank votes switching to "other" parties in the legislative elections is also three times as large for prototypes 2 and 3, compared to that of prototype 1. While outside the scope of this paper, a restricted menu of political parties for the national election resulted in an increase in the split ticket rate (Benoit, Giannetti, and Laver, 2006).[14]

The summary data, however, provides little information about the particular effect of ballot design and the voters' cognitive ability on the reported rates of split ticket

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[14] All major parties displayed in Figure 2 and Table 5 presented candidates in both races. The random assignment of voters to prototypes should also guarantee that the split ticket rate across devices is not a function of the restriction in the number of parties presenting lists in both races.

voting. In the next section, we provide a broader statistical analysis to explain the determinants of split ticket rates described in Figure 2 and Table 4.

The Data

The dataset includes the individual level votes for 11,471 participants in 120 voting stations. We retrieved the individual level vote variable from the digital logs of each machine. Legal restrictions, however, prevented us from linking the individual level data with the individual level survey and technical log data. We did merge, however, the individual level vote data with the aggregate summaries of the survey and technical data for each voting station. The models presented here, therefore, use individual level vote data describing vote choice and aggregate public opinion data for each of the 120 machines.

Our dependent variable is the individual level split ticket choice, coded 1 if the voter selected different parties for the national congress and the local legislature, and 0 otherwise. The main independent variables used in our analyses test for the effect of different ballot designs and for differences in the voters' cognitive ability. Five independent variables measure how voters found their preferred list using (i) the *name of the first candidate*, (ii) the *logo of the party*, the (iii) *name of the party*, the (iv) *official number of the party*, and (v) *other unspecified information on the ballot*. We expect that voters using race specific information, such as the name of the first candidate, will have trouble recalling other information needed to vote for the same party in less visible races. Therefore, we expect significantly more split tickets among voters that search for their preferred alternative by using the name of the first candidate and "other unspecified information". By contrast, voters that identify their preferred choice using the party list or the party logo should be less likely to split their vote. Because voters were randomly assigned to the prototypes, differences in search patterns are explained by the cues provided by the different voting devices. We expect that a ballot design reinforcing race specific features, such as the name of the first candidate (prototype 2), will increase split ticket rates. By contrast, voting technologies that emphasize global cues (such as the party number in prototype 1) will lead to lower levels of split ticket voting.

We also test for two variables describing the cognitive ability of voters: the mean (vi) level of *education* of the respondents, as a proxy for their technical proficiency to find their preferred choice; and the mean level of (vii) *political sophistication*, obtained from the voters' response to four knowledge questions.[15] The expected effect of these variables differs. We expect that education should strongly correlate with voting ability and, therefore, should reduce unintentional split ticket voting. The literature on political knowledge, by contrast, provides competing arguments about the split ticket behavior of political sophisticates. On the one hand, researchers have consistently found that voters who are politically savvy tend to split their vote to a greater degree than the average voter (Burden and Kimball 1998). On the other hand, higher political knowledge should reduce the split ticket rate that is due to information failures (in a fashion similar to the effect of level of education). In introducing a control variable measuring political knowledge, therefore, we are somewhat agnostic as the expected relationship to split-ticket voting.

Other controls included a variable measuring the average (viii) time that voters needed to cast a vote, which we expected to be associated with more complex search

[15] We measured political sophistication using the first rotated component of a factor analysis on four questions, which asks respondents about their reported (i) *interest in politics*, (ii) knowledge about the name of the *minister of economy*, (iii) the *minister of education*, and (iv) the *Minister of Health*.

patterns leading to split ticket voting. Finally, the (ix) mean *reported voting problem* in each machine, which was particularly important in prototype 3.[16] We also estimated a base line model with random intercepts for each prototype. To account for the different mean split ticket rates of voters of different parties, we also include as a control five *party dummy variables* indicating whether the vote for national deputies went to the UCR, the ARI, the FPV, the PRO, or was a Blank vote. The baseline category was "others", identifying the vote for any of the twenty-five remaining parties and representing ≈41% of the total vote. We expect that split ticket voting will vary across parties. Well-established political parties will suffer from less split ticket voting than less visible parties.

The Models

While we have 11,471 individual level observations of split-ticket voting and party choice, there are only 120 aggregate level observations summarizing the survey and technical logs of the 120 prototypes deployed on Election Day. Running a simple logistic model combining the individual and aggregate level information would provide smaller than warranted standard errors for all aggregate level parameters.[17] In order to combine the individual and aggregate level information, therefore, we run multilevel logistic models via bayesian MCMC simulation. By using a multilevel model, we provide corrected standard errors that account for the higher than observed variance of the aggregate level data.

[16] The wording of the question is "Were you able to cast a vote for your preferred choice?" It is also possible that voters are not aware that the selected vote was not the "right" vote. See Herrnson, et.al. 2006.

[17] To run the standard Logit model, it is customary to match the aggregate level data to the 13,000 observations. The parameters estimated from the aggregate level information, however, have fewer degrees of freedom and, if left uncorrected, will provide standard errors that will be too small.

We programmed three models in Winbugs (Spiegelhalter et.al., 2003) and R 2.1. The first two specifications are random intercept models, estimating different intercepts for each one of the 120 different voting machines. More formally:

$$Split_{im} \sim Bern(\theta_{im})$$

$$ln\left[\frac{\pi_{im}}{1-\pi_{im}}\right] = \propto_m + \sum_t \beta_t X_{ti}, \;\; i = 1, \dots, n; \;\;\; t = 1, \dots, T$$

$$\propto_m \sim \mathcal{N}\left(\sum_j \lambda_j Z_{jm}, \sigma_\alpha^2\right), \; m = 1, \dots, M; j = 1, \dots, J \qquad Eq. \quad (1)$$

where $Split_{ik}$ is a dummy variable indicating whether voter i in device m selected different parties for each race, $\sum_t \beta_t X_{ti}$ describes the set of individual level predictors to explain split ticket voting. The first level equation estimates a random intercept $\propto_m$ capturing the mean split ticket rate for each prototype, and $\sum_j \lambda_j Z_{jm}$ is a set of second level parameters with aggregate level information for each of the 120 devices.

Model 1 only estimates four second level predictors measuring the compound effect of the different e-vote technologies. Our interest is in measuring the split ticket differences across parties and prototypes, which provide a streamlined version of the descriptive information in Table 4.

Model 2 estimates the effect of priming on different features of the ballot using the variables described in the previous subsection. The second level parameters, therefore, use the aggregate survey data rather than individual level information. Because we are inferring individual level estimates from aggregate data, a classic ecological inference problem, the results are sensitive to aggregation bias (King, 1997; King et.al. 2004). The experimental nature of the data, however, guarantees that all prototypes are tested in parallel in the same voting places and the variation in the number of voters per machine is relatively small. Aggregation bias, therefore, could occur across voting places but not across prototypes.[18]

Finally, Model 3 estimates a varying slope model that measures information effects within each prototype. The experimental design keeps information cues constant within each of the four different prototypes and, therefore, we expect within prototype variation to be smaller.

Results

Table 5 presents the results of the three models, measuring the individual and aggregate level variables described. As shown in Model 1, we observe large and statistically significant differences in split ticket voting across devices, with candidate centric prototypes (2 and 3) leading to considerably more split ticket rates than party centric devices (1 and 4). A voter of the incumbent FPV, for example, would split her vote only $\approx 10\%$ of the time in Prototype 4 and $\approx 20\%$ in Prototype 1. By contrast, the split ticket intent of an FPV voter would increase to $\approx 32\%$ in Prototype 3.

<Insert Table 5>

To test for the hypothesis that differences across prototypes are reflective of the underlying search patterns described by the aggregate level data, we ran a second model that incorporates second level predictors of the voter's behavior. As shown in Model 2, voters who searched for their preferred ballot using the name of the first candidate were significantly more likely to split their vote than those searching by party centric cues. For example, a voter for the incumbent FPV who searched primarily by using the name of the

[18] We still conducted t-tests on the variable education between each pair of prototypes. All t-tests were statistically insignificant, with the mean reported level of education $\cong 6.7$ (elementary education) for all four prototypes.

first candidate had a 25% chance of splitting her vote. Meanwhile, a similar voter using as cue the name of the party had only an 12% chance of splitting her vote.

Because candidate centric patterns do not provide voters with new information to guide their vote in less visible races (compared to party logo, name and number, which are invariant across races), voters using cues that are specific to one of the races are also more likely to split their vote. It is important to note that, because we assigned voters randomly to each device, differences in the propensity to search by different ballot features can only be explained by the different cues introduced by the e-vote technology. Prototype 2, as explained before, volunteered the name of the first candidate and, in consequence, voters were twice as likely to search for their preferred list by the candidate's name. Prototype 1, in contrast, forced voters to access a second navigation level to see the entire candidate's list. Voters were half as likely to search for their preferred alternative by the first candidate's name, paying considerably more attention to the party name and number which was the same across races.

Voters that identified their preferred list by the party number were the least likely to split their vote, a characteristic prominently featured in prototypes 1 and 4. It is worth noticing that in prototype 4 (an optical scanner), the options were listed on the ballot ordered by the party number, and voters in prototype 1 had to punch in the number of the party in order to access the second navigation level to see the list of candidates. While 35% of voters declared using the party number to identify their preferred alternative in prototype 1, only 21% of voters searched by party number in prototype 2.

As expected, the higher the level of education the more likely that voters do not split their vote. The variable education, in our case, provides a good proxy for the cognitive ability of voters and, given that the experimental design controls for other confounding patterns that affect unintentional split ticket voting, the more educated voters are reporting fewer voting problems. As described in the third section, the number of subjects with higher education that reported "voting problems" was 8 points below that of respondents with high-school education. Proficiency in voting, however, is a separate attribute from political sophistication. Our results do not provide evidence of higher split ticket rates among more sophisticated voters, showing that education and political knowledge exert distinct effects on split-ticket voting.

As expected, an increase in the mean time used to vote was positively associated with higher split ticket rates, capturing the longer time spent in the voting booth by those voters that had the most trouble finding their preferred choices. The party dummies are all statistically significant, with higher split tickets among UCR and FPV voters, and lower split tickets among the center-right PRO voters. The substantive differences in split tickets among parties are not necessarily induced by technology and are explored in further detail in OMMITED REFERENCE (XXXX).

A more intuitive interpretation of the results is in Figure 3, which describes the relationship between the cognitive ability of an FPV voter (*Diputados*) and her split ticket behavior. Figure 3 shows two relationships of interest: first, it shows that a voter's cognitive ability has a very significant impact on split ticket voting. Such differences are particularly dramatic for voters with less than an elementary education (7 years in Argentina).

<Insert Figure 3>

Second, and more important, Figure 3 shows the effect of the candidate- or party-centric search types, with voters that use the name of the first candidate as cue being significantly more likely to split their vote than those using party name. As we already indicated in the previous section, searching by party number significantly reduced the amount of split ticket voting, leading to close to 25% fewer split ticket votes.

The third and final model in Table 5, a random slope hierarchical model, provides further insight into the effect of different types of searches within each prototype. Because each prototype leads voters into different search patterns, within prototype variation should be less dramatic than the one described across prototypes. The result of the third model shows that voters in Prototype 1 were more sensitive to differences in their search patterns. Voters in Prototype 1 were considerably more likely to split their vote when searching for their preferred option using the name of the first candidate and less likely to split their vote when searching using the name of the party. By contrast, voters in Prototype 4 were the least sensitive to different search patterns. That is, voters in Prototype 4 not only split their vote the least but, as important, they display also the lowest variance in their search patterns. The use of a single ballot with only party names, party logo, and party numbers dominated the search strategy of voters.

The results in the Model 3 point to an interesting area of new research, showing not only that voters are sensitive to different cues in ballot design, but also that different e-vote technologies can better accommodate the search patterns of different types of voters. Future research should investigate, therefore, why voters are more or less sensitive to different cues when voting.

8. Conclusion

Recent innovations in voting technology promise a new era of accountability, in which voters can express preferences on a broader range of issues and gain control over the selection of a larger number of candidates and policies. Difficulties in manually tallying votes for different parties, candidates, propositions, and offices may now be quickly resolved through new technologies that minimize human error and promise accurate results in a matter of hours. The increasing sophistication of vote technology, however, comes with hidden costs. E-vote technology requests heterogeneously informed voters to learn on-the-spot how to navigate electoral information and to communicate preferences on a wide number of parties, candidates, and issues they know very little about. Where some voters see increased political freedom to express more nuanced preferences, other voters see a navigation maze with candidate names and political propositions they hardly recognize. The result is that increasing technological sophistication effectively requires voters with very different cognitive abilities to search for cues that identify their ideologically preferred alternative in a very short time.

In the last twenty years, a broad literature has emerged trying to determine the extent to which the uneven distribution of political knowledge among voters shapes the collective opinions obtained through survey data. A central concern of this literature is that information asymmetries bias the perceived preferences of the public towards the preferences of the most informed voters. As this paper shows, information asymmetries also have an important effect on the electoral behavior of citizens. Citizens are very receptive to information cues provided by different ballot designs and significantly alter their vote in response to different e-vote technologies. Faced with the need to find their preferred party or candidate, voters cross-refer cues presented to them on the ballot or within the e-vote framework. Unlike public opinion surveys, however, elections prompt citizens to vote even when they have weak preferences. *Non-responses*, which feature prominently in almost all public opinion data, are notoriously absent in electoral results hinting to a larger role for information effects on election day.

In the particular case of split ticket voting, the Argentine experiment demonstrates that prototypes that reinforce candidate-centric cues lead to a larger number of split tickets among voters. E-vote prototypes that require participants to pay attention to features common to all races, such as the party name, the party logo, or the party number, result in considerably less split ticket voting than prototypes that reinforce candidate-centric cues. As we demonstrate in this article, therefore, different e-vote technologies do not simply collect the "right" result but also shape the outcome of elections. As countries move to replace manual count and paper ballots with newer e-vote technologies, policy-makers should protect democratic fairness, investing resources not only to minimize the risks of technological breakdown but also to understand how e-vote technologies interact with heterogeneously informed citizens to shape political behavior.

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Table 1: Distinctive Features of the E-vote Prototypes

	Prototype 1 **Digital, Keypad**	**Prototype 2** **Digital, Touch Screen**	**Prototype 3** **Optical, Two Ballots**	**Prototype 4** **Optical, Mark, Single Ballot**
Priming on	**Party Centric Cues**	**Candidate Centric Cues**	**Candidate Centric Cues**	**Party Centric Cues**
How to cast a vote	The voter inserts the smartcard to initiate the voting process. Using a numeric keypad, the voter scrolls over party labels and selects a party list for each race. There is no straight-ticket voting option.	The voter inserts the smartcard to initiate the voting process. Using a touch-screen device, the voter scrolls over party labels and selects a party list for each race. There is no straight-ticket voting option.	The voter is asked to insert a paper ballot or press the CONTINUE button to cast a blank vote. Two paper ballots scanned, for National and local Legislators.There is no straight-ticket voting option.	The voter marks the same paper ballot for National and Local representatives. An optical device scans a single ballot. There is no straight-ticket voting option. Separate marks for each race.
Location of ballot	Party lists order is assigned randomly for both races. Two screens displayed party labels for national deputies and three screens for local legislators	Party lists order is assigned randomly for both races. Three screens displayed party labels for national deputies and four screens for local legislators	Separate ballots for each race (and not placed in order as in the official election).	Party labels listed on increasing order (official Party Number).
Information displayed on ballot	Party name, number, and emblem featured on the screen. Entering the official party number (keypad) displays the complete list of candidates.	Name of the first candidate, party name, number, and emblem featured on the screen. Second navigation level for the complete list of candidates.	All available information featured on the paper ballot: party name, party number, party emblem, and complete list of candidates. Candidate name appears in a larger typesetting.	Only the party name and number featured on the ballot. All other information available in a separate booklet.
Default no-choice alternative	A special button on the keyboard allows voters to cast a blank vote.	The voter must search the blank ballot label randomly placed among other party labels on the screen.	The voter presses the "CONTINUE" button without scanning a paper ballot.	The blank vote label, listed last in the paper ballot, has to be marked. Failure to select a party will not count as a blank vote.

Table 2: How voters found their preferred ballot

Search By	***Prototype 1***	***Prototype 2***	***Prototype 3***	***Prototype 4***	All
Party name	51.42	50.95	44,3	53,2	49,3
First candidate name	33.33	50.09	47,3	45,3	44,3
Party symbol	27,2	30,4	22,2	7,4	25,8
Party number	35,4	21,1	19,9	28,4	25,3
Others	4,1	2,7	7,5	6,3	4,7

Prototype 1*

Search by Candidate Name		**Search by Party Name:** No	**Search by Party Name:** Yes	
	No	32.76	33.9	66.67
	Yes	15.81	17.52	**33.33**
		48.52	51.42	

Prototype 2*

Search by Candidate Name		**Search by Party Name:** No	**Search by Party Name:** Yes	
	No	20.38	29.53	49.91
	Yes	28.68	21.42	**50.09**
		49.05	50.95	

* Prototype 1did not display the name of the first candidate in the label.

** Prototype 2 displayed the name of the first candidate in the label.

Table 3: Respondent's View on Candidate Search in Prototypes 1 & 2

"search for the list of candidates in Prototype 1 was easy"

Age	< 30	30-65	>65	Total
I am sure that is not the case	7.59	8.06	2.97	7.39
I think that is not the case	17.72	12.42	7.92	12.86
I think that is the case	24.05	30.97	37.62	30.49
I am sure that is the case	50.63	48.55	51.49	49.26

"search for the list of candidate in Prototype 2 was easy"

Age	< 30	30-65	>65	Total
I am sure that is not the case	2.69	7.91	5.04	6.39
I think that is not the case	7.69	12.52	11.51	11.31
I think that is the case	32.69	32.41	33.81	32.64
I am sure that is the case	56.92	47.04	49.64	49.57

Table 4: Vote Transition Matrix from *Diputados* to *Legisladores*: Percent of *Diputado* Vote Transferred to *Legislatura* Candidates by Party and Prototype. (Bold numbers indicate the percent of straight ticket voting)

From: Vote Diputados Nacionales		TO: Vote Local Legislature							
		Blank	***Others***	***UCR***	***ARI***	***FPV***	***PRO***	***Total***	***N***
Blank	Prototype 1	**79.82**	11.40	1.75	3.51	0.88	2.63	100	114
	Prototype 2	**65.05**	29.10	1.94	2.91	0.00	0.97	100	103
	Prototype 3	**53.61**	28.80	2.00	3.20	6.00	6.40	100	250
	Prototype 4	**87.50**	7.50	0.00	0.00	2.50	2.50	100	40
Others	Prototype 1	2.04	**84.76**	1.26	5.15	3.69	3.11	100	1030
	Prototype 2	3.19	**81.71**	2.18	6.30	3.11	3.50	100	1285
	Prototype 3	6.19	**78.23**	2.74	5.87	3.21	3.76	100	1277
	Prototype 4	1.43	**91.40**	1.08	2.51	0.36	3.23	100	279
UCR	Prototype 1	3.82	26.11	**59.24**	7.64	1.91	1.27	100	157
	Prototype 2	2.13	24.47	**60.11**	7.45	3.72	2.13	100	188
	Prototype 3	6.08	31.08	**52.71**	6.08	2.03	2.03	100	148
	Prototype 4	0.00	16.67	**83.30**	0.00	0.00	0.00	100	54
ARI	Prototype 1	2.45	19.74	2.74	**70.03**	1.30	3.75	100	694
	Prototype 2	2.68	24.27	3.66	**63.54**	2.32	3.54	100	820
	Prototype 3	6.43	23.23	1.98	**63.59**	1.81	2.97	100	607
	Prototype 4	1.08	13.98	1.61	**81.20**	1.08	1.08	100	186
FPV	Prototype 1	2.92	22.57	0.97	2.92	**68.68**	1.95	100	514
	Prototype 2	2.95	25.92	1.77	3.98	**62.89**	2.50	100	679
	Prototype 3	5.63	27.62	1.53	5.37	**57.29**	2.56	100	391
	Prototype 4	0.74	14.07	0.74	3.70	**80.70**	0.00	100	135
PRO	Prototype 1	2.92	10.69	1.53	3.33	1.94	**79.58**	100	720
	Prototype 2	4.13	16.92	1.71	3.42	2.11	**71.71**	100	993
	Prototype 3	5.03	17.09	0.84	3.69	2.01	**71.36**	100	597
	Prototype 4	0.77	5.36	0.38	1.53	0.77	**91.10**	100	261
Total Vote Share	Prototype 1	5.30	38.93	4.43	18.40	12.95	20.01	100	3229
	Prototype 2	4.79	41.03	4.97	16.72	12.64	19.86	100	4068
	Prototype 3	9.57	44.89	4.31	15.93	9.36	15.93	100	3270
	Prototype 4	4.61	34.14	5.55	17.49	12.04	26.18	100	955

Note: Vote transition matrix computed from individual level data (cross-tabulation). The category others includes 25 parties collecting close to 35% of the total *Diputados* vote and 40% of the *Legislador* vote.

Table 5: Multilevel Logistic Model of Split Ticket Choice, by Device and Party

Multilevel Logit Model 1, Random Intercept Model		Multilevel Logit Model 1, Random Intercept Model		Multilevel Logit Model 3, First Level			Multilevel Logit Model 3, Second Level, Varying Slopes		
First Level		*First Level*		*First Level*		*Second Level*			*SE*
Blanco	-1.100***	Blanco	-1.151***	Blanco	-1.200***	Search by Candidate	Prototype 1	0.700***	(0.210)
	(0.101)		(0.1007)		(0.101)		Prototype 2	0.11	(0.210)
UCR	-0.820***	UCR	-0.848***	UCR	-0.835***		Prototype 3	0.530***	(0.220)
	(0.096)		(0.09563)		(0.096)		Prototype 4	0.08	(0.260)
ARI	-1.15***	ARI	-1.166***	ARI	-1.149***				
	(0.058)		(0.05425)		(0.056)	Search by Logo	Prototype 1	-0.32	(0.330)
FPV	-1.08***	FPV	-1.058***	FPV	-1.066***		Prototype 2	0.36	(0.330)
	(0.061)		(0.06199)		(0.062)		Prototype 3	-0.580*	(0.340)
PRO	-1.58***	PRO	-1.59***	PRO	-1.568***		Prototype 4	-0.61	(0.390)
	(0.058)		(0.05681)		(0.058)				
Second Level		*Second Level*		Voting problems	0.0682	Search by Party Name	Prototype 1	-0.618***	(0.120)
Search by Party Logo	0.038	Prototype 1	0.2024***		(0.114)		Prototype 2	-0.21	(0.130)
	(0.217)		(0.04548)	Education	-0.135***		Prototype 3	-0.220*	(0.130)
Search by Candidate	0.500***	Prototype 2	-0.5529***		(0.042)		Prototype 4	-0.12	(0.160)
	(0.183)		(0.04281)	Sophisticate	-0.0726				
Search by List Number	-0.612**	Prototype 3	0.8374***		(0.077)	Search by Party Number	Prototype 1	-0.21	(0.180)
	(0.243)		(0.04471)	Time (LN)	0.464***		Prototype 2	0.27	(0.180)
Search by other	0.201	Prototype 4	-0.5536***		(0.086)		Prototype 3	0.560***	(0.190)
	(0.399)		(0.08699)	Constant	-0.920*		Prototype 4	0.35	(0.250)
Search by Party Name	-0.401**				(0.469)				
	(0.203)					Search by Others	Prototype 1	-0.045	(0.730)
Education	-0.230***			N-First Level	11471		Prototype 2	-0.549	(0.710)
	(0.033)			N-Sec. Level	120		Prototype 3	1.862***	(0.710)
Sophisticate	-0.077			N-Prototypes	4		Prototype 4	-0.933	(0.830)
	(0.090)								
Voting Problems	1.400***								
	(0.465)								
Time (ln)	0.440***								
	(0.051)								
Deviance	14130	Deviance	14190						

Note: Reported mean parameter values with standard deviations in parenthesis. To simplify interpretation we report standard deviations instead of the usual 80/20 intervals. *** p<.01, **p<.05, *p<.1.

Figure 1: The Four E-Vote Prototypes

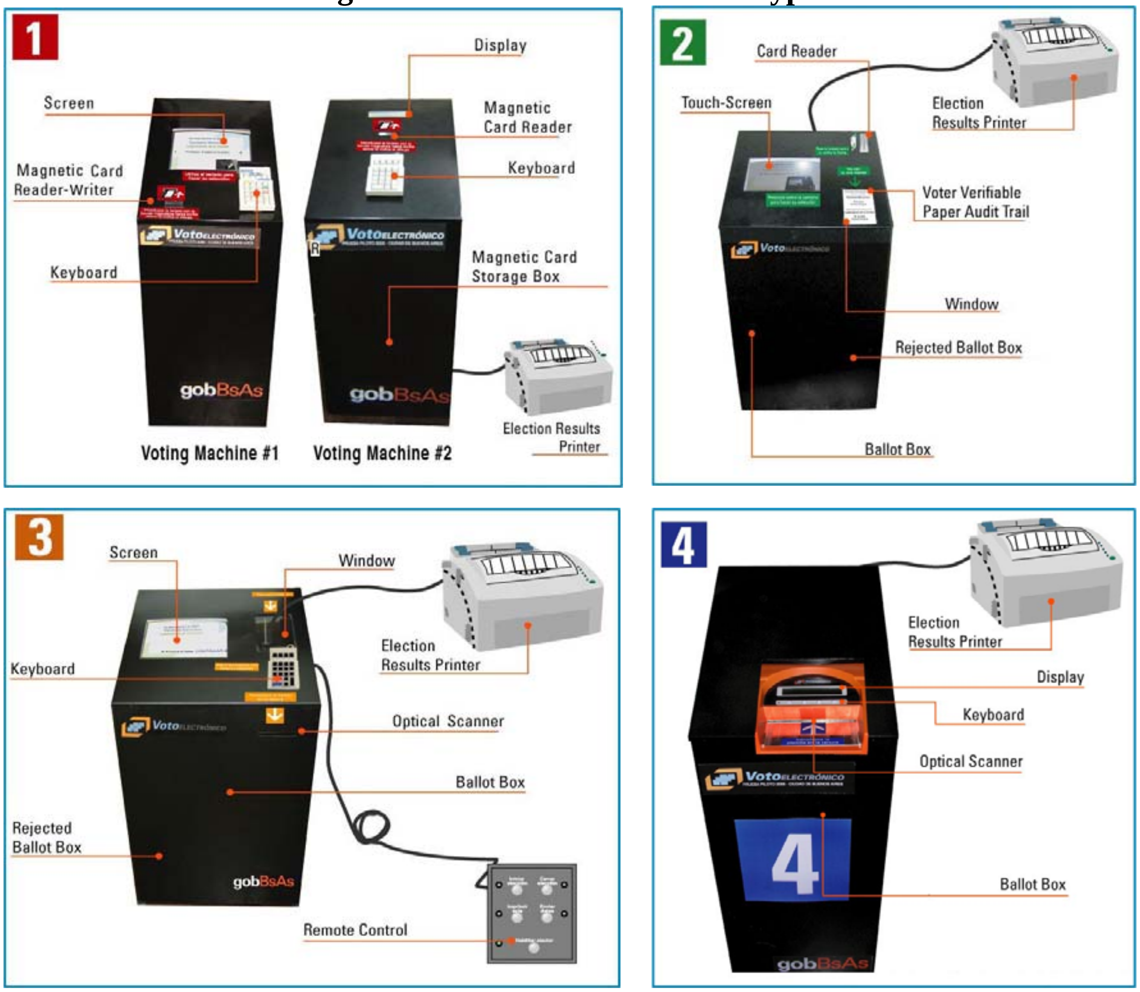
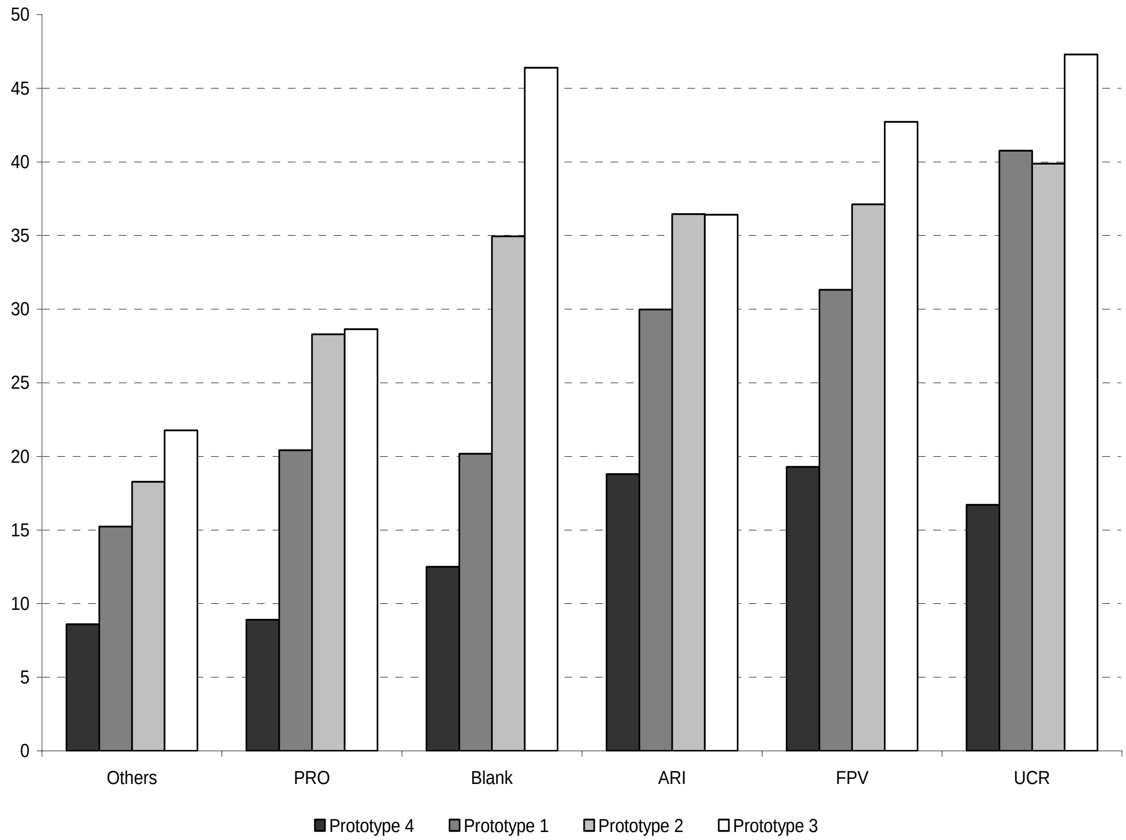
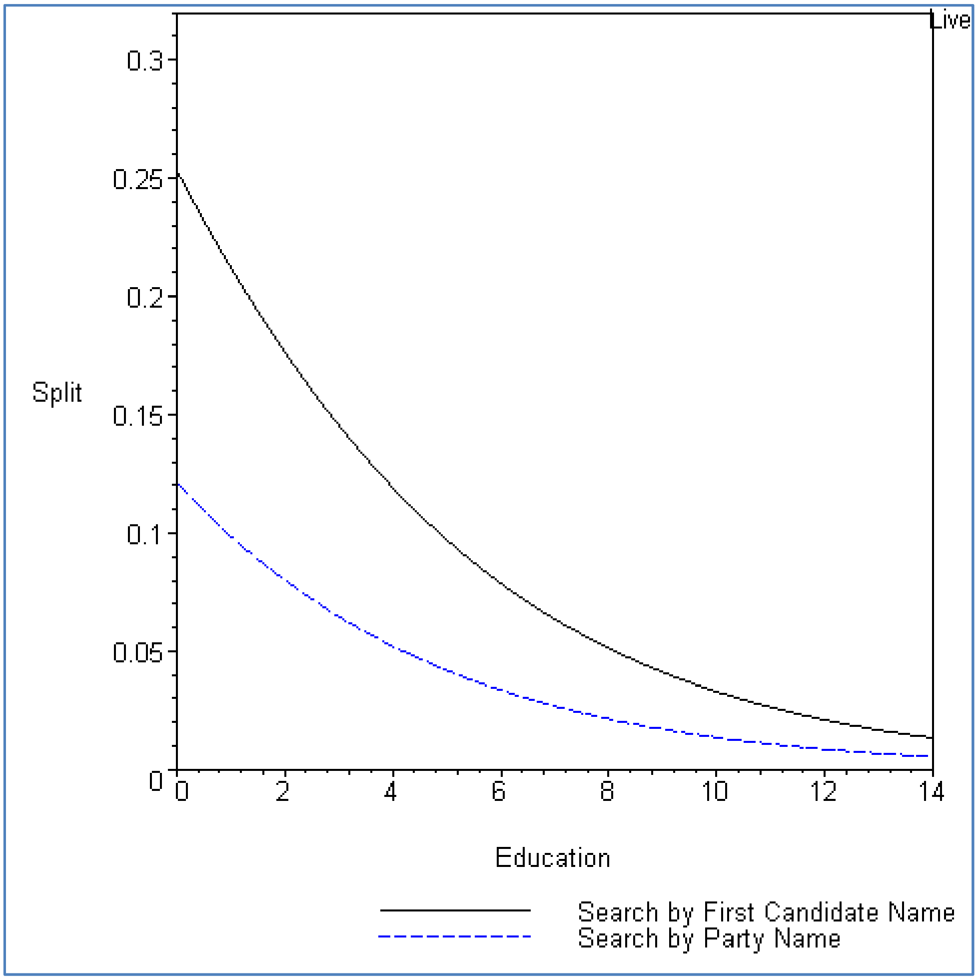


Figure 2: Percent of Participants that Split their Vote: by Party* and Prototype



* Voter's choice for the *National Diputados*.

Figure 3: Split-Ticket Vote by Type of Search and Education, FPV Voter



Note: Estimated probabilities from Model 1, Table 5.