Adding Ideology to the Equation: New Predictions for Election Results under Compulsory Voting *

Fernanda L L de Leon†
University of East Anglia

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Abstract

This paper provides new predictions for compulsory elections, taking into consideration the differences in ideological views between compulsory and voluntary voters. Having explored Brazil's dual voting system, I predict changes in Americans' preferences and estimate a voting model applied to US senatorial elections. I find that, if the current voting population had ideological preferences of a compulsory electorate, Democrats would gain 8.7 percentage points in their vote shares and win 68% of the elections. Moreover, candidates that are voted for less would be the ones that gain more votes under compulsory elections, while this system would be most detrimental for highly voted-for candidates. Another consequence includes the candidates' reaction while converging in the ideological spectrum.

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†Assistant Professor. School of Economics. University of East Anglia. E-mail: f.de-leon@uea.ac.uk

1 Introduction

"If America had compulsory voting, would Democrats win every election?" This question was posed by *The Economist* during the 2012 US Election, when discussing parties' efforts (like the voter-ID law) in manipulating voting turnout as an attempt to suppress the votes of the other side.[1] Such a controversial initiative leads society to question the value of a compulsory voting policy and the resulting election outcomes in a voting system in which full democracy is ensured. Common sense states that compulsory voting would benefit Democrats,[2] but this idea is not consensual among political scientists. In classical studies, Citrin et al. (2003) and Brunell and DiNardo (2004) predict modest changes in election results under full participation. More recent studies exploring exogenous variation in turnout, like weather conditions on Election Day, find that an increase in voter participation leads to a relevant increase in Democrats' vote share (Gomez and Hansford, 2010; Gomez, Hansford, Krause 2007).

This paper provides new predictions about election results under compulsory voting, looking at this issue from a new angle. I address the question of what the results would be in US elections if the current voting population had the ideological preferences of a compulsory electorate. For this purpose, I refer to the Brazilian experience. In Brazil, individuals between the ages of 16 and 18 or those older than 69 are entitled to vote but not required to do so, while those older than 18 and younger than 69 are legally required to vote. In Leon and Rizzi (2012), we conducted a survey on young adults exposed to either system, collecting information on their political behaviour, preferences, and information.

[1] The object of the study was a new law (proposed by Republicans) requiring voters to show an up-to-date identification card with an expiry date in Pennsylvania. While Republicans justify their initiative as a way to control election fraud, Democrats see it differently. According to them, the voters most likely to lack a drivers' license or other official ID are low-income black and Hispanics, who historically are more likely to vote for Democrats.

[2] Considering that non-voters systematically come from less-well-off demographics (blacks and minorities), and they tend to vote for Democrats.

I use this data for two purposes. First, I document information and ideological differences among voters under different systems - voluntary (henceforth, VV) and compulsory (henceforth, CV) - to give a sense of how the introduction of compulsory voting affects electorate behaviour. I compare voters in different electoral systems, but in the same country and election year, and control for a large number of individual characteristics to isolate the electoral system effect. The results are that CV voters are substantially less informed and more likely to be center-oriented (or moderate) than VV voters.

I then apply this insight to the American data, constructing counterfactual voters' preferences (i.e. the probability of being center-oriented) under either electoral regime. Information about ideological preferences and demographics is compatible with those of American surveys. Since the determinants of ideology are similar between Brazilians and Americans (as will be argued in Section 3), using the Brazilian experience as a counterfactual for the U.S. presents a valid approach. Using data from the 2000 and 2004 National Annenberg Election Survey (NAES), I estimate a model linking the electoral system (voluntary and compulsory), citizens' ideology and voters' candidate choice. Based on these estimates, I conduct counterfactuals for election results, assuming the change in voters' ideologies under compulsory elections. I find that, if voting was compulsory, Democrats' vote-share would increase on average by 8.7 percentage points and would win 68% of elections. In addition, one relevant pattern revealed in the data is that candidates who under the current system receive lower vote-shares would benefit from compulsory elections, while this system would be detrimental for highly voted-for candidates.

An important caveat to these results is that in the face of such drastic changes, Republicans might react to citizens' preferences in determining their policies and changing their own ideology. In Section 5.1, I estimate the relationship between the fractions of moderate citizens in the constituency on policy issues publicized on their TV political ads. For that, I use also data on 292,632 promotional ads assembled by the Campaign Media Analysis Group (CMAG). The findings are that an increase in the proportion of

moderates would lead a significant convergence in the policy space among candidates. This suggests that, under compulsory voting, other characteristics than ideology, such as candidates' charisma or looks, would become more important in explaining candidates' votes.

This paper proceeds in six sections. In Section 2, I review the literature. I explain the data and provide estimates for the effects of compulsory voting system on the electorates' behaviour and preferences in Section 3. In Section 4, I explain the econometric framework to make the counterfactuals for compulsory election in the US, and in Section 5, I describe the results. Section 6 concludes.

2 Literature Review

This paper investigates the effects of compulsory voting on the electorate, the relationship between voting system (compulsory and voluntary) and election results, and the patterns of elected candidates across systems. It relates to several works of literature.

Studies based on a cross-country analysis and laboratory experiments examine how compulsory voting correlates with population and electorate characteristics. Gordon and Segura (1997) and Berggren (2001) find that citizens living in CV countries are more informed than individuals living in VV countries. The same pattern is observed in the laboratory (Seebauer and Grosser 2006),[3] while studies based on an hypothetical compulsory voting scenario find no difference across voters in either system (Czesnik 2011).[4] This paper looks at differences among voters exposed to VV and CV in the same country and election- year. Hence, I can better isolate confounders associated to country-election year differences to draw a causal inference. Also, this data presents an advantage with respect to the laboratory experimental one , since it is based on real-life

[3]They find that subjects became significantly more likely to acquire costly information when assigned to compulsory elections than assigned to voluntary elections.

[4]Asking explicitly non-voters whom they would vote for if they participated in the election.

incentives. I use the same data as in Leon and Rizzi (2012), in which we document in a regression discontinuity framework that exposure to a compulsory election (as opposed to a voluntary system) does not lead to an increase in political information among this population. In this paper, I focus only on the group of voters to document differences among electorates.

This paper also relates to the literature that predicts US election results under high-turnout rates (consistent with those under compulsory voting). The results are mixed. While early studies conclude that changes in turnout would not cause significant changes in election outcomes (Citrin et al. 2003; Brunell and DiNardo 2004; Highton and Wolfinger 2001),[5] others predict important changes (Martinez and Gill 2005; Gomez, Hansford and Krause 2007; Hansford and Gomez 2010).

Gomez, Hansford and Krause (2007) and Hansford and Gomez (2010) explore weather conditions on Election Day to establish a causal relationship between voting participation and candidate choice. They find that bad weather leads to less voting participation and helps republicans gain votes. Hansford and Gomez (2010) use an IV approach, explaining US presidential candidates' vote share with county turnout, that is instrumented by Election Day rainfall. They predict that a 4% change in turnout leads to a change in Democrats' vote share at the national level of just less than one percentage point. Although very persuasive, these estimates represent local average treatment average effects on individuals who react to the instrument (weather condition) in turning out to vote (Imbens and Angrist, 1994.) It is difficult to extrapolate this causal effect for the whole population of non-voters and use these estimates to guess election results under compulsory voting (Angrist and Pischke 2009).

[5] Citrin et al. (2003) and Brunell and DiNardo (2004) predict ballot choices of non-voters based on choice of voters with similar demographics, and then forecast election results under full participation. Their modest findings related to turnout effects might be driven by their counterfactual. Non-voters differ from voters not only in demographics, but also in their ideological preferences (Martinez and Gill 2005) and possibly in other unobservable characteristics. As pointed out by Brunell and DiNardo (2004), "This is the most significant limitation of this framework or any other framework that is unable to utilize credibly exogenous variation in voter participation".

In this paper, I propose an alternative approach by asking how people would vote if they had the same ideological preferences as compulsory voters. To the best of my knowledge, this perspective is new. I explain choices and election results in 64 senatorial elections and, hence, can draw inferences about patterns of elected candidates under either electoral system. Although the conventional wisdom is that high turnout benefits Democrats, the theory (DeNardo 1980) and evidence (DeNardo 1980, Nagel and McNulty 1996, Hansford and Gomez 2010) are in line with heterogeneous turnout effects based on the party composition of the electorate, and favouring the minority party. The economic literature, on the other hand, is concerned with identifying the electoral system that provides more welfare to the population, assuming rational and pivotal voters (Feddersen and Pesendorfer, 1997; Borges, 2004; Ghosal and Lockwood, 2009, Krasa and Polborn 2009; Krishna and Morgan, 2011). At least two of them focus on a less controversial environment where there is an ideological majority among potential voters, and voters do not face uncertainty about candidates and reach different welfare conclusions.[6] Overall, the literature, based on game-theory models, does not have a sole and definitive answer regarding whether compulsory or voluntary voting is the most desirable system in society.

[6]Krasa and Polborn (2009) assume an environment where voters do not face uncertainty on candidates' characteristics, only on their voting costs, and decide their votes based on ideology. They show that mandatory voting outperforms voluntary voting if the expected absolute sizes of the candidates' supporters groups are sufficiently different. In contrast, Krishna and Morgan (2011) add competence as an extra dimension to politicians' characteristics. They assume that voters always choose candidates based on an ideological basis and show that, under voluntary and costly voting, turnout adjusts endogenously (as voters on different ideological sides perceive different values in electing their part), so the most competent candidate is always elected. Under a compulsory system, on the other hand, elections are decided purely on an ideological basis and differently from VV, so voting welfare is not always maximized.

3 Data

This paper uses data from three sources. To understand the association between voters' ideology and electoral systems, I use data from Leon and Rizzi (2012). We conducted a survey among Brazilian young adults during the 2010 Presidential Elections. In this paper, I use data from a sample of 2,653 voters who, at the time of the survey, were exposed to VV or CV systems. Details about the implementation of the survey are explained in that paper.

Data from the 2000 and 2004 American Elections are about citizens' characteristics (demographics and ideology), their voting choices on Senatorial elections, and US Senate candidates' ideological positioning. Data on American voters is gathered from the National Annenberg Election Study (NAES).[7] Information about issues advertised by senatorial candidates comes from Campaign Media Analysis Group (CMAG), based on the content of 292,632 TV promotional political ads. Table A1 in the Appendix presents summary statistics of the main variables considered in the paper.

3.1 The Brazilian Lesson: Voters in Compulsory and Voluntary Systems

The CV system is in place in 14.5% of the world's countries; it is a controversial matter in that it brings better election outcomes in counting the ballots of those that otherwise would rather abstain from the political process. As mentioned, Brazil has a dual voting system; individuals between 16 and 18 years old or those older than 69 are entitled to vote but not required to, while those older than 18 and younger than 69 are

[7]The NAES has a panel and a rolling cross-section sample. The former sample is smaller and collects data on actual voting based on interviews conducted after Election Day. This sample is used to estimate the determinants of voters' choices of candidates. The cross-section sample is larger and is used to estimate citizens' ideological preferences at the state level. These in turn are used to explain candidates' degree of convergence (to be explained in Section 5.1). As pointed out by Lovett and Peress (2010), this sample is large enough to estimate the distribution of constituency characteristics within a state.

legally required to vote. In Leon and Rizzi (2012), we conducted a survey during the week following the 2010 Brazilian Presidential Election among high school and college students who are exposed to either electoral system - voluntary or compulsory.

The survey consisted of a comprehensive set of demographic and political preference questions and a quiz to evaluate respondents' levels of political information. In this section, I examine five main political outcome variables. The first set of outcomes is based on respondents' actual knowledge about politics, measured by the performance in the political quiz. First, I consider the proportion of correct answers (quiz score). The second outcome is an indicator of whether the voter correctly identified the political party of his chosen candidate (knows the chosen candidate party). The third outcome is an indicator of whether the voter correctly identified the political party of his chosen candidate's running mate (knows the running mate's party). The second set is based on ideological outcomes. In addition to their self-reported political orientation (left-, center, or right-wing), I consider whether the respondent has a preference for a particular political party.

To document differences related to the electoral system, I estimate (1) for the sample of voters in the 2010 Election.[8]

$$Outcome_i = \beta X_i + \alpha Compulsory_i + \epsilon_i \tag{1}$$

The dependent variable is the political outcome of voter i. A dummy, denoted by α, indicates whether the voter is in a compulsory as opposed to a voluntary voting system. Since, by definition, compulsory voters are older and age correlates with political behaviour, I include controls for year-of-birth, year-of-birth squared. Other controls include indicators for church attendance, race, gender, and income. Standard errors are robust to heteroskedasticiy.

[8]In this sample, voting over-reporting does not seem to be a concern, as documented and explained in Leon and Rizzi (2012). Aggregate turnout rates are very similar to the official ones, and retrospective votes (reported by older students about previous participation in elections) are close to current turnout (reported by younger students about participation in the current election).

Table 2 presents estimates for α on several political outcomes. CV voters are less informed than VV voters. Their performance in the political quiz demonstrates a 3% lower performance than that of voluntary voters. Their votes are also less knowledgeable; they are 4.82% less likely to identify the party of the chosen candidate and 8.92% less likely to identify the party of their chosen candidate's running mate. Compulsory voters are also less politically polarized than others. Table 2 shows that they are 8.44% less likely to declare a preference for a political party and are 8.55% more likely to self-declare as moderate than other voters. Contrary to common sense, the change in ideology between the VV and CV electorate does not seem to occur in a way that increases the fraction of left-wing voters, as shown in row (6). As a robustness check, in row (8), I present results from an ordered logit, in which the dependent variable assumes value 1 for left-wing, 2 for moderate, and 3 for right wing. Although the coefficient related to compulsory voters is negative, suggestive that under this system voters are concentrated in the left side in an ideological spectrum, the coefficient is not statistically significant.

In summary, voters in a compulsory system are less informed and more center-oriented (or moderate)[9] than those in a voluntary system. For the remainder of the paper, I propose a model linking voters' ideology to voting choices, using as a key explanatory variable, a prediction for their chance to self-declare as moderate.[10]

[9] I refer to center-oriented and moderate as the same ideology and use these terms interchangeably in the paper.

[10] Some readers may question this paper's approach in focusing on ideological differences. It is possible that CV and VV voters differ in many other traits that determine their candidate choice. For example, voters' degree of knowledge is a determinant of their candidate choice (Banerjee et al., 2010). Nonetheless, only ideological information in the Brazilian survey is compatible with information from American surveys and hence used in this exercise.

4 Econometric Framework

Building on Citrin *et al.* (2003), I explain individual i's choice of voting for a Democrat in a senatorial race j in election season t, ($VoteDem_{ijt}^{system}$), focusing on the sample of self-declared non-voters. The candidate choice is determined by a set of individual characteristics - age, education, whether the voter lives in an urban area, income, marital status, and union status - represented by vector Z_i and by state-fixed effects (θ_s).

Adding to the framework of Citrin et al. (2003), I assume that this decision also depends on voters' ideology, represented by the likelihood of self-declaring as moderate ($PModerate_i^{system}$). This probability varies according to electoral system - voluntary or compulsory - and it is the channel by which election results depend on the electoral system. To get better predictions on how moderates evaluate candidates, I allow for a flexible specification, including controls for interactions of state indicators with the ideology prediction ($\sum_s \pi_s \cdot PModerate^{system} \cdot \theta_s$) and interactions of state indicators with the probability of being moderate in the 2000 Election ($\sum_s \varphi_s PModerate_i^{system} \cdot \theta_s \cdot Election_{2000}$). This set of variables accounts for heterogeneity in moderates' perception across a pair of candidates faced in a race, and hence to some candidates' characteristics (e.g. charisma) that may be more distinguishable among moderates. The model is estimated using the ideology prediction under voluntary voting (the system in vogue in the US during the 2002 and 2004 elections).

$$\begin{aligned} VoteDem_{ijt}^{system} &= \delta Z_i + \alpha PModerate_i^{system} + \theta_s + \sum_s \pi_s PModerate_i^{system} \cdot \theta_s + \\ &\quad \sum_s \varphi_s PModerate_i^{system} \cdot \theta_s \cdot Election_{2000} + \varepsilon_{irt} \end{aligned} \tag{2}$$

The probability of voting Democrat ($VoteDem^{system}$) is derived based on integration over ε_{irt}, where $\Phi(z) = \frac{e^z}{1+e^z}$ denotes the respective logistic cdf. The parameters associated to voters' preferences (α, π_s and φ_s) are identified based on longitudinal

variation across voters' characteristics between the 2000 and 2004 elections. Using the ideology prediction (instead of actual ideology) enables me to conduct counterfactuals and circumvent the endogeneity between voting choice and citizens' ideology.[11] As will be explained in Section 4.0.1, the variable $PModerate_i^{system}$ is determined by a weighted average of three individuals' characteristics: gender, race, and church attendance. While the first two variables are fixed, the fraction of individuals that do not frequent church in the US increased from 17.1% to 21.5%, from 2000 to 2004. This change constituted an exogeneous and increased shift on individuals' probability of assuming a moderate position. It identifies relationships between ideology and votes, similar to an instrumental variable approach. Before turning to the results, I explain in detail how the variable $PModerate_i^{system}$ is constructed.

4.0.1 Relationship between Ideology and Electoral System

To predict the relationship between individuals' ideology and electoral system, I use Brazilian data and estimate a multinomial logit model, assuming that the choice process is determined by (3).[12]

$$Ideology^{system}(J) = \beta_J X_i + \gamma_J Compulsory_i + \eta_i \ , \tag{3}$$

$$J = \{left, moderate, right\}$$

[11] The reverse causal channel of ideology being determined by vote choice is possible. For example, Mullainathan and Washington (2009) find that voting choice affects the future evaluation of candidates.

[12] It is easier to understand the relationships stated in (2) in a more aggregated context (population rather than individual). A more natural specification for individuals' ideological choice would assume heterogeneous effects among voters or non-voters. Then it would be considered how the exposure to the compulsory system affects each of these two types. A challenge to this approach is data over-reporting in the NAES, since only 10% of the samples self-declare as non-voters. If VV voters are less affected by the obligation to vote than non-voters, in considering heterogeneous effects, I would be underestimating the impact of the compulsory voting legislation on the preferences of the population.

The relevant variable is a dummy indicating whether the voter has the legal requirement to vote ($Compulsory_i$). Other controls are represented by X_i. The unobservable component (η_i) is assumed to be drawn from a type I extreme value distribution. The probabilities of ideology positioning are derived based on integration over η_i, where $\Phi(z) = \frac{\eta^z}{1+\eta^z}$ denotes the respective cdf. To determine voters' likelihood of assuming a moderate orientation, I use coefficients in (3) and American voters' characteristics X_i^{us}, as described in (4) and (5). Equation (2) is estimated using (4) and the NAES cross-sectional data.

$$PModerate_i^{VV} = \Phi(\beta_{MOD} X_i^{us}) \quad (4)$$

$$PModerate_i^{CV} = \Phi(\beta_{MOD} X_i^{us} + \gamma_{MOD}) \quad (5)$$

In this approach, a critical empirical choice relates to X_i. Ideally, it has to have explanatory power and be such that Brazilian and Americans resemble each other regarding their ideological choice. Following these criteria, I include indicators for gender, race, and church attendance.[13] To demonstrate that these variables follow these conditions, Table 3 shows the association between ideology and demographics for voters in the US and in Brazil. Although the magnitude of coefficients differs across country samples, their signs suggest that similar relationships are observed between ideology and chosen characteristics for the US and Brazil. Females are more likely to self-report to be left-wing and are less likely to self-report being right-wing. One the other hand, those who never attend church are less likely to self-report to be right-wing and are more likely to self-report being left-wing. Although the sign of coefficients suggests that the correlation between whites and the likelihood of being moderate or left-wings are the same in Brazil and US, only in the NAES are the coefficients statistically significant.

[13] An important possible confounding aspect is aging effects. In alternative regressions, I explain ideology as also including controls for age. The size and significance of γ_J is very similar under this specification. The choice to exclude this variable was made due to the fact that the samples from Brazil and the US are composed of citizens of different ages.

Table 4 shows the distribution of individuals according to their predicted probabilities of being moderate. For the sake of comparison, Column 1 describes the predictions using the coefficients between ideology and demographics estimated in the American data ($\beta^{US}_{VV,MOD}X^{us}_i$). Column 2 presents the relationships estimated in the Brazilian data ($\beta^{BR}_{VV,MOD}X^{us}_i$, used in the analysis). Measures in Column 1 and 2 are close, but Column 2 predicts a large fraction of moderate voters (between 53% and 58%). Column 3 shows the distribution for compulsory voting (using the Brazilian relationships, $\beta^{BR}_{CV,MOD}X^{us}_i$.) A shift up in individuals' probability of assuming a moderate ideology is noticeable, with the fraction of individuals with a chance of being moderate between 44% to 53% increasing from 7.61% to 53.96% and with the chance of being moderate between 53% and 58.5% increasing from zero to 7.61%.

5 Election Results under Compulsory Elections

Table 5 reports model results. As a check, I compare this model with the one using the specification from Citrin et al. (2003.) The inclusion of ideology variables increases the prediction power of the model. The specification (2), presented in Table 5 achieved a higher R-square (10.31 vs. 7.51), and F-tests reject the hypothesis of no joint significance of ideology variables, at the 1% level of significance, demonstrating the relevance of these controls.

Based on coefficients estimated in (2), I predict probabilities of votes for a Democrat candidate, exogenously changing the predicted ideology for both voluntary and compulsory systems. For counterfactual exercises, I assume that the estimated relationships would remain the same under either regime and that only a fraction of ideological groups would change, affecting voters' preferences. Then, I aggregated individuals' estimated probabilities by race-election weighting each individual by his relative frequency in the NAES cross section,[14] as recommended by Train (2009).

Turning to the results, if the current voting population had the ideological prefer-

[14]The weights were based on combinations of age, education, and household income.

ences of a compulsory electorate, Democrats would gain an average of 8.7 p.p. to their vote shares and would win (i.e. obtain more than 50% of votes) in 68% (=44/64) of the compulsory elections, as opposed to 43.75% (=28/64) as predicted for voluntary elections. They actually won 48.4% (=31/64) of total races. The actual value and predictions for Democrats' vote share in the 2000 and 2004 senatorial race are reported in Table A2 in the Appendix.

In Figure 1, I present the data sorted by predicted vote share for voluntary voting to ease the comparison with compulsory voting predictions. It shows (and more formal analysis confirms) that candidates with expected lower vote shares are the ones that benefit more from compulsory elections.[15] These are mostly Democrats that run for elections in red states like Wyoming, Indiana, and Mississippi. It is possible that Democrats that self-select to run for election in "*safe Republican*" states are weaker than other Democrats (those in *toss-up* state, for example.) This finding is also in line with the "Two-effect hypothesis" proposed by DeNardo (1980). According to this concept, higher turnout helps the minority party within an electorate, since this is the affiliation of "peripheral" voters (those who vote occasionally). The mechanism driving these results are that, under compulsory voting, peripheral voters or moderates become a larger fraction of the electorate.

According to this paper's predictions, in the 2000 Wyoming election, the Democrat challenger, mine worker and first-time runner Mel Logan, would obtain 54.8% of total votes and beat the Republican incumbent Craig Thomas, a hard-core conservative according to *On The Issues*'s ratings.[16] Figure 1 also shows that those with higher vote share are the ones who lose more votes under compulsory elections (but still would win the election). According to the model, the Democrat incumbent Ron Wyden would see

[15] The same relationship is observed using actual vote shares.

[16] This is a non-profit and non-partisan organization (http://www.ontheissues.org). They rate candidates' ideologies based on information from newspapers, speeches, press releases, book excerpts, House and Senate voting records, Congressional bill sponsorships, political affiliations and ratings, and campaign websites from the Internet.

his vote share decrease from 72.5% in CV to 64.4% in VV, but would still beat the Republican candidate Al King. There are still some cases in which the voting system would not make a difference in deciding the election outcome or candidates' vote share. One example is the 2000 New York election, a high-profile open race in which Hillary Clinton run against Rick Lazio and won the election.

Overall, the predicted changes in election outcomes, had the electorate changed their preferences, are large. If voting became compulsory in the US, most likely, Republicans would react in determining their agenda.[17] To provide some support to this statement, I estimate the relationship between constituencies' ideology and the senatorial candidates' degree of convergence on policy issues.

5.1 The Case of Strategic Candidates

Using information on candidates' advertised on 50 policy issues (e.g. education, health care, national security) to promote themselves in TV political ads,[18] I calculate candidates' ideological convergence like in (6).

$$Converge_{ct} = \sum_{issue}^{e} Min[(A_{rt}(D), A_{rj}(R)]/T_{ct}, c = \{D, R\} \tag{6}$$

Where $A_{rt}(D)$ and $A_{rt}(R)$ denotes, respectively, the total time devoted to issue e by the Democrat and the Republican in their campaign in race r, election t. T_c is the total time devoted to issue e by candidate c. The variable $Converge_{ct}$ can vary between 1 (in case both candidates spent the same amount of time in every issue) and 0 (in case neither candidate spent any time in any of the same issues). Its value increases the degree of resemblance of a candidate's campaign with the opposing candidate.[19]

[17] This conjecture is consistent with many political economy models. Perhaps the most renowned of all is the median voter theorem (Downs 1957) that the states in which the outcome most preferred by the median voter is selected in a majority voting system.

[18] CMAG codes political advertisement tone into three categories: promotion, comparison, or attack. I use information on promoting ads as they are more informative about candidates' agenda.

[19] The measure in (6) follows closely the one put forward by Sigelman and Buell (2004). The main

During political campaigns, candidates anticipate the consequences of their campaign actions in terms of votes. One reasonable approach to account for this is to explain candidates' decision with the expected election result, but this would lead to biased estimates due to an endogeneity problem.[20] In this paper, I only estimate a reduced form equation explaining candidates' convergence in terms of pre-determined characteristics that correlates with vote share. These are the predicted fractions of moderate citizens in the state ($FractionModerates_{ct}$), an indicator for the Democrat candidate ($Democrat_{ct}$), constituency characteristics, determined by demographics (X_{rt}), state fixed effects (θ_s) and a random component (υ_{crt}),as described in (7).

$$Converge_{crt} = \varphi FractionModerates_{ct} + \beta X_{rt} + \delta Democrat_{ct} + \theta_s + \upsilon_{crt} \qquad (7)$$

Table 7, Column 1 presents the results. The coefficient φ is positive and statistically significant at the 12% level. This suggests that candidates react by converging in the ideological space to the fraction of moderates in the constituency. The magnitude of φ is such that an increase in one standard deviation in the predicted proportion of moderates leads candidates to increase the fraction of the same advertised policy issues in 0.36%, or 1.24 standard deviations. This reaction does not differ by political party, as revealed by the fact that coefficient δ is not statistically significant. In Column 2, I present estimates using as a control variable the actual proportion of moderates. The coefficient φ is also positive and statistically significant at the 5% level. It has a similar magnitude of the estimates in Column 1.

difference is that the one in (6) is constructed at the candidate level, while their measure is defined at the race level.

[20]In an earlier version, I estimate a model that enables votes to correlate with candidates' policy platforms. I find that the Republican "base" reacts to the convergence measure. Predicted right-wing-oriented voters become less likely to vote Democrat when the Republican candidate converges with his or her opponent. These are available under request.

6 Conclusion

The effects of full democracy present a crucial question in political science. This paper contributes to the discussion, providing new predictions about election results under compulsory voting. I find that, if the current voting population had ideological preferences of a compulsory electorate, Democrats would win 68% of the time in senatorial elections and on average would add 8.7 percentage points in their vote share.

The stronger argument among advocates of compulsory voting is that it is distributive, as discussed in the classic paper by Lijphart (1997). Non-voters systematically come from less-well-off demographics (blacks and minorities), and they tend to vote for Democrats. This paper abstains from this discussion, by "fixing demographic characteristics" and only varying ideological preferences among the electorate. However, it reaches the same conclusions. It reinforces previous findings in the literature using different data and methodology, both in supporting the turnout effect favouring Democrats and predicting heterogeneous turnout effects based on the party composition of the electorate (Hansford and Gomez 2010, DeNardo 1980, Nagel and McNulty 1996.)

I also find that candidates who under the current system receive lower vote-shares would benefit from compulsory elections, while this system would be detrimental for highly voted-for candidates. To some extent, vote-share correlates with candidates' "quality", and the change in electoral system can make elections noisier, as forced voters are less informed than voluntary voters, as shown in this paper. This is visible with the disproportional gain (loss) in votes among low (high) voted-for candidates that are in the tails on the voting distribution.

Finally, this paper only illustrates part of the compulsory voting picture. This analysis, as in the previous literature, does not take into account that politicians will react to the preferences of the new electorate. As demonstrated in this paper, based on historical data, candidates converge in an ideological spectrum with the increase in the proportion of moderates. For a new CV electorate, other candidate characteristics, like charisma or looks, may play a bigger role than ideology, and candidates may compete

and differentiate themselves in other dimensions than ideology.

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Figure 1 - Democrat Predicted Vote Share by Senatorial Election and Electoral System

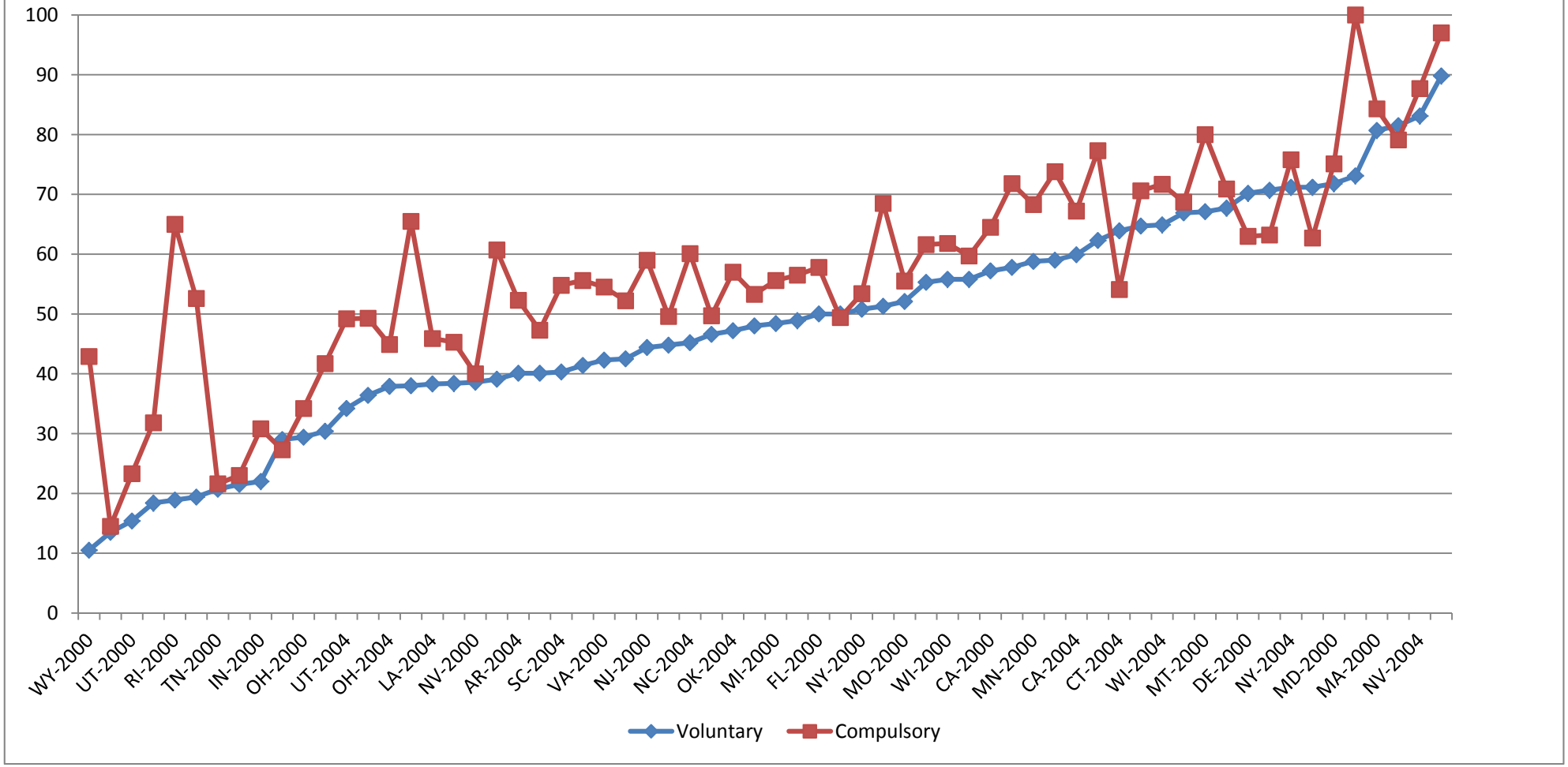

Table 1 - Differences Among Voters under Compulsory and Voluntary System
Coefficient on Indicador for Voter under Compulsory System

		Mean Value for VV voter	coefficient	stand error	obs
	Dependent variables				
[1]	Political Quiz (% correct answers)	0.626	-0.0302	0.0121**	2689
[2]	Knows chosen candidate party	0.9845	-0.0482	0.0101**	2402
[3]	Knows running mate party	0.3144	-0.0892	0.0387**	2402
[4]	Preference for a Political Party	0.477	-0.0844	0.0393*	2676
[5]	Left-wing	0.2477	-0.0524	0.0347	2663
[6]	Moderate	0.4189	0.0855	0.0389**	2663
[7]	Right-wing	0.3333	-0.033	0.037	2663
[8]	Ideology (ordered logit)		-0.0367	0.1611	2663

Notes: 1) All rows, but the last, bring OLS estimates for separate regressions. The last row brings estimates from an ordered logit model. The variable ideology assumes values 1, 2 and 3 in case the self-reported ideology is left-, moderate or right-wing, respectively.
2) All regressions include controls for date of birth, date of birth squared, and indicators for church attendance, race, gender, and income. 3) *Significant at the 10 percent level, **Significant at the 5 percent level.

Table 2 - Relationship between Ideology and Demographics in Brazil and US

	Sample of Voters	
	Brazil	US
Dependent Variable: Left-wing		
Female	-0.0182	0.0885
	[0.01659]	[0.01035]**
White	-0.0119	-0.0602
	[0.0204]	[0.0123]**
Never attend church	0.0748	0.2296
	[0.0162]**	[0.0108]**
N	2786	12196
R2	0.0089	0.0619
Dependent Variable: Moderate		
Female	0.0893	-0.0285
	[0.0192]**	[0.0124]**
White	-0.0685	-0.0319
	[0.0235]**	[0.0180]*
Never attend church	-0.0245	-0.0192
	[0.0190]	[0.0132]
N	2786	11922
R2	0.0116	0.01
Dependent Variable: Right-wing		
Female	-0.0711	-0.0567
	[0.0177]**	[0.0107]**
White	0.0804	0.0855
	[0.0202]**	[0.0157]**
Never attend church	-0.0503	-0.2045
	[0.0173]**	[0.0109]**
N	2786	11922
R2	0.0116	0.0498

Notes: 1) Columns bring OLS estimates for separate regressions. Robust standard errors are in brackets.
2) *Significant at the 10 percent level, **Significant at the 5 percent level.

Table 3 - Distribution of Predicted Probability of Self-declaring Moderate by Electoral System

	Method (Voting System)		
Predicted Probability of self-declaring Moderate	β(US)*Xus (VV) [1]	β(Brazil)*Xus (VV) [2]	(CV) [3]
34% to 37%	38.55	38.43	0
37% to 44%	61.45	53.96	38.43
44% to 53%	0	7.61	53.96
53% to 58.5%	0	0	7.61

Note: Explanations are in the text.

Table 4- Determinants of Vote for a Democrat

Predicted Probability of Self-declaring Moderate	42.994
	[0.6376]**
Demographics	yes
State-fixed effects	yes
State fixed effect x Predicted Probability of Moderate	yes
State fixed effect x Predicted Probability of Moderate x 2000 Election	yes
P-value (F-stat: State fixed effect x Predicted Probability of Moderate=0)	0.0000
P-value (F-stat: State fixed effect x Predicted Probability of Moderate x 2000 Election=0)	0.0000
R2	0.1031
N	8668

Note: 1) Entries are OLS estimates. Demographic controls include indicators for education, income, age, marital status and union status.
2) Stardard error clustered at the state level is in brackets, **Significant at the 5 percent level.

Table 5 - Determinants of Candidates' Ideology Convergence

	[1]	[2]
Predicted Proportion of Moderate Citizens	27.226	
	[17.395]	
Actual Proportion of Moderate Citizens		14.616
		[4.846]**
Democrat	0.015	0.018
	[0.0567]	[0.0536]
R2	0.5032	0.5591
N	86	86

Notes: 1) Entries are OLS estimates. Explanation about the dependent variable is in the text. 2) Regressions include controls include proportion of females, and state fixed effects and Total number of ads. 2) **Significant at the 5 percent level.

Table A1 - Summary Statistics

	mean	stand deviation	min	max	obs
Leon and Rizzi (2012) sample - Brazilian voters					
Female	0.5801	0.4936	0	1	2944
Never Attend Church	0.4955	0.5000	0	1	2944
White	0.7847	0.4109	0	1	2944
Year of Birth	1990.89	2.273	1952	1994	2944
Voters under voluntary voting system					
Political Quiz (% correct answers)	57.28	17.16	0	100	354
Knows chosen candidate party	0.9559	0.2054	0	1	354
Knows running mate party	0.2578	0.4381	0	1	354
Left-wing	0.2244	0.4178	0	1	354
Center	0.5451	0.4986	0	1	354
Right-wing	0.2303	0.4216	0	1	354
Voters under compulsory voting system					
Political Quiz (% correct answers)	59.36	17.95	0	1	2590
Knows chosen candidate party	0.9401	0.2372	0	1	2323
Knows running mate party	0.2182	0.4131	0	1	2323
Left-wing	0.2378	0.4258	0	1	2560
Center	0.4781	0.4996	0	1	2560
Right-wing	0.2839	0.4510	0	1	2560
NAES - Cross Sectional Component					
Female	0.5532	0.4971	0	1	139795
Never Attend Church	0.1734	0.3786	0	1	138012
White	0.8636	0.3431	0	1	134059
Age	47.01	16.6	18	97	138230
NAES - Panel Component					
Female	0.5592	0.4965	0	1	10861
Never Attend Church	0.1788	0.3832	0	1	10786
White	0.8809	0.3239	0	1	10756
Age	50.01	16.07	18	97	10798
Voted for a Democrat	0.4793	0.4996	0	1	6371
CMAG					
Convergence	0.3451	0.2828	0	1	86
Democrat candidate	0.5000	0.5029	0	1	86

Table 2A- Actual and Estimated Democrat Vote Share (in %)

		Actual	Predicted Ideology		
state	year	Vote share	Voluntary (A)	Compulsory (B)	(B) - (A)
CA	2000	55.8	57.2	64.5	7.3
CT	2000	63.2	70.7	63.2	-7.5
DE	2000	55.5	70.2	63	-7.2
FL	2000	51	50	57.8	7.8
GA	2000	58	57.8	71.8	14
IN	2000	31.9	22	30.8	8.8
MA	2000	72.9	80.7	84.3	3.6
MD	2000	63.2	71.8	75.1	3.3
ME	2000	31.1	13.5	14.5	1
MI	2000	49.4	48.4	55.6	7.2
MN	2000	48.8	58.8	68.3	9.5
MO	2000	50.4	52.1	55.5	3.4
MS	2000	31.6	38	65.5	27.5
MT	2000	47.2	67.1	80	12.9
ND	2000	61.4	50	49.4	-0.6
NE	2000	51	46.6	49.7	3.1
NJ	2000	50.1	44.4	59	14.6
NM	2000	61.7	62.3	77.3	15
NV	2000	39.7	38.6	40	1.4
NY	2000	55	50.8	53.4	2.6
OH	2000	35.9	29.4	34.2	4.8
PA	2000	45.5	38.4	45.3	6.9
RI	2000	41.1	18.9	65	46.1
TN	2000	32.2	20.7	21.6	0.9
TX	2000	32.3	30.4	41.7	11.3
UT	2000	31.5	15.4	23.3	7.9
VA	2000	47.7	42.3	54.5	12.2
VT	2000	25.4	18.4	31.8	13.4
WA	2000	48.7	44.8	49.6	4.8
WI	2000	61.5	55.8	61.8	6
WV	2000	77.7	81.5	79.1	-2.4
WY	2000	22	10.5	42.9	32.4
AL	2004	32	42.5	52.2	9.7
AR	2004	56	40.1	52.3	12.2
AZ	2004	21	21.5	23	1.5
CA	2004	57.7	59.9	67.2	7.3
CO	2004	51.3	55.3	61.6	6.3
CT	2004	66.4	63.9	54.1	-9.8
FL	2004	48.3	48.9	56.5	7.6
GA	2004	40	36.4	49.3	12.9
IA	2004	27.9	29	27.3	-1.7
ID	2004	0.01	19.4	52.6	33.2
IL	2004	70	64.7	70.6	5.9
IN	2004	62	59	73.8	14.8
KS	2004	28	39.1	60.7	21.6
KY	2004	49	51.3	68.5	17.2
LA	2004	29	38.3	45.9	7.6
MD	2004	64.8	67.7	70.9	3.2
MO	2004	42.8	55.8	59.7	3.9
NC	2004	47	45.2	60.1	14.9
ND	2004	68	66.9	68.7	1.8
NH	2004	34	41.4	55.6	14.2
NV	2004	61.1	83.1	87.7	4.6
NY	2004	71.16	71.2	75.8	4.6
OH	2004	36.1	37.9	44.9	7
OK	2004	41.2	47.2	57	9.8
OR	2004	63.4	71.2	62.7	-8.5
PA	2004	42	40.1	47.3	7.2
SC	2004	44.1	40.3	54.8	14.5
SD	2004	49.4	73.1	100	26.9
UT	2004	28.4	34.2	49.2	15
VT	2004	70.6	89.8	97	7.2
WA	2004	55	48	53.3	5.3
WI	2004	55.4	64.9	71.7	6.8