Voting Costs and Voter Turnout in Competitive Elections

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August 27, 2010

Abstract

How different are voters in competitive elections from voters in uncompetitive elections? If voters in competitive elections are treated differently by politicians, if they respond to different stimuli, and if their voting calculus is different, then how much can we learn from studies that ignore the heterogeneity of effects by electoral context? This paper suggests that as elections become more competitive fewer voters are on the fence about their decision to vote or abstain. One consequence of this is that small changes to the voting calculus will not affect turnout in competitive elections. After developing the theory, we turn to a voting cost that is randomly assigned and exogenous to politics - Election Day rain storms. We find that this small cost impacts turnout rates only in elections that are not competitive. The implication of this work is that few inferences can be made about voting behavior in close elections from research conducted using uncompetitive elections alone.

*The authors thank Stephen Ansolabehere, Matt Clifford, Claudine Gay, Justin Grimmer, Sunshine Hillygus, Gary King, Ronald Lai, Gabe Lenz, Patrick Lam, Adam Okulicz-Kozaryn, and Miya Woolfalk, as well as Brad Gomez, Thomas Hansford, and George Krause for their helpful comments. They also thank Brad Gomez, Thomas Hansford, George Krause, and James Campbell for sharing data.

In an uncompetitive region of an uncompetitive state, a shark attack evidently caused some citizens to vote against the incumbent President in 1916 (Achen and Bartels 2004). If generalizable, then elections can be determined by events far outside a leader's control. Or, is this merely an example of unsought-after votes shifting in an inconsequential manner? In dozens of field experiments in which get-out-the-vote mailers were sent to non-targeted random citizens in mostly uncompetitive contests, turnout increased by a few percentage points (see Gerber, Green, and Larimer 2008). If generalizable, then campaigns have but a tiny influence on elections. Or, do such field experiments not at all resemble voter mobilization in close contests? A rainstorm can depress turnout (Gomez, Hansford, and Krause 2007). If generalizable, elections can be decided by idiosyncratic random events. Or, is such an effect limited to jurisdictions in which the election outcome is not in question?

Answers to these questions hinge on the assumption of homogeneous treatment effects across types of elections. If compared to voters in uncompetitive contests, voters in competitive elections are treated differently by politicians, or respond to different stimuli, or have a different voting calculus, then many claims about why people vote the way they do may not be applicable in all circumstances. As is well known, but not universally accounted for in the literature on voting, effects that are heterogeneous with respect to electoral context can make the difference between a result that calls democracy into question and one that is politically irrelevant.

In this paper, we ask whether voters residing in competitive electoral contexts respond differently than other voters when a randomly-assigned cost is imposed on them. Our theoretical discussion suggests that as elections become more competitive, fewer and fewer voters are indecisive about their turnout decision, and consequently a minor cost will not impact many voters. Conversely, when elections are not close, a small cost can have a great impact on turnout, but not enough to tip the election outcome. We conjecture that political campaigns, by reducing costs to voters and increasing the salience of a close election, facilitate

this heterogeneous effect. In Presidential elections in particular, the Electoral College provides candidates with a strong incentive to run campaigns in a few states and ignore voters in most states. We test our theory by treating Election Day rain storms as a random nuisance that can affect a citizen's decision to vote (see Hansford and Gomez 2010). We estimate the relationship between rain and turnout in a series of Presidential elections and measure how the relationship varies with electoral context.

Our evidence suggests that some combination of campaign engagement and voter interest make elections in competitive contexts very different than elections in uncompetitive contexts. Rain storms depress turnout *on average*, but this is not the case when elections are close. The result is a simple but clear illustration of the need for greater attention to heterogeneous treatment effects in electoral studies. We suggest that any number of influences that might affect a citizen's vote choice in an uncompetitive race may have no influence at all on a citizen in a close election.

1 Costs, Campaigns and the Voting Calculus

An individual's decision to vote is often characterized by a calculation of costs and benefits. If the benefits of voting outweigh the costs, one votes; otherwise, one abstains (Downs 1957). When costs rise, such as when onerous registration requirements are imposed, participation rates decline (Wolfinger and Rosenstone 1980, Aldrich 1993). Voters are sensitive to changes in costs since voting is neither a very costly activity nor a very beneficial one - each person's decision to vote or abstain is, in his or her own mind, of minuscule consequence (Aldrich 1993). Because the stakes are so low, small changes to the cost-benefit calculation can have significant effects on turnout rates.

The supposed sensitivity of voters to costs and benefits suggests that election outcomes may be determined by idiosyncratic rules like registration requirements (Wolfinger and

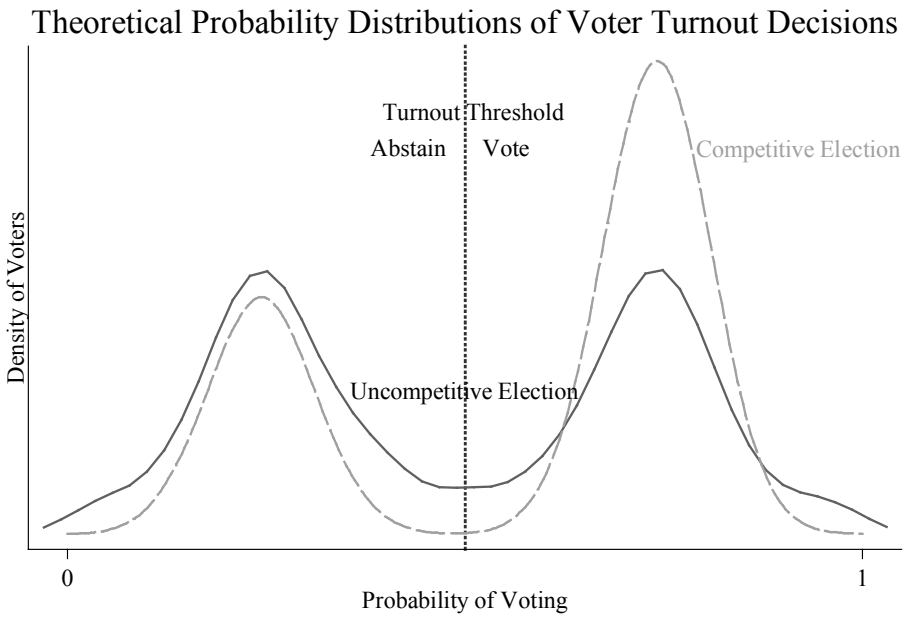
Rosenstone 1980) and by random events like a rainy day (Gomez, Hansford and Krause 2007). These sorts of events could add just enough of a penalty to voting such that a substantial number of citizens may abstain. If this line of theorizing is correct, it is indeed concerning that democracy seems to be at the mercy of rather minor and even random events.

But perhaps citizens are only sensitive to minor costs when their votes are not sought-after by campaigns. Consider a simple propensity model in which an increasing interest in the election raises a citizen's likelihood of voting. If the propensity crosses a critical threshold, then the citizen votes; otherwise she abstains. A cost may be introduced that will lower the citizen's propensity to vote. If the presence or absence of the cost changes the citizen's decision to vote or abstain, then the cost may be thought to affect the citizen's vote choice. Otherwise, it is inconsequential. A propensity model of voting is at the foundation of individual-level turnout equations in which a logit or probit regression is employed to predict participation.

At first glance, it appears that as elections become more closely contested, small costs and benefits become more important to outcomes. After all, the voters who are hovering around the critical threshold have a greater chance of making a difference as the margin of victory decreases. Consider the *uncompetitive* distribution in Figure 1, denoted by a solid line. In this election, 50% of the voters are on the "vote" side of the threshold and are therefore predicted to cast their ballots. The 50% of voters on the left of the threshold will likely abstain. As for the non-trivial number of voters clustered around the threshold point, a small change to the cost-benefit model can have a impact on their turnout, which could tip the election in a close contest.

In the second distribution of voters depicted if Figure 1, the voters who were previously on the fence about voting have shifted to the right; they will now vote with near certainty. If a small cost is imposed such that all citizens uniformly experience a 1% decrease in their

Figure 1:



likelihood of voting, few if any citizens would switch from "vote" to "abstain" because so few have turnout propensities near the threshold of indecision. Thus, if voters are distributed in this fashion in a close contest, a small cost or benefit would not likely tip the race.

In the limit, it is undeniably true that as an election becomes more and more competitive, it becomes more likely that a small or random factor will tip the balance. In an election decided by one vote, surely there will be any number of registered voters for whom if something about their day had been different they would have switched from voting to abstaining or vice-versa. The argument pursued here is that there is a counteractive force in elections. In the limit, as a high-stakes race like a Presidential contest becomes more competitive in a particular place, voter interest is piqued and campaigns on the ground work tirelessly so as to avoid the election being decided by a random event or a minor nuisance.

As indicated in Figure 1, we suggest that as an election becomes more competitive, the citizenry is distributed with fewer and fewer voters on the fence in their decision to vote or

abstain. If we are correct, then contrary to Aldrich's (1993) generally useful insight, a small change to the voting calculus will not affect many voters in close contests and therefore a small change is unlikely to affect election outcomes. Two features of elections suggest that voters in competitive races will be distributed as predicted in Figure 1 and so will be less affected by minor costs. The first is that when campaigns engage voters by mobilizing supporters and by garnering media attention, voter interest in campaigns increases. The second is that campaigns will respond directly to voting costs in jurisdictions in which they are active. These two processes lead to fewer voters distributed near the turnout decision threshold and lower costs to voting for citizens in competitive jurisdictions.

1.1 In Competitive Elections, Turnout Decisions are More Stable and Costs are Lower

Voters in closely contested elections accumulate information about the candidates and the race (Gimpel, Kaufmann and Pearson-Merkowitz. 2007, Hill and McKee 2005, Gerber, Green, and Panagopoulos 2005). Media focuses on the campaigns, and voters have the opportunity to develop an interest in the contest. Furthermore, campaigns raise interest by mobilizing voters, reminding them to turn out and persuading them to vote for their respective candidates. Where campaigns are most active, voters will learn which of the candidates is most consistent with their own "enlightened preferences" (Gelman and King 1993).

Whereas in non-competitive elections marginal voters may be clustered around the turnout decision threshold, when campaigns are active, fewer voters are on the fence about their decision to vote. Indeed, the most obvious reason for why citizens may be on the fence about voting in the first place is that no one is informing them and no one is appealing to them. A feeling of civic duty may pull the citizen to consider voting, but without being bom-

barded with information about the race, other priorities may overcome the duty imperative. Where information and appeals are plentiful, most voters will become sufficiently interested in voting or remain sufficiently disinterested.

Not only does voter interest increase in the presence of campaigns, but participatory costs decrease. In the weeks and months preceding an election in a competitive jurisdiction, campaigns build a mobilization infrastructure. They help citizens register to vote. They inform registrants about the date of election and location of the polling station. They offer rides to the polls. They study voter registration records to identify the infrequent voters who will need the most attention. Thus, quite apart from voter's own interest, a great number of voting costs are reduced by the presence of campaigns. Except for the limited number of factors that simply cannot be addressed by campaigns, campaigns will exert great effort to help citizens overcome costs to voting, large and small.

Because of the institution of the Electoral College, there are stark differences in how campaigns interact with voters across states in Presidential contests. In such contests, the fifty U.S. states are divided by the campaigns into "safe" states that do not merit attention and "swing" states that are winnable by either campaign. In their strategic allocation of time and resources, campaigns must ignore many states and dedicate their money and staff support to just a few places. States that the campaigns consider safe receive negligible amounts of TV ads, campaign phone calls, mailers, and visits by the candidates (Shaw 2006, Hillygus and Monson 2009). As one stark example of this, none of the Presidential and Vice-Presidential candidates set foot in about half the states in the 2000 and 2004 general election campaigns. But in these two campaigns, the major candidates visited the battleground state of Florida a combined 131 times (Shaw 2006).

Building on several decades of campaign research, we have suggested that few voters are undecided about the turnout decision in competitive elections. Importantly, this claim does not imply anything about turnout rates across electoral environments, though turnout

does seem to be higher in swing states (Aldrich 1993; Hill and McKee 2005; Lipsitz 2008; Rosenstone and Hansen 1993, 181; Schachar and Nalebuff 1999; Wolak 2006). Turnout rates can actually be the same in two contexts even if the distribution of turnout propensities are different. The distribution of propensities is itself important because if voters in competitive environments are distributed more like in the proposed distribution in Figure 1, then election outcomes are much less likely to be susceptible to small changes in costs. Small changes will only affect voters in places where the election outcome is not in question or where the outcome is not important enough to the media or political parties to merit attention.

Unfortunately, it is very difficult to measure an individual citizen's propensity to vote in an election. Given the trouble voters have in reporting past voting behavior in surveys (Silver, Anderson, and Abramson 1986), it is unlikely that their reported certainty about their intention to vote in a future election will be particularly reliable. Indirect measurement, however, strongly confirms our basic insight. In his work on habitual voting, Fowler (2006) shows that citizens are quite set in their tendencies either to vote or abstain. Most citizens always vote or always abstain. In other words, if past vote frequency is treated as a proxy for turnout propensity, then voters are distributed in a bimodal fashion just as Figure 1 suggests. In spite of the difficulty in adequately measuring vote propensities, the empirical implication of alternative distributions we have posited is clear. (1) If in competitive elections few voters are uncertain about their turnout decision on Election Day, then if a random event like a rain storm shifts the propensity to vote down by a small degree, voter turnout will not be affected. (2) If in an uncompetitive election many voters are uncertain about their propensity to vote, then a sudden downpour will keep on-the-fence voters at home. These constitute the key hypotheses we will test.

1.2 Rain as a Randomly Assigned Voting Cost

Election Day rain presents a small but perceptible obstacle to voters and thus has been thought to reduce voter turnout. Furthermore, after controlling for typical weather patterns in a jurisdiction, whether or not it actually rains on Election Day is random. While we cannot assign voting jurisdictions to a competitive or uncompetitive electoral environment, we can treat bad weather as a randomly assigned cost to participation and observe how turnout is affected in competitive places versus uncompetitive places.

Gomez, Hansford, and Krause (2007) estimate that, on average, an inch of rainfall can reduce turnout in a county by almost one percentage point. Gomez and his colleagues used new tools to estimate weather's effect, including spatial geographical information system (GIS) technology to measure county-level precipitation rates based on reports from over 20,000 weather stations. The result is a much more plausible measure of the effect of weather than previous research provided.[1]

As with other voting costs, once a campaign has a staff, an army of volunteers, and a GOTV plan in place in a state, it can respond to the hassle of Election Day storms. In fact, some campaigns go so far as to plan for bad weather well in advance of Election Day. To get a sense of campaign strategy in this domain, we spoke with a paid staffer from Hillary Clinton's 2008 Presidential primary campaign, who was involved in the GOTV operation in the crucial state of Iowa. Weeks in advance of the Iowa caucuses, the Clinton campaign bought shovels for every Iowa precinct - a pricey investment. Campaign volunteers were instructed to make sure the sidewalks were clean of snow and to offer to shovel driveways for supporters. The campaign also provided rides to citizens who did not want to drive in

[1] Prior to this 2007 study, political scientists found inconclusive evidence of a negative impact of weather on turnout. Merging county-level weather reports with individual-level data from the National Election Studies, Knack (1994) finds no effect on turnout and no partisan impact from rain. Matsusaka and Palda (1999) investigate the impact of extreme temperatures in Canadian elections and also find no effect. Merrifield (1993) and Schachar and Nalebuff (1999), on the other hand, do find that rain is negatively related to turnout in U.S. elections, but their results must be discounted due to their very blunt and unreliable measure of precipitation: rainfall in each state's largest city.

bad weather and babysitters for those who had children at home.

When asked why the campaign made this extraordinary effort before even knowing whether it would snow on the night of the caucuses, the staffer replied, "Because it's January. And it's Iowa." In a closely fought election where poor weather can be a serious factor, the campaigns build into their budget and strategy a plan to counteract weather. The high-stakes and frigid Iowa caucus may be an extreme case, but even in competitive states where the weather is less predictable than Iowa in January, campaigns have field offices and scores of volunteers who can intensify their GOTV drive to counteract the effects of a sudden rain or snow storm. As for the Clinton campaign's response to bad weather in other states, the staffer recalled that there was terrible rain and snow during the Virginia primary, but there the campaign did not make any special effort to compensate for the weather. This decision is not surprising under our theory, given that Senator Obama was leading Senator Clinton by about twenty points in the Virginia polls.

The benefits that come along with residing in a swing state - engagement with the contest, information about the election, mobilization by the campaigns, shovels, umbrellas and rides to the polls - result in weather not being a factor in these states. Campaigns may even overcompensate for poor weather with overwhelming get-out-the-vote (GOTV) drives when it rains or snows to make sure that voters won't be deterred from the polls. As with other participatory costs, bad weather should not be expected to negatively affect voters in competitive places.

The crux of our argument is that none of the mobilization, engagement and response to Election Day costs that come along with swing state campaigns applies to the safe states. Campaigns are unlikely to expend any kind of effort if rain or snow falls in a safe state. They will not respond to minor voter registration or administrative nuisances either. Indeed, campaigns have no infrastructure in these states to make such an effort. In the absence of heightened mobilization and voter engagement, turnout will be depressed by small costs like

poor weather. Because a change in turnout of even a few percentage points will not be nearly enough to swing the election in safe states, neither voters nor campaigns will be animated to compensate for the loss of votes.

In sum, the random assignment of Election Day rainstorms helps to gauge whether close elections and unclose elections are particularly comparable. If there is something about competitive elections – whether campaign activity or voter engagement or a combination of the two – that makes voters capable of responding to a random cost in one environment but not the other, then this calls into question an array of estimated effects thought to be applicable to elections of varying degrees of competitiveness. If voters in different electoral contexts fail to react the same way to the rain, then serious doubt should meet claims that they will react the same way to campaign appeals, economic factors, or other treatments commonly tested in the literature.

We have presented an argument for why we think the case for homogeneity of treatments across electoral contexts is implausible. The competing claim is one of minimal effects. This argument holds that closeness, competitiveness, and campaigns do not have meaningful influences in election outcomes, and therefore what is true in a less competitive environment is likely to be true in a more competitive one. The data to which we now turn will help to resolve this debate.

2 Methodology

Our estimation approach builds off of the methodology and data used by Gomez, Hansford, and Krause (2007), adding measures of electoral closeness in order to focus on how our randomly assigned cost (rain) has a different impact depending on the electoral environment. The dependent variable is the number of votes for President cast in a county divided by the Voting Age Population of that county. The data include county-level returns in Presidential

elections 1948-2000, leaving out Hawaii and Alaska because these states were not part of the union prior to 1959 and leaving out Oregon in 2000, since it switched to a widely utilized vote-by-mail system.

Gomez, Hansford, and Krause provide two measures of county rainfall and snowfall: the number of inches of rain or snow in each county on Election Day, and the number of inches of rain or snow in deviation from normal conditions in that county on the particular date of the election. Their analysis prefers the latter measure, while we use the former, for two reasons. First, in nearly every county deviation from normal rain is negative if actual rainfall is 0, making substantive interpretation of rainfall more complicated. Second, although Gomez, Hansford, and Krause assert that citizens in jurisdictions with more rain may be less deterred from voting due to the weather, we do not want to set up our model with this assertion established beforehand. Instead, we use the average amount of rain received by a jurisdiction as a control variable in our model.[2]

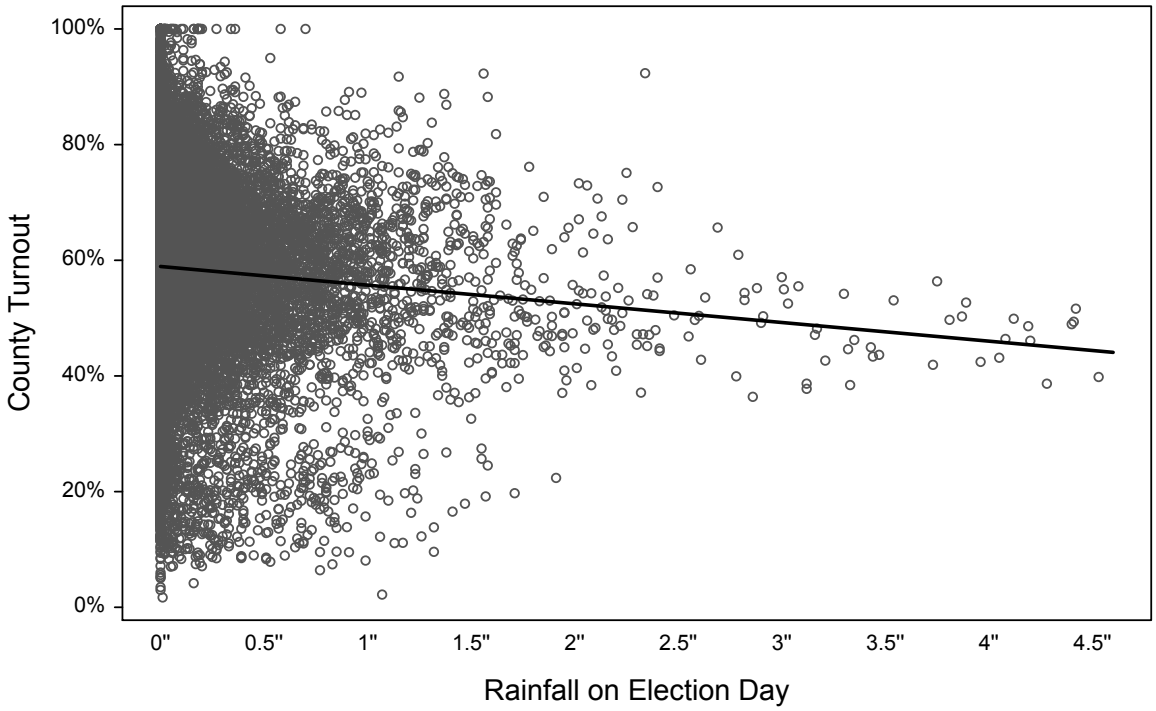
The bivariate relationship between rain and turnout indicates that rain serves as a cost, depressing turnout a small amount on average. Figure 2 fits a regression line with a simple linear model using turnout as the dependent variable and rainfall as the sole independent variable. The downward slope demonstrates that, at the county level, an increase in rainfall leads to a decrease in participation, even without accounting for the myriad of other factors that contribute to the voting calculus.

While Figure 2 would seem to suggest inclement weather deters voters, much variation is left unaccounted for. In our full regression models, we include a set of control variables with the goal of eliminating election-specific variation in turnout not attributable to the weather. These include county-level measures of average income, percent high school graduates, percent black, number of farms per capita,[3] and indicators for whether the county in

[2]Models run using the Rain Deviation measure have the same substantive result.

[3]It can be argued that this variable does not belong in the model. Because farms are likely to be located in favorable climates and because climate is causally prior to farm locations, this variable corrupts the model

Figure 2: Bivariate Relationship between Rain and Turnout



a particular year required a poll tax, a literacy test, or a property requirement. Following Gomez, Hansford and Krause, we include a measure of how far ahead of the election citizens are required to register, whether a state has a motor-voter law in each year, indicators for the presence of a gubernatorial or senatorial race on the ballot, and the turnout level in the previous Presidential contest.

2.1 Measuring Electoral Closeness

There are two common ways to measure electoral closeness: *ex post* estimates and *ex ante* estimates. An *ex post* measure relies on post-election data such as the actual margin of victory in each state. About 70% of political science articles that study closeness utilize

by introducing post-treatment bias. Because running our statistical tests with and without this control does not change the substantive result, we have opted to leave the farms per capita variable in our model to be consistent with previous scholarship.

this kind of measure (Geys 2006; see, for example, Caldeira and Patterson 1982, Cox and Munger 1989, Settle and Abrams 1976). An *ex ante* measure relies on pre-election opinion polls, previous election outcomes in the state, the normal vote, or subjective methods such as reports from campaign strategists about the states each campaign actively contested (see, for example, Hill and McKee 2005, Lipsitz 2008, Shaw 1999, Shaw 2006, Wolak 2006).

For the present study, there are advantages to using each kind of measure, and so we show results from models using both, demonstrating that the substantive conclusion is the same in either case. For an *ex ante* measure, we use state-by-state predictions from Campbell, Ali, and Jalalzai's (2005) Presidential forecasting model, which is an updated version of Campbell's (1992) earlier forecasting work. The model provides a prediction of the two-party Democratic vote share in each state for each election. We transform the predicted Democratic vote share into a variable that ranges from 0 (least competitive) to 1 (most competitive) by performing the following operation: competitiveness $= 1 - |(\text{predicted Dem share} - 0.5) * 2|$, with a measure of 0 equivalent to 100% of the vote going to the winning candidate and 0% to the losing candidate. A measure of .95 is equivalent to a 5% margin of victory, or the two-party vote share splitting 52.5% to 47.5%.[4] For an *ex post* measure, we perform the same operation on the actual Democratic share of the two-party vote in each state for each election.[5] We perform the same transformation as with the *ex ante* competitiveness measure. The correlation between the two measures is .81.

While the *ex ante* measure has the advantage of being estimated ahead of each election,

[4]Three state elections cause problems for this *ex ante* variable. For Alabama in 1948 and Alabama in 1964, no national Democrat was on the Presidential ballot. In the 1960 Mississippi presidential election, a plurality of voters selected "Unpledged," rather than selecting a candidate. Because the forecasting model requires the state election result from the previous three elections in order to calculate a prediction, six other state/year combinations are missing as well. For these six elections (Alabama in 1952, 1956, 1968, and 1972; Mississippi in 1964 and 1968), we impute a value based on the actual Democratic vote share garnered in those elections. For all other state/years, we use the transformation of the prediction.

[5]Because the effect of rain and snow on vote share is on the magnitude of no more than a couple percentage points in the most extreme weather scenario, there is no great concern that weather conditions make states substantially more or less competitive as measured by an *ex post* variable.

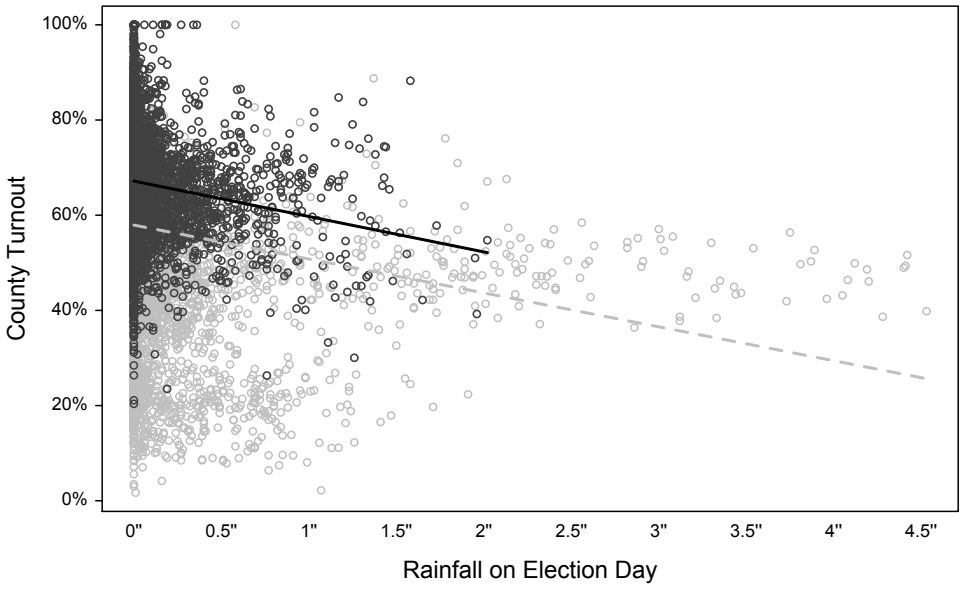
predicted competitiveness has disadvantages. First, forecasting models have a particularly difficult time predicting how states will vote in turbulent periods when entire regions of the country experience party realignments (Campbell, Ali, and Jalalzai 2005). There are enough far-off predictions in the Campbell, Ali, and Jalalzai (2005) forecasts (as well as in other forecasting models) to affect the results in some of our statistical analyses. Second, the *ex ante* measure does not take into account any campaign activity by design (see Gelman and King 1993), meaning that any attempt by campaigns to make races more contested than economic or demographic conditions would suggest is not incorporated into the model. While we show estimates from models using both competitiveness measures, it is our sense that the actual election result in the state provides a better proxy for how competitive the election actually was than the pre-election predictions. Thus we will focus our attention on the models that utilize this *ex post* measure.

As a final note, academics and pundits focus on *how* competitive a state is, but it is plausible to think voters and campaigns are more concerned with whether or not their state is considered "battleground," aside from the magnitude of competitiveness. Shaw (2006) constructs an indicator for whether at least one Presidential campaign considered a state do be a battleground state as a measure of competitiveness. Linking Shaw's measure of battleground status to *ex post* competitiveness, the average margin of victory in a battleground state is 5.72%, with a lower quartile of 8%. A non-battleground state averages a 15.59% margin of victory, with an interquartile range of 21% to 7.89%. Given that many factors produce closer margins of victory than expected by campaigns (but not necessarily by voters), we can be reasonably confident that our measures of competitiveness are compatible with subjective understandings of how contested a state is in a given election. As the Shaw variable only exists for the 1988-2000 subset of the data, we opt not to use this more course measure in our models.

Figures 3 and 4 split the county-level dataset into uncompetitive and competitive states,

here defined as those states where the margin of victory is 20% or greater for Figure 3 and 5% or less in Figure 4. As southern states are often noted to have distinct participatory patterns, particularly before the fall of Jim Crow, these plots show a separate regression line with the South included as a dashed gray line, and Southern counties shown in lighter gray.[6] Here we begin to see evidence for a differential impact of costs in competitive and uncompetitive environments, with voters in uncompetitive counties more susceptible to rain-induced low turnout than those in competitive states. Again, however, a full model is necessary to interpret whether this effect is simply an artifact of unaccounted-for variation.

Figure 3: Bivariate Relationship between Rain and Turnout, Uncompetitive States

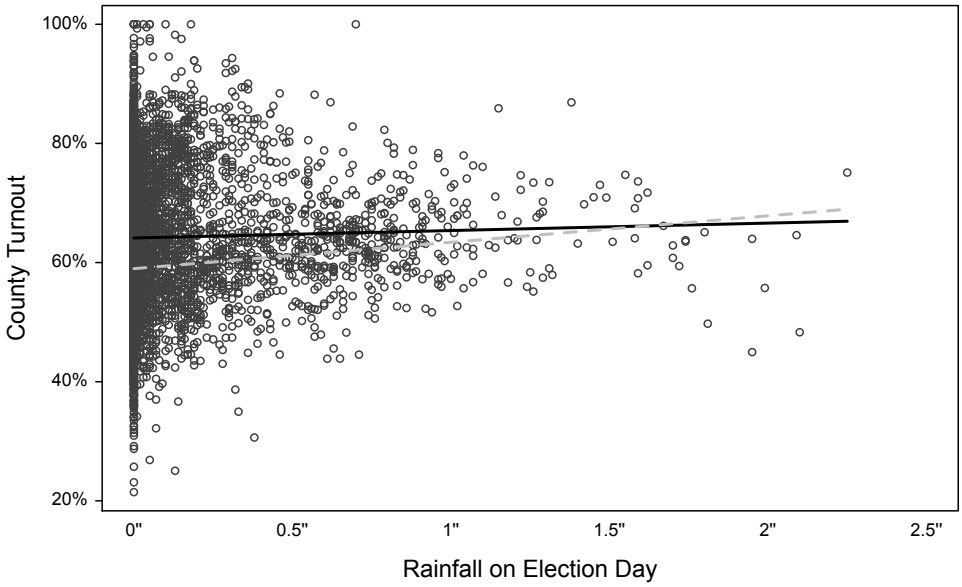


2.2 How Random is Rainfall?

While Election Day rainfall is a cost exogenous to the political system, the distribution of rainfall across the nation follows predictable patterns based on climate. Adding the average

[6]Competitive southern counties are occluded by competitive non-southern counties in Figure 4, but are included in the model.

Figure 4: Bivariate Relationship between Rain and Turnout, Competitive States



amount of rain received by a jurisdiction on election day would seem to account for most of this variation. As an additional robustness check, we use Coarsened Exact Matching (CEM, Iacus, King, and Porro 2009) to ensure our treatment (rained) and control (did not rain) groups are balanced on this important covariate.[7] Matching trims six treated observations, all from three counties in the Olympic Peninsula region of Washington, each of which average 0.45 inches of rain or more on election day. As one of the few regions of the nation with a temperate rain forest, and having the highest average rain of any set of counties in the dataset, it is not especially surprising that these observations do not have viable pairings. Because November 3rd appears as a particularly high rain day on average for these counties, no comparable non-treated match can be made.[8]

[7]With such a large number of covariates at our disposal, matching on all variables would seem to be attractive. However, this ignores the time-series cross-sectional nature of our data, as every county has 14 separate observations. We can produce no theory that says that after controlling for average rain and ensuring each treated county has a matched untreated county, any other variables should impact assignment to the treatment group.

[8]No time-series match could be made for these observations because it rained on the same day of the year (November 3) in both the 1964 and 1992 elections. The removal of these counties does not substantively change our results, however, they are excluded in the results presented below for methodological consistency.

After matching, our treatment group consists of 16,448 observations, while our control group has 26,886 observations. The mean level of turnout in the treatment group is 58.5%, slightly lower (as expected) than the control group, at 58.7%. The mean value of the average rain variable is 0.091 in the treatment group, and 0.089 in the control group, again conforming to our expectations but demonstrating that the groups are sufficiently comparable.

2.3 Results from the Turnout Model

The data consist of fourteen time units, with each time period including 3,114 county cross-sectional units.[9] We use a linear mixed-effects approach to generate estimates from this dataset, which includes random effects for each county and fixed effects for each election year. These effects are included in an attempt to mitigate systematic between-county and between-election variation. We add our measures of competitiveness both as a main effect and in interaction terms with the rain and snow deviation variables. This enables us to gauge the impact of the random cost on turnout in close versus landslide contests.

In Table 1, we estimate the effect of inclement weather on county-level turnout in the two electoral environments.[10] We show four variations of the result, all of which utilize the rain and snow deviation variables that are described above. In Models 1 and 2, we use the *ex post* competitiveness variable; in Models 3 and 4, we use the *ex ante* competitiveness variable. We show results with and without control variables.

Looking across the four models in Table 1, the estimates tell the same story. The positive coefficient on the competitiveness variable indicates that turnout is higher in counties situated in competitive states, a finding consistent with the literature on electoral closeness. The negative coefficients on rain and snow indicate that in an uncompetitive environment,

[9] Counties in Alabama in 1948 and 1964 and Mississippi in 1960 are not included, as the national democratic party candidate was not on the ballot in these states

[10] We use the the `ls.mixed` command in the `Zelig` package of `R` to generate these estimates (see Bailey and Alimadhi (2007) and Imai, King, and Lau (2008)).

Table 1: Impact of Competitiveness and Inclement Weather on Turnout

Dep Var: County Turnout	**Model 1**	**Model 2**	**Model 3**	**Model 4**
	ex post	***ex post***	***ex ante***	***ex ante***
	Competitive	**Competitive**	**Competitive**	**Competitive**
Independent Variables	**(Reduced)**	**(Full)**	**(Reduced)**	**(Full)**
Competitiveness	**3.296**	**2.840**	**0.810**	-0.308
	(0.239)	(0.248)	(0.286)	(0.299)
Rain × Competitiveness	**6.318**	**5.913**	**9.018**	**8.124**
	(0.577)	(0.562)	(0.799)	(0.776)
Snow × Competitiveness	0.144	1.574	-2.255	-0.200
	(0.863)	(0.839)	(1.281)	(1.243)
Rain	**-5.262**	**-5.226**	**-7.939**	**-7.489**
	(0.441)	(0.450)	(0.655)	(0.636)
Snow	-0.322	**-1.708**	1.772	-0.234
	(0.734)	(0.713)	(1.157)	(1.123)
% High School Grads		0.529		0.477
		(0.046)		(0.046)
Income		0.230		0.285
		(0.093)		(0.093)
% African American		-0.024		-0.024
		(0.003)		(0.003)
Rural		24.533		23.266
		(0.932)		(0.923)
Registration Closing Date		-0.029		-0.032
		(0.001)		(0.001)
Motor Voter		-0.145		-0.052
		(0.110)		(0.110)
Property Requirement		-3.162		-3.224
		(0.318)		(0.322)
Literacy Test		-0.106		-0.086
		(0.105)		(0.105)
Poll Tax		-5.865		-5.952
		(0.139)		(0.139)
Gubernatorial Election		-0.123		-0.124
		(0.065)		(0.065)
Senatorial Election		0.076		0.055
		(0.051)		(0.051)
Turnout_{t-1}	0.859	0.746	0.876	0.751
	(0.002)	(0.003)	(0.002)	(0.003)
Average Rain	-4.618	2.228	-4.090	2.592
	(0.496)	(0.586)	(0.501)	(0.584)
Average Snow	6.524	6.821	6.417	6.648
	(0.378)	(0.429)	(0.379)	(0.427)
Constant	4.613	10.494	6.536	13.080
Observations	43,118	43,118	43,118	43,118
Log-Likelihood	-131,521	-130,331	-131,649	-130,438
Likelihood Ratio Test	91,516	93,897	91,260	93,682

Standard Errors are in Parentheses. Year fixed effects are estimated but not presented.

inclement weather decreases turnout. Most important, the large positive coefficients on the interaction terms suggest that the demobilizing effect is mitigated by a competitive electoral environment.

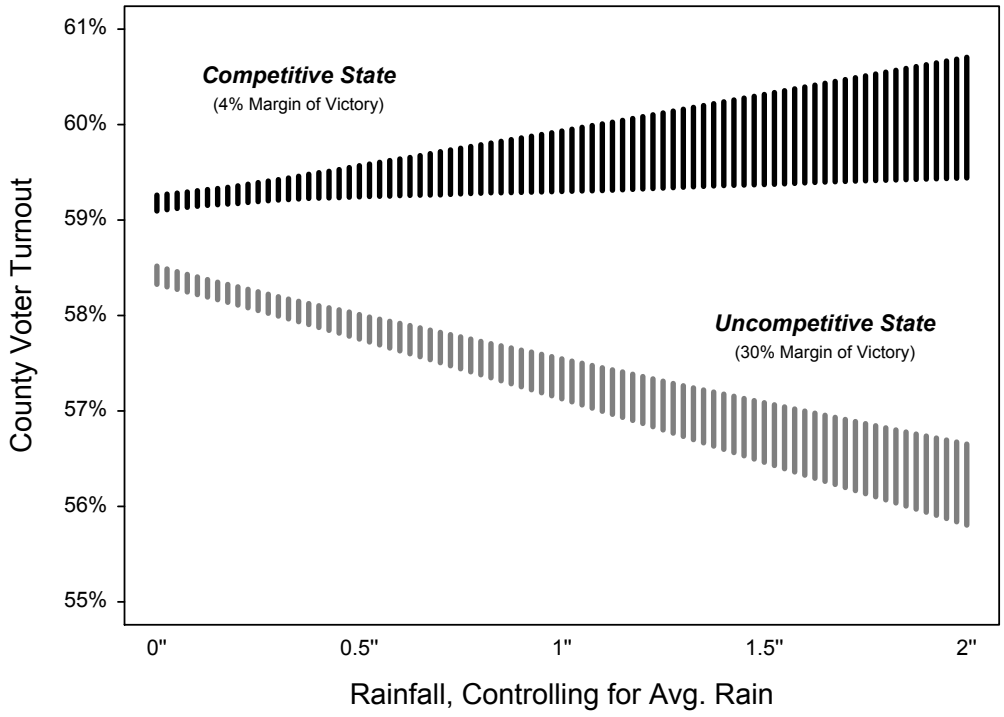
To get a sense of how strongly our theory is supported by the data, we have constructed Figure 5, which simulates how county-level turnout changes with increasing rain in two different electoral environments: a competitive environment where the spread between the parties is four percentage points and an uncompetitive environment where the spread is 30 points. All variables apart from those related to competitiveness are held at their means. With average precipitation in a county, turnout is only slightly higher in the competitive environment than in the uncompetitive environment. However, under rainy conditions, turnout drops in the safe state, but actually slightly increases in the competitive state.

While we would not want to make too much of the slight increase in turnout under rainy conditions in competitive states, this pattern does suggest that campaigns might be overcompensating in close elections to ensure that voters are not deterred by inclement weather. Campaigns might do so by increasing the number of GOTV phone calls they make or by offering more rides to the polls, as was suggested by the Clinton staffer with whom we spoke.

3 Discussion

We have shown that estimating an average effect of precipitation on voter turnout without taking into account the electoral environment leads to faulty inferences about the importance of Election Day weather. Heavy rain and snow present a clear, tangible cost to voters on Election Day, but this cost will not be felt the same in all electoral environments. If the election in a particular state matters (i.e. it is close), inclement weather has no substantive impact.

Figure 5: Simulated Outcomes, Competitive and Uncompetitive Environments



Bad weather is among the most basic and universally understandable costs that influences a citizen's decision to vote on Election Day. But even weather does not have the same influence over all voters. If the effect of weather is heterogeneous across electoral environments, it seems fair to ask what other treatments might have differential effects in competitive and uncompetitive places. Our finding, though simple and straightforward, emphasizes the difficult challenge scholars face in making inferences about the way close elections are decided from studies that do not account for heterogenous contextual effects.

Let us now return to the mechanism for this differential impact in competitive and uncompetitive contexts. Costs like inclement weather are mitigated in close electoral environments either because *voters* think about close elections differently from one-sided elections or because *campaigns* treat close elections differently. While it is likely a combination of the perceptions of voters and the strategies of campaigns (Cox and Munger 1989), we follow

Aldrich (1993) in speculating that the on-the-ground campaign is the real workhorse here.

Campaigns have limited resources, and they focus these resources in places where they can make a difference. Given the incentive structure of the Electoral College, campaigns will ignore many states and overwhelm a few states. GOTV operations in swing states will triage all sorts of obstacles on Election Day. They will respond to complaints at individual precincts, they will call supporters multiple times throughout the day, and they will have a plan in place in the event of inclement weather. Elections are simply not given this kind of attention in uncompetitive states. For those who are skeptical of the difference campaigns actually make in a Presidential election, our result suggests, albeit indirectly, that campaigns can help voters overcome Election Day costs.

To better understand the underlying mechanism at play in our findings, it would be useful to bring other sources of data to bear on this question. Specifically, we have explored ways to employ campaign spending data and individual voter report data to measure increased campaign activity under inclement weather conditions. Unfortunately, our efforts have been frustrated because of the timing of campaign mobilization efforts. Voters are contacted by campaigns over a long stretch of time leading up to an election. When surveys such as the NES ask voters if they were contacted by the political parties, there is no way to determine exactly when they were contacted. However, in studying Election Day mobilization and the weather, it is critical to determine the timing the appeal. Inclement weather would only increase campaign contact, we theorize, on or around Election Day itself. Survey questions about political contact are far too crude to measure this specific sort of campaign activity. Similarly, campaign spending data is only useful here if GOTV spending in the final day(s) of the campaign can be identified and isolated. We have not found this data to be sufficiently sensitive to timing either.

As a larger research agenda, our efforts here point to a more intensive study of heterogeneous effects in elections research. Just as precipitation has a different effect on turnout

depending on the electoral context, other features of elections, such as campaign mobilization and voter reaction to economic hardship, may have similarly heterogeneous effects. We conceive this modest study as a test of the sensitivity of election research to electoral context. The result of this test is a compelling affirmation of the view that competitive elections and uncompetitive elections are simply must be treated as substantively distinct phenomena.

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