Swingin' in the Rain

The Impact of Inclement Weather on Voting Behavior in U.S. Presidential Elections

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Abstract

While political experts have long claimed that bad weather lowers voter turnout, the impact of weather on U.S. election outcomes remains unclear. The most rigorous work to date found that precipitation benefits Republicans and suggested that Florida rains influenced the outcome of the 2000 presidential election, but a more recent analysis finding that precipitation only lowers turnout in uncompetitive election states calls this claim into question. Here, we reanalyze the 1972-2000 U.S. presidential elections with a focus on supporters of non-major party candidates, an oft-overlooked contingency. We propose that bad weather affects election outcomes not through its effect on turnout—as has long been assumed—but rather, through its psychological effect on swing voters. Specifically, we find evidence that bad weather increases regret aversion among supporters of non-major party candidates in competitive elections, leading some to instead vote for their preferred two-party candidate.

Background

- Since at least the 1800s, the press has claimed that weather affects voter turnout [1], but only in recent years have researchers been able to analyze the impact of weather on election outcomes with rigorous empirical methods
- Gomez, Hansford and Krause [2] found that Republican vote share increases with precipitation, leading them to conclude, "Republicans should pray for rain."
  - ➢ Their model even predicted that Al Gore would have won the 2000 election if it had rained less in Florida that election day
- This finding has been called into question by Fraga and Hersh [3] who found that while rain lowers turnout *on average*, it does not lead to lower turnout in competitive election states (see Figure 1 below).

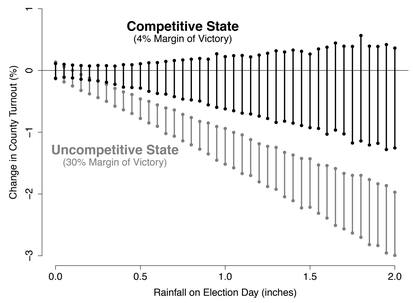

Figure 1: Change in county-level voter turnout as a function of rainfall in competitive vs. uncompetitive election states. A replication of Figure 4 in Fraga and Hersh [3]

Our Theory

Rain impacts voting behavior not only through its effect on turnout, but also through its effect on voters' choices at the polls

- Pleasant weather (e.g., sunlight, low humidity, high barometric pressure) is associated with better mood, better memory, and broadened cognitive style [4-7], which is associated with optimism bias and risk seeking behavior [8-9]
- In contrast, bad weather is associated with negative mood [10], which is associated with pessimism and risk aversion [11]
- The effect of weather on mood has been shown to have significant real world outcomes, affecting everything from consumer reviews of restaurants [12] to stock market returns [13]
- In the context of political behavior, sunshine has been shown to lead to higher approval ratings of the president [14], and at least one laboratory experiment found that bad weather depresses mood and risk tolerance, increasing the likelihood that voters desire candidates who are less risky [15].

More precisely, we theorize that inclement weather in competitive election contexts increases regret aversion among supporters of non-major party candidates, leading some to instead vote for their preferred major-party candidate.

Methods

- We follow closely in the methodological tradition of Gomez et al [2] and Fraga and Hersh [3]
- Both research efforts utilized a novel dataset created by Gomez et al [2], who painstakingly matched meteorological data from over 22,000 U.S. weather stations to more than 3,000 U.S. county voting results
- They accomplished this by first dividing the country into micro cells of 4,000 m^2 (less than an acre), then estimating the rainfall and snowfall in each micro cell with data from nearby weather stations and, finally, determining county-level estimates of rainfall and snowfall from those micro cell totals (see Figure 2, below)
- The dataset also includes a set of control variables for average rainfall, income, and more

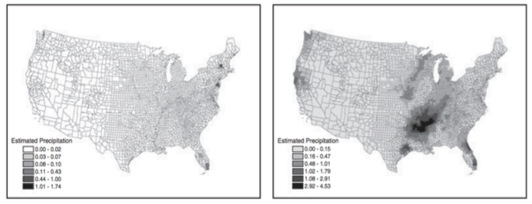

Figure 2: Map of Election Days with minimum and maximum rainfall. This figure is taken from Figure 1 in Gomez et al. [2]..

While Gomez et al. [2] analyzed the impact of precipitation on Republican vote share without considering the competitiveness of elections and Fraga and Hersh [3] added measures of a state's electoral competitiveness but only examined the effect of precipitation on average voter turnout, we separately model the turnout for Republican, Democratic, and "other" candidates while also taking into account the competitiveness of elections.

Results

In support of our theory, we test two main hypothesis:

1) Precipitation leads to decreased turnout for non-major party candidates and more so in competitive election states than in uncompetitive election states (Figure 3)

- If precipitation has no effect on voters' *choices* at the polls, then we should expect changes in turnout for non-major party candidates associated with precipitation to be similar in uncompetitive and competitive election states

2) Precipitation in competitive election states leads to *increased* turnout for the major party candidate that is closest ideologically to the leading non-major party candidate (Figures 4 & 5)

- It is difficult to explain how rain could lead to increased turnout for any party unless rain effects voters' choices
- A look at the most significant non-major party candidates over the period we analyze helps to clarify this hypothesis further: Ross Perot in 1992 and 1996, Ron Paul in 1988, and John Anderson in 1980, all had strong conservative credentials. Thus, we hypothesize that, on average, precipitation leads to increased turnout for the Republican candidate at the expense of turnout for 'other' candidates (Figure 4)

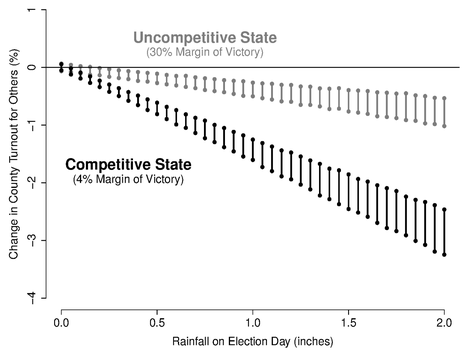

Figure 3: Change in county-level voter turnout for non-major party candidates as a function of rainfall in competitive vs. uncompetitive election states (1972-2000).

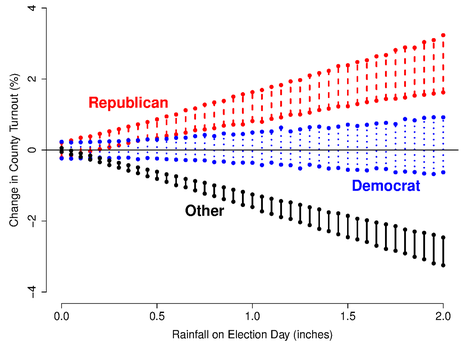

Figure 4: Change in county-level voter turnout as a function of rainfall in uncompetitive election states (1972-2000).

Results: The 2000 Election

In 2000, unlike the other years of our sample, the major 3rd party candidate was a progressive – Ralph Nader – who famously 'spoiled' the election for Democratic candidate Al Gore. In support of hypothesis 2, we find that the trend reverses in 2000, with rain benefitting the Democratic candidate. In stark constrast to the finding of Gomez et al. [2], we suggest that Gore would have won if it had rained *more* in Florida that year, not less.

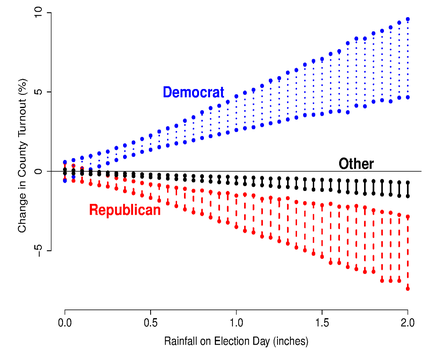

Figure 5: Change in county-level voter turnout as a function of rainfall in uncompetitive election states (2000).

Discussion

Political scientists have long considered how inclement weather affects election outcomes, but they have assumed that it does so through increasing the cost of showing up to the polls. Here, by turning to the psychology literature, we have drawn attention to the effect of inclement weather on a second behavior: voters' decisions once they arrive at the polls.

Our results suggest that the psychological effect of weather on voters' choices plays a larger role in impacting election outcomes that the effect of weather on turnout because voter turnout is resilient to inclement weather in competitive election states.

Furthermore, our results show that while rain historically tends to benefit Republicans, the effect of rain on voter behavior is more complex than initially thought. According to our analysis, the beneficiary of rain varies in any given election year depending on the ideology of the leading non-major party candidate

Our central contribution is the recognition that rain impacts voter psychology—particularly in competitive election contexts—in addition to the cost of voting, and through doing so weather may have substantive impacts on election outcomes.

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