Polls and Presidential elections

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- But the candidates’ vote shares can be accurately forecast (within a few percentage points) months before the election
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Pre-election polls

- ABC, CBS, Gallup, etc.
- Mostly random-digit-dial surveys (but other countries use face-to-face interviews)
- Response rates below 30%
- Over/undersample by sex, ethnicity, age, education, ...
- Weighting to adjust to Census
- Can estimate state-level opinion from national polls using Bayesian hierarchical modeling
- Also state polls, academic polls, internet polls, ...

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Why do we trust the polls?

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Republican share of two-party preference in pre-election polls

1992

1988

1984

1980

1976

1972

1968

1964

1960

Andrew Gelman
Polls and Presidential Elections
Presidential election forecasting

- 4 years ahead, 2 years ahead, 1 year, 4 months, 2 months, 2 weeks, ... election night
- 2 months before election: candidates have been chosen, final campaign still to go
- Predict election outcome using polls, national economy, incumbency, candidates’ ideologies, state economic and political trends, home states, home regions
- Fit model using elections since 1948, use to predict current election
- Errors at state, regional, national levels
- Can also use this model on election night (Bayesian inference, combine with exit poll and vote data)
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- National forecast from Wlezien and Erikson based on polls and economic indicators: 51.7% (±2.5%) for Bush
- Take relative positions of states from 2000, correct for home-state effects
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Uniform partisan swing

- Who’s doing the fluctuating?
  - All groups move together
  - Even during each Democratic and Republican conventions, all groups move in the same direction ("uniform swing")
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Pre-election polls and forecasting
Partisan bias in the electoral college?
Probability the election is tied
When and why is it rational to vote?

Presidential Support by Group

Party

Ideology

Race

Region

Sex

Income

Andrew Gelman

Polls and Presidential Elections
Changes in Presidential campaign polls during Democratic and Republican conventions, 1964-1992

(conventions in 1988 circled)
You can predict a voter’s preference given “demographics”: sex, ethnicity, age, education, political ideology, party identification.

This prediction improves as the campaign goes on:
- Fit model to a series of polls before the 2000 election
- The coefficients for the predictors increase
- The residual error of the model decreases
Moving toward a predictable outcome

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Increasing coefficients for fundamental predictors
Decreasing residual error of model of individual vote
Increasing predictive power for new data
The random-walk and mean-reversion models

- **Random-walk model**: voters are bounced around by campaign events, then the election comes

- **Mean-reversion model**: voters will mostly end up where predicted. It just takes them awhile to get there

- Mean-reversion model fits the data better, also explains why polls vary so much when elections are so predictable
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Does the Electoral College favor one party or the other?

To find out, use state-by-state forecasts for each election year.
Forecasts are uncertain (probabilistic).
What is \( \Pr(\text{Democrats win in electoral college}) \), if they receive \( X\% \) of the popular vote?
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Percentage of the popular vote required for Democrats to have a given chance of winning the Electoral College.
Next topic:
What is the chance that the Electoral College will be tied?

- Use the state-by-state forecast for 2004
- Estimated probability is 0.05 (1 in 200)
- Combinatorics is not an issue

With a large number of states, the Central Limit Theorem takes over.
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- \( \Pr(\text{your state is tied}) \times \Pr(\text{your state's electoral votes are needed, given that your state is tied}) \)

- A state with \( N \) voters and \( E \) electoral votes
  - approx. \( \Pr(\text{your state is tied}) \propto 1/N \)
  - approx. \( \Pr(\text{your state's electoral votes are needed}) \propto E \)
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- Higher for small states and states closer to the national average
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- Higher for small states and states closer to the national average
Next topic:
What is the chance that your vote will be decisive?

- $\Pr(\text{your state is tied}) \times \Pr(\text{your state's electoral votes are needed, given that your state is tied})$
- A state with $N$ voters and $E$ electoral votes
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![Graph showing the probability of an individual voter being decisive vs. the number of electoral votes for the state.](graph.png)
A mathematical digression

- We said \( \Pr(\text{your state is tied}) \propto 1/N \)
- Simple “binomial model” of random votes
  - Mean proportion of votes for Democrat is 0.5, sd is 0.5/\( \sqrt{N} \)
  - \( \Pr(\text{tie}) \propto 1/\sqrt{N} \)
- Binomial model implies that elections in large states are much closer than in small states
- Binomial model does not fit actual election data!
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Historical Pres. elections by state: vote margins vs. $N$
Other electoral systems: vote margins vs. $N$

- U.S. state house elections
- U.S. state senate elections
- U.S. Congressional elections
- U.S. Senate elections
- U.S. statewide offices
- European national elections
Next topic:
When and why is it rational to vote?

- The probability of your vote being decisive is about 1 in 10 million, so why vote?
- Utility calculation: $\Delta U = pB - c$
  - $\Delta U$ = utility from voting
  - $p$ = probability that your vote changes the election outcome
  - $B$ = your benefit from your preferred candidate winning
  - $c$ = net cost of voting
- Suppose $p = 10^{-7}$ and $B = $1000. Then $pB = 1/100$ of a cent!
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- (Utility calculation: $\Delta U = pB - c$)
- Maybe $p$ is overestimated
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- Now $B$ is proportional to $N$, and so it can be rational to act so as to improve your candidate's chance of winning
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Short-term political tactics aren’t so important—even if the polls jump around

Elections are predictable given fundamental variables and campaign resources

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National opinion moves in synch

Pr(your vote is decisive) \approx 10^{-7}

But voting is rational if you think your guy can make the country a better place!

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