Strategic Voting in Plurality Rule Elections

Stephen D. Fisher (Oxford) • David P. Myatt (LBS)

Third Annual Formal Theory & Comparative Politics Conference
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What fraction of voters are instrumentally motivated?
New York Senatorial Election 1970

Candidate | Votes | Share
----------|-------|------
James R. Buckley | 2,288,190 | 39%
Richard L. Ottinger | 2,171,232 | 37%
Charles E. Goodell | 1,434,472 | 24%
Total | 5,893,894 | 100%

E.g. liberal preferences: Goodell ≻ Ottinger ≻ Buckley

Key district characteristics for a supporter of (liberal) Goodell:

- Winning Margin = 39% − 37% = 2%
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A close race + far from contention ⇒ vote strategically?
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Theory
(i) **A Plurality-Rule Election with Aggregate Uncertainty**
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Instrumental voter ranks three candidates $u_1 > u_2 > u_3$. 
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Others vote for $i \in \{1, 2, 3\}$ with *conditional* prob. $p_i$. 

Neutral prior + sample voting intentions $\Rightarrow$ Dirichlet posterior.

$f(p) \propto [p_1^{\pi_1} p_2^{\pi_2} p_3^{\pi_3}]^s$ where $\pi \in \Delta$.

Modal beliefs $\pi_1 + \pi_2 + \pi_3 = 1$ and precision $s$.

Think of $s$ as a sample size: number of uncorrelated friends.

Distance from contention and marginality: $d = \pi_2 - \pi_1$ and $m = \pi_3 - \pi_2$. 
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Voter observes own preference type and private signal

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Equilibrium: decision to vote strategically based on $[u_1/u_2]$ and $\hat{\theta}$. 
Optimal Voting and the Strategic Incentive

Optimal to vote for strategically for candidate 2 rather than 1 if

\[(u_1 - u_3) Pr[13] + (u_1 - u_2) Pr[12] < (u_2 - u_3) Pr[23] - (u_1 - u_2) Pr[12]\]

Equivalently, vote strategically if

\[u_1 - u_2 \sim u_1 - u_3 \Rightarrow \text{loyalty to favourite} < Pr[23] - Pr[13] + 2 Pr[12] \Rightarrow \text{strategic incentive} \]

or equivalently \[\sim u < \Lambda\].

If \[\sim u \sim U[0,1]\] (equivalently: if \[u_2 \sim U[u_3, u_1]\]) then \[Pr[\text{Strategic}] = \Lambda\].

(i) Dirichlet model: find \[\Lambda\] as a function of constituency and \[s\].

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Aggregate uncertainty ⇒ \[\Lambda \in (0,1)\] even in large electorates.
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\[\tilde{u} = \text{loyalty to favourite} \prec \Pr[23] - \Pr[13] \prec \Lambda = \text{strategic incentive} \text{ or equivalently } \tilde{u} < \Lambda.\]

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Aggregate uncertainty $\Rightarrow \Lambda \in (0, 1)$ even in large electorates.
Predictions
Cain (1978, American J. of Pol. Science) expected "... third-party support to be lower in competitive (i.e. closely contested) than in non-competitive constituencies (i.e. one-party dominant), since the pressure to defect and cast a meaningful vote will be greater in constituencies with close races."

Blais and Nadeau (1996, Electoral Studies) argued that "... the closer the race for first place ... the more likely is one's vote to make a difference and the more one should consider probabilities of winning as well as preferences in the vote decision."
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"... third-party support to be lower in competitive (i.e. closely contested) than in non-competitive constituencies (i.e. one-party dominant), since the pressure to defect and cast a meaningful vote will be greater in constituencies with close races."

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Riker-Ordershook → Palfrey, Myerson-Weber, Cox

Third candidate out of contention ⇒ Duvergerian eq'm ($SF = 0$).

Second and third exactly tie ⇒ non-Duvergerian eq'm ($SF = 1$).
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Riker-Ordershook \(\rightarrow\) Palfrey, Myerson-Weber, Cox

Third candidate out of contention \(\Rightarrow\) Duvergerian eq’m (SF = 0).
Second and third exactly tie \(\Rightarrow\) non-Duvergerian eq’m (SF = 1).
Strategic incentive is positive if and only if $\pi_1 < \pi_2$. Results for changes in $s$ depend on position of favourite. Incentive is increasing in distance $d$ and margin $m$. Hence, fixing the distance, lower incentives in close races. Marginality effect is much weaker than the distance effect.

In the unique stable equilibrium, the expected strategic incentive is increasing in the distance from contention & winning margin; increasing in the heterogeneity of voter's preferences; and decreasing in the proportion of instrumental voters.
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Strategic Incentives with Dirichlet Beliefs

- Strategic incentive is positive if and only if $\pi_1 < \pi_2$. 

Results for changes in $s$ depend on position of favourite. Incentive is increasing in distance $d$ and margin $m$. Hence, fixing the distance, lower incentives in close races.

Marginality effect is much weaker than the distance effect.
(i) Strategic Incentives with Dirichlet Beliefs

- Strategic incentive is positive if and only if $\pi_1 < \pi_2$.
- Results for changes in $s$ depend on position of favourite.

(ii) Unique Stable Equilibrium of a Game-Theoretic Model

In the unique stable equilibrium, the expected strategic incentive is increasing in the distance from contention & winning margin; increasing in the heterogeneity of voter's preferences; increasing in the precision voters' of signals; and decreasing in the proportion of instrumental voters.
Strategic Incentives with Dirichlet Beliefs

- Strategic incentive is positive if and only if $\pi_1 < \pi_2$.
- Results for changes in $s$ depend on position of favourite.
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- increasing in the precision voters’ of signals; and
- decreasing in the proportion of instrumental voters.
\[ \Lambda \equiv \text{Incentive to Vote Strategically} \]

\[ \pi_3 - \pi_2 \]
$\Delta \equiv \text{Incentive to Vote Strategically}$

$\pi_1 = 0.075$

$\pi_1 = 0.175$

$\pi_1 = 0.275$
Incentive to Vote Strategically

\[ \pi_3 - \pi_2 = \pm m = \text{Winning Margin} \]
\[ \pi_3 - \pi_2 = \pm m = \text{Winning Margin} \]
Incentive to Vote Strategically

\[
\pi_3 - \pi_2 = \pm m = \text{Winning Margin}
\]
Empirics (i): Voting Patterns
The United Kingdom General Election: 1987
The United Kingdom General Election: 1987
The United Kingdom General Election: 1987

Alliance

Labour

Conservative
The United Kingdom General Election: 1987
The United Kingdom General Election: 1987
The United Kingdom General Election: 1987
The United Kingdom General Election: 1987
The United Kingdom General Election: 1992
The United Kingdom General Election: 1997
The United Kingdom General Election: 2001

Liberal Democrat

Labour

Conservative
Liberal Democrat

Labour

Conservative

The United Kingdom General Election: 2005
Empirics (ii): Distance and Margin
British Election Surveys: Identifying Motive and Preferences
Which one of the reasons on this card comes closest to the main reason you voted for the party you chose?

1. I always vote that way.
2. I thought it was the best party.
3. I really preferred another party but it had no chance of winning in this constituency.
4. Other (write in).
Which one of the reasons on this card comes closest to the main reason you voted for the party you chose?

1. I always vote that way.
2. I thought it was the best party.
3. I really preferred another party but it had no chance of winning in this constituency.
4. Other (write in).

Please choose a phrase from this card to say how you feel about the ← party name inserted here →

1. Strongly in favour
2. In favour
3. Neither in favour nor against
4. Against
5. Strongly against
<table>
<thead>
<tr>
<th>Election</th>
<th>All Voters</th>
<th>Risk Population</th>
<th>Third Party Supporters</th>
</tr>
</thead>
<tbody>
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<td>%</td>
<td>N</td>
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<tr>
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<tr>
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The graph illustrates the incentive to vote strategically as a function of the winning margin, $\pi_3 - \pi_2 = \pm m$. The red line represents $d = 0.40$, the blue dashed line is for $d = 0.25$, and the green dotted line indicates $d = 0.10$. The x-axis represents the winning margin, while the y-axis shows the incentive to vote strategically.
<table>
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<tr>
<th>Variable</th>
<th>Coefficient 1</th>
<th>Coefficient 2</th>
<th>Std. Error 1</th>
<th>Std. Error 2</th>
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<td>Constant</td>
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<td>0.04</td>
<td>(0.03)</td>
<td>(0.04)</td>
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<tr>
<td>Dist. from Contention</td>
<td>★ 0.87</td>
<td>★ 0.79</td>
<td>(0.12)</td>
<td>(0.11)</td>
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<td>Margin of Victory</td>
<td>0.09</td>
<td>0.06</td>
<td>(0.08)</td>
<td>(0.08)</td>
</tr>
<tr>
<td>1st Preference Gap</td>
<td>★ -0.42</td>
<td></td>
<td>(0.04)</td>
<td></td>
</tr>
<tr>
<td>2nd Preference Gap</td>
<td></td>
<td>★ 0.31</td>
<td></td>
<td>(0.04)</td>
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</table>

Plain vanilla OLS linear probability model.
Election year dummies used but not reported.
Similar results for the usual binary-response specifications.
Empirics (iii): Incentive Strength
<table>
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\[ \pi_1 < \min\{\pi_2, \pi_3\} \]
\[ \pi_1 < \min\{\pi_2, \pi_3\} \text{ and } s = 5 \]
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\( \pi_1 < \min\{\pi_2, \pi_3\} \) and \( s = 5 \)

\( \bar{\Lambda} = 0.2896 \)
\( \pi_1 < \min\{\pi_2, \pi_3\} \) and \( s = 10 \)

\[ \bar{\Lambda} = 0.4533 \]
\[ \pi_1 < \min\{\pi_2, \pi_3\} \text{ and } s = 20 \]

\[ \bar{\Lambda} = 0.6401 \]
$\pi_1 < \min\{\pi_2, \pi_3\}$ and $s = 40$

$\bar{\Lambda} = 0.7938$
\[
\pi_1 < \min\{\pi_2, \pi_3\} \quad \text{and} \quad s = 5 \quad \bar{\Lambda} = 0.2896
\]

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\pi_1 < \min\{\pi_2, \pi_3\} \quad \text{and} \quad s = 20 \quad \bar{\Lambda} = 0.6401
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\]
Empirics (iv): Types vs. Information
All Voters Risk Population Third Party Supporters

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Average Strategic Incentive for TPS

$s = \text{Precision of Voters' Beliefs}$
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</table>
The Likelihood of Strategic Voting
The Likelihood of Strategic Voting

Voters are instrumental with probability $ψ$. 
The Likelihood of Strategic Voting

Voters are instrumental with probability $\psi$. Dirichlet beliefs.
The Likelihood of Strategic Voting

Voters are instrumental with probability $\psi$. Dirichlet beliefs.

Precision of beliefs $s$.
The Likelihood of Strategic Voting

Voters are instrumental with probability $\psi$. Dirichlet beliefs.

Precision of beliefs $s$. Proxy modal belief $\pi$ with election outcome.
The Likelihood of Strategic Voting

Voters are instrumental with probability $\psi$. Dirichlet beliefs.

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Voters are instrumental with probability $\psi$. Dirichlet beliefs.

Precision of beliefs $s$. Proxy modal belief $\pi$ with election outcome.

Suppose voters’ types $\tilde{u} \sim U[0, 1]$ or equivalently $u_2 \sim U[u_3, u_1]$. 
The Likelihood of Strategic Voting

Voters are instrumental with probability $\psi$. Dirichlet beliefs.

Precision of beliefs $s$. Proxy modal belief $\pi$ with election outcome.

Suppose voters’ types $\tilde{u} \sim U[0, 1]$ or equivalently $u_2 \sim U[u_3, u_1]$.

Without constituency variation (single $\pi$):
The Likelihood of Strategic Voting

Voters are instrumental with probability $\psi$. Dirichlet beliefs.

Precision of beliefs $s$. Proxy modal belief $\pi$ with election outcome.

Suppose voters’ types $\tilde{u} \sim U[0, 1]$ or equivalently $u_2 \sim U[u_3, u_1]$.

Without constituency variation (single $\pi$):

$$\Pr[\text{Strategic Vote}] = \psi \times \Lambda(\pi, s)$$
The Likelihood of Strategic Voting

Voters are instrumental with probability $\psi$. Dirichlet beliefs.

Precision of beliefs $s$. Proxy modal belief $\pi$ with election outcome.

Suppose voters’ types $\tilde{u} \sim U[0, 1]$ or equivalently $u_2 \sim U[u_3, u_1]$.

Without constituency variation (single $\pi$):

$$\Pr[\text{Strategic Vote}] = \psi \times \Lambda(\pi, s) \quad \Rightarrow \quad \psi = \frac{\text{Proportion Strategic}}{\Lambda(\pi, s)}$$
The Likelihood of Strategic Voting

Voters are instrumental with probability $\psi$. Dirichlet beliefs.

Precision of beliefs $s$. Proxy modal belief $\pi$ with election outcome.

Suppose voters’ types $\tilde{u} \sim U[0, 1]$ or equivalently $u_2 \sim U[u_3, u_1]$.

Without constituency variation (single $\pi$):

$$\text{Pr[Strategic Vote]} = \psi \times \Lambda(\pi, s) \quad \Rightarrow \quad \psi = \frac{\text{Proportion Strategic}}{\Lambda(\pi, s)}$$

With variation over observations in districts $j \in \{1, \ldots, n\}$:
The Likelihood of Strategic Voting

Voters are instrumental with probability $\psi$. Dirichlet beliefs.

Precision of beliefs $s$. Proxy modal belief $\pi$ with election outcome.

Suppose voters’ types $\tilde{u} \sim U[0, 1]$ or equivalently $u_2 \sim U[u_3, u_1]$.

Without constituency variation (single $\pi$):

$$\Pr[\text{Strategic Vote}] = \psi \times \Lambda(\pi, s) \quad \Rightarrow \quad \psi = \frac{\text{Proportion Strategic}}{\Lambda(\pi, s)}$$

With variation over observations in districts $j \in \{1, \ldots, n\}$:

$$\log L = \sum_{j=1}^{n} \log L_j \quad \text{where} \quad L_j = \begin{cases} \psi \times \Lambda(\pi[j], s) & \text{Strategic} \\ 1 - \psi \times \Lambda(\pi[j], s) & \text{Sincere} \end{cases}$$
Proportion $\psi_0.4$.

$\hat{s} = $ ML Estimate of Beliefs Precision
Proportion $\psi$ of Instrumental Voters

0.6
0.8
1.0

$\hat{s} = \text{ML Estimate of Beliefs Precision}$
Proportion of Instrumental Voters

\[ \hat{\psi} = 0.31 \]

\[ \hat{s} = 23.7 \]

\[ \psi \] is the ML Estimate of Beliefs Precision

Punchline: a third of voters instrumental with 20 friends.
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Empirical Frequency of Strategic Voting

Predicted Strategic Voting: $\psi \times \Lambda$
Strategic Voting in Plurality Rule Elections

Stephen D. Fisher (Oxford) • David P. Myatt (LBS)

How big (in theory) is the incentive to vote strategically?

How do this relate to the pattern of party support within a district?

What fraction of voters should we expect to vote strategically?

Are the answers (or other theories) supported by the data?

How much do voters know? How many are instrumental?
How big (in theory) is the incentive to vote strategically?

- Moderate: between 20% to 80% for reasonable parameters.

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How big (in theory) is the incentive to vote strategically?
• Moderate: between 20% to 80% for reasonable parameters.

How do this relate to the pattern of party support within a district?
• Lower incentives in close races; much higher for high distance.

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What fraction of voters should we expect to vote strategically?

• $\approx$ two-thirds of instrumentally motivated third-party supporters.

Are the answers (or other theories) supported by the data?

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How do this relate to the pattern of party support within a district?
• Lower incentives in close races; much higher for high distance.

What fraction of voters should we expect to vote strategically?
• \( \approx \) two-thirds of instrumentally motivated third-party supporters.

Are the answers (or other theories) supported by the data?
• Comparative statics work, but overall fraction a little low.

How much do voters know? How many are instrumental?
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• Moderate: between 20% to 80% for reasonable parameters.

How do this relate to the pattern of party support within a district?
• Lower incentives in close races; much higher for high distance.

What fraction of voters should we expect to vote strategically?
• ≈ two-thirds of instrumentally motivated third-party supporters.

Are the answers (or other theories) supported by the data?
• Comparative statics work, but overall fraction a little low.

How much do voters know? How many are instrumental?
• About a third are instrumental, just over twenty friends.
Strategic Voting in Plurality Rule Elections

Stephen D. Fisher (Oxford) • David P. Myatt (LBS)

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