Comparing Strategic Voting Incentives in Plurality and Instant-Runoff Elections

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    - also make results more difficult to interpret and impose additional costs on voters

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- **This paper:** how do strategic incentives look like under either system, both qualitatively and quantitatively?

Types of strategic votes in electoral systems

2018 San Francisco Mayoral Special Election
Ranked Choice Voting Results
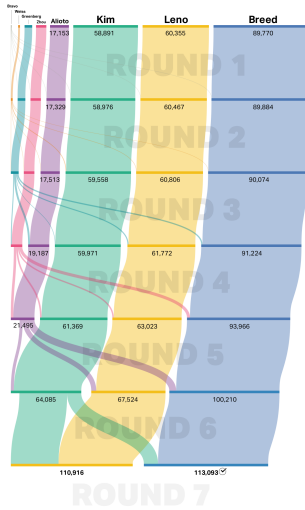
General Framework

Set-up. Let there be K candidates, B admissible ballot types (e.g., in Plurality, $b = 3$), and N voters.

Probability of winning. Let **P** denote a $K \times B$ matrix where each column is a vector of candidates' winning probability as a function of an additional ballot b.

Voters' utility. Let **U** denote a $N \times K$ matrix where each row is a vector of any voter's utilities from a given candidate winning.

Expected utility from any ballot type. Finally, let $\bar{\mathbf{U}} = \mathbf{UP}$ denote the expected utility from each ballot type for any voter.

General Framework (cont'd)

Strategic voting. For every voter i, the strategic voting incentive is defined as:

$$\text{Expected Benefit} = \arg \max_b \bar{\mathbf{u}}(b) - \bar{\mathbf{u}}(b_s) \tag{1}$$

where $\bar{\mathbf{u}}$ is the ith row from the expected utility matrix $\bar{\mathbf{U}} = \mathbf{U}\mathbf{P}$.

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Example

$$\bar{\mathbf{u}}_{\text{Plur}} = \begin{bmatrix} \mathbf{0.67} & 0.57 & 0.33 \end{bmatrix}$$

$$\bar{\mathbf{u}}_{IRV} = \begin{bmatrix} 0.67 & 0.57 & 0.33 & \mathbf{0.86} & 0.21 & 0.40 \end{bmatrix}$$

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How to model utilities and beliefs / outcome probabilities?

Modelling preferences and beliefs

We rely on CSES data to characterise preferences and beliefs – election surveys from 160 cases (58 countries). (230k voters in total). We focus on the three largest parties in every reported survey.

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Beliefs

Given reported preferences in survey, model election outcome beliefs using Dirichlet distribution:
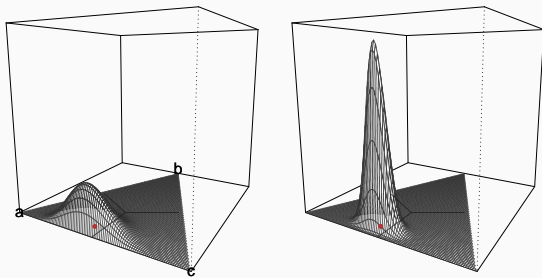
$$f(\mathbf{v}) = \text{Dir}(s \times \mathbf{v}_0)$$

Figure 2: Example of a Dirichlet distribution

Modelling preferences and beliefs (cont'd)

Beliefs (cont'd)

- Expected outcome (mode of distribution): vote shares if everyone in survey voted sincerely $\Rightarrow$ iterative polling algorithm to adjust for 'strategicness'.

- Precision parameter: using previous empirical work, between $s = 10$ and $s = 85$.

- Given the distribution over election outcomes, we can also specify the probabilities of each candidate winning for each type of marginal ballot.

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- For empirics, we set $\lambda = .05$.
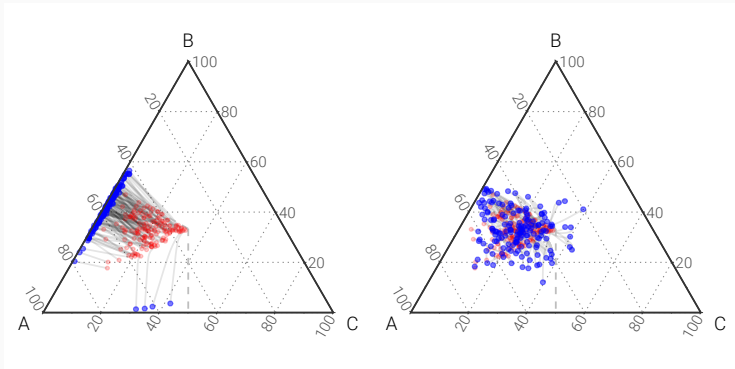
Figure 3: Iterative polling paths in Plurality (left) and IRV (right). Red dots mark sincere profiles, blue dots mark ballot distribution after 60 iterations.
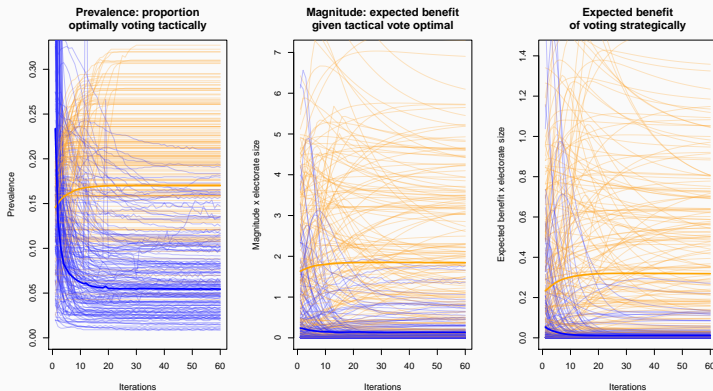
Figure 4: Main results: Prevalence, Magnitude, and Expected Benefit of strategic voting in Plurality (orange) and IRV (blue) for a precision parameter of $s = 85$, where Prevalence $\times$ Magnitude = Expected Benefit [intensive / extensive margin].

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Key results

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- strategic voting more likely to backfire in IRV (risk of electing least favoured candidate)
- strategic incentives can be "substitutes" in IRV

Appendix

Strategic voting in FPTP

Given candidates $\{a, b, c\}$, three possible ballots: $\{a, b, c\}$.

Eggers & Nowacki (2019)

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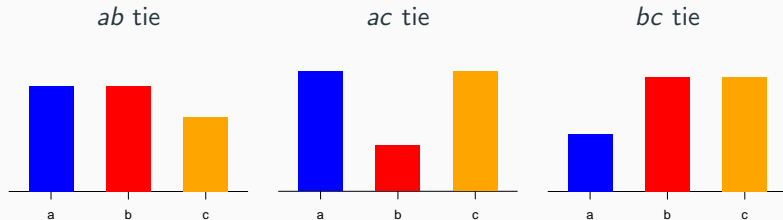
Three ways to affect outcome:
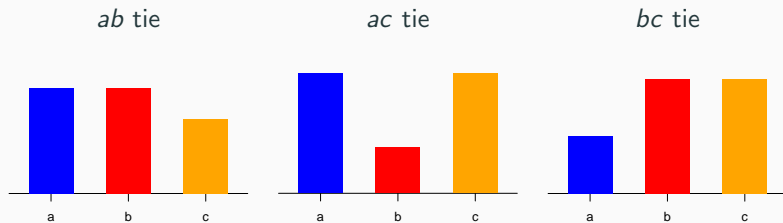
Strategic voting in FPTP

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Three ways to affect outcome:

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Strategic voting in IRV

Six possible ballots: $\{abc, acb, bac, bca, cab, cba\}$.

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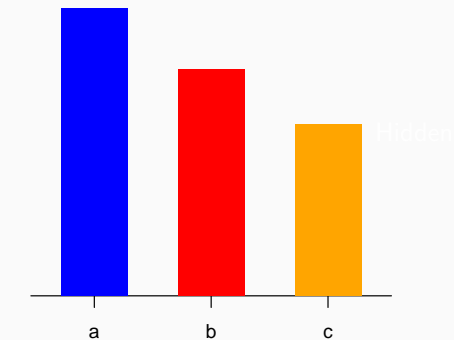- determine who wins post-elimination (3 ways)

Two types of **strategic logic in IRV**:

1. "Desert a leading candidate to avoid wasting one's vote"
   - Center-left voter: 'Macron will advance, so I'll rank Fillon/Le Pen first'

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2. "Desert a trailing candidate to avoid electing one's least favorite"
    - Right-wing voter: 'Le Pen can't beat Macron, so I'll rank Fillon first'
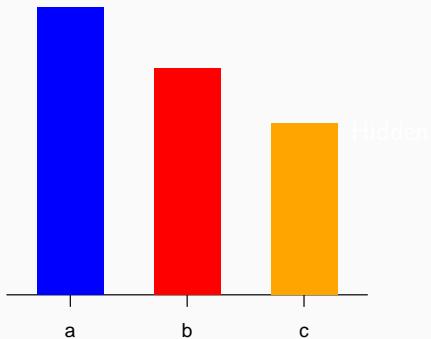
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Positive feedback in FPTP elections

Discrepancy in support for c vs. other candidates $\implies$ $c \to a$, $c \to b$ votes.

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Strategic responses to discrepancy $\implies$ discrepancy widens.

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Negative feedback in IRV elections
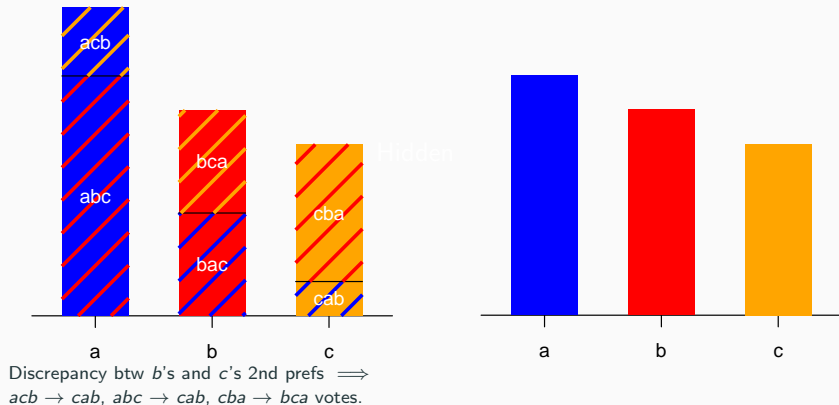

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Negative feedback in IRV elections

Discrepancy btw b's and c's 2nd prefs $\implies$
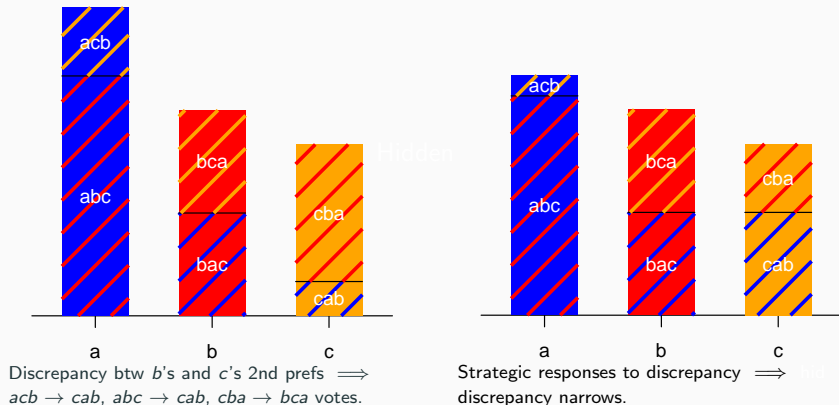$acb \rightarrow cab$, $abc \rightarrow cab$, $cba \rightarrow bca$ votes.

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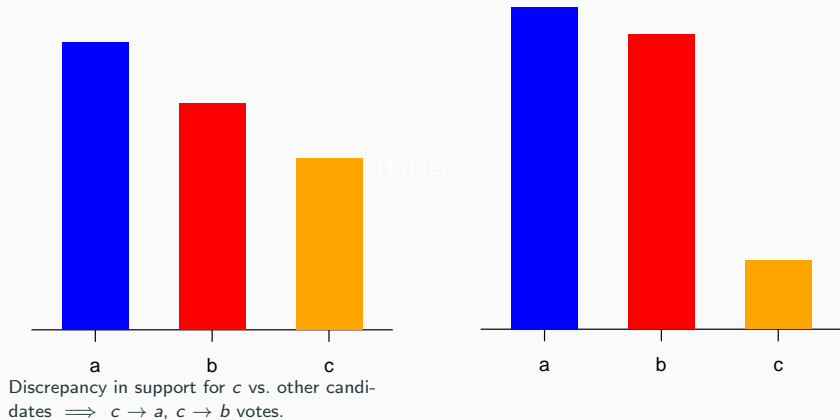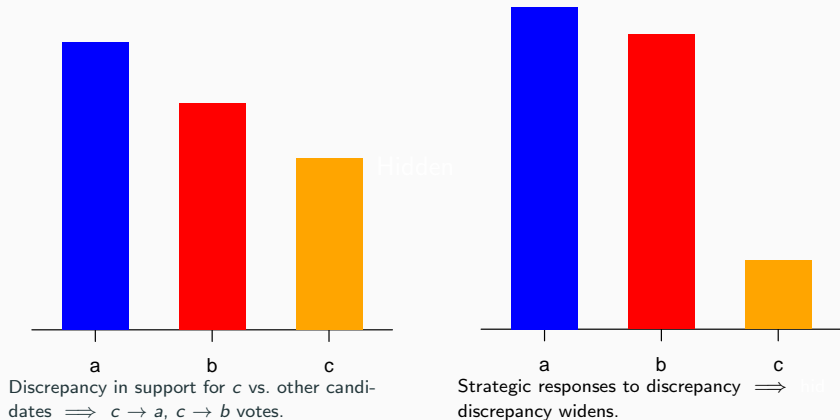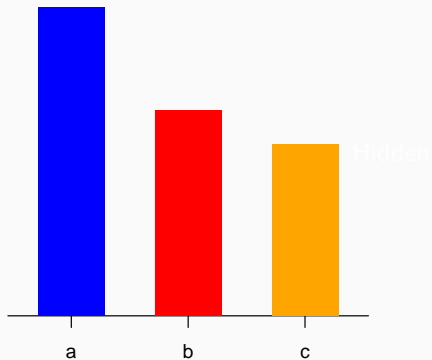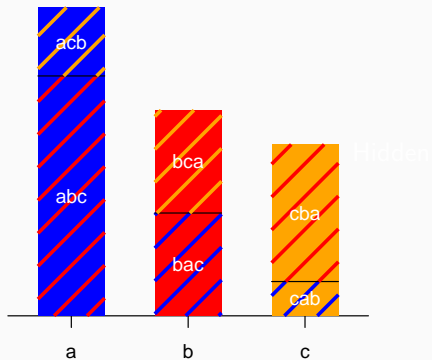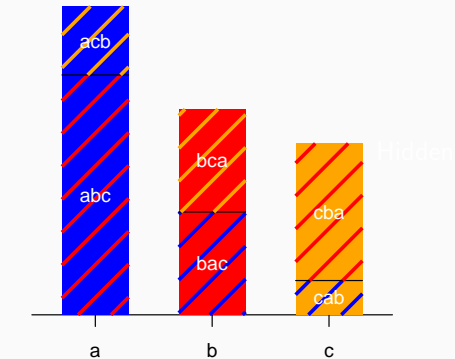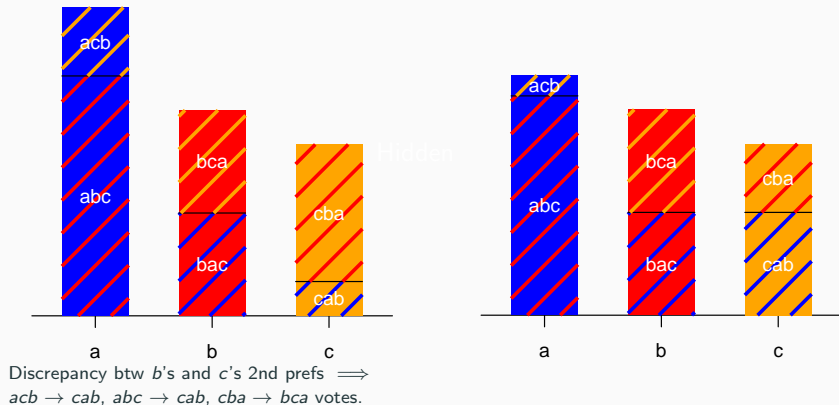
Likelihood of 'pivotal events'

Events that reward strategic votes in IRV are less likely

- In Plurality, we need a tie (close result) between the first and and the second candidate.

- In IRV, two candidates must tie in first preferences **and** we need a tie (close result) in second preferences in the run-off.
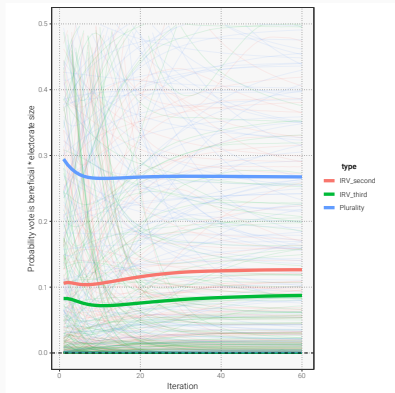

Figure 5: Expected probability of strategic vote being beneficial (weighted by electorate size)

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Conflicting events

Strategic voting in IRV is more likely to backfire

- In **Plurality**, only first/second tied: deserted third can be far away

- For strategic voting in **IRV** to be beneficial, all three candidates must be reasonably close to one another – greater risk of backfiring!
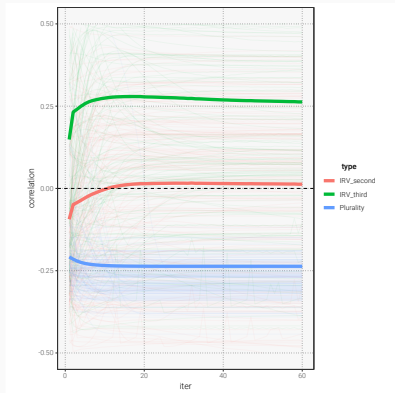

Figure 6: Correlation between costs and benefits of strategic vote

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Conflicting events

Strategic voting in IRV is characterised by substitutes

- In **Plurality**, if others desert the third-placed candidate, my incentive to do so, too, grows (*C* less likely to win overall)

- In **IRV**, if other *CBA* voters vote *ACB*, my incentive to do so, too, diminishes: risk of accidentally electing *A* increases (when *A* beats *C* in second round)

Eggers & Nowacki (2019)