Voting and Deliberation

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Hung Juries

1. Symmetric Treatment of Decisions
   If you require unanimous vote to convict, you may also require unanimous vote to acquit.
   Any split vote leads to a new trial.
2. Voter is pivotal if the rest of the jury is unanimous in either direction.
3. Properties
   1. Unanimous Rule May Work Well
   2. Information Leakage?
   3. It takes many rounds to reach an agreement.
      Probability that N informative voters agree:
      $p^N + (1-p)^N$.

WHAT COMES NEXT

1. Heterogeneity Without Deliberation
   Large Numbers: Full Information Equivalence.
2. Heterogeneity with Deliberation
   1. Unanimity Fails to Guarantee Full Revelation
   2. Environments where Full Information is Revealed

SWING VOTER MODEL

1. Two States and Two Actions
2. Three types of agent: partisans of each action and independents
3. Uncertainty about number of voters and their information. (An individual is a partisan of candidate 0, 1, independent, or inactive.)
4. Active voters receive a signal: either noise or the truth.
5. Majority Rule

STRATEGIES

Active Voters Can Vote for Either Candidate or Abstain.
Partisans and Informed Voters have Dominant Strategy.
Uninformed Agents Must Decide What to Do.
Look for Symmetric Equilibrium.

SINCERE BEHAVIOR IS NOT RATIONAL

Suppose Prior Favors 1.

- Uninformed voters (sincerely) vote for 1.
- Informed voters vote their information.
- When an uninformed voter is decisive, informed voters must be voting for 0.
- So: uninformed would want to vote for 0.

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RESULTS

- If decisive, it is more likely that you will vote for the worse candidate.
  Reason: Informed independent voters vote for the better candidate, so the better candidate is likely to be ahead.
- Voters Abstain.
  Uninformed agents vote to balance the vote shares of partisans. If partisans are balanced, then informed agents determine the outcome. Provided that the expected size of partisans groups is small, this can be done by voting with small probability for the smaller partisan group. Abstention rates are high when the expected gap in partisan group size is small.

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- Good Information Aggregation Properties.
  You do not need many informed independent agents to arrive at good outcome. These agents always vote sincerely and swing voters make informed voters decisive whenever possible.
  - If uninformed can balance partisans, then informed independents determine outcome.
  - If uninformed cannot balance partisans, then full information outcome does not depend on information.
  - Asymptotically you get the result you'd get with full information and majority rule.

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MODEL

1. N voters
2. Two outcomes: $X = 0, 1$.
3. Continuous ($s \in [0, 1]$) state space.
4. Preference parameter ($x \in [-1, 1]$).
5. Preferences: $v(x, s)$ is the utility difference between states 1 and 0 for agent x in state s.
6. Information: Agent x receives signal about s.
7. Strategy: Vote for X.
8. Aggregation Rule: Fraction of votes needed to select an outcome. (Assumed to be in $(0, 1)$.)

PREFERENCES

Voter x prefers outcome 0 if $v(x,s) > 0$.
Assume that $v(-1,s) < 0 < v(1,s)$ all s.
Higher x means more likely to vote for 0.
Assume continuity and strongly increasing, $s > s'$, $x > x'$ implies:

$$v(x,s) - v(x,s') > \kappa(s - s')$$

and

$$v(x,s) - v(x',s) > \kappa(x - x')$$

for some $\kappa > 0$.

INFORMATION

- $G(\cdot)$ prior on states with density $g(\cdot)$, uniformly positive and bounded:
$$\frac{1}{\alpha} > g(s) > \alpha$$
for some $\alpha > 0$.
- Type (x, k) where k takes on values from finite set. $F(\cdot)$ prior on types ($F(x, k)$ is the probability that preference type is no greater than x and k is information source. Density $f(\cdot)$ on x, $\sum_k f(x, k) > \alpha$.

- Continuous $\rho_k(\sigma \mid s)$ describes information structure. Higher signals and higher messages go together (MLRP):

$$\frac{\rho_k(\sigma', s')}{\rho_k(\sigma', s)} > \frac{\rho_k(\sigma, s')}{\rho_k(\sigma, s)}$$

when $\sigma > \sigma'$ and $s > s'$.
$\rho_k(\sigma, s) > \alpha$ for all k, σ, and s.
(No signal rules out a state).

STRATEGIES

Voters decide who to vote for given (x, k, σ).
Monotone structure guarantees that for each k and σ there are at most two cutoffs.
Low x ignore information and vote for 1.
High x ignore information and vote for 0.
The intermediate values condition on information.

CHARACTERIZATION

When the population grows, the fraction of the population who conditions on information goes to zero.
Intuition: The information content from being pivotal in a large population is larger than the information from a private signal. (This is an oversimplification.)

FULL INFORMATIONAL EQUIVALENCE

The voting equilibrium outcome is the same as what would result if information were aggregated perfectly.
This result may seem amazing because most people in the population are not using their information.
Keep in mind:

1. When the population is large, many people vote informatively even when most do not.
2. The voters are those whose preferences are most relevant to selecting the outcome.

Result requires a stronger MLRP. The basic preliminary result is that a pivotal voter almost can infer the state.

QUESTION and ANSWER

What is the Impact of Aggregation Rule when Players Communicate?
Non-majority rules are equivalent.

EXPLANATION

Players first pool information and then all vote for their favorite action.
With common preferences, this is rational.
Given that everyone else votes for the same thing, as long as a unanimous vote is unnecessary, all aggregation rules are equivalent. (Implementation under unanimous rule more difficult.)
Warning: This result depends on picking a “strange" equilibrium.

EXTENSIVE FORMS

Result: Symmetric Equilibrium in symmetric static voting game is also an equilibrium in any sequential voting game.
Reason: Conditioning on being pivotal contains all information that would be revealed in symmetric sequential voting.

DELIBERATION FAILS

Austen-Smith and Feddersen:
Assume full support, consensus and monotonicity. There exists a fully revealing debate equilibrium if and only if the committee is not minimally diverse.
Assumptions:
full support: harmless
consensus: possibility of ex post agreement.
monotonicity: natural ordering on information.

CONCERNS

1. Why do we care about full revelation?
2. Minimally Diverse – always a realization when there is disagreement – is stronger than it looks.