Influential Opinion Leaders

Jakub Steiner[1] Colin Stewart[2]

[1]Kellogg, MEDS

[2]Toronto

We rely on expert advice in choices of:

- investments,
- technologies,
- political candidates.

Do experts influence mass opinions?

“Rational players cannot be fooled”:

- Cheap talk,
- Signalling.

But there is evidence:

- Page, et. al (1987); Beck et. al. (2002); Druckman, and Parkin (2008); and DellaVigna, and Kaplan (2007).

Rational players can be coordinated:

- Corsetti et al. (2004), Ekmekci (2009).

Many experts:

- How do they coordinate?

Social Learning under Strategic Uncertainty

Global games:

- Strategic uncertainty has large equilibrium consequences.
- Strategic uncertainty only in rare contingencies.
- But that set is pivotal.

Social learning in global games:

- Voters interpret actions of experts.
- Voters neglect the contingencies with strategic uncertainty.
- When strategic uncertainty arises, the voters "get fooled".

Overview

Setup:

- Many experts: endorse candidates.
- Voters:
  - observe endorsements,
  - elect a winner by majority rule.
- Coordination motive.

Experts' strategic position is weak:

- No individual "market power".
- Heterogenous preferences.
- Distribution of biases is common knowledge.

Yet, manipulation arises.

Intuition

Typical State

- experts know the outcome
- no impact of biases

Pivotal State

- uncertain election outcome
- impact of biases

- Bayesian updating: based on typical state.
- Equilibrium condition: based on pivotal state.

Conformism

- Psychological motives, Callander (2007, 2008) based on Asch (1951).
- Strategic voting, Cox (1997), Myatt (2007).
- Desire for united party.

Election Without Experts

model

Voters

- Voters $i \in [0,1]$.
- $a^i \in \{A, B\}$.
- Majority rule; $w \in \{A, B\}$ — the winner.
- Partisan voters, $2/3$.
- Swing voters, $1/3$:

$$u_v(a^i, w) = \mathbf{1}_{a^i = w}.$$

- (0 probability of being pivotal.)

Uncertainty

- Uncertainty over distribution of partisans.
- State θ:
  - if $\theta < 0$ then A wins,
  - if $\theta > 1$ then B wins,
  - if $\theta \in (0, 1)$ then
    tie arises when share of swing votes for A equals θ.
- $\theta \sim$ strength of candidate B.

Information

- Common prior: $\theta \sim U[\underline{\theta}, \overline{\theta}]$.
- Voters' signals $y^i = \theta + \epsilon^i$.
- Strategy maps y^i to a^i.

analysis

Pivotal Condition

Symmetric monotone Bayes Nash equilibrium:

- Outcome monotone in θ.
- θ^* — pivotal state in which tie arises:

$$\begin{cases} w = A, \text{ if } \theta < \theta^*, \\ \text{tie, if } \theta = \theta^*, \\ w = B, \text{ if } \theta > \theta^*. \end{cases}$$

- Pivotal condition:

$$\theta^* = \Pr(s(y^i) = A \mid \theta^*).$$

Behavior in the Pivotal State

Beliefs $\longrightarrow$ actions:

- Vote for the likely winner.

Distribution of beliefs:

- $\pi(y^i)$ — posterior that A wins.
- $\pi(y^i)|\theta^* \sim U[0,1]$.

Recall pivotal condition:

$$\theta^* = \Pr(\pi(y^i) > 1/2 \mid \theta^*) = 1/2.$$

Result

Summary

1. *Unique monotone BNE.*
2. $\theta^* = \frac{1}{2}$.

Election With Experts

model

Experts

- Experts $j \in [0, 1]$.
- $a^j \in \{A, B\}$.
- $1/3$, partisans supporting A.
- $1/3$, partisans supporting B.
- $1/3$, swing experts:

$$u_e(a^j, w) = b^j \mathbf{1}_{a^j=A} + \mathbf{1}_{a^j=w},$$

  $-1 < b^j < 1$.
- Distribution of biases known.

Information

Experts' signals:

- $x^j = \theta + \sigma\xi^j$,
- Support: $\xi^j \in [-1/2, 1/2]$.

Social Learning:

- Each voter i privately observes a random sample of n endorsements.
- $\lambda^i \in \{0, \dots, n\}$ — # of endorsements for A in i's sample.
- Unobserved preferences.

Strategy of

- expert maps x^j to a^j,
- voter maps (y^i, λ^i) to a^i.

analysis

Pivotal Condition

- Monotone Weak Perfect Bayesian equilibrium.
- Pivotal Condition:

$$\theta^* = \Pr\left(s(y^i, \lambda^i) = A \mid \theta^*\right).$$

We need to understand:

- experts' behavior,
- voters' interpretation of experts' behavior,
- voters' behavior.

Experts' Behavior

$e(\theta, \theta^*)$ — fraction of experts endorsing A.

Depends on:

- realized state θ,
- pivotal state θ^*,
- bias and error distribution.

Simple cases:

$$e(\theta, \theta^*) = \begin{cases} \frac{1}{3}, \text{ for } \theta > \theta^* + \sigma; \\ \frac{2}{3}, \text{ for } \theta < \theta^* - \sigma; \\ \frac{1}{2} + \frac{\overline{b}}{6}, \text{ for } \theta = \theta^*. \end{cases}$$

Voters

bayesian updating

- As $\sigma \to 0$ voters assign vanishing probability to atypical θ.
- $p_v(y, \lambda)$ — voter's posterior that A wins.
  - monotone in λ,
  - independent of the distribution of biases.

Voters

behavior in the pivotal state

Distribution of signals at θ^*:

- $\lambda|\theta^* \sim B\left(\frac{1}{2} + \frac{\bar{b}}{6}, n\right)$.

Updating rule:

- Does not correct for the bias.

Optimal behavior:

- Vote for the more likely winner.

Recall pivotal condition:

$$\theta^* = \Pr\left(s(y^i, \lambda^i) = A \mid \theta^*\right).$$

Results

Summary

1. *Unique monotone weak perfect equilibrium.*
2. *Characterization of* $\theta^{**} = \lim_{\sigma \to 0} \theta^{*}(\sigma)$.
3. θ^{**} *increases with average bias* $\bar{b}$.
4. $$\lim_{n \to \infty} \theta^{**}(n) = \begin{cases} 1, \textit{ if } \bar{b} > 0, \\ 0, \textit{ if } \bar{b} < 0. \end{cases}$$

Noise Independence

Consequences:

- Providing additional information to voters does not help.
- Experts' influence can be large.

Summary

“Rational players cannot be fooled”...

Weak interpretation:

- Rational social learning:

$$I_e | I_v .$$

Truism.

Strong interpretation:

- Correct beliefs in every state:

$$(I_e | I_v) = (I_e | I_v, \theta) .$$

Incorrect.

In Our Model

Voters get fooled at the pivotal state:

- Gap between $I_e|I_v$ and $I_e|(I_v, \theta^*)$.
- Monotone in experts' biases.
- $\Rightarrow$ Equilibrium is monotone in experts' biases.
- Voters get fooled on a small set of θ.
- But equilibrium consequences are large.