Do Expert Panelists Herd? Evidence from FDA Committees

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**CONTRIBUTION**

- This paper contributes to the empirical literature on herd behavior.
- Other empirical papers have studied herding in different settings (e.g., restaurant dining (Cai et al., 2001), provisionary primaries (Knight and Schiff, 2010), stock market trading (Cipriani and Guarino, 2014)).
- We are the first to estimate herd voting in committees.
- Our empirical estimation strategy, making use of a natural experiment, is unique.

**OVERVIEW OF THE MODEL**

- Members vote on yes/no questions:
  - Voting procedure: \( i \in \{ \text{simultaneous, sequential} \} \)
  - For each question there is an unobserved state \( \theta \in \{ 0, 1 \} \): \( p(\theta = 1 | i = 0, 1) \) is common prior belief that the correct answer is 1 or “yes”
- Each member \( j \) receives a private signal \( s_j \) which depends on \( \theta \) and precision of information \( t \) (following Cipriani and Guarino, 2014):

**EMPIRICAL STRATEGY**

- To estimate our model we specify the likelihood of the sequence of votes over the set of voting questions \( i \): 
  \[
P(\mathbf{v} | \mathbf{z}, \theta) = \prod_i P(\mathbf{v}_i | \mathbf{z}, \theta_i)
\]
  where \( \mathbf{v} \) is the vector of parameters \( \theta \), \( t \), and \( s \).
- To incorporate heterogeneity we specify \( \theta \), \( t \), and \( s \) as functions of observable voter characteristics.
- The common prior depends on observable characteristics of the vote question via a logit formulation.
- We maximize the likelihood function directly using the full data.

**RESULT**

- Subjects vote on yes/no questions related to new drug applications.
- Change in procedure 2007: sequential voting \( \rightarrow \) simultaneous, due to concerns of “herding.”
- If members engage in herd behavior (i.e., swayed by observing preceding votes) information contained in vote may be compromised.
- On average, \( \Pr(v > s) \) is around half the Bayesian model.

**QUANTIFYING HERD VOTES**

- A herd vote occurs when herd type actually changes their vote from what it would have been if they had ignored the vote history.
- Using our model and estimated parameters we simulate voting, by comparing an individual’s simulated vote under both regimes in which we can directly observe herd votes.

**FACTS**

- On average, simultaneous voting improves information aggregation given our estimates.
- Local herds can form in both the correct and incorrect direction under sequential voting.
- Incorrect (albeit rare) local herds drive our result that simultaneous voting outperforms sequential voting.
- Informational inefficiencies under sequential voting are more prominent if belief updating is naive.
- With naive updating, herd types take the preceding votes at face value, thus belief updating may accelerate faster and it is also harder to overturn beliefs that get off on the wrong foot.

**OBSERVATIONS**

- Heterogeneity in members’ abilities (\( \lambda \)): regular members have highest ability on average. consumer and patient rep’s have less precise information.
- On average committee members are slightly cautious (\( \lambda = 0.58 \)).
- Consumer rep’s are particularly cautious, their standard of proof is 0.67, whereas for patient rep’s it is 0.49.
- Estimated common priors range from 0.44 to 0.84.

**PRACTICAL IMPLICATIONS**

- Follow the example of the FDA and substitute sequential voting with simultaneous (electronic) voting.

**DATA**

- 10,466 yes/no votes with full voting profiles (813 questions).
- Voter characteristics: regular or temporary member, consumer or patient representative, educational background, gender, conflict of interest waiver.
- Vote question characteristics: FDA reviewer score, priority review, application type, and committee (e.g. Oncologic).
- Note: Recommendations from committee are non-binding.

**RESEARCH QUESTIONS**

- We develop and estimate a structural model of voting behavior to answer the following questions:
  1. Do expert panelists in FDA Committees engage in herd behavior? If yes, what proportion of votes are herd votes?
  2. Are some types of experts more likely to herd?
  3. Which voting procedure, simultaneous or sequential, leads to better information aggregation?