University of California – Berkeley
Department of Economics
Game Theory in the Social Sciences
(ECON C110 | POLSCI C135)
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Lecture XI
Social preferences and social learning

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Simple games of social preferences: dictator, ultimatum, and trust

[1] Dictator

- One player (the dictator) receives an endowment and then decides what fraction s/he wants to give to another (anonymous) player (the recipient).

[2] Ultimatum

- One player (the proposer) receives an endowment and then decides what fraction s/he wants to offer to another (anonymous) player (the responder).

- The responder can accept the proposer's offer or reject it, implying that the two players receive nothing.

[3] Trust

- One player (the trustor) receives an endowment and then decides what fraction s/he wants to offer to another (anonymous) player (the trustee).

- There is nothing the trustor can do to ensure a return of any kind. Before the transfer arrives into the trustee's hands, the transfer is magnified by a factor $K > 1$ (doubled or tripled).

- The trustee has the option to send any fraction of the received transfer back to the trustor.

“Economic man” in cross-cultural perspective: Behavioral experiments in 15 small-scale societies

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DISCRIMINATION IN A SEGMENTED SOCIETY: AN EXPERIMENTAL APPROACH*

CHAIM FERSHTMAN AND URI GNEEZY

This paper proposes an experimental approach to studying different aspects of discrimination. We let participants play various games with opponents of distinct ethnic affiliation. Strategies based upon such ethnic affiliation provide direct evidence of ethnic discrimination. This approach was utilized to study ethnic discrimination in Israeli Jewish society. Using the "trust game," we detected a systematic mistrust toward men of Eastern origin. A "dictator game" experiment indicated that this discrimination was due to (mistaken) ethnic stereotypes and not to a "taste for discrimination." The "ultimatum game" enabled us to trace another ethnic stereotype that reversed the discrimination's direction. One of the surprising results is that this ethnic discrimination is an entirely male phenomenon.

Distributional preferences

- Distributional preferences shape individual opinions on a range of issues related to the redistribution of income.

- Examples include government-sponsored healthcare, social security, unemployment benefits, and more.

- These issues are complex and contentious in part because people promote their competing private interests.

- But people also often disagree about what constitutes a just or equitable outcome.

For example:

- We typically associate the Democratic party with the promotion of policies which reduce inequality, and the Republican party with the promotion of efficiency.

- However, whether Democratic voters are more willing to sacrifice efficiency, and even their own income, to reduce inequality is an open question.

Distinguish fair-mindedness from preferences regarding equality-efficiency tradeoffs and accurately measuring both in a large and diverse sample of American voters.

Fair-mindedness and equality versus efficiency

Distributional preferences may naturally be divided into two qualitatively different components:

- The weight on own income versus the incomes of others (fair-mindedness) .
- The weight on reducing differences in incomes versus increasing total income (equality-efficiency tradeoffs).

Fair-minded people may disagree about the extent to which efficiency should be sacrificed to combat inequality, as a comparison of Harsanyi (1955) and Rawls (1971) would suggest.

Template for analysis

[1] A generalized dictator game where each subject faces a menu of budget sets representing the feasible monetary payoffs.

[2] An incentivized experiment using the American Life Panel (ALP), a longitudinal survey administered online by the RAND Corporation.

[3] Combine data from the experiments with detailed individual demographic and economic information on panel members.

A choice of the allocation (π_s, π_o) from the budget set $p_s\pi_s + p_o\pi_o = 1$ represents the payoffs to persons $self$ and $other$, respectively.

The budget line configuration allows to identify the equality-efficiency tradeoffs that subjects make in their distributional preferences:

- *decreasing* $p_s\pi_s$ when p_s/p_o *increases* indicates preferences weighted towards efficiency (increasing total payoffs)
- *increasing* $p_s\pi_s$ when p_s/p_o *increases* indicates preferences weighted towards equality (reducing differences in payoffs).

A standard model of distributional preferences

We decompose distributional preferences into fair-mindedness and equality-efficiency tradeoffs by employing constant elasticity of substitution (CES) utility functions.

The CES form is commonly employed in demand analysis. In the redistribution context, the CES has the form

$$u_s(\pi_s, \pi_o) = [\alpha(\pi_s)^\rho + (1-\alpha)(\pi_o)^\rho]^{1/\rho}$$

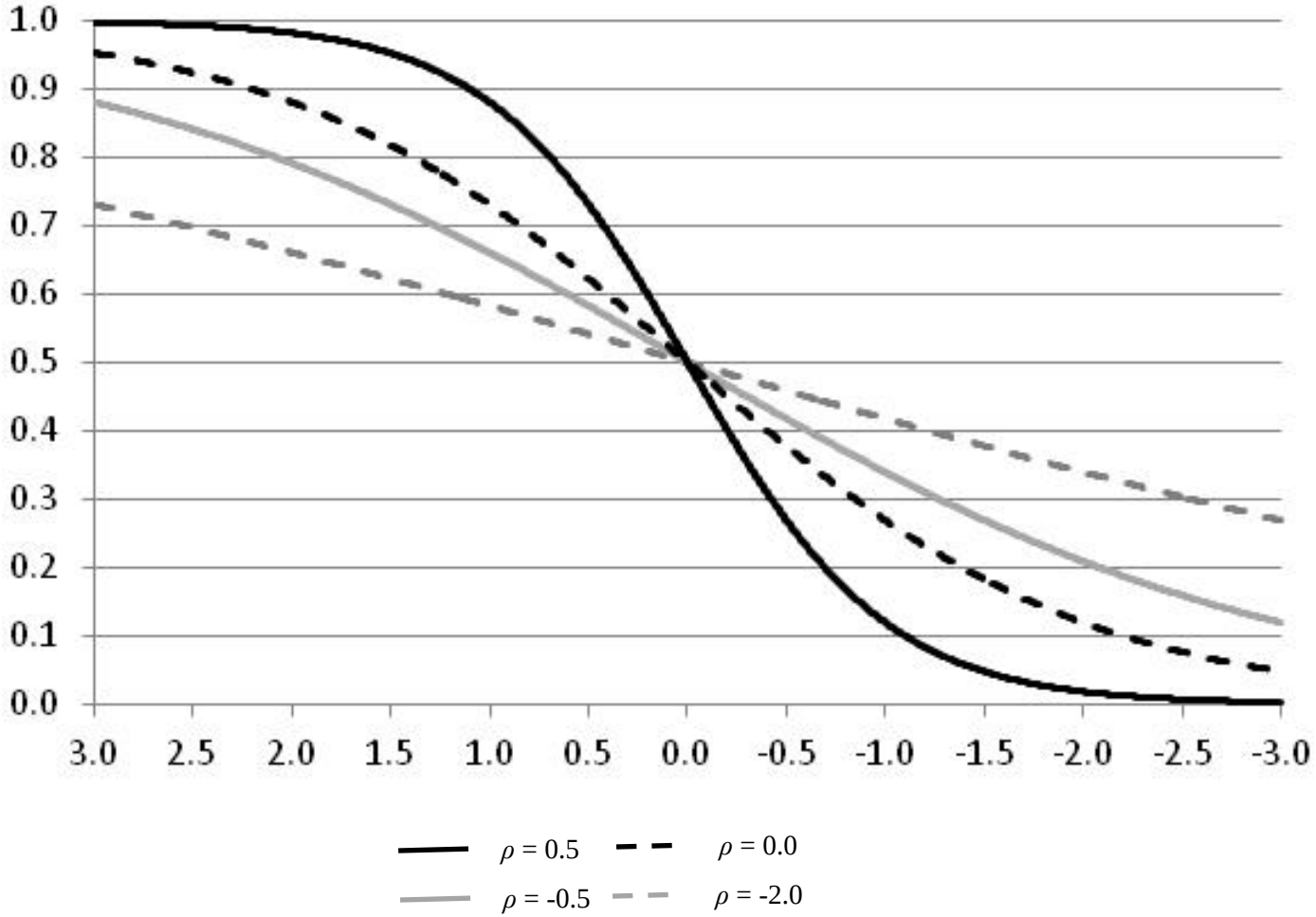
where α measures the indexical weight on payoffs to $self$, whereas ρ measures the willingness to trade off equality and efficiency.

If $\rho > 0$ ($\rho < 0$) a decrease in the relative price giving p_s/p_o lowers (raises) the expenditure on tokens allocated to $self$ $p_s\pi_s$:

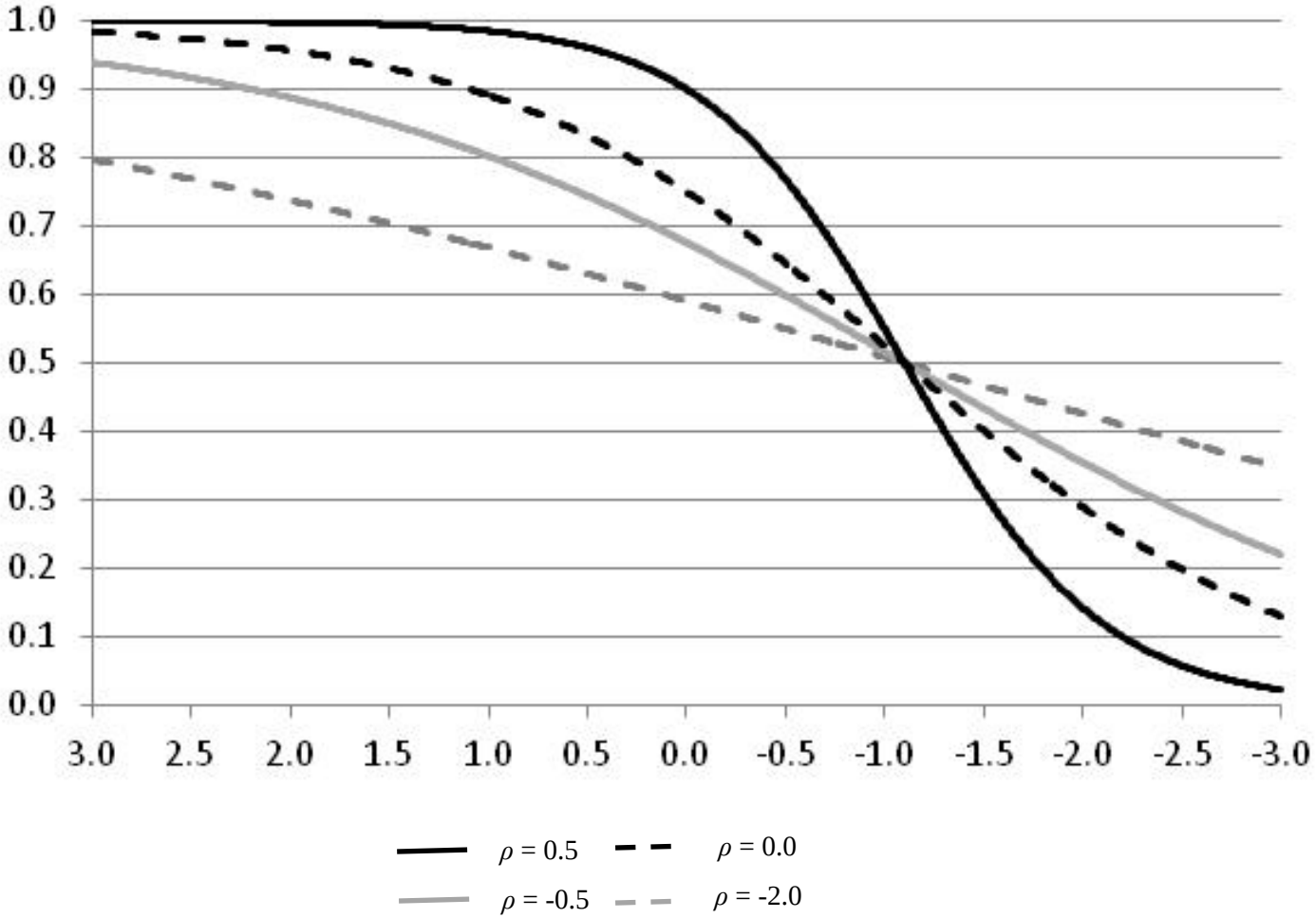
- $\rho > 0$ indicates preferences weighted towards increasing total payoffs.
- $\rho < 0$ indicates preferences weighted towards reducing differences in payoffs.

Our experimental method generates many observations per subject, and we can therefore analyze both types of distributional preferences at the individual level.

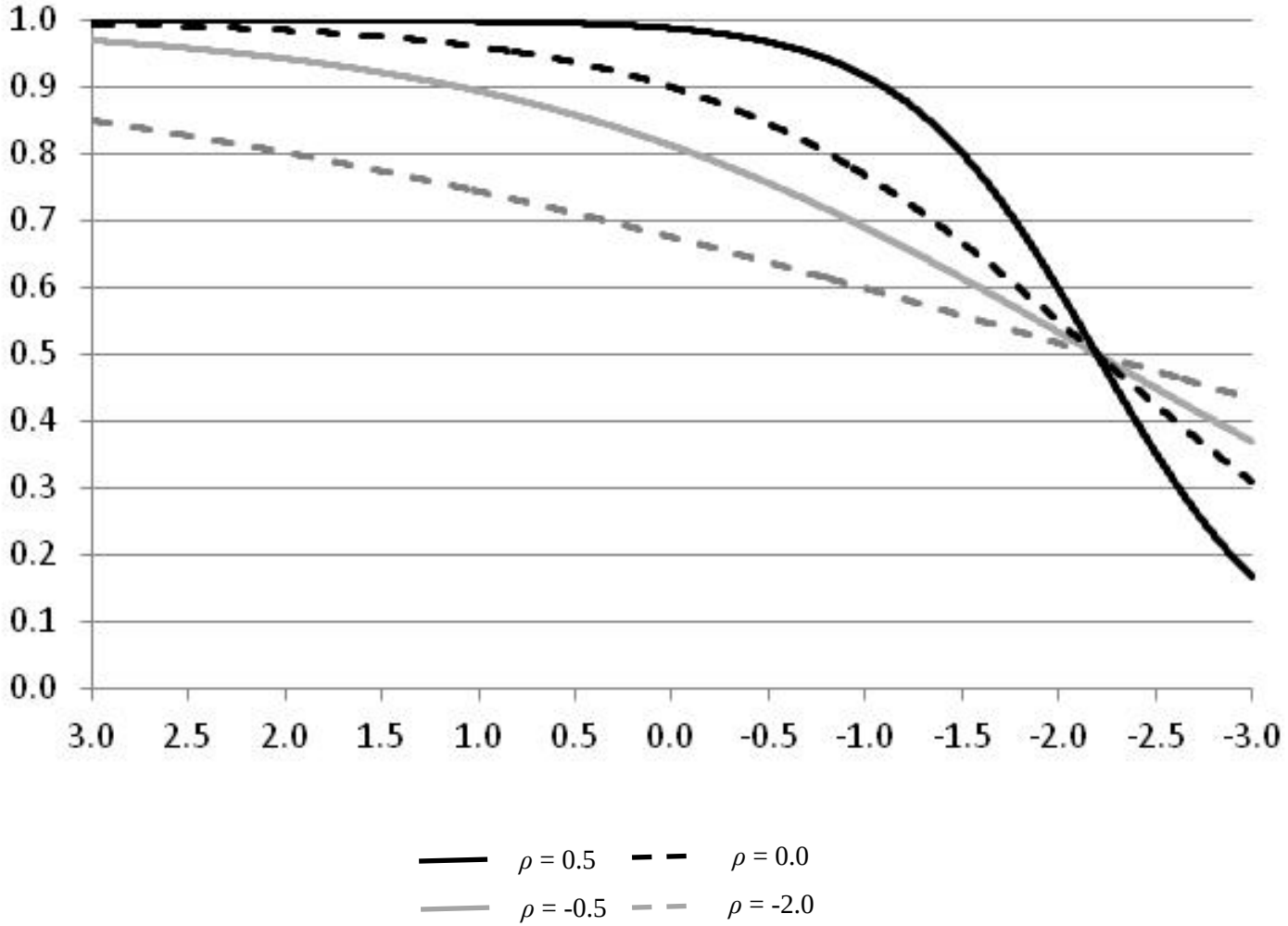
The relationship between the log-price ratio and optimal token share (α=0.5 and different values of ρ)



The relationship between the log-price ratio and optimal token share (α=0.75 and different values of ρ)



The relationship between the log-price ratio and optimal token share (α=0.9 and different values of ρ)



Foundations of Economic Analysis (1947)

Paul A. Samuelson (1915-2009) – the first American Nobel laureate in economics and the foremost (academic) economist of the 20th century (and the uncle of Larry Summers…).

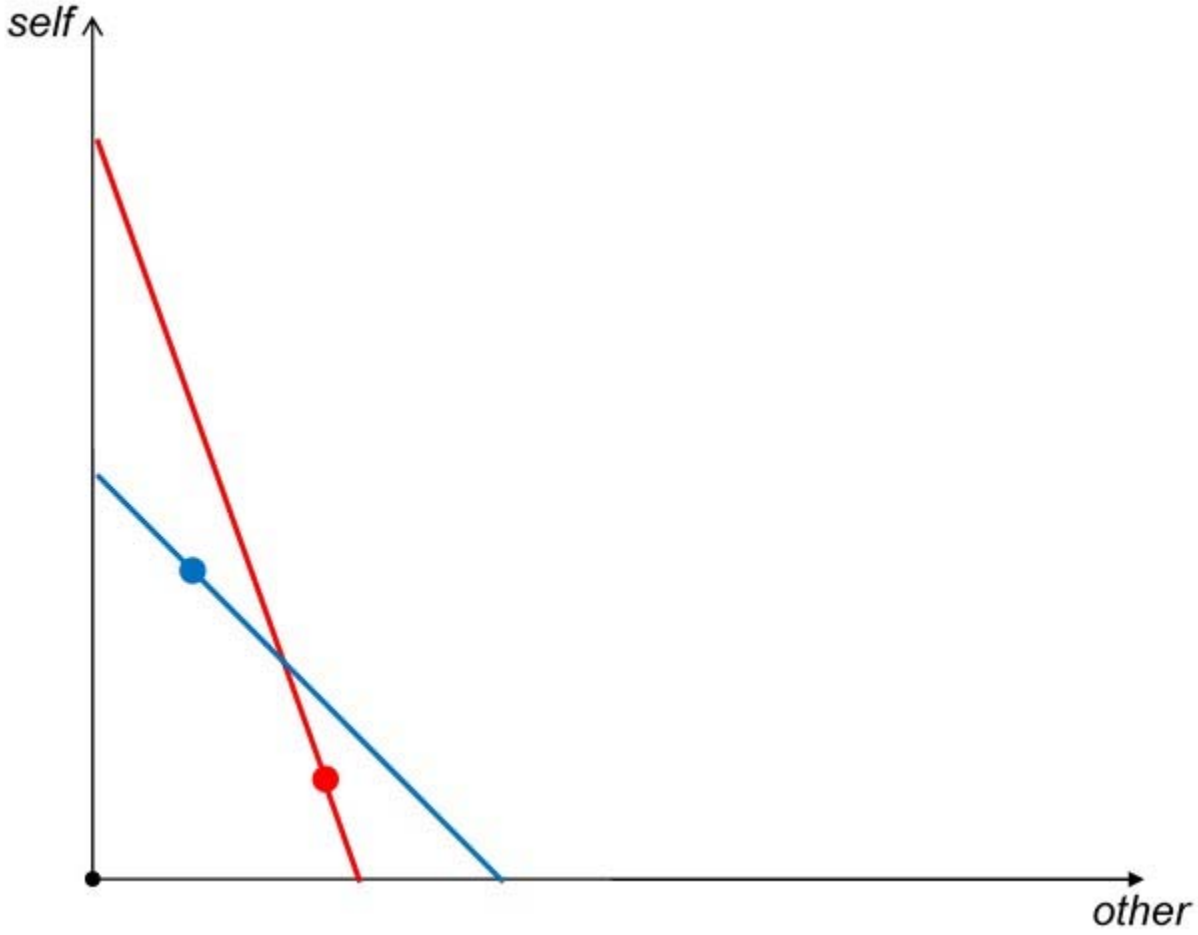
The Generalized Axiom of Revealed Preference (GARP)

The most basic question to ask about choice data is whether it is consistent with individual utility maximization, and classical revealed preference theory provides a direct test:

- choices are consistent with maximizing a well-behaved (piecewise linear, continuous, increasing, and concave) utility function if and only if they satisfy GARP.

The obvious difficulty: GARP provides an exact test of utility maximization – either the data satisfy GARP or they do not – but individual choices frequently involve at least some errors.

Testing for GARP



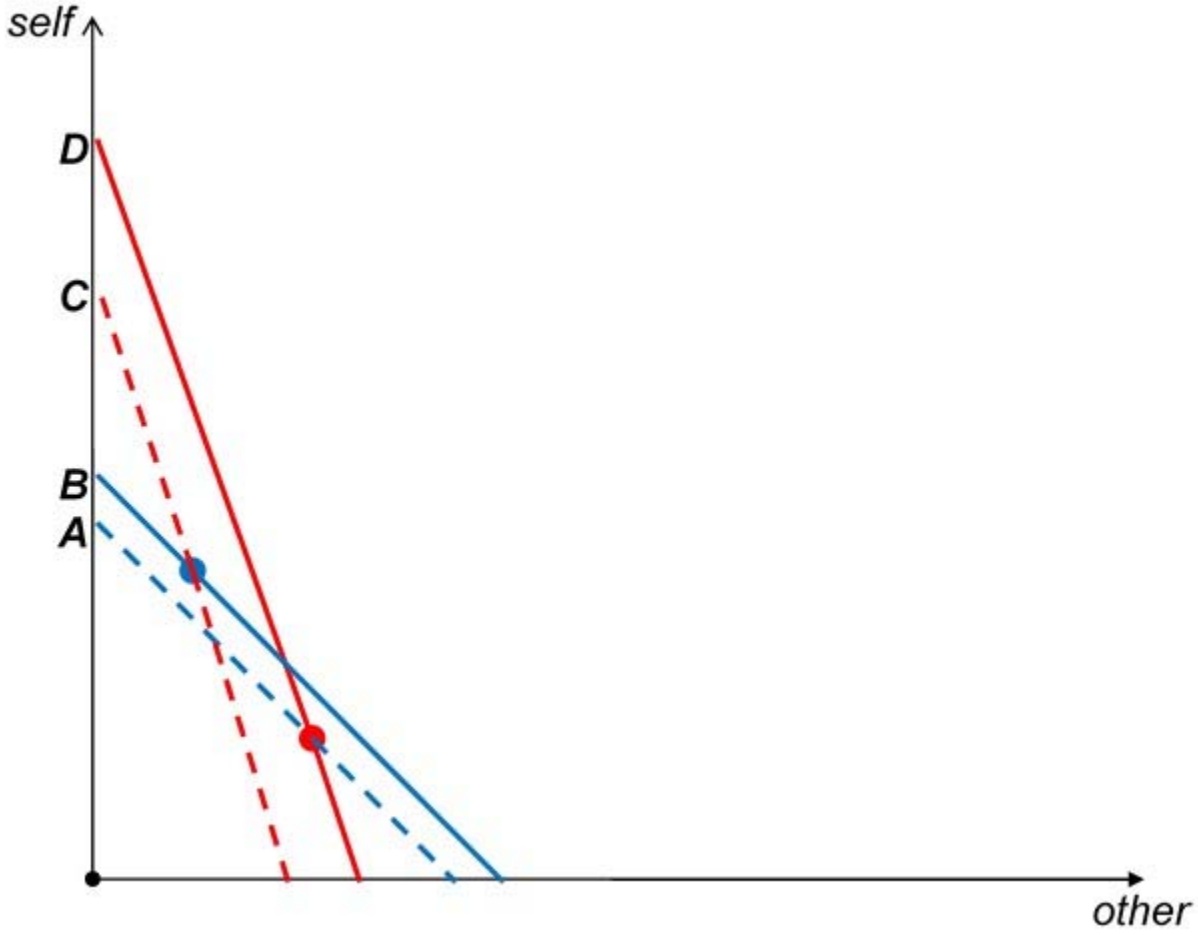
The critical cost efficiency index (CCEI)

The CCEI measures the fraction by which each budget constraint must be shifted in order to remove all violations of GARP.

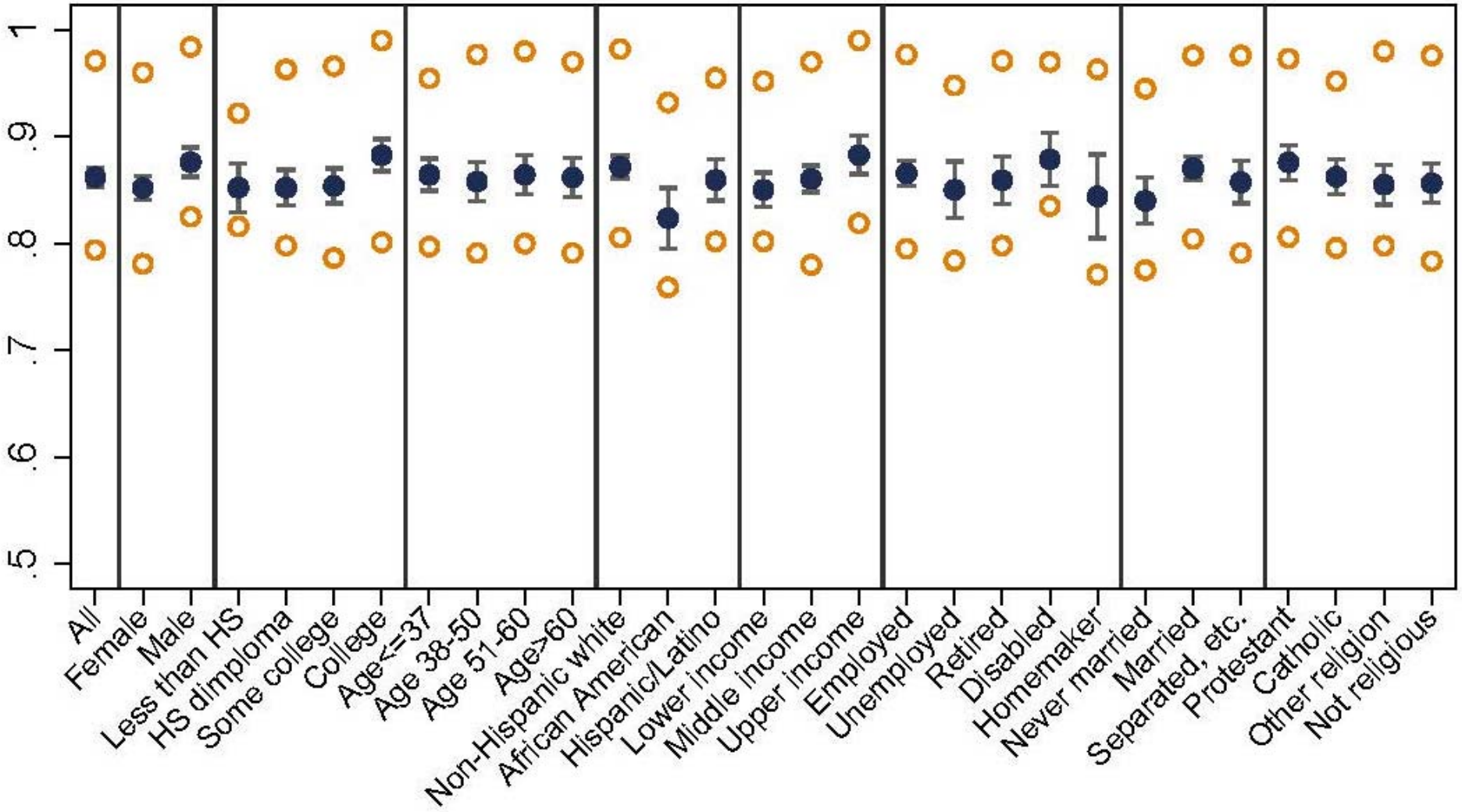
- The CCEI is between 0 and 1 – indices closer to 1 mean the data are closer to perfect consistency with GARP and hence with utility maximization.

Because our subjects make choices in a wide range of budget sets, our data provides a stringent test of utility maximization.

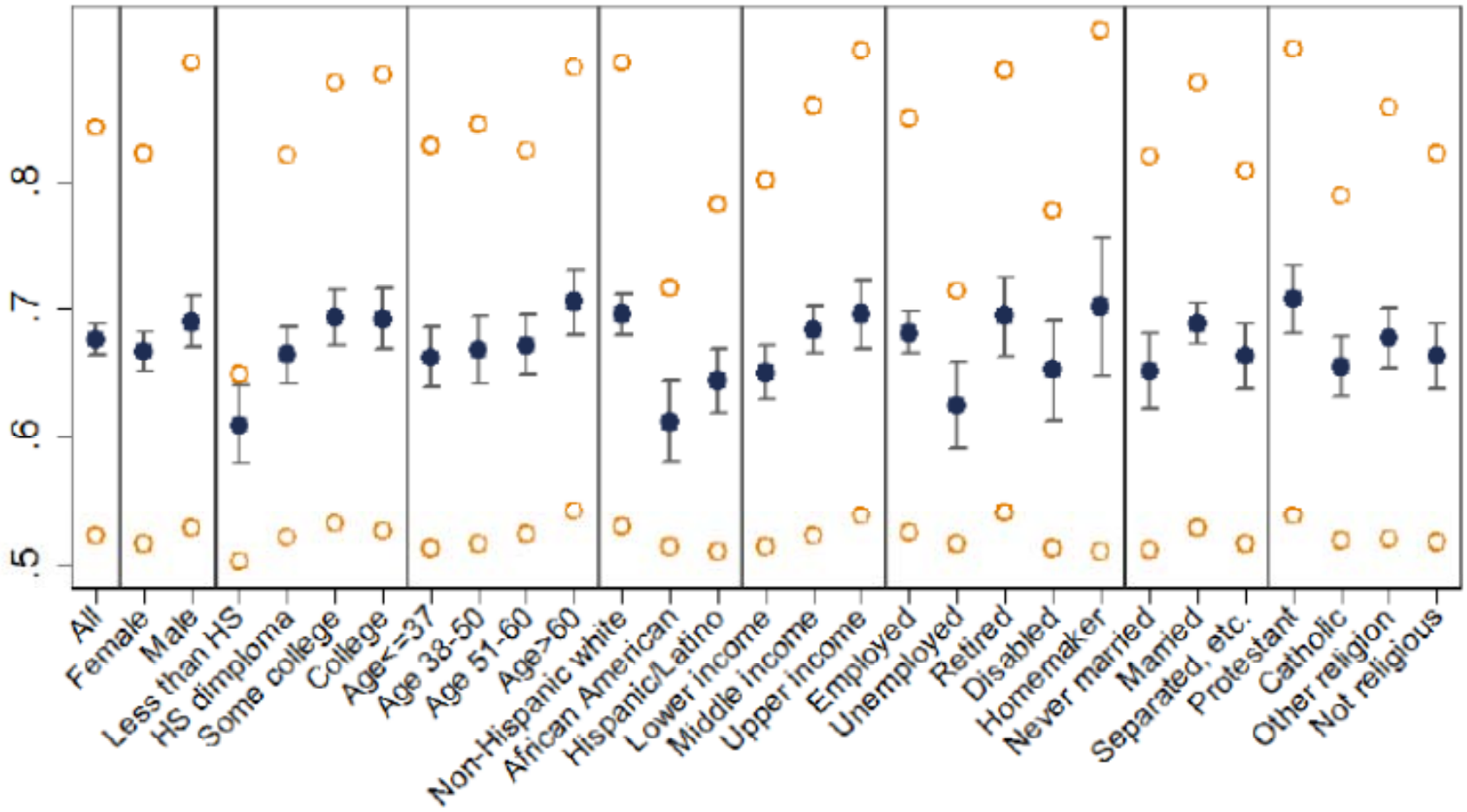
The construction of the CCEI



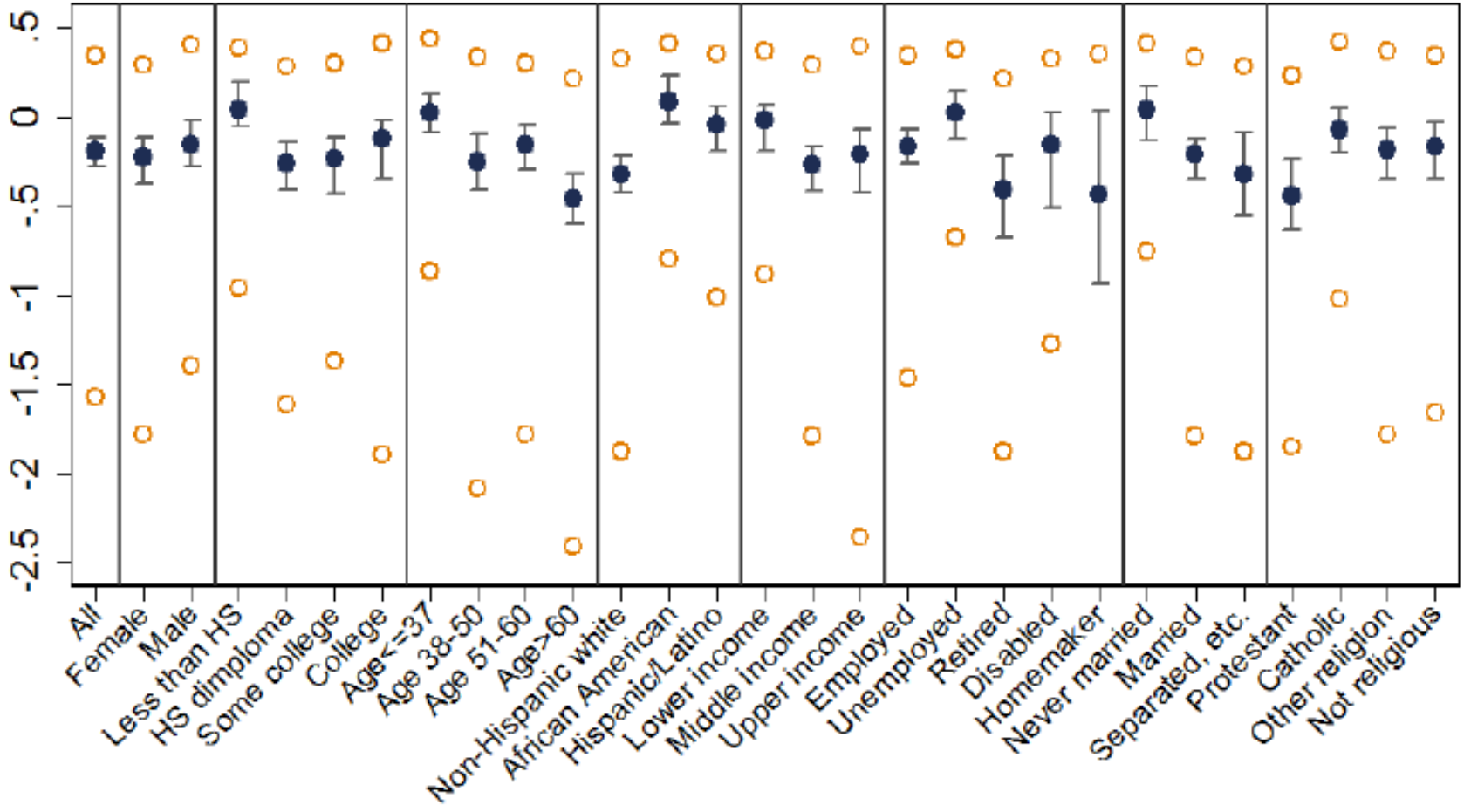
Economic rationality – CCEI scores



The mean estimated fair-mindedness by sub-group



The median estimated equality-efficiency tradeoff by sub-group



Distributional preferences and voting behavior

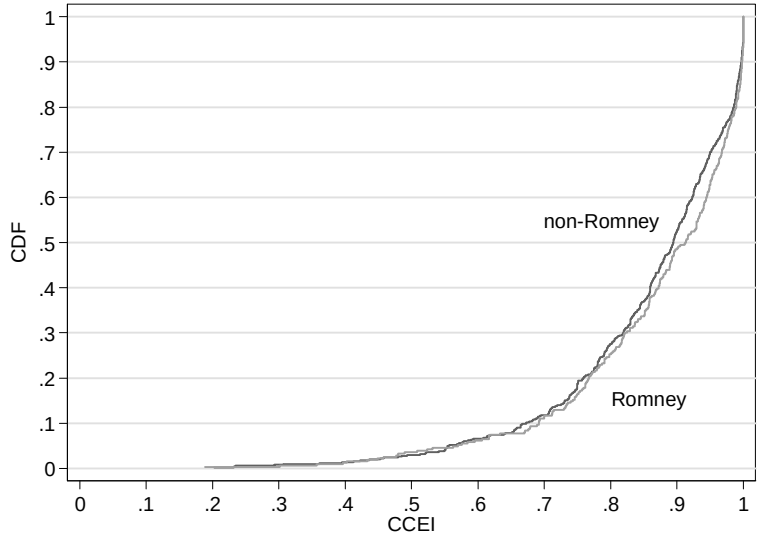
- It is natural to examine the empirical relationship between distributional preferences and subjects' political decisions.

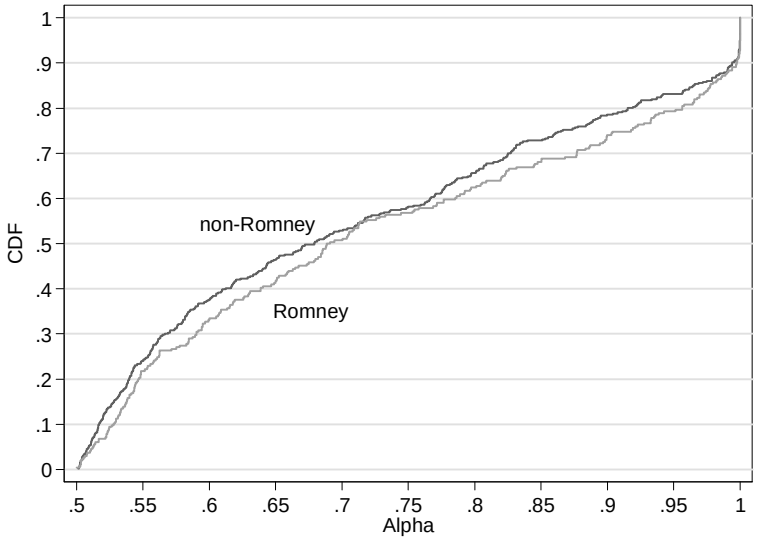
- Whether efficiency-focused distributional preferences are associated with political support for government redistribution is an open question.

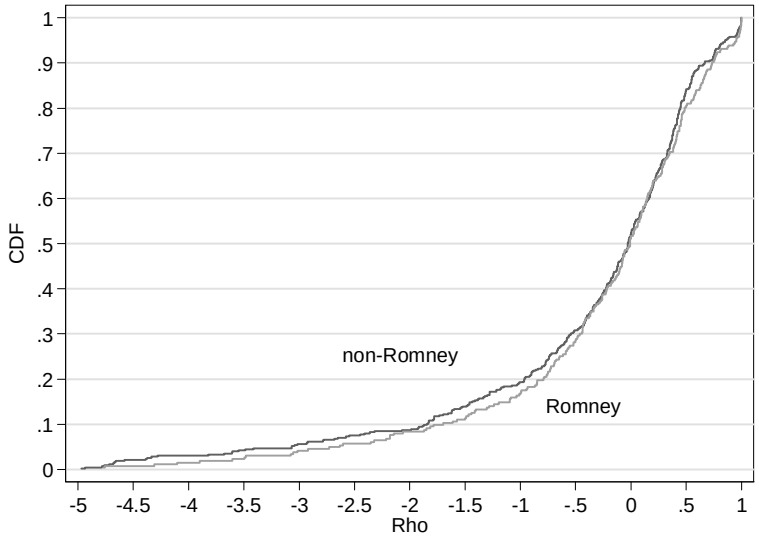
- Democrats are not more averse to inequality than Republicans – they instead look more favorably on government intervention in general.

- We explore the link between equality-efficiency tradeoffs and political behavior by looking at voting decisions in the 2012 presidential election.

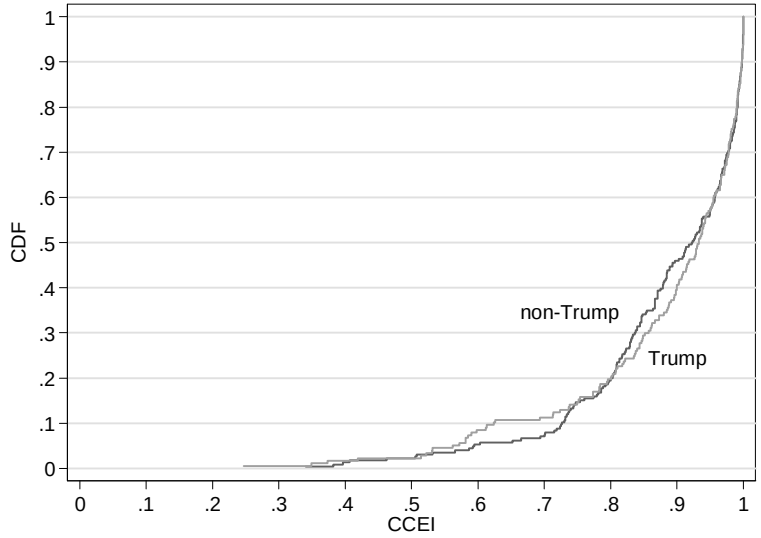
Romney versus non-Romney voters

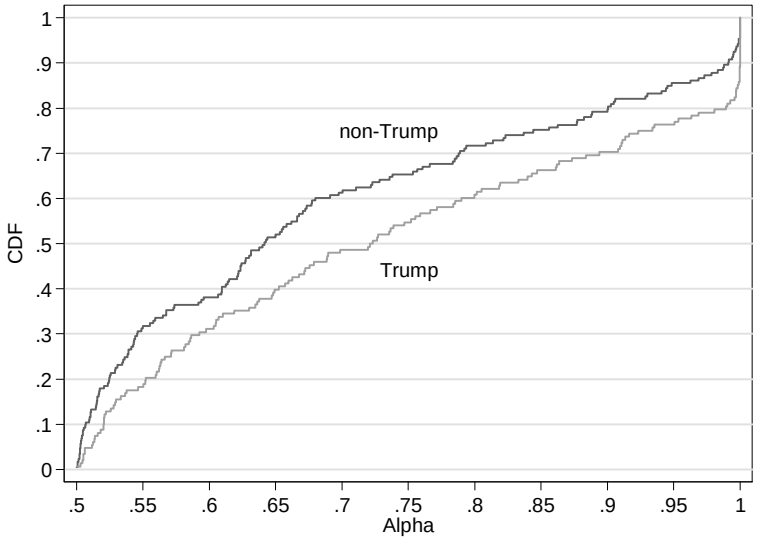


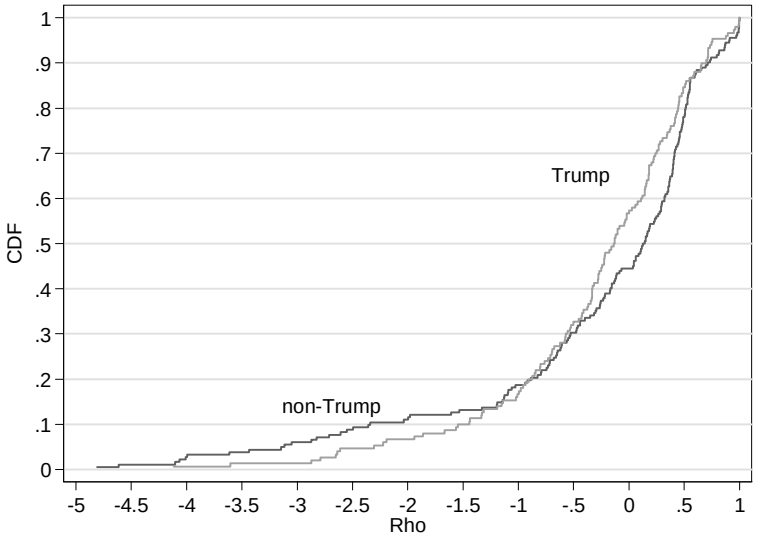




Trump versus non-Trump voters







The Distributional Preferences of Elites

The distributional preferences of law students

Elite law students hold especial interest because they assume positions of substantial power in national and indeed global social, economic and political affairs:

- All eight sitting Supreme Court Justices (as well as Garland and Gorsuch nominated to succeed Scalia) are graduates of either Yale or Harvard Law Schools.

- Over the past century more than half of the presidents attended Yale, Harvard or Princeton, and the last four before Donald Trump are graduates of Yale or Harvard.

The distributional preferences of elite law students will likely exercise a major influence over public and private orderings in the United States.

The distributional preferences of medical students

Patients rely on physicians to act in their best interest, healthcare systems rely on physicians to efficiently ration limited care, and physicians must balance these often conflicting imperatives against their own self-interest.

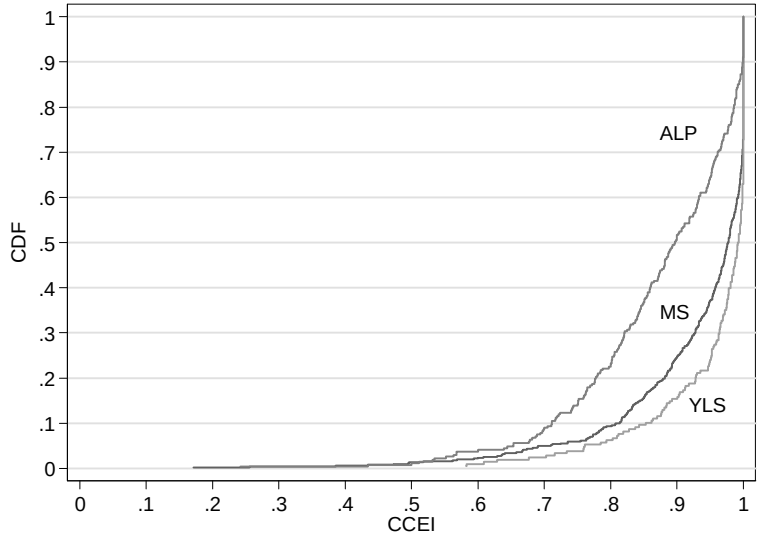
The distributional preferences of physicians thus have profound implications for patient outcomes and wellbeing, as well as the success of reforms attempting to provide more equitable, higher quality and more efficient healthcare.

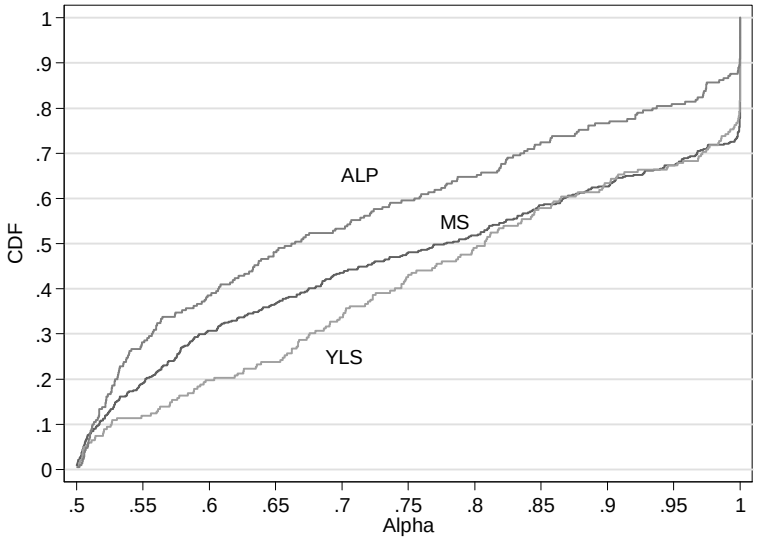
Physicians' fair-mindedness – the concern for patient health and wellbeing beyond own self-interest – has been reinforced by ethical guidelines such as in the Hippocratic Oath.

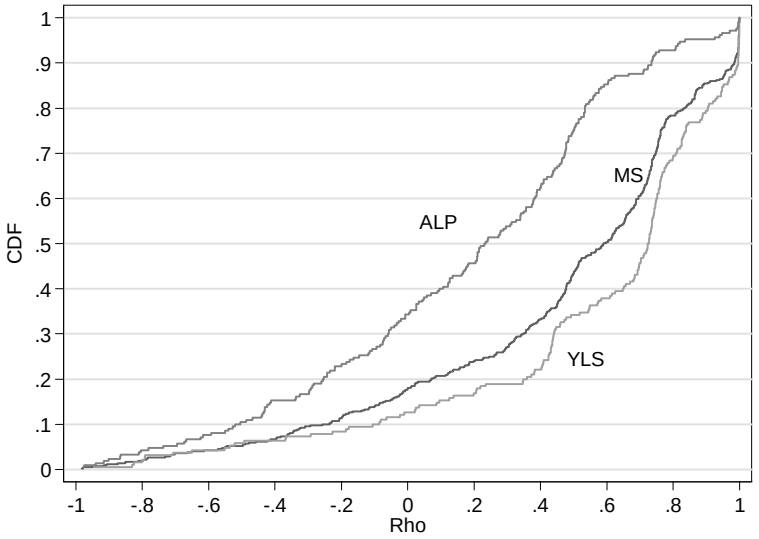
"...the behavior expected of sellers of medical care is different from that of business men in general...His behavior is supposed to be governed by a concern for the customer's welfare which would not be expected of a salesman." (Kenneth Arrow, 1963)

"...medicine is one of the few spheres of human activity in which the purposes are unambiguously altruistic." (Editors, *New England Journal of Medicine*, 2000)

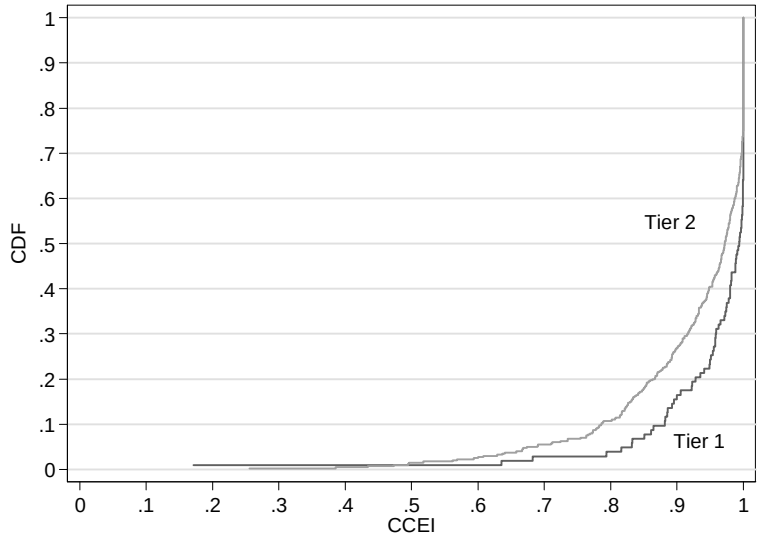
Law students (YLS), medical students (MS) and the general population (ALP)

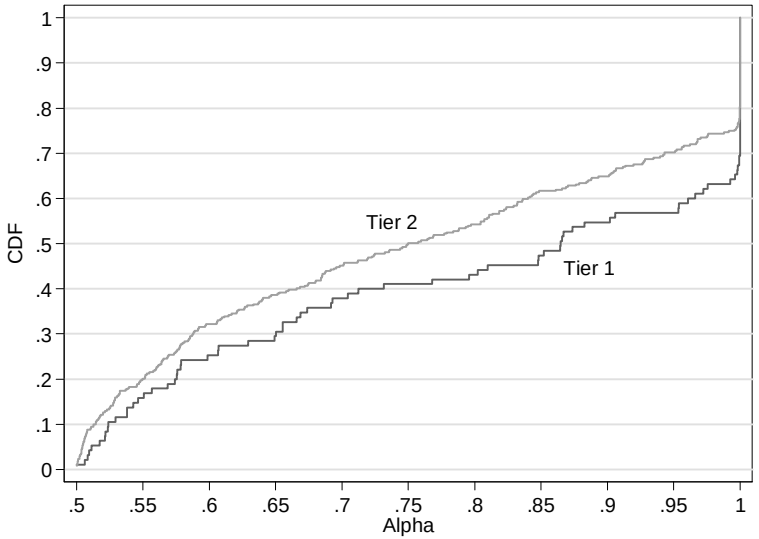


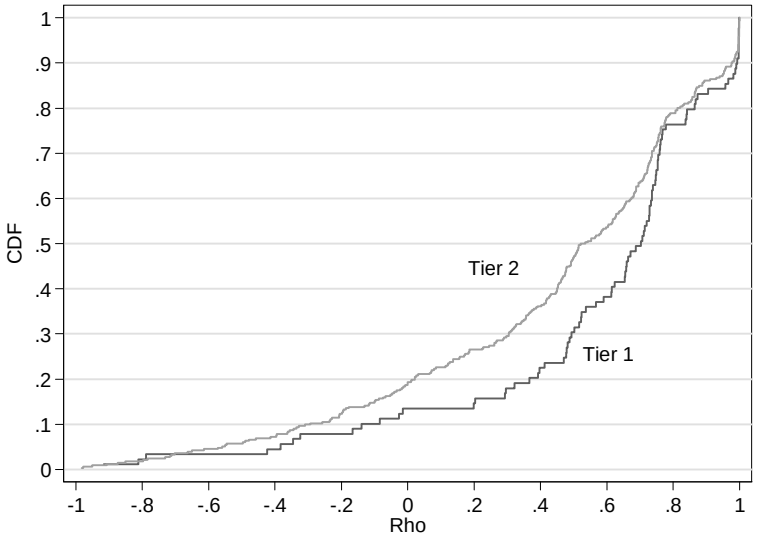




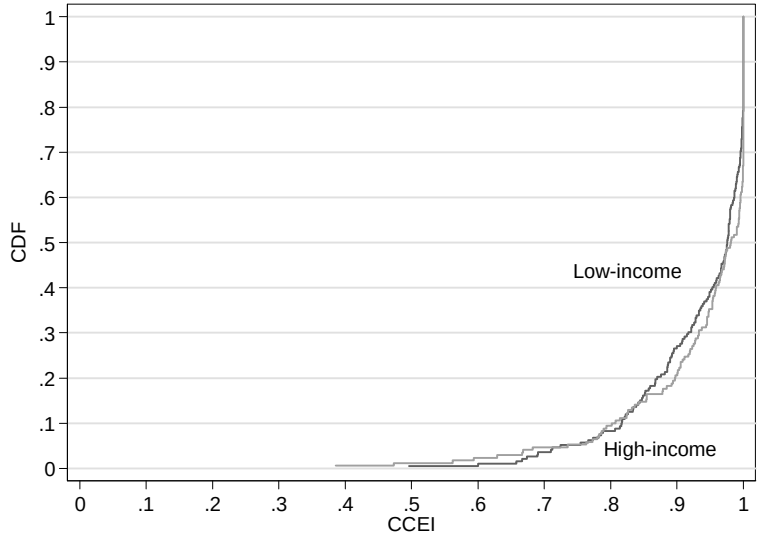
medical students attending tier 1 versus tier 2 medical schools

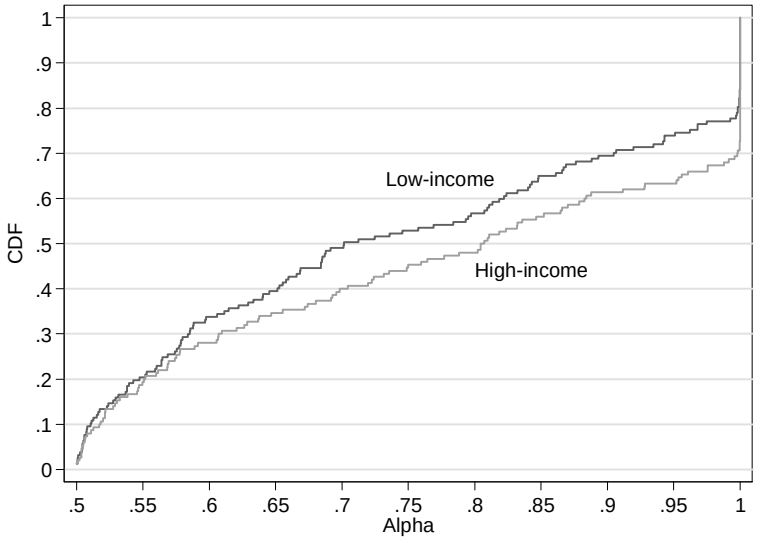


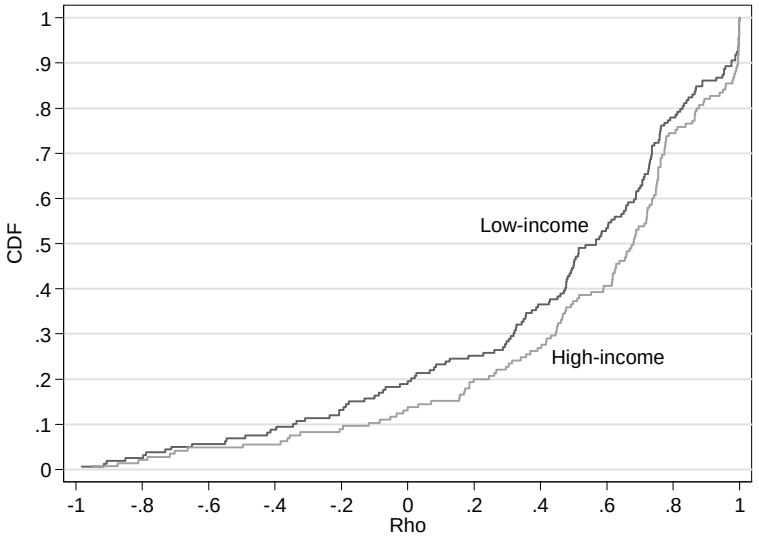




Low-income (<$300K) versus high-income (>$300K) medical specialties







Social Learning
Herd behavior and informational cascades

"Men nearly always follow the tracks made by others and proceed in their affairs by imitation." Machiavelli (Renaissance philosopher)

Why should individuals behave in this way?

Several "theories" explain the existence of uniform social behavior:

- benefits from conformity
- sanctions imposed on deviants
- network / payoff externalities
- social learning

Broad definition: any situation in which individuals learn by observing the behavior of others.

Informational cascades and herd behavior

Two phenomena that have elicited particular interest are *informational cascades* and *herd behavior*.

- Cascade: agents 'ignore' their private information when choosing an action.

- Herd: agents choose the same action, not necessarily ignoring their private information.

- While the terms informational cascade and herd behavior are used interchangeably there is a significant difference between them.

- In an informational cascade, an agent considers it optimal to follow the behavior of her predecessors without regard to her private signal.

- When acting in a herd, agents choose the same action, not necessarily ignoring their private information.

- Thus, an informational cascade implies a herd but a herd is not necessarily the result of an informational cascade.

A model of social learning

Signals

- Each player $n \in \{1, ..., N\}$ receives a signal θ_n that is private information.
- For simplicity, $\{\theta_n\}$ are independent and uniformly distributed on $[-1, 1]$.

Actions

- Sequentially, each player n has to make a binary irreversible decision $x_n \in \{0, 1\}$.

Payoffs

- $x = 1$ is profitable if and only if $\sum_{n \leq N} \theta_n \geq 0$, and $x = 0$ is profitable otherwise.

Information

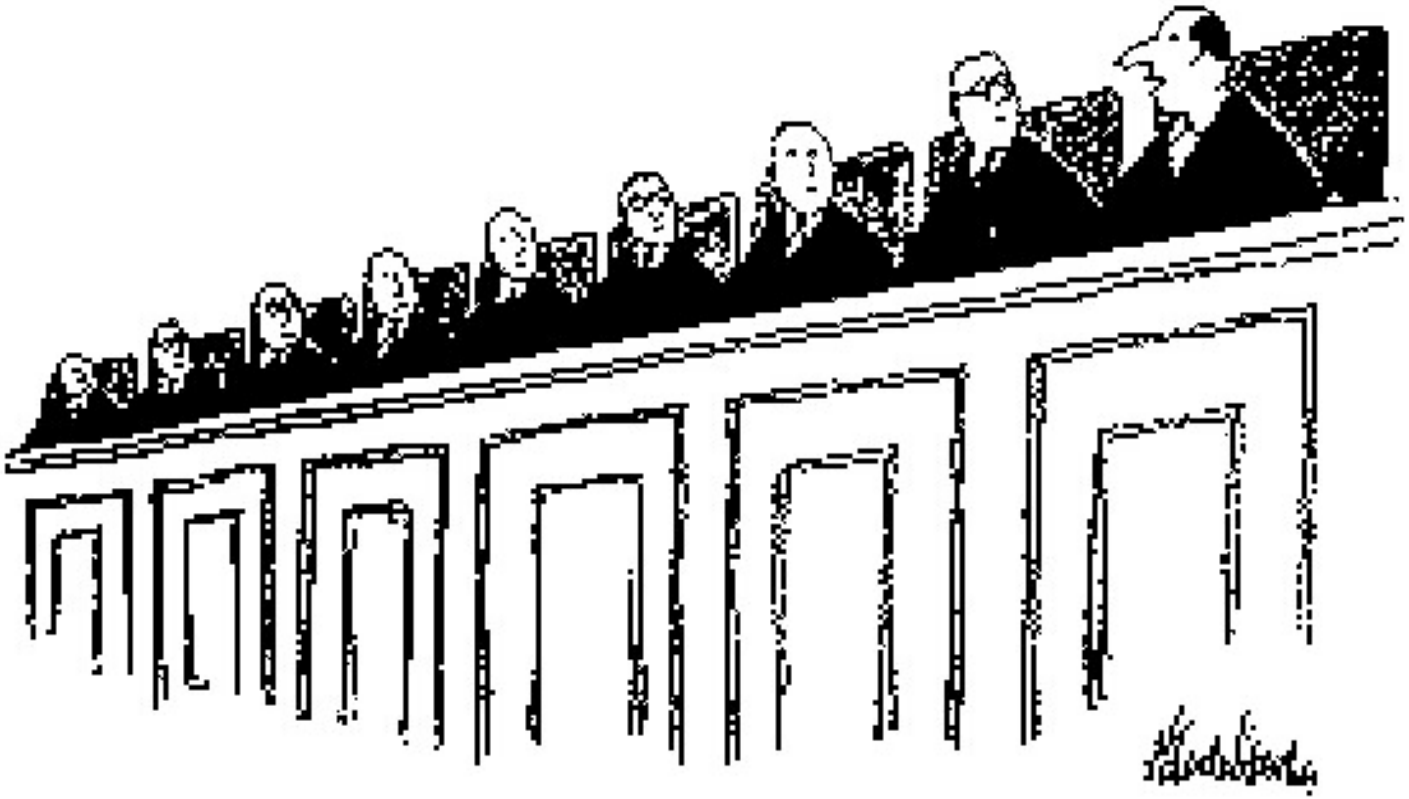
- Perfect information

$$\mathcal{I}_n = \{\theta_n, (x_1, x_2, ..., x_{n-1})\}$$

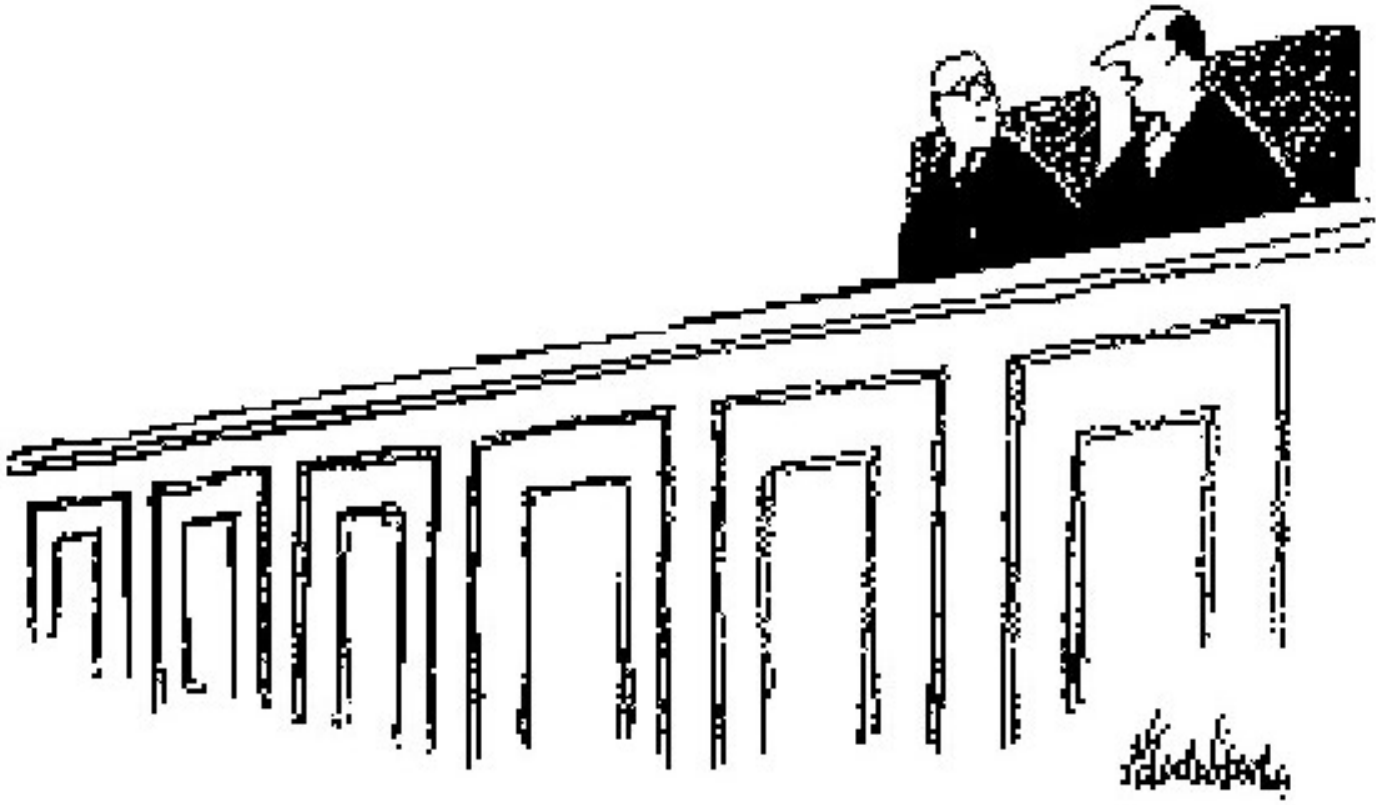
- Imperfect information

$$\mathcal{I}_n = \{\theta_n, x_{n-1}\}$$

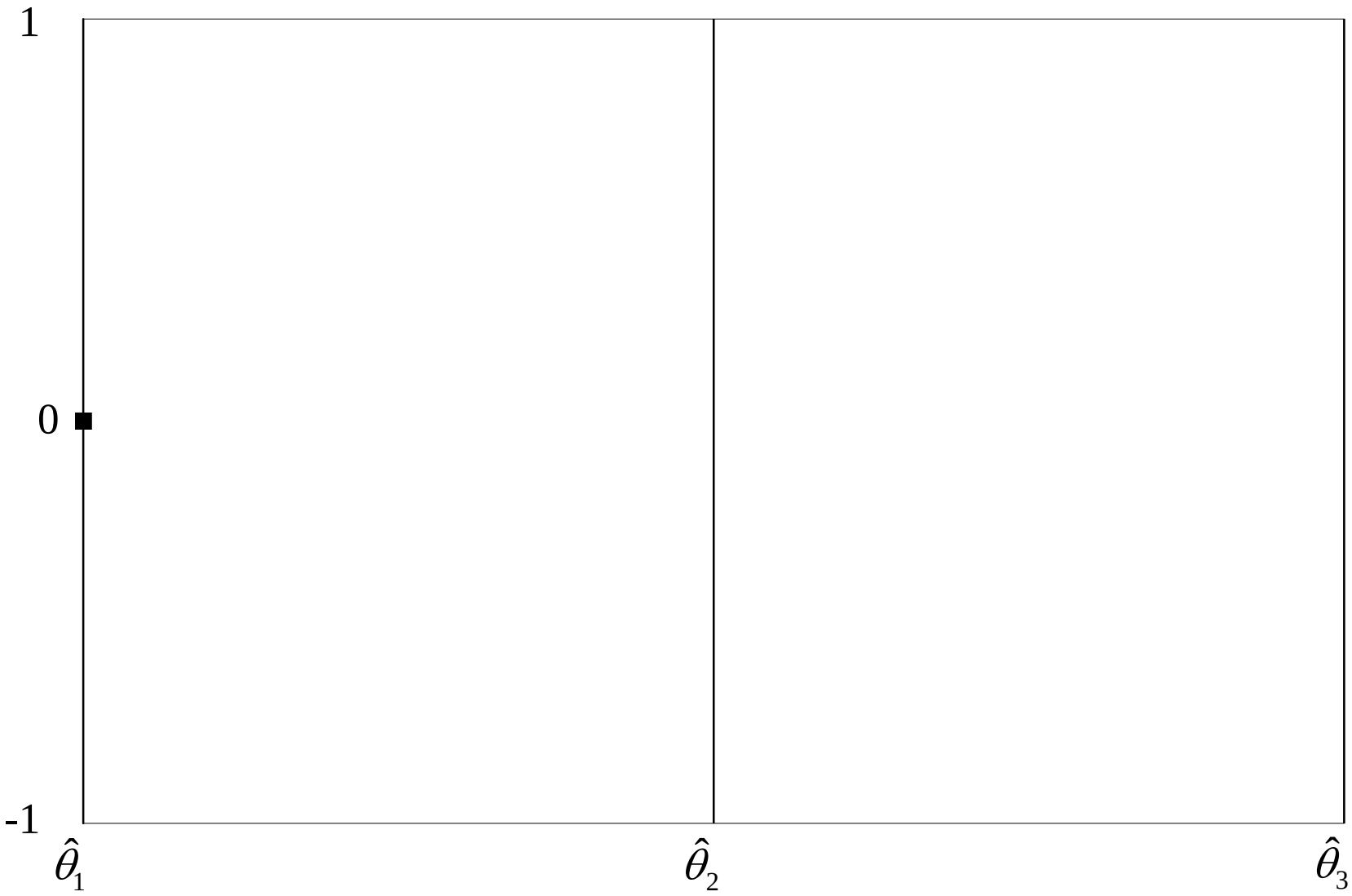
Sequential social-learning model:
Well heck, if all you smart cookies agree, who am I to dissent?



Imperfect information:
Which way is the wind blowing?!



A three-agent example



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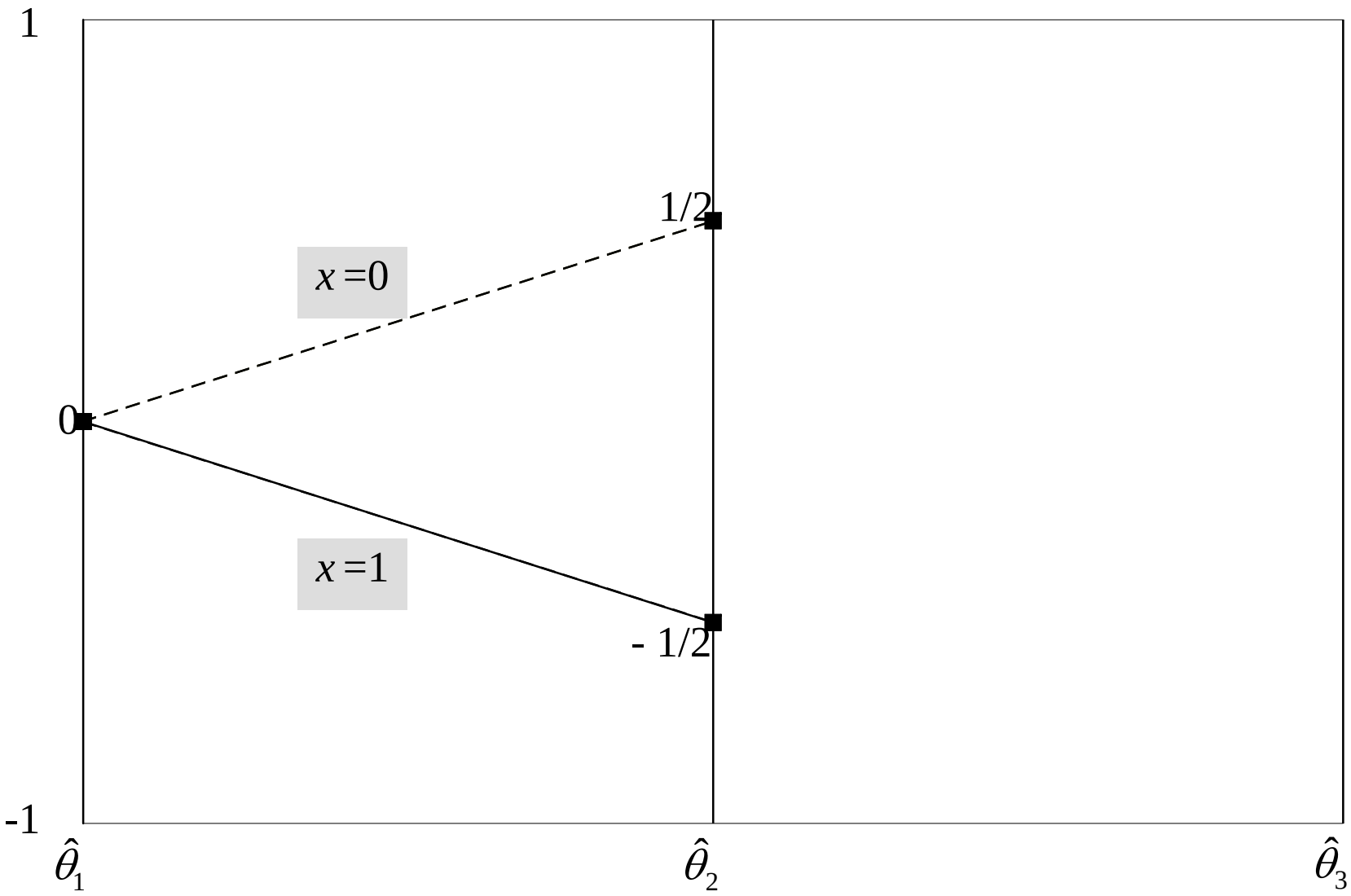
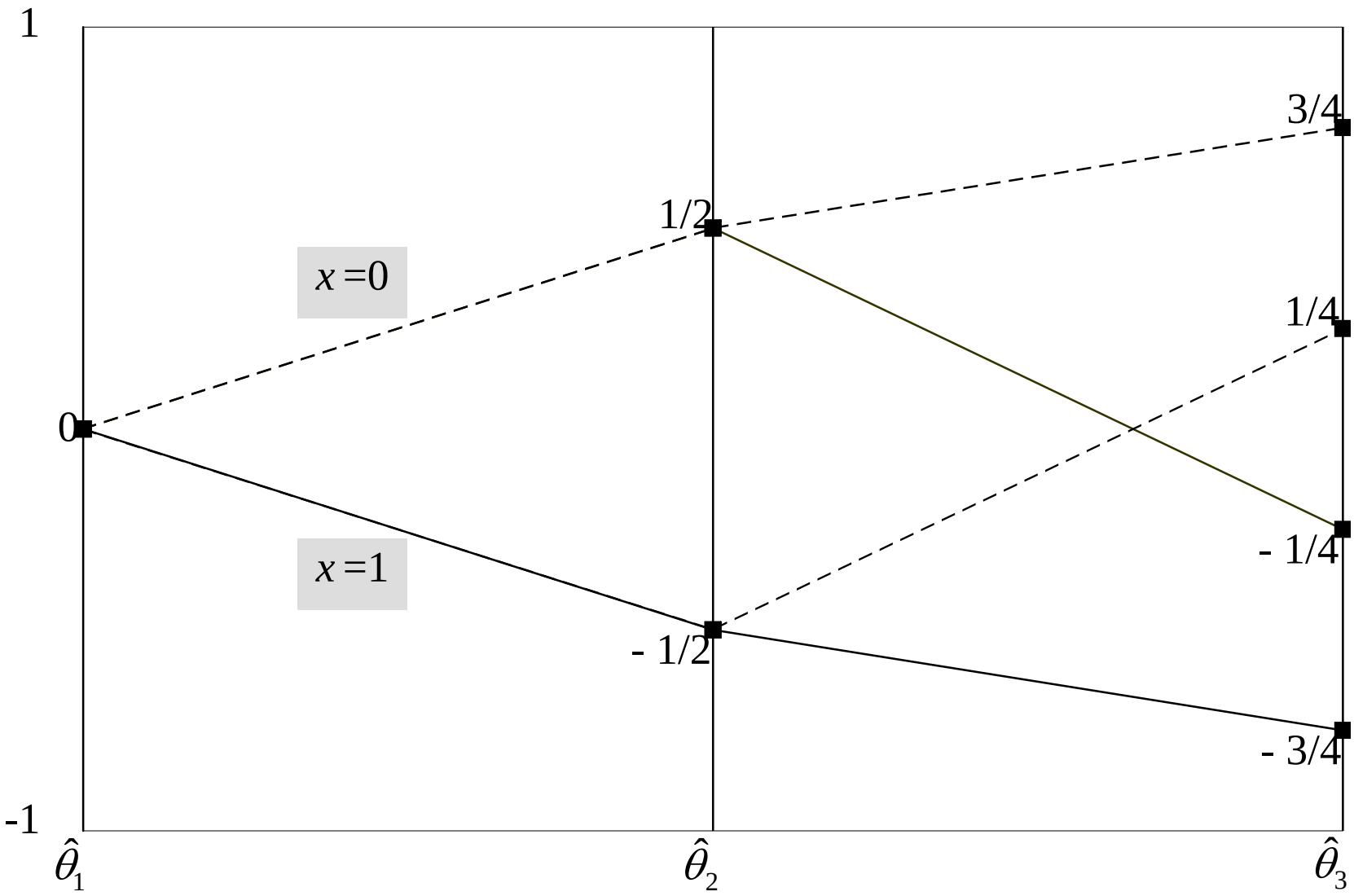
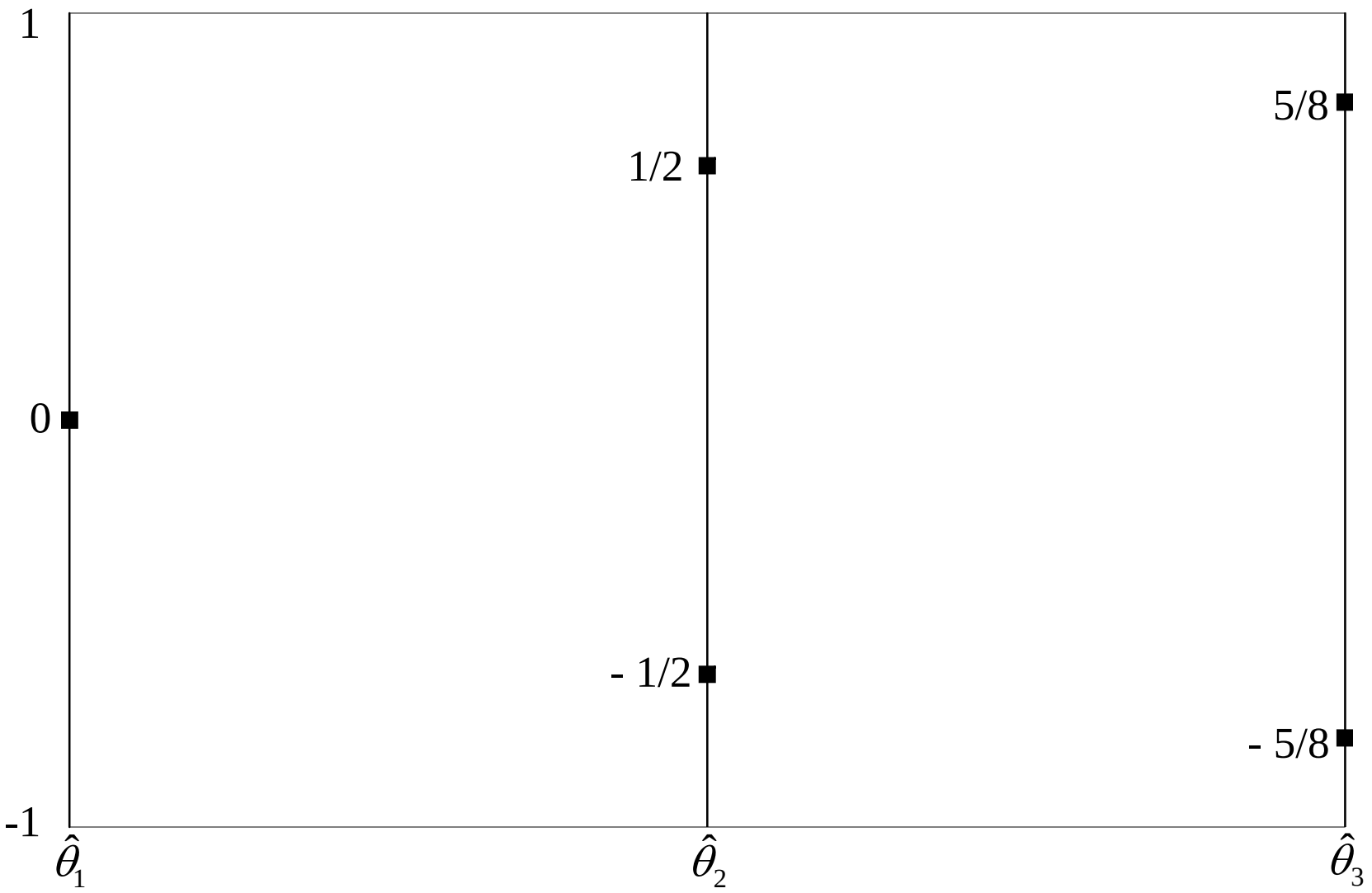


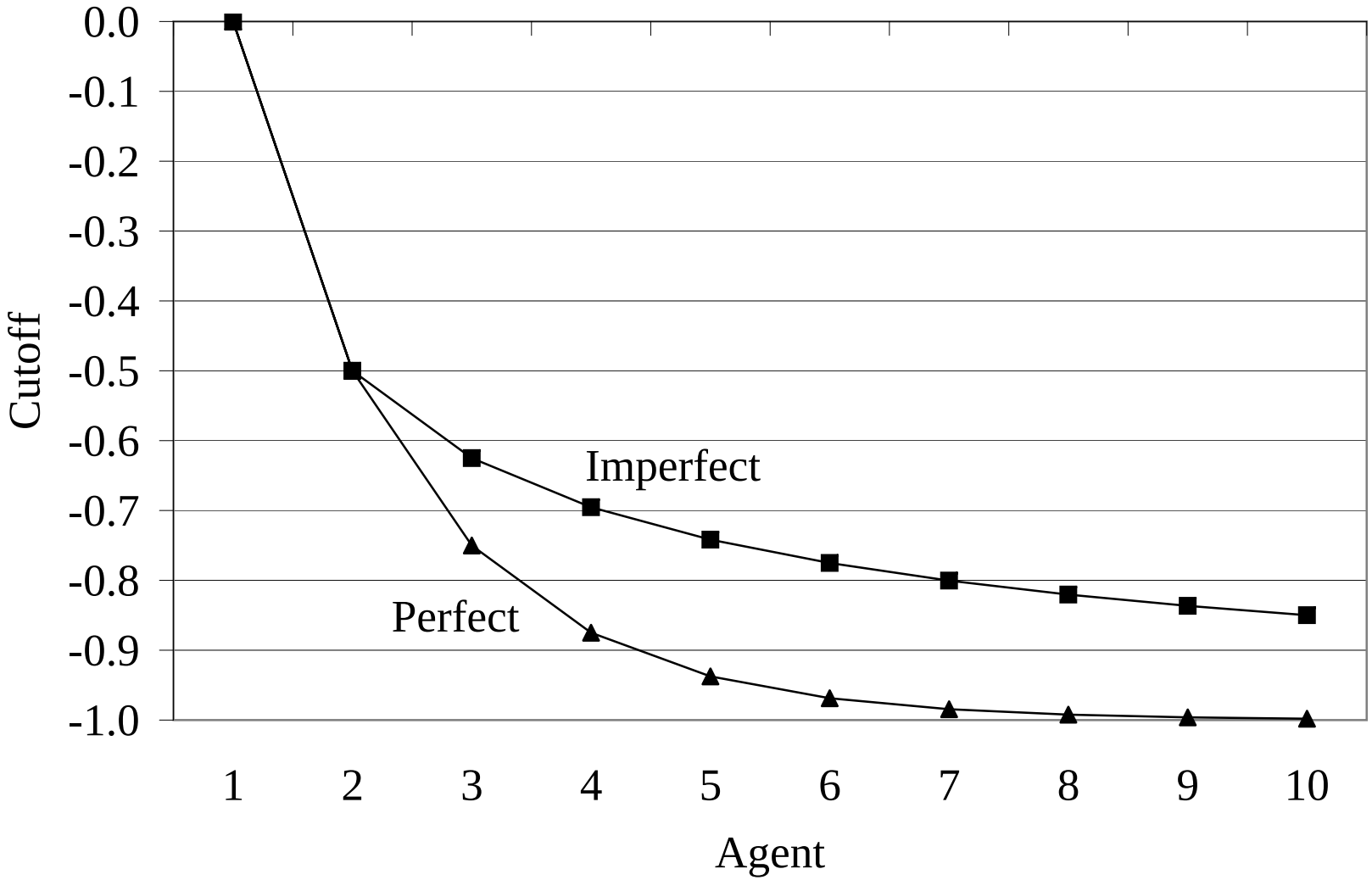
A three-agent example under perfect information



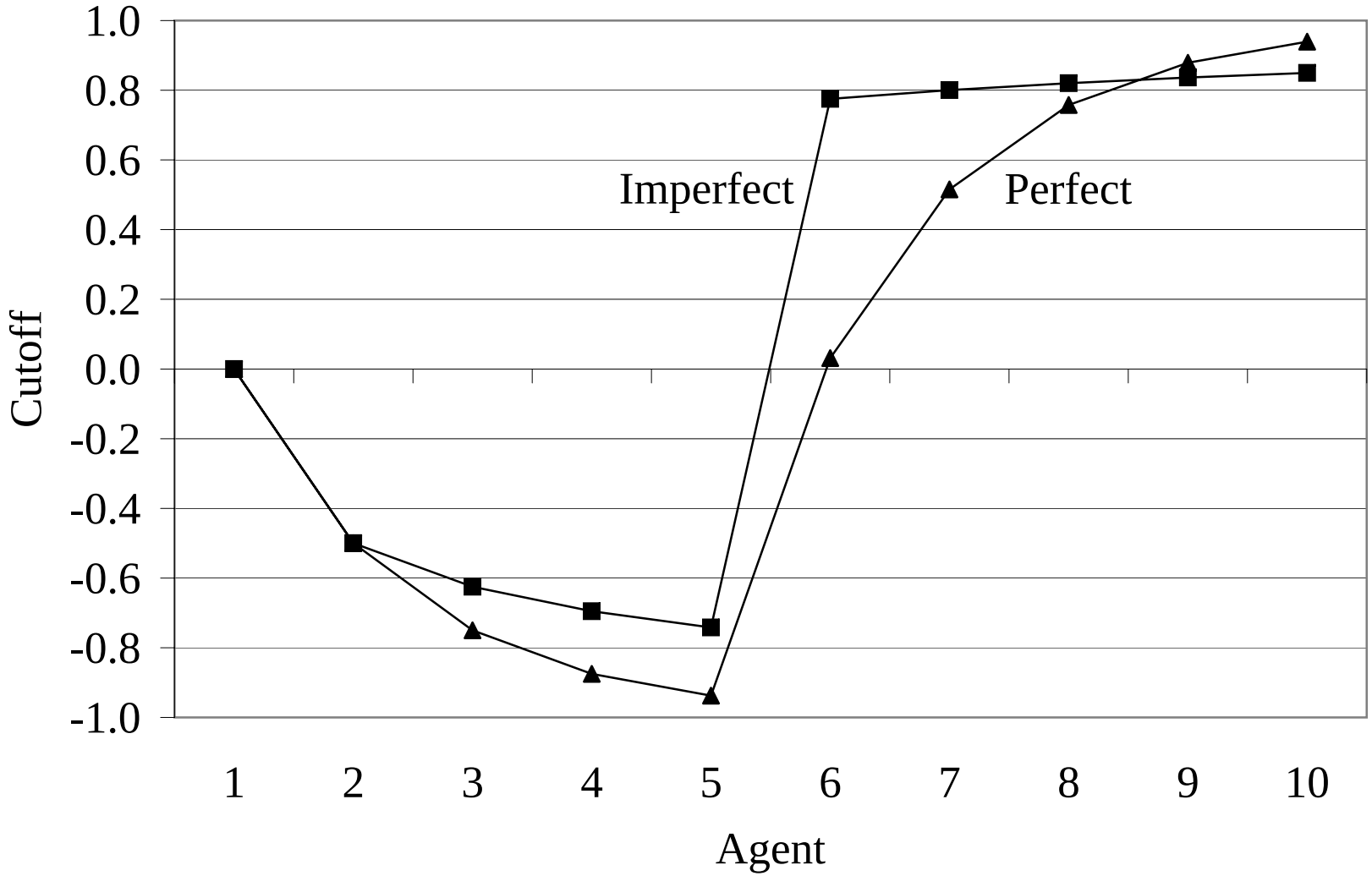
A three-agent example under imperfect information



A sequence of cutoffs under imperfect and perfect information



A sequence of cutoffs under imperfect and perfect information



The decision problem

– The optimal decision rule is given by

$$x_n = 1 \text{ if and only if } \mathbb{E}\left[\sum_{i=1}^{N} \theta_i \mid \mathcal{I}_n\right] \geq 0.$$

Since $\mathcal{I}_n$ does not provide any information about the content of successors' signals, we obtain

$$x_n = 1 \text{ if and only if } \mathbb{E}\left[\sum_{i=1}^{n} \theta_i \mid \mathcal{I}_n\right] \geq 0$$

Hence,

$$x_n = 1 \text{ if and only if } \theta_n \geq -\mathbb{E}\left[\sum_{i=1}^{n-1} \theta_i \mid \mathcal{I}_n\right].$$

The cutoff process

- For any n, the optimal strategy is the *cutoff strategy*

$$x_n = \begin{cases} 1 & if \quad \theta_n \geq \hat{\theta}_n \\ 0 & if \quad \theta_n < \hat{\theta}_n \end{cases}$$

  where

$$\hat{\theta}_n = -\mathbb{E}\left[\sum_{i=1}^{n-1} \theta_i \mid \mathcal{I}_n\right]$$

  is the optimal history-contingent cutoff.

- $\hat{\theta}_n$ is sufficient to characterize the individual behavior, and $\{\hat{\theta}_n\}$ characterizes the social behavior of the economy.

Overview of results

Perfect information

- A cascade need not arise, but herd behavior must arise.

Imperfect information

- Herd behavior is impossible. There are periods of uniform behavior, punctuated by increasingly rare switches.

- The similarity:
  - Agents can, for a long time, make the same (incorrect) choice.
- The difference:
  - Under perfect information, a herd is an absorbing state. Under imperfect information, continued, occasional and sharp shifts in behavior.

- The dynamics of social learning depend crucially on the extensive form of the game.

- The key economic phenomenon that imperfect information captures is a succession of fads starting suddenly, expiring rather easily, each replaced by another fad.

- The kind of episodic instability that is characteristic of socioeconomic behavior in the real world makes more sense in the imperfect-information model.

As such, the imperfect-information model gives insight into phenomena such as manias, fashions, crashes and booms, and better answers such questions as:

- Why do markets move from boom to crash without settling down?
- Why is a technology adopted by a wide range of users more rapidly than expected and then, suddenly, replaced by an alternative?
- What makes a restaurant fashionable over night and equally unexpectedly unfashionable, while another becomes the 'in place', and so on?