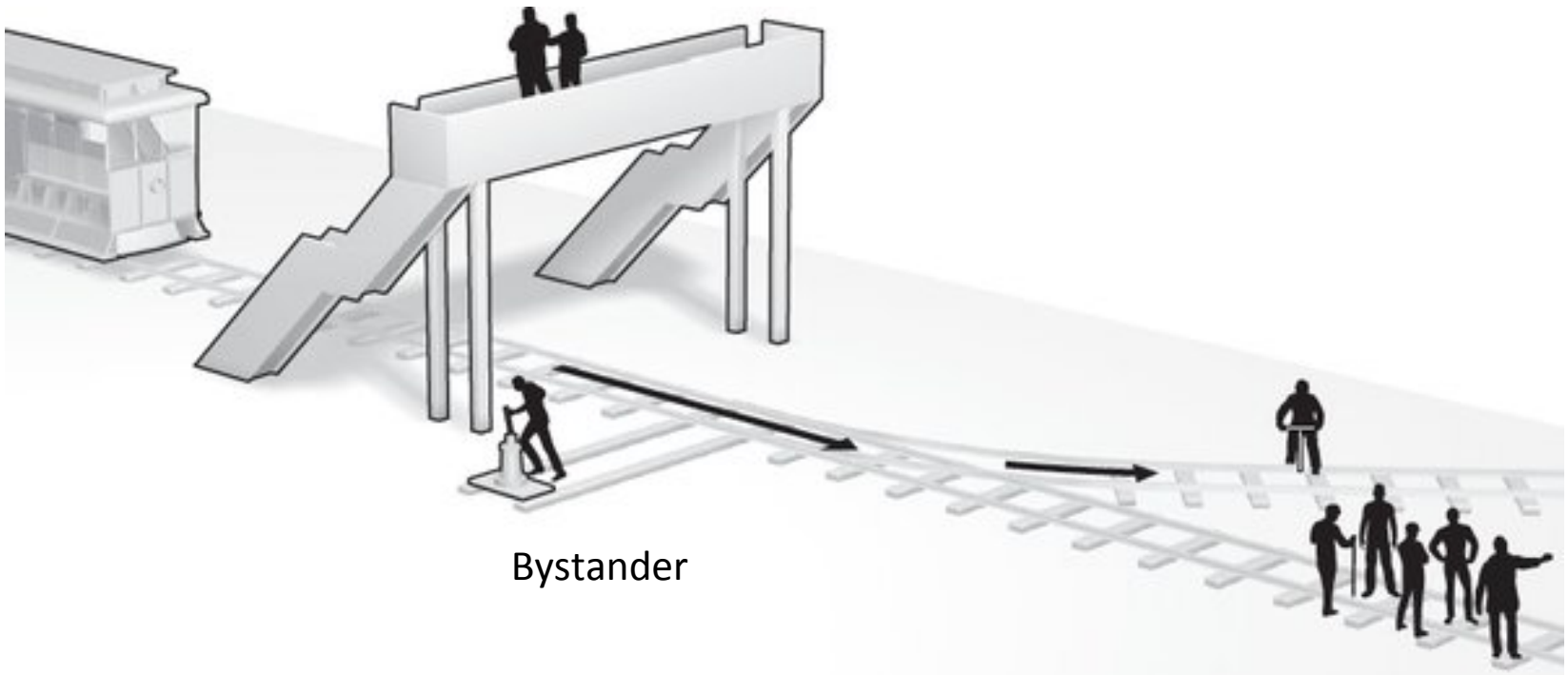
Social Preferences or Sacred Values?
Theory and Evidence of Deontological Motivations

A Theory of Experiments:
Invariance of Equilibrium to the Method of Elicitation

The Impact of Economics on Moral Decision-Making and Legal Thought

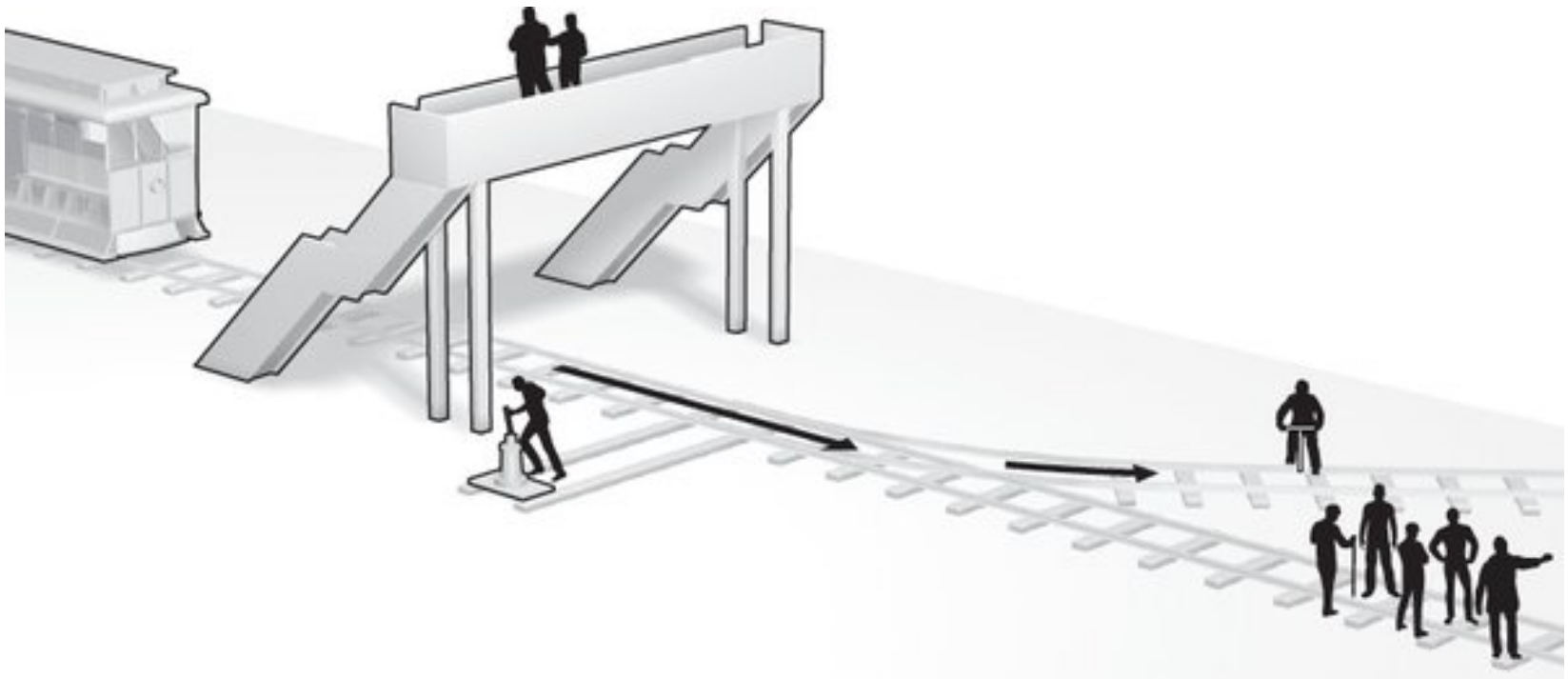
Daniel L. Chen (TSE Institute for Advanced Study, Harvard Law LWP, NYU Courant Center for Data Science)

Moral Trolley Problem



Moral Trolley Problem

Footbridge



Generations of Social/Moral Preferences

Domain of preferences:

- Agent's material consequences (homo oeconomicus)
- Agent's material consequences and others' (e.g. Fehr-Schmidt, pure altruism)
- Agent's material consequences, others' material consequences, and social audience (e.g. impure altruism, intentions)
- Agent's material consequences, others' material consequences, social audience, and purely internal consequences (e.g., duty/deontological motivations)

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Research Problem

Research question

"Do people have deontological (duty-based) motivations?"

Revealed preference approach so deontological motivations is interpretation.

Problem:

Consequentialist and deontological motivations are hard to distinguish in normal circumstances. We identify non-consequentialism by varying the probability of a decision being consequential.

Kant

Moral problem:

Your friend is hiding in your house from a murderer. The murderer arrives and asks you whether your friend is hiding in your house. Assuming you cannot stay silent, should you lie or tell the truth?

Kant (1793) says you must not lie. ◂ Kant considers uncertainty

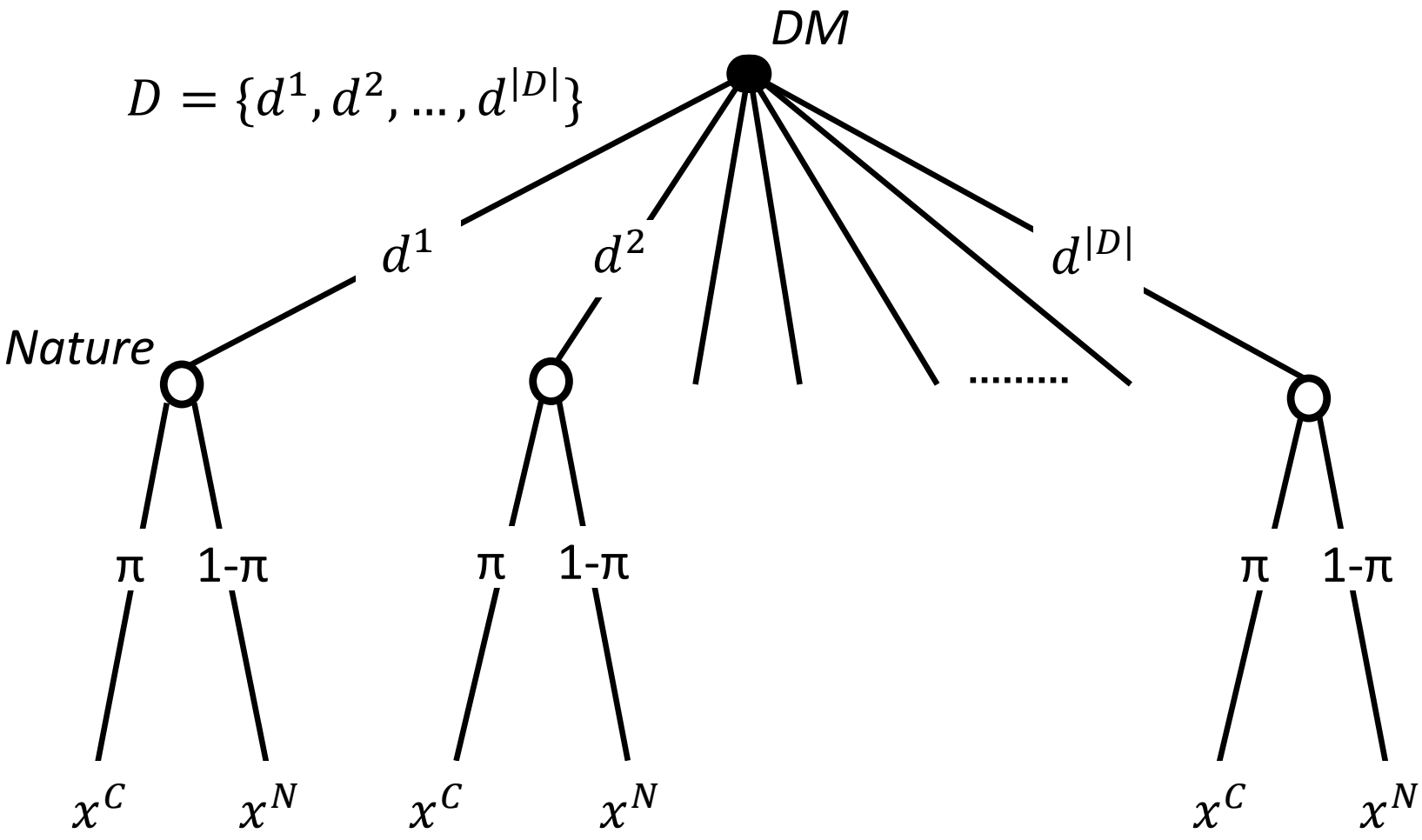
Note:

We are talking here about Kant as a non-consequentialist. The categorical imperative is about what the duties are.

Distinguishing decisions from broad consequences

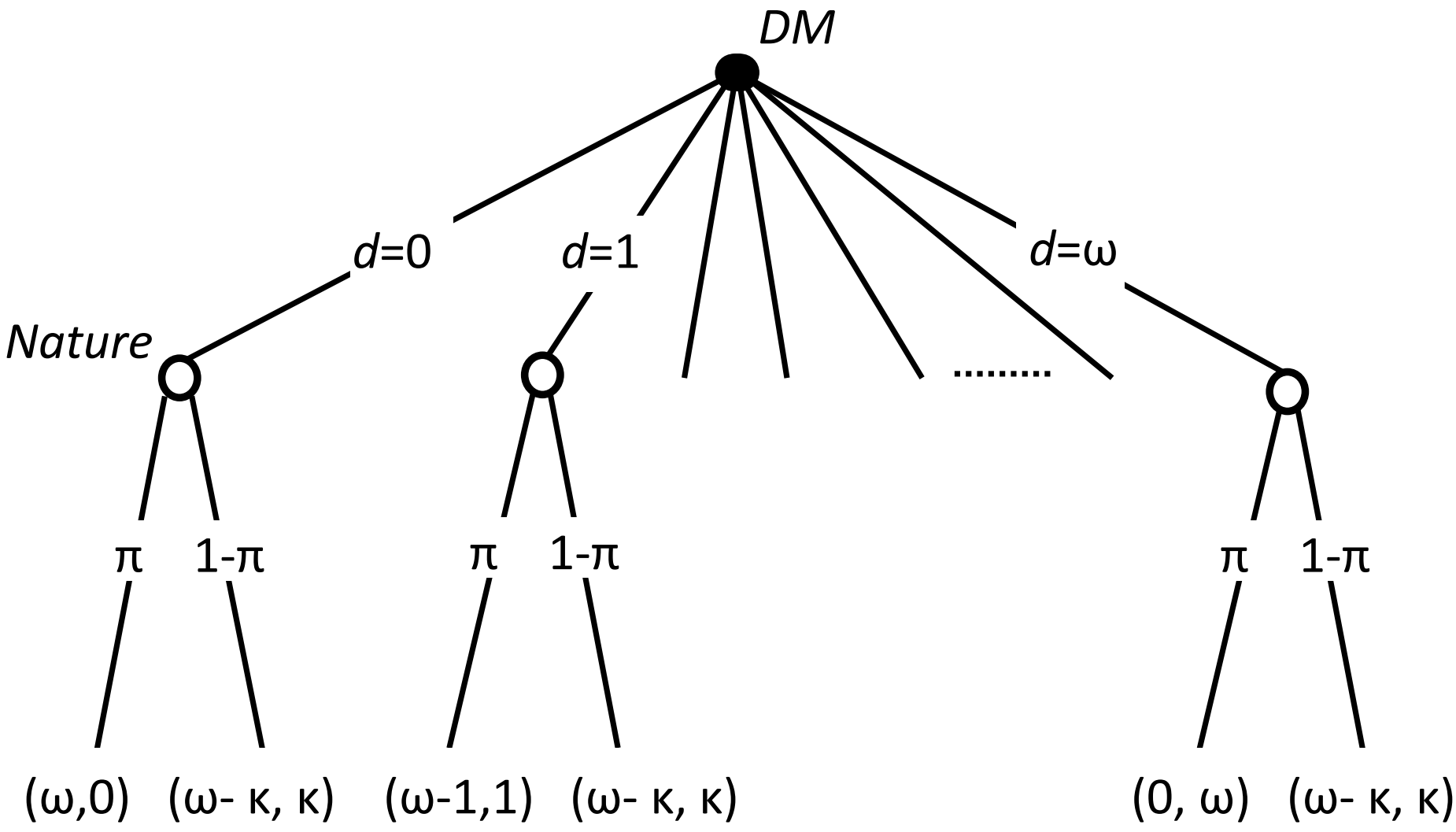
- Thought experiment
  - Separate decision d from the consequences x
- Anything that is a function of x is an outcome (reputation, inferences by other player about $DM's$ intention, etc.)
  - x is a function of the state of nature and decision d
  - In state C, d becomes common knowledge
  - In state N, d remains unknown to anyone except DM
- Consequentialism: Preferences are over lotteries
- Deontological motivations: d matters per se, even in state N

General Idea

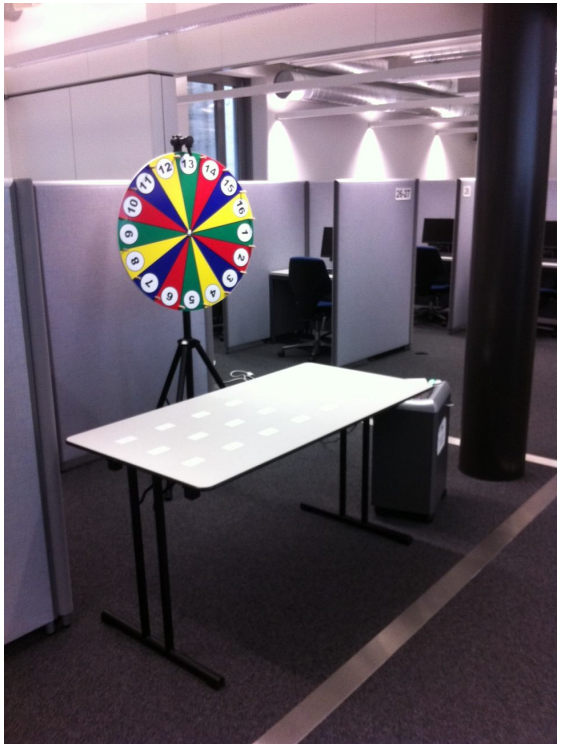


$x^C = x^C(d), x^N = constant$

Duty to Share



Field Analog



Field version

- $d =$ Bone marrow donotion **sign-up**, variation π (need & genetic match)

  (Bergstrom et al. 2009)

- $d =$ Not abort a fetus with Down Syndrome, π (prospective vs. likely vs. 100%)

  (Choi et al. 2012)

  - decision is not anonymous

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(Intuition) Optimal Decision is Invariant to π

Expected Utility (EU)

$$E[u(x_1, x_2)] = \pi u(x_1^C, x_2^C) + (1-\pi)u(x_1^N, x_2^N)$$

- *DM* maximizes the objective function given π.
- One choice variable d.
- Indirect objective function: $V(d) = \pi u(\omega - d, d) + (1-\pi)u(\omega - \kappa, \kappa)$
- $V(d)$ is proportional to $u(\omega - d, d)$
- $\Rightarrow \frac{\partial d^*}{\partial \pi} = 0$

Invariance Theorem

Theorem

If there exist $x, x', x'' \in X$ *and* $\pi \in (0;1]$ *such that* $\pi x + (1-\pi)x''$ $\succcurlyeq \pi x' + (1-\pi)x''$, *and if DM satisfies the assumptions Preference Relation, FOSD (and Strict FOSD), then for all* $\pi' \in (0;1]$ *:*
$\pi' x + (1-\pi')x'' \succcurlyeq \pi' x' + (1-\pi')x''$

1. ◂ Proof Graphically
2. ◂ Proof
3. ◂ Theorem is not Savage's Sure Thing Principle
4. ◂ FOSD is weaker than Independence
5. ◂ Strict FOSD does not imply FOSD

Deontologicalism

"deontological moralities, unlike most views of consequentialism, leave space for the supererogatory. A deontologist can do more that is morally praiseworthy than morality demands. A consequentialist cannot. For the consequentialist, if one's act is not morally demanded, it is morally wrong and forbidden. For the deontologist, there are acts that are neither morally wrong nor demanded." (Stanford Encyclopedia of Philosophy)

This can be formalized as a lexicographic preference, with deontological before consequentialist motivations.

Definition: Deontological Preference

A preference is called *deontological* if there exist u, f such that $u = u(d)$, and $f = f(x)$, and f.a. $(x,d),(x',d')$: $(x,d) \gtrsim (x',d')$ if and only if $u(d) > u(d')$ or $[u(d) = u(d')$ and $f(x) \geqq f(x')]$.

For purely deontological preferences the optimal decision is constant in π

Can d^* vary in π?

- Under both consequentialist and deontological preferences, d^* invariant to probability.

Definition: Consequentialist-Deontological Preference

A preference is called *consequentialist-deontological* if there exists a utility representation u such that $u = u(x, d)$.

Consequentialist-deontological preferences

Consider additive preferences over x_1, d:

- $u(x_1, d) = f(x_1) + b(d)$; f, b strictly concave

Objective function

- $E[u(x_1, d)] = \pi(f(x_1^C) + b(d)) + (1-\pi)(f(x_1^N) + b(d))$

Indirect objective function

- $V(d) = \pi f(\omega - d) + (1-\pi) f(\omega - \kappa) + b(d)$

FOC

- $\frac{\partial V(d)}{\partial d} = -\pi f_1(\omega - d) + b_1(d) = 0$

Second derivative

- $\frac{\partial^2 V(d)}{\partial d^2} = \pi f_{11}(\omega - d) + b_{11}(d) < 0$

Using the FOC, by the implicit function theorem

- $\frac{\partial d^*}{\partial \pi} = \frac{f_1(\omega - d^*)}{\pi f_{11}(\omega - d^*) + b_{11}(d^*)} < 0$

Note: b can be convex

- ◂ Non-additive utility not interpretable under uncertainty

Confounds

Ex-ante fairness

What if people value some kind of ex-ante fairness?

Utility function for ex-ante fairness:

$U = f(E[u(x_1)], E[\widetilde{u}(x_2)])$

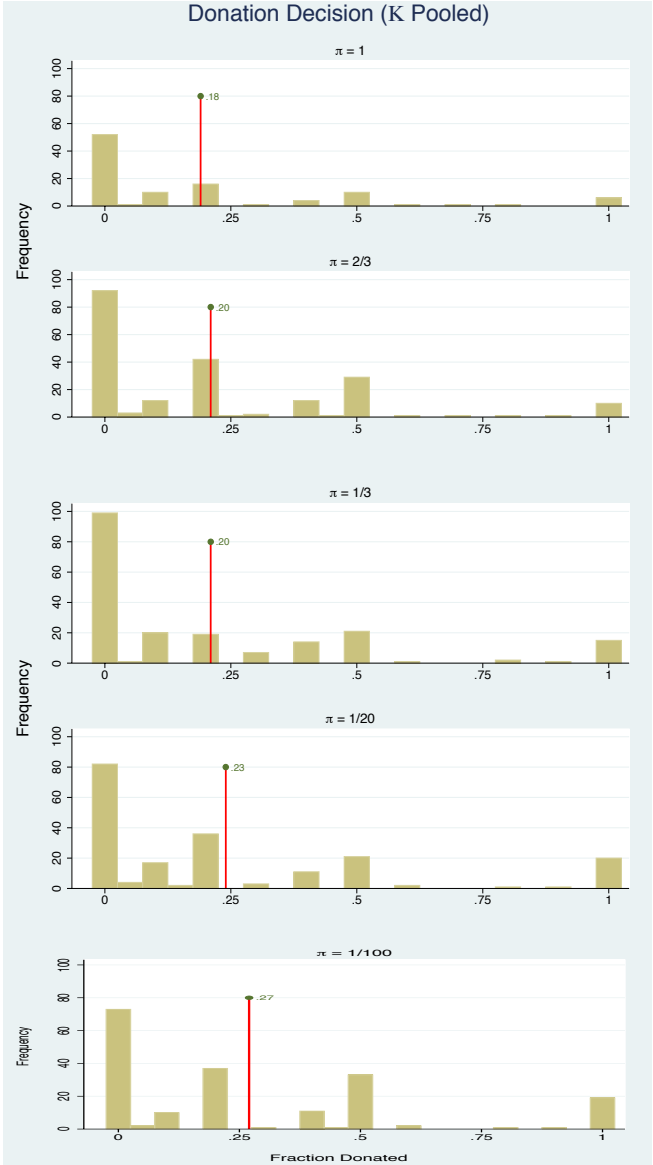
- $u, \tilde{u}$ strictly increasing, concave
- $E[u(x_1)], E[\widetilde{u}(x_2)]$ are normal goods

Fact:

If the *DM* maximizes ex-ante fairness then the sign of $\frac{\partial d^*}{\partial \pi}$ is the same as that of $\kappa - d^*$.

- ◂ Cognition Costs
- ◂ Revealed preference method cannot distinguish between internal consequences

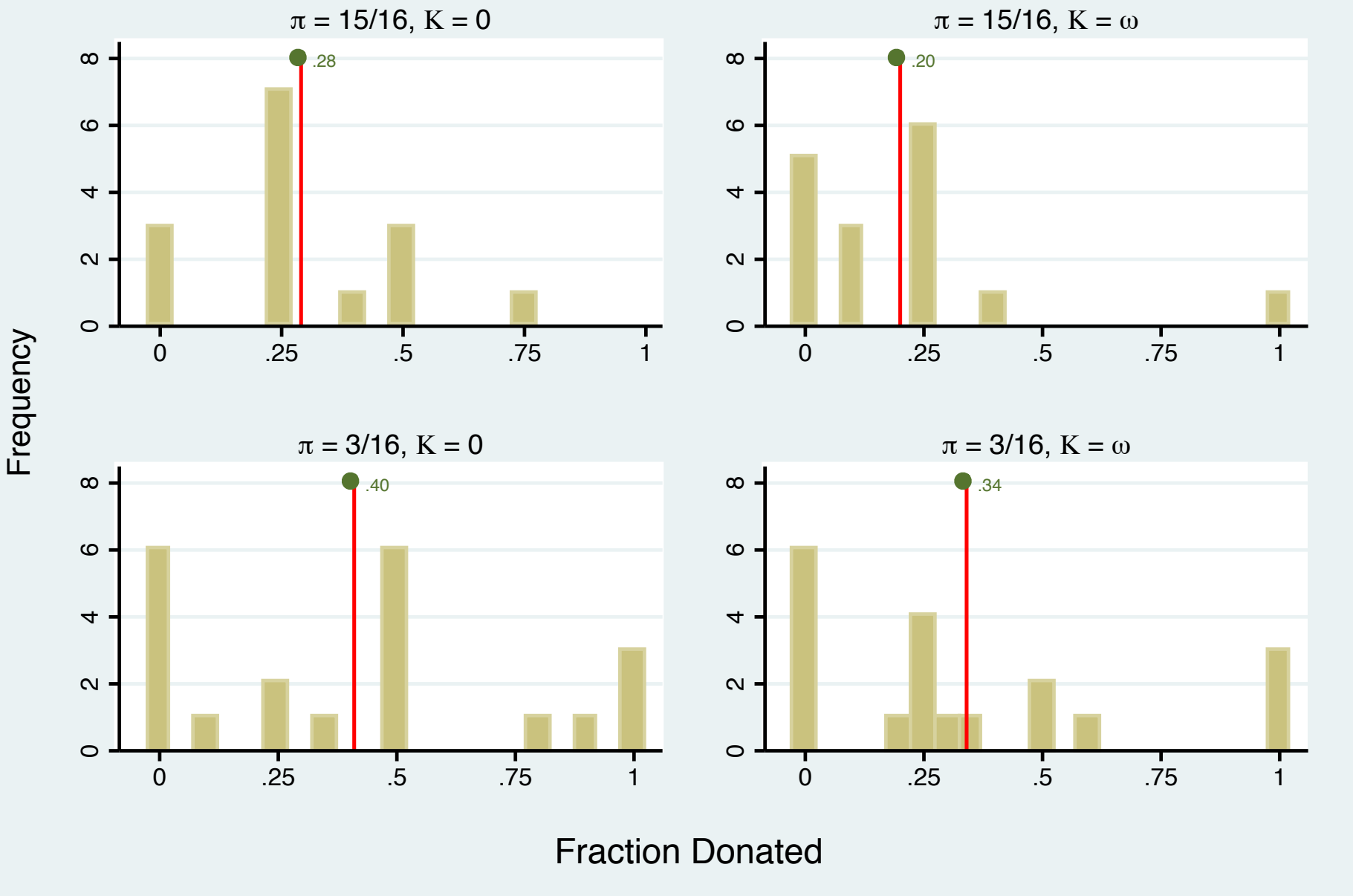
Donation (MTurk)



Red: Mean

N = 900

Donation (Shredding)



Recall: ex-ante consequentialism => sign $\frac{\partial d^*}{\partial \pi}$ = sign $(\kappa - d^*)$; N = 71 (of 264 invited)

Additional Checks

- ◂ Not targeting expected income of recipient
- ◂ Not targeting expected giving
- ◂ Regression and non-parametric
- ◂ Heterogeneity: Americans more responsive
- ◂ Conservative Germans more responsive in N = 173 (of 975 invited)

Intermediate Signpost

- Theory
  - Formal interpretation of major moral philosophies
- Method
  - Revealed preferences method to detect deontological motivations
  - The direction of the decision changes gives insight into the location of the optimand for one's greatest duty
- Evidence
  - Suggests both consequentialist and deontological motivations
  - ◂ MTurk subjects become 33% more "moral" when decision is hypothetical
  - ◂ Shredding subjects become 50% more "moral" when decision is hypothetical
  - Decision to sign-up to be a bone marrow donor is 3.5 times more likely, as probability your decision is implemented falls (from .3 to .1%) (Bergstrom et al. 2009)
  - Prospective parents were 60% more "moral" when decision to abort is hypothetical (Choi et al. 2012)

Intermediate Signpost

- Relevance for economics
  - Contingent valuation; psychological vignettes $\precsim$ consequential decisions
  - Negative framing
    - Methods like the random lottery method for moral decisions may reveal decisions that are 'too' moral (and treatment effects may be larger)
  - Positive framing
    - Strategy method incidentally turns out to be a method to investigate non-outcome based preferences
- Relevance for law
  - *mens rea* (intention) vs. *actus reus* (outcome) when it matters
  - moral rights in copyright (litigate for non-consequential reasons)
- Welfare economics with 'sacred values'

A Theory of Experiments

Invariance of Equilibrium to the Method of Elicitation

and Implications for Social Preferences

w/ M. Schonger

A Theory of Surveys: Efficient Elicitation of Truthful Preferences

w/ C. Caville and K. Van der Straeten

Daniel L. Chen (IAST)

Invariance of Equilibrium

Strategy Method (SM)—an increasingly popular way to estimate preferences

- Participants asked to indicate their choices at all information sets rather than only those actually reached
- Compare differences in decisions at different information sets
  - information set with low offer vs. information set with high offer

Appeal of SM

- Simplicity
- Elucidate equilibria actually played if theory predicts multiple equilibria
- Circumvent endogeneity problems in estimating preferences when making comparisons between heterogeneous individuals

Limitations

- Much of the debate revolves around emotion and cognitive fatigue
- Construal theory (psychological distance) prima facie invalidate SM

Focus on issues related to *economic theory*

- Information sets in strategy method and direct elicitation (DE) differ
- *Drafting* a contract (Battigalli et. al 2002; Tirole 1999; Schwartz et. al 2004)

Intuition

Consider these 2 questions:

1. Suppose I hit you in the face. What would you do?
   (suppose answer is binding)
2. Suppose in fact I just had hit you in the face, then what would you do?

What We Do

Strategy Method (SM) helps examine rare or off-equilibrium behavior that cannot be observed using direct elicitation (DE)

- Strategic equivalence holds for monetary payoff (Kohlberg et al. 1986)
  - but not for game actually played, which is in terms of utilities

Formalize the mapping from monetary payoff game to the actual game

- Provide necessary and sufficient conditions for strategic equivalence
  - Fails w/ intentions, disappointment aversion, self-image motives,..

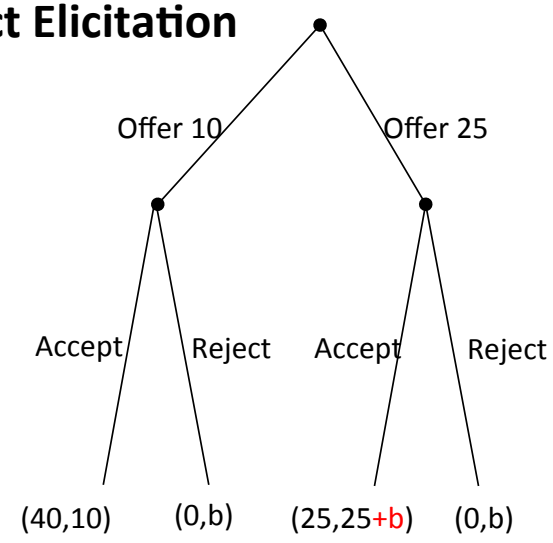
Investigate past literature and our own experiments

1. Not accounting for estimation bias when decisions at one information set can influence utility at another can render significant differences
2. Bias can be large and equivalent to other causal effects being measured
3. Subtle interventions on salience can similarly magnify these differences

Example of Variance w/ Self-Image Motives

Simplified ultimatum game

Direct Elicitation



Strategy Method

		x≥10 (AA')	x≥25 (RA')	(AR')	(RR')
p	10	(40,10)	(0,b)	(40,10)	(0,b)
1-p	25	(25,25)	(25,25+b)	(0,b)	(0,b)

Can we find an example of a non-consequentialist preference that predicts different outcomes under Direct Elicitation vs. Strategy Method?

Self-image: If I did not commit or in fact accept the unfair offer, I get an additional psychic benefit of 0<b<10.

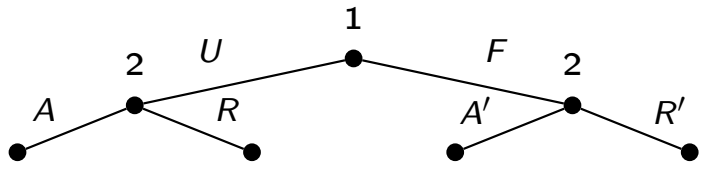
DE: offer 25 -> accept -> utilities (25,**25+b**)
DE: offer 10 -> accept -> utilities (40,10)

SM: strategy accept x≥10 yields: p*10 + (1-p)25 = 25-15p
SM: strategy accept x≥25 yields: p*(0+b) + **(1-p)(25+b)** = 25+b-25p

Act on self-image (x≥25) **iff** p<0.1b (**low prob of bearing consequences of obtaining self-image**)

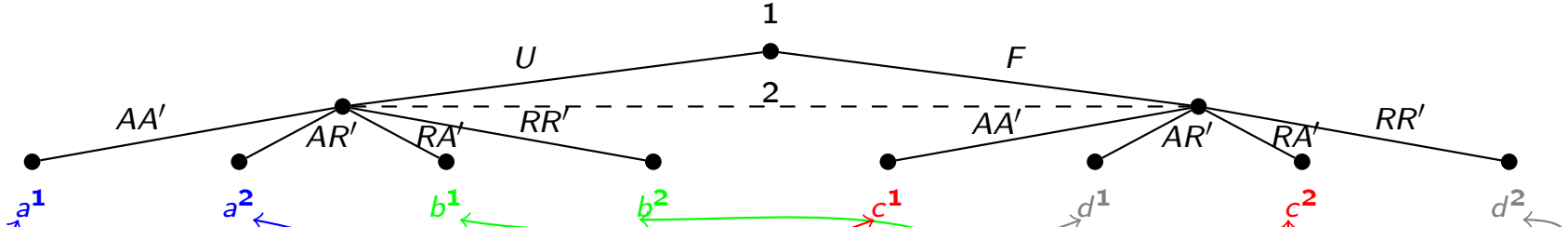
General Idea

Direct Elicitation:



	AA'	AR'	RA'	RR'
U	$u(a)$	$u(a)$	$u(b)$	$u(b)$
F	$u(c)$	$u(d)$	$u(c)$	$u(d)$

Strategy Method:



	AA'	AR'	RA'	RR'
U	$u(a^1)$	$u(a^2)$	$u(b^1)$	$u(b^2)$
F	$u(c^1)$	$u(d^1)$	$u(c^2)$	$u(d^2)$

Conventional Wisdom

Empirical researchers

Behavioral Validity of the Strategy Method in Pubic Good Experiments ***(Fischbacher et. al 2012)***

"According to the standard game-theoretic view, the strategy method should yield the same decisions as the procedure involving only observed actions." ***(Brandts and Charness 2011)***

Theoretical researchers

"..any solution concept [..] should only depend on the normal form [of the game]" ***(Kohlberg and Mertens 1986)***

"..in general the solution of a game with a sequential structure simply has to depend on this sequential structure and cannot be made dependent on the normal form only" ***(Harsanyi and Selten 1988)***

"..the notion of subgame perfect equilibrium is lost in the transition from the extensive to the strategic form of the game, since there are no subgames in a game in which players state their strategies simultaneously." ***Alvin E. Roth (ch.4, Handbook of Experimental Economics, 1995)***

Causal inference can be severely biased

1. SM relies on many decisions at different information sets
2. Most dependent variables are typically highly related
3. Off equilibrium decisions can affect the utility of decisions at different information sets

Formal framework

Extensive form Γ

- game tree
- I - number of players
- who plays at each non-terminal node
- information sets (perfect recall)
- Z - set of terminal nodes
  examples: $a, b, b^1 ...$, generic: z

Extensive form game G

- extensive form Γ
- Bernoulli utility functions $u_i : Z \to \mathbb{R}$ (not directly observable)

Laboratory

- extensive form Γ
- monetary payoff functions $\pi_i : Z \to \mathbb{R}$

Problem: $u_i(z) \neq \pi_i(z)$

Theorem

$G_\pi^{DE} = \left(\Gamma^{DE}, \pi^{DE} : Z^{DE} \to \mathbb{R}^{\mathrm{I}}\right)$ — Strat. iden. $\Leftrightarrow$ — $G_\pi^{SM} = \left(\Gamma^{SM}, \pi^{SM} : Z^{SM} \to \mathbb{R}^{\mathrm{I}}\right)$

$\uparrow$ equilibrium may change $\downarrow$ — $\uparrow$ equilibrium may change $\downarrow$

$G^{DE} = \left(\Gamma^{DE}, u^{DE} : Z^{SM} \to \mathbb{R}^{\mathrm{I}}\right)$ — Thm. $\Leftrightarrow$ — $G^{SM} = \left(\Gamma^{SM}, u^{SM} : Z^{SM} \to \mathbb{R}^{\mathrm{I}}\right)$

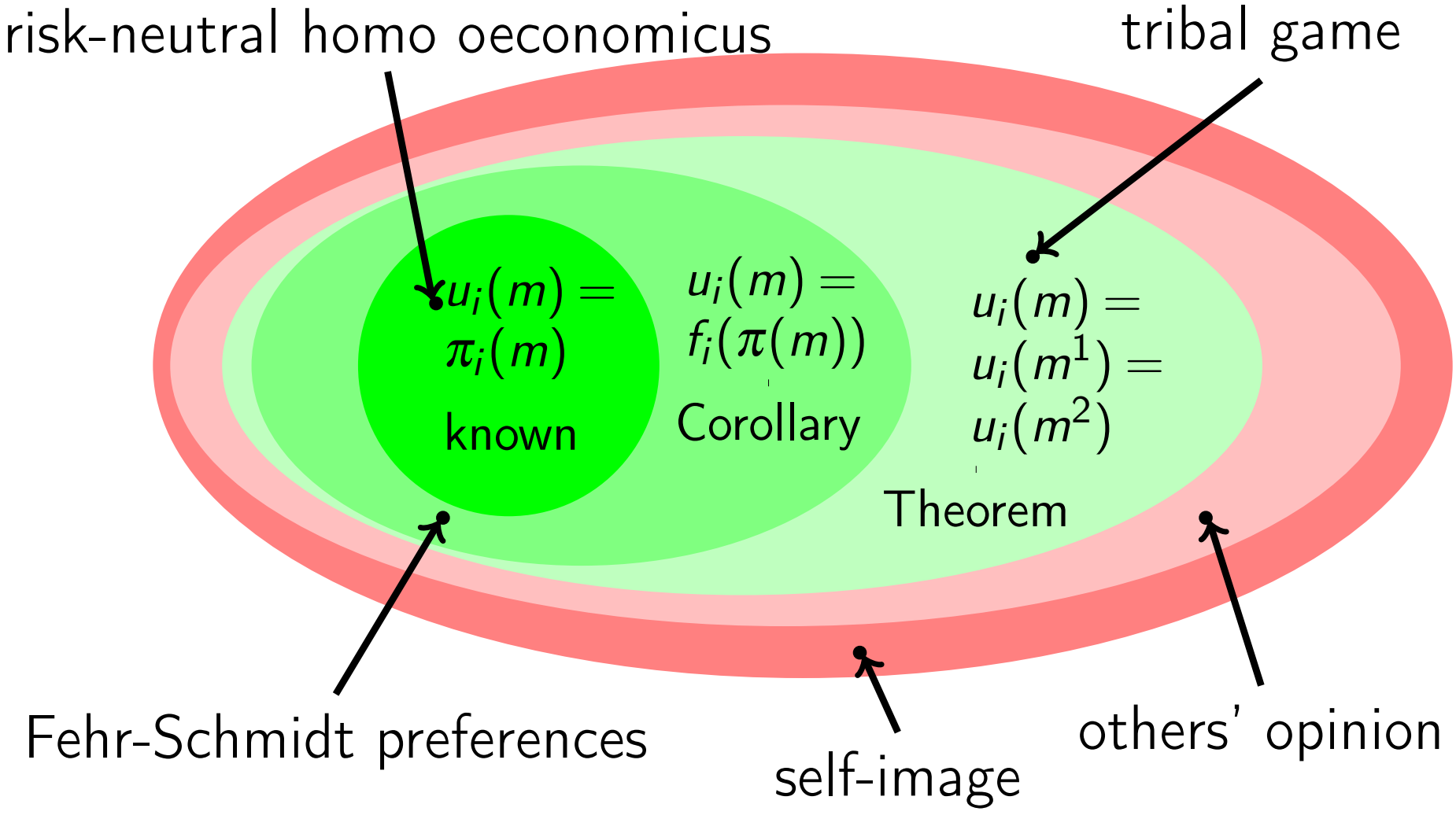
- Strategic equivalence if their strategic forms are identical up to a positive affine transformation of each player's Bernoulli **utility**

  (Moulin 1986; Rouchet 1981)

  - G^{DE} and G^{SM} are strategically equivalent iff $\forall$ players i, $\exists$ real numbers $\alpha_i, \beta_i > 0$ such that $\forall\ z^{SM} \in Z^{SM} : u_i^{SM}\left(z^{SM}\right) = \alpha_i + \beta_i u^{DE}\left(\zeta\left(z^{SM}\right)\right)$

Venn diagram

◂ Examples of invariance holding vs. breaking down



Experimental Evidence

Briefly revisit prior meta-analysis

and conduct our own meta-analysis of ultimatum game experiments (31 papers) [Study 1]

Randomize whether respondent is in SM or DE in ultimatum game [Study 2]

- Extend to another simple game, the trust game [Study 3]
  - Subsequent experiments allow proposer to know if respondent is in SM or DE

Manipulate salience of off-equilibrium motivations

- Simple game like ultimatum game [Study 4]
- Complex game like three-player prisoners' dilemma [Study 5]

Study 1 (Meta-Analysis: Ultimatum Game) $N = 31$ papers

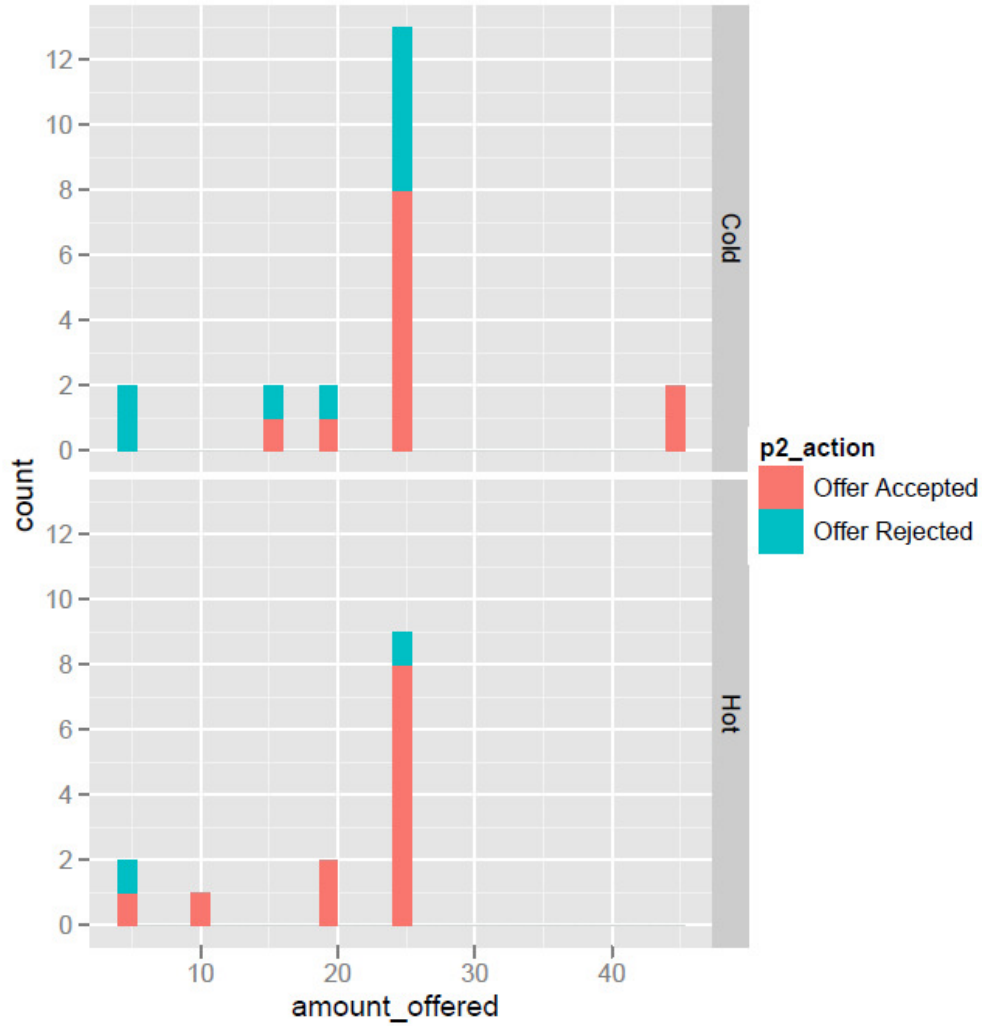
Accept ($Y = 1$) or Reject ($Y = 0$)?

	(1)	(2)	(3)	(4)	(5)	(6)
(Intercept)	0.877***	0.768***	0.823***	0.549**	0.788***	0.696***
	(0.0183)	(0.134)	(0.133)	(0.197)	(0.0915)	(0.111)
Strategy method	-0.198***	-0.208***	-1.205*	-0.933+	-0.0943	-0.103**
	(0.0528)	(0.0507)	(0.535)	(0.518)	(0.122)	(0.0357)
Offer level		0.399	0.264	0.900+	0.291	0.554*
		(0.306)	(0.306)	(0.451)	(0.225)	(0.267)
Repeated experiment		-0.120***	-0.114**	-0.113**	-0.138***	-0.125***
		(0.0337)	(0.0330)	(0.0352)	(0.0300)	(0.0272)
Developing country		-0.0241	-0.0278			
		(0.0381)	(0.0372)			
Strategy Method X Offer			2.507+	1.874		
			(1.338)	(1.288)		
Mean of Y	0.853	0.853	0.853	0.841	0.860	0.867
N	50	50	50	33	50	49

Standard errors in parentheses
+ p<0.1, * p<0.05, ** p<0.01, *** p<0.001

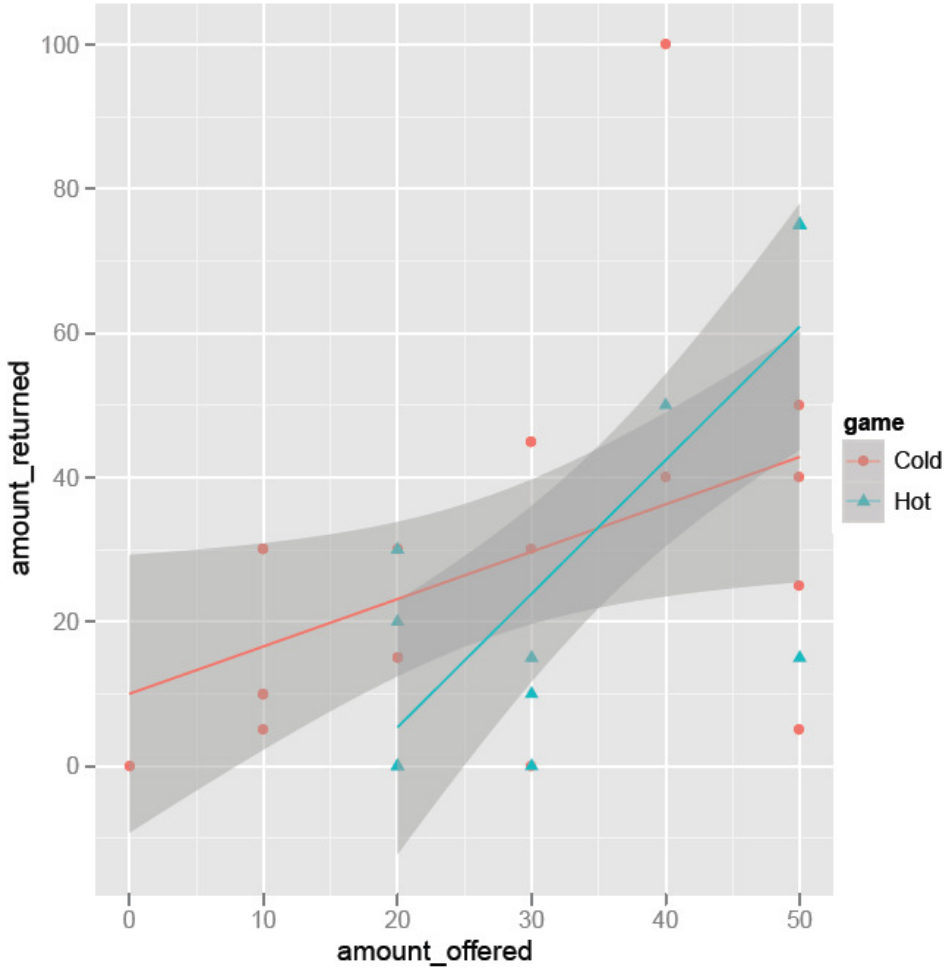
1. Direct elicitation increases acceptance rates by 20%
2. Robust to controls for offer amount, whether the experiment was repeated, and whether in LDC
3. Strategy method increases sensitivity to offer
4. Drop LDCs
5. Weight by citation counts renders main effect insignificant
6. Weight by number of observations
7. Our reading of Brandts and Charness (2011) is SM and DE diverged in simple games with moral content, but did not or had mixed results for complex games framed as economic games; Schotter et al. (1994) also finds differences emerge in simple games, where subjects were more likely to use and fear incredible threats.

Study 2 (Ultimatum Game DE vs. SM for Respondent) $N = 78$



- Direct elicitation increases acceptance rates by 20% (as in Study 1)
  - equivalent to an offer increase of 34% of endowment
- Strategy method increases sensitivity to offer (as in Study 1)

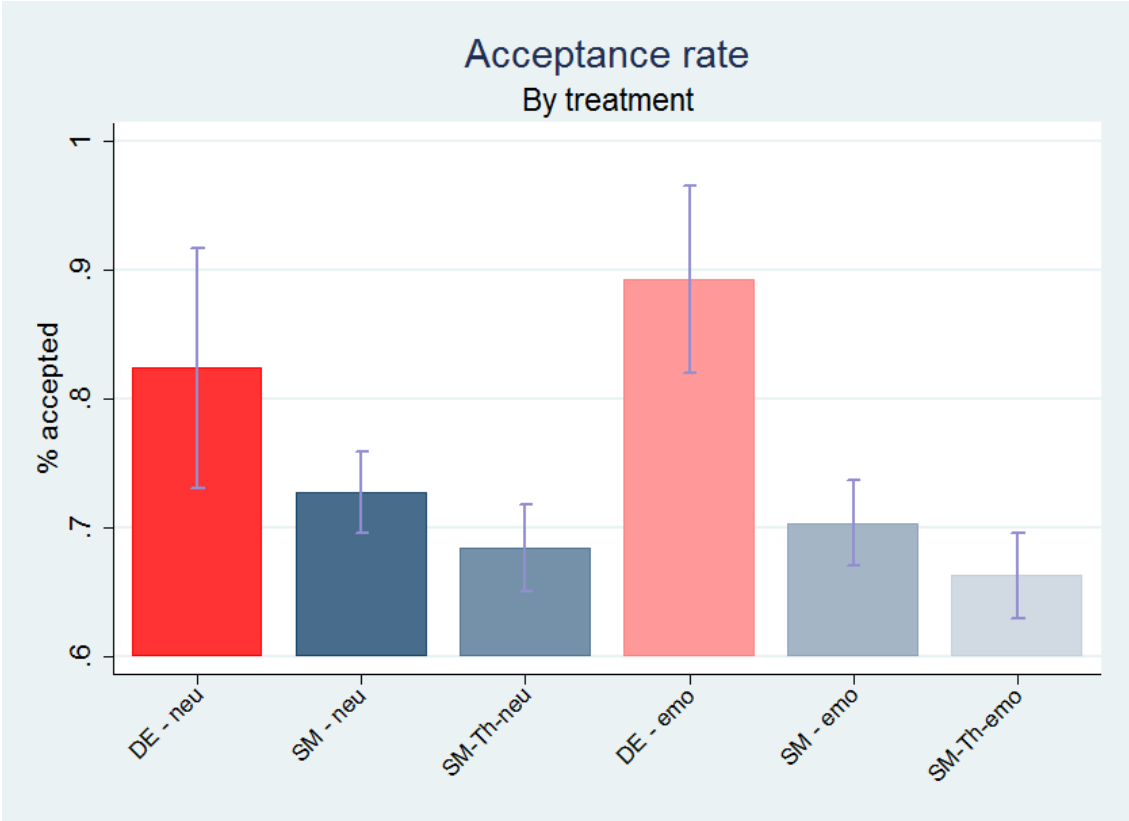
Study 3 (Trust Game DE vs. SM for Respondent)



- Direct elicitation increases sensitivity by 3x to amount given

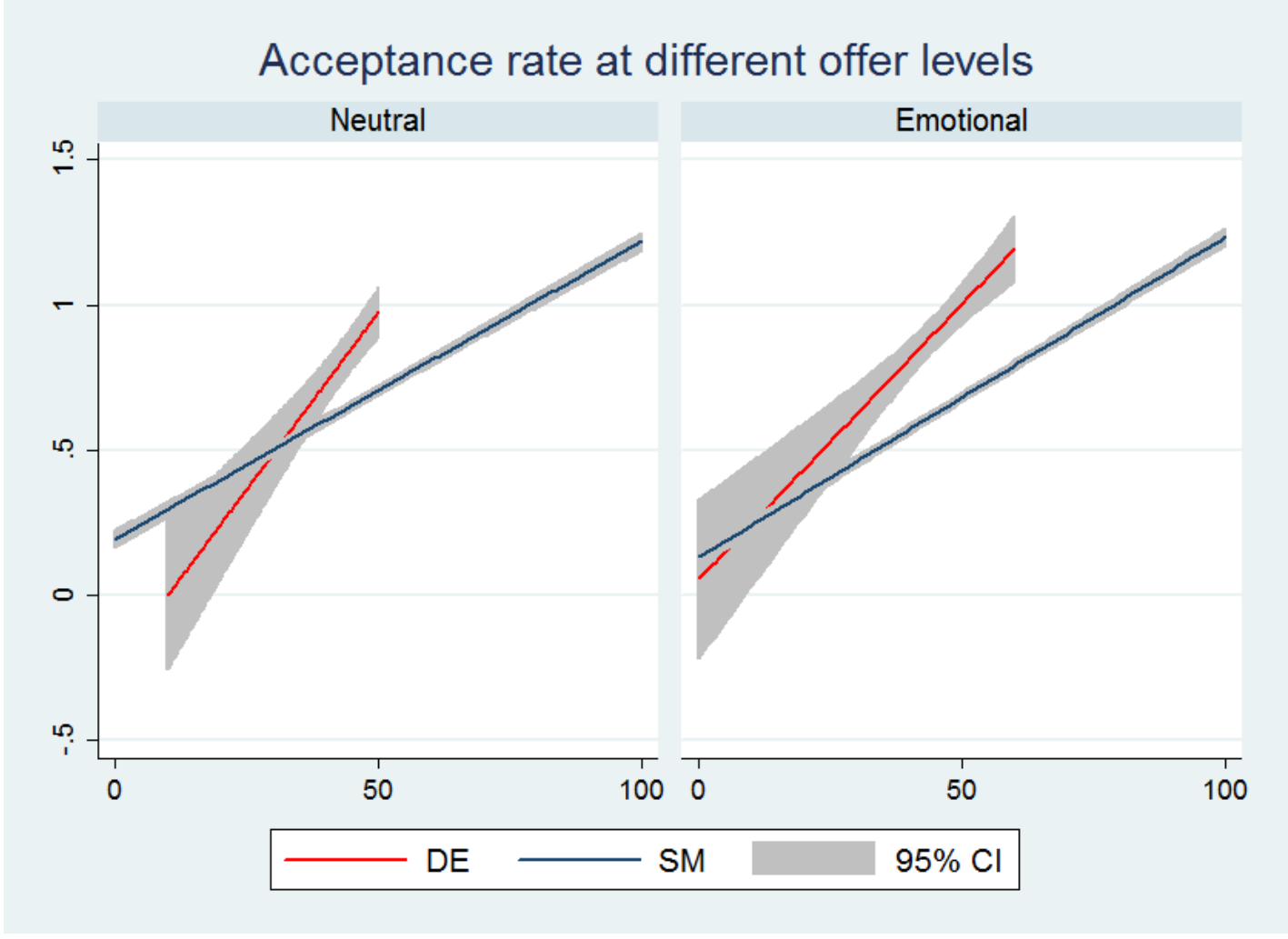
Study 4 (Ultimatum Game: *DE vs. SM* x *Emotion vs. Neutral*) $N = 418$

In the high salience treatment, two word changes: *proposer* $\rightarrow$ *dictator*, *respondent* $\rightarrow$ *subject*.



- Direct elicitation (DE) increases acceptance rates by 18% (as in Studies 1 & 2)
- This effect is larger when off-equilibrium payoffs are salient (increases to 27%)
- No significant differences between strategy (SM) and threshold method (TM)
- Note: Offers are slightly, but not significantly, lower in direct elicitation setting; ◂ Control for Offer

Study 4 (Ultimatum Game: *DE vs. SM* x *Emotion vs. Neutral*) $N = 418$



- Direct elicitation (DE) increases sensitivity by 2x to offers (as in Study 3)

Study 5 (3-player prisoner's dilemma: *DE vs. SM* x *Emotion vs. Neutral*) $N = 585$

Stage 1 public goods game, stage 2 deduction opportunity *also* from self

SM involves listing 4 possible deductions–2 contributors (CC), 2 defectors (DD), CD, and DC

To manipulate salience, one word change and color change: *group* $\rightarrow$ *team*, purple $\rightarrow$ red

- Direct elicitation responders were more cooperative (as Study 1, 2, 4)
  - ◂ Deductions differentially affected by emotional prime
  - ◂ Controlling for first stage outcome
- Differences between DE and SM (and diff-in-diff) were greater:
  - ◂ for deductions of D1
  - ◂ if you are a contributor

Research Questions

1. Is it really true that from a game theoretical perspective direct elicitation (DE) and the strategy method (SM) *should* yield the same equilibrium outcome?
   - No: Not in general
2. If not, can we find conditions such that DE and SM should yield the same equilibrium outcome?
   - Yes: But they are on preferences
3. Can we use the theoretical answers from above to shed some light on non-consequentialist motivations?
   - Yes

Discussion

Method of elicitation

- the strategy method (SM) is one of the most important tools in experimental economics
- compared to direct elicitation (DE) it generates vastly more data,
- unlike DE the SM gives us data on off-the-equilibrium-path behavior
- differences between DE and SM have been observed, explanations have been non-formal

Our contributions

- We provide an evaluation/appraisal of the SM
- We show that the SM incidentally turns out to be a method to investigate non-payoff dependent preferences
- To do so we provide formal insights as well as experimental evidence

Discussion

"For example, the notion of subgame perfect equilibrium is lost in the transition from the extensive to the strategic form of the game, since there are no subgames in a game in which players state their strategies simultaneously." *Alvin E. Roth (ch.4, Handbook of Experimental Economics, 1995)*

- We have learnt that there is a much more fundamental problem:
  - Strategic equivalence is often lost in the transition from direct elicitation to strategy method elicitation.
- Because of off-equilibrium motivations, conventional SM may be grossly biased, leading to serious over- or under-estimation of treatment effects.
  - A large fraction of SM papers rely on many decisions at different information sets that are highly related, the off-equilibrium decisions can affect the *utility* of decisions at different information sets, even when it does not affect monetary payoff.

Implications for Experiments

An alternative view of natural field experiments (a subset of DE) as the gold standard for causal estimates (Harrison, Levitt, List, ...)

- Use differences between SM and DE to understand the general way in which agents' motives influence behavior (Camerer 2011)

We hope that our study will contribute in generating further work on alternative estimation methods besides DE that is more efficient in the presence of off-equilibrium motivations.

The Impact of Economics on Moral Decision-Making and Legal Thought

Elliott Ash, Daniel L. Chen, and Suresh Naidu

Behavioral Influences on Judicial Decisions

Circuit	District	SCOTUS	Asylum	New Orleans DA
Priming	Mood	Masculinity	Gambler's Fallacy	Implicit Egoism
Deontological	Mental Accounting	Mimicry	Snap Judgments	Heirarchy
Economics	Economics	Visual cues	Mood/Time	Judge v. Prosecutor

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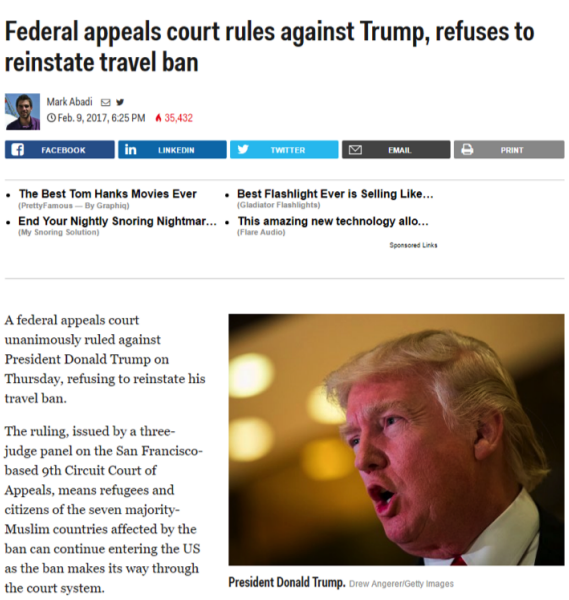
US federal courts as "natural laboratory"

- Do schools of thought matter for policymaking?
  - We have recently seen the importance of US federal courts ruling against DT.
  - These courts involve expert decision-making with far-reaching implications.



Federal appeals court rules against Trump, refuses to reinstate travel ban

Mark Abadi
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President Donald Trump. Drew Angerer/Getty Images

The Washington Post
Democracy Dies in Darkness

BREAKING: Federal judge freezes Trump's new travel ban hours before it was to take effect

- Judges exercise power and discretion in policymaking. (e.g. Epstein et al. 2013)
  - **Interpret**, apply, create law and legal precedent under uncertainty.
    - **Subjective** decision-making creates a role for schools of thinking.
    - System of ideas and **normative commitments** forming basis for policy.
    - Principles of thinking that agents use to organize **values**. (Falk et al. 2016)
  - e.g. Originalism, Critical Legal Theory, or **Law and Economics** (today's talk).

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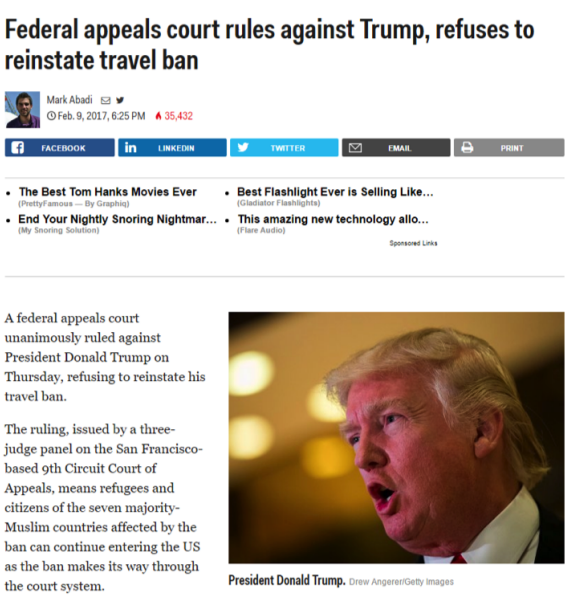

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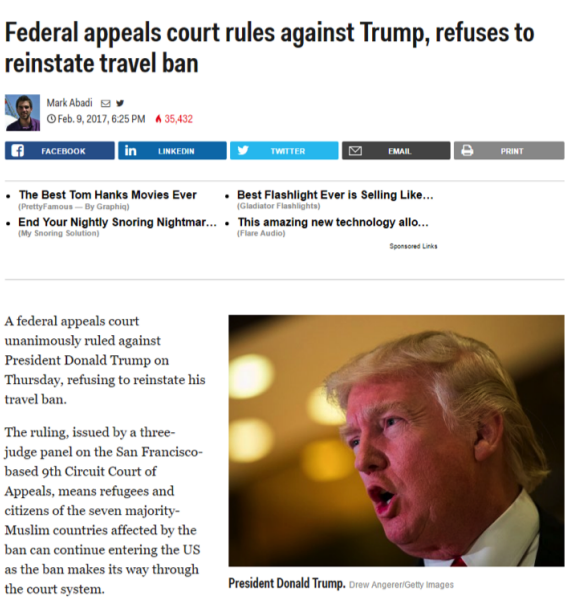

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  - 5th Circuit **invalidated** a Mississippi statute *requiring its doctors to obtain admitting privileges at local hospitals* but allowed an identical Texas statute, resulting in one-third of Texas abortion clinics shutting down
    - Reasoned on potential **consequences** on abortion access for women.
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  - Shift from reasonable person to **reasonable woman *standard*** for what constitutes sexual harassment.
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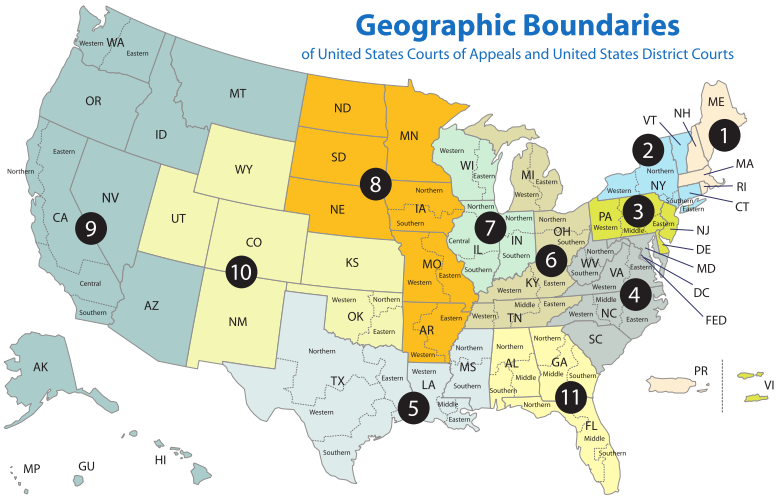

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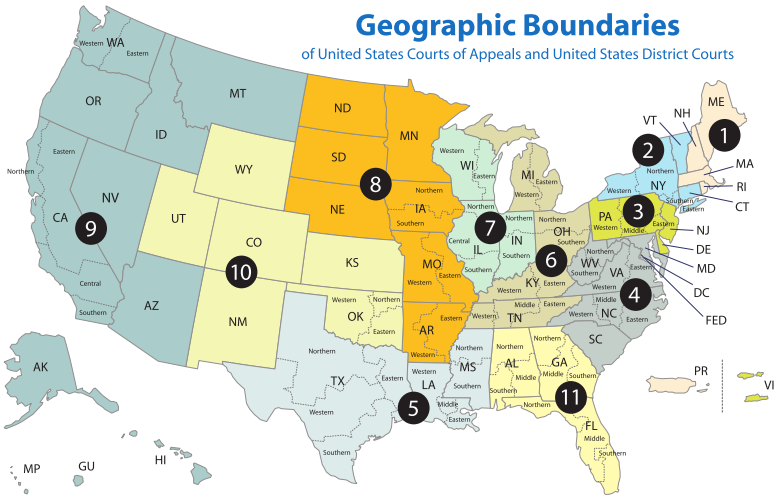

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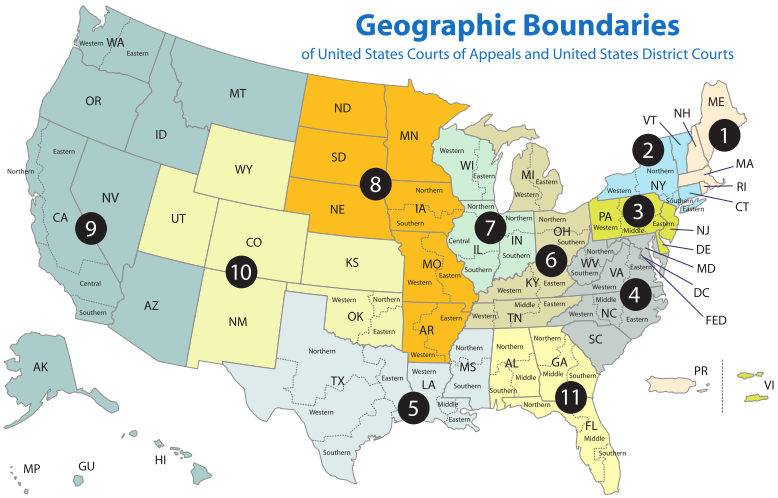

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  - All 380K cases, 1,150K judge votes, from 1880-2013 in US Circuit Courts
  - 2B N-grams of length 8, 5M citation edges across cases
  - 268 judges (250 biographical features); 5% sample, 400 hand-coded features
  - 6K cases hand-coded for meaning in 25 legal areas
  - 1M criminal sentencing decisions, from 1999-2011 in US District Courts
  - 1300 judicial biographies (and digitize 250K opinions from 1923-2017)
- We exploit *attendance* in an influential economics training program.
  - Placebo: their opinions prior to attendance
- We exploit a policy change giving judges more *discretion*.
  - Placebo: their decisions under mandatory sentencing guidelines
- We exploit random panel composition to examine peer *influence*.
  - e.g., as non-authoring peer, does the trained judge impact verdicts?
- We exploit exogenous seating network to identify *learning* effects.
  - e.g., was there a trained judge on your previous panel?
  - Placebo: next panel, topic's previous panel, previous panel prior judge's attendance
- We exploit exogenous topic ordering to identify *memetic* effects.
  - e.g., which phrases leap across topics
- We exploit exogenous homophily to identify *active or passive* persuasion.
  - e.g., does transmission occur more in like-minded groups?

Motivation and Literature

- Effects of ideology on outcomes
  - Random teacher's ideology $\Rightarrow$ social preferences (Fisman et al. 2009)
  - Curricula $\Rightarrow$ free market attitudes (Cantoni et al. 2014)
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    - Largely qualitative (e.g. Kessler and Pozen 2016)
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Validating the N-grams

capital punishment: involuntary, mental health v. attack

Campaign Finance	advertis influenc outcom vote, argument appel consid definit, challeng present, case controversi district, disclosur sourc	Expens, inform elector mean provis, compel court went histori, buckley court limit
Capital Punishment	duti make reason, Involuntari, materi reason probabl, mental health	consid mitig, Attack, Inelig, counti jail
EPA	act impos, board character, Chevron, Elimin, interst transport hazard wast	factor demonstr, id statut silent ambigu respect, requir provis
FCC	arrier transport,	recov intrast contribut state

Law-and-Economics Movement

- Influential in antitrust, labor regulation, criminal law, and more
  - Antitrust laws
    - Should promote economic efficiency and consumer welfare, rather than shield individuals from competitive market forces or redistribute income.
    - Economic analysis has attained near complete consensus. (Judge Ginsburg)
    - Law-and-economics judges' decisions are appealed less. (Baye et al. 2011)
  - Against New Deal labor law and union protections (Posner 1984, Epstein 1983)
  - Law-and-economics training sponsored by George Mason University
- Conservativism
  - Burke (1790): tradition is best changed slowly if at all; conservativism is "preservation of the ancient **moral** traditions of humanity" (Kirk 2001)
  - Conservativism criticizes reforms as jeopardizing those **values**. (Hirschman 1978)
  - Unified by ongoing defense of past inequalities in face of challenge. (Robin 2011)
    - Law-and-economics focuses on efficiency. Its key criticism of regulatory policies is that they have perverse, unintended economic consequences.

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Manne Program in Law and Economics (now at George Mason University)

- Founded in 1976 – two-week economics course for federal judges:
  - Lectures by Friedman, Samuelson, Alchian, Demsetz, Feldstein, Ashenfelter, ..
  - Demand/supply theory, bargaining, externalities, expected value/utility, Coase Theorem, torts, contracts, monopoly theory, statistics, basic regression
  - *Law & Economics* (Cooter & Ulen), *Exchange & Production* (Alchian & Allen)
- By 1990, forty percent of sitting federal judges had attended.
  - By 1926, 6% of cases had a Manne judge, by 1960, 12%, by 1970, 24%, and by 1975, 41%.
  - By 1990, 66% of cases had Manne judge.
- We obtained a list of all attendees. (Butler 1999)

".. [academic attention to the role of economics in law] could actually be the most lasting contribution of the judges' program to the development of law and economics."

"As I always told the judges in my session-closing remarks, 'If you are doing your job right, there really should not be many different results in your cases. But you will have a better understanding of the law because of the insights economics offers, and that will help you be better judges."'

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Judge Reactions to Manne Program (Butler 1999)

"*the instruction was far more intense than the Florida sun. .. my enduring appreciation.*" *(Justice Ruth Bader Ginsburg, SCOTUS)*

"*I don't believe I have ever attended a seminar that involved such intensive study and discussion. My wife, who accompanied me, commented, 'I don't see any more of you here than I do at home.' .. one of my fellow judges .. said, 'I can't believe how much I have learned, but I'm glad I didn't have to take this course in college.'*" *(Judge Curran, U.S.D.C. Eastern Wisconsin)*

"*a principled basis for deciding close cases.*" *(Judge Michel, Federal Circuit)*

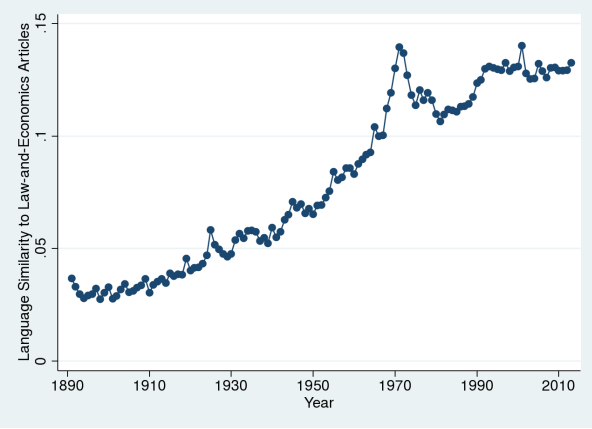
"*a sound theoretical and rational structure for my decisions.. the potential effects and foreseeable impact of imposing a duty*" *(Judge Jolly, Fifth Circuit)*

"*I regard myself as a social progressive and all the economists in attendance, from my perspective, had Neanderthal views on race and social policy. The basic lesson I learned .. is that social good comes at a price, a social and economic cost. I had never thought that through before being exposed to Henry's teachings. .. has led me to measure the cost of the social good being furthered against the gain to be achieved.*" *(Judge Carter, S.D.N.Y.)*

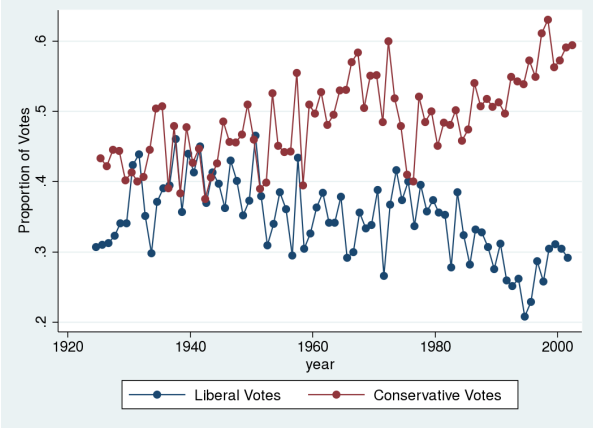
"*there is a wide area of decision entrusted to us where the result can go either way, depending on how we view the evidence. That area is called 'judicial discretion.' This is the area that is most affected by these seminars .. as a result of what I have learned at these seminars, I have become a much better judge*" *(Judge Alaimo, U.S.D.C. Southern Georgia)*

"*Henry and his LEC colleagues were of a conservative persuasion. .. the class wanted to express our gratitude on the final day. The person who rose to speak was Judge Hall from West Virginia .. Without doubt he was a Democrat going back to New Deal days. He was fervent in his appreciation*" *(Judge Griesa, S.D.N.Y.)*

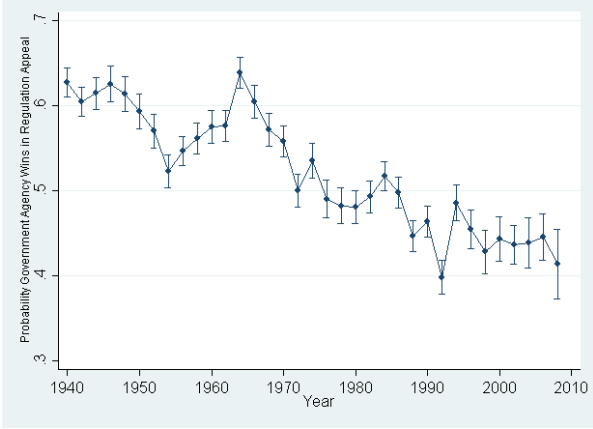
Increasing conservativism in federal judiciary



Language similarity to law-and-economics articles



Conservative Votes



Voting for government regulation

Preview

- Judges who use **economics** language (in cases other than the current)
  - **vote** for and **author** conservative verdicts, especially for economics cases
  - are more **opposed** to government regulation and criminal appeals
- Judges **trained** in economics use economics language (e.g., "efficient")
  - **render** conservative verdicts (especially for economics jurisprudence)
  - **reject** government regulation
  - **reject** criminal appeals
    - Only after attendance in training program
  - **render** harsher criminal sentences
    - Only after *Booker* made previously mandatory guidelines "advisory"

  Despite significant negative impacts of incarceration on families, communities, and limited deterrence effects. (e.g. Mueller-Smith 2014; Chalfin et al. 2014; Morsy et al. 2016)
- Judges **trained** in economics impact panelists
  - **influence** criminal appeals verdicts when not the author
  - **increase** use of "deterrence" in panelists' subsequent opinion
    - Not their prior opinion
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  - "**Deterrence**" and "**capital**" have memetic tendencies (crossing topic boundaries)
  - **Stronger** transmission in **like-minded** groups

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Data

Table: Distribution of Case Topics

Songer Topic	Freq.	Percent	Detailed Topic (partial list)	Freq.	Percent
Economics	332,553	29.69	Criminal Law	246,012	22.27
Due Process	259,845	23.20	Civil Procedure	194,391	17.6
Criminal Appeal	250,281	22.34	Administrative Law	51,900	4.7
Miscellaneous	149,322	13.33	Tax & Accounting	46,404	4.2
Civil Rights	67,350	6.01	Bankruptcy Law	40,773	3.69
Labor	54,681	4.88	Constitutional Law	34,575	3.13
First Amendment	5,268	0.47	Habeas Corpus	33,429	3.03
Privacy	927	0.08	Contracts	32,700	2.96
Total	1,120,227	100.0	.. and 86 additional topics		

- Hand-labeled for 5% random sample by Songer-Auburn and for 100% and then aggregated to Songer topics.

Data

Table: Distribution of Ideology

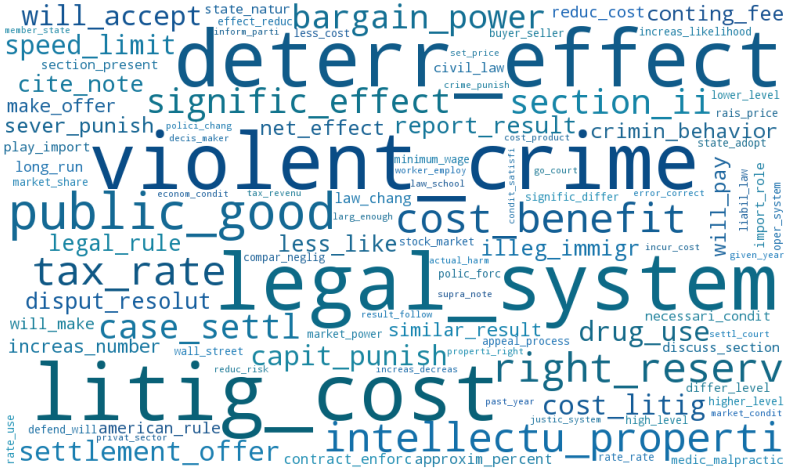
Liberal and Conservative Votes			Party Membership		
Vote Valence	Freq.	Percent	Party of Appointment	Freq.	Percent
Liberal	17,529	33.74	Democrat	515,418	44.56
Neutral/Other	8,355	16.08	Other	38,486	3.33
Conservative	26,076	50.18	Republican	602,836	52.12
Total	51,960	100.00	Total	1,156,740	100.00

- Hand-labeled vote valence for a random 5% sample by Songer-Auburn.
- 0.7 correlation between **conservative** vote and ruling against regulatory agency in economics cases.
  - rejecting defendant in a criminal procedure case,
  - rejecting plaintiff asserting violation of First Amendment rights
  - rejecting Secretary of Labor who sues a corporation for violation of child labor regulations

Outline

Law-and-Economics Language

- All available JSTOR articles with JEL K (Law and Economics) (1991-2008)
  - Highest and lowest frequencies for two-grams in $\geq$ 1000 cases:



Most similar to Law-Econ Corpus

Least similar to Law-Econ Corpus

- Note: deterrent effect, cost-benefit, public goods, bargaining power, litigation costs

Scoring Judges By Economics Style

- E_g: relative frequencies for phrase g in JEL K
- $F_i = \{F_{i1}, F_{i2}, ..., F_{iP}\}$: relative frequencies for phrase g in case i
  - Economics Style of case i is average economics score of its phrases:

$$z_i = F_i \cdot E$$

- Score judges by their use of economics language:
  - Residualize z_i on circuit-year fixed effects to control for case portfolio
  - J_j: set of n_j cases authored by judge j. Economics Style of judge j is:

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Empirical Approach

- The coefficient γ gives the causal effect of judge-assignment
  - case i, judge j, court c, year t

$$Y_{ijct} = \alpha_{ct} + \gamma Z_j + X_j'\beta + \varepsilon_{ijct}$$

- Outcome Y_{ijct} measured four ways:
  - (1) $1 =$ conservative vote, $-1 =$ liberal vote (Songer-Auburn 5%, hand-labeled)
  - (2) Voting against government regulatory agencies (100%, machine-coded)
  - (3) Rejecting criminal appeals (100%, machine-coded)
    - from gov't in title of case, Π vs. $\triangle$, for (2) Economics, Labor, and (3) Criminal Appeals cases
  - (4) Length of criminal sentence (100%, FOIA requested to include judge identity)
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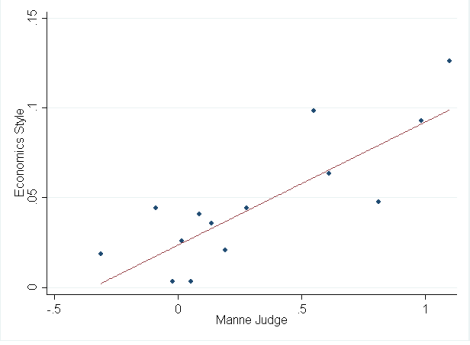
  - X_j: judge covariates, e.g. Republican (benchmark for Economics Training)

Summary Correlations



Economics Training correlated with Economics Style

	Republican		
	(1)	(2)	(3)
Economics Style	0.0367*		**0.0563****
	(0.0146)		**(0.0191)**
Economics Training		0.140**	**0.191****
		(0.0382)	**(0.0602)**
N	923866	410309	380085
adj. R-sq	0.137	0.082	0.099

Both are independently correlated (but not synonymous) with Republican Party

Summary Correlations

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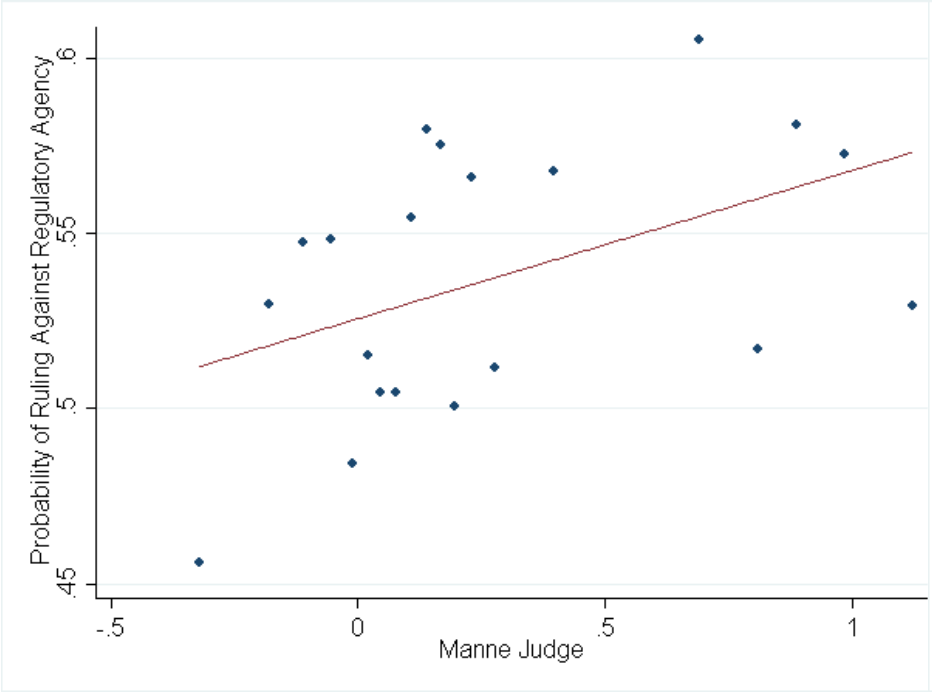
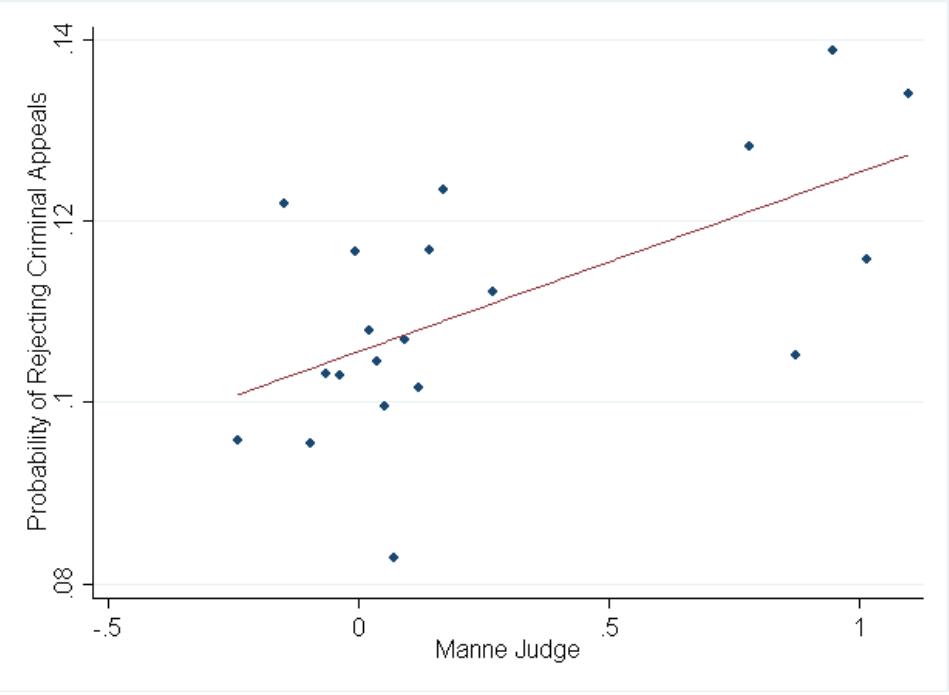




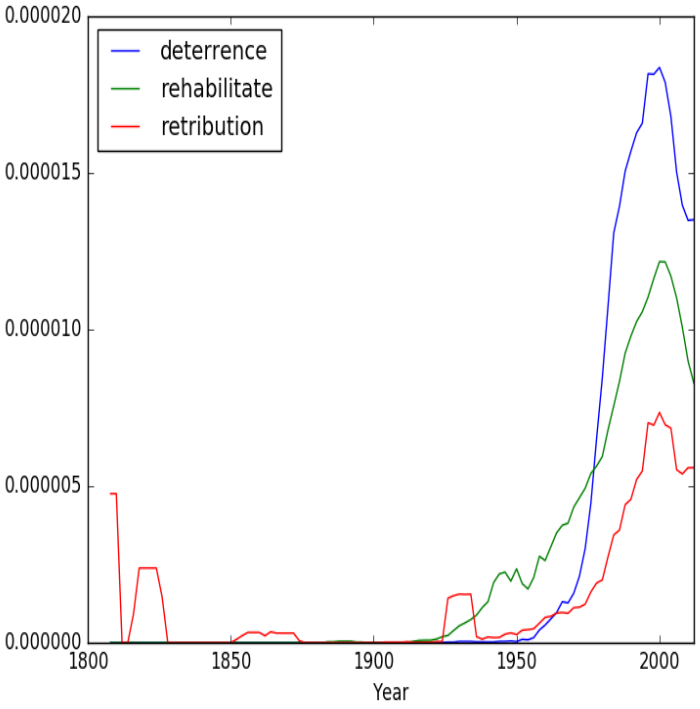
Economics Trained Judges vote against regulation and reject criminal appeals.

Binscatter: Probability vs. economics training, residualized on circuit-year fixed effects and Republican indicator

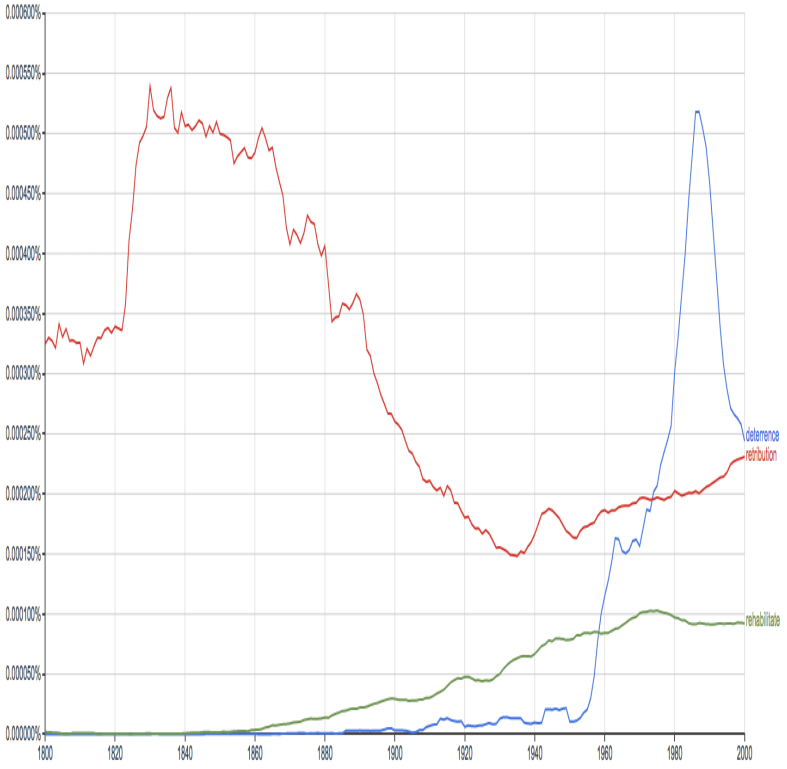
Benchmark Effect of Economics

	Ruling Against Regulatory Agency				Rejecting Criminal Appeal			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Econ Style	**0.00554****	**0.00533****			**0.00250***	**0.00222***		
	(0.00245)	**(0.00243)**			**(0.00132)**	**(0.00132)**		
Econ Training			**0.0364***	**0.0425****			**0.0199****	**0.0220*****
			(0.0208)	**(0.0212)**			**(0.00774)**	**(0.00781)**
Republican		-0.00752		-0.0333		-0.00963***		-0.0164***
		(0.00750)		(0.0208)		(0.00333)		(0.00630)
N	53977	53977	12320	12320	194070	194070	97824	97824
adj. R-sq	0.100	0.100	0.173	0.173	0.239	0.239	0.043	0.043
Circuit-Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Sample	All	All	Post 1991		All	All	Post 1991	

Google Books



Word Frequency in State Court Opinions



Word Frequency in Google Books

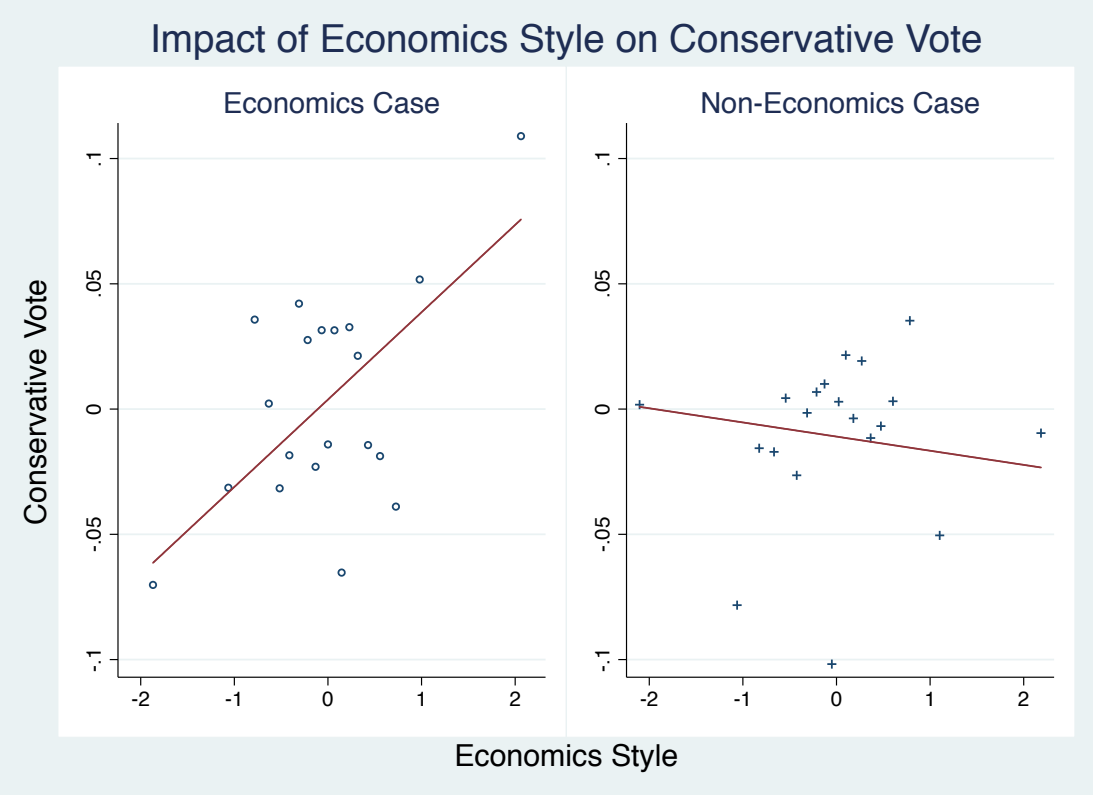
- A_g: relative frequency in law and economics articles
- B_g: relative frequency in Google Books.
- Token g relatedness to law and economics: $E_g = \frac{A_g}{B_g}$.

Outline

Judge Randomization

- **Interviews** of courts and **orthogonality checks** of observables
  - (1) 2-3 weeks before oral argument, computer:
    - randomly assigns available judges including visiting judges
    - ensures judges are not sitting together repeatedly
    - senior judges reduced frequency entered into the program
  - (2) randomly assign panels on yearly basis, then randomly assign cases
    - judges can occasionally recuse
    - panel sees case again on remand
    - exceptions for specialized cases like death penalty
- **Omnibus test**: how similar string of panel assignments is to random strings
  - Not accounting for vacation, sick leave, senior status, en banc, remand, and recusal can lead to the inference that judges are not randomly assigned.
  - We assume these deviations from randomness are Rubin-ignorable.

Impact of Economics Judges on Economics Cases



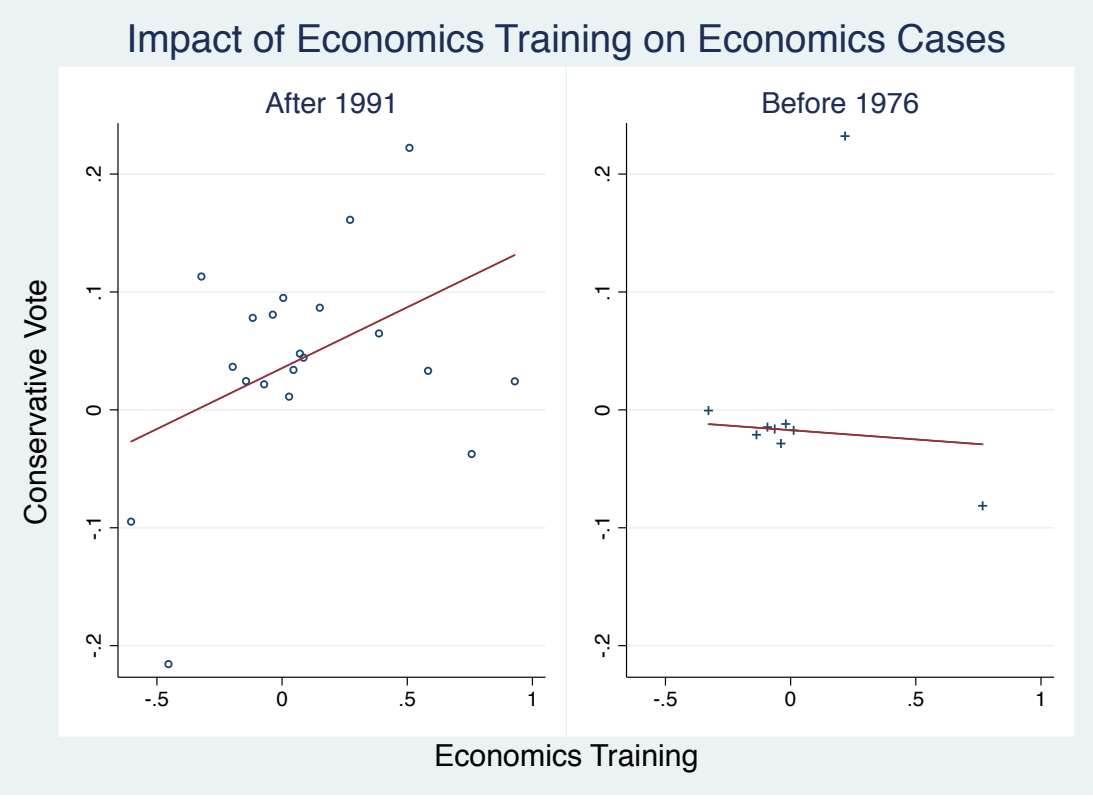
In Economics Cases, Economics Style Judges render Conservative Votes (normalized).

Impact of Economics Judges on Economics Cases

	Conservative Vote (+1/0/-1)				Conservative Vote (+1/0/-1)		
	(1)	(2)	(3)		(4)	(5)	(6)
Econ Style	-0.0116	-0.0120	-0.0125	Republican	0.00622	0.0113	0.00660
	(0.0102)	(0.0103)	(0.0111)		(0.0234)	(0.0147)	(0.0273)
Econ Case	-0.229***	-0.241***	-0.243***	Econ Case	-0.262***	-0.241***	-0.274***
	(0.0138)	(0.0171)	(0.0167)		(0.0236)	(0.0171)	(0.0276)
Econ Style *	**0.0609*** **	**0.0600*** **	**0.0636*** **	**Republican ***	**0.0678***	**0.0254**	**0.0806***
Econ Case	**(0.0141)**	**(0.0140)**	**(0.0148)**	**Econ Case**	**(0.0370)**	**(0.0259)**	**(0.0434)**
N	48195	48195	33901	N	52215	48195	37921
adj. R-sq	0.089	0.089	0.100	adj. R-sq	0.123	0.089	0.138
Circuit-Year FE	Y	Y	Y	Circuit-Year FE	Y	Y	Y
Control	N	Repub	N	Control	N	Econ Style	N
Sample	All	All	Non-Author	Sample	All	All	Non-Author

Holds controlling for Republican and examining Non-Authors

Impact of Economics Judges on Economics Cases



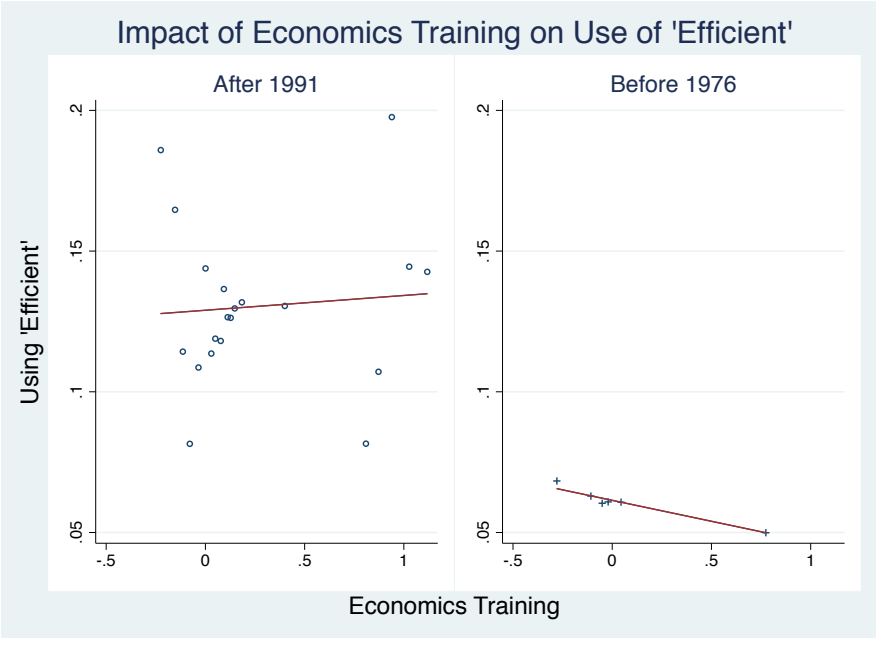
After attendance, Economics Trained Judges render Conservative Votes (normalized).

Impact of Economics Judges on Economics Cases

	Conservative Vote (+1/0/-1)					
	(1)	(2)	(3)	(4)	(5)	(6)
Econ Training * Econ Case	-0.129	**0.257*** **	0.000178			
	(0.126)	**(0.0977)**	(0.0581)			
Econ Training * Econ Case * Post 1991			**0.207** **			
			(0.103)			
Econ Training * Econ Case * Post				**0.625*** **	0.708***	0.427*
				(0.160)	(0.169)	(0.226)
N	29153	9639	52215	52215	26202	25975
adj. R-sq	0.146	0.106	0.271	0.302	0.355	0.320
Circuit-Year FE	Y	Y	Y	Y	Y	Y
Control	N	N	N	N	N	N
Judge FE	N	N	**Y**	**Y**	**Y**	**Y**
Sample	Year < 1976	**Year > 1991**	All	All	**Rep**	**Dem**

Holds within Judge and with fully interacted Republican. Rows omitted (but not regressors).

Impact of Economics Judges on Regulation Cases



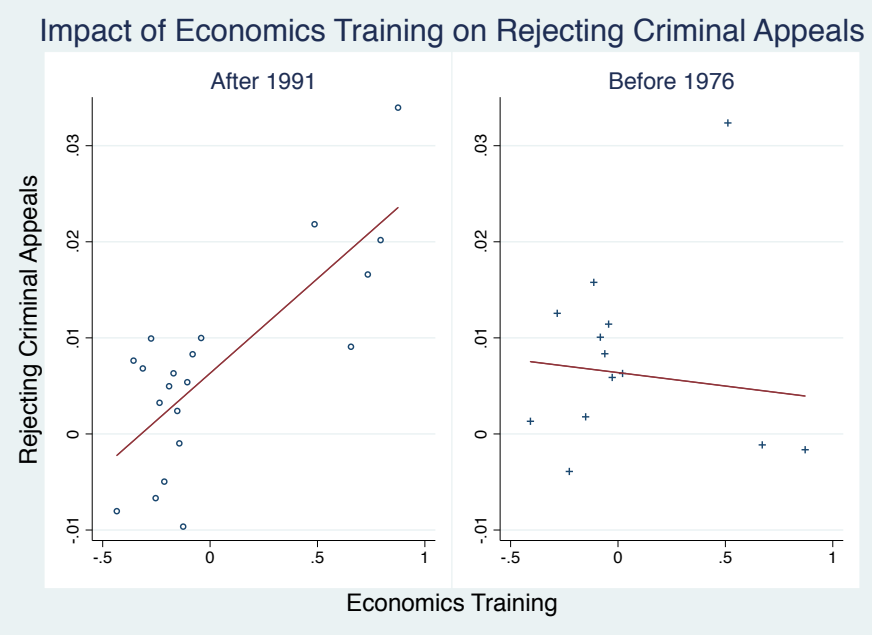
After attendance, Economics Trained Judges increase use of "efficient" when authoring regulatory case opinions.

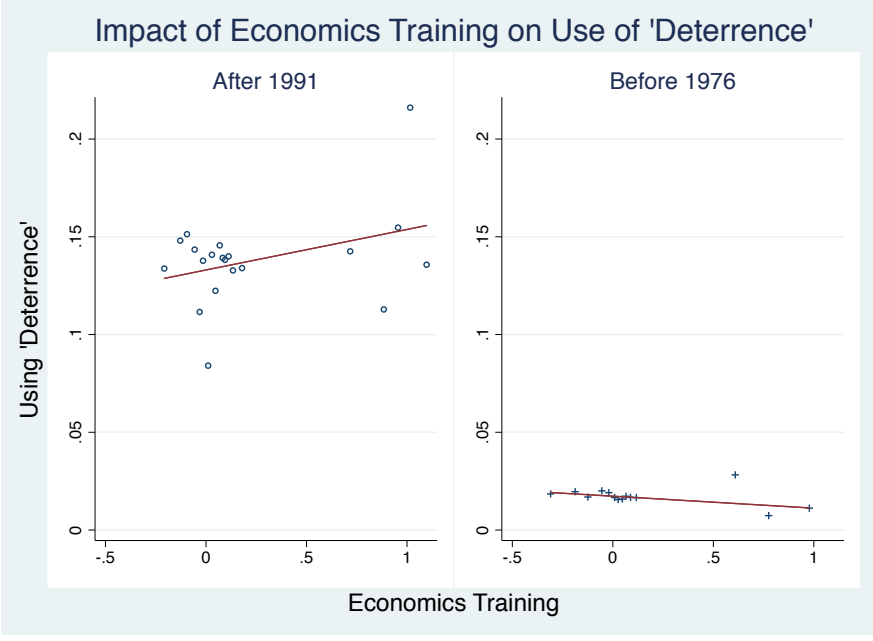
Impact of Economics Judges on Regulation Cases

	# Uses of "Efficient"		
	(1)	(2)	(3)
Econ Training	-0.00407	**0.0494*** **	
	(0.00455)	**(0.0188)**	
Econ Training *			**0.0495***
Post 1991			**(0.0272)**
N	45752	11372	72005
adj. R-sq	0.125	0.148	0.261
Circuit-Year FE	Y	Y	Y
Control	N	N	N
Judge FE	N	N	Y
Sample	Year < 1976	**Year > 1991**	All

Similar with Republican control.

Impact of Economics Judges on Criminal Cases





After attendance, Economics Trained Judges increase rejection of Criminal Appeals (normalized)

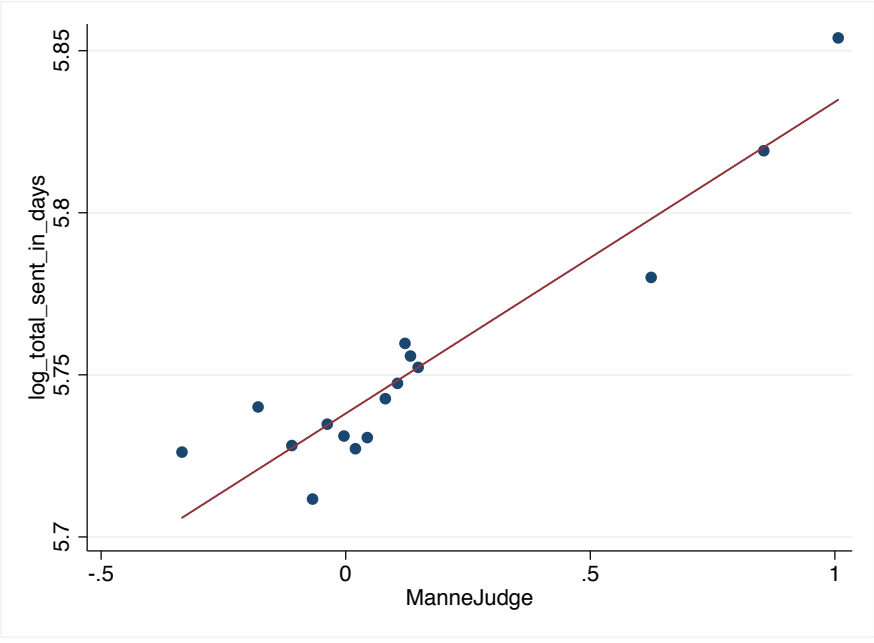
and increase use of "deterrence" when authoring criminal case opinions.

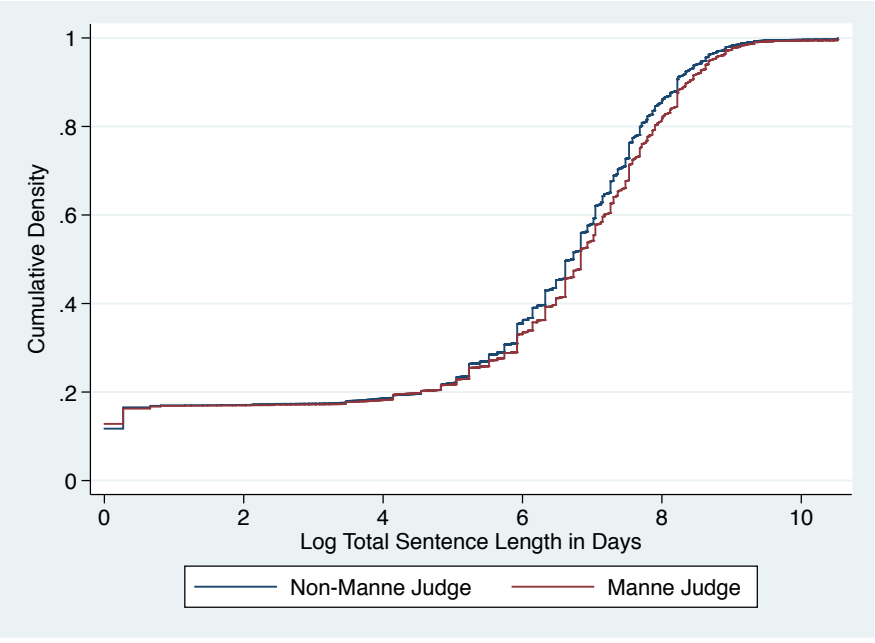
Impact of Economics Judges on Criminal Cases

	Rejecting Criminal Appeal			# Uses of "Deterrence"	
	(1)	(2)		(1)	(2)
Econ Training	-0.00525	**0.0197****	Econ Training	0.00497	**0.0387****
	(0.0212)	**(0.00792)**		(0.00664)	**(0.0189)**
N	76183	92306	N	19199	29850
adj. R-sq	0.305	0.044	adj. R-sq	-0.019	0.023
Circuit-Year FE	Y	Y	Circuit-Year FE	Y	Y
Control	N	N	Control	N	N
Sample	Year < 1976	**Year > 1991**	Sample	Year < 1976	**Year > 1991**

Similar with Republican control.

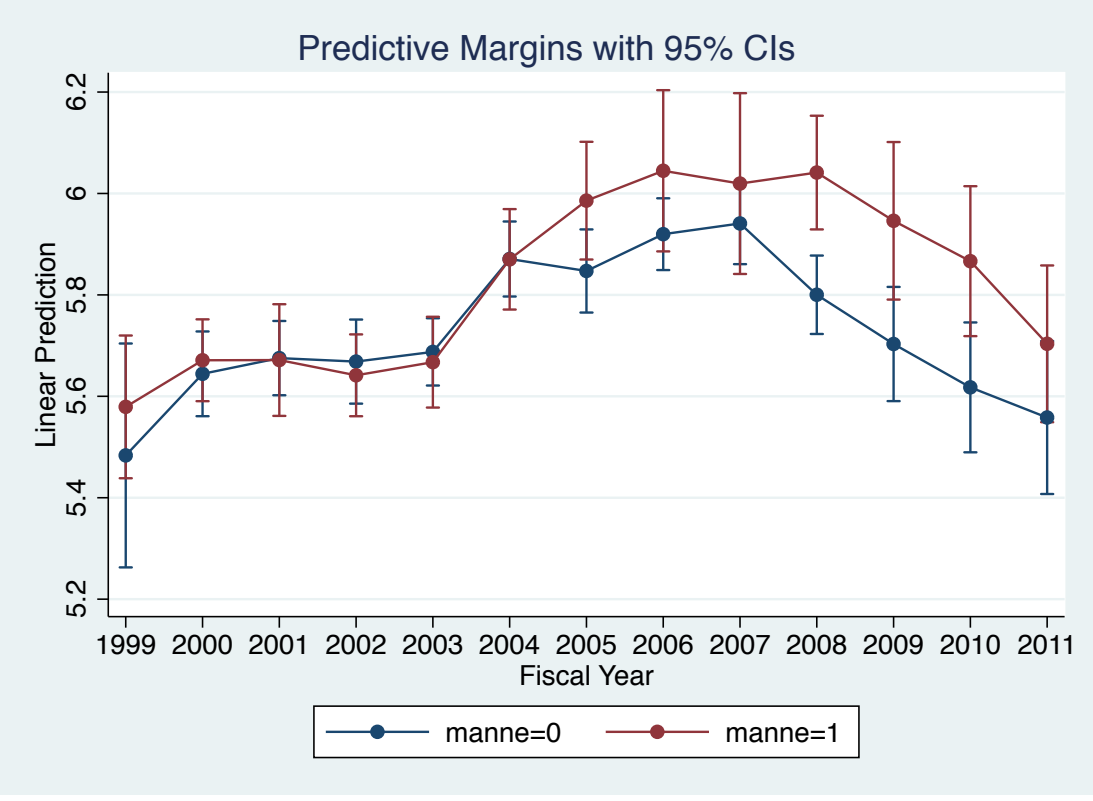
Impact of Economics Judges on Sentencing





Economics Trained Judges render more severe sentences.

Impact of Economics Judges, Pre and Post *Booker*



- After allowing judicial discretion, Economics Trained Judges increase sentencing severity in district courts.
- In *U.S. v. Booker* (Jan 12, 2005) the Supreme Court declared the existing guidelines violated Constitution.
- Other studies have documented increased variance after *Booker* (Yang 2014); Republicans becoming harsher (Cohen and Yang 2017)

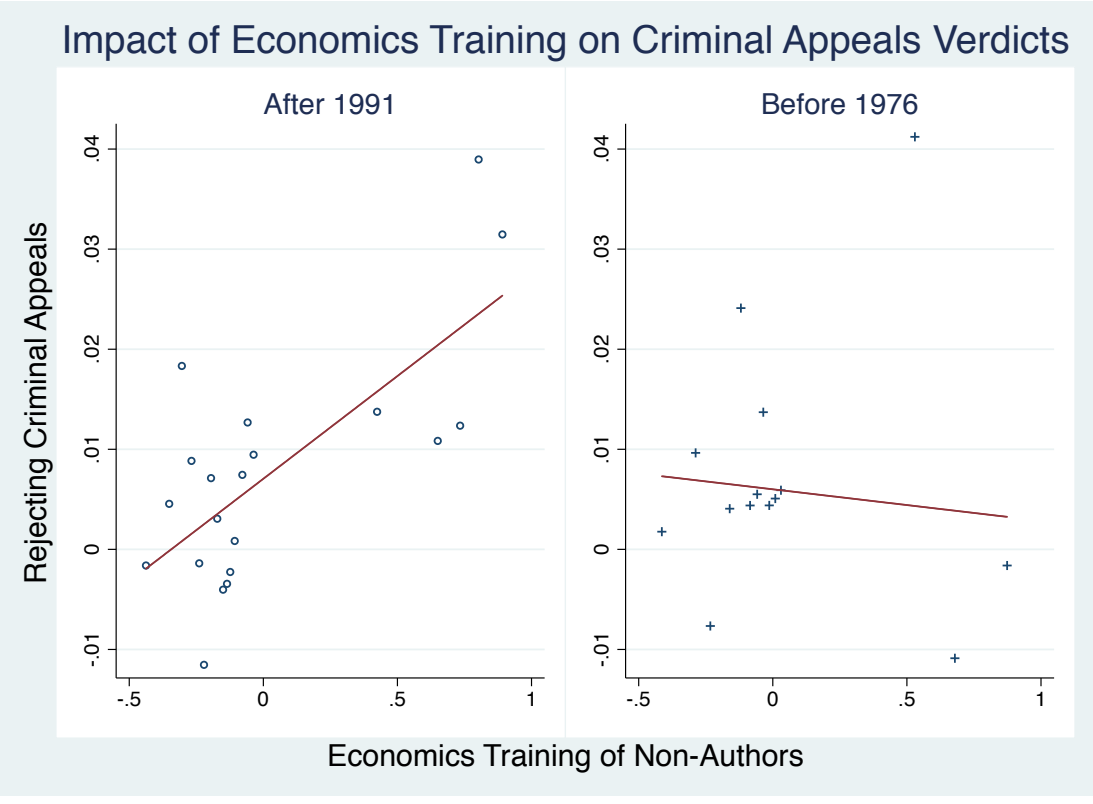
Impact of Economics Judges, Pre and Post *Booker*

	Any Sentence		Log of Total Sentence	
	(1)	(2)	(3)	(4)
Econ Training	-0.00433	-0.0336	-0.00527	-0.00795
	(0.00692)	(0.0594)	(0.0462)	(0.142)
Econ Training *	**0.0117***	**0.198****	**0.131***	**0.130***
Booker (≥2005)	**(0.00631)**	**(0.0829)**	**(0.0731)**	**(0.0774)**
N	930448	930448	819881	889951
adj. R-sq	0.035	0.037	0.085	0.053
Courthouse and Calendar FE	Y	Y	Y	Y
Judge FE	N	N	N	**Y**
Sample	All	All	Sentence > 0	All

Similar with fully interacted Republican. To benchmark, blacks receive almost 10% longer sentences than comparable white defendants arrested for the same crimes (Rehavi and Starr 2014)

Outline

Impact of Peer Econ Judges on Criminal Appeals Verdicts



After attendance, Economics Training of Non-Authors increases Rejection of Criminal Appeals.

Impact of Peer Econ Judges on Criminal Appeals Verdicts

	Rejecting Criminal Appeal	
	(1)	(2)
Econ Training	-0.00697	**0.0205****
	(0.0232)	**(0.00928)**
N	59123	65354
adj. R-sq	0.316	0.050
Circuit-Year FE	Y	Y
Control	N	N
Judge FE	N	N
Sample	Year < 1976	**Year > 1991**
Sample	Non-Author	Non-Author

Similar with fully interacted Republican.

Learning & Memetic Empirical Approach

- The coefficient γ gives the causal effect of judge-assignment
  - case i, judge j, court c, year t

$$F_{ijct} = \alpha_{ct} + \gamma Z_{ijct} + X_j'\beta + \varepsilon_{ijct}$$

- Token F_{ijct} measured:
  - (1) # of uses of "deterrence" (modeling joint choice to author and use word)
  - (2) words previously identified, e.g., in legal scholarship (Ellickson 2000)
- Z_{ijct}, law-and-economics exposure:
  - γ_1· Presence of Economics Training on the **Previous Case of this Judge**
    - Treatment is judge; so cluster by judge; weight to treat judge-years equally
  - Presence of Economics Training on the **Previous Case in this Circuit**
    - Treatment is case; so two-way cluster by judge and case
  - γ_2· Presence of Economics Training on the **Previous Case of Judge on Topic**
  - Presence of Economics Training on the **Previous Case of Circuit on Topic**
    - Separately identify the impact within topic (γ_2) vs. across topic (γ_1)
- Active v. Passive Persuasion (Was there division on previous case?)
- Controls - α_{ct}: court-year fixed effects; X_j: judge covariates, e.g. Republican

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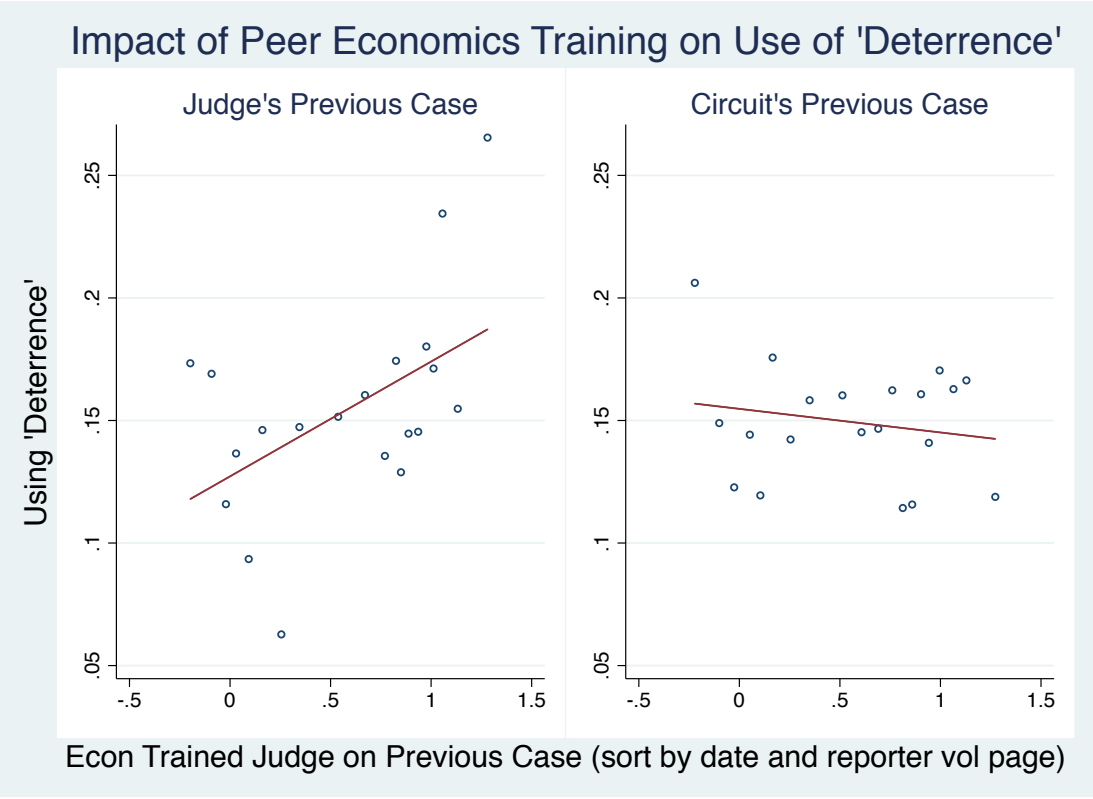
Impact of Peer Econ Judges on Criminal Case Reasoning



Average number of cases per judge = 94. Average number of cases per circuit = 16,748. Exclude same day cases.

Previous case by a judge, median, 9 days ago; previous case in a circuit, median, 2 days ago.

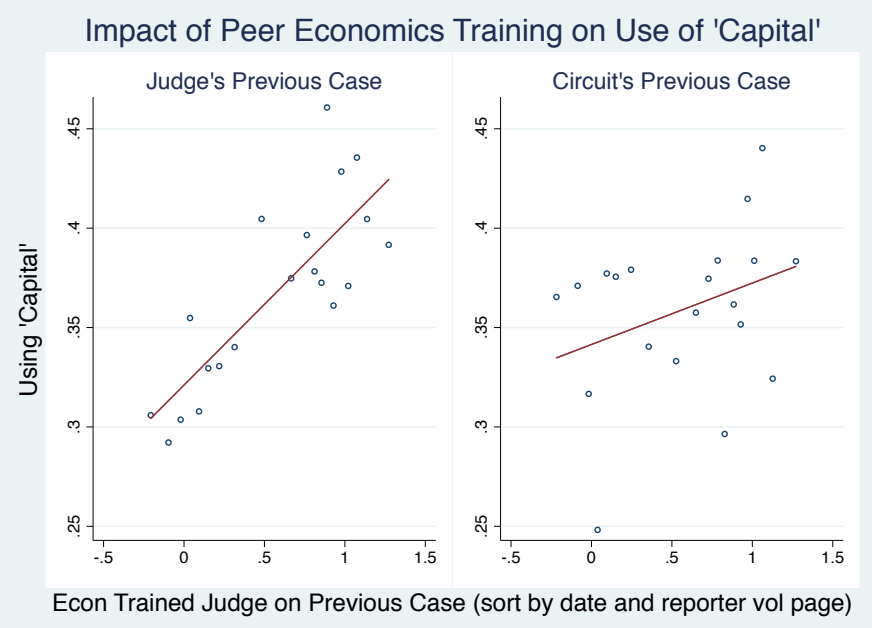
Impact of Peer Econ Judges on Criminal Case Reasoning

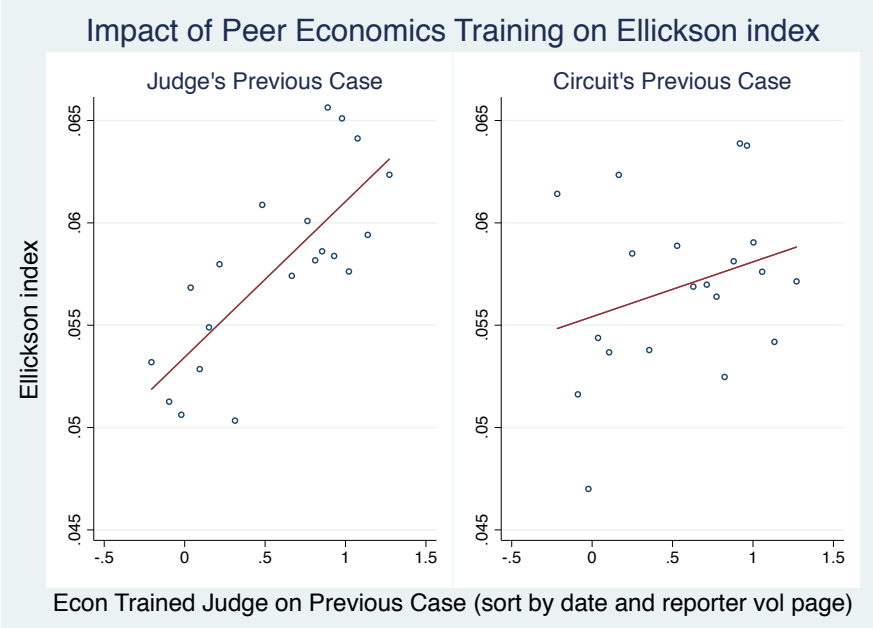
	# Uses of "Deterrence"						
Econ Training on	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Next Case	-0.0229				-0.00718		
	(0.0146)				(0.00558)		
This Case		**0.0320***				**-0.00730**	
		(0.0187)				**(0.00553)**	
Previous Case			**0.0465***				**-0.00228**
			(0.0238)				**(0.00418)**
Two Cases Ago				0.0133			
				(0.0198)			
N	76596	85261	77162	83041	64024	74968	63641
adj. R-sq	0.045	0.055	0.058	0.062	0.008	0.014	0.008
Circuit-Year FE	Y	Y	Y	Y	Y	Y	Y
Sample	**Year > 1991**	**Year > 1991**	**Year > 1991**	**Year > 1991**	**Year < 1976**	**Year < 1976**	**Year < 1976**
Order within	Judge	Judge	Judge	Judge	Judge	Judge	Judge
Cluster	Judge	Judge	Judge	Judge	Judge	Judge	Judge

Impact of Peer Econ Judges on Criminal Case Reasoning

	# Uses of "Deterrence"						
Econ Training on	(8)	(2')	(3')	(9)	(10)	(11)	(12)
Next Case				0.00883			
				(0.0246)			
This Case		**0.0320**			**0.0320**		
		(0.0240)			**(0.0240)**		
Previous Case			**0.0465****			**-0.00973**	
			(0.0229)			**(0.0275)**	
Two Cases Ago	0.00168						-0.0424
	(0.00424)						(0.0273)
N	70907	85261	77162	66741	85261	66797	80112
adj. R-sq	0.008	0.055	0.058	0.049	0.055	0.060	0.056
Circuit-Year FE	Y	Y	Y	Y	Y	Y	Y
Sample	**Year < 1976**	**Year > 1991**	**Year > 1991**	**Year > 1991**	**Year > 1991**	**Year > 1991**	**Year > 1991**
Order within	Judge	**Judge**	**Judge**	Circuit	**Circuit**	**Circuit**	Circuit
Cluster	Judge	Judge + Case	Judge + Case	Judge + Case	Judge + Case	Judge + Case	Judge + Case

Identifying Memetic Economic Phrases





- All cases
- Ellickson average (index of externalit*, transaction_costs, efficien*, deterr*, cost_benefit, capital, game_theo, chicago_school, marketplace, law1economic, law2economic)

Identifying Memetic Economic Phrases

	# Uses of "Deterrence"			
Econ Training on	(1)	(2)	(3)	(4)
Next Case	-0.00412			
	(0.00730)			
This Case		**0.0161****		
		(0.00683)		
Previous Case			**0.0127***	
			(0.00692)	
Two Cases Ago				**0.0120***
				(0.00678)
N	353981	355504	354695	353928
adj. R-sq	0.009	0.010	0.010	0.010
Circuit-Year FE	Y	Y	Y	Y
Circuit Order	Y	Y	Y	Y
Sample	**Year > 1991**	**Year > 1991**	**Year > 1991**	**Year > 1991**
Order within	Judge	Judge	Judge	Judge
Cluster	Judge	Judge	Judge	Judge

Identifying Memetic Economic Phrases

	Ellickson average			
Econ Training on	(1)	(2)	(3)	(4)
Next Case	-0.000957			
	(0.00231)			
Next Case	-0.000231			
Same Topic	(0.00192)			
This Case		**0.00585****		
		(0.00271)		
Previous Case			**0.00379***	
			(0.00212)	
Previous Case			**0.00385***	
Same Topic			**(0.00223)**	
Two Cases Ago				-0.000710
				(0.00303)
Two Cases Ago				**0.00689****
Same Topic				**(0.00272)**
N	327844	355504	338739	327821
adj. R-sq	0.017	0.011	0.014	0.016

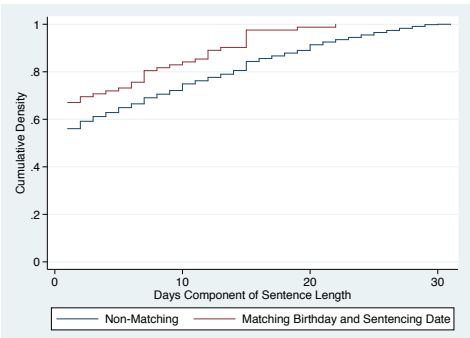
Active or Passive Persuasion

More transmission when panel is like-minded.

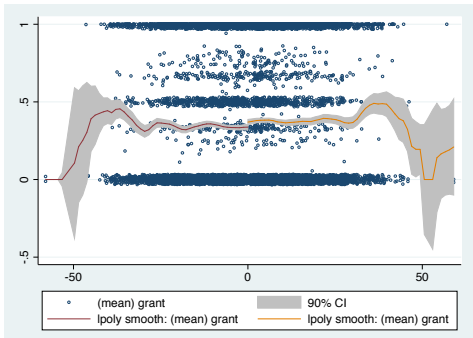
	# Uses of "Deterrence"	
Econ Training on	(1)	(2)
Previous Case	0.0131	
	(0.0089)	
Previous Case	-0.0005	
* Previous Case Divided	(0.0109)	
Two Cases Ago		**0.0244****
		(0.0116)
Two Cases Ago		-0.0182
* Two Cases Ago Divided		(0.0129)
N	354647	353878
adj. R-sq	0.010	0.010
Circuit-Year FE	Y	Y
Circuit Order	Y	Y
Sample	**Year > 1991**	**Year > 1991**
Order within	Judge	Judge

Summary and Outlook

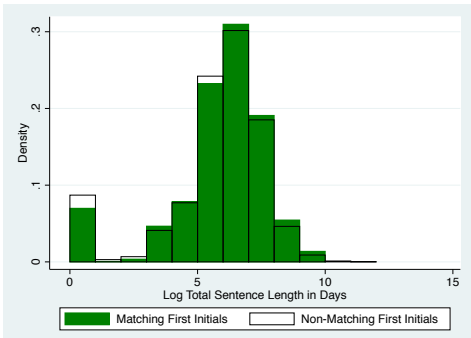
- Economics judges significantly impact US judicial outcomes
  - Render conservative votes and verdicts
  - Against regulation and criminal appeals
  - Harsher criminal sentences and deterrence reasoning
- Next steps
  - FOIA to get the exact day of application (RDD "first-come, first-served" around quota)
  - General equilibrium (measure impacts along citation edge)
  - High-dimensional data (word2vec, document and judge embeddings)
- Cultural roots of social preferences (courts as "natural incubator")
  - Reference points, mental accounting, emotions (punishment)
  - Identity, egotism, dissimilation, curvature of moral costs (duties)
  - Memes, implicit bias from judicial corpora, grammar of law (4 terabytes data)



Leniency on Defendant Birthdays



after NFL football wins



not matching first initials

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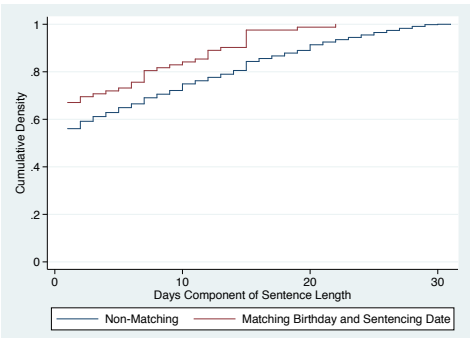

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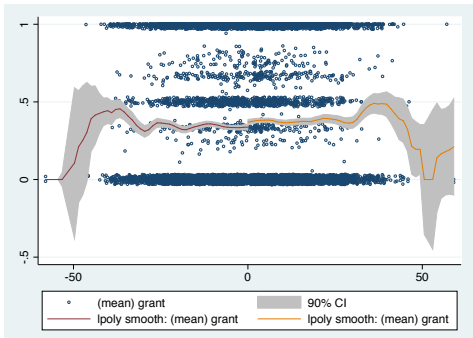
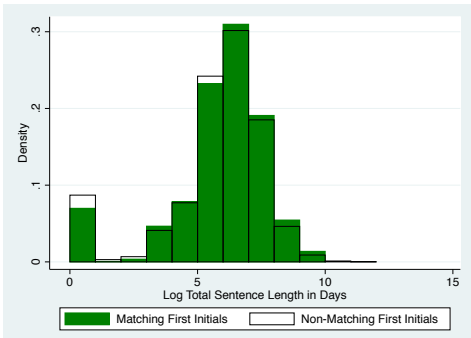


after NFL football wins



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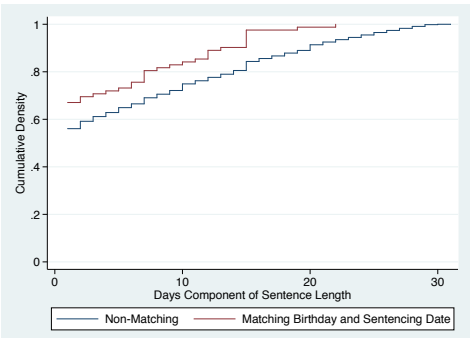

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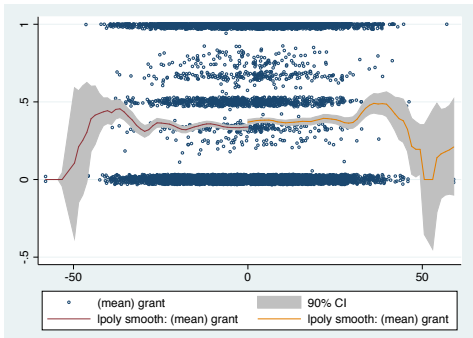

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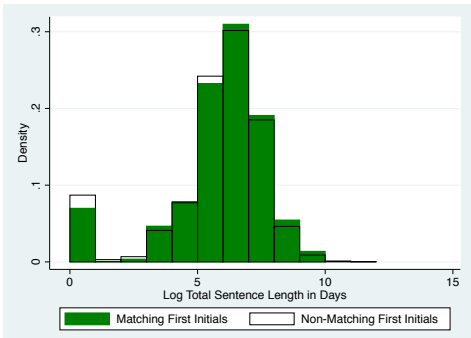


not matching first initials

Constructing Memes

- Legal terminology
  - A: Adjective, N: Noun, V: Verb, P: Preposition, D: Determinant, C: Conjunction.
  - 2-grams: AN, NN, VN, VV, NV, VP.
  - 3-grams: NNN, AAN, ANN, NAN, NPN, VAN, VNN, AVN, VVN, VPN, ANV, NVV, VDN, VVV, NNV, VVP, VAV, VVN, NCN, VCV, ACA, PAN.
  - 4-grams: NCVN, ANNN, NNNN, NPNN, AANN, ANNN, ANPN, NNPN, NPAN, ACAN, NCNN, NNCN, ANCN, NCAN, PDAN, PNPN, VDNN, VDAN, VVDN.
  - 350,000 N-grams
- Phrase that propogates along the citation graph
  - or seating graph
  - or citation meme that propogates

Scoring Memetic Phrases

$$f_m = N_{\text{has meme}} / N_{\text{total}}$$

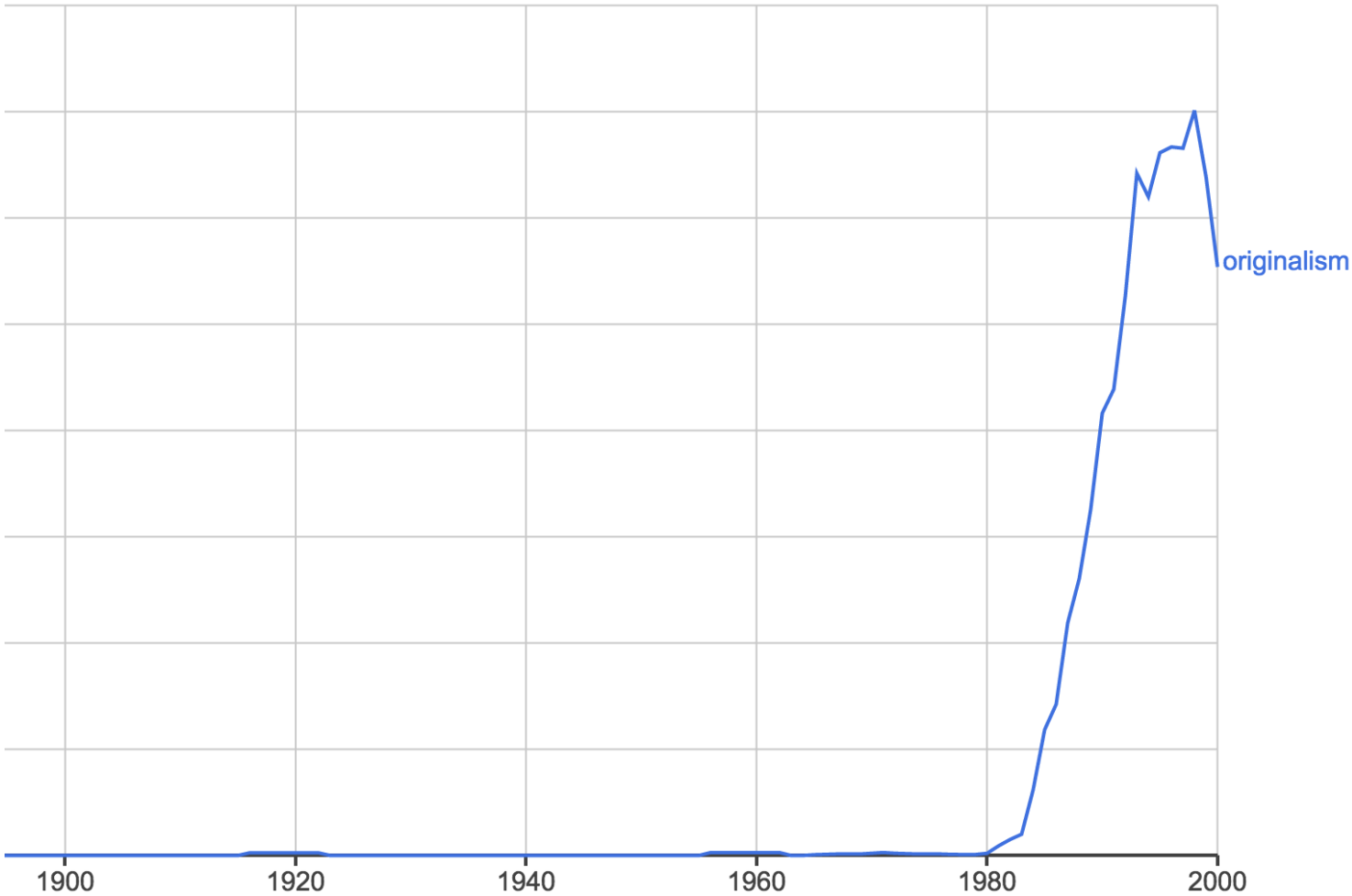
$$P_m = \frac{d_{m \to m}}{d_{\to m} + \delta} \Big/ \frac{d_{m \to \not m} + \delta}{d_{\to \not m} + \delta}$$

- $d_{m \to m}$ = # of cases with m, and cite ≥ 1 case with m
- $d_{\to m}$ = # of cases which cite ≥ 1 case with m
- $d_{m \to \not m}$ = # of cases with m, and do not cite any other case with m
- $d_{\to \not m}$ = # of cases which do not cite any other case with m
- δ is a noise factor to account for non-citing cases
- The overall meme score of a phrase is: $S_m = f_m \times P_m$

Memetic Phrases

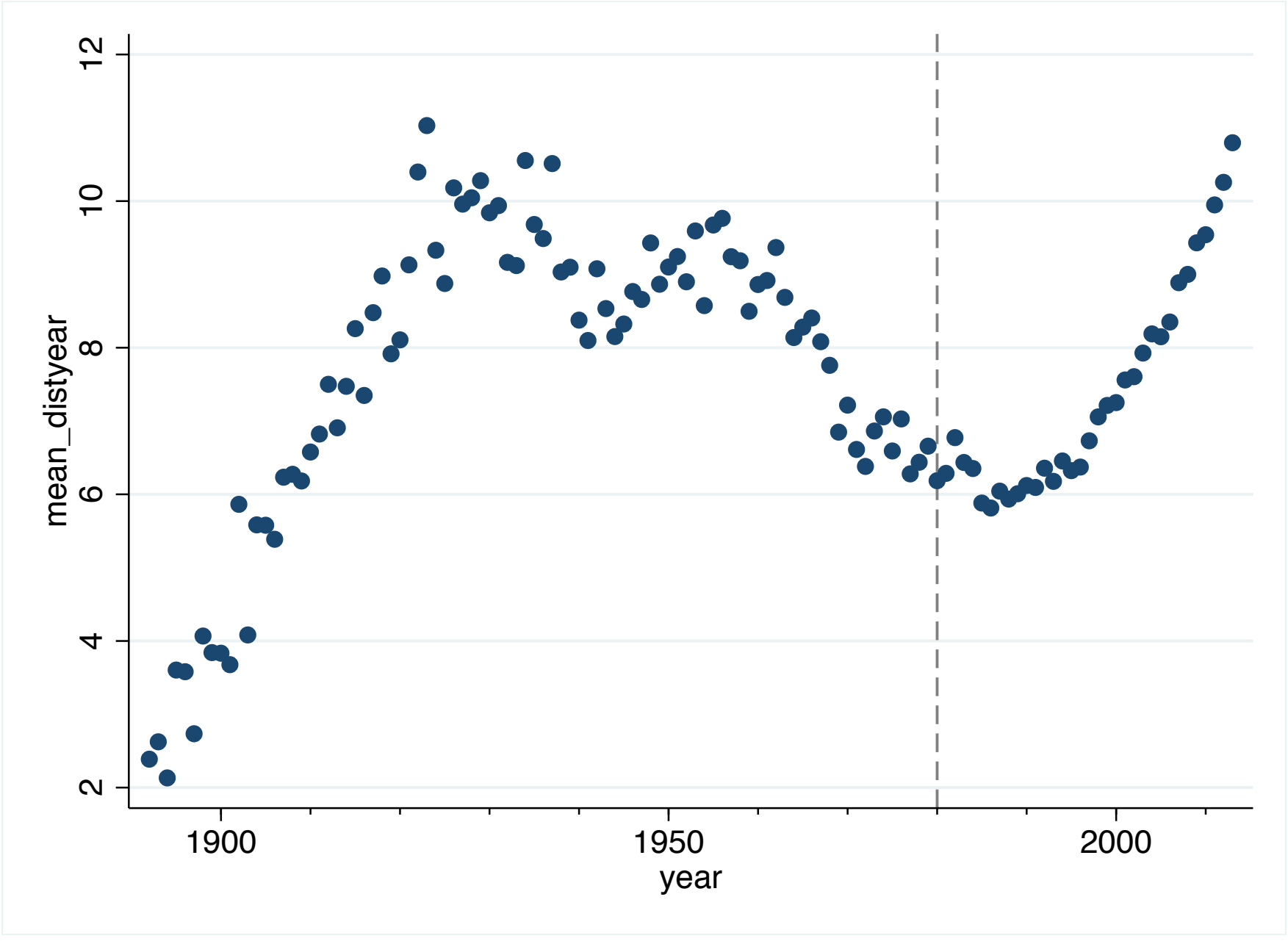
Phrase	Normalized Meme Score
red heat	0.138
salvage services	0.0039
said cars	0.0029
Atlantic coast	0.00216
citizens of different states	0.00212
insurance effected	0.0020
separable controversy	0.0018
taken in tow	0.0017
schooner was	0.00126
fourteenth amendment	0.00125
contract of affreightment	0.00119
patented design	0.0011
constitution or laws	0.0009
mere transient or sojourner	0.0008

Originalism



- The word "originalism" was coined by Paul Brest in 1980.
- Here is the famous passage: *"By "originalism" I mean the familiar approach to constitutional adjudication that accords binding authority to the text of the Constitution or the intentions of its adopters."*

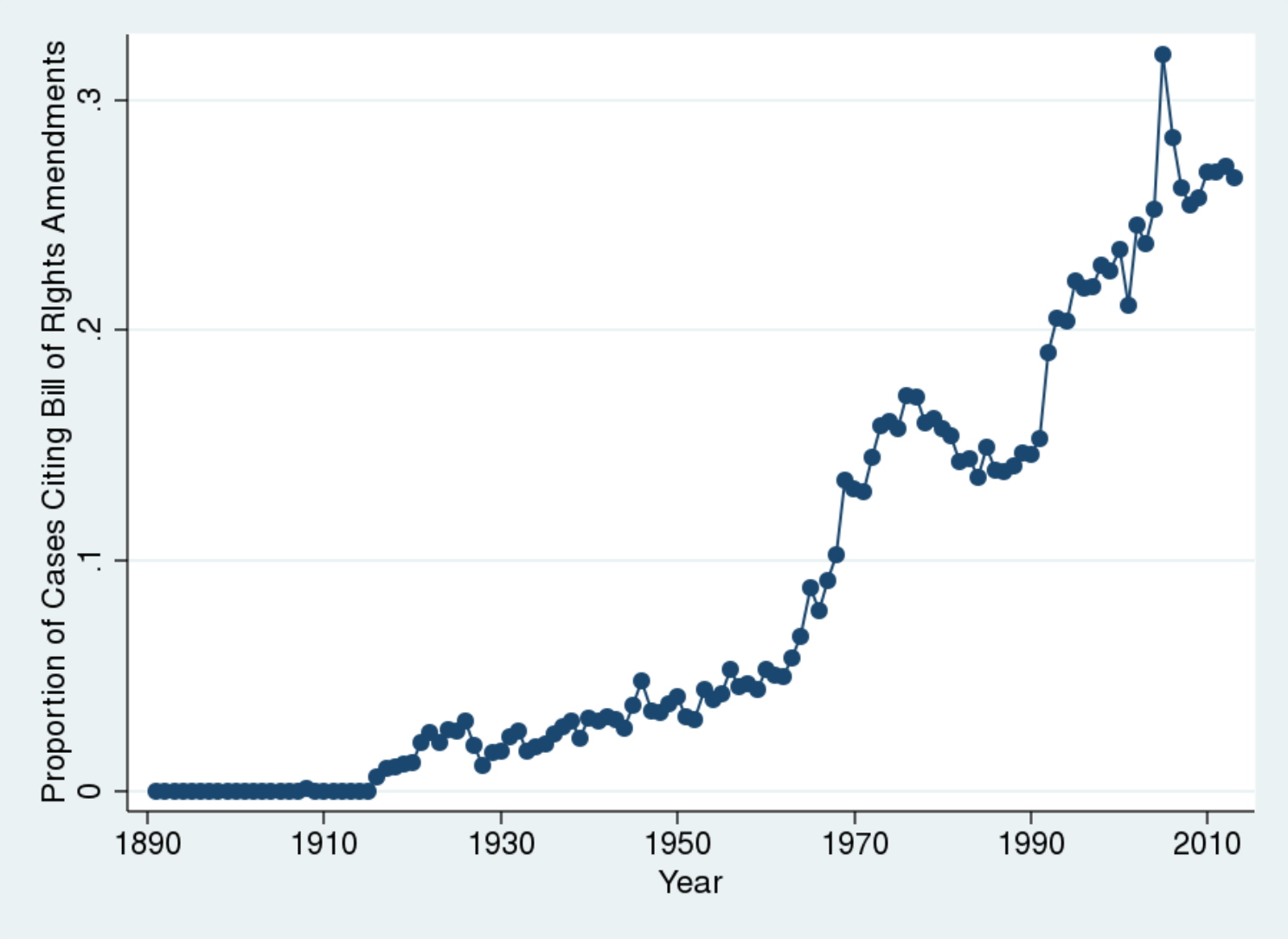
Measuring Originalism



Measuring Originalism

- "We are all Originalists now"

Figure: Trend in Citing Bill of Rights Amendments



Most Originalist Circuit Court Judges

Rank	Judge	Originalism Score
1	DUNCAN, ALLYSON	6.76
2	RAWLINSON, JOHN	6.08
3	SYKES, DIANE S.	5.29
4	**SCALIA, ANTONIN**	**5.13**
5	PARKER, BARRINGTON	4.76
6	MARCUS, STANLEY	4.33
7	LINN, RICHARD	3.88
8	LEMMON, DAL	3.78
9	GRABER, SUSAN	3.43
10	HARDIMAN, THOMAS	3.36
11	WESLEY, RICHARD	3.19
12	SACK, ROBERT DAVID	3.17
13	CLEVENGER, RAYMOND	3.13
14	MCKEAGUE, DAVID	2.77
15	**GARLAND, MERRICK**	**2.67**
16	KETHLEDGE, RAYMOND	2.30
17	**GORSUCH, NEIL M.**	**2.28**
18	CLAY, ERIC L.	2.24
	...	
	SOTOMAYOR, SONIA	**0.26**
	POSNER, RICHARD A.	**-0.4**

Validating the N-grams

- Predict hand-coded cases
- Delete N-grams which appear in no more than a threshold based on the number of observations in each individual legal field
- Logistic AUC (better for imbalanced data - plots true positive over false positive rate)

Validating the N-grams

AUC	Logistic Regression with tf-idf
11th Abrogation	0.845
Abortion	0.642
ADA	0.751
Affirmative Action	0.653
Campaign Finance	0.876
Capital Punishment	0.650
EPA	0.72
FCC	0.96
First Amend	0.695
Homosexual Rights	0.873
NEPA	0.783
NLRB	0.715
Obscenity	0.855
Piercing Corp Veil	0.719
Sex Discrimination	0.752
Title 7	0.78

Validating the N-grams

Legal Field	Positive	Negative
11th Abrogation	accru plaintiff knew known, amend constitut unit state, argu eleventh amend, compel undertak approach, congress unequivoc express, congruent proport	cite discrimin public, compet privat enterpris doe mean, congress articl, enact statut, plaintiff appel argument exact relief seek
Abortion	appeal concern, Life health, court held proper function legislatur, health servic, pregnant minor	mother result, clinic district court abus discret, plaintiff deni,
ADA	Administr, Distress, punit damag, rehabilit act claim	medic condit, Dispar, extend
Affirmative Action	black candid, board compli, racial balanc, impermiss	Arbitrari, argu constitut, Conscienc, constitut violat

Validating the N-grams

capital punishment: involuntary, mental health v. attack

Campaign Finance	advertis influenc outcom vote, argument appel consid definit, challeng present, case controversi district, disclosur sourc	Expens, inform elector mean provis, compel court went histori, buckley court limit
Capital Punishment	duti make reason, Involuntari, materi reason probabl, mental health	consid mitig, Attack, Inelig, counti jail
EPA	act impos, board character, Chevron, Elimin, interst transport hazard wast	factor demonstr, id statut silent ambigu respect, requir provis
FCC	arrier transport,	recov intrast contribut state

Validating the N-grams

First Amend	materi fact, purpos regul, materi fact, purpos regul	concur result reach judg hall opinion analysi amend, direct narrowli, essenti curti content statut inclus, provid ineffect remot support govern
Homosexual Rights	claim revers, equal protect claus fourteenth amend, homosexu engag consensu sodomi court state great, prohibit homosexu conduct, sexual prefer	know corps, militari matter difficult think clearer,
NEPA	accord proper forest servic fish, area plan, increas risk, litig cost save, nativ	caprici violat. result destruct, project narrowli
NLRB	animus design rid compani financi, care includ critic, complaint alleg violat section mention, Limit, involv face simpl jurisdict question doe	alleg februari precis interrog employe threaten employe, allow mason van atter time acclim posit, expens attribut unit employ

Validating the N-grams

obscenity: constitutionally protected v. core pornographic

Obscenity	appel court, constitut protect, regard invalid major opinion miller recogn	core pornographi, materi public, sexual relat
Piercing Corp Veil	oblig make, issu liabil, refund	agreement district, alleg complaint, court review
Sex Discrimination	district court grant summari judgment favor, dismiss complaint, complain, opinion	deni, discrimin, evid
Title 7	Faith, Reason trier fact, conclud	prima faci case racial discrimin, discrimin retali

Peer Effects

Judicial Peer Effects: The Effect of Being on Unified Panels

	(1)	(2)	(3)	(4)	(5)
			Dissent Vote		
Mean of dep. var.	0.0275	0.0275	0.0275	0.0286	0.0266
Majority	-0.0141***	-0.0128***	-0.0144***	-0.0138***	-0.0157***
	(0.000989)	(0.000870)	(0.00102)	(0.00132)	(0.00142)
Unified	-0.0194***	-0.0177***	-0.0197***	-0.0180***	-0.0220***
	(0.00120)	(0.00108)	(0.00124)	(0.00159)	(0.00183)
% Unified in Last Quarter	0.000983	0.00393	0.00112	0.00427	-0.00397
* Minority	(0.00285)	(0.00260)	(0.00293)	(0.00439)	(0.00431)
% Unified in Last Quarter	-0.00473***	-0.00399***	-0.00466***	-0.00384*	-0.00645***
* Majority	(0.00144)	(0.00110)	(0.00149)	(0.00213)	(0.00241)
% Unified in Last Quarter	0.00675***	0.00519***	0.00690***	0.00281	0.0103***
* Unified	(0.00141)	(0.00112)	(0.00145)	(0.00195)	(0.00244)
Circuit-Year Quarter-Party FE	Yes	No	Yes	Yes	Yes
Judge FE	No	Yes	No	No	No
Legal Issues FE	No	No	Yes	Yes	Yes
Sample	All	All	All	Experience $\leq$ 10 y	Experience $>$ 10 y
Observations	1109611	1109611	1060203	588120	438050
R-squared	0.020	0.020	0.021	0.025	0.034

Notes: Robust OLS standard errors clustered at the circuit-year level in parentheses (* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$).

- Polarization: same party exposure $\Rightarrow$ $\uparrow$group agree when majority
- Disassimilation: same party exposure $\Rightarrow$ $\uparrow$dissent in uniform group

Peer Effects

Judicial Peer Effects: The Effect of Being Minority on Divided Panels

	(1)	(2)	(3)	(4)	(5)
			Dissent Vote		
Mean of dep. var.	0.0275	0.0275	0.0275	0.0286	0.0266
Majority	-0.0146***	-0.0147***	-0.0149***	-0.0158***	-0.0143***
	(0.00125)	(0.00116)	(0.00128)	(0.00157)	(0.00195)
Unified	-0.0145***	-0.0153***	-0.0148***	-0.0168***	-0.0130***
	(0.00130)	(0.00120)	(0.00134)	(0.00164)	(0.00200)
% Minority in Last Quarter	0.00156	-0.00152	0.00158	-0.000250	0.00487
* Minority	(0.00221)	(0.00167)	(0.00227)	(0.00320)	(0.00343)
% Minority in Last Quarter	-0.000417	-0.000797	-0.000401	0.00126	-0.000476
* Majority	(0.00155)	(0.00117)	(0.00160)	(0.00256)	(0.00230)
% Minority in Last Quarter	-0.00843***	-0.00807***	-0.00830***	-0.00530	-0.0101***
* Unified	(0.00216)	(0.00195)	(0.00223)	(0.00348)	(0.00330)
Circuit-Year Quarter-Party FE	Yes	No	Yes	Yes	Yes
Judge FE	No	Yes	No	No	No
Legal Issues FE	No	No	Yes	Yes	Yes
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Notes: Robust OLS standard errors clustered at the quarter-year level in parentheses (* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$).

- Repulsion: ideological minority exposure $\Rightarrow$ $\uparrow$agree in uniform group

A Theory of Surveys

Measurement

- Talk is cheap
  - Trump, Brexit, Colombia peace vote–all mispredicted
  - Sophisticated adjustments of polls still failed

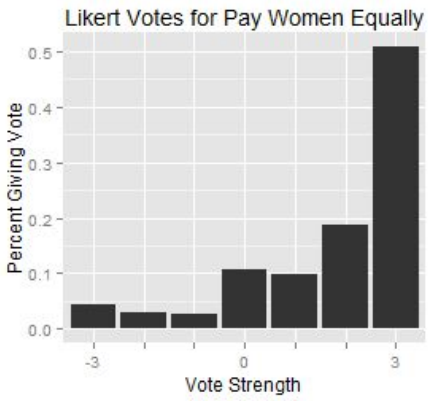
Model

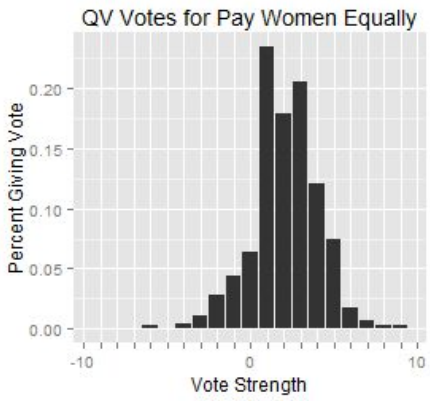
- Make costly the expression of moral and ideological beliefs in surveys
- Revealed preference heuristic
  - Marginal benefit of an additional "vote" scales linearly, so should the marginal cost
  - Implies quadratic costs $\sum_{i=1}^{N}(v_i^j)^2 = B$

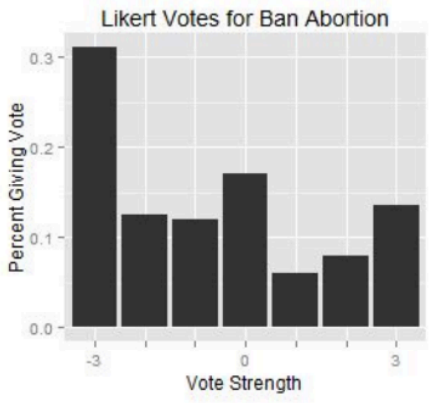
Applications

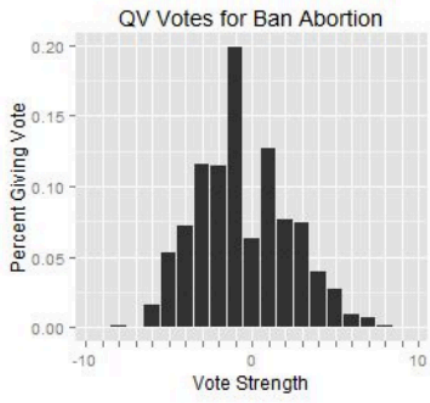
- Polls, attitudinal surveys, World Value Survey, GSS
- Preference curvature, ideal point estimation
- Decision-making in social & political settings

A Theory of Surveys









- With Likert, responses are strongly right-skewed
- With quadratic costs, normally distributed (but doesn't have to be)
  - (Quarfoot, Kohorn, Slavin, Sutherland, Konar 2016)
- What we do
  - formalize conditions where Likert is superior or inferior to 'costly' expression
  - link socially optimal curvature of survey voting costs to
    - ★ respondents' expressive v. strategic motivations
    - ★ surveyor's objective function

Conclusion

1. Public opinion and attitudes—mismeasured cheap talk can lead to
   - Spurious inferences
   - Magnified treatment effects ('leaders lead the public')
   - Different policy actions
     - ★ leaders may be less constrained by public preferences
2. Preference intensity and curvature—has implications for important real-world decision making
   - Predict real world behavior better than existing surveys
   - May be used to explore nature of motivated beliefs / polarization
     - ★ whether ideological perfectionists ignore information

Explanations for Differences

1. Hot is more emotionally stimulating.
2. Cold improves subjects' understanding of the game.
3. Cold has weaker incentives per cognitive act.
4. Strategic equivalence fails.

Explanations for Differences

1. Hot is more emotionally stimulating.
   "many people have speculated that the difference between a «hot» and a «cold» decision stems from the different degree of emotions present" Brandts and Charness (2011)
   "A potential disadvantage of [the strategy] method, however, is that it may reduce the impact of emotions: [agents] may [..] experience stronger emotions when reacting to an actual violation of a fairness norm than when contemplating what he would do in case of such a violation." Fehr and Fischbacher (2004)
2. Cold improves subjects' understanding of the game.
3. Cold has weaker incentives per cognitive act.
4. Strategic equivalence fails.

Explanations for Differences

1. Hot is more emotionally stimulating.
2. Cold improves subjects' understanding of the game.
   "because the strategy method requires respondents to think about possible reactions in different situations, it might better reflect their behavior in the field, outside the artificial environment of the laboratory."
   Casari and Cason (2009)
3. Cold has weaker incentives per cognitive act.
4. Strategic equivalence fails.

Explanations for Differences

1. Hot is more emotionally stimulating.
2. Cold improves subjects' understanding of the game.
3. Cold has weaker incentives per cognitive act.
   "It could also be argued that the strategy method dilutes the monetary incentives because subjects make more decisions for the same amount of money."
   Fehr and Fischbacher (2004)
4. Strategic equivalence fails.

Explanations for Differences

1. Hot is more emotionally stimulating.
2. Cold improves subjects' understanding of the game.
3. Cold has weaker incentives per cognitive act.
4. Strategic equivalence fails.
   "The DE and the SM games played in the laboratory are not in general strategically equivalent." (this paper)

Strategic equivalence: Definition

Definition (vNM-Strategic Equivalence)

2 games are strategically equivalent if their strategic forms are identical up to a positive affine transformation for each player's Bernoulli utility.
Harsanyi and Selten (1988)

- Trivial fact: An extensive form and its strategic form representation are strategically equivalent
- This strategic equivalence is the reason for the belief that theory says that direct elicitation and the strategy method should result in the same behavior.

  "According to the standard game-theoretic view, the strategy method should yield the same decisions as the procedure involving only observed actions."
  Brandts and Charness (2011)

- This paper: Game theory does not claim this. There are 2 weaknesses:
  - Multiple equilibria: equilibrium refinement and selection

Equilibrium refinement and selection

Irrelevant critique of SM if the Nash equilibrium is unique.

- Equilibrium refinement:

  "..any solution concept [..] should only depend on the normal form"

  Kohlberg/Mertens (1986)

  "..in general the solution of a game with a sequential structure simply has to depend on this sequential structure and cannot be made dependent on the normal form only"

  Harsanyi/Selten (1988)

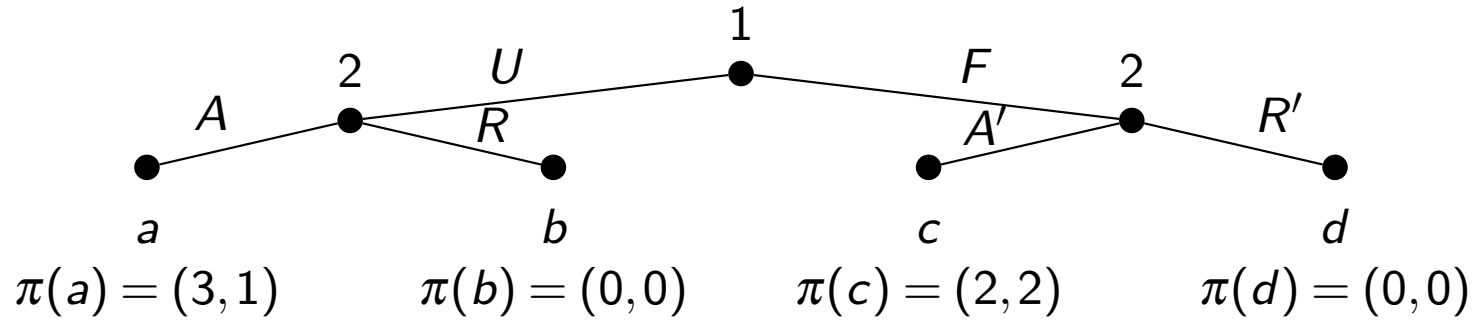
- Equilibrium selection:
  Universal agreement that seemingly irrelevant details like sunspots can determine the equilibrium selected. Thus whether DE or SM is used could be used as a selection device.

But this is not as bad for the SM as one might think, as in experiments when using the SM the game is framed in terms of the extensive form.

◂ Intro

Examples of invariance holding vs. breaking down

Simplified Ultimatum game



Story:

- 1 divides \$4 between herself and player 2
- Simplified UG: only 2 choices $(3,1)$ and $(2,2)$

What does the pictorial above represent?

- extensive form Γ
- monetary payoff functions π_i: $Z \to \mathbb{R}$

What is missing?

- Bernoulli utility functions u_i:$Z \to \mathbb{R}$

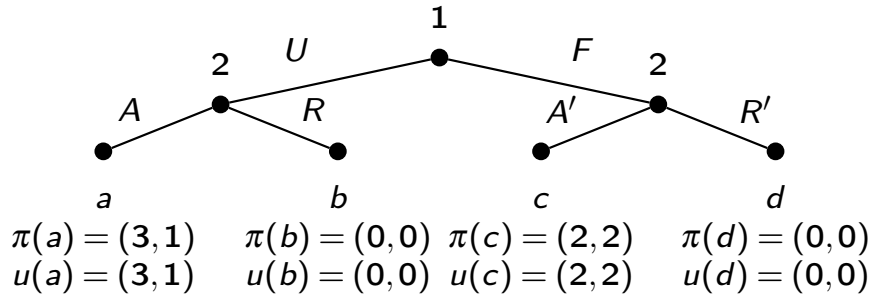
Examples of Bernoulli utilities

Exercise on the next slides: Assume different Bernoulli utilities and check for strategic equivalence.
Bernoulli utilities we consider:

- Player 1: example of homo oeconomicus $u_1(z) = \pi_1(z)$
- Player 2:
  1. example of homo oeconomicus: $u_2(z) = \pi_2(z)$
  2. example of Fehr-Schmidt: $u_2(z) = \pi_2(z)$ - $\frac{1}{2} max\{\pi_1(z) - \pi_2(z), 0\}$
  3. example of image concerns: like homo oeconomicus but deciding to accept unfair offer gives loss of $0 < \alpha < 1$

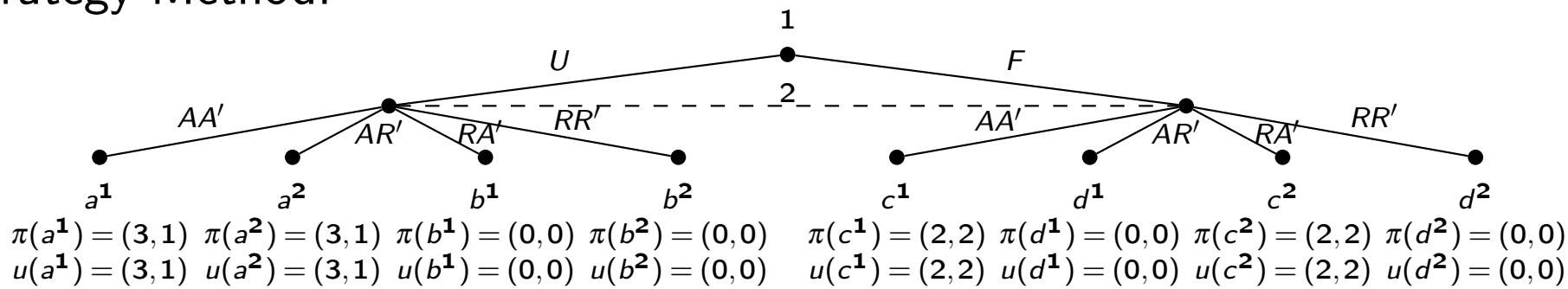
Ex.1: Homo oeconomicus

Direct Elicitation:



	AA'	AR'	RA'	RR'
U	$u(a) = (3,1)$	$u(a) = (3,1)$	$u(b) = (0,0)$	$u(b) = (0,0)$
F	$u(c) = (2,2)$	$u(d) = (0,0)$	$u(c) = (2,2)$	$u(d) = (0,0)$

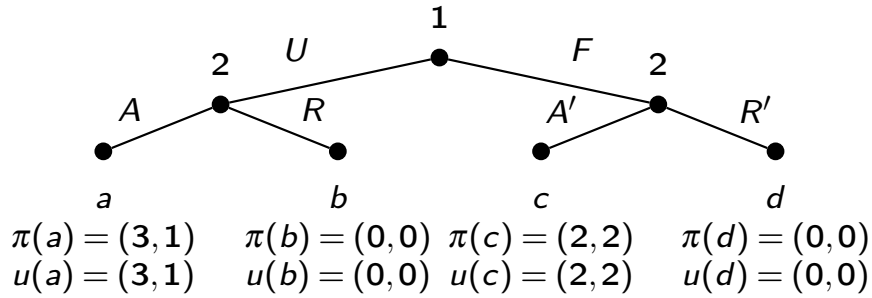
Strategy Method:



	AA'	AR'	RA'	RR'
U	$u(a^1) = (3,1)$	$u(a^2) = (3,1)$	$u(b^1) = (0,0)$	$u(b^2) = (0,0)$
F	$u(c^1) = (2,2)$	$u(d^1) = (0,0)$	$u(c^2) = (2,2)$	$u(d^2) = (0,0)$

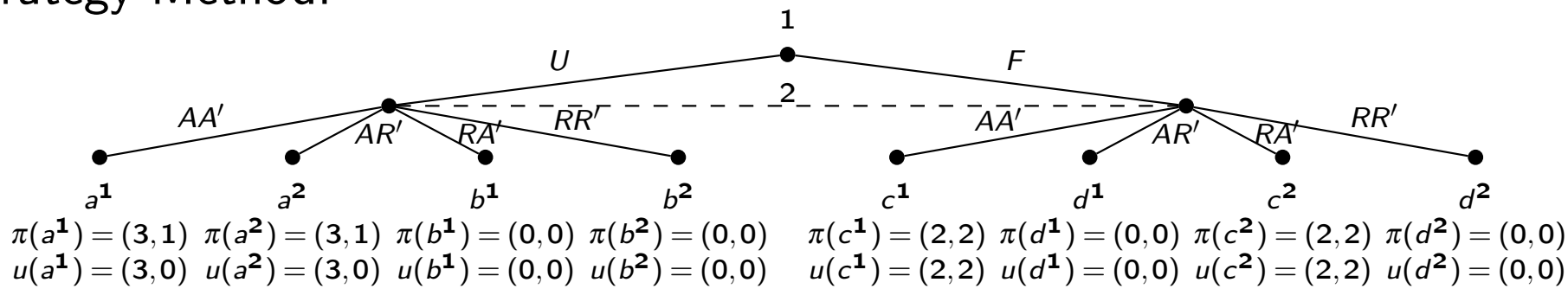
Ex.2: Fehr-Schmidt

Direct Elicitation:



	AA'	AR'	RA'	RR'
U	$u(a) = (3,0)$	$u(a) = (3,0)$	$u(b) = (0,0)$	$u(b) = (0,0)$
F	$u(c) = (2,2)$	$u(d) = (0,0)$	$u(c) = (2,2)$	$u(d) = (0,0)$

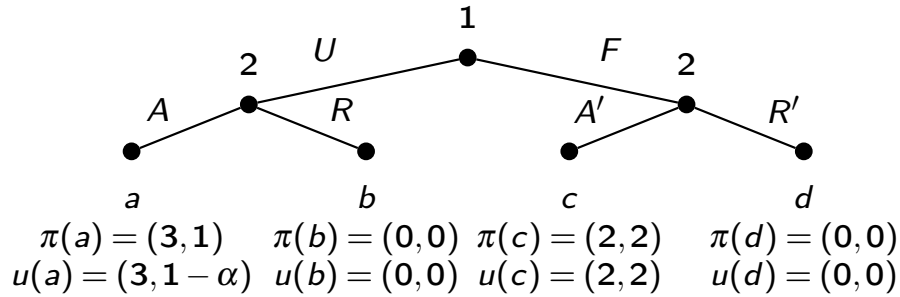
Strategy Method:



	AA'	AR'	RA'	RR'
U	$u(a^1) = (3,0)$	$u(a^2) = (3,0)$	$u(b^1) = (0,0)$	$u(b^2) = (0,0)$
F	$u(c^1) = (2,2)$	$u(d^1) = (0,0)$	$u(c^2) = (2,2)$	$u(d^2) = (0,0)$

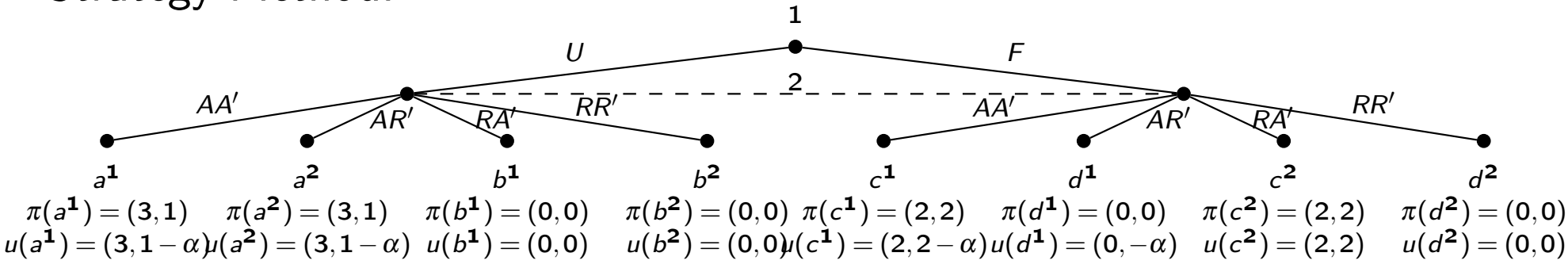
Ex.3: Image concerns

Direct Elicitation:



	AA'	AR'	RA'	RR'
U	$u(a) = (3, 1-\alpha)$	$u(a) = (3, 1-\alpha)$	$u(b) = (0,0)$	$u(b) = (0,0)$
F	$u(c) = (2,2)$	$u(d) = (0,0)$	$u(c) = (2,2)$	$u(d) = (0,0)$

Strategy Method:



	AA'	AR'	RA'	RR'
U	$u(a^1) = (3, 1-\alpha)$	$u(a^2) = (3, 1-\alpha)$	$u(b^1) = (0,0)$	$u(b^2) = (0,0)$
F	$u(c^1) = (2, 2-\alpha)$	$u(d^1) = (0, -\alpha)$	$u(c^2) = (2,2)$	$u(d^2) = (0,0)$

Summary of examples

- Strategic equivalence holds for homo oeconomicus and Fehr-Schmidt examples
- Strategic equivalence holds does not hold for image concerns examples
- This inspires and is the intuition for theorem 1.

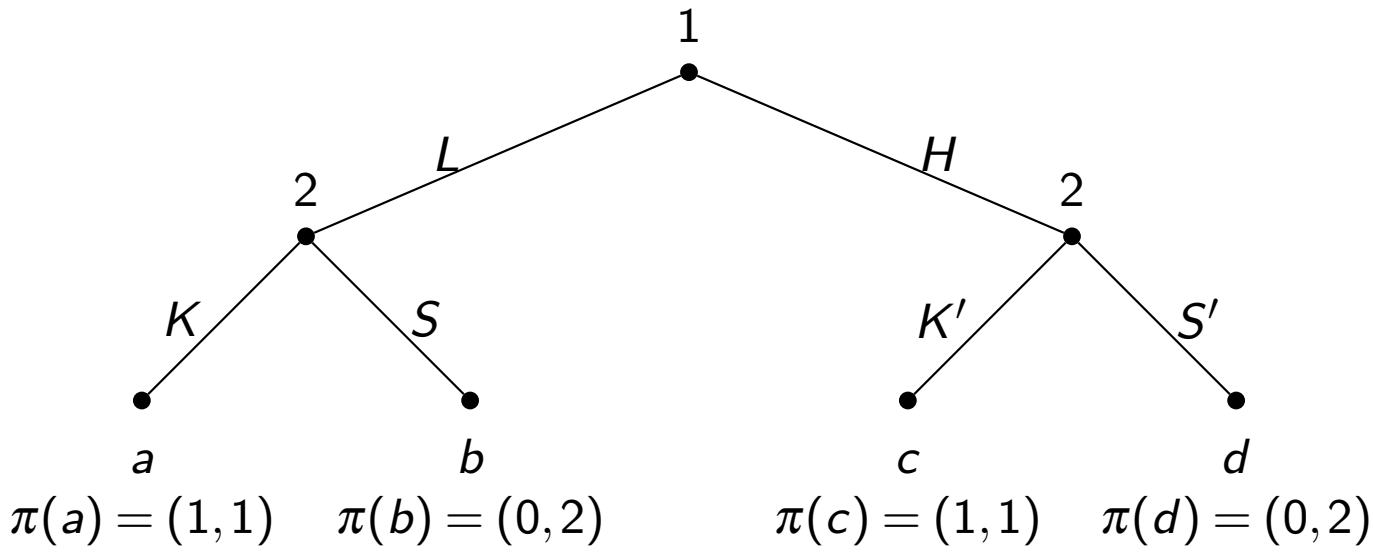
Theorem 1

Theorem (1)

If for all players i there exists a function $f_i : \mathbb{R} \to \mathbb{R}$ such that $u_i(z) = f_i(\pi(z))$ for both $G^{DM} = (\Gamma^{DM}, u^{DM})$ and $G^{SM} = (\Gamma^{SM}, u^{SM})$ then the strategic forms of G^{DM} and G^{SM} are identical.

- Identity of strategical forms is the strongest form of strategic equivalence.
- social preferences, preference of payoff vectors only
- Preferences that fall under this class: Fehr-Schmidt preferences, altruism, envy, utilitarianism
- Next question: Can this be broadened?
  To answer this we propose a tribal game.

Tribal Game: the story

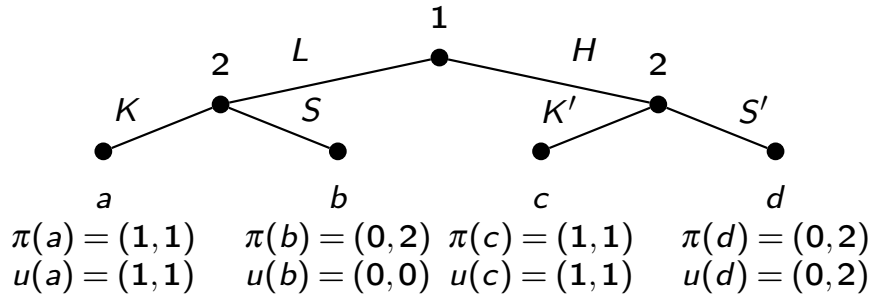


Story:

- 1 can claim to love (L) or hate (H) the favorite sports team of 2
- 2 divides \$2 between herself and 1 in a kind (K) or self-interested way (S).

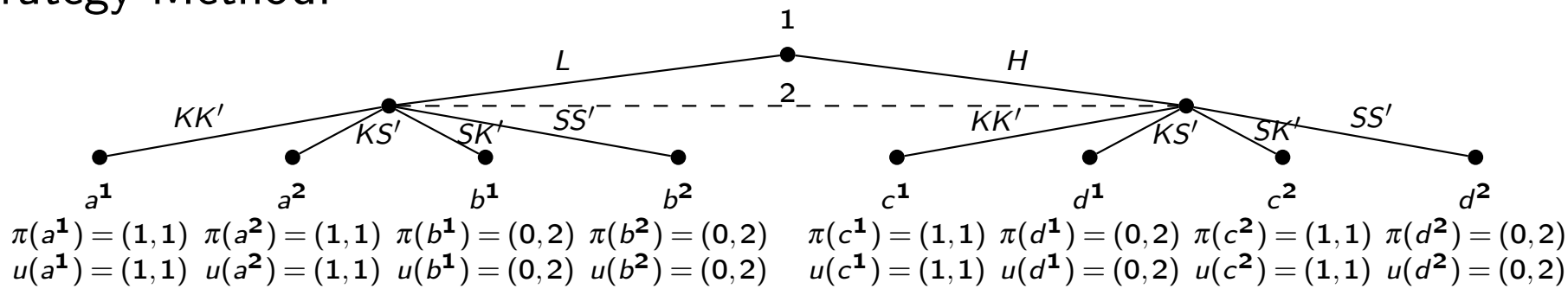
Tribal Game: DE and SM with homo oeconomicus

Direct Elicitation:



	KK'	KS'	SK'	SS'
L	$u(a) = (1,1)$	$u(a) = (1,1)$	$u(b) = (0,2)$	$u(b) = (0,2)$
H	$u(c) = (1,1)$	$u(d) = (0,2)$	$u(c) = (1,1)$	$u(d) = (0,2)$

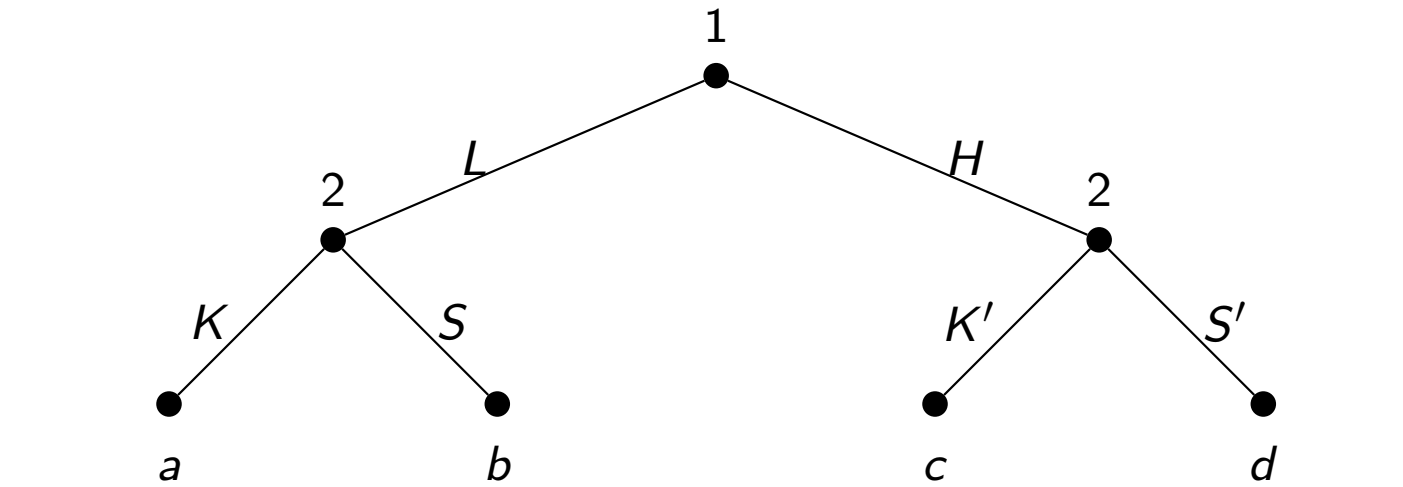
Strategy Method:



	KK'	KS'	SK'	SS'
L	$u(a^1) = (1,1)$	$u(a^2) = (1,1)$	$u(b^1) = (0,2)$	$u(b^2) = (0,2)$
H	$u(c^1) = (1,1)$	$u(d^1) = (0,2)$	$u(c^2) = (1,1)$	$u(d^2) = (0,2)$

Tribal Game: Emotions

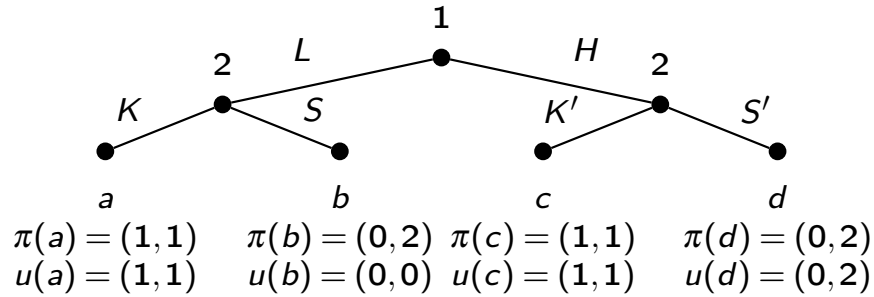
- player 1: homo oeconomicus
- player 2 has emotions:
  $a \sim a^1 \sim a^2 \succ d \sim d^1 \sim d^2 \succ b \sim b^1 \sim b^2 \succ c \sim c^1 \sim c^2$
- $u_2(a) = -1, u_2(d) = -2, u_2(b) = -3, u_2(c) = -4$
- note: $\nexists\ f_2 : u(m) = f_2(\pi(m))$
- Invariance: DE and SM strategically equivalent



	KK'	KS'	SK'	SS'
L	$u(a^1) = (1,1)$	$u(a^2) = (1,1+\varepsilon)$	$u(b^1) = (0,2)$	$u(b^2) = (0,2)$
H	$u(c^1) = (1,1)$	$u(d^1) = (0,2)$	$u(c^2) = (1,1)$	$u(d^2) = (0,2)$

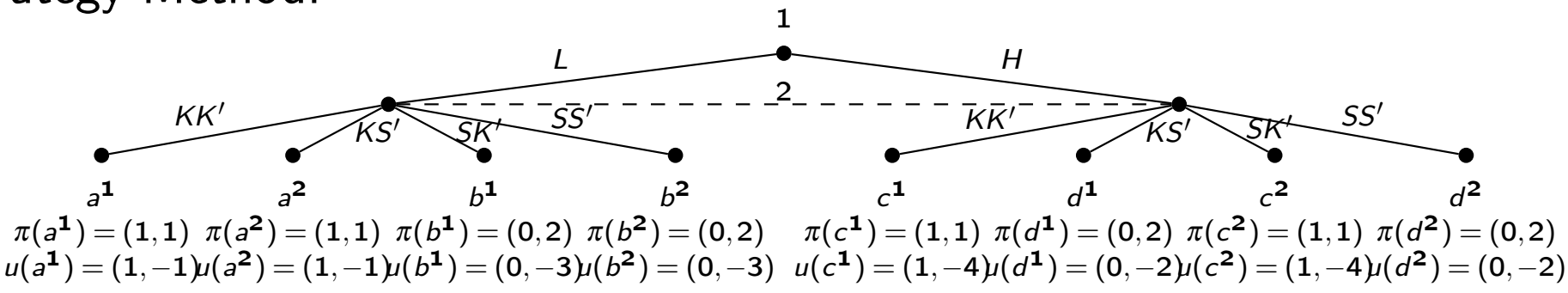
Tribal Game: DE and SM with emotions

Direct Elicitation:



	KK'	KS'	SK'	SS'
L	$u(a) = (1,-1)$	$u(a) = (1,-1)$	$u(b) = (0,-3)$	$u(b) = (0,-3)$
H	$u(c) = (1,-4)$	$u(d) = (0,-2)$	$u(c) = (1,-4)$	$u(d) = (0,-2)$

Strategy Method:



	AA'	AR'	RA'	RR'
U	$u(a^1) = (1,-1)$	$u(a^2) = (1,-1)$	$u(b^1) = (0,-3)$	$u(b^2) = (0,-3)$
F	$u(c^1) = (1,-4)$	$u(d^1) = (0,-2)$	$u(c^2) = (1,-4)$	$u(d^2) = (0,-2)$

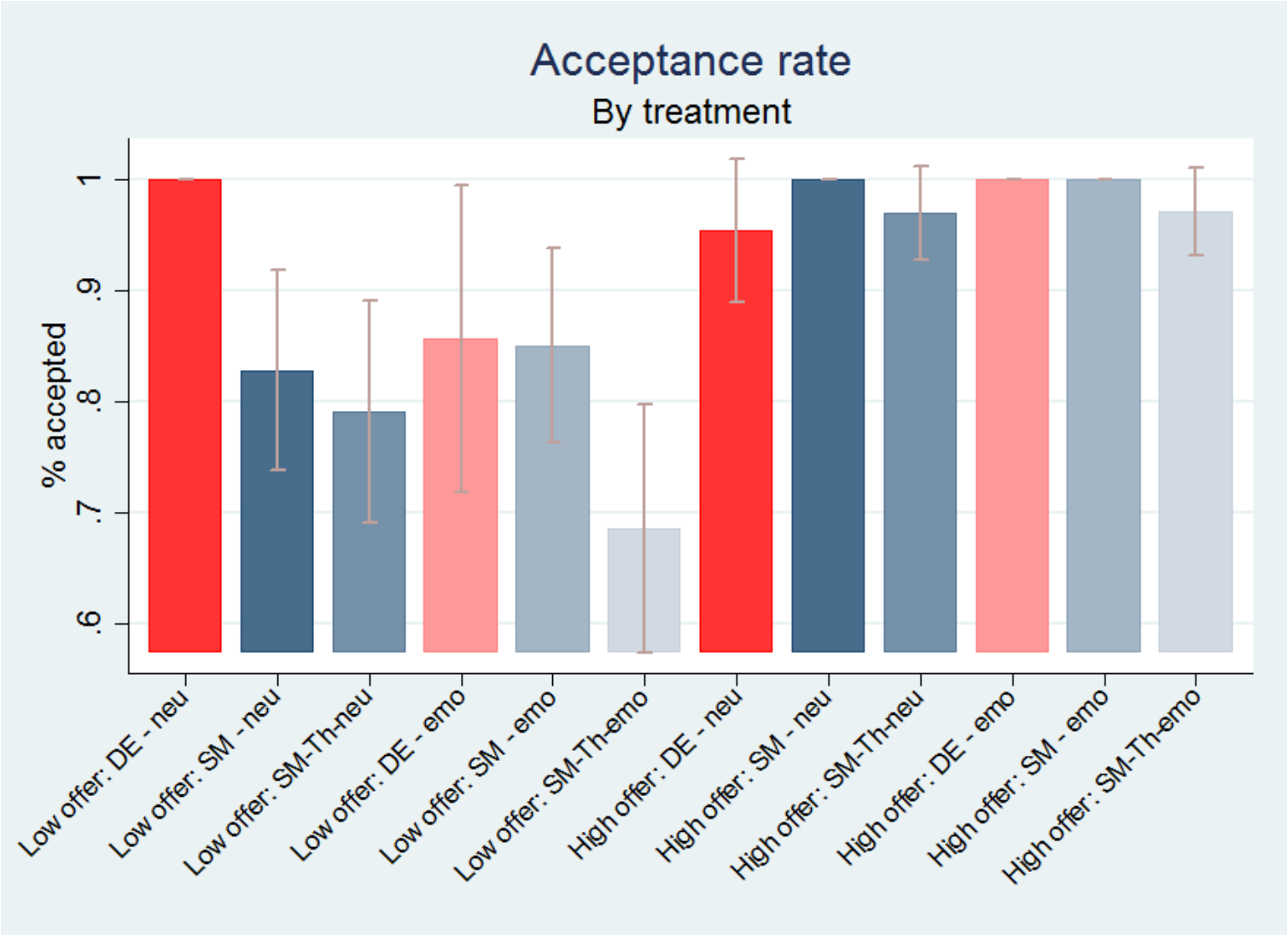
Corollary

Corollary (2)

If off-equilibrium behavior does not impact evaluation of a history then DE and SM are strategically equivalent (e.g. $(L, KS') \sim (L, KK')$*)*

- Some concerns for actions/labels may be unproblematic for strategic equivalence ◂ Venn Diagram

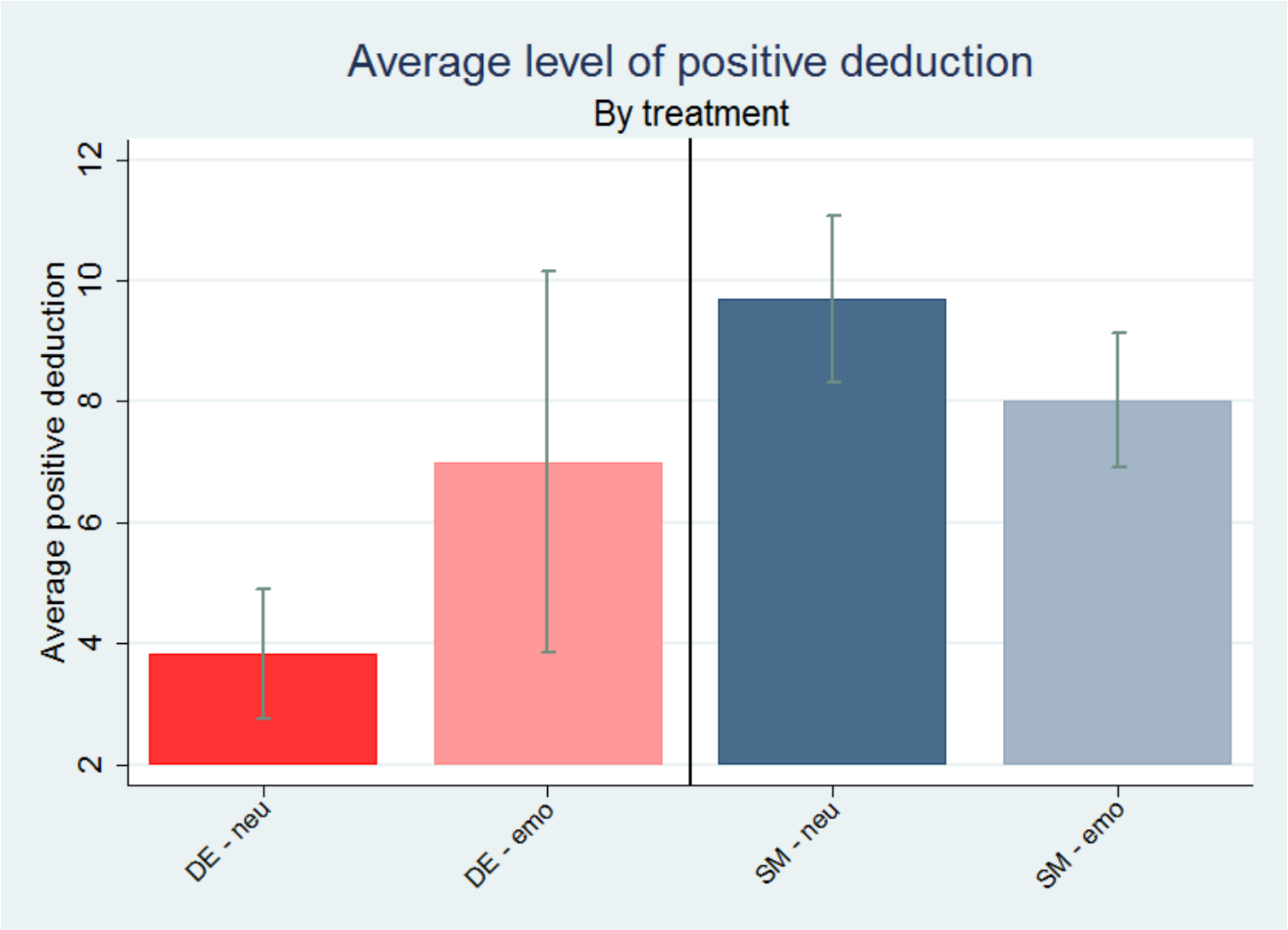
Study 4 (Ultimatum Game: *DE vs. SM* x *Emotion vs. Neutral*) $N = 418$



- Concern: strategy/threshold provides far more data at offer levels that are off the equilibrium or rare.
- Focusing on the sample of frequent offers that are 40 or 50% (these offers occur over 80% of the time)
- Responder acceptance rates of low offers still diverge between direct elicitation and strategy/threshold. Emotions reduce further the willingness for Responders to accept low offers in the threshold setting.

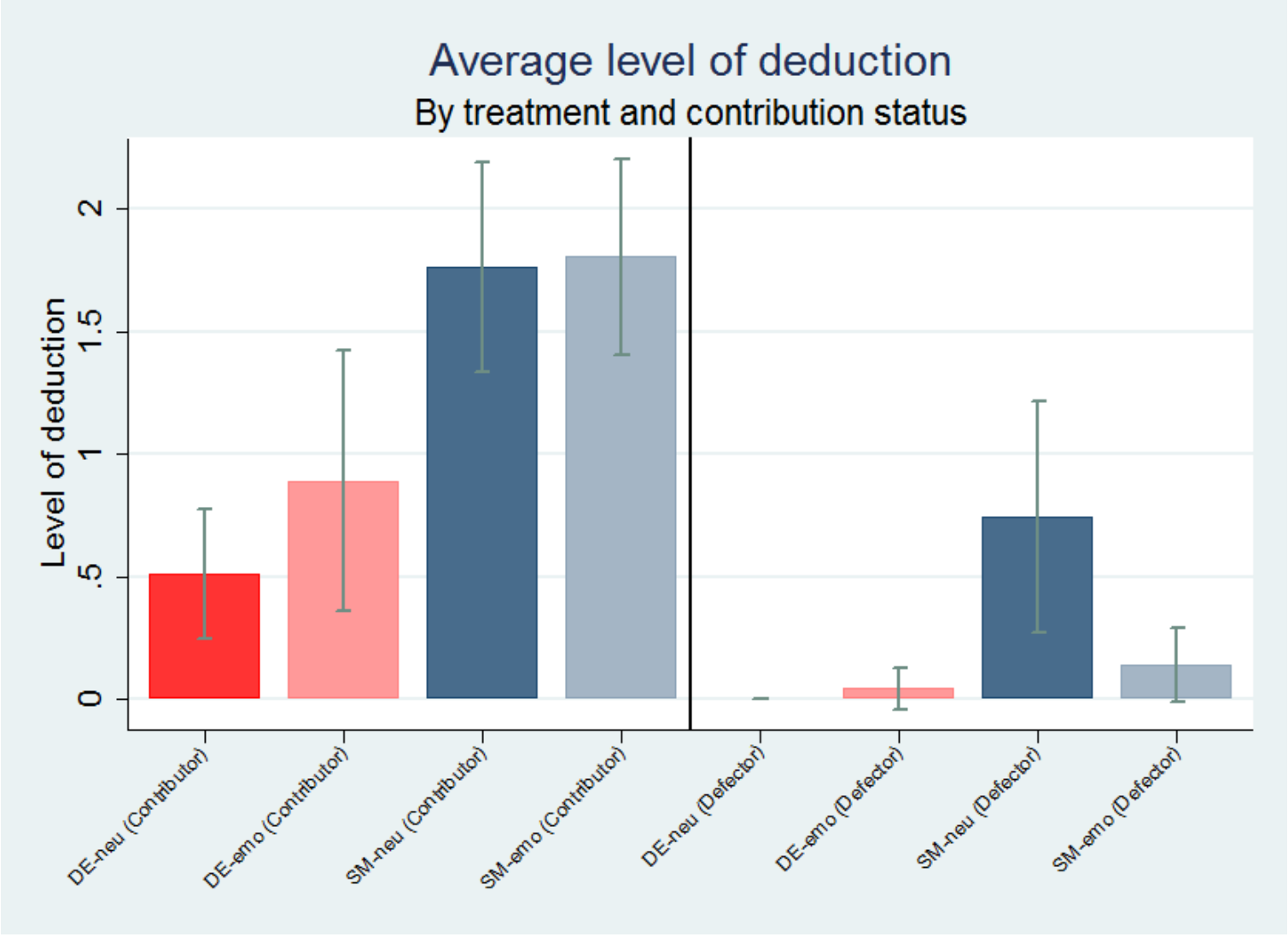
◂ UG

Study 5 (3-player prisoner's dilemma: *DE vs. SM* x *Emotion vs. Neutral*) $N = 585$



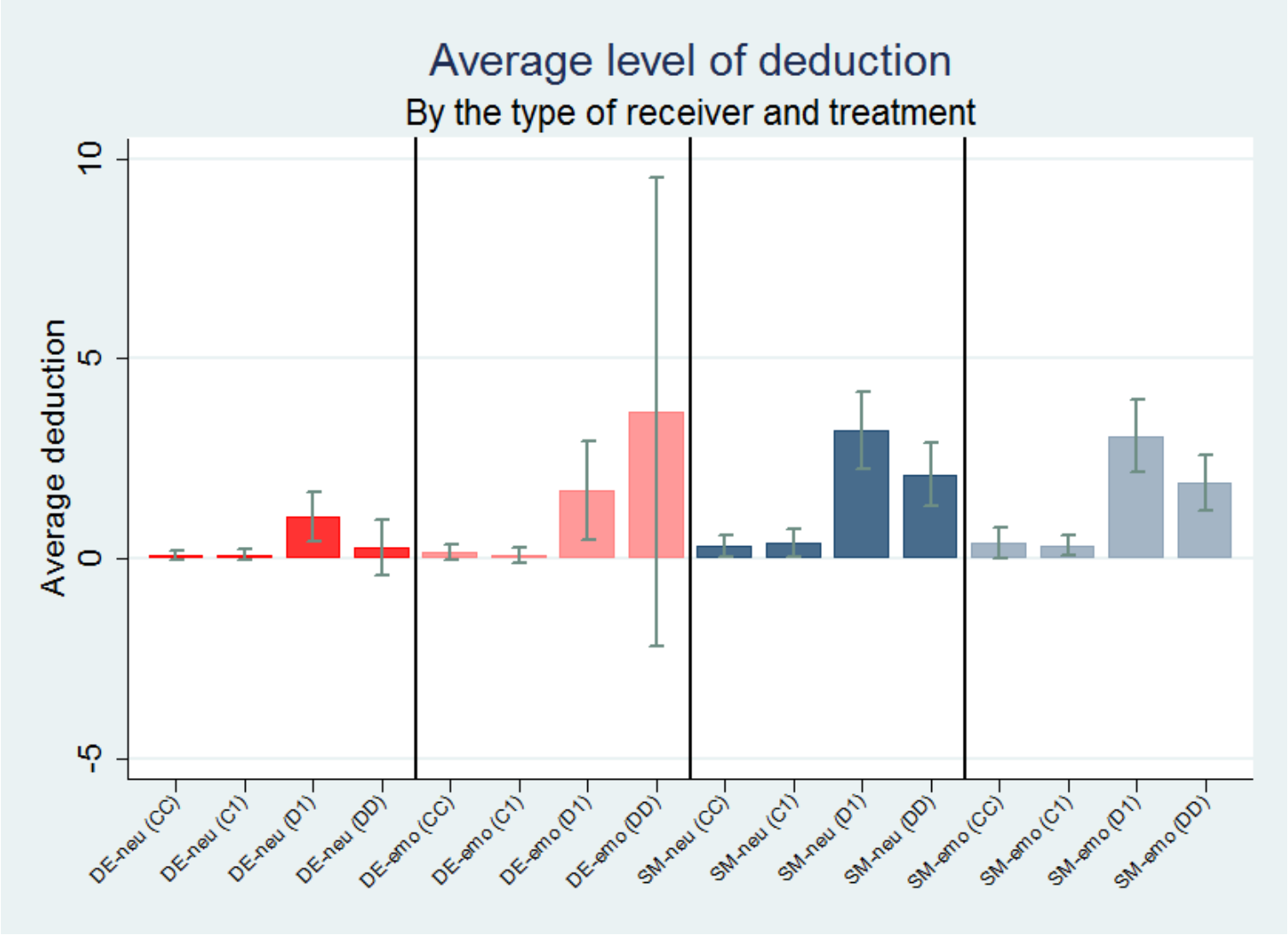
Direct elicitation decreased deductions, and differences emerge depending on salience (in terms of magnitudes, salience doubles difference between SM and DE) ◂ 3PD

Study 5 (3-player prisoner's dilemma: *DE vs. SM* x *Emotion vs. Neutral*) $N = 585$



Similar results emerge when controlling for first stage outcome—what punisher did in first stage—Direct elicitation decreased deductions, and differences emerge depending on salience ◂ 3PD

Study 5 (3-player prisoner's dilemma: *DE vs. SM* x *Emotion vs. Neutral*) $N = 585$



Deductions of D1 are differentially affected ◂ 3PD

References I

Brandts, J. and Charness, G. (2011). The strategy versus the direct-response method: a first survey of experimental comparisons. *Experimental Economics*, 14:375–398. pages

Casari, M. and Cason, T. (2009). The strategy method lowers measured trustworthy behavior. *Economics Letters*, 103(3):157–159. pages

Fehr, E. and Fischbacher, U. (2004). Third-party punishment and social norms. *Evolution and Human Behavior*, 25(2):63 – 87. pages

Harsanyi, J. and Selten, R. (1988). *A general theory of equilibrium selection in games*. MIT Press. pages

Kant on lying

- Kant does discuss uncertainty
- Kant says one must not lie (one may remain silent)

"It is indeed possible that after you have honestly answered Yes to the murderer's question as to whether the intended victim is in the house, the latter went out unobserved and thus eluded the murderer, so that the deed would not have come about. However, if you told a lie and said that the intended victim was not in the house, and he has actually (though unbeknownst to you) gone out, with the result that by so doing he has been met by the murderer and thus the deed has been perpetrated, then in this case you may be justly accused as having caused his death. For if you had told the truth as best you knew it, then the murderer might perhaps have been caught by neighbors who came running while he was searching the house for his intended victim, and thus the deed might have been prevented. [...] ***To be truthful (honest) in all declarations is, therefore, a sacred and unconditionally commanding law of reason that admits of no expediency whatsoever."***

- Kant (1799) : "On a supposed right to lie because of philanthropic concerns". ◂ Kant

Invariance Theorem

Theorem

If there exist $x, x', x'' \in X$ *and* $\pi \in (0;1]$ *such that* $\pi x + (1-\pi)x'' \succcurlyeq \pi x' + (1-\pi)x''$, *and if DM satisfies the assumptions Preference Relation, FOSD (and Strict FOSD), then for all* $\pi' \in (0;1]$ *:*
$\pi' x + (1-\pi')x'' \succcurlyeq \pi' x' + (1-\pi')x''$

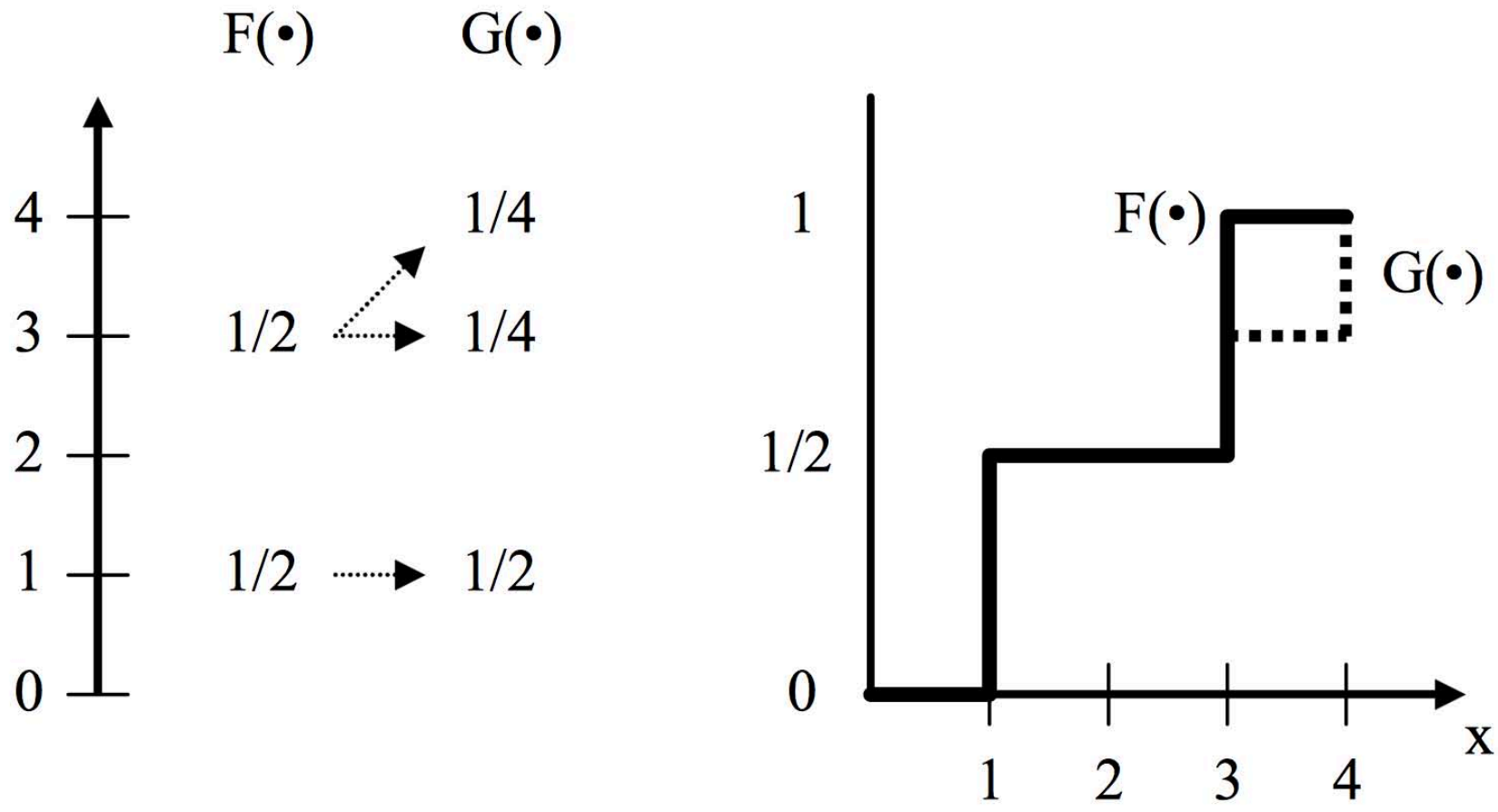
Proof.

(i) $x \gtrsim x'$: Suppose not, then $x' \succ x$, and therefore $\pi x' + (1-\pi)x''$ strictly FOSD $\pi x + (1-\pi)x''$. Then by Strict FOSD,
$\pi x' + (1-\pi)x'' \succ \pi x + (1-\pi)x''$, a contradiction.
(ii) Since $x \gtrsim x'$, $\pi' x + (1-\pi')x''$ first-order stochastically dominates $\pi' x' + (1-\pi')x''$. Thus by FOSD $\pi' x + (1-\pi')x'' \succcurlyeq \pi' x' + (1-\pi')x''$.

◂ Invariance Theorem

■

First-Order Stochastic Dominance



G first-order stochastically dominates F with respect to $\succsim$ if for all x':
$\sum_{x:x' \succsim x} G(x) \leq \sum_{x:x' \succsim x} F(x)$

◂ Invariance Theorem

First-Order Stochastic Dominance

Definition

(FOSD) p first-order stochastically dominates q with respect to $\succsim$ if for all x': $\sum_{x:x' \succsim x} p(x) \leq \sum_{x:x' \succsim x} q(x)$.

Assumption: FOSD If p FOSD q with respect to $\succsim$, then $p \succsim q$.

Note: Social preferences not monotone, so we define FOSD with respect to ordering induced by preferences.

Strict FOSD

Definition

(Strict FOSD) p strictly FOSD q with respect to $\succsim$ if p FOSD q with respect to $\succsim$, and
there exists x': $\sum_{x:x' \succsim x} p(x) < \sum_{x:x' \succsim x} q(x)$.

Assumption: Strict FOSD If p strictly FOSD q with respect to $\succsim$, then $p \succ q$.

Notes:

- p strictly FOSD q, then p FOSD q.
- If p FOSD q but not strictly so, and q FOSD p but not strictly so, this does not imply $p = q$.
- Assumption Strict FOSD satisfied does NOT imply the assumption FOSD satisfied.

Strict and Weak FOSD

Example

Preferences that satisfy strict FOSD but violate weak FOSD.

- An indivisible treat that mom can allocate to one of her two children x or y. Mom would like to be exactly fair, thus her most preferred lottery is $(x;\frac{1}{2},y;\frac{1}{2})$, she is indifferent between all other lotteries. For all $\pi,\pi' \in [0;1] \setminus \frac{1}{2}$: $(x;\pi,y;1-\pi) \sim (x;\pi',y;1-\pi')$ and $(x;\frac{1}{2},y;\frac{1}{2}) \succ (x;\pi,y;1-\pi)$. These preferences are complete and transitive. Strict FOSD is trivially satisfied since there is no lottery that strictly first-order stochastically dominates another lottery.
- However, axiom WFOSD is violated: $(x;\frac{2}{3},y;\frac{1}{3})$ weakly first order-stochastically dominates $(x;\frac{1}{2},y;\frac{1}{2})$, but $(x;\frac{1}{2},y;\frac{1}{2}) \succ (x;\frac{2}{3},y;\frac{1}{3})$.
- When does strict FOSD imply weak FOSD?

Continuity and FOSD

Definition

$\succsim$ is **continuous** if for all $p, q, r \in P$ the sets $\{\alpha \in [0,1] : \alpha p + (1-\alpha)q \succsim r\}$ and $\{\alpha \in [0,1] : r \succsim \alpha p + (1-\alpha)q\}$ are closed in [0,1].

Note that: $\{\alpha \varepsilon [0,1] : x \succsim \alpha x + (1-\alpha)y\} = [0; \frac{1}{2}) \cup (\frac{1}{2}, 1]$. But continuity is not enough.

Example

Again mom would like to be fair, but now between two unfair lotteries she prefers the one that is more fair. For all $\pi, \pi' \in [0;1]$:
$\pi \cdot (1-\pi) \geq \pi' \cdot (1-\pi')$ if and only if $(x; \pi, y; 1-\pi) \succsim (x; \pi', y; 1-\pi')$.
Strict FOSD and continuity are satisfied. But WFOSD is violated:
$(x; \frac{2}{3}, y; \frac{1}{3})$ weakly first order-stochastically dominates $(x; \frac{1}{2}, y; \frac{1}{2})$, but $(x; \frac{1}{2}, y; \frac{1}{2}) \succ (x; \frac{2}{3}, y; \frac{1}{3})$.

Rich Domain, Continuity and FOSD

However, if there are also two outcomes $x, y \in X$ such that $x \succ y$, then strict FOSD implies weak FOSD.

Proof.

Suppose p weakly first-order stochastically dominates q. We need to show that $p \succsim q$.
Suppose not, that is $q \succ p$. Since X is finite there exists an $\overline{x}$, $\underline{x}$ such that for all x: $\overline{x} \succsim x$, and an $x \succsim \underline{x}$. By RICH $\overline{x} \succ \underline{x}$.
At least one of the following three cases is satisfied: (i) $\overline{x} \succ q$, (ii) $p \succ \underline{x}$ or (iii) $q \succsim \overline{x} \succ \underline{x} \succsim p$.
(i) Since p weakly first-order stochastically dominates q, and $\overline{x} \succ q$, for any $\alpha > 0$ the lottery $\alpha\overline{x} + (1-\alpha)p$ strictly first-order stochastically dominates q. But then $\{\alpha : \alpha\overline{x} + (1-\alpha)p \succsim q\} = (0,1]$, a violation of continuity. (ii) and (iii) similarly.

■

◂ Invariance Theorem

FOSD is not Sure-Thing Principle

Savage's Sure-Thing Principle is not FOSD. If invariant, then probability does not matter.

7 The sure-thing principle

A businessman contemplates buying a certain piece of property. He considers the outcome of the next presidential election relevant to the attractiveness of the purchase. So, to clarify the matter for himself, he asks whether he would buy if he knew that the Republican candidate were going to win, and decides that he would do so. Similarly, he considers whether he would buy if he knew that the Democratic candidate were going to win, and again finds that he would do so. Seeing that he would buy in either event, he decides that he should buy, even though he does not know which event obtains, or will obtain, as we would ordinarily say. It is all too seldom that a decision can be arrived at on the basis of the principle used by this businessman, but, except possibly for the assumption of simple ordering, I know of no other extralogical principle governing decisions that finds such ready acceptance.

Machina and Schmeidler (1992) formulation of Sure-Thing Principle is about $\frac{\partial d^*}{\partial \kappa} = 0$.

◂ Invariance Theorem

FOSD is not Independence

(IND) $\succsim$ satisfies independence if for all lotteries p, q, r in P : $p \succsim q \Leftrightarrow \alpha p + (1-\alpha) r \succsim \alpha q + (1-\alpha) r$.

Example

Cumulative Prospect Theory (Rank Dependent Expected Utility) satisfies FOSD and allows for Allais Paradox, but not Independence.

If the cardinality of the outcome space is 2, that then independence is as weak an axiom as first-order stochastic dominance.

◂ Invariance Theorem

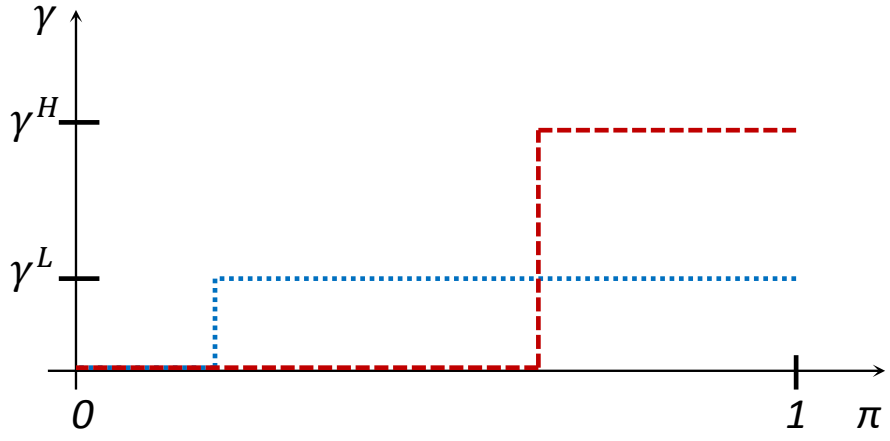
Non-Additive Utility

- It is possible to generate examples where $\frac{\partial d^*}{\partial \pi} > 0$
- Let $u = u(x_1, d)$, $u_1, u_2 > 0$ and $u_{11}, u_{22} < 0$ (risk-aversion).
- For sufficiently negative $u_{12}(\omega - d, d)$ we can get $\frac{\partial d^*}{\partial \pi} > 0$.
- SOC: need u_2 sufficiently positive and sufficiently negative u_{22}.
- But these are not interpretable under uncertainty. u_{12} can easily change sign if, for example, you take the log or square or other strictly monotone transformation of the utility function.

◂ Consequentialist-deontological preferences

Cognition Costs

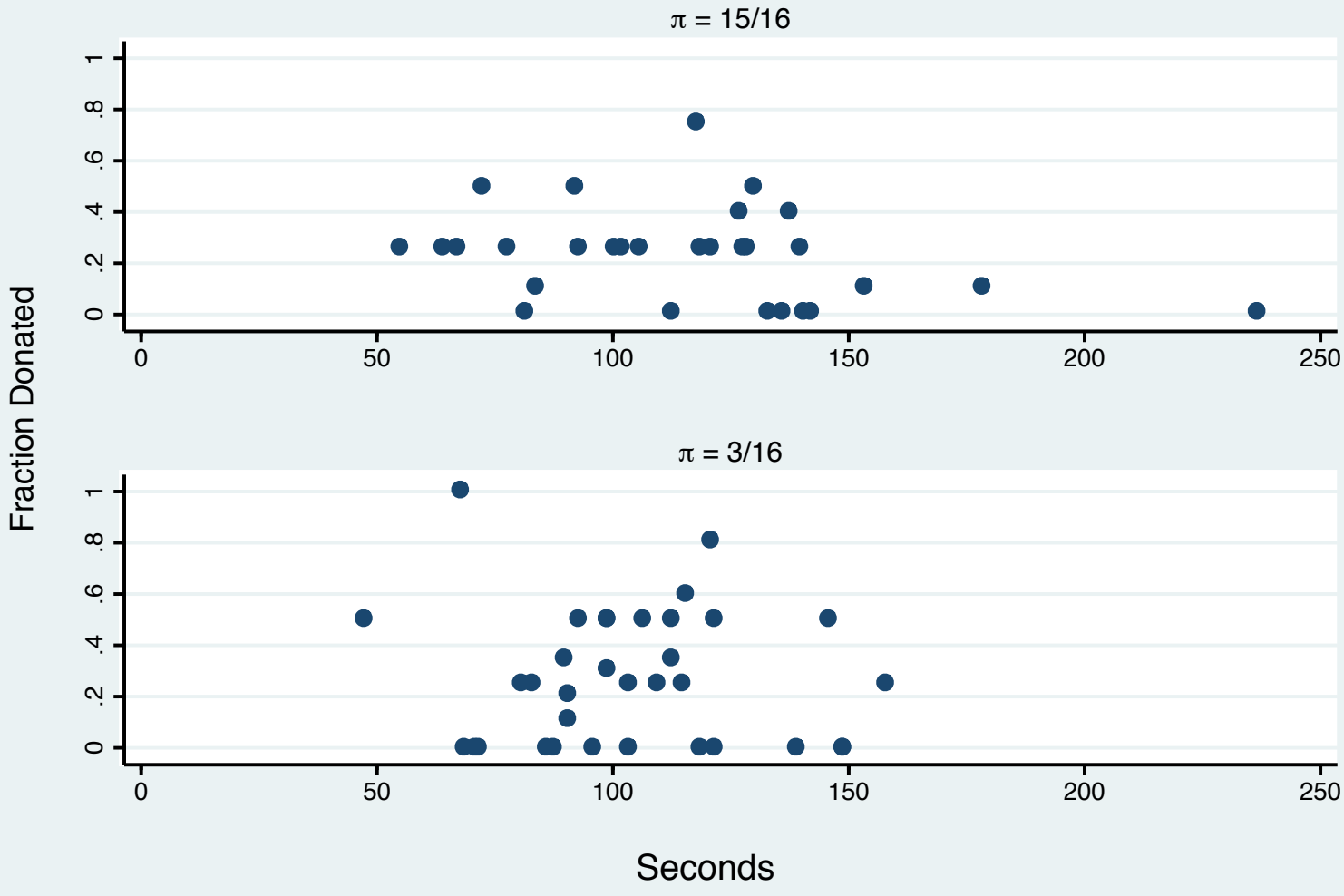
The *DM* can compute the optimal decision, but to do so, she incurs a cognition cost $\gamma \geq 0$, or otherwise she can make a heuristic (fixed) choice $\bar{d}$ for which (normalized) costs are 0.



Note:

Cognition cost model predicts that time spent on the survey also changes as d changes with π.

Time Spent

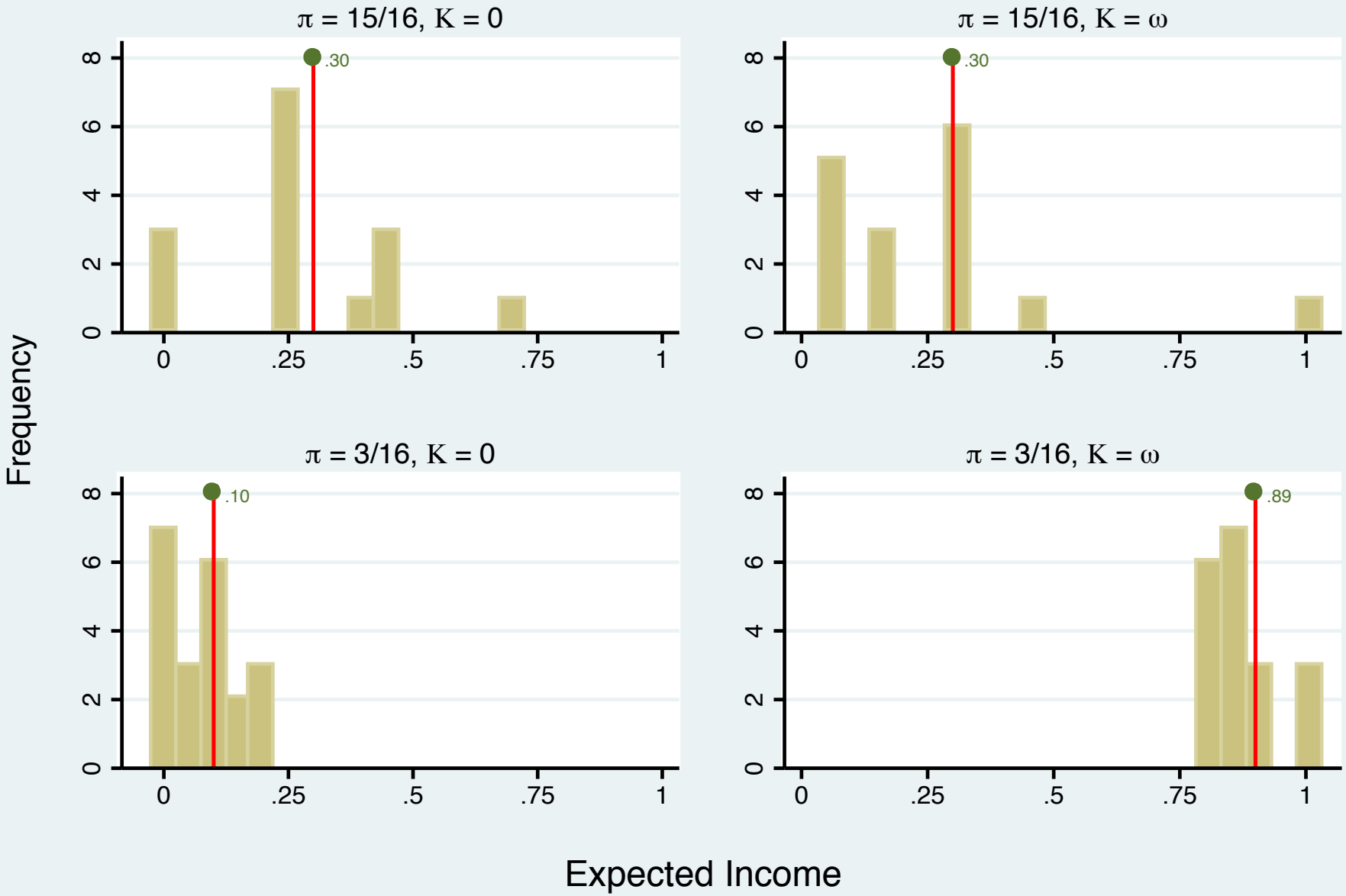


◂ Confounds

Revealed preference method cannot distinguish different internal "consequences"

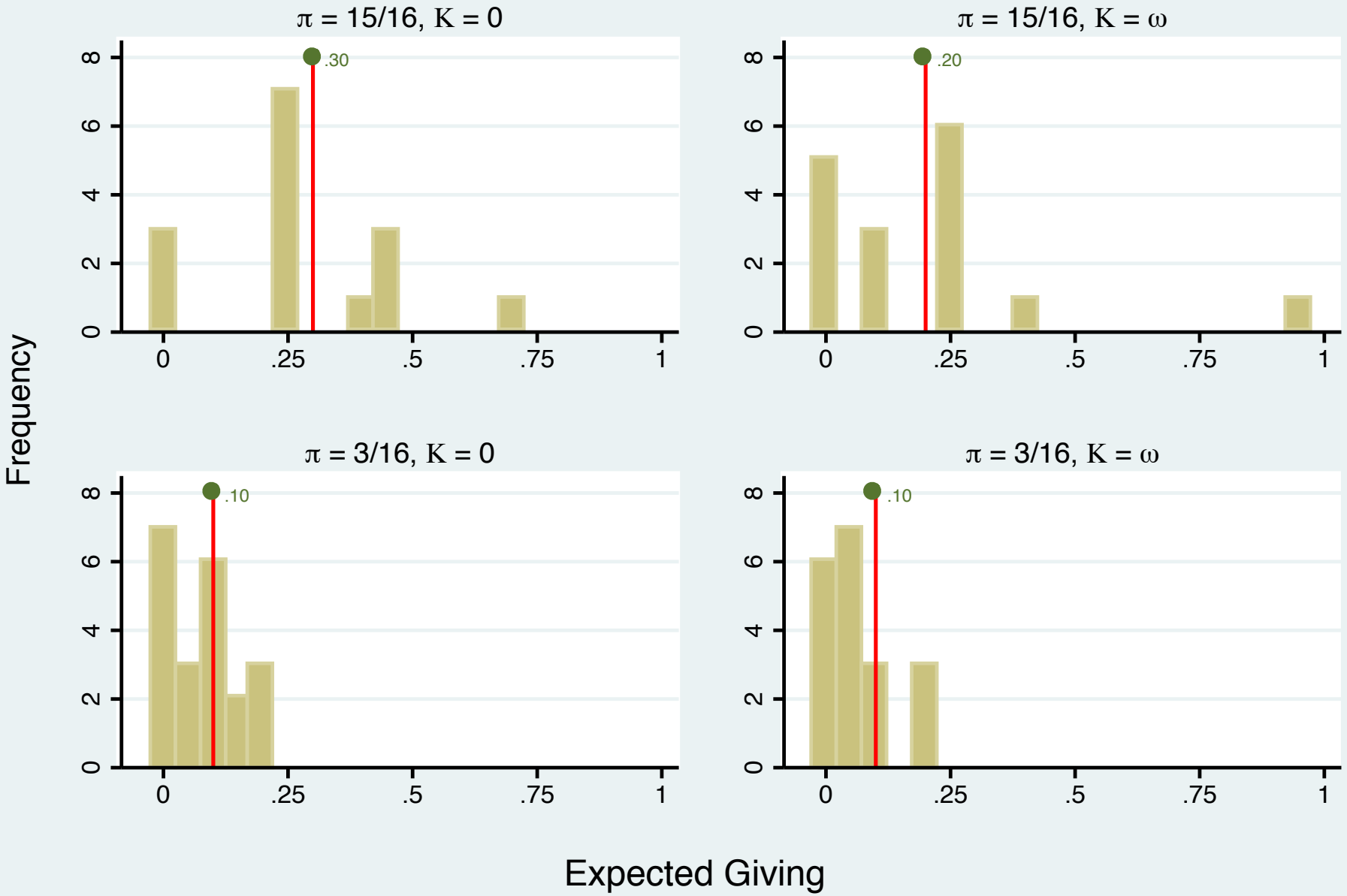
- One response: it may be a semantic difference
  - Even purely deontological preferences likely have some neurobiological "consequence"
  - What drives deontological motivations, is it conscience or guilt or ?
- Second response: Is self-image long-term?
  - Self-signaling (Benabou and Tirole 2006)
  - Perhaps distinguish through forgetting or cognitive load
  - or faster speeds (Spontaneous Giving and Calculated Greed; Rand et al 2012)
- Third response: Shredding removes the experimenter
  - Foreigner presence increased generosity by 20% (Cilliers, Dube, Siddiq 2015)
- ◂ Confounds

Expected Income E(x_2) (by κ)



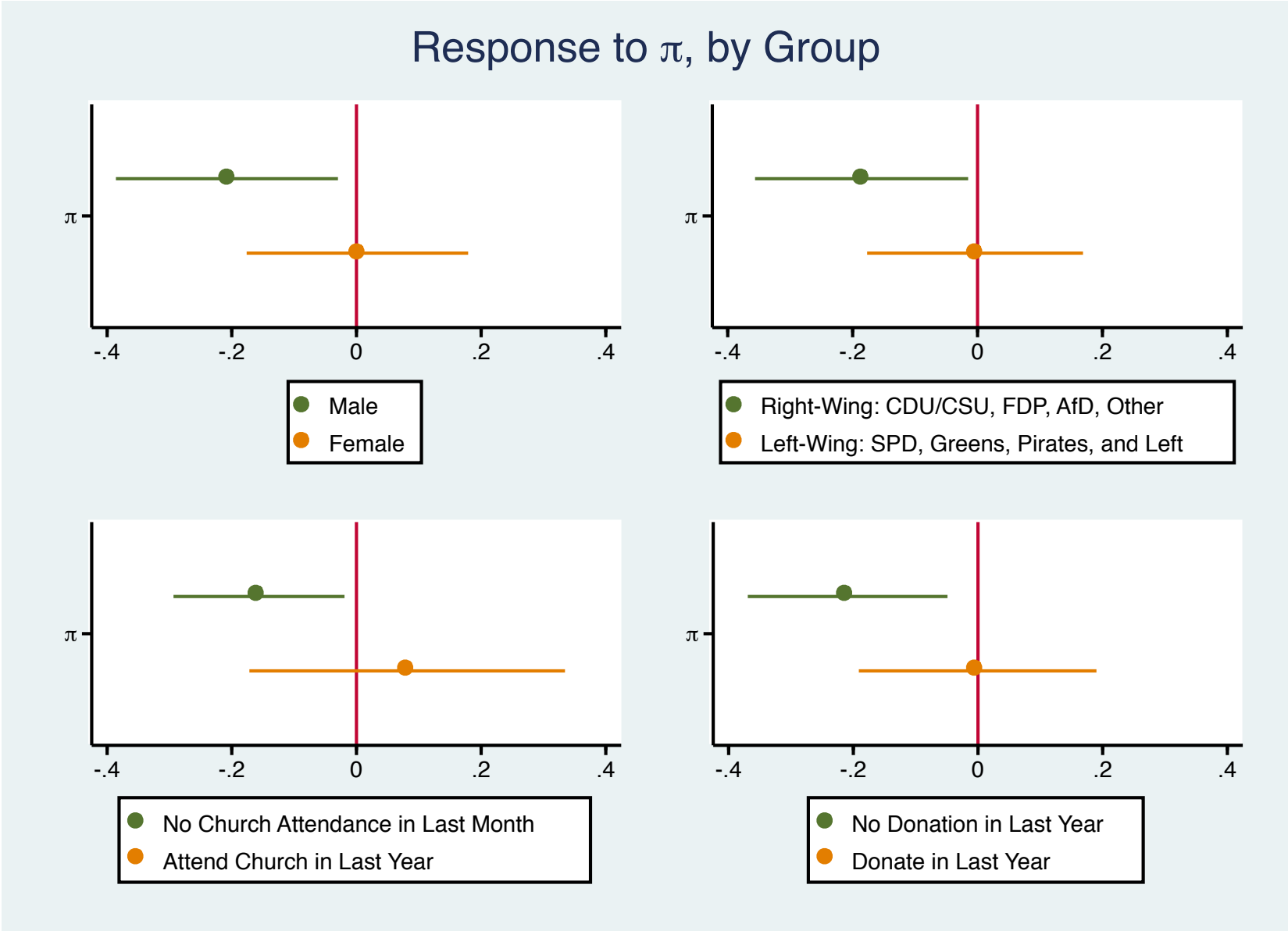
Recall: ex-ante fairness implies sign $\frac{\partial d^*}{\partial \pi} = \text{sign}\,(\kappa - d^*)$ ◂ Additional Checks

Expected Giving (πd^*) (by κ)



Recall: ex-ante => sign $\frac{\partial d^*}{\partial \pi}$ =sign $(\kappa - d^*)$ ◂ Additional Checks

Heterogenous Treatment



N = 173 (of 975 invited) ◂ Additional Checks

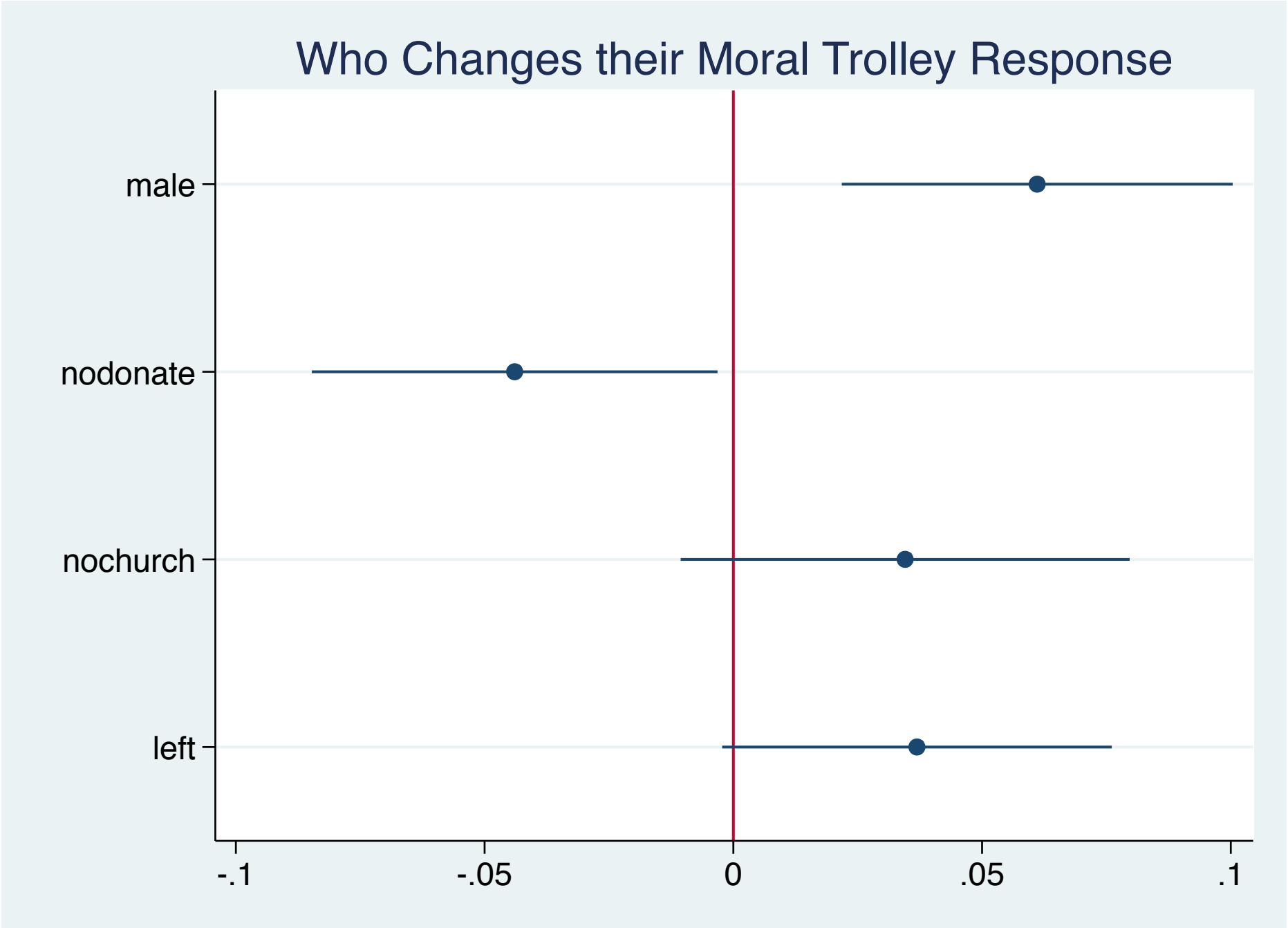
Moral Trolley

You are a solider and you and a few other soldiers are taken prisoner by the enemy. After a year in captivity, your group has tried to escape, but was caught. The enemy overseer decided to hang you and your group. At the gallows he loosens the noose around your neck and proclaims that if you pull the chair under one of the other soldiers in your group, you and the other **19 soldiers** in your group will be released. If you do not, everyone will be hung. The warden says this seriously and will keep his promise. Would you remove the chair in this situation?

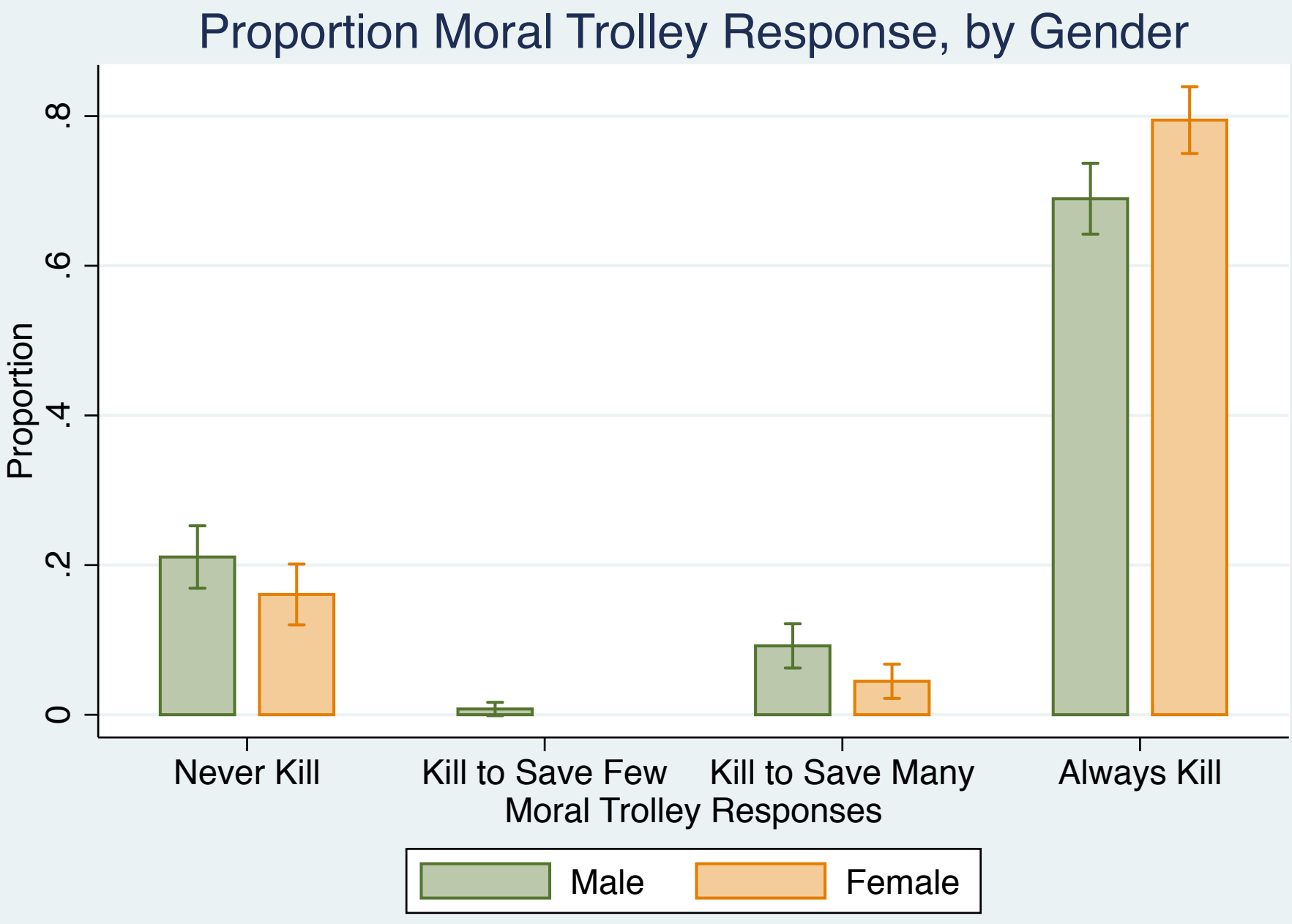
Moral Trolley

You are a solider and you and a few other soldiers are taken prisoner by the enemy. After a year in captivity, your group has tried to escape, but was caught. The enemy overseer decided to hang you and your group. At the gallows he loosens the noose around your neck and proclaims that if you pull the chair under one of the other soldiers in your group, you and the other **5 soldiers** in your group will be released. If you do not, everyone will be hung. The warden says this seriously and will keep his promise. Would you remove the chair in this situation?

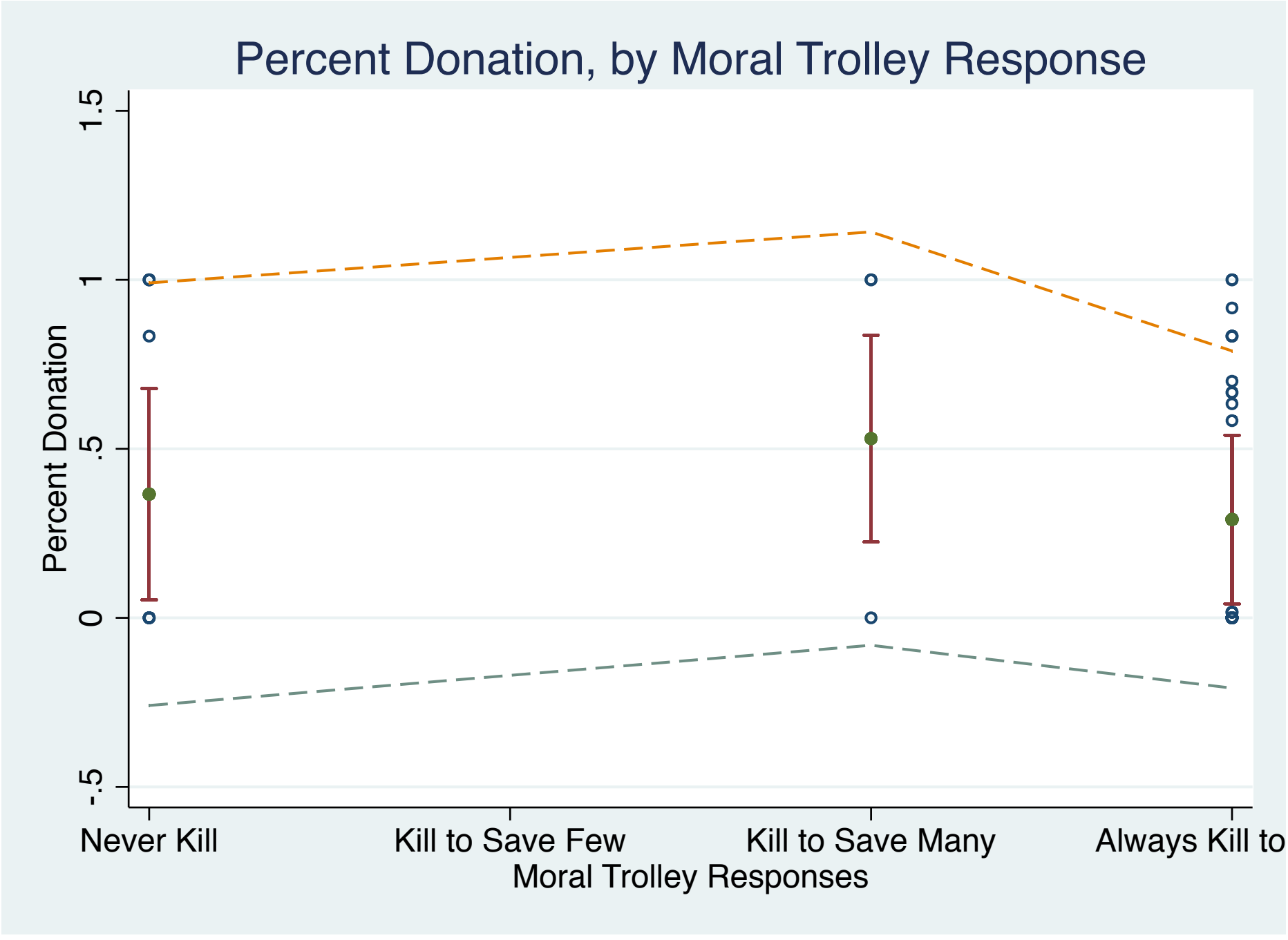
Moral Trolley



Moral Trolley



Moral Trolley



Econometric Specifications

- Basic regression: $d_i = \beta_0 + \beta_1 Treatment_i + \beta_2 X_i + \varepsilon_i$
- Wilcoxon test
- Sensitivity d_i^* to π as predicted from demographics
  - $d^*{}_i = \beta_0 \pi_i + \beta_1 \mathbf{X}_i \pi_i + \alpha \mathbf{X}_i + \varepsilon_i$
- Structural estimation (assume specific mixed preference and get estimates on relative importance)

Pooled Results

	Ordinary Least Squares					
	(1)	(2)	(3)	(4)	(5)	(6)
	d^*		Expected Income E(x_2)		Expected Giving (πd^*)	
Mean dep. var.	0.30		0.39		0.12	
% Consequential (π)	-0.176*	-0.159*	-0.259**	-0.278***	0.212***	0.219***
	(0.0978)	(0.0855)	(0.108)	(0.0802)	(0.0484)	(0.0452)
K Fixed Effects	N	Y	N	Y	N	Y
Observations	71	71	71	71	71	71
R-squared	0.045	0.292	0.077	0.506	0.218	0.339

Notes: Standard errors in parentheses. Raw data shown in Figures 4 and 5. * p $<$ 0.10, ** p $<$ 0.05, *** p $<$ 0.01

◂ Conclusion

Pooled Results

	Ordinary Least Squares					
	(1)	(2)	(3)	(4)	(5)	(6)
	d^*		Expected Income E(x_2)		Expected Giving (πd^*)	
Mean dep. var.	0.23		0.34		0.07	
% Consequential (π)	-0.0725**	-0.0684*	-0.224***	-0.219***	0.194***	0.213***
	(0.0288)	(0.0390)	(0.0334)	(0.0299)	(0.0132)	(0.0181)
K Fixed Effects	N	Y	N	Y	N	Y
Controls	N	Y	N	Y	N	Y
Observations	902	900	902	900	902	900
R-squared	0.007	0.059	0.048	0.604	0.194	0.214

Notes: Standard errors in parentheses. Raw data shown in Figure 10. Controls include indicator variables for gender, American, Indian, Christian, Atheist, aged 25 or younger, and aged 26-35 as well as continuous measures for religious attendance and accuracy in the lock-in data entry task. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

◂ Conclusion

Disaggregated Results

	Ordinary Least Squares							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Decision (d)		Decision (d)		Decision (d)		Decision (d)	
	K = Unknown		K = 10¢		K = 0¢		K = 50¢	
Mean dep. var.	0.26		0.22		0.20		0.22	
% Consequential (π)	-0.0778	-0.0654	-0.0525	-0.0321	-0.0711	-0.0708	-0.0644	-0.0675
	(0.0523)	(0.0523)	(0.0526)	(0.0536)	(0.0464)	(0.0466)	(0.0462)	(0.0456)
Male		-0.0909**		-0.0474		0.0108		0.0178
		(0.0399)		(0.0430)		(0.0395)		(0.0362)
American		0.0241		-0.0539		0.0838		0.117*
		(0.0524)		(0.0539)		(0.0664)		(0.0598)
Indian		-0.0672		-0.0785		-0.0673		-0.0626
		(0.0566)		(0.0560)		(0.0630)		(0.0590)
Christian		-0.0295		0.0584		-0.0215		-0.000293
		(0.0483)		(0.0503)		(0.0494)		(0.0479)
Atheist		-0.0188		0.00480		0.0113		-0.0927
		(0.0644)		(0.0649)		(0.0802)		(0.0725)
Religious Services Attendance		-0.00614		0.000508		0.00367		-0.00546
		(0.0145)		(0.0156)		(0.0137)		(0.0137)
Ages 25 or Under		-0.0207		-0.122**		-0.0109		-0.113**
		(0.0518)		(0.0570)		(0.0493)		(0.0474)
Ages 26-35		0.00271		-0.110*		-0.00105		-0.111**
		(0.0548)		(0.0593)		(0.0493)		(0.0480)
Own Errors		-0.000192		-0.000186		0.000220		-0.000148
		(0.000193)		(0.000163)		(0.000194)		(0.000143)
Observations	260	260	218	218	256	255	271	270
R-squared	0.009	0.069	0.005	0.081	0.009	0.052	0.007	0.097

Notes: Standard errors in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01

Non-Parametric Tests

	Wilcoxon-Mann-Whitney 2-sided test (p-values)		
	(1)	(2)	(3)
Thresholds	K Unknown or 10¢	K = 0¢ or 50¢	K Pooled
$\pi = 1$ vs. $\pi \leq 0.67$	0.91	0.05	0.11
$\pi \geq 0.67$ vs. $\pi \leq 0.33$	0.07	1.00	0.20
$\pi \geq 0.33$ vs. $\pi \leq 0.05$	0.05	0.10	0.01
$\pi \geq 0.05$ vs. $\pi = 0.01$	0.15	0.02	0.01

	π Pooled
$K \geq 10¢$ vs. $K = 0¢$	0.40
$K = 50¢$ vs. $K \leq 10¢$	0.11

Non-Parametric Tests

	Non-parametric test for equality of medians, 2-sided test (p-values)
Thresholds	Pooled
$\pi = 3/16$ vs. $\pi = 15/16$	0.04
K = 0 vs. K = Max	0.01

Who responds to π?

	Ordinary Least Squares									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Decision (d)									
Mean dep. var.	0.23									
% Consequential (π)	-0.100**	-0.0493	-0.124**	-0.0500	-0.0522	-0.0774	-0.0618	-0.0548	-0.0839**	-0.0190
	(0.0494)	(0.0429)	(0.0506)	(0.0436)	(0.0403)	(0.0616)	(0.0467)	(0.0443)	(0.0407)	(0.126)
π * Male	0.0612									0.0490
	(0.0577)									(0.0611)
π * American		-0.0675								0.0370
		(0.0627)								(0.0911)
π * Indian			0.0990*							0.0426
			(0.0574)							(0.0963)
π * Christian				-0.0599						-0.0658
				(0.0632)						(0.0783)
π * Atheist					-0.133					-0.145
					(0.0837)					(0.108)
π * Religious Services Attendance						0.00394				-0.00739
						(0.0210)				(0.0224)
π * Ages 25 or Under							-0.0149			-0.0815
							(0.0576)			(0.0787)
π * Ages 26-35								-0.0386		-0.0878
								(0.0597)		(0.0808)
π * Own Errors									0.000402	0.000319
									(0.000299)	(0.000307)
K Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	900	900	900	900	900	900	900	900	900	900
R-squared	0.061	0.061	0.063	0.060	0.062	0.059	0.059	0.060	0.061	0.068

Notes: Standard errors in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01

Homo oeconomicus

Example

Homo oeconomicus and Duty Bliss point

$u(x_{1,}, d) = \lambda(x_{DM}) + (1-\lambda)(-(\delta - d)^2) = \lambda(\omega - d) + (1-\lambda)(-(\delta - d)^2)$

FOC: $0 = \pi\lambda(-1) + 2(1-\lambda)(\delta - d)$

Linear: $d^* = \frac{-\lambda}{2(1-\lambda)}\pi + \delta$

Estimate of -0.073 implies that $\lambda = 0.13$.

Many people donate more than the bliss point of 25%

Fehr-Schmidt

Example

Fehr-Schmidt preferences and deontological bliss point

$u(x_{1,},x_2,d) =$
$\lambda(x_1 - \alpha max\{x_2 - x_1, 0\} - \beta\, max\{x_1 - x_2, 0\}) + (1-\lambda)(-(\delta - d)^2).$
GMM:
$E\left[\pi\left(1[\frac{\omega}{2} > d]\left[d - \pi\frac{\lambda(2\beta-1)}{2(1-\lambda)} - \delta\right] + 1[\frac{\omega}{2} \leq d]\left[d - \pi\frac{\lambda(-2\alpha-1)}{2(1-\lambda)} - \delta\right]\right)\right] = 0$

Linear: $d^* = \frac{\lambda(-2\alpha-1)}{2(1-\lambda)}\pi + \frac{\lambda(\alpha+\beta)}{(1-\lambda)}\pi 1[\frac{\omega}{2} > d] + \delta$

Fehr-Schmidt

Table 8: Trading Off Consequentialist-Deontological Motivations (AMT Experiment)

	OLS	IV	IV
	(1)	(2)	(3)
	Decision (d)		
Mean dep. var.	0.23		
% Consequential (π)	-0.239***	-0.363***	-0.368***
	(0.0249)	(0.0548)	(0.139)
π * $1(d \geq w/2)$	0.870***	1.516***	1.542**
	(0.0412)	(0.250)	(0.714)
Constant (Duty Bliss Point)	0.251***	0.249***	0.249***
	(0.0116)	(0.0131)	(0.0134)
IV	N	π, Indian	π, Age $\leq$ 25
Observations	902	902	902
R-squared	0.336	0.155	0.140

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Fehr-Schmidt

Example

Fehr-Schmidt preferences and deontological bliss point

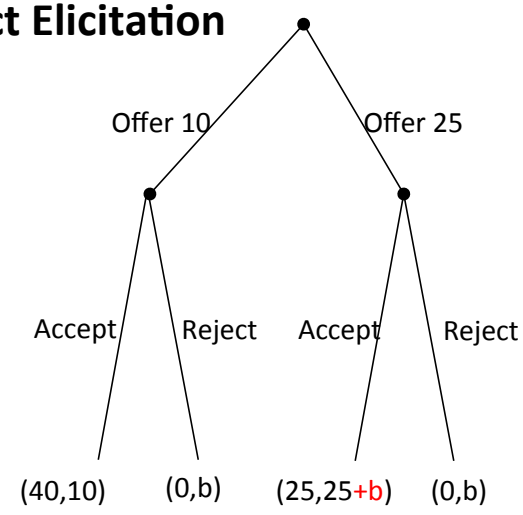
$u(x_{1,}, x_2, d) =$
$\lambda(x_1 - \alpha max\{x_2 - x_1, 0\} - \beta max\{x_1 - x_2, 0\}) + (1-\lambda)(-(\delta - d)^2)$.

$\frac{\lambda(2\beta-1)}{2(1-\lambda)} = -0.36$ (I) and $\frac{\lambda(-2\alpha-1)}{2(1-\lambda)} = 1.16$ (II). 2 equations and 3 unknowns.
Same problem: $\lambda < 0$ if $\alpha > \beta > 0$.
Linear form of Fehr-Schmidt leads to bang-bang solution. Either consequentialist donates nothing, but many people donate more than bliss point, or, consequentialist donates 50-50, which is too much so $\lambda < 0$.

Self-Image

Simplified ultimatum game

Direct Elicitation



Strategy Method

		x≥10 (AA')	x≥25 (RA')	(AR')	(RR')
p	10	(40,10)	(0,b)	(40,10)	(0,b)
1-p	25	(25,25)	(25,25+b)	(0,b)	(0,b)

Can we find an example of a non-consequentialist preference that predicts different outcomes under Direct Elicitation vs. Strategy Method?

Self-image: If I did not commit or in fact accept the unfair offer, I get an additional psychic benefit of 0<b<10.

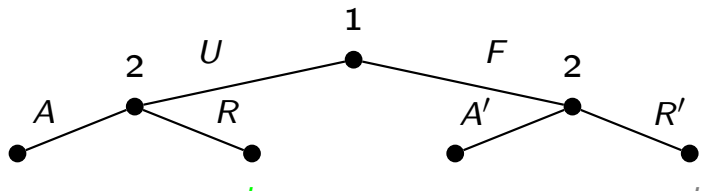
DE: offer 25 -> accept -> utilities (25,**25+b**)
DE: offer 10 -> accept -> utilities (40,10)

SM: strategy accept x≥10 yields: p*10 + (1-p)25 = 25-15p
SM: strategy accept x≥25 yields: p*(0+b) + **(1-p)(25+b)** = 25+b-25p

Act on self-image (x≥25) **iff** p<0.1b (**low prob of bearing consequences of obtaining self-image**)

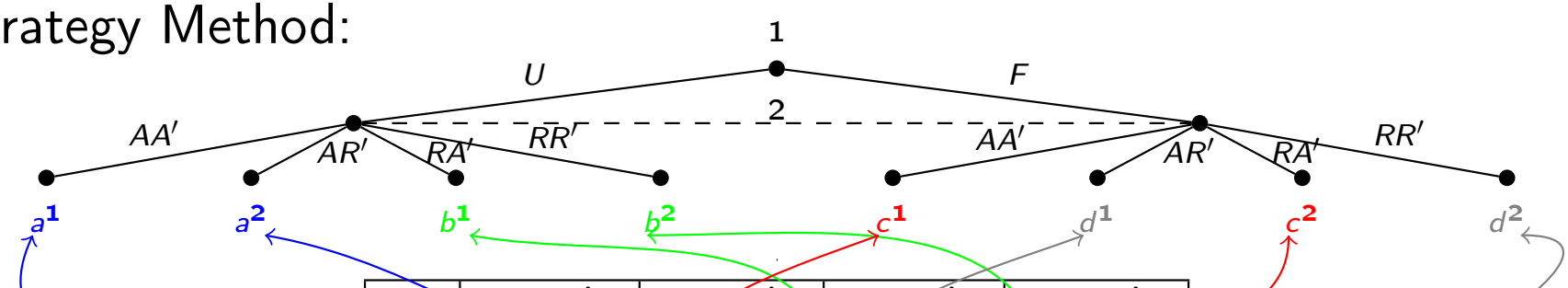
General Idea

Direct Elicitation:



	AA'	AR'	RA'	RR'
U	$u(a)$	$u(a)$	$u(b)$	$u(b)$
F	$u(c)$	$u(d)$	$u(c)$	$u(d)$

Strategy Method:



	AA'	AR'	RA'	RR'
U	$u(a^1)$	$u(a^2)$	$u(b^1)$	$u(b^2)$
F	$u(c^1)$	$u(d^1)$	$u(c^2)$	$u(d^2)$

Research Questions

1. Is it really true that from a game theoretical perspective direct elicitation (DE) and the strategy method (SM) *should* yield the same equilibrium outcome?
   - No: Not in general
2. If not, can we find conditions such that DE and SM should yield the same equilibrium outcome?
   - Yes: But they are on preferences

Theorem

$G_\pi^{DE} = (\Gamma^{DE}, \pi^{DE} : Z^{DE} \to \mathbb{R}^{\mathrm{I}})$ — Strat. iden. $\Leftrightarrow$ — $G_\pi^{SM} = (\Gamma^{SM}, \pi^{SM} : Z^{SM} \to \mathbb{R}^{\mathrm{I}})$

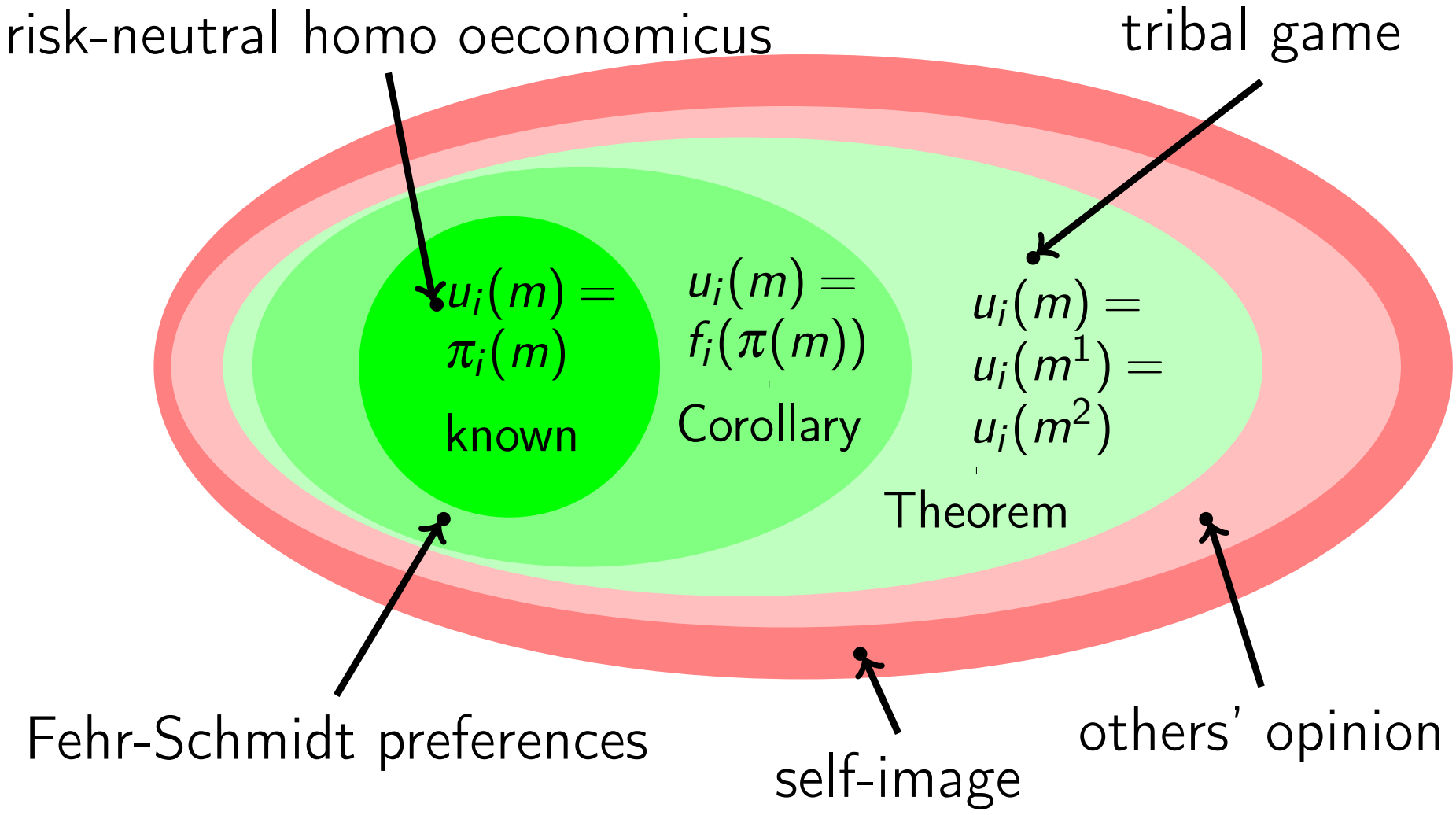
$\uparrow$ equilibrium may change $\downarrow$ — $\uparrow$ equilibrium may change $\downarrow$

$G^{SM} = (\Gamma^{DE}, u^{DE} : Z^{SM} \to \mathbb{R}^{\mathrm{I}})$ — Thm. $\Leftrightarrow$ — $G^{SM} = (\Gamma^{SM}, u^{SM} : Z^{SM} \to \mathbb{R}^{\mathrm{I}})$

- Strategic equivalence if their strategic forms are identical up to a positive affine transformation of each player's Bernoulli **utility**

(Harsanyi et al. 1988)

Venn diagram



Experimental Evidence

See if off-equilibrium payoffs affects behavior depending on whether the strategy and direct response method is used in:

- Lab, online, and meta-analysis of ultimatum game
- (More complex) 3-player prisoner's dilemma with varying salience of off-equilibrium payoffs

Meta-Analysis (Ultimatum Game)

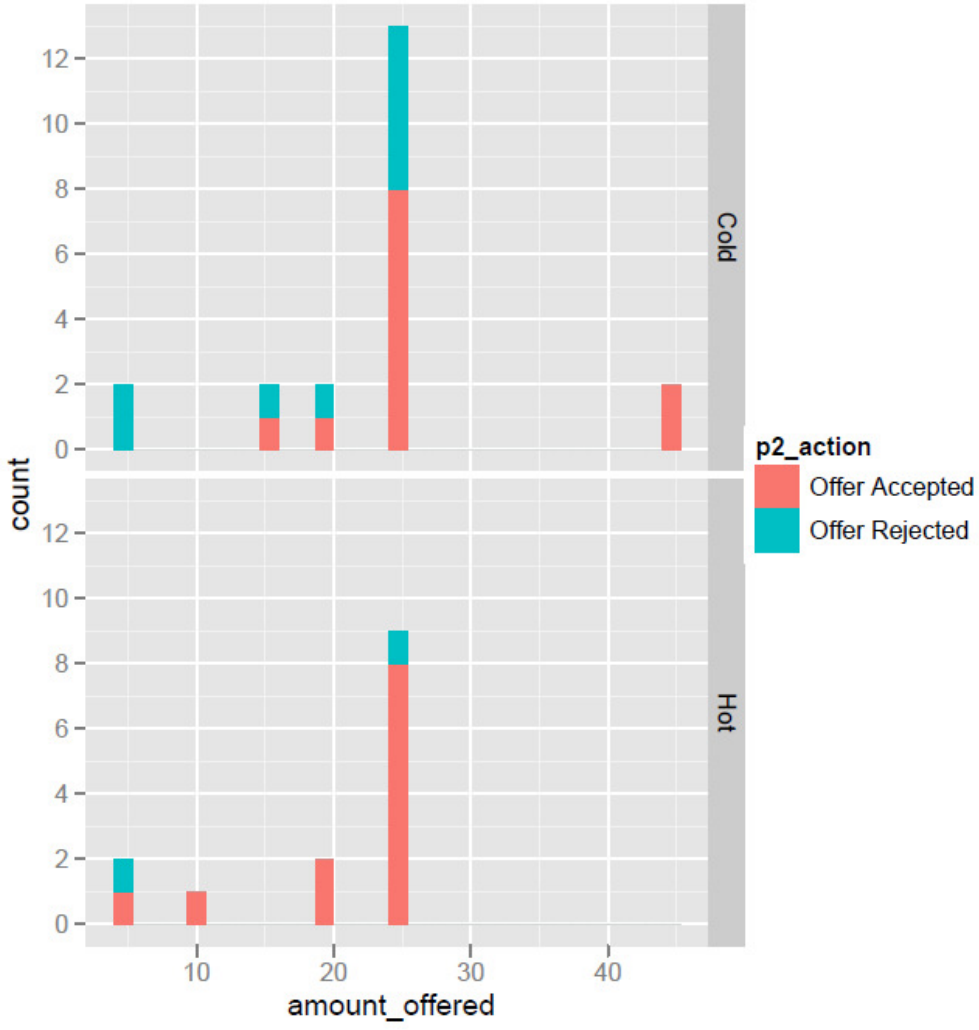
	(1) rejectionrate	(2) rejectionrate	(3) rejectionrate	(4) rejectionrate	(5) rejectionrate	(6) rejectionrate
hot	-0.225***	-0.214***	-1.595**	-1.599**	-0.0732	-0.124*
	(0.000)	(0.001)	(0.009)	(0.010)	(0.660)	(0.021)
offer		-0.373	-3.609*	-3.609*	-0.227	-0.377
		(0.280)	(0.014)	(0.016)	(0.408)	(0.241)
poor		-0.0160				
		(0.697)				
hotoffer			3.438*	3.443*		
			(0.022)	(0.024)		
pooroffer				0.00719		
				(0.939)		
_cons	0.348***	0.497**	1.789**	1.789**	0.303	0.397**
	(0.000)	(0.001)	(0.003)	(0.003)	(0.139)	(0.005)
N	49	49	49	49	49	48

p-values in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

- 20% additional acceptances occur in the hot setting
- (2) add linear time trend and dummy indicator for country economic development
- (3-4) add interaction between offer and hot setting, poor setting
- (5) weighted with citations; (6) weighted by number of observations in experiment
- Among the 16 cold experiments, 9 reported the threshold only. The 9 studies had a higher average threshold, which suggests if the 9 studies had also reported acceptance rates, the difference between hot and cold may have been even larger.
- Offer was not significantly influenced by elicitation method

Ultimatum Game (DE vs. SM)



- Direct elicitation results in more acceptances

Ultimatum Game (DE vs. SM x Emo vs. Neu)

- 418 subjects, roughly 70 per treatment
- Direct elicitation results in more acceptances
- This effect is larger when off-equilibrium payoffs are salient
- No significant differences between strategy and threshold method
- Note: Offers are slightly, but not significantly, lower in direct elicitation setting;

◂ Control for Offer

3-player prisoner's dilemma (Falk, Fehr, Fischbacher)

- Strategy method increased deductions
  - ◂ Deductions differentially affected by emotional prime
  - ◂ Controlling for first stage outcome
- Differences between Direct Elicitation and Strategy Method (and differences-in-differences) were greater:
  - ◂ for deductions of D1
  - ◂ if you are a contributor

Implications

"For example, the notion of subgame perfect equilibrium is lost in the transition from the extensive to the strategic form of the game, since there are no subgames in a game in which players state their strategies simultaneously."
Alvin E. Roth (ch.4, Handbook of Experimental Economics, 1995)

- We have learnt that there is a much more fundamental problem:
  - Strategic equivalence is often lost in the transition from direct elicitation to strategy method elicitation.

Do people have deontological (duty-based) motivations?

Research question

Revealed preference in lab settings. How about in the field?

Research question

How should we model deontological motivations? Any relevance for theory?

Fooled by Randomness

How people often imagine a sequence of coin flips:

0101001011001010100110100

A real sequence of coin flips:

0101011111011000001001101

Fooled by Randomness

Law of Small Numbers (Rabin 2002)

- Expect very small samples/short sequences to resemble the population
- Expect alternation even though streaks often occur by chance

Gambler's Fallacy (Tversky and Kahneman 1974)

- Seeing a 0 or 0s increases the odds of the next draw being a 1 and vice versa (e.g. a "fair" slot machine)

Decision-Making under the Gambler's Fallacy

Large literature explores these misperceptions of randomness

- Many studies focus on **predictions** in lab settings or **betting** behavior in casinos
- Little field research on how misperceptions of randomness can affect agents making sequential **decisions** under uncertainty

Hypothesis:

- Gambler's fallacy $\Longrightarrow$ Negatively autocorrelated decisions, avoidance of streaks

The Decision-Maker's Problem

Suppose an agent makes 0/1 decisions on randomly ordered cases

- If decisions are based on case merits, decision on the previous case should not predict decision on the next case (controlling for base rates)

If the decision-maker suffers from the gambler's fallacy

- After deciding 1 on the previous case, will approach the next case with a *prior belief* that it is likely to be a 0 (and vice versa)
- Also receives a noisy signal about the quality of the current case
- Decisions will be negatively autocorrelated if they depend on a mixture of prior beliefs and the noisy signal
- Similar patterns if agent is rational but judged by behavioral others

Decisions vs. **predictions/betting**: Greater confidence in the noisy signal $\Longrightarrow$ less negative autocorrelation in decisions

Three High-Stakes Real World Settings

1. Refugee court judge decisions to grant or deny asylum
   - Random assignment to judges and FIFO ordering of cases
   - High stakes decisions determining whether refugees are deported

2. Loan officer decisions to grant or deny loan applications
   - Field experiment with random ordering of loan files (Data from Cole, Kanz, and Klapper 2013)
   - Randomly assigned incentive schemes

3. Umpire calls of strike or ball for pitches in baseball games
   - Exact pitch location, speed, etc. to control for pitch quality
   - Know whether the decision was correct

Asylum Judges: Data

High stakes: Applicant reasonably fears imprisonment, torture, or death if forced to return to her home country (Stanford Law Review 2007)

Cases filed within each court are randomly assigned to judges, and judges review the queue of cases following "◂ first-in-first-out"

- Control for time-variation in court-level case quality using recent approval rates of other judges in same court (tends to be slow-moving positive autocorrelation)
- Control for time of day fixed effects

Judges have a high degree of discretion

- No formal or advised quotas (substantial heterogeneity in grant rates across judges in the same court)
- Serve until retirement, fixed wage schedule w/o bonuses

Asylum Judges: Baseline Results

	Grant Asylum Dummy				
	(1)	(2)	(3)	(4)	(5)
Lag grant	-0.00544*	-0.0108***	-0.0155**	-0.0326***	
	(0.00308)	(0.00413)	(0.00631)	(0.00773)	
β_1: Lag grant - grant					-0.0549***
					(0.0148)
β_2: Lag deny - grant					-0.0367**
					(0.0171)
β_3: Lag grant - deny					-0.00804
					(0.0157)
p-value: $\beta_1 = \beta_2 = \beta_3$					0.0507
p-value: $\beta_1 = \beta_2$					0.290
p-value: $\beta_1 = \beta_3$					0.0214
p-value: $\beta_2 = \beta_3$					0.0503
Exclude extreme judges	No	Yes	Yes	Yes	Yes
Same day cases	No	No	Yes	Yes	Yes
Same defensive cases	No	No	No	Yes	Yes
N	150,357	80,733	36,389	23,990	10,652
R^2	0.374	0.207	0.223	0.228	0.269

- Judges are up to 5 percentage points less likely to grant asylum if the previous case(s) were granted
- Up to 17% decline relative to the base rate of asylum grants

Asylum Judges: Heterogeneity

Stronger negative autocorrelation

- Consecutive cases with applicants of the same nationality
- Moderate judges (grant rate, excluding current observation, is between 0.3 and 0.7)

Weaker negative autocorrelation

- More experienced judges (8+ years)

Abbreviated Results

Negative autocorrelation in decisions and avoidance of streaks

- Up to ◂ 5% of decisions are reversed are reversed due to the gambler's fallacy
- Stronger bias for moderate decision-makers, similar or close-in-time cases
- Weaker bias for experienced or educated decision-makers, under strong incentives for accuracy

Unlikely to be driven by potential alternative explanations

- Preference to be equally nice/fair to two opposing teams
- ◂ Sequential contrast effects
- ◂ Quotas and/or learning
- ◂ Not driven solely by concerns of external perceptions

Preference for Randomization

Agents may prefer to alternate being "mean" and "nice" over short time horizons

- Loan officers in the experiment are told that their decisions do not affect actual loan origination

- More generally, the gambler's fallacy and desire to "do right" may be the reason why agents feel more guilty after "1100" than "1010"

Roadmap

Social Preferences or Sacred Values? Theory and Evidence of Dentological Motivations

A Theory of Experiments: Invariance of Equilibrium to the Strategy Method of Elicitation and Implications for Social Preferences

Decision-Making Under the Gambler's Fallacy: Evidence From Asylum Courts, Loan Officers, and Baseball Umpires

Ideological Perfectionism on Judicial Panels

Deontological Motivations

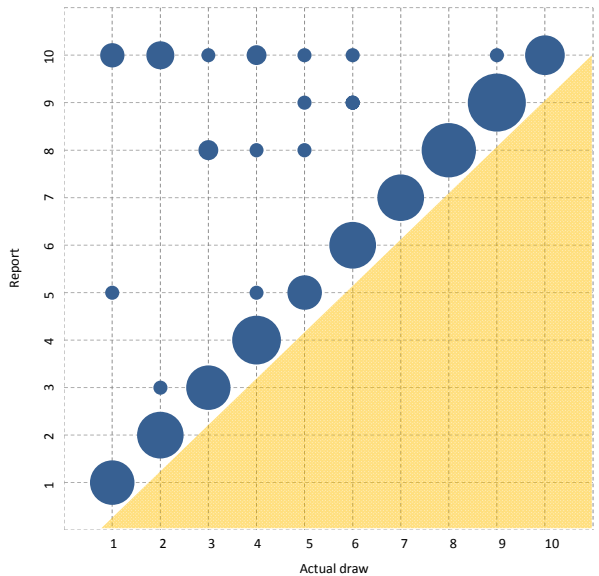
- How do individuals perceive the cost of taking actions they disagree with politically or morally?
- Economics tends to gravitate towards the assumption that costs – be they economic, effort or cognitive – are convex
- One rationale for this assumption is that it makes theoretical models analytically tractable
- Another rationale is that it seems intuitively plausible. However, such intuition has proved fragile following a number of recent experiments
  - even small deviations from convictions are perceived to be very costly, but once a small deviation has been made, further deviations will entail relatively little additional cost
  - implies individuals tend to give up on their morals if they cannot follow them fully, suggesting a concave cost of deviation
- Concave ideological preferences explains a novel and puzzling phenomenon in judicial decisions along with a number of related empirical facts

Lab Experiments

- For instance, individuals with concave moral costs will tend to give up on their morals if they cannot follow them fully
- This pattern of behavior has been popularly labeled the "what-the-hell-effect" (Ariely 2012; Baumeister et al. 1996)
  - The decision whether to lie is often insensitive to the outcome of lying once it it preferred over the outcome of being truthful (Hurkens et al. 2009; Gneezy et al. 2013) ◂ (Abeler, Nosenzo, Raymond)
  - Once individuals are induced to cheat, they succumb to full-blown cheating (Gino et al. 2010)
  - Once induced to kill mice, indifferent to the number of mice killed ◂ (Falk and Szech 2013)
  - In politics it may be more sensible to assume concave preferences. A voter on the far right would be more or less indifferent between two candidates on the left (both are equally bad), but would care greatly about which of the right wing candidates wins (Osbourne 1995)
- What are the implications of concave preferences for important real world decision situations

Lab Experiments

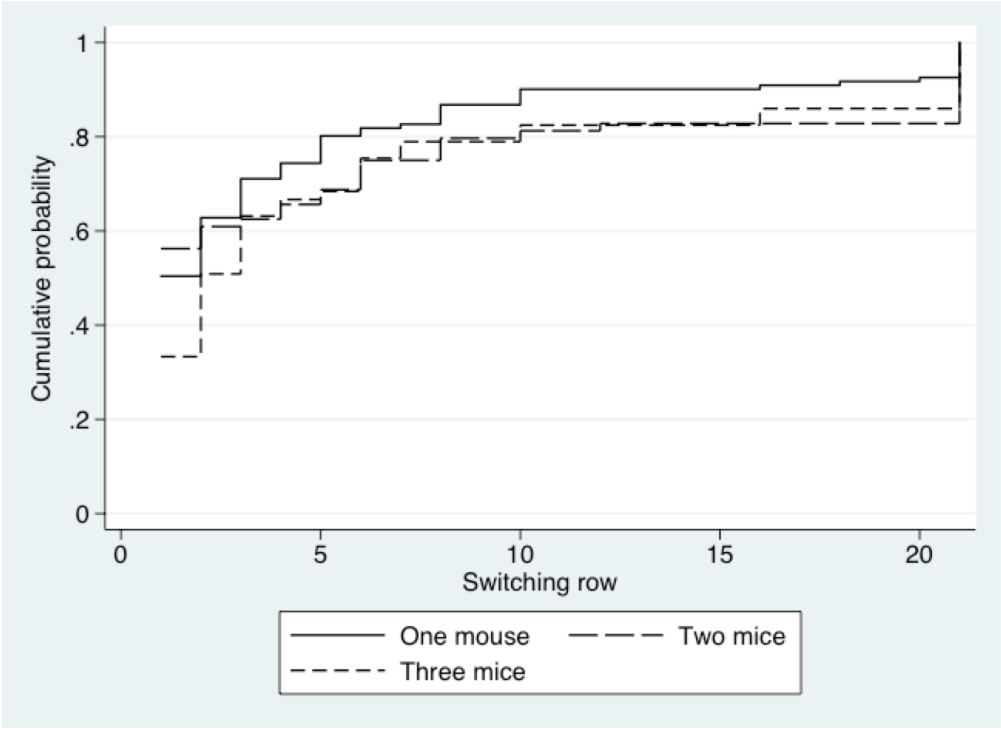
Abeler/Nosenzo/Raymond - experiment



- **Reports do depend on actual draws**.
- 83% of subjects report their true draw.
- Strong positive correlation between draws and reports (Spearman's rho = 0.657, p = 0.000).
- **None underreports their draws**.

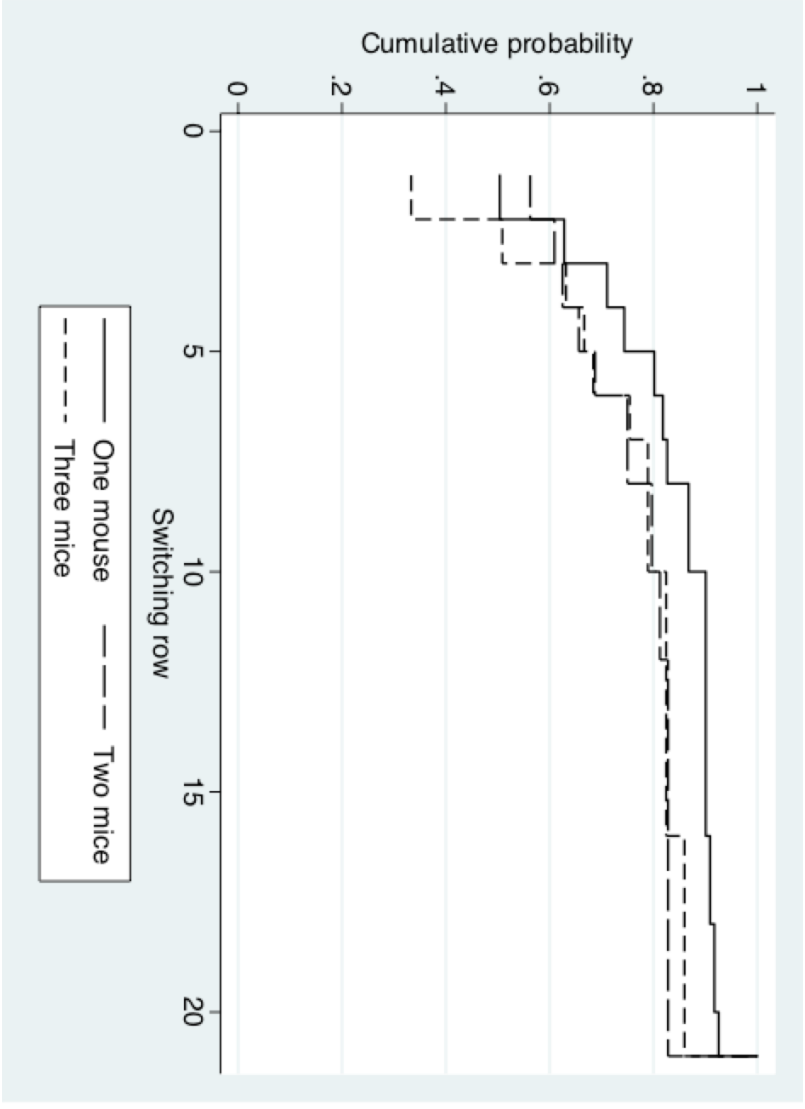
- Subjects did a computer task and at the end of the task they randomly drew their reward from a uniform distribution between 1 and 10 (they knew the distribution).
- The number they sampled appeared on their screen and they were asked to copy it on a piece of paper and hand it out to the experimenter on their way out of the lab in order to get paid. ◂ Lab

Lab Experiments

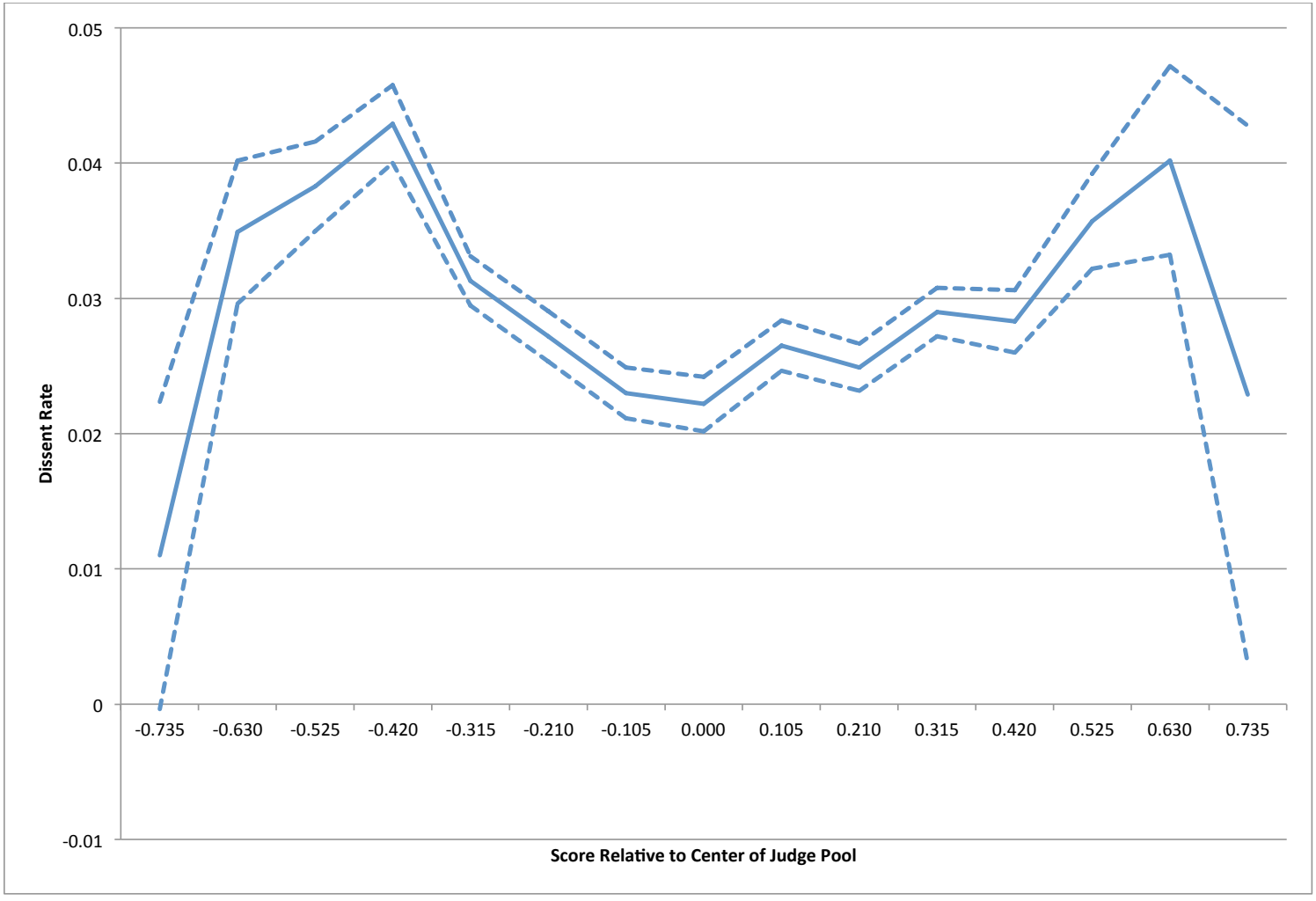


- Subjects were shown a list of binary alternatives, labeled Option A and Option B
- Option A implied that the mouse would be saved and that the subject would receive no money. Option B implied the killing of the mouse and a monetary amount. Monetary amounts associated with killing increased from row to row, starting from 5 up to 100 euros, in steps of 5 euros.
- Earlier a subject switches, the less he or she values the life of his or her mouse relative to earning money

Lab Experiments



The "Spider" Result



Intuition

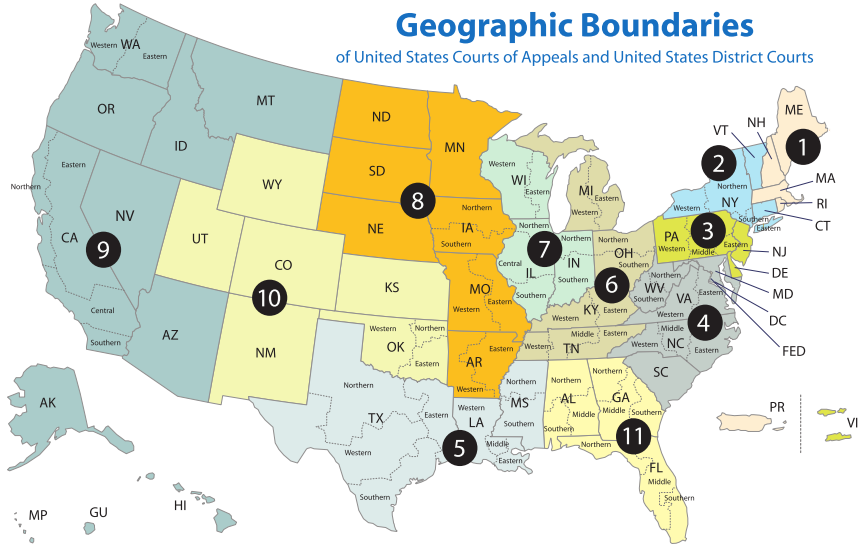
- Judges feel bad when signing "unfavorable" verdicts
- They are ideological perfectionists: signing even one unfavorable verdict comes at high cost, signing many is marginally less costly
- Not signing (i.e., dissenting on a 3-judge panel) implies a collegial pressure

Intuition

- For extreme judges, the marginal cost of signing unfavorable verdicts falls while the marginal benefit of signing unfavorable verdicts stays high, so you just sign all of others' verdicts.
- For moderate and centrist judges, the marginal cost of signing unfavorable verdicts remains high while the marginal benefit is low, so the # of dissents is determined by the natural normal distribution of judge scores.

Circuit Courts

- 12 Circuit courts decide on appeals from lower courts
  - Three judges are randomly picked to a case
  - Set precedent for future cases
  - Between 8 to 40 judges in each circuit, politically appointed by president, for life
- The opinion (interpretation of the law) is what sets precedent and is a continuous variable
- Judges can **"dissent"** by not signing opinion and then write motivation why



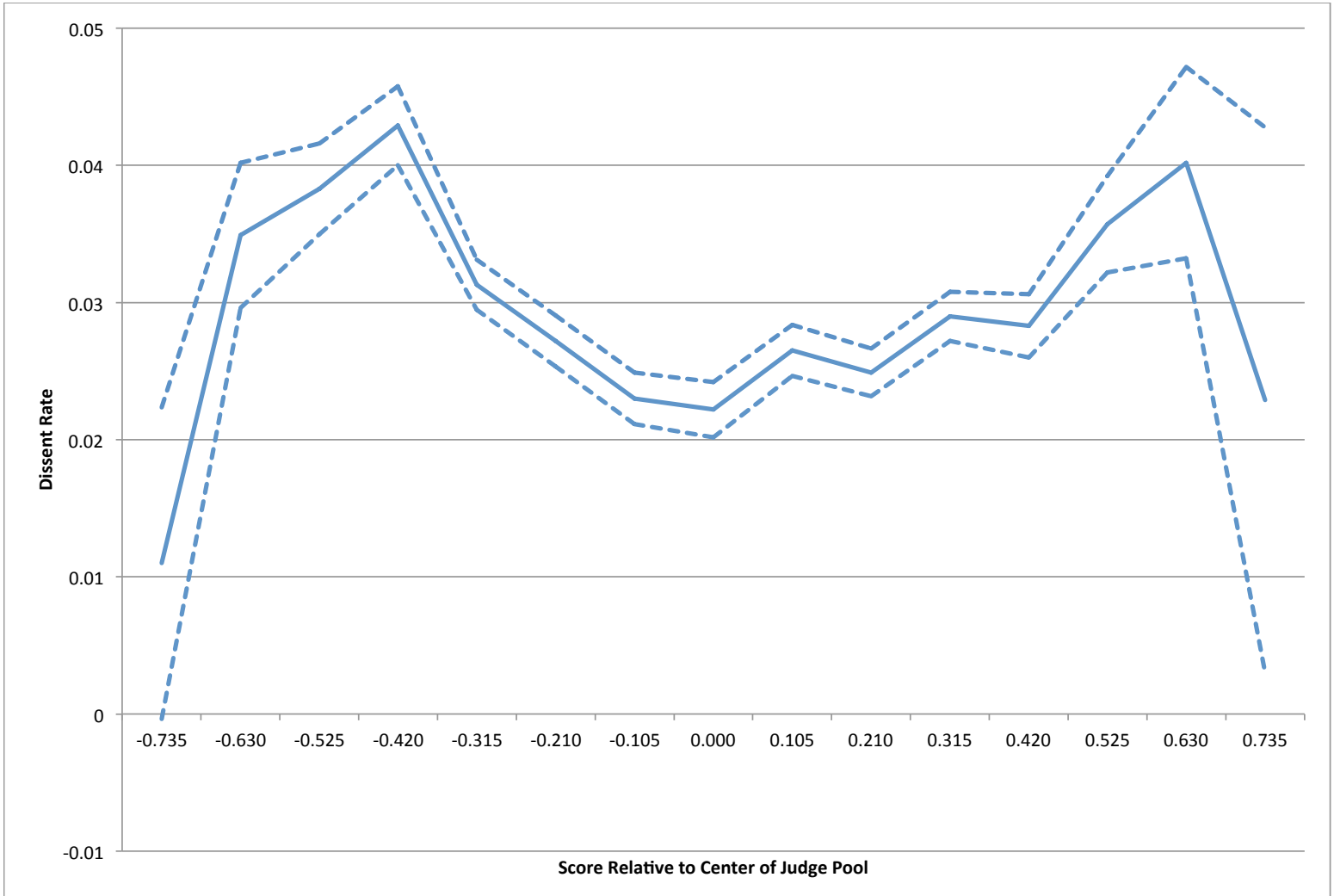
Ideology

- What role does ideology play in determining whether a judge dissents?

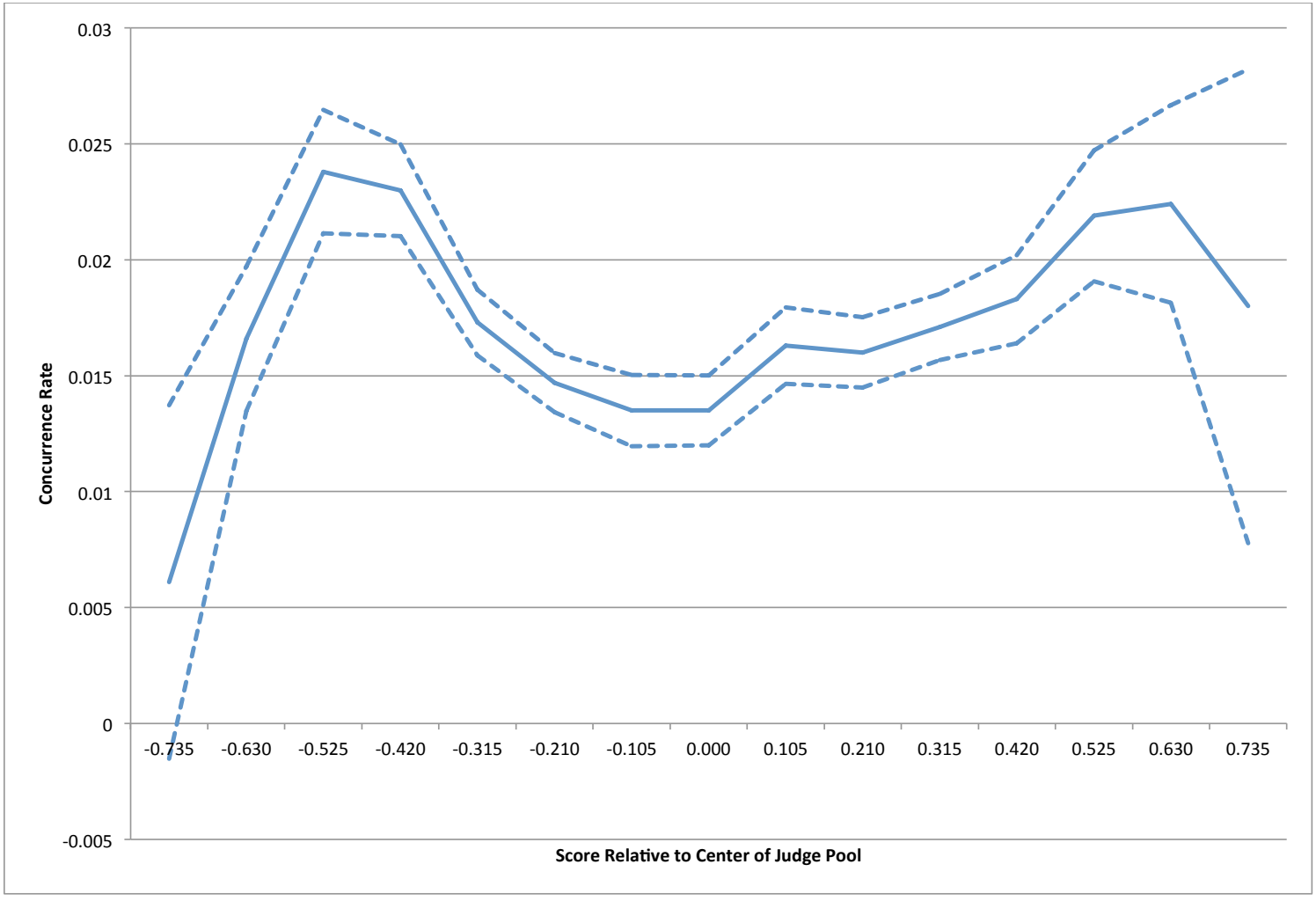
- Use proxy for ideology by weighing voting behavior of appointing president and voting behavior of home state senators (Judicial Common Space)
- Yearly data 1950-2007 (Openjurist), 5% sample (1925-2002) (Songer-Auburn)
- Proxy goes from -1 (leftist/liberal/democrat) to +1 (rightist/conservative/republican)

The "Spider" Result for Dissents

- Dissent is as a non-monotonic function of ideological extremeness:
  - Centrists dissent seldom
  - Moderates dissent often
  - Extremists dissent seldom



The "Spider" Result for Concurrences



How Can the Spider Be Explained?

- Note: The result is driven by ideological distance between judges, not by the ideology per se.
- Example: A very liberal judge (-1) will dissent seldom when in circuit of very conservative judges (+1), but dissent often in circuit of moderate liberals (-0.5).
- This is about interaction between judges with different ideologies.

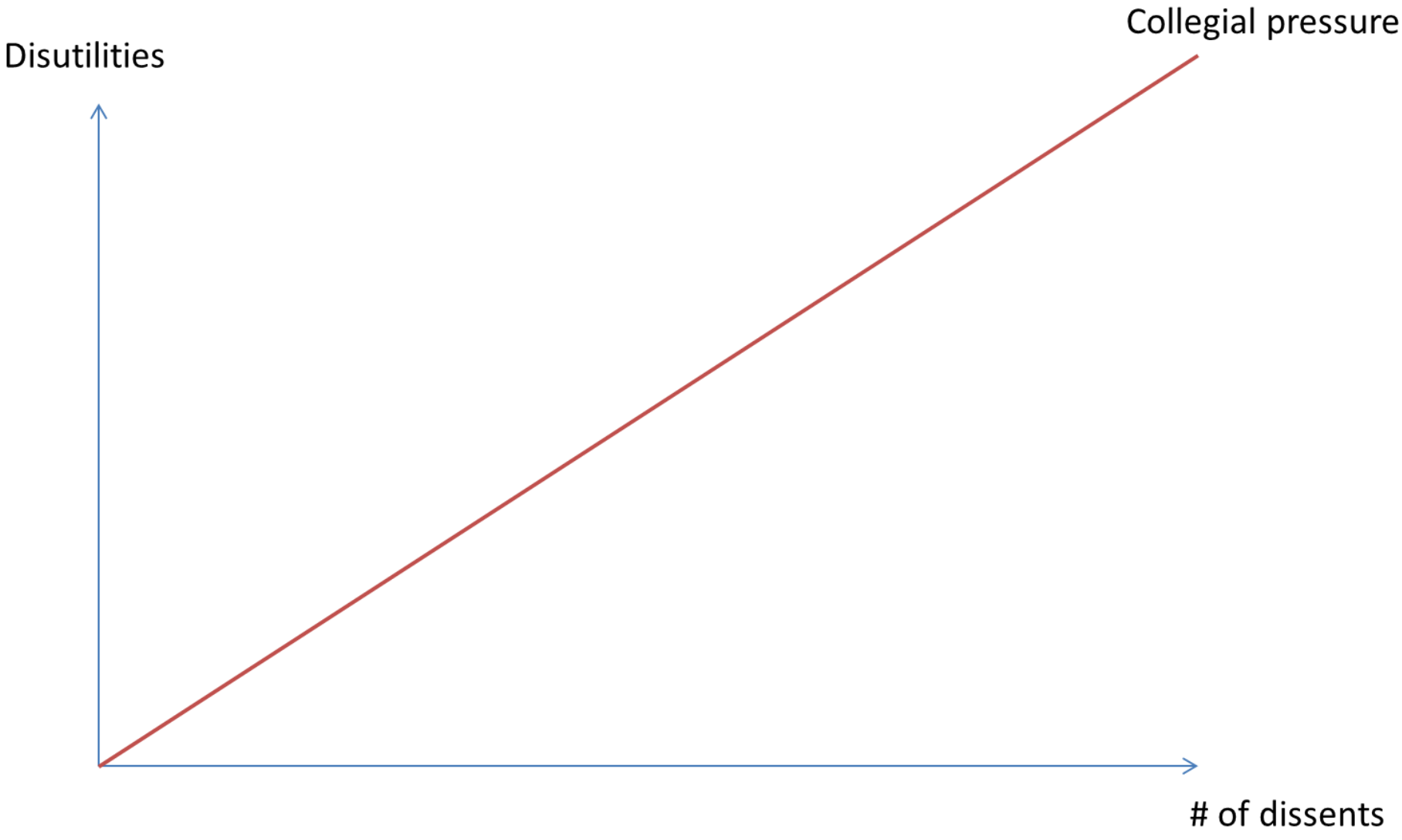
Dissent More When a Judge's Ideology Far From Panel Median

Table: Dissents and Concurrences vs. Distance to Center of Judge Panel (1950-2007)

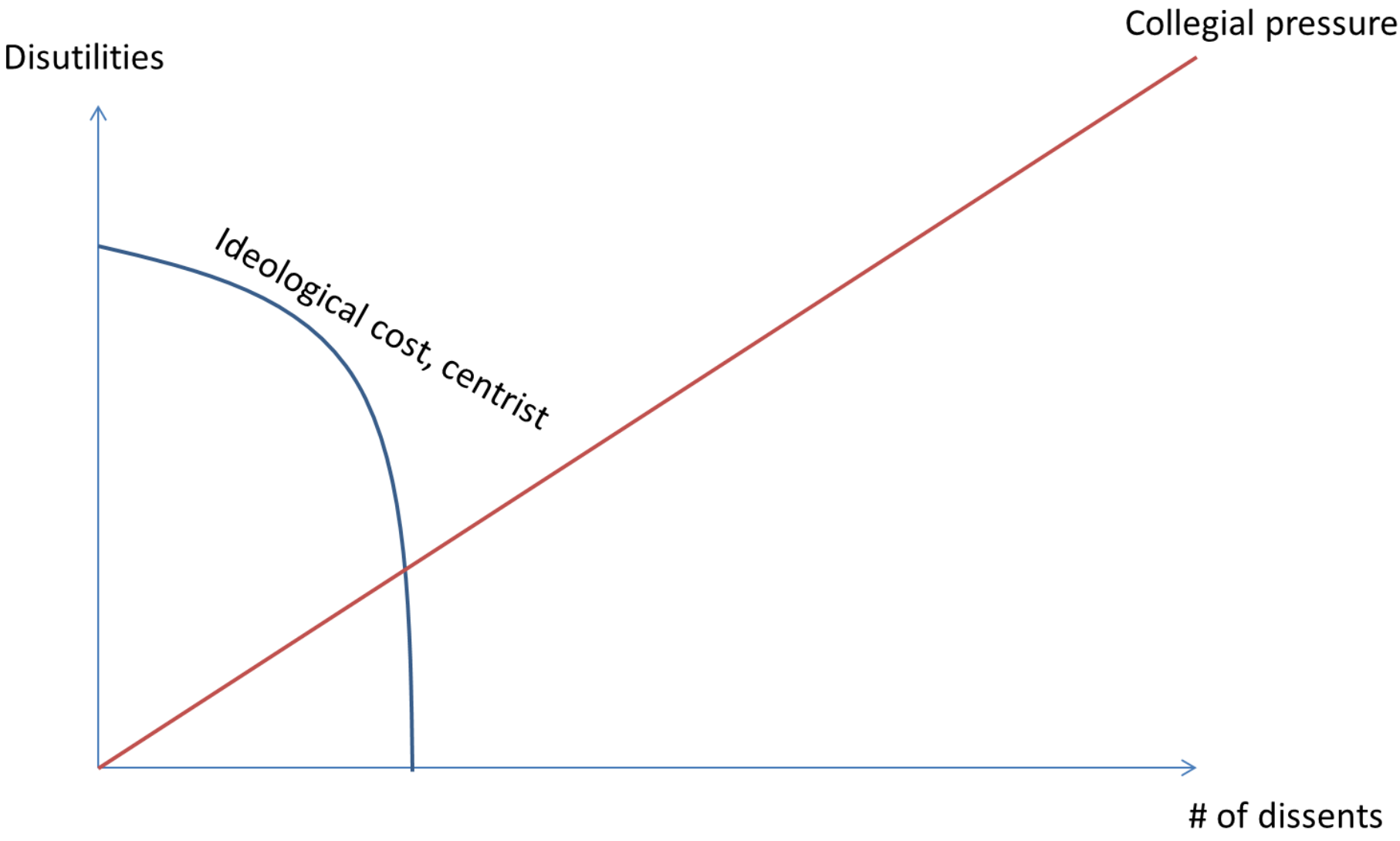
	Dissents or Concurs
Distance to Center of Panel	0.0399***
	(0.00580)
Circuit Fixed Effects	Y
Year Fixed Effects	Y
N	541182
R-sq	0.008

Extremists more often distant to panel center, should dissent more often, yet dissent less according to spider

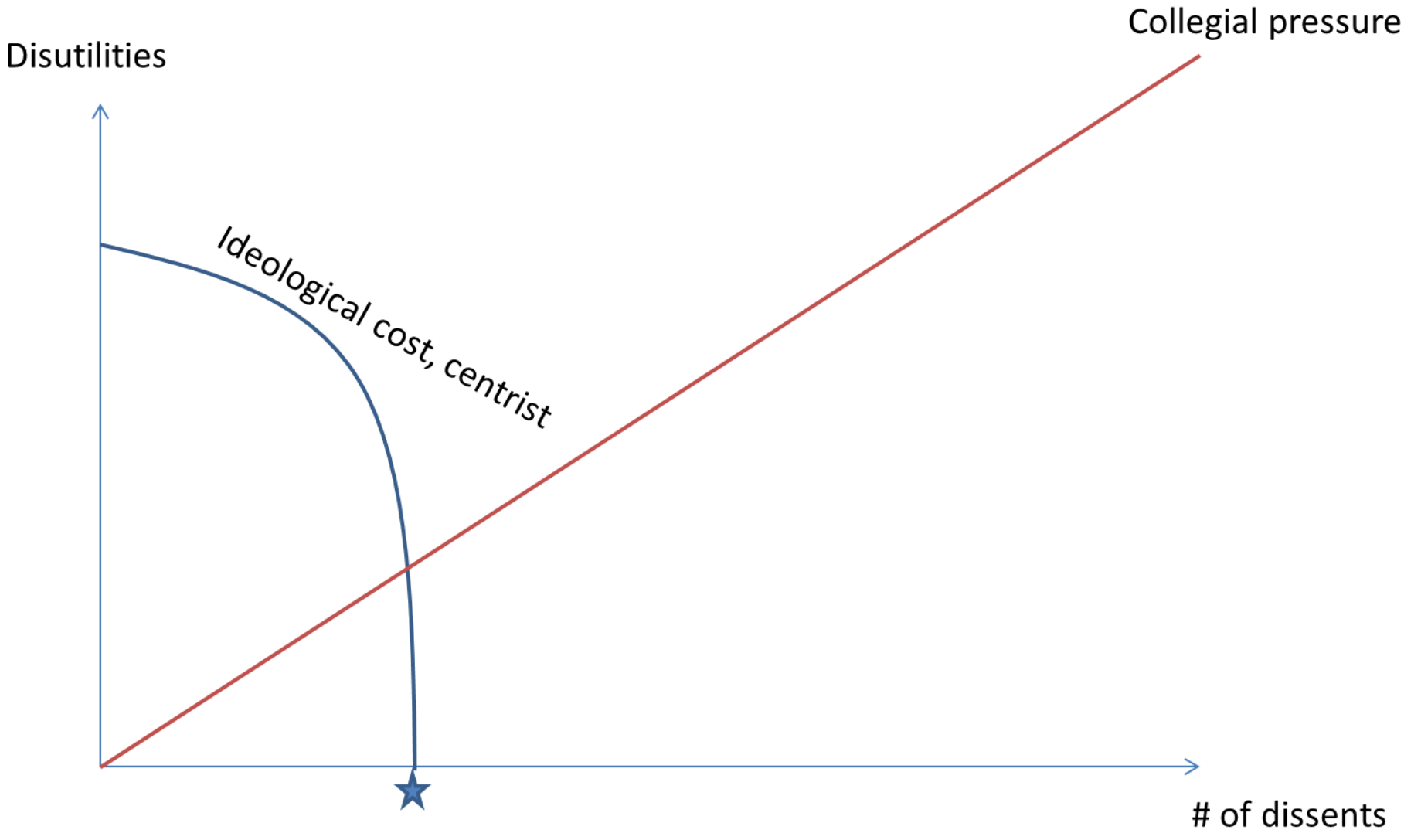
Intuition



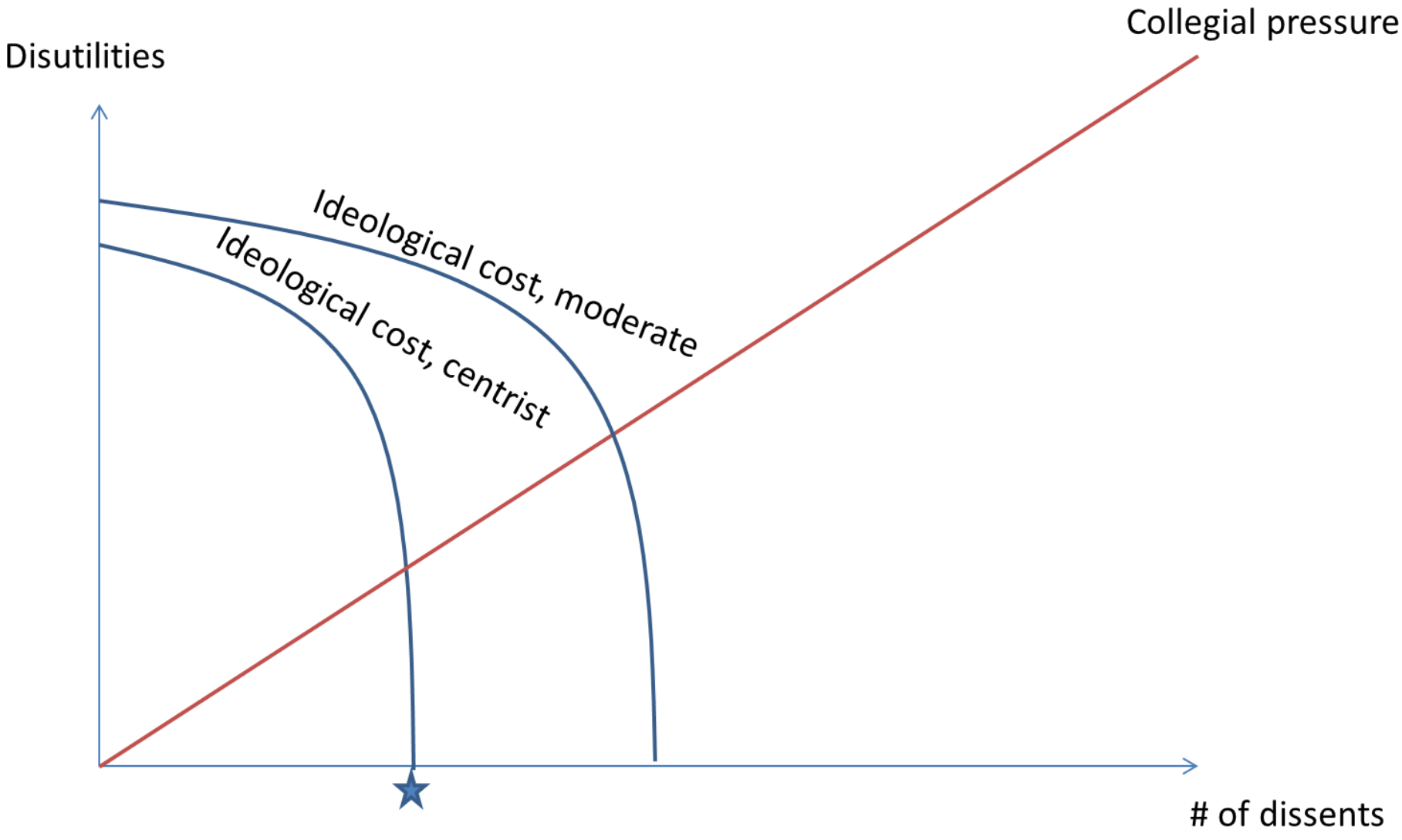
Intuition


Collegial pressure
Disutilities
Ideological cost, centrist
# of dissents

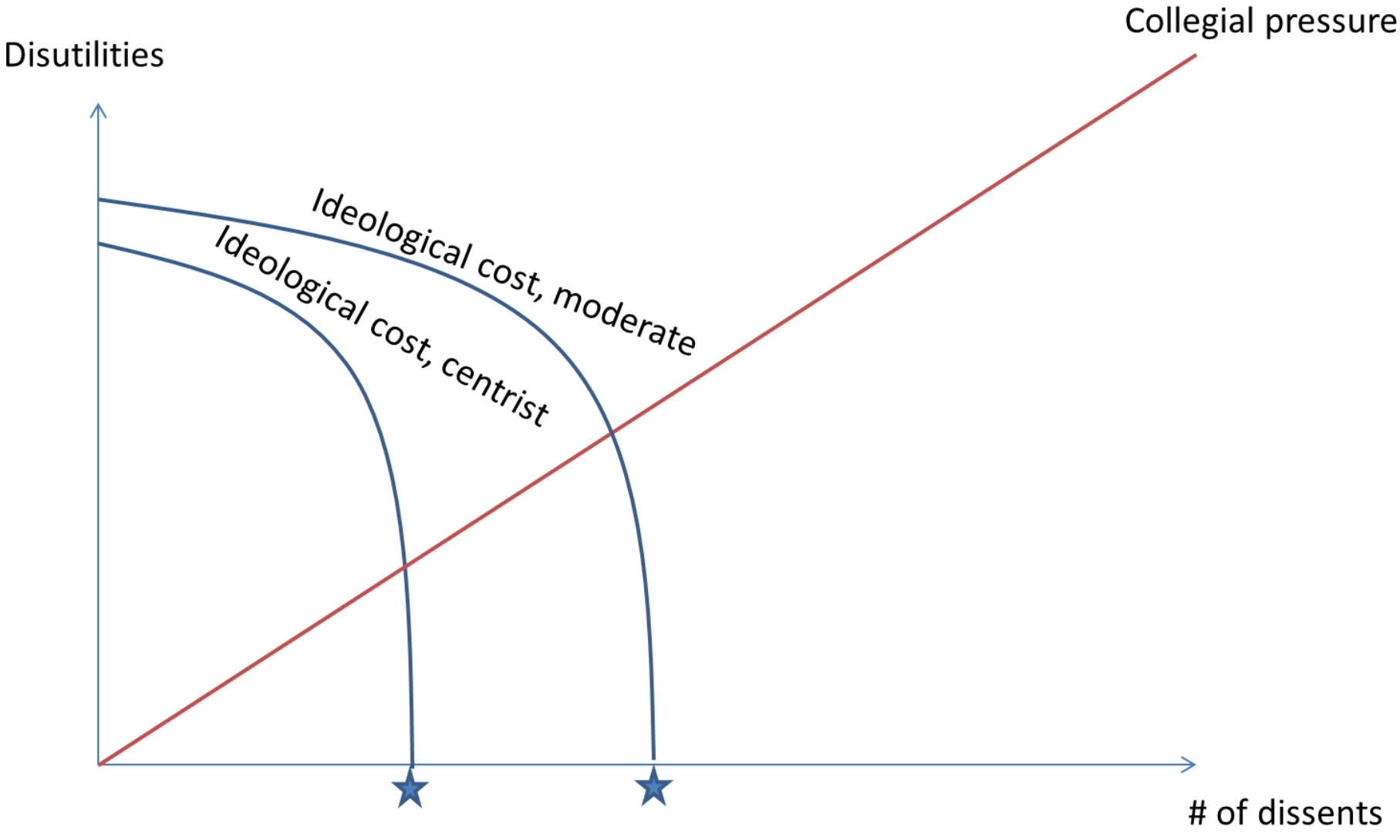
Intuition


Collegial pressure
Disutilities
Ideological cost, centrist
# of dissents

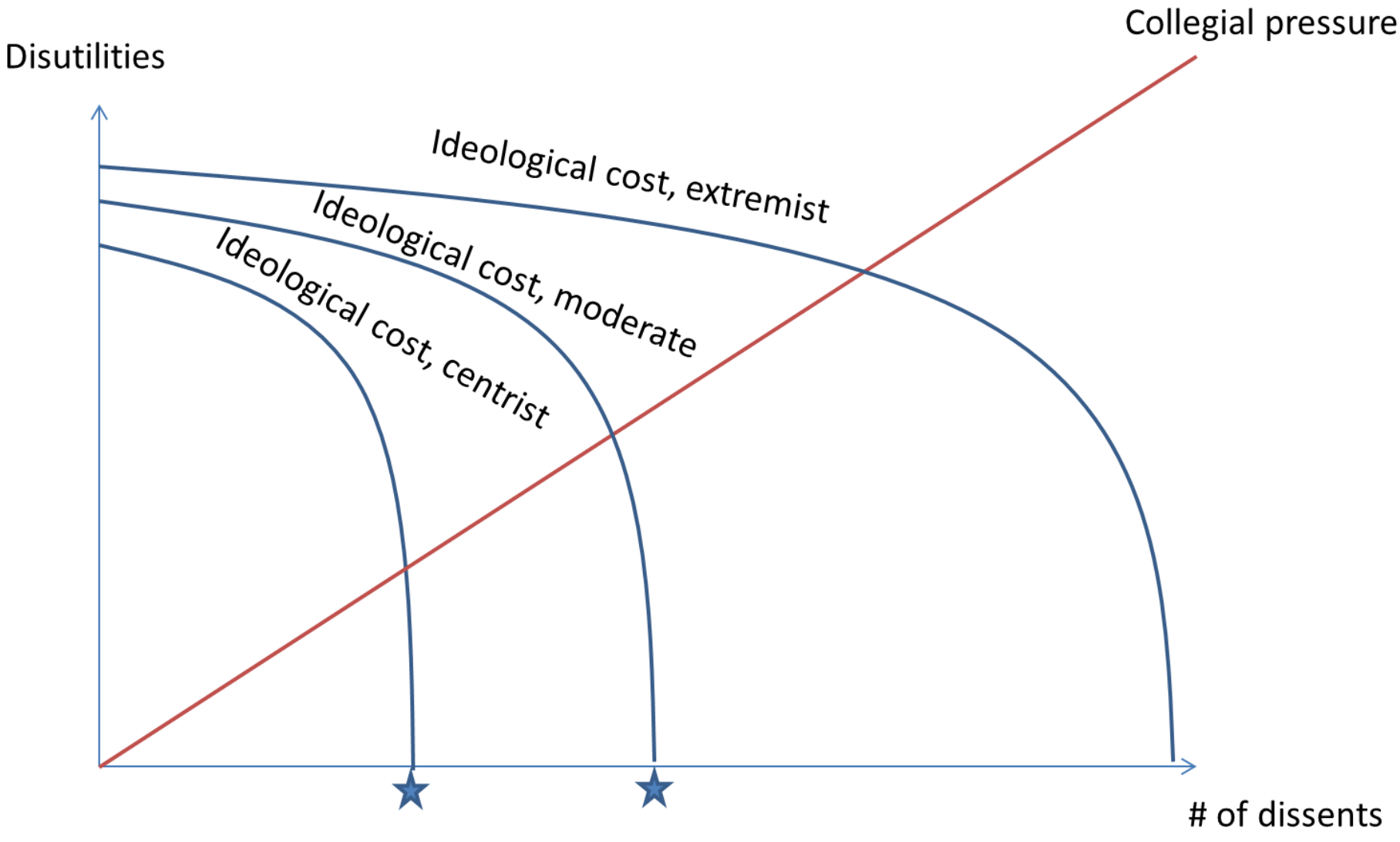
Intuition


Collegial pressure
Disutilities
Ideological cost, moderate
Ideological cost, centrist
# of dissents

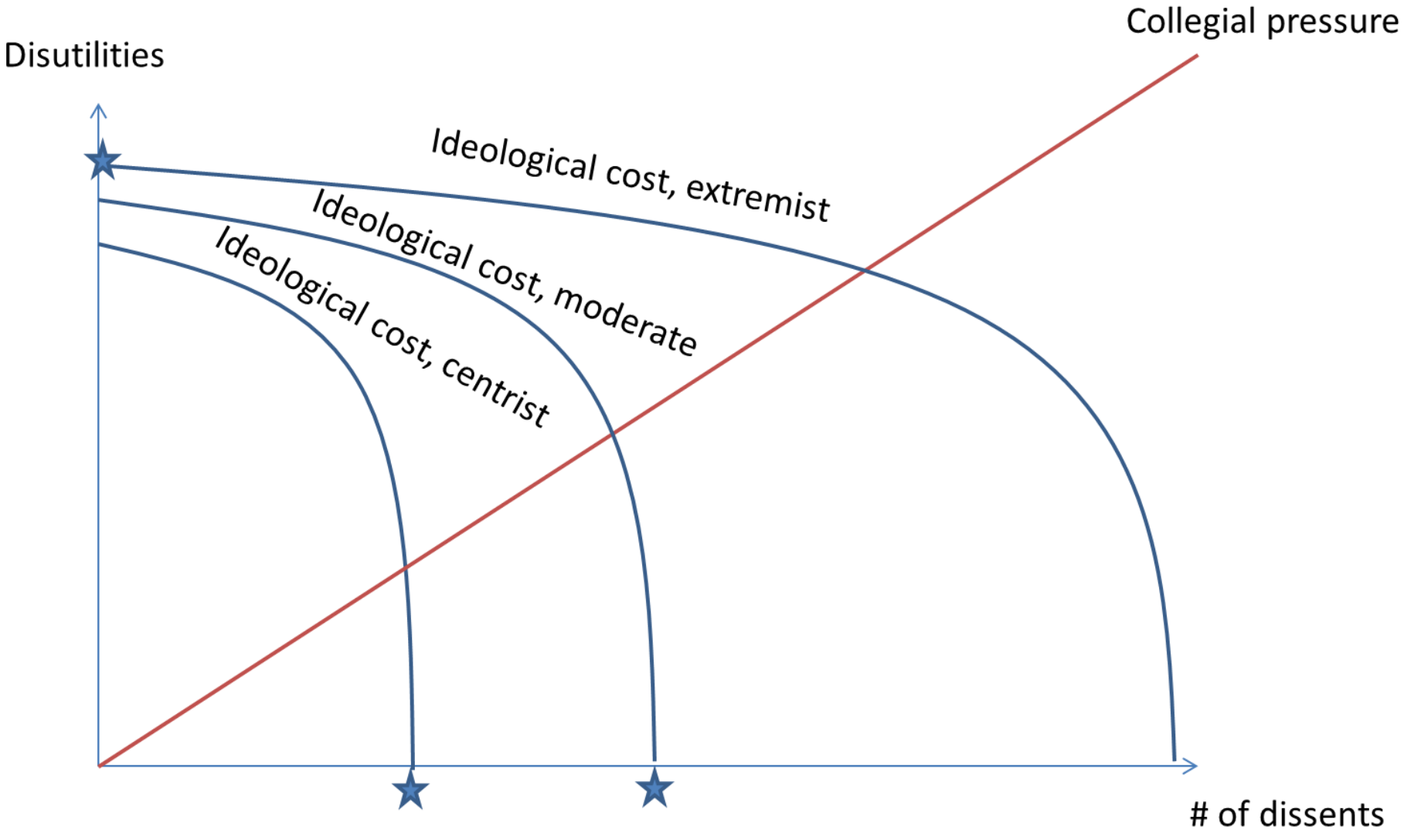
Intuition


Collegial pressure
Disutilities
Ideological cost, moderate
Ideological cost, centrist
# of dissents

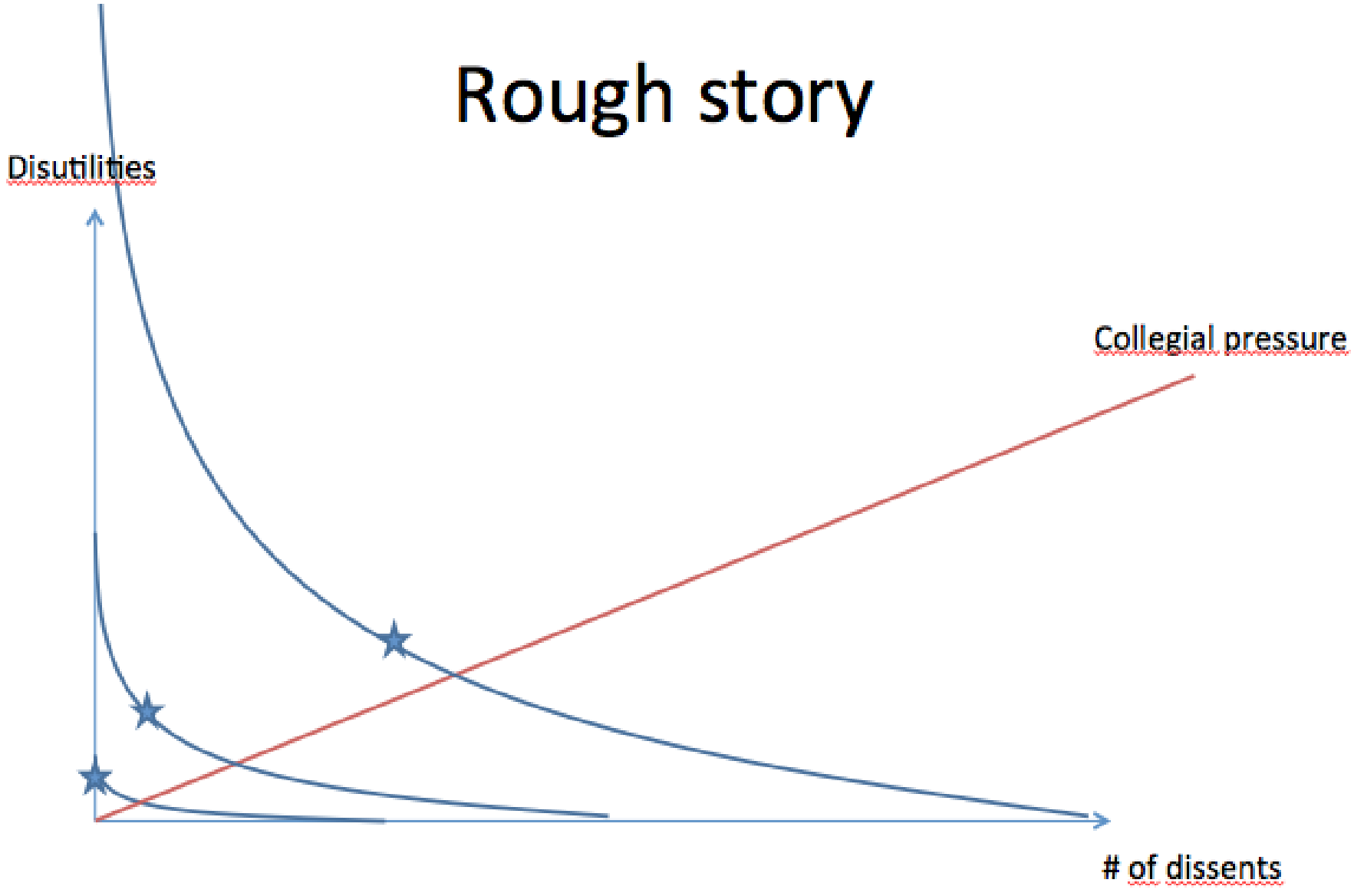
Intuition


Collegial pressure
Disutilities
Ideological cost, extremist
Ideological cost, moderate
Ideological cost, centrist
# of dissents

Intuition


Collegial pressure
Disutilities
Ideological cost, extremist
Ideological cost, moderate
Ideological cost, centrist
# of dissents

Theorem: Convex costs cannot explain spider



Alternative Theory

- Judges whistleblow to signal to Supreme Court. Extreme judges have no incentive to dissent since the Supreme Court will not overturn.
  - Decrease in cost should push peak outwards for "what the hell" and push peak inwards for whistleblowing
    - Caseload, 9/11 caseload surge, and Circuit 5 split proxy for increase in cost
  - For extremely low cost, "what the hell" predicts dissent positively correlated with distance to center and whistleblowing predicts negative correlation
    - Senior status is measure of extremely low cost

Conclusion

- Document non-monotonicity of dissents: extreme judges dissent less than others, moderate judges dissent the most
  - Can be explained by model of ideological perfectionism and collegial pressure
  - Test auxiliary model results
- Judges are sensitive to interaction with judges with distant ideologies
- But extremist judges get numb and give up on their ideology
- ◂ Concave ideological costs can explain backlash and legitimization

Further Predictions From Theory

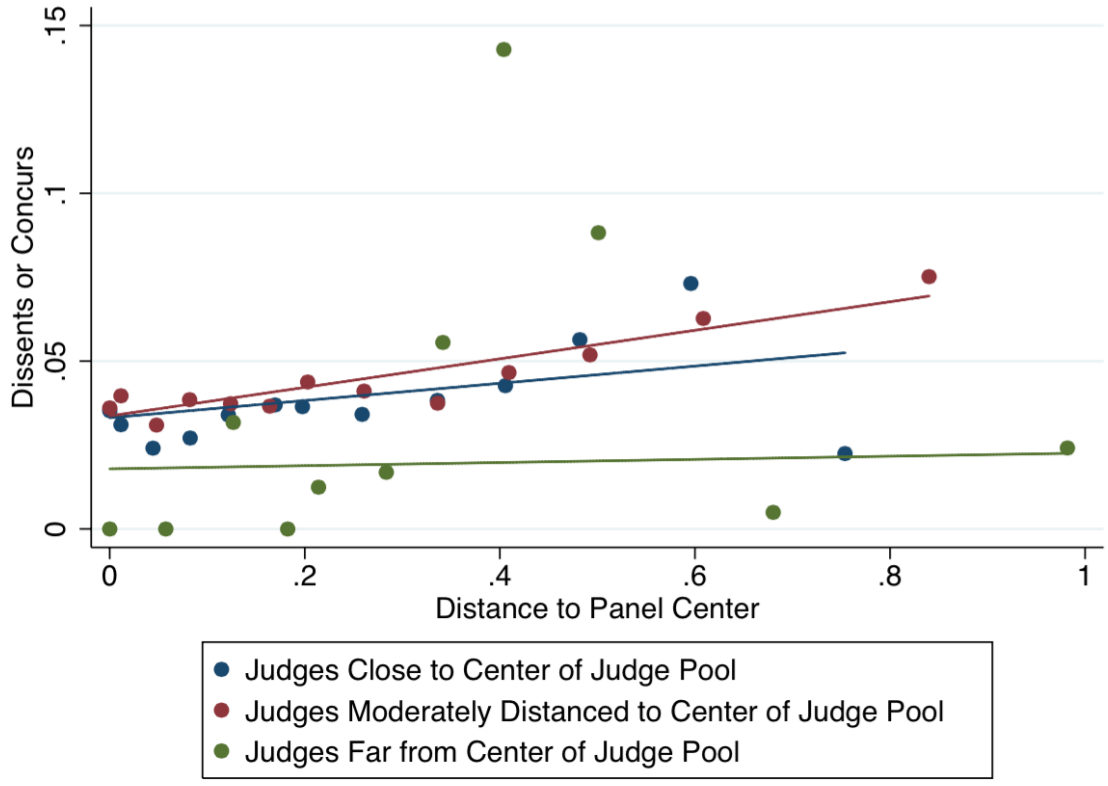
- Prediction: In all cases $v \equiv$ median judge in panel.
- Prediction: The further a judge is from panel median, the higher the probability (s)he will dissent.
- Prediction: Extreme judges sign verdicts which are more unfavorable to them than what moderate judges sign.

Does the Median Judge Decide?

	(1)
	Liberal Verdict
Score	-0.0915***
	(0.0138)
Center Judge	-0.00492***
	(0.00108)
Score * Center Judge	-0.153***
	(0.0278)
N	23031
R-sq	0.003

- Determine who in each panel has median ideology, and who among other two is closest to median and furthest from median.
- Use database of handcoded ideology (liberal=+1, conservative=-1) of each "opinion."

Extreme Judges Sign Verdicts Which Are More Unfavorable?



Polarization

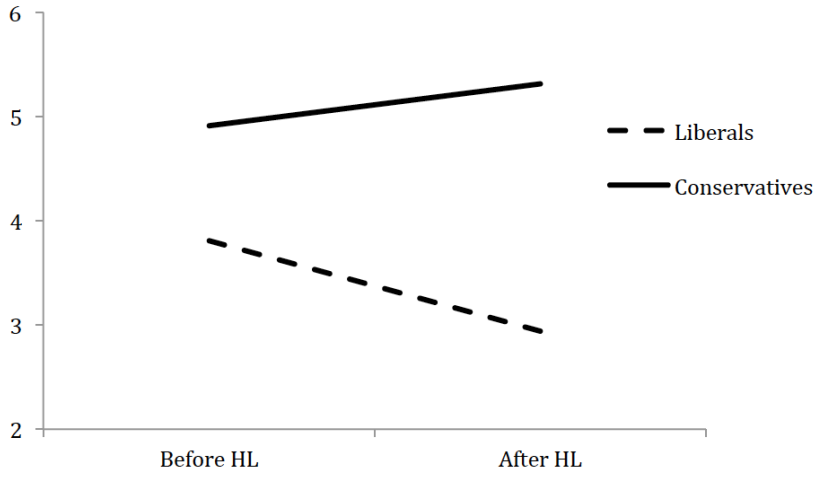


Figure 3: Liberals and conservatives views on religious liberty of closely held company before and after Hobby Lobby. The y-axis represents support for religious freedom rights: Higher scores indicate greater support for such rights

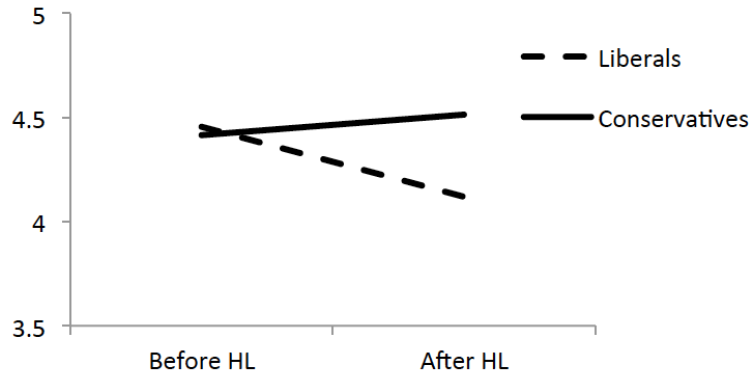
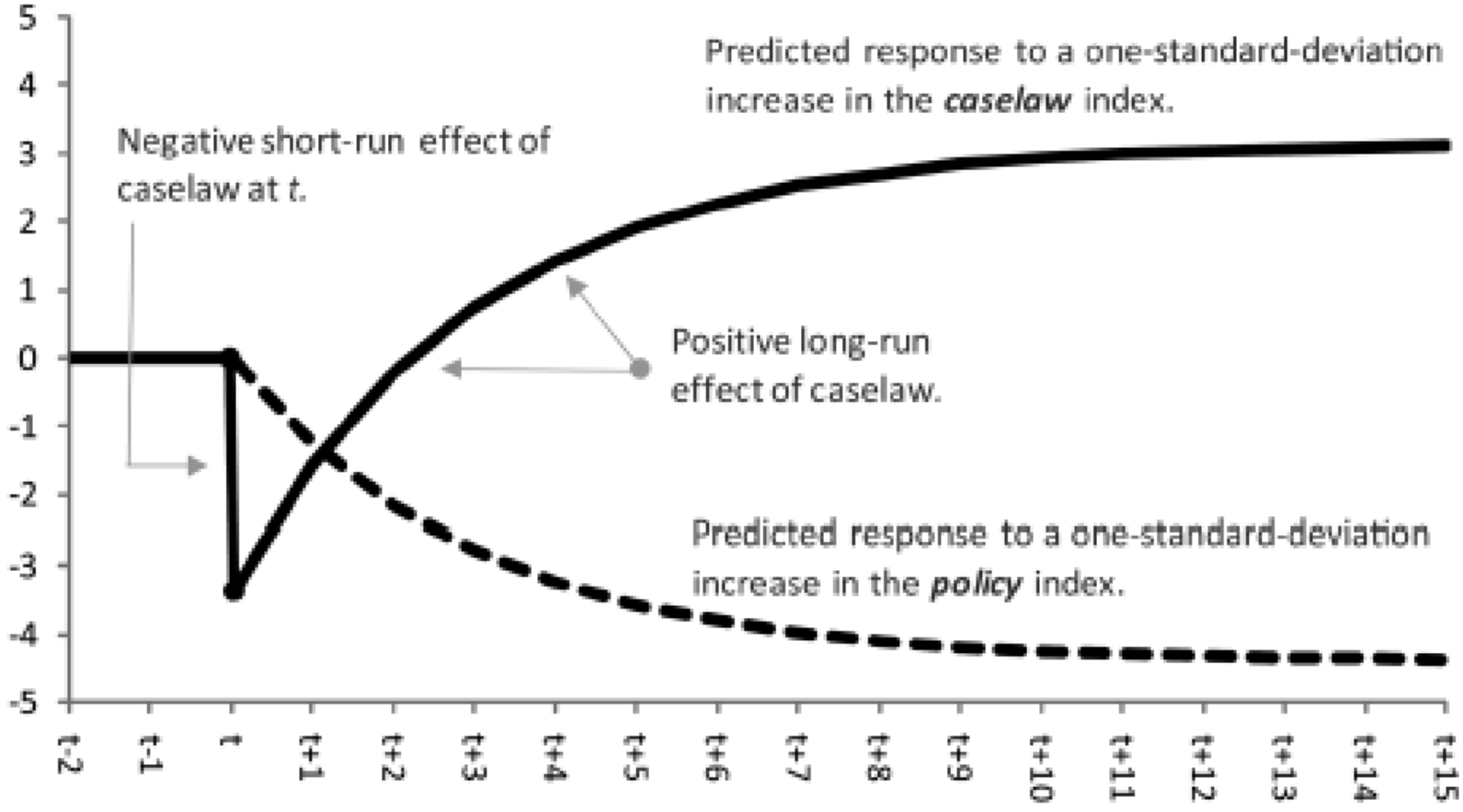


Figure 6b: Liberals' and conservatives' trust in the Supreme Court (before a after *Hobby Lobby*)

Morally repugnant decisions impact stated (and revealed) preferences

Backlash and Legitimization

FIGURE 2 Predicted Responses in Mood to One Standard Deviation Increases in Caselaw and Policy



Instantaneous backlash, then countervailing long-run effect that follows the law

Model

2 periods, actions at $t = 0$ that may result in abortion at $t = 1$

- Utility of no abortion: 0; an abortion yields: $-u_a < 0$
- After an abortion, no subsequent change to utility from additional abortions ("What the hell", concave cost to deviating from duty)
- q (laws, access to abortion, exogenous) -> $\uparrow$Pr(abortion)
- p (attitudes, donations, endogenous) -> $\downarrow$Pr(abortion)
  - $c(p) \geq 0,\ c' > 0, c'' > 0$
  - $P(q-p),\ P' > 0,\ P'' > 0$

$$\max_p \{(P(q-p))(-u_a) - c(p)\}$$

$$\max_p \{-P(q-p) - c(p)\}$$

Dynamics of Law and Norms

- If the agent has already had an abortion, $p^* = 0$
  - else, $P'(q-p) = c'(p)$
  - s_0 share of the population have not had an abortion
- Assume share of abortions in the society is at steady-state
  - $s = P(q-p)$ will have an abortion at $t = 1$
  - share α of new people enter; β exit
  - $s_0(1-s)(1-\beta)+\alpha$ is share without abortion at $t = 1$
  - A steady state obtains if:

$$s_0(1-s)(1-\beta)+\alpha = s_0$$

Equilibrium Effect of Laws

- Implicit Function Theorem yields:

$$\frac{\partial p^*(q)}{\partial q} = \frac{P''(q-p^*)}{P''(q-p^*)+c''(p^*)}$$

- Since $P'' > 0$, and $c'' > 0$:

$$0 < \frac{\partial p^*(q)}{\partial q} < 1$$

- Pro-choice decision at $t = 0$ stimulates p: initial backlash
  - Overall anti-abortion attitude is: $s_0 p$
- At $t = 1$, both p^* and s_0 will change

$$s_0 p^* = \frac{\alpha p^*}{s^* + \beta - s^*\beta} = \frac{\alpha p^*}{P(q-p^*)+\beta - P(q-p^*)\beta}$$

Backlash or Expressive?

- q increases both the numerator and the denominator

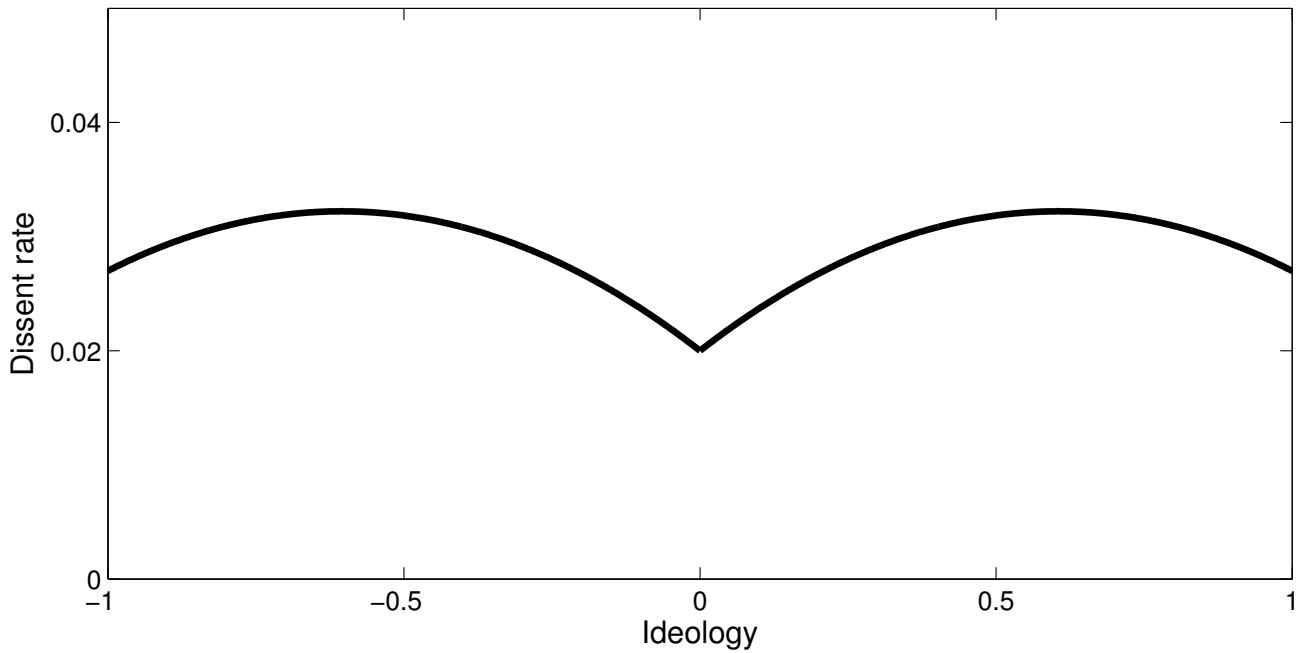
$$s_0 p^* = \frac{\alpha p^*}{P(q - p^*) + \beta - P(q - p^*)\beta}$$

  - Overall effect depends on the relative increase of p in the numerator compared to increase of $P(q - p^*)$ in the denominator
- If large increase in p^* offsets the increase in the probability of abortions, then long-term equilibrium also displays backlash
  - Otherwise, at $t = 1$, the overall effect of a pro-choice decision reduces negative attitudes, i.e. expressive
- Big q or small q?

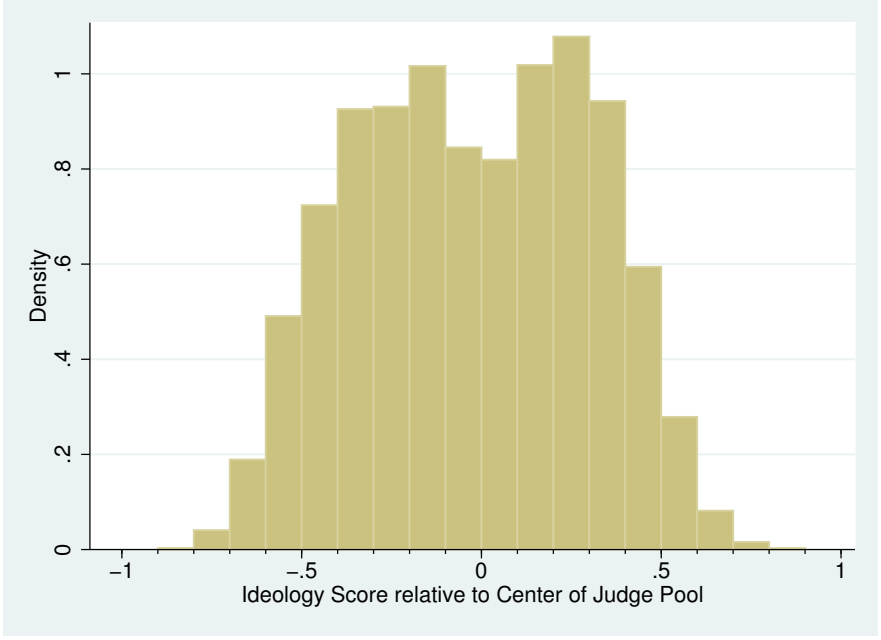
Dissent in Polynomial Distance to Expected Center

	(1)	(2)
	Dissent	Concur
Distance to Center of Judge Pool	0.0404***	0.0285***
	(0.00756)	(0.00570)
Distance^2	-0.0334***	-0.0313***
	(0.0118)	(0.00862)
Circuit Fixed Effects	Y	Y
Year Fixed Effects	Y	Y
N	10043	10043
R-sq	0.109	0.086

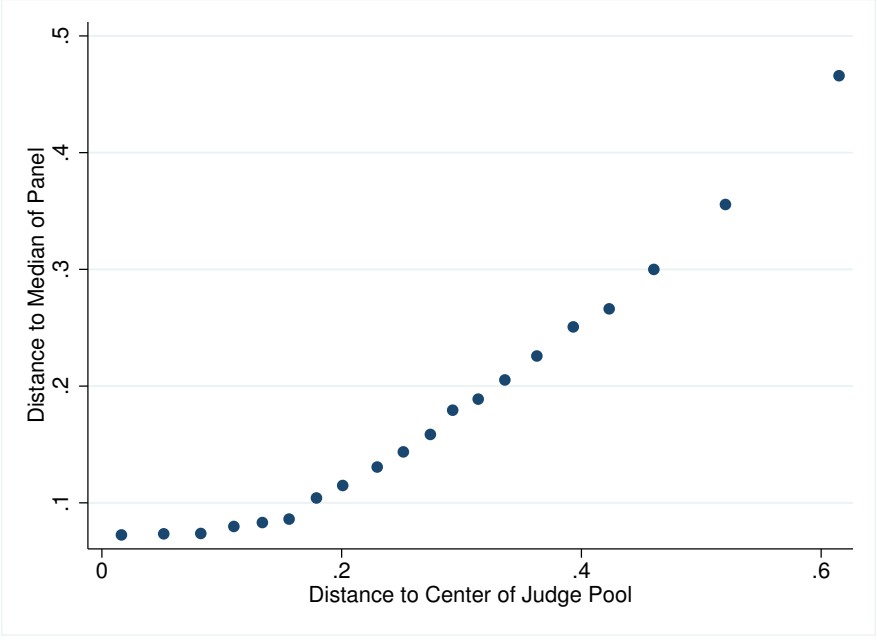
Dissent in Polynomial Distance to Expected Center



Distribution of Ideology Scores (1950-2007)



Distance to Panel Median and Distance to Center of Judge Pool



Alternative Explanations

- Do the results come from preferences?
  - No: result is driven by peer pressure
- Are extreme judges different? e.g., to signal non-bias
  - No: spider shows up mainly for relative measures of extremeness
- Do outliers explain dissent (and concurrence) spider?
  - No: would need low dissent rates for outliers, and dissent rate is bounded by zero
- Convex peer pressure and linear D?
- Is it mechanical that the presence of extreme judges requires large variance in scores?
  - No: there non-monotonicity in the spider

Alternative Explanations

- Extremists dissent less since they want to hide their private (extremist) type. Judges feel collegial pressure for their private views and not for their behavior – i.e. judges try to hide their private preferences from each other.
    - Judges know each other well; still requires a concave D
- Extremist judges think that if the verdict equals their (extremist) type then nobody will take the verdict seriously anyway – it's precedential power will be weak.
    - Requires that the ones who are supposed to cite the verdict have concave costs of deviating from it. If they had convex costs of deviating from a precedent then an extremist would always like extreme verdicts that set precedent.
- Are moderate and centrist judges who happen to sit in a panel with two extremists being backed up by others on the circuit?
    - Does the peer pressure function increase with how extreme you are?

Model

- Bell-shaped continuous distribution of judge types (t between -1 and +1)
- Continuum of cases, three judges picked randomly for each case
- Each judge foresees all cases she will sit in (alt: cases are decided upon simulatenously).
- For verdict $v \in R$, judge feels an outer disutility of $O(|v-t|)$, O is increasing fn
- Judge feels an inner disutility D which is increasing in the cumulative unfavorable verdicts s/he has signed ($s(v)=1$):

$$D = D(\int_v |t-v| g(v) s(v) dv)$$

- For each dissent ($s(v)=0$) judge feels collegial pressure W

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$$D = D(\int_v |t - v| g(v) s(v) dv)$$

- For each dissent ($s(v) = 0$) judge feels collegial pressure W

Model

- Bell-shaped continuous distribution of judge types (t between -1 and +1)
- Continuum of cases, three judges picked randomly for each case
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Timing within Case

1. The three judges suggest and vote about verdict.
2. Each judge decides whether to sign or not.
3. Disutility is applied

$$L = \int_v O(|v-t|)g(v|t)dv$$

$$+D(\int_v (|t-v|)g(v)s(v)dv)$$

$$+W\int_v (1-s(v))g(v|t)dv$$

Voting Procedure and Outcome

- Each of the three judges suggests a verdict.
- Condorcet winner determines final verdict v.
- Since L is increasing in $|v - t|$:

Lemma (prediction): In all cases $v = t_m \equiv$ median type

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To Sign or Not to Sign

- After v has been determined, outer disutility plays no role in decision making.

$$+D(\int_v |t-v|g(v)s(v)dv)$$

$$+W\int_v(1-s(v))g(v|t)dv$$

To Sign or Not to Sign

- Problem can be rewritten so:
- *Lemma (prediction): Each judge chooses a cutoff verdict distance, c: if verdict is beyond then dissent, if verdict is closer then sign.*
- Probability of dissent

$$P(t,c) = Pr(v < t-c) + Pr(v > t+c)$$

$$= Pr(t_m < t-c) + Pr(t_m > t+c)$$

- For given c, $P(t,c)$ increasing with extremeness $|t|$.
- (For spider we need $P(t,c)$ to decrease(!) to fall for large $|t|$.)
- Hence, necessary condition for $P(t,c(t))$ to fall in $|t|$ is for $c(t)$ to increase in $|t|$:
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What the Spider Needs

Lemma: If D is linear or convex then $c(t)$ is (weakly) decreasing in $|t|$ and hence $P(t, c(t))$ is increasing in $|t|$.

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What Suffices for the Spider

- Suppose D is a step function
- Then signing any one $v \neq t$ gives same ideological cost as signing many $v \neq t$.
- Meanwhile, collegial cost is increasing in dissent.
- If you sign once, then sign always!
- If you dissent, then dissent any time t$\neq$tm.

$$P(t) = \begin{cases} \Pr(t \neq t_m) & \text{if } |t| < t_{\text{cutoff}} \\ 0 & \text{if } |t| \geq t_{\text{cutoff}} \end{cases}$$

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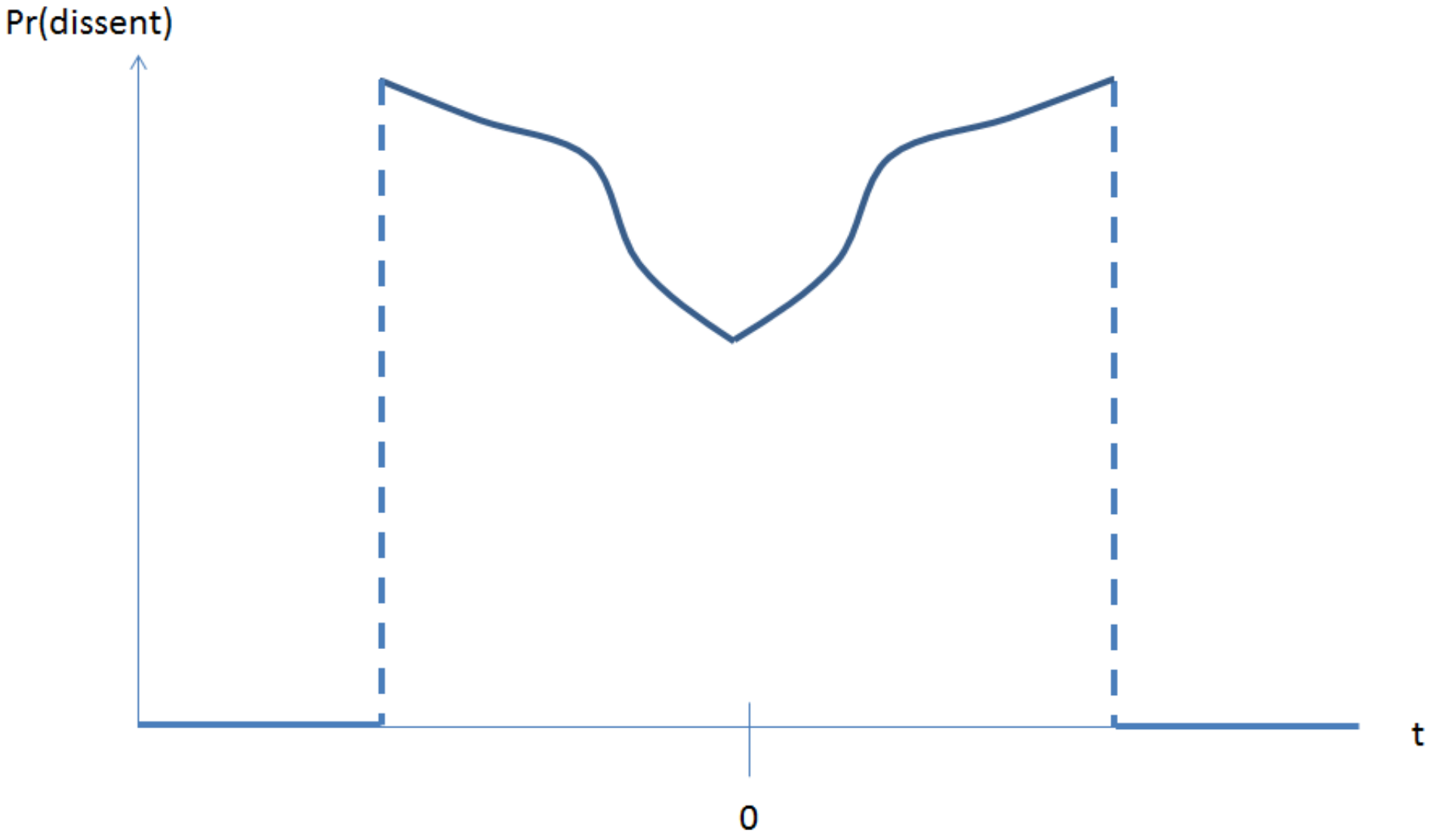
The Fixed Cost Spider



Empirical Prediction: Are Extreme Judges, More Than Others, Signing Verdicts Which Are More Unfavorable?

$$\text{Prob(dissent or concur)} = a + b_1 abs(t) + b_2 abs(t)^2$$

$$+ b_3 abs(t - t_m) + b_4 abs(t - t_m) abs(t)$$

$$+ b_5 abs(t - t_m) abs(t)^2$$

- Cutoff verdict increasing when judges become extreme: $b_5 < 0$
- b_3, b_4, b_5 together such that Pr(dissent) increases in distance from t to *panel* median: judges dissent against unfavorable verdicts

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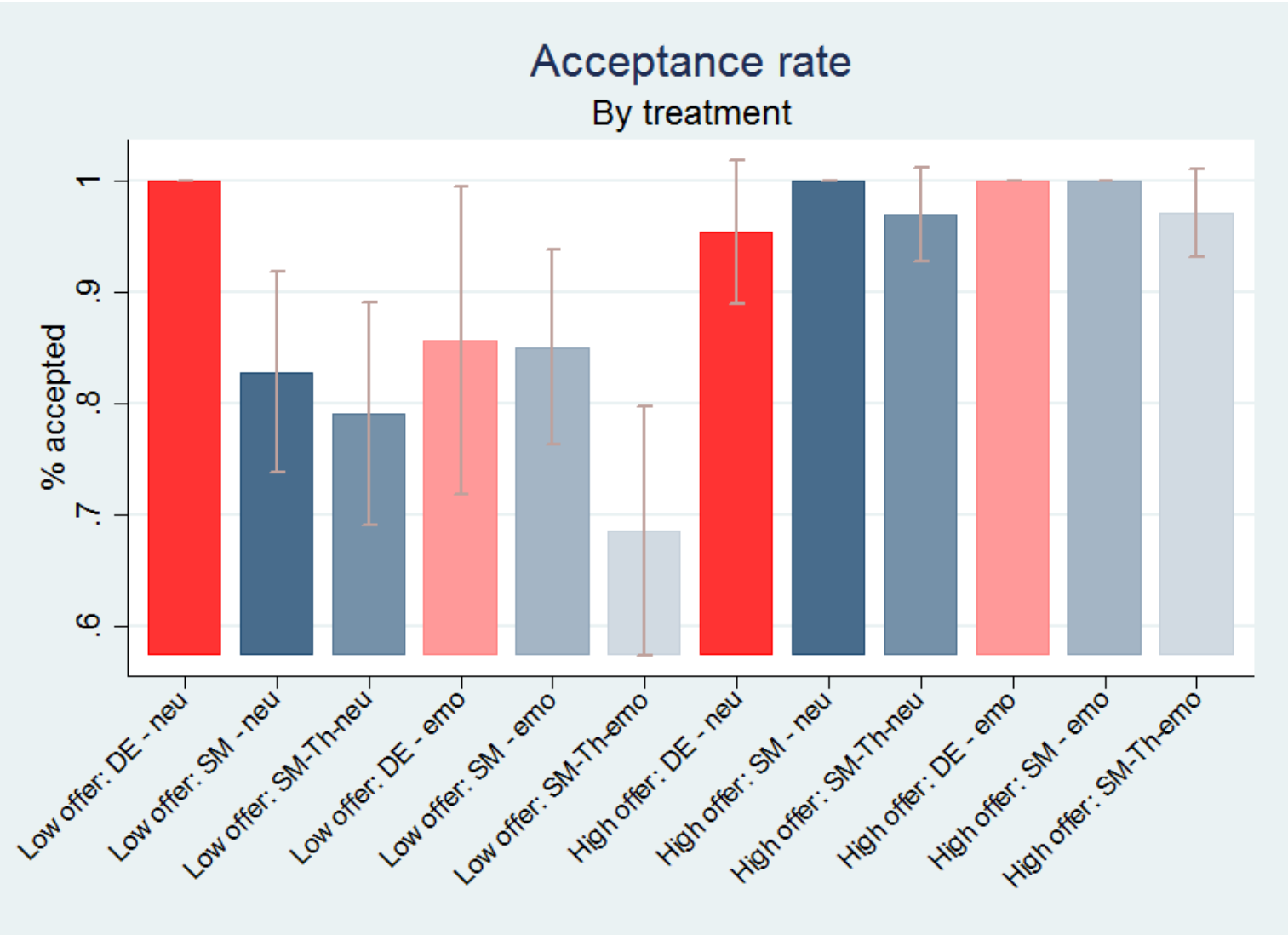
Dissents and Concurrences vs. Distance to Median of Judge Panel (1950 - 2007)

	(1)
	Dissents or Concurs
Distance to Center of Judge Pool	0.0180
	(0.0225)
Distance to Center of Judge Pool^2	-0.0403
	(0.0389)
Distance to Median of Panel	-0.00335
	(0.00892)
Distance to Median of Panel *	0.244***
Distance to Center of Judge Pool	(0.0572)
Distance to Median of Panel *	-0.287**
Distance to Center of Judge Pool^2	(0.103)
Circuit Fixed Effects	Y
Year Fixed Effects	Y
N	509022
R-sq	0.008

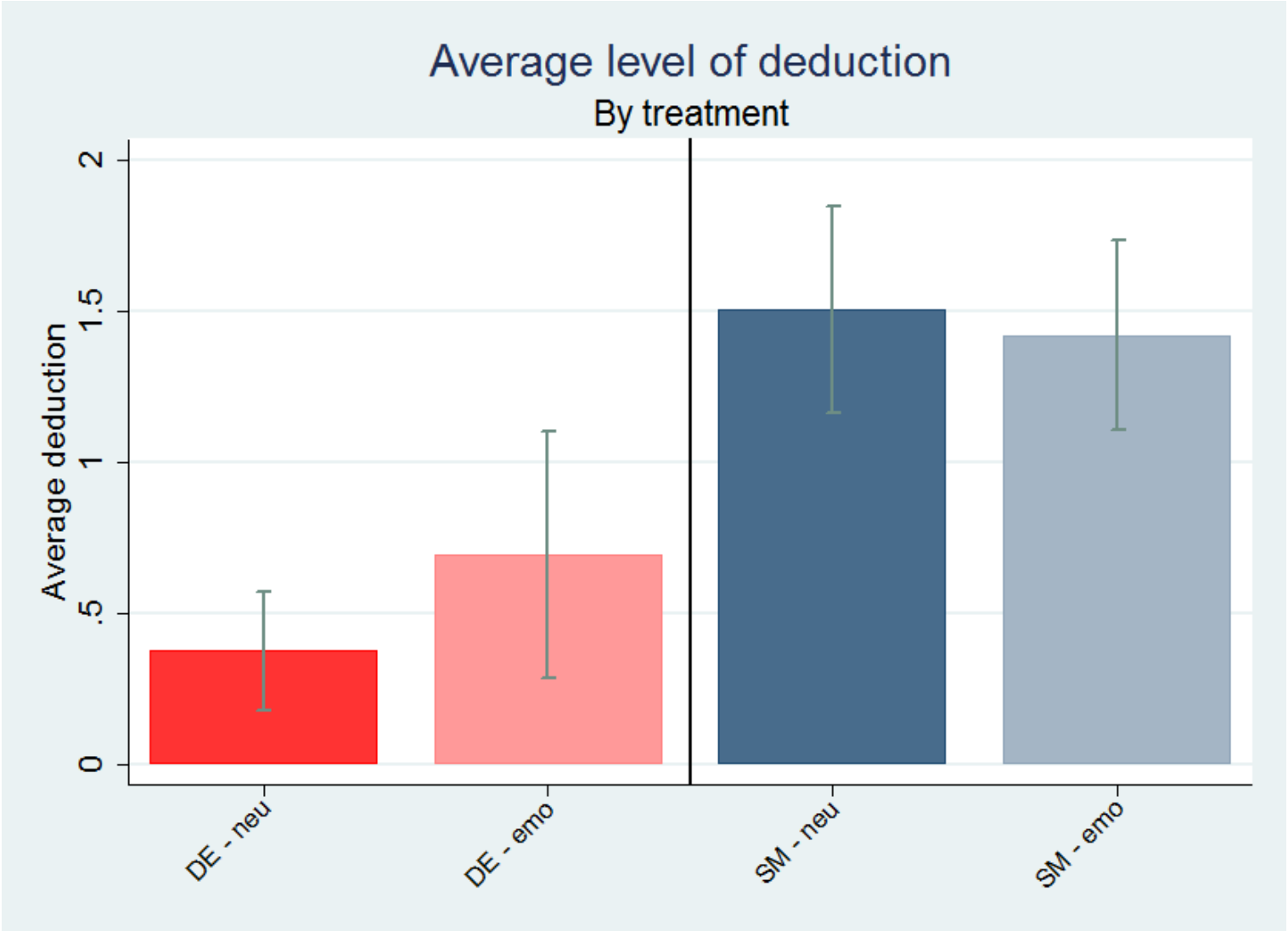
Ultimatum Game (DE vs. SM x Emo vs. Neu)



- Concern: strategy/threshold provides far more data at offer levels that are off the equilibrium or rare.
- Focusing on the sample of frequent offers that are 40 or 50% (these offers occur over 80% of the time)
- Responder acceptance rates of low offers still diverge between direct elicitation and strategy/threshold. Emotions reduce further the willingness for Responders to accept low offers in the threshold setting.

◂ UG

3-Player Prisoner's Dilemma



The strategy method increased deductions and did so primarily in the neutral setting; similar results when controlling for first stage outcome or restricting to specific first stage outcomes ◂ 3PD

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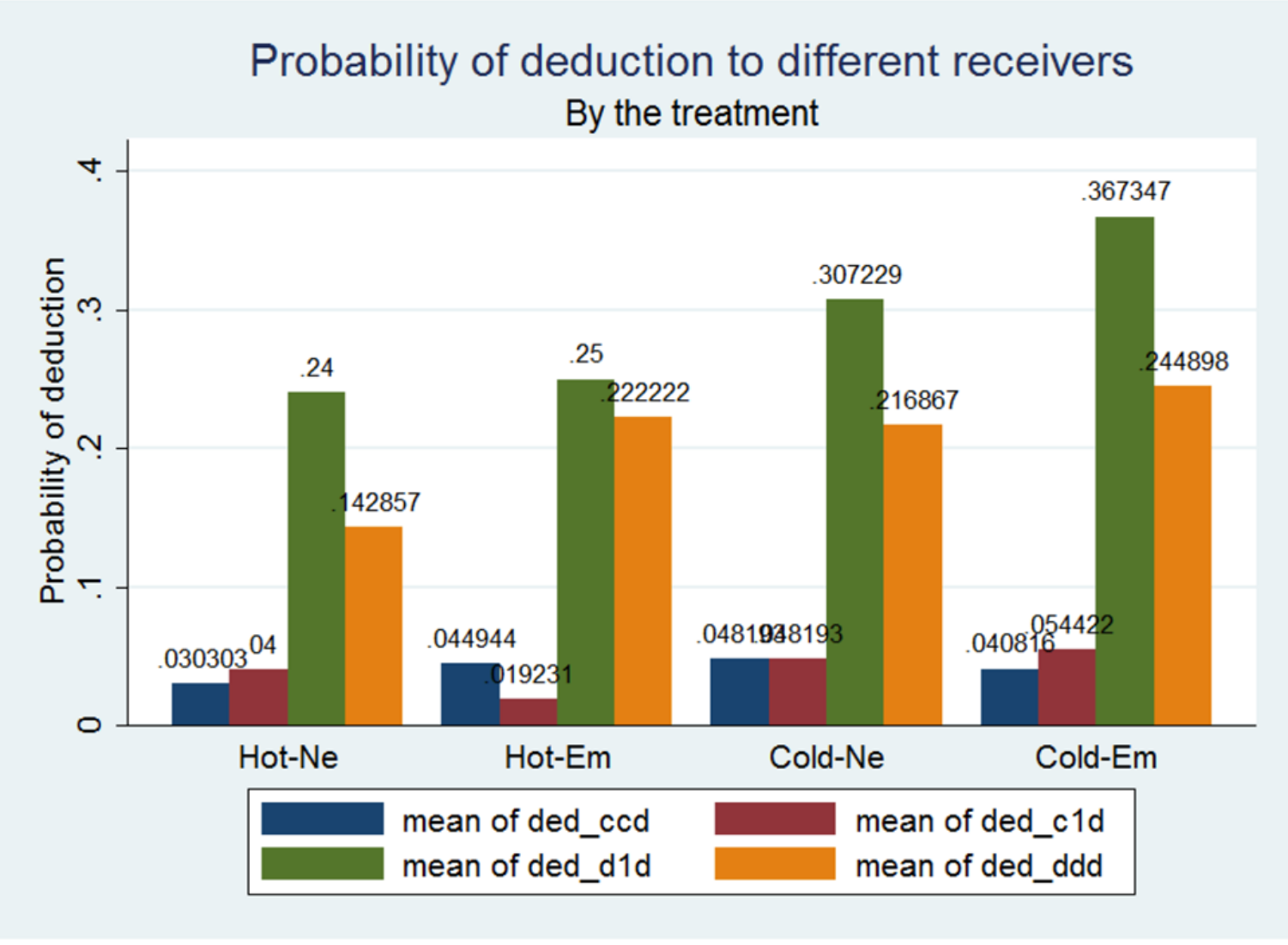

Deductions for D1 in hot and cold settings are differentially affected by emotional prime

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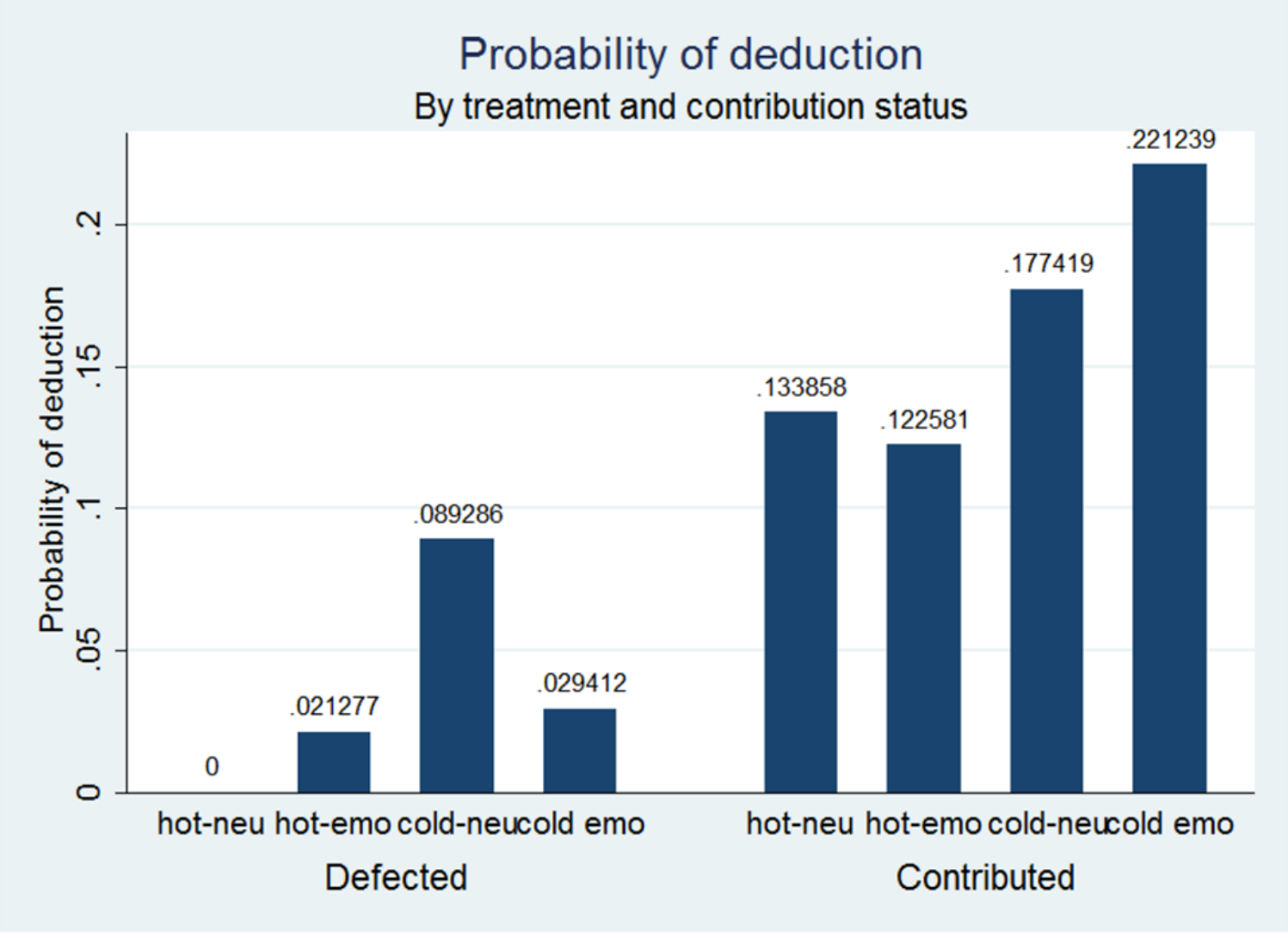

Deductions by contributors in hot vs. cold are differentially affected by emotional prime

◂ 3PD

Sequential Contrast Effects (SCE)

Criteria for quality while judging the current case may be higher if the previous case was particularly high quality (Bhargava and Fisman, 2012)

$$Y_{it} = \beta_0 + \beta_1 Y_{i,t-1} + \beta_2 Quality_{i,t-1} + Controls + \varepsilon_{it}$$

If SCE causes negatively autocorrelated decisions, we expect $\beta_2 < 0$

- Controlling for discrete decision $Y_{i,t-1}$, decision-makers should be more likely to reject the current case if the previous case was of very high quality, as measured continuously using $Quality_{i,t-1}$

Asylum Judges: Sequential Contrast Effects

	Grant Asylum Dummy	
	(1)	(2)
Lag grant	-0.0356***	-0.0352***
	(0.00788)	(0.00785)
Lag case quality	0.00691*	0.00520
	(0.00385)	(0.00360)
p-value lag case quality < 0	0.0367	0.0751
Quality Measure	1	2
N	23981	23973
R^2	0.228	0.228

- Case quality is predicted using a regression of asylum decisions on applicant characteristics

◂ Abbreviated Results

Quotas and/or Learning

Judges, loan officers (in field experiment), and umpires do not face explicit quotas or targets, but may self-impose these

We control for the fraction of the previous 2-10 decisions that were 1's

- Conditional on this fraction, the most recent decision still negatively predicts the next decision
- Unlikely to be explained by quotas/learning unless unless agents can't remember beyond the most recent decision
- Agents are highly experienced, and quality bar is given in baseball

◂ Abbreviated Results

Concerns about External Perceptions

Decision-maker is rational but judged by others who suffer from the gambler's fallacy

- This is broadly consistent with our hypothesis and would be an interesting question for follow-up research
- Not likely to be a strong factor in the loan officers experiment where they are paid for accuracy
- Asylum judges typically serve until retirement, are paid fixed salary, and can discriminate by nationality of asylum applicant
- Negative autocorrelation in umpire calls does not vary dramatically by game attendance or leverage

◂ Abbreviated Results

Fraction of Decisions Altered by Gambler's Fallacy

Simple regression

$$Y_{it} = \beta_0 + \beta_1 Y_{i,t-1} + \varepsilon_{it}$$

Base rate of affirmatives

$$\alpha \equiv P(Y = 1) = \frac{\beta_0}{1 - \beta_1}$$

Fraction of decisions altered ◂ Abbreviated Results

$$(\beta_0 - \alpha) \cdot P(Y_{i,t-1} = 0) + (\alpha - (\beta_0 + \beta_1)) \cdot P(Y_{i,t-1} = 1)$$

$$= 2\beta_1 \alpha (1 - \alpha)$$

Asylum Judges: First-in-First-Out

FIFO can be violated if asylum applicant claims work hardship, files additional applications, etc.

- Assume these violations of FIFO, which are driven by applicant behaviors, are not negatively correlated with the previous decision
- Asylum judges scheduling system usually picks the next available date

- We estimate the "quality" of each case by regressing grant decisions on case characteristics and using the predicted grant outcomes
  - Predicted case quality is positively autocorrelated
- Previous grant or deny decisions do not significantly predict whether the next case has a written decision, remote hearing, or non-decision

Asylum Judges: Ordering of Case Quality

	Lawyer Dummy	Lawyer Quality	Size of Family
	(1)	(2)	(3)
Lag grant	-0.0000772	-0.00117	-0.00927
	(0.00258)	(0.00293)	(0.0104)
N	23,990	19,737	23,990
R^2	0.0858	0.451	0.159

- A previous grant decision does not predict that the next case will be lower in observed quality measures
- ◂ Asylum Background

Asylum Judges: Summary Statistics

	Mean	Median	S.D.
Number of judges	357		
Number of courts	45		
Years since appointment	8.41	8	6.06
Daily caseload of judge	1.89	2	0.84
Family size	1.21	1	0.64
Grant indicator	0.29		
Non-extreme indicator	0.54		
Moderate indicator	0.25		
Lawyer indicator	0.939		
Defensive indicator	0.437		
Morning indicator	0.47		
Lunchtime indicator	0.38		
Afternoon indicator	0.15		