Government 2005: Formal Political Theory I

Lecture 13

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Tales from the Lab

- Experiments in social sciences
- Behavioral game theory
- Two applications:
  1. Property rights in ultimatum and dictator games
  2. Evolution of cooperation in repeated games
- Lab vs field experiments

Experiments in social sciences

Do they make sense?

"unfortunately, we can seldom test particular predictions in the social sciences by experiments explicitly designed to eliminate what are judged to be the most important disturbing influences." M. Friedman (1953) "The Methodology of Positive Economics".

"It is rarely, if ever, possible to conduct controlled experiments with the economy. Thus economics must be a non-laboratory science." R. Lipsey (1979), An Introduction to Positive Economics Fifth Edition.

".... social scientists rarely, if ever, are in a position to repeat any experiment; we typically take the data as given and, in many applications, are not even in a position to isolate phenomenon under consideration from the general economic environment." J. Darnell and J. Lynne Evans (1990), The Limits of Econometrics.

Experiments in social sciences (contd.)

A little bit of (selected) history

* Source: Roth, A. (1995), "An Introduction to Experimental Economics," *The Handbook of Experimental Economics Vol.1*

- Thurstone (1931) experiment on indifference curves
- The Wallis-Friedman (1942) critique

"It is questionable whether a subject in so artificial an experimental situation could know what choices he would make in an economic situation; not knowing, it is almost inevitable that he would, in entire good faith, systematize his answers in such a way as to produce plausible but spurious results."

"For a satisfactory experiment it is essential that the subject give actual reactions to actual stimuli. Questionnaires based on conjectural responses to hypothetical stimuli do not satisfy this requirement."

Experiments in social sciences (contd.)

A little bit of (selected) history (contd.)

- Dresher-Flood (1950s) experiments on prisoner's dilemma
- Nash (1958) comment

"The flaw in this experiment as a test of equilibrium point theory is that the experiment really amounts to having the players play one large multimove game. There is much too much interaction, which is obvious in the results of the experiment. Viewing it as a multimove game a strategy is a complete program of action."

"It is really striking, however, how inefficient Row and Column were in obtaining the rewards. One would have thought them more rational."

"If this experiment were conducted with various different players rotating the competition and with no information given to a player of what choices the others have been making until the end of all the trials, then the experimental results would have been quite different."

Experiments in social sciences (contd.)

A little bit of (selected) history (contd.)

- Schelling (1957) on focal points

Experiment 1: You and your partner (rival) are to be given $100 if you can agree on how do divide it without communicating. Each of you is to write the amount of his claim on a sheet of paper; and if the two claims add to no more than $100, each gets exactly what he claimed. If the two claims exceed $100, neither of you gets anything

Experiment 2: You and your two partners (or rivals) each have one of the letters A, B, and C. Each of you is to write these three letters, A, B, C, in any order. If the order is the same, you get prizes totaling $6, of which $3 goes to the one whose letter is first on all three lists, $2 to the one whose letter is second, and $1 to the person whose letter is third. If the letters are not in identical order, none of you gets anything

- In the first, 36 out of 40 subjects chose $50
- In the second, 9 out of 12 A's, 10 out of 12 B's, and 14 out of 16 C's chose the order ABC

Experiments in social sciences (contd.)

What did we learn from early experiments?

- Bring the money
  - Experiments in which subjects' behavior determines how much they earn (unlike social psychology)
- Strict (and bilateral) interplay with theory
  - From theory to experiments, and vice versa
- The devil is in the detail
  - Non-repeated, non-symmetric, anonymous interactions
  - Relevance of framing, context, information on knowledge of the game

Experiments in social sciences (contd.)

Some examples/series

- Free-riding games
- Coordination games
- Bargaining games
- Experiments in political economy
  - Reference: Palfrey, T. (2016), "Experiments in Political Economy," *The Handbook of Experimental Economics Vol.2*

Experiments in social sciences (contd.)

Pros

- Subjects are randomly assigned to the treatment conditions (no selection bias)
- *Ceteris paribus* analysis of motivated individual agents (no endogeneity bias)
- Variables that cannot be directly observed in the field can be observed in the lab (e.g., reservation wages, anticipated versus non-anticipated money supply shocks)
- Better direct control as a substitute for complicated econometric methods
- Statistical tests are replicable under similar conditions

Experiments in social sciences (contd.)

Cons

- External validity (Campbell and Stanley, 1963): To what populations, settings, treatment variables, and measurement variables can this effect be generalized?
  - Induction problem: Behavioral regularities persist in new situations only if the relevant underlying conditions are unchanged
  - Representativity problem: Experimental subjects may or may not be representative of out-of-sample populations
- Related accusations:
  - Participants are just students
  - The stakes are small
  - The number of participants is small
  - Participants are inexperienced

Behavioral game theory

Approach

* References: Camerer, C. (1997), "Progress in Behavioral Game Theory," *Journal of Economic Perspectives*
  Rabin, M. (1998), "Psychology and Economics," *Journal of Economic Literature*

- Describe actual behavior
- Driven by empirical observation
- Middle course between over-rational equilibrium analysis and under-rational adaptive analysis
- Draw insights from psychological research

Behavioral game theory (contd.)

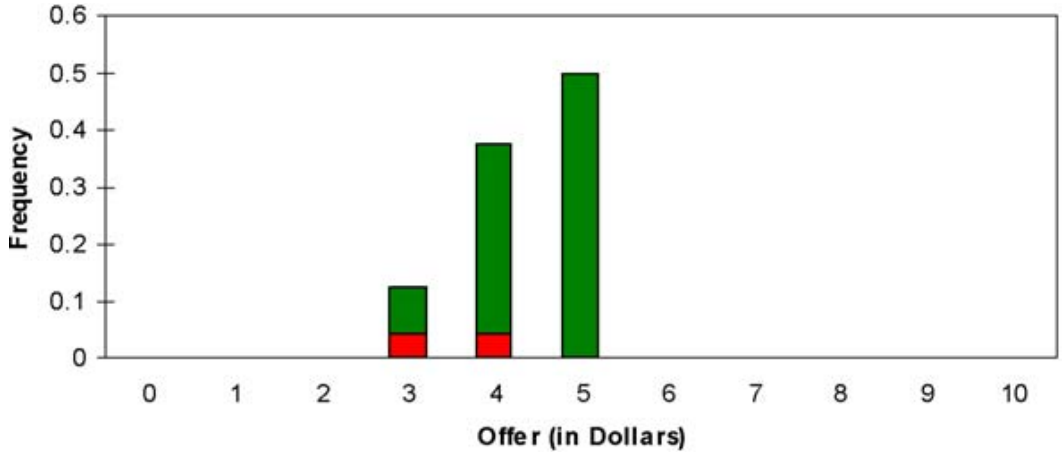
(Some) important results

- Other-regarding preferences
- Fairness equilibrium
- Loss aversion
- Cognitive biases
  - Confirmation bias
  - Overconfidence
  - Small sample bias
- Framing
- Knowledge of the game (e.g., first mover)

Property rights in ultimatum and dictator games

- Usually, in ultimatum and dictator games, participants seem to ask the question: Is this allocation fair?
- In ultimatum, more than 50% of the times, offers below 20% are rejected
- Anticipating this, usual range of offers between 40% and 50%
- In dictator, less generous but non-zero offers from 20% to 30%
- BUT perceptions on property rights matter too!
  (See Hoffman, McCabe, and Smith, Ch.47 *Handbook Vol.1*)
  - 12 subjects per session
  - Random/divide treatment: Pair is "provisionally allocated" \$10 to be split with one-shot ultimatum or dictator game
  - Contest/divide treatment: 6 first movers are chosen with general knowledge quiz
  - (Additional treatment: "seller-buyer" exchange-like framing)

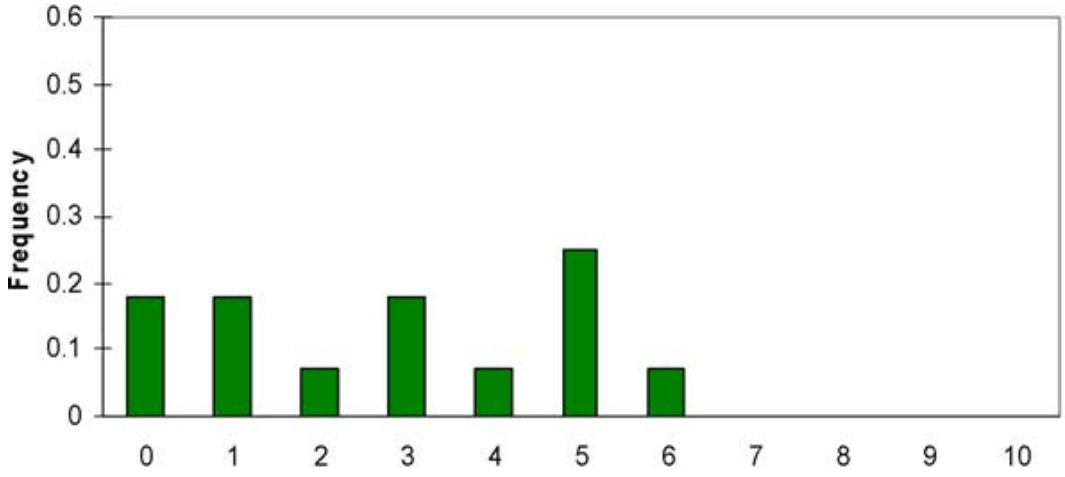
Property rights in ultimatum and dictator games (contd.)



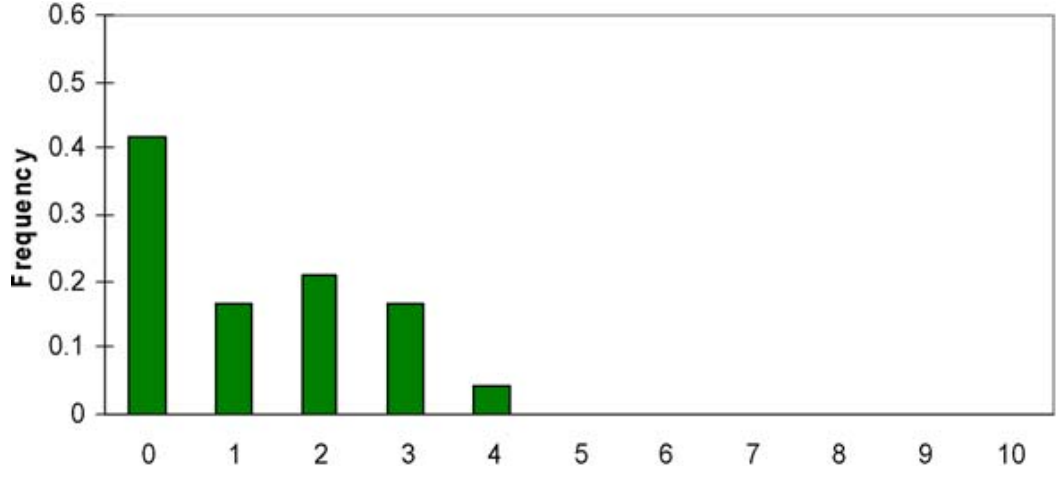
(a)

(b)

Property rights in ultimatum and dictator games (contd.)



(a)



(b)

Evolution of cooperation in repeated games

- Problem with infinitely repeated games: multiplicity of equilibria
- Dal Bo and Frechette ("The Evolution of Cooperation in Infinitely Repeated Games: Experimental Evidence," *American Economic Review*, 2011) address the issue in the lab
- They (exogenously) manipulate continuation probability and payoffs
- Each subject participates in between 23 and 77 infinitely repeated games
- Aim: To study how cooperation evolves as subjects gain experience
- Main result: Being a possible equilibrium action is a **necessary but not sufficient** condition for cooperation to arise with experience

Evolution of cooperation in repeated games (contd.)

Table 1: Stage Game Payoffs

	C	D
C	R, R	12, 50
D	50, 12	25, 25

Table 2: Cooperation as Equilibrium (SGPE) and Risk Dominant (RD) Action

	R=32	R=40	R=48
$\delta = 1/2$	Neither SGPE or RD	SGPE	SGPE and RD
$\delta = 3/4$	SGPE	SGPE and RD	SGPE and RD

Evolution of cooperation in repeated games (contd.)

- They address three questions:

1. Do subjects learn to defect when it is the only equilibrium action?
2. Do subjects learn to cooperate when it is one of the possible equilibrium action?
3. Do subjects learn to cooperate when it is risk dominant?

Evolution of cooperation in repeated games (contd.)

Table 4: Percentage of Cooperation by Equilibrium Condition and Risk Dominance

Repeated Game Begins in Interaction	First Rounds Cooperation is				All Rounds Cooperation is			
	Not SGPE	SGPE			Not SGPE	SGPE		
		All	Not RD	RD		All	Not RD	RD
1-10	28.57	39.11	31.43	46.53	21.00	34.42	23.56	42.11
11-20	13.04	28.54	20.60	36.26	12.91	27.19	18.10	35.09
21-30	12.23	31.01	14.86	44.34	11.97	33.61	13.48	45.36
31-40	10.61	36.04	14.01	51.83	10.51	38.64	14.63	52.72
41-50	10.20	34.88	14.21	53.99	7.85	34.98	13.81	53.09
51-60	9.75	41.47	18.51	57.47	6.54	39.85	16.32	61.30
61-70	7.14	37.89	17.54	48.98	8.09	40.02	19.21	54.44
71-80	5.65	36.86	20.32	50.00	4.48	39.73	19.10	55.99
81-90	4.72	38.60	20.57	58.42	6.20	44.39	20.75	60.89
91-100	6.11	40.91	22.01	54.88	7.91	47.11	19.28	66.45
101-110	6.64	45.38	17.93	67.62	11.99	46.12	19.50	66.92
111-120	5.50	49.77	22.46	70.61	6.45	55.88	22.60	73.86
121-130	5.77	45.95	21.03	62.05	11.11	43.31	21.99	59.60
131-140	8.33	47.43	30.70	59.49	9.17	42.99	26.23	61.40
141-		46.32	23.86	65.69		47.83	16.57	76.82

Evolution of cooperation in repeated games (contd.)

Table 7: Estimation of Strategies Used

	δ=1/2			δ=3/4		
	R = 32	R = 40	R = 48	R = 32	R = 40	R = 48
AD	0.920***	0.783***	0.533***	0.648***	0.109	0.000
	(0.085)	(0.074)	(0.109)	(0.119)	(0.096)	(0.000)
AC	0.000	0.078	0.072	0.000	0.296**	0.079
	(0.000)	(0.059)	(0.046)	(0.000)	(0.123)	(0.085)
G	0.000	0.040	0.000	0.000	0.267	0.116
	(0.000)	(0.040)	(0.000)	(0.024)	(0.202)	(0.195)
TFT	0.080	0.098	0.376***	0.352***	0.327*	0.561***
	(0.085)	(0.070)	(0.112)	(0.115)	(0.186)	(0.185)
WSLS	0.000	0.000	0.019	0.000	0.000	0.000
	(0.000)	(0.007)	(0.026)	(0.000)	(0.000)	(0.000)
T2	0.000	0.000	0.000	0.000	0.000	0.244
Gamma	0.362***	0.541	0.428***	0.447***	0.435***	0.287***
	(0.098)	(1.077)	(0.061)	(0.053)	(0.126)	(0.061)

Bootstrapped standard errors in parenthesis.

Lab vs field experiments

* Reference: Levitt, S.D. and List, J.A. (2007), "What Do Laboratory Experiments Measuring Social Preferences Reveal About the Real World?" *Journal of Economic Perspectives*

- Note the original title of the paper: "What Do Laboratory Experiments Tell Us About the Real World?"
- Thesis: Human behavior may be sensitive to a variety of factors that systematically vary between the lab and the real world (this may be true also in field experiment, though)
- Model: Besides monetary calculations, human decisions are influenced by
  - Whether actions are scrutinized by others
  - Context in which a decision is embedded
  - Self-selection of individuals making the decision
- Final take home: Lab and field experiments as complements more than substitutes