How Theory Can Inform Experiments

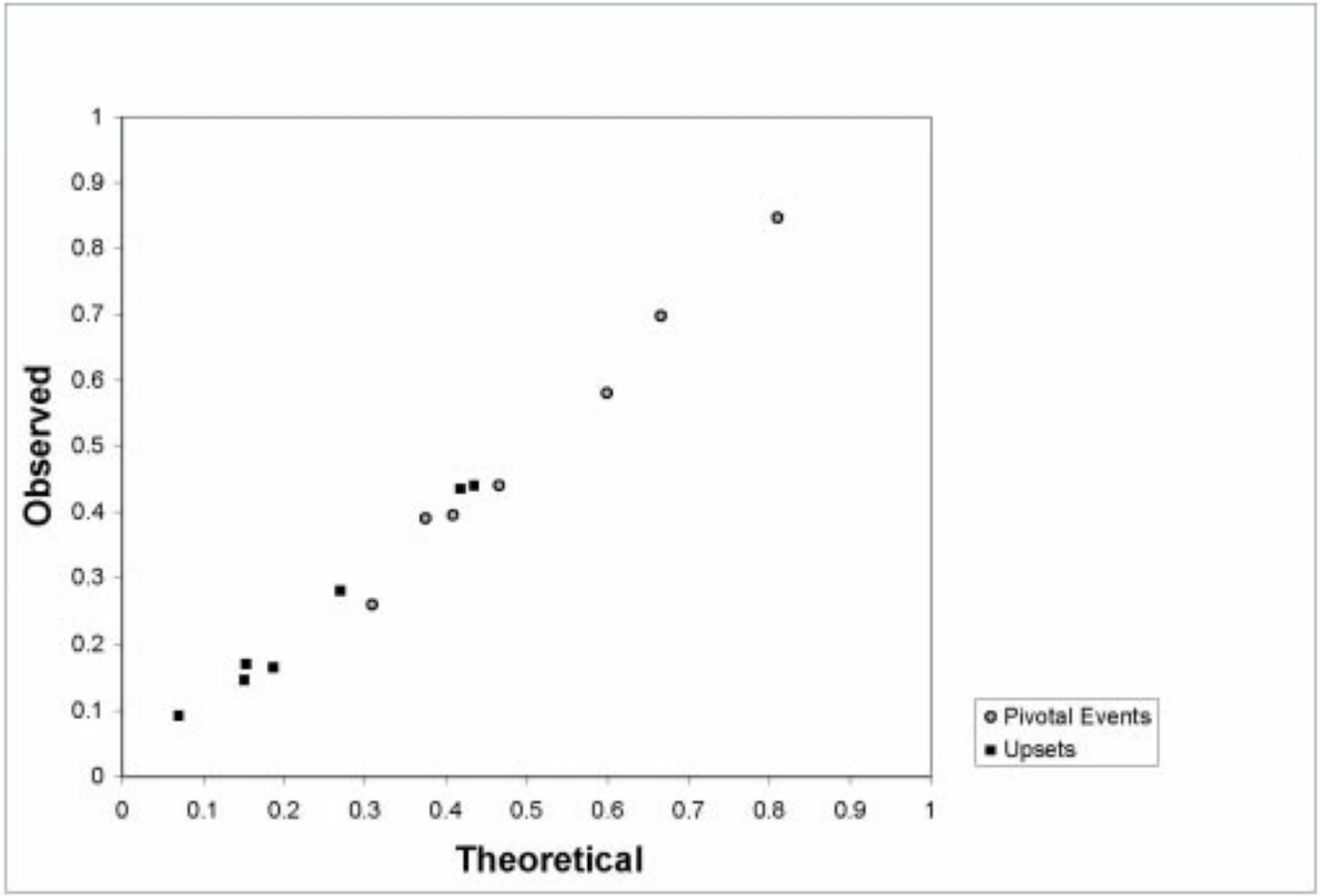
And vice versa

Rolf Mantel Lecture

November 19, 2009

David K. Levine

Theory That Works: Voting



Levine and Palfrey [2007]

Theory that Works: Competitive Equilibrium

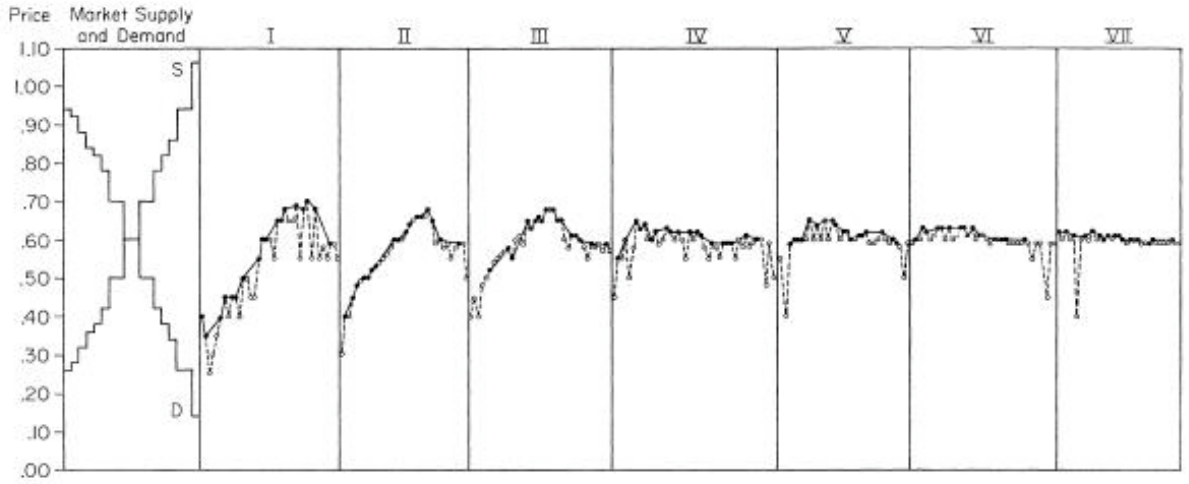


FIGURE 6

Sequences of bids and contracts. Experiment 2—(oral bid). ○ = unaccepted bid; ● = accepted bid (contract)

PLOTT & SMITH EXCHANGE INSTITUTIONS 143

Plott and Smith [1978]

Theory That Works? Ultimatum Bargaining

x	Offers	Rejection Probability
$2.00	1	100%
$3.25	2	50%
$4.00	7	14%
$4.25	1	0%
$4.50	2	100%
$4.75	1	0%
$5.00	13	0%
	27	

US $10.00 stake games, round 10

Roth, Prasnikar, Okuno-Fujiwara, Zamir [1991]

What the Theory Tells us: Losses In Ultimatum

Out of $10

	Losses
Knowing	$0.34
Unknowing	$0.99

Fudenberg and Levine [1997]

- Learning and short-term errors are an important part of mainstream economics

Equilibrium: The Weak versus the Strong

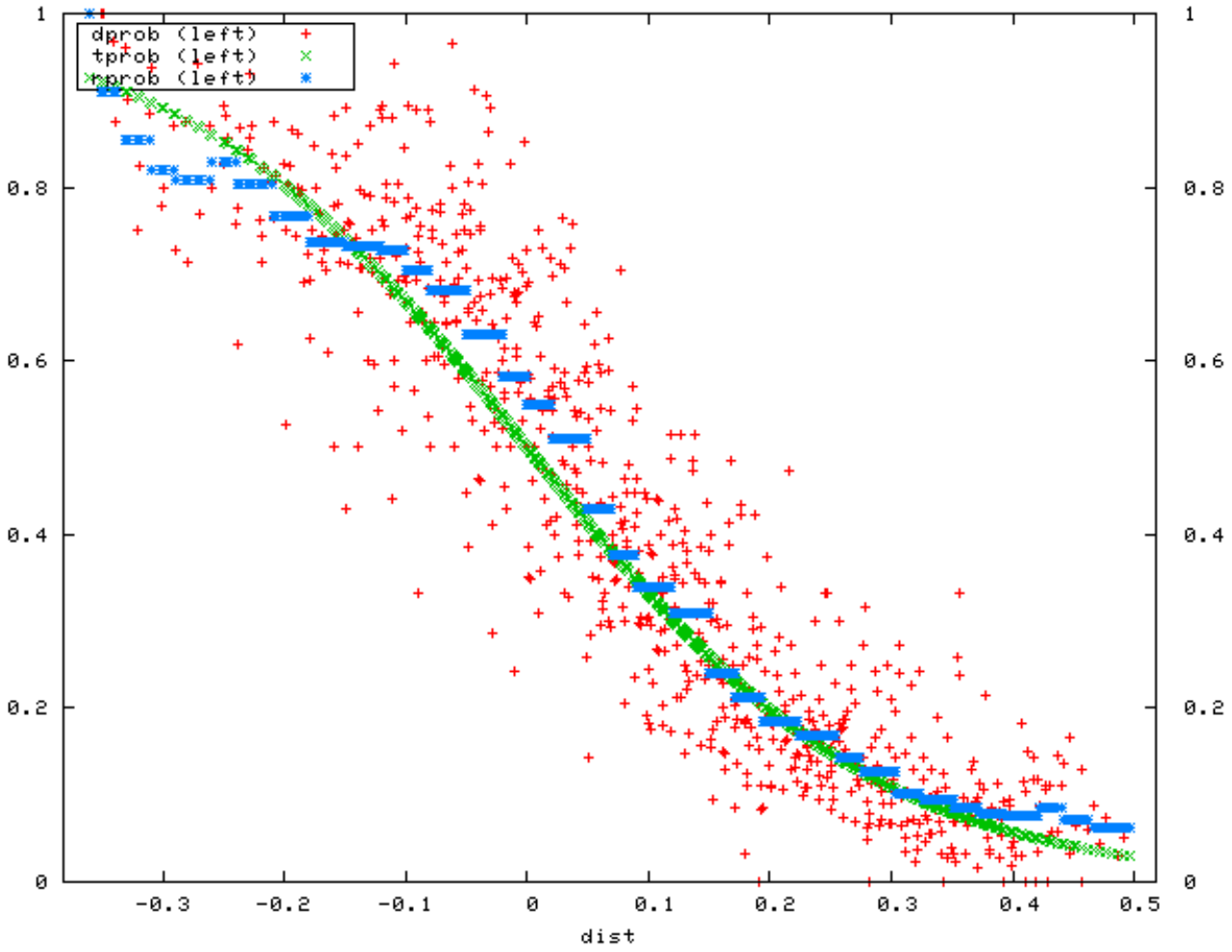
Approximate or ε-equilibrium

s_i strategy choice; μ_i beliefs; u_i utility

$$u_i(s_i \,|\, \mu_i) + \varepsilon \geq u_i(s_i' \,|\, \mu_i)$$

equilibrium: beliefs are correct

Individual Play in Voting



Quantal Response Equilibria

σ_i mixed strategy or probability of play

$\lambda_i > 0$ parameter

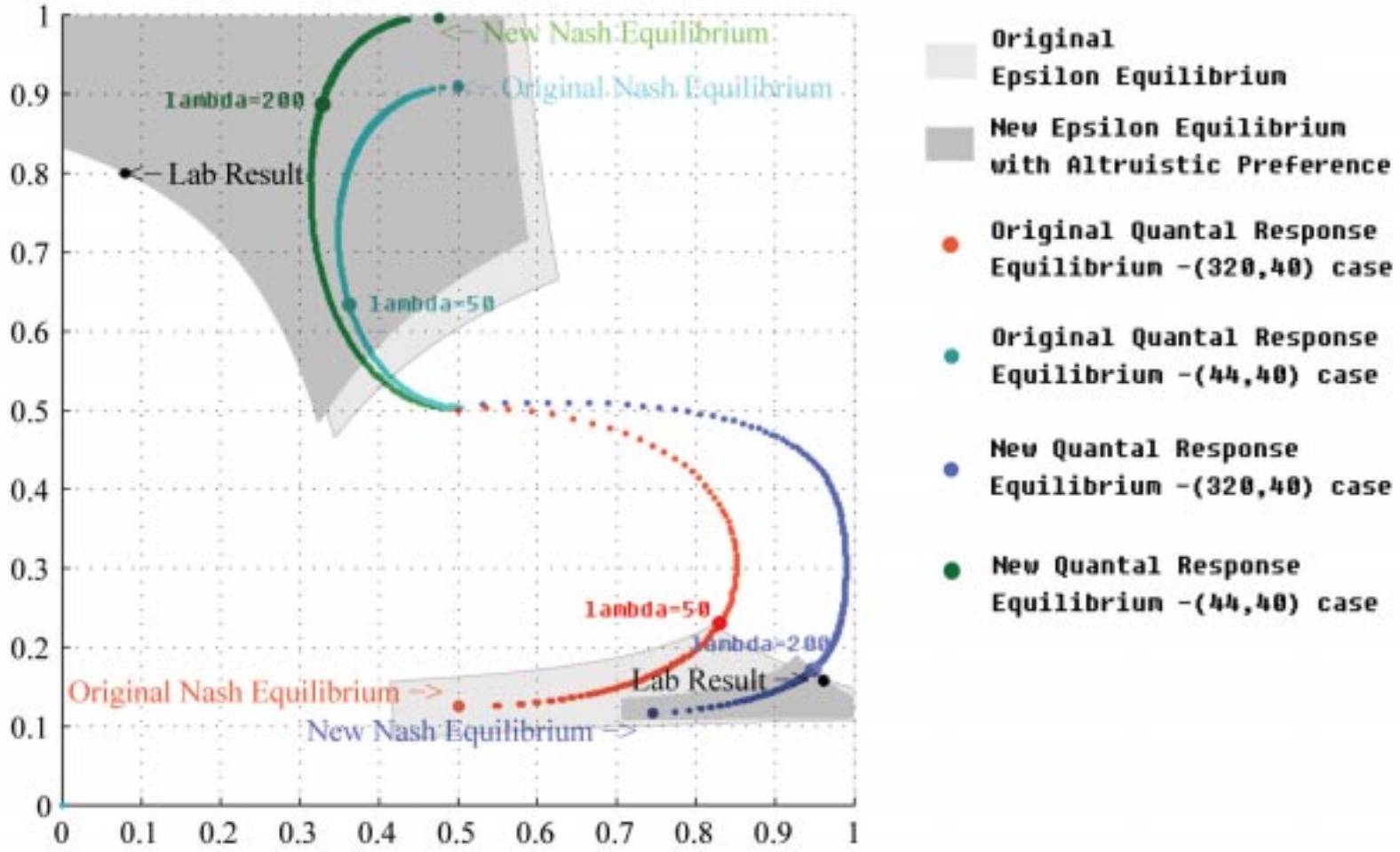
$$p_i(s_i) = \exp(\lambda_i u_i(s_i, \sigma_{-i}))$$

$$\sigma_i(s_i) = p_i(s_i) / \sum_{s_i'} p_i(s_i')$$

Games with Strong Equilibria

- voting
- competitive equilibrium

Quantal Response Application:Goeree and Holt [2001]



Procrastinating at the Health Club

- people who choose membership pay more than $17, even though a $10-per-visit fee is also available
- agents overestimate … delay contract cancellation whenever renewal is automatic ($70 per month)

DellaVigna, Malmendier 200

Hypothesis 1: people think incorrectly that they will cancel tomorrow

Hypothesis 2: people think it will be an expensive hassle to cancel; wait for “hassle” cost to be low

Prospect Theory

Suppose that p_i is the chance of winning one of two prizes $x_i \geq 0$

$$U = \sum_i \frac{.846 {p_i}^{.414}}{.846 {p_i}^{.414} + (1 - p_i)^{.414}} {x_i}^{1.056}$$

Bruhin, Fehr-Duda, and Epper [2007]

Would you rather have:

A. $5,000 for sure

B. a 50-50 coin-flip between $9,700 dollars and nothing

and you don't exhibit the Allais paradox

Strengthening Economic Theory

Mainstream models

- learning
- habit formation
- consumer lock-in

Works in progress

- ambiguity aversion and the dishonest
- level-k thinking and one-off play
- interpersonal (social) preference
- menu choice and self-control

The Rabin Paradox

If you are indifferent between a 70% - 30% chance of

A: $40 and $32

B: $77 and $2

And your lifetime wealth is $860,000 then your coefficient of relative risk aversion is 27,950

If you are indifferent between holding stocks and bonds your coefficient of relative risk aversion is 8.84

- The reference point is real

Dual Self Models

- Equivalent under certain circumstances to models of self-control costs
- To explain: hyperbolic discounting
- To explain: addiction
- Can also explain: Rabin paradox, Allais paradox

Commitment versus Self-control

$$U_{RF} = \sum_{t=1}^{\infty} \delta^{t-1} [\, u_t - g(\overline{u}_t - u_t)\,]$$

Self-Control with a Cash Constraint

periods $t = 1, 2, \ldots$

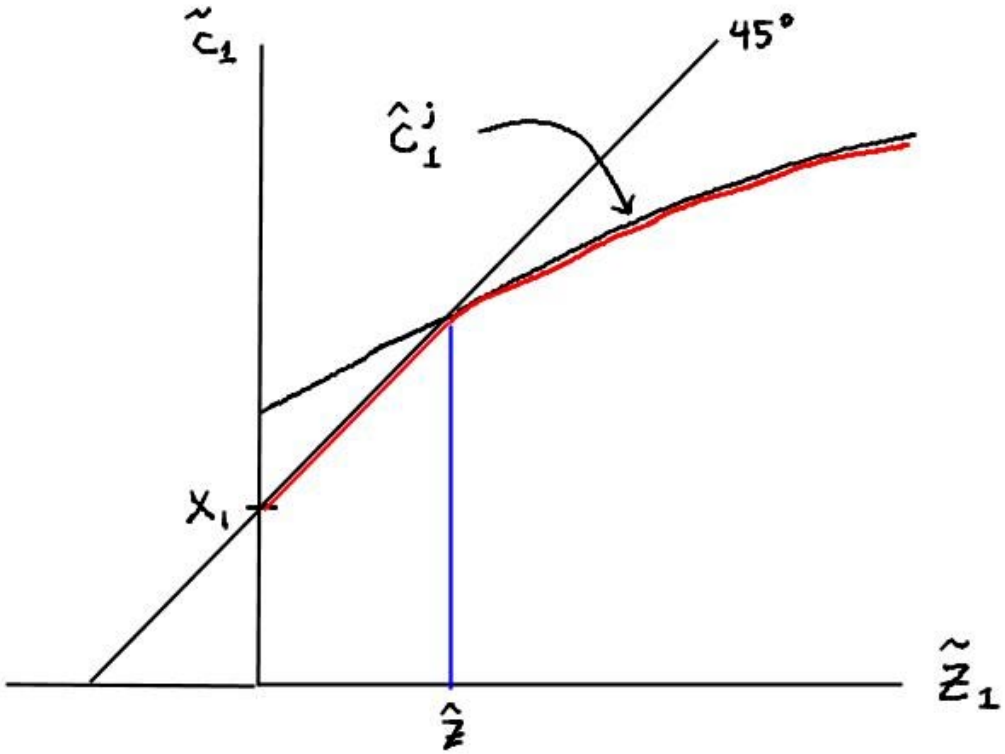
state $w \in \Re_+$ wealth at beginning of period

at the beginning of the period "pocket cash" x_t chosen not subject to self-control (that is – by earlier short-run self)

consumption $0 \leq c_t \leq x_t$ subject to self-control cost

$w_{t+1} = R(w_t - c_t)$ no borrowing possible, and no source of income other than return on investment

The Consumption Function



Conclusions

- Rabin paradox
- No connection between risk aversion for small and large stakes
- No obvious implication for macro
- Yet: Allais and common ratio paradoxes explained

Probabilistic Hyperbolic Discounting

		Probability of reward	
		1.0	0.5
A	$175 now	0.82	0.39
	$192 4 weeks	0.18	0.61
B	$172 26 weeks	0.37	0.33
	$192 30 weeks	0.63	0.67

Keren and Roelsofsma [1995] .

The Delayed Allais Paradox

	Now	3 month delay
A. 1.00 chance of 9 euros	0.58	0.43
B. 0.80 chance of 12 euros		
A. 0.10 chance of 9 euros	0.22	0.21
B. 0.08 chance of 12 euros		