The Upside and Downside of Behavioral Economics

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At Penn State

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Preconceptions

- Existing economic theory is useless
- It supposes a model of hyperrational individuals that is incapable of describing the behavior of real individuals
- We must throw out standard theory and replace it with a psychological theory and this will revolutionize economics
- Unfortunately (fortunately?) these statements are all false
Theory That Works: Voting

Levine and Palfrey [2007]
Theory that Works: Competitive Equilibrium

Plott and Smith [1978]
Theory That Works?? Ultimatum Bargaining

<table>
<thead>
<tr>
<th>x</th>
<th>Offers</th>
<th>Rejection Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2.00</td>
<td>1</td>
<td>100%</td>
</tr>
<tr>
<td>$3.25</td>
<td>2</td>
<td>50%</td>
</tr>
<tr>
<td>$4.00</td>
<td>7</td>
<td>14%</td>
</tr>
<tr>
<td>$4.25</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>$4.50</td>
<td>2</td>
<td>100%</td>
</tr>
<tr>
<td>$4.75</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>$5.00</td>
<td>13</td>
<td>0%</td>
</tr>
</tbody>
</table>

US $10.00 stake games, round 10

Roth, Prasnikar, Okuno-Fujiwara, Zamir [1991]
Equilibrium: The Weak versus the Strong

How much do you lose relative to what you might have had?
In equilibrium: zero
Models are imperfect: modern theory doesn’t say zero it says “small”
“approximate” equilibrium
What the Theory Tells us: Losses In Ultimatum

Out of $10

<table>
<thead>
<tr>
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<th>Losses</th>
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<tbody>
<tr>
<td>Knowing</td>
<td>$0.34</td>
</tr>
<tr>
<td>Unknowing</td>
<td>$0.99</td>
</tr>
</tbody>
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Fudenberg and Levine [1997]
Strong Equilibrium

Small individual departures from rationality don’t matter in the large.

Games with Strong Equilibria
- voting
- competitive equilibrium

We know which games have strong equilibria from theory without looking at data.
Quantal Response Equilibria

“naïve” behavioral model

pure cost side analysis: probability of mistakes depends on how costly they are

no “benefit” (altruism, cognitive bias) considered

individual play in voting – quantal theory is the green curve

more refined and stronger predictions than “approximate equilibrium”
Selling a Jar of Pennies

Suppose a finite number of possible jars, one jar drawn at random
Suppose finite sets of bids and bidders
Conclusions

- best outcome: best jar at zero cost
- worst outcome: worst jar at maximum cost
- quantal response says that there is a least possible probability of any bid that depends on the number of possible bids, the best outcome, the worst outcome – but not the number of
- As the number of bidders grows large the chances that someone makes the highest possible bid approaches
- With many bidders you can sell the “average” jar for the highest possible bid
Has Traditional Theory Been Proven Useless?

The Fire Escape Game aka the Prisoner’s Dilemma

<table>
<thead>
<tr>
<th>Everyone else</th>
</tr>
</thead>
<tbody>
<tr>
<td>You</td>
</tr>
<tr>
<td>orderly</td>
</tr>
<tr>
<td>rush</td>
</tr>
</tbody>
</table>

no need to model sick feeling of panic
Market Crashes
Lasse Pedersen: “quant event” of August 3-14 2007

minute by minute real market price and computed from pure rational expectations
Is it Mainstream

- 1979 in the *Journal of Money, Credit and Banking*: “A Model of Balance-of-Payments”
- under perfect foresight crises are ubiquitous when speculators swoop in and sell short
- deficient: crises are perfectly foreseen so cannot lead to catastrophic drops in prices
- long-since remedied: 2,354 follow-on papers, including the beautiful 1983 Salant paper with uncertainty and rational expectations
- contradicts a famous New York Times pundit who says economists don’t deal with such things
Procrastination

- Obviously people procrastinate: a standard example, they put off doing referee reports until the last minute
- Obviously this is inconsistent with economic theory and demands a psychological explanation
- Except: what does a rational but impatient person do when facing a deadline for performing an unpleasant task?
- Oops

- Failure to apply common sense and think about what standard theory says far too common in behavioral economics
The Becker Marschak DeGroot Elicitation Procedure

- Willingness to pay versus willingness to accept
- Zeiler and Plott 2004
Where Are We?

- Where is the weakness in economic theory? Not in having wrong predictions.
- Weakness is poor predictive power in some situations where monetary incentives are weak.
- It would be useful to be able to analyze psychological factors that tilt the balance in the face of weak monetary incentives.
- We don’t need hundreds of theories of cognitive biases, one for each fact; we especially don’t need incorrect predictions in the huge and important set of cases where monetary incentives are strong and standard theory does a good job.
Where Should We Go?

- We need to fix the things that are wrong with economics, not the things that are right
- We need general purpose theories not specific explanations of certain facts or events
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
**Missing from Economics: Imagination**

- We do read novels; the line between events and our imagination of events is imperfect.
- Why do we not live in an imaginary world? Why do we not live only in the real world?
- Are not beliefs endogenous trading off what we want to believe versus what we must believe?
- Seems important in a lot of areas where we are weak: theory of innovation; tastes for “cultural” goods; behavior in the non-economic sphere.
- May indeed lead to cognitive biases.
- Leeat Yariv “I'll See It when I Believe It: A Simple Model of Cognitive Consistency”