Behavioral Economics: An Introduction

Why Behavioral Economics?

The workhorse of economic modelling is *homo-economicus*; that is, an agent who is characterized by an infinite ability to make rational decisions. Rationality means that agents

1. update their beliefs correctly, in the manner described by Bayes' Law when they receive new information, and
2. given their beliefs, make choices that are normatively acceptable in the sense that they are consistent with the expected utility framework.

This traditional framework is appealing and simple hence it would be very comforting if its predictions were confirmed in the data. But they are not!

Motivation Behind Behavioral Economics

- Are people *homo-economicus*?
- If not, how do they behave?
- What are the implications of their behavior to mechanism design?

What Behavioral Economics Does?

It adds to the standard model of economics some reality about how humans behave. In particular, it adds

- bounded rationality,
- biases in interpreting information,
- interdependent preferences,
- emotions,
- learning, and
- ...

What Behavioral Economics is Not?

- It is not about throwing away the economics textbook to start from scratch.
  - Behavioral economists fully recognize the crucial role played by models based on homo-economicus.
  - Behavioral economists want to work with and adapt these models to take account of human behavior in those instances where it seems important to do so.

What Behavioral Economics is Not? (Cont.)

- It is not about reinventing psychology.
  - Behavioral economists do and should draw on psychology but focus on different questions while retaining the methodology and mathematical rigor of economics and game theory.
- It is not about the mindless economic debate on how much neuroscience and evolutionary psychology, and the like, really add to economics.

The Basic Nature of Behavioral Economics

1. We can find that people do behave as if *homo-economicus*.
2. We can find that people have interdependent preferences and emotions, but are behaving rationally relative to these.
3. We can find that people are biased in choices and how they interpret information.

The Methods of Behavioral Economics

- Experiments
  - Laboratory/Artefactual
  - Internet
  - Field
  - Natural
  - Neuroscience
- Theory
  - Game theory
  - Decision theory
  - Evolutionary theory
- Simulations
  - Agent-based simulations

What About Policy?

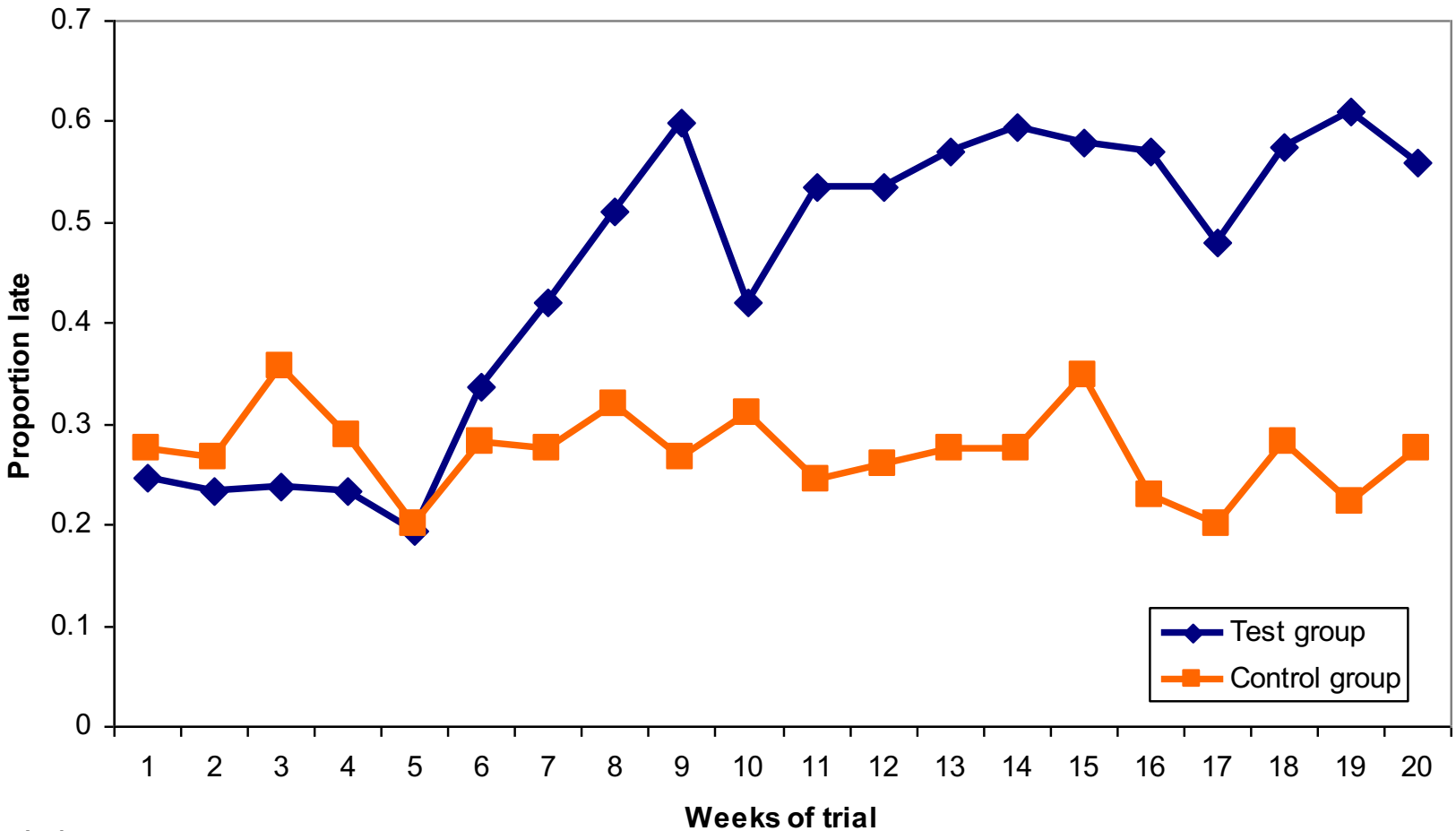
- By its nature, behavioral economics should be relevant in all areas of economic policy.
- If policy is about influencing individuals (even if they are within a corporate or other structure), then behavioral economics is crucial to get things right.

Example

- A problem for primary schools and nurseries is parents picking their children up late. The school must play the role of a babysitter.
- Suppose that we fine parents for picking their children up late?
- What do you think will happen to the number of children that are picked up late?

Example (Cont.)

- Gneezy and Rustichini (2000) report an experiment in 10 day care centres in Haifa, Israel in 1998. In week 4, a fine was introduced, and, in week 17, it was removed.



History Sketch

- Behavioral economics naturally emerged with game theory in the 50s and 60s. Researchers like Vernon Smith, Kahneman, Tversky, and Selten showed its power.
- From the 80's onwards, behavioral economics has been the fastest growing area in economics: partly due to dissatisfaction with the standard model and partly due to the breadth of talent that has worked in the area.
- But note that behavioral economics is not new. Historically, economists, including Adam Smith, Keynes and Marshall talked a lot about behavioral tendencies.

Topic I: Fairness and Reciprocity

- Consider the Dictator and Ultimatum games.
  - How do you think people behave in these scenarios (go with your instinct)?
  - How would *homo-economicus* behave?
  - How are these scenarios different?
  - How are these scenarios similar?

Dictator and Ultimatum Games

- The Nash equilibrium in all of these games is simple.
  - In the Dictator game, the dictator should give nothing to the recipient and keep everything for himself.
  - In the Ultimatum game, the receiver should accept any positive amount, because something is better than nothing, hence, the proposer should propose that he keeps all of the money, minus some minimal amount, because the receiver will accept any offer.

Empirical Evidence: Dictator Games

- We typically observe
  - around 60% of participants give a strictly positive amount of money to the other player, and
  - the mean amount given is around 20% of the endowment.

Empirical Evidence: Ultimatum Games

- We typically observe
  - median and modal offers are 40%-50%,
  - the mean offer is 30%-40%,
  - offers below 20% are rejected about half of the time,
  - high stakes, reputation, anonymity do not change the results, and
  - demographic variables have weak effects.

How About Chimpanzees?

- Jensen, Call and Tomasello (2007) report an experiment of the Ultimatum game with Chimpanzees. As a matter of fact, Chimpanzees do behave in accordance to the Nash equilibrium. Chimpanzees propose an unequal split, which is not rejected.

Empirical Findings

- Many people seem to desire reciprocity: if someone does good (or bad) to me, then I want to do good (or bad) to them.
- People care about outcomes relative to others; that is, they care about fairness.
- How is this different from the standard model?

Fairness and Reciprocity

- In the standard model, utility is a function of consumption, i.e., €10 is always as good as €10.
- In behavioral economics, where the €10 came from and what the other participants got *does matter*.
  - For instance, if it's stolen, then the amount induces guilt and shame, whereas if it's earned, the amount induces pride.
  - If you are getting €10 and the others are getting €20, this might be annoying, whereas if the others are getting €5, the amount might induce guilt.
- Note the important interaction between these two effects.

Modelling Fairness and Reciprocity

- There are now lots of models to model fairness and reciprocity.
- For instance, one of the most popular ones, is the Fehr-Schmidt model of guilt and envy. The model is simple and transparent but ignores the importance of context.
  - Given an allocation $(x_1, x_2, \ldots, x_n)$ a person's utility is $U_i(X) = x_i - \frac{\alpha_i}{n-1} \sum_{k \neq i} max(x_k - x_i, 0) - \frac{\beta_i}{n-1} \sum_{k \neq i} max(x_i - x_k, 0)$, where $0 \leq \beta_i < 1$ and $\beta_i \leq \alpha_i$.
  - Thus, agents feel envy as given by α and guilt as given by β.
  - However, the model ignores motives and context.

Applications and Policy

- Fairness and reciprocity have wide-ranging policy consequences.
- One area with important consequences is pricing and wage setting. For instance, Fehr and Gachter (2000) indicate that high wages are reciprocated. The higher the wage the more the effort that individuals put.

Topic II: Interpreting New Information, Intertemporal Choice, Emotions

- How do you think people behave in the following hypothetical scenario?
- Would you expect any biases in judgements?

Example

A certain town is served by two hospitals. In the larger hospital about 45 babies are born each day, and in the smaller hospital about 15 babies are born each day. As you know, about 50 percent of all babies are boys. However, the exact percentage varies from day to day. Sometimes it may be higher than 50 percent, sometimes lower. For a period of 1 year, each hospital recorded the days on which more than 60 percent of the babies born were boys. Which hospital do you think recorded more such days?

(a) The larger hospital?

(b) The smaller hospital?

(c) About the same?

The Law of Small Numbers

- People exaggerate how closely a small sample will represent the population.
    - 22% of the participants said the large hospital, 56% said no difference, and 22% said the small hospital.

Consequences of the Law of Small Numbers

- We overestimate the importance of small samples.
  - We underestimate the importance of large samples.
  - There is regression to the mean.
- We tend to think there is more variation in different things than there really is.

Confirmatory Bias

- People tend to be too inattentive to new information that contradicts their hypothesis; that is,
  - people can ignore contradictory evidence, and
  - misread it as supporting their hypothesis.

Consequences of the Confirmatory Bias

- Information contradicting a hypothesis can be ignored or misinterpreted.
- A person who has recently changed his mind can be under-confident in a hypothesis.
- The confirmatory bias need not be eliminated by increasing information.

Policy Thoughts

- Greater information and choice is not in itself good enough.
- It is necessary to counteract biases and inertia.
- Maybe people can be forced to become better informed. For instance, patients could be forced to be exposed to different practitioners.

Topic III: Coordination Games

- How do you think people behave in these scenarios?
- How should they behave?

Example

$$Payoff_i = BsWg - (Cost \times Effort_i) + (BnFct \times Min_{j \in Firm}(ActvA)$$

- In this example, the base wage is set at 300, the cost is set at 5 per hour, and the bonus factor is set at 6.

Minimum Effort Hours by Employees of the Firm						
		0	10	20	30	40
Effort by Employee i	0	300	-	-	-	-
	10	250	310	-	-	-
	20	200	260	320	-	-
	30	150	210	270	330	-
	40	100	160	220	280	340

Weak-Link Games

- In an order-statistic coordination game, it is a Nash equilibrium for everyone to choose the same number.
- The Pareto superior Nash equilibrium is for everyone to choose the highest number.
- This, however, is risky because if you choose high and someone else chooses low you loose out.

Empirical Findings

- Van Huyck, Battalio and Beil (1990) indicate that groups move towards the worst outcome of choosing low numbers.
- If effort is not costly though, groups do typically converge to the Pareto optimum of high numbers.
- Bigger groups have difficulty in coordinating well, while pairs seem to coordinate better.

Modelling Choices in the Weak-Link Game

- The model of Crawford (1991) assumes that in each period people update their beliefs about what others will do according to a linear adjustment rule, and best respond to this belief assuming they have negligible influence.
- Eventually, play will converge to an equilibrium. However, this equilibrium will depend on the initial beliefs of people.
- The model does capture the data well.

How to Coordinate?

- It has become fashionable to think of many international issues as a global Public Goods game in which nations can free-ride. For example, consider climate change.
- As it turns out, many of these issues are more closely-related to Weak-Link games instead.
- This matters, because it means we do not need to solve a free-riding problem - we just need to get people to coordinate.
- Having said this, there are no simple solutions. We need to somehow improve communication and remove the risks of bidding higher.