

Behavioral Choices: Interrogating Rationality

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Defending (certain aspects of) neo-classical worldview

A criticism often heard from social scientists outside economics is that the utility maximization paradigm in economics shows just how far disconnected mathematical models in economics are from reality—after all, the critics would ask, do you know of anyone in the real world who makes decisions by optimizing a utility function!

Based on our analysis here, how would you respond to this criticism?

Defending (certain aspects of) neo-classical worldview

In praise of rationality as consistency

- Intransitive preferences and money pumps

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Economics (following Mark Machina)

- Descriptive
- Theoretical
- Normative

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Models, including those of behavior, are abstractions . . . and there is nothing wrong with that. In fact, that's precisely the strength of a good model

. . . but, let's consider behavioral econ perspective also

Is rationality only about what is chosen?

- WHAT of choice vs WHY of choice (i.e., psychological underpinnings of choice)
- Substantive Rationality vs Procedural Rationality
- Behavioral economics essentially rejects “*as if* economics”

Limitations of WARP as Rationality

WARP: Is internal consistency of choice all that there is to rationality?

¹Example motivated by Amartya Sen

Limitations of WARP as Rationality

WARP: Is internal consistency of choice all that there is to rationality?

Set of alternatives $X = \{\text{Pork } (P), \text{ Chicken } (C), \text{ Turkey } (T)\}$

DM with following choice function satisfies WARP

- $c(\{P, C, T\}) = P; c(\{C, T\}) = C; c(\{P, C\}) = P; c(\{P, T\}) = P$

Suppose DM is visiting Germany but does not follow German. She has to now choose from the set $X' = \{\text{schwein } (s = P), \text{ hähnchen } (h = C), \text{ puten } (p = T)\}$. Further, she gets confused between the translation of pork and turkey and reports her choices as follows:

- $c'(\{s, h, p\}) = p; c'(\{h, p\}) = p; c'(\{s, h\}) = h; c'(\{s, p\}) = p$

The choice function c' satisfies WARP as well!¹

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An Example: DM's Choices over Dishes

- With $X = \{\text{Pork } (P), \text{Chicken } (C), \text{Veg } (V)\}$, DM with following choice function satisfies WARP
 - $c(\{P, C, V\}) = P$; $c(\{C, V\}) = C$; $c(\{P, C\}) = P$; $c(\{P, V\}) = P$

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 - $c(\{P, C, V\}) = P$; $c(\{C, V\}) = C$; $c(\{P, C\}) = P$; $c(\{P, V\}) = P$
- But, now suppose that DM has to make a restaurant reservation for the weekend in one of two restaurants. The choice is between restaurant R which serves the chicken dish and the veg dish and R' which serves those two dishes and, in addition, the pork dish. You happen to observe that DM makes a reservation in restaurant R . What should you conclude?

An Example

- Self Control Matters
- The Stanford marshmallow experiments by Walter Mischel

Intrapersonal Conflicts

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 - “*The only thing I cannot resist is temptation*” – Oscar Wilde

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- Another example: Addiction

Choice Heuristics

- Choice heuristics are simple rules of thumb that DMs formulate to make choices in complex environments
- Heuristics and biases
- Heuristics and ecological rationality

Choice Heuristic: Example

- $X = \{a, b, c\}$ are routes that DM can take to work
- DM's choices are summarized by the choice function $c : \mathcal{P}(X) \rightarrow X$

$$c(X) = a; \quad c(\{a, b\}) = a; \quad c(\{b, c\}) = b; \quad c(\{a, c\}) = c$$

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- Choices not rationalizable from the perspective of rational choice
- However, suppose DM offers you following rationale for choices:
 - I decide first on the basis of traffic. If this criterion is not decisive, then I choose on the basis of the length of the route. Specifically, I prefer less traffic to more and shorter routes to longer ones
 - Route c is shorter than a and a is shorter than b . Route b has less traffic than c , but traffic comparisons are hard to make among the other routes
- DM's reasoning seems perfectly reasonable

Gains and Losses vs. Levels

- What are the carriers of value: gains and losses or absolute levels?

Experimental Evidence: Loss Aversion

Experimental Evidence

- Some of the most compelling evidence in favor of loss aversion (relative to some reference point) comes from a set of experimental findings that come under the label *endowment effect* (Thaler, 1980).
- Evidence in favor of the endowment effect may be further broken down into two distinct findings. The first pertains to *status quo bias*, and the second, to a *gap between willingness to accept and willingness to pay*

Experimental Evidence: Status Quo Bias: The classic reference on exchange asymmetries is Knetsch (1989). He gave half the participants in his experiment a mug, and the other half, a candy bar. After a few minutes, during which the participants are asked to complete an unrelated questionnaire, Knetsch asks those who initially received the mug whether they would like to exchange it for the candy, and those who initially received the candy, whether they would like to exchange it for the mug. If, as in traditional economic analysis, preferences over goods do not depend on initial endowments, then whether a participant chooses to go home with a mug or with candy should not depend on the good that this participant was initially given. In fact, Knetsch finds that the initial allocation has a huge effect on subsequent choice: *89 percent of those initially given a mug opt to keep it, while only 10 percent of those initially given candy opt to exchange it for a mug.*

Experimental Evidence: WTA/WTP gaps: The classic reference for gaps between willingness to accept and pay is Kahneman, Knetsch, and Thaler (1990). In their experiment, half the participants were given a mug and asked to state, for a given list of prices, whether, for each price, they would give up the mug in exchange for that amount of money; in other words, they were asked their *willingness to accept*. The remaining participants were told that they had the option of receiving either a mug or a sum of money equal to its price. They were asked to state, for a given list of prices, whether, for each price, they would like the mug or the sum of money; in other words, they were asked their *willingness to pay*. Traditional analysis says there should be almost no difference between these two measures. Kahneman et al. find large differences, however: *median willingness to pay is around \$3 but median willingness to accept is around \$7*.

Opportunity Costs

- Sometimes it is useful to think about rational choices in terms of opportunity costs.
- Opportunity cost is defined as the value of the best foregone alternative
- Rationality involves considering the correct opportunity cost of our actions

Opportunity Costs

Let a_1, \dots, a_n be n actions available to a decision maker. Further, let $u(a_1), \dots, u(a_n)$ denote the respective utilities of these acts.

DEFINITION

The opportunity cost of action a_i is given by

$$c(a_i) = \max \{u(a_1), \dots, u(a_{i-1}), u(a_{i+1}), \dots, u(a_n)\}$$

Example

Opportunity Costs

PROPOSITION

a_i is a rational choice if and only if $u(a_i) \geq c(a_i)$.

Ignoring Opportunity Costs

EXAMPLE

Jacket-Calculator problem (due to Kahneman and Tversky): Imagine that you need to purchase a jacket and a calculator. You go to a store. The price of the jacket is \$125 and that of the calculator is \$15

- *Scenario 1: The salesperson at the store tells you that the calculator is on sale for \$10 at the other branch of the store, a 20 mins drive away*
- *Scenario 2: The salesperson at the store tells you that the jacket is on sale for \$120 at the other branch of the store*

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In K-T's original study, 68% were willing to make the drive to save \$5 on the calculator. But, only 29% were willing to make the drive to save that amount on the jacket

Sunk Cost Fallacy

- Investments or costs that we incur in the past should not influence our choices going forward

Sunk Cost Fallacy

Other Examples

- Movie Tickets (a bit dated)
- Reading habits
- Vietnam
- Bullet trains in California

Sunk Cost Considerations Matter

A Few Examples

- Vietnam war

- In 1965, George Ball, then Undersecretary of State, wrote to Lyndon Johnson, *“The decision you face now is crucial. Once large numbers of US troops are committed to direct combat, they will begin to take heavy casualties in a war they are ill-equipped to fight in a noncooperative if not downright hostile countryside. Once we suffer large casualties, we will have started a well-nigh irreversible process. Our involvement will be so great that we cannot—without national humiliation—stop short of achieving our complete objectives. Of the two possibilities, I think humiliation will be more likely than the achievement of our objectives—even after we have paid terrible costs.”*

Sunk Cost Considerations Matter

A Few Examples

- Bullet trains in California
 - In 2011, California Governor Jerry Brown pushed an effort to build a 520 mile high speed train between Los Angeles and San Francisco. His plan was to start construction in relatively remote and unpopulated parts of the state. Why?

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 - In 2011, California Governor Jerry Brown pushed an effort to build a 520 mile high speed train between Los Angeles and San Francisco. His plan was to start construction in relatively remote and unpopulated parts of the state. Why?

“What they are hoping is that this will be to high-speed rail what Vietnam was to foreign policy: that once you are in there , you have to get in deeper”—Richard White, Professor of History at Stanford

Attraction Effect (aka Decoy Effect)

- The presence of an irrelevant alternative may make another alternative look more attractive and by so doing change choice behavior

Attraction Effect

EXAMPLE

Economist subscription (due to Ariely): Ariely elicited choices of MBA students at MIT Sloan in the following choice situations:

- Choose between:

Option I: Web subscription for \$59

Option II: Print + web subscription for \$125

- Choose between:

Option 1: Web subscription for \$59

Option 2: Print subscription for \$125

Option 3: Print + web subscription for \$125

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In the first choice scenario, 68% chose option I and 32% chose option II

In the second choice scenario, 16% chose option 1, 0% chose option 2 and 84% chose option 3.

Attraction Effect

- Violation of expansion condition
- Asymmetric dominance

Menu Dependence

- Attraction effect is an example of menu dependence
- Another effect associated with menu dependence is the compromise effect
- Examples of compromise effect
 - Placement of wines in a wine store
 - Introducing really expensive items in restaurant menus

Judgements and Perceptions

- So far we have focussed on (so called) “anomalies” from the perspective of choices. A similar set of observations apply when it comes to judgements and perceptions

Frames Matter

- Framing Effects: The influence that formulation of a problem has on beliefs, preferences or choices

Frames Matter

Kahneman and Tversky's "Asian disease problem" experiment

- Treatment 1: Imagine that the United States is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimates of the consequences of the programs are as follows:
 - If program A is adopted, 200 people will be saved
 - If program B is adopted, there is a $\frac{1}{3}$ -rd probability that 600 people will be saved and a $\frac{2}{3}$ -rd probability no people will be saved

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In this treatment, a large majority of the respondents choose program A

Frames Matter

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- Treatment 2: Imagine that the United States is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimates of the consequences of the programs are as follows:
 - If program A' is adopted, 400 people will die
 - If program B' is adopted, there is a $\frac{1}{3}$ -rd probability that no one will die and a $\frac{2}{3}$ -rd probability that 600 people will die

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In this treatment, a large majority of the respondents choose program B'