Behavioral Economics

Topic 1: Choice under Uncertainty

Lecture 5: Prospect Theory

Professor Bushong

MICHIGAN STATE UNIVERSITY

Taking Stock

Last class:

- Evidence that contradicts expected utility theory

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Today:

- An alternative model: Prospect Theory

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Today:

- An alternative model: Prospect Theory

Logistics:

- Problem Set 2 is due Thursday, September 24
    - The first part of Problem 7 is nasty. I will help you with it in class next week!
- Problem Set 1 was due before class — detailed solutions posted this afternoon

Alternative To EU: Prospect Theory

Our Outline

Use Extreme Cases to Clarify Your Thinking

Some concepts are hard to get your head around. It can be easier to think about things in the extreme limit.

Helpful Tip

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- E.g., “risk aversion" will continue to trip you up throughout this section.
- Think about the limit case: a person who is *infinitely* risk averse.
- Now think about the other limit case: a person who is risk neutral.
- In between those lies reality. The **definition** of the term only offers that a person is at least a teensy tiny itty bitty bit above risk neutrality. How she actually behaves depends on **how** risk averse she is

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Helpful tip to build intuition for a problem: think about limit cases.

Contrasts Matter

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- “Ooh! Whoa, that actually feels good after the crotch!”

Reference-Dependent Preferences

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$\Rightarrow$ We should consider the modified utility function $u(x; r)$, not just $u(w + x)$, where r is some reference point or reference level.

We'll explore this idea for the next few lectures. There are deep implications for economics in this simple observation.

Figure – Amos Tversky and Daniel Kahneman in 1970s. Kahneman won the Nobel Prize in Economics for their joint work in 2002.

Prospect Theory proposes two phases of choice process:

- Editing

Prospect Theory (an alternative to EU Theory)

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Prospect Theory proposes two phases of choice process:

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- Evaluation

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This is an example of the type of thing we won't spend a lot of time on in this course, but it was important to early pioneers

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- Loss Aversion
- Diminishing Sensitivity

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  - Income-targeting

Loss Aversion in Action

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Patrick Mahomes after Super Bowl loss: “Any time you lose the Super Bowl, it’s the worst feeling in the world...they hurt probably more than the wins feel good”

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17 heads/13 tails v. 16 heads/14 tails		4 heads/0 tails v. 3 h/1 t

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Reflects big and general fact about human psychology:

- We most often think in terms of proportions rather than absolutes.

Prospect Theory: Evaluation Stage

A person evaluates a prospect $(x, p; y, q)$ according to:

$$V(x, p; y, q) \quad = \quad \pi(p)\, v(x) \quad + \quad \pi(q)\, v(y)\,.$$

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and that of Expected Value

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   - Formally: $v(x) + v(-x) < v(y) + v(-y)$ for all $x > y$.

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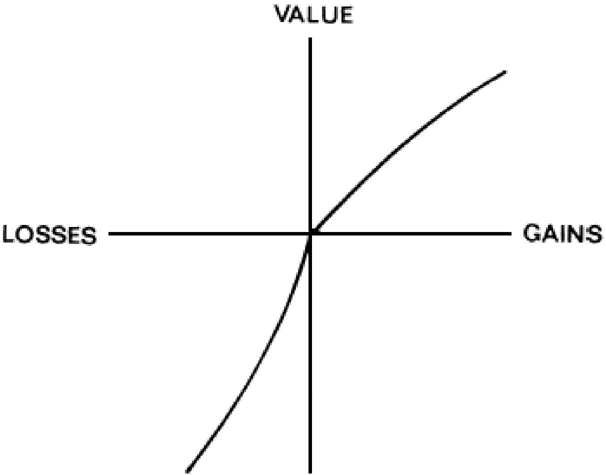
These assumptions lead to the following visual form of the value function:



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- *Note:* This second functional form removes diminishing sensitivity and isolates the effect of loss aversion on decision-making. In lots of settings this will greatly simplify the problem while leaving the fun stuff intact.

Practice Problem

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  - Answer $p = 15.7$

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   - Implication 4 requires important additional assumption.

First-Order Risk Aversion

For small risks, an EU-maximizer must be almost *risk neutral*: the "premium" required to take on that risk would go to zero as the size of the risk goes to zero.

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We will carry this assumption through many of our functional forms.

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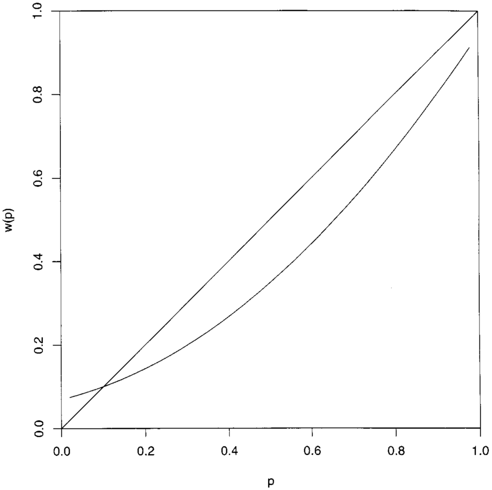
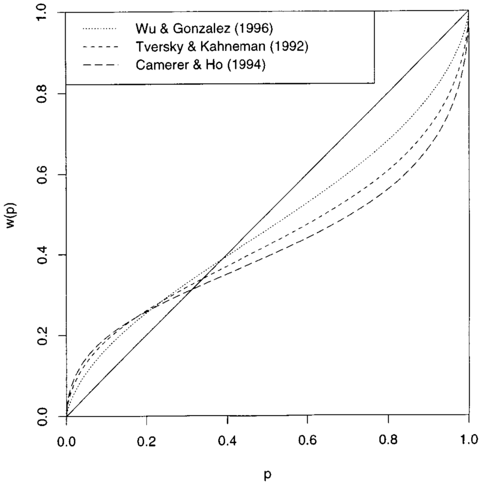
Visualizing the Probability Weighting Function

Kahneman and Tversky suggest the weighting function could look like:



Visualizing the Probability Weighting Function

Research began refining this function with focused lab evidence:



Themes that Emerged from Prospect Theory

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Next Class

Today: Intro to Prospect Theory

Next class: Applications of Prospect Theory (real-world phenomenon it helps explain)

Remember:

- Problem Set 2 is due Thursday, September 24
  - The first part of Problem 7 is nasty. I will help you with it in class next week!
- Problem Set 1 was due before class — detailed solutions posted this afternoon