Psychology and Economics
(Lecture 3)

Xavier Gabaix

February 10, 2003

1 Discussion of traditional objections

- "In the real world people would get it right"
  Answer: there are many non-repeated interactions, where people don't
  get it right such as
  schooling, retirement, marriage, stock market bubble

- "In the aggregate mistakes will cancel out"
  Answer:
  in some games mistakes can only go one way
  in general, we will study systematic biases (that tend to go one way),
  e.g. overconfidence
  [also the structure of the game may amplify the mistakes rather than
  cancel them out — like in resonance of pendula]

- "In the markets, arbitrage and competition will eliminate the effects of irrational agents" ("Chicago school" argument, Milton Friedman and Gary Becker) E.g. if you produce bad computers, then none buys. The argument is true in many markets, particularly financial.
  Answer. The argument explains lots of facts about financial markets such as their unpredictability in the short run. However:

  - there are monopolies

  - there are bubbles

  - arbitrage is risky, hence difficult

  - if there are enough irrational agents, rational players start imitating them, e.g. engage in p-beauty contests or ride the bubble

– lots of decisions are hard/impossible to arbitrage, e.g. buying a car, personal finances

- "These theories are very ad hoc"
  Answer:

  – Already there are some systematic behavioral theories.

  – It is work in progress. That is how the quantum mechanics began, hopefully some unification in behavioral economics will come.

- "Those things can be explained by traditional theory." An example: bubbles comes from limited information [or variation in discount rates] Answer — consider for example the question whether people say winners or losers from their stock portfolio. People sell losers, but selling winners is rational due to tax purposes. Notabene, for some rational economics people an explanation via beliefs is allowed and those explanations are also too flexible. An explanation via psychic pain of selling the loser is not allowed in this tradition however.

2 Some Psychology of Decision Making

2.1 Prospect Theory (Kahneman-Tversky, Econometrica 79)

Consider gambles with two outcomes: x with probability p, and y with probability $1 - p$ where $x \geq 0 \geq y$.

- Expected utility (EU) theory says that if you start with wealth W then the (EU) value of the gamble is

$$V = pu\left(W + x\right) + \left(1 - p\right)u\left(W + y\right)$$

- Prospect theory (PT) says that the (PT) value of the game is

$$V = \pi\left(p\right)u\left(x\right) + \pi\left(1 - p\right)u\left(y\right)$$

where π is a probability weighing function. In standard theory π is linear.

- In prospect theory π is concave first and then convex, e.g.

$$\pi(p) = \frac{p^{\beta}}{p^{\beta} + (1-p)^{\beta}}$$

for some $\beta \in (0,1)$. The figure below gives the graph of $\pi(p)$ for $\beta = .8$.
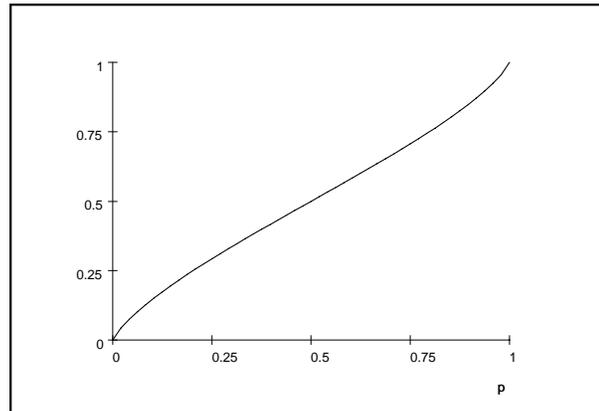
2.1.1 What does the introduction of the weighing function π mean?

- $\pi(p) > p$ for small p. Small probabilities are overweighted, too salient. E.g. people play a lottery. Empirically, poor people and less educated people are more likely to play lottery. Extreme risk aversion.

- $\pi(p) < p$ for p close to 1. Large probabilities are underweighted.

In applications in economics $\pi(p) = p$ is often used except for lotteries and insurance
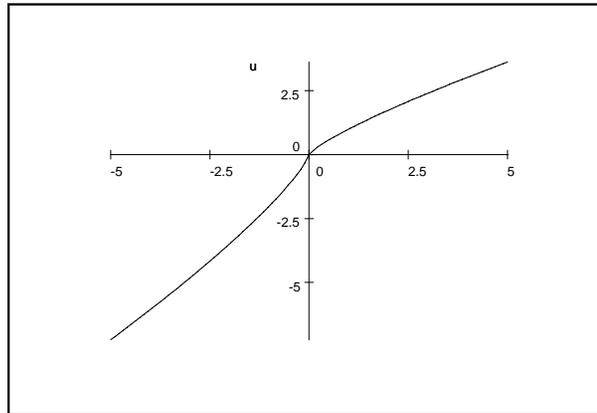
2.1.2   Utility function u

- We assume that $u(x)$ is increasing in x, convex for loses, concave for gains, and first order concave at 0 that is

$$\lim_{x \to 0+} \frac{-u(-x)}{u(x)} = \lambda > 1$$

- A useful parametrization

$$u(x) = |x|^\beta \text{ for } x \geq 0$$
$$u(x) = -\lambda |x|^\beta \text{ for } x \leq 0$$

- For $\lambda = 2$ and $\beta = .8$ the graph of $y = u(x)$ (on vertical axis) is given below

Meaning - Fourfold pattern of risk aversion u

- Risk aversion in the domain of likely gains

- Risk seeking in the domain of unlikely gains

- Risk seeking in the domain of likely losses

- Risk aversion in the domain of unlikely losses

See tables 2.1 and 3.4 in the file Prospect-Theory-Experiments.pdf. We will discuss it in more detail on Thursday, February 12.

Parenthesis. Compare this to the limited liability: the managers utility is concave for gains, and convex close to bankruptcy.

2.1.3   Reading for next time:

Kahneman-Tversky Econometrica 1979 (on prospect theory)