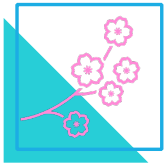
PROSPECT THEORY

THE FINAL EPISODE



EE 416 Behavioral Economics, SEM2/2021

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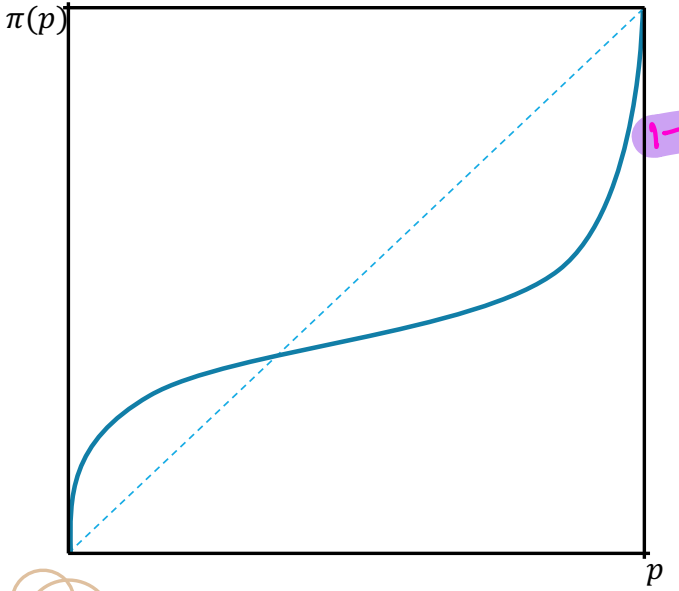
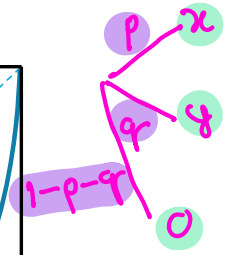
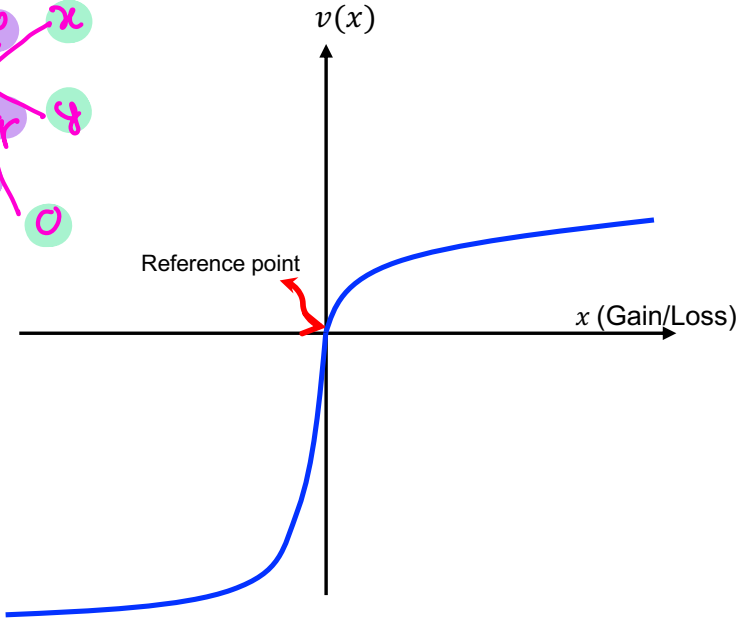
Fourfold patterns of choices under risk

Prospect theory value

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

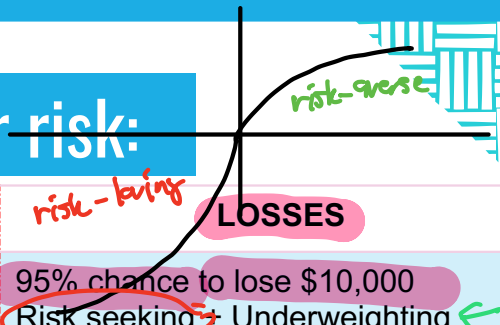


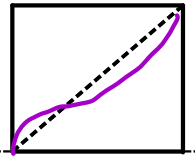




The core achievement of prospect theory

The fourfold pattern of choice under risk:



	GAINS	LOSSES
HIGH PROBABILITY Underweight Reinforcing forces 	95% chance to win $10,000 Risk averse + Underweighting Fear of disappointment **RISK-AVERSE BEHAVIOR** Accept unfavorable settlement Ex: refusing low-risk high return business opportunity	95% chance to lose $10,000 Risk seeking + Underweighting Hope to avoid loss **RISK-SEEKING BEHAVIOR** Reject favorable settlement Ex: taking desperate gambles for a small hope of avoiding large loss
LOW PROBABILITY Overweight Competing forces Influence of PWF wins.	5% chance to win $10,000 Risk averse + Overweighting Hope of large gain **RISK-SEEKING BEHAVIOR** Reject favorable settlement Ex: buying lottery tickets	5% chance to lose $10,000 Risk seeking + Overweighting Fear of large loss **RISK-AVERSE BEHAVIOR** Accept unfavorable settlement Ex: buying insurance policies

Choices are:
risk averse if less-risky option is preferred;
risk seeking if more-risky option is preferred.

The fourfold pattern of choice under risk:

- For intermediate/large probabilities, we have risk-averse behavior over gains and risk-loving behavior over losses.

- For small probabilities, we have risk-loving behavior over gains and risk-averse behavior over losses.

Narrow framing vs. Broad framing

Decision (i)

- Choose between

A. sure gain of $240

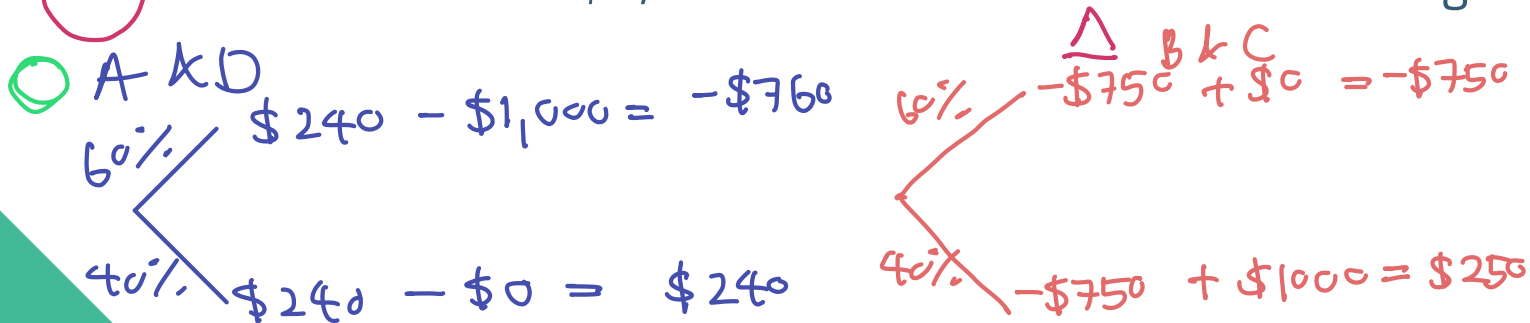
B. 40% chance to gain $1,000 and 60% chance to gain nothing

Decision (ii)

- Choose between

C. sure loss of $750

D. 60% chance to lose $1,000 and 40% chance to lose nothing



Decision (iii)

- Choose between

A&D. 40% chance to win $240 and 60% chance to lose $760

B&C. 40% chance to win $250 and 60% chance to lose $750

Narrow framing is costly.

- Majority of respondents chose:
  - A. in decision (i)
  - D. in decision (ii).

- AD is dominated by BC.

It is costly to be risk averse for gains and risk seeking for losses.

Narrow framing vs. Broad framing

- Narrow framing: a sequence of two simple decisions, considered separately
  - Think about A vs. B
  - Think about C vs. D
- Broad framing: a single comprehensive decision, with four options
  - Think about A, B, C, D together: AC, AD, BC, BD

Narrow framing vs. Broad framing

- A rational agent will engage in broad framing.
- A rational agent will use mental efforts to enforce consistency.
- Econs will be coherent in their choices.

- Humans are naturally narrow framers.
- We are susceptible to WYSIATI (What You See Is All There Is). That is, we use the information we have as if it is the only information.
- We are averse to using mental effort.

Inducing to use broad framing

- ✓ "To think like a trader" helps with loss aversion and endowment effect
- ✓ "Treat this problem as one of many monetary decisions, which will sum together to produce a portfolio"
- ✓ Broad framing blunt the emotional reaction to losses

Blindspots of Prospect theory

Blindspots of Prospect theory

- Prospect theory doesn't address how the reference point is formed.

→ see

Kaszegi & Rabin (2006)
A Model of Reference-Dependent Preferences.

Blindspots of Prospect theory

- Prospect theory doesn't allow the value of an outcome to change with the alternative.
  - Prospect theory assumes that available options in a choice are evaluated separately and independently, and the choice with the highest value is selected.
  - Consider following problems
    1. Choose between 90% chance to win $1 million or $50 with certainty
    2. Choose between 90% chance to win $1 million or $150,000 with certainty
- $v(x_1)$ doesn't depend on x_2.
- Prospect theory doesn't allow for regret.

Suppose we chose: 1 vs. 2

Consider: $v(\$1\,mil)$

not: $v(\$1\,mil, \$50)$

$v(\$1\,mil, \$150{,}000)$

$(x_1, p; x_2, q) \Rightarrow$ i.e. consider $v(x_1)$ not $v(x_1, x_2)$

Blindspots of Prospect theory

- Prospect theory doesn't allow the value of an outcome to change when it is highly unlikely.
  - Consider following prospects
    - 1 in 1,000,000 to win $1,000,000
    - 90% chance to win $1,000,000 and 10% chance to win nothing
- $v(\cdot)$ doesn't depend on p.

Consider $v(\$1\text{ mil})$

$v(\$1\text{ mil}, \frac{1}{1,000,000})$

$v(\$1\text{ mil}, 90\%)$

Also, $\pi(p)$ $\pi(\frac{1}{1,000,000})$

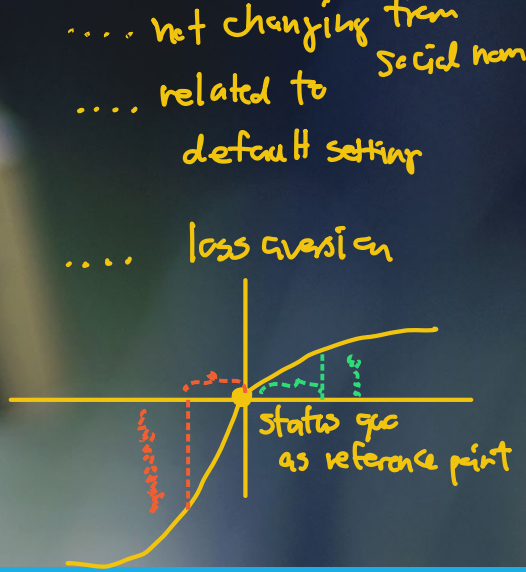
not $\pi(p, x)$ $\pi(\frac{1}{1,000,000}, \$40\text{ mil})$

$\pi(\frac{1}{1,000,000}, \$5)$

The tendency of people to remain at the status quo even when it is in their best interest to change what they are doing.

Status quo bias

(coined by Samuelson and Zeckhauser (1988))

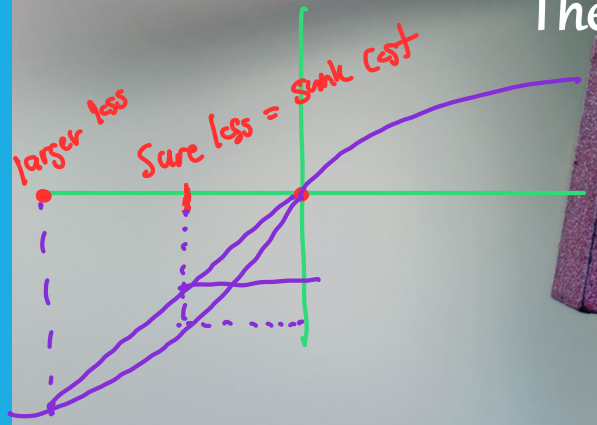


Status quo bias

- Examples:
  - Failure to sell stocks when the market tanks because people do not want to admit to losses
  - Failure to adopt new technology and accept changes in production methods because the existing skills and knowledge become worthless
  - Failure to change saving plan for retirement
  - Staying in a bad relationship too long
  - The failure to react to price changes
- An alternative became significantly more popular when it was designated as the status quo.

The Sunk Cost Fallacy

The sunk-cost fallacy (bias) is the irrational behavior of "throwing good money after bad," i.e. once found on a course of action to which they committed an investment (e.g. time, money, effort), people continue to stay on that course of action and invest even more resources despite it being unprofitable(Arkes & Blumer, 1985).



- endowment effect ?
- status quo bias ?
- loss aversion ?
- risk-seeking in loss domain ?
- underweighting of large probability to get large loss ?

The Sunk Cost Fallacy

- Normative economic theory indicates that costs incurred in the past are irrelevant for future marginal payoffs
- Sunk costs must be ignored.
- The larger the sunk cost, the stronger the bias, and cognitive ability does not alleviate the bias(Haita-Falah, 2017)

The Sunk Cost Fallacy

Examples:

- Students stay with a research topic way too long before switching to another one
- Continued investment into engineering a new product that has become a black hole for money with no production in sight
- Continued marketing expenditures on a product that consumers hate

DANKE!

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