Part II: Behavioral Economics

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II.1 Big Picture: What is Behavioral Economics?

"Behavioral economics uses facts, models, and methods from neighboring sciences to establish descriptively accurate findings about human cognitive ability and social interaction and to explore the implications of these findings for economic behavior. (...) Behavioral Economics is deeply rooted in empirical findings or methods, and advances economics on its own terms — generating theoretical insights, making more accurate predictions of field phenomena, and suggesting better policy."

Princeton University Press Series in Behavioral Economics

Short definition: "Behavioral Economics is a way of doing economics research that is centered around the belief that economists should aspire to making assumptions about humans that are as realistic as possible."

What is Behavioral Economics? (cont.)

New field developed to capture phenomena beyond the standard economic model.

Some basic methodological principles:

- Use of experiments
- Interest in microfoundations of behavior:
  - Preferences
  - Beliefs
  - Cognition
- Interest in psychological research on behavior:
  - Social psychology
  - Cognitive psychology

Three Lessons from Behavioral Economics

1) Choice under uncertainty:

- Framing matters: The way you present a choice problem makes all the difference.
- Reference-dependence: Changes in wealth from a reference point are the carriers of utility rather than absolute levels of final wealth.
- Loss aversion: Losses weight much more than gains.
- Probability weighting: Humans systematically violate the Expected Utility Theory (EUT) assumption of a preference function over lotteries that is linear in probabilities.

Three Lessons from Behavioral Economics (cont.)

2) Buyers, Sellers, and Markets:

- The endowment effect: People tend to overvalue goods they are endowed with.
- Reference-dependence matters: It can explain the endowment effect and many other "anomalies" that the standard model is unable to explain.
- Consumer confusion can be good for firms: Firms can gain by obfuscating consumers even in markets with many firms.
- Curse of Education: Firms do not have incentives to debias consumers if these become less profitable.

Three Lessons from Behavioral Economics (cont.)

3) Intertemporal Choices:

- Present-biased preferences: A tendency for immediate gratification that is bad in the long run.
- Humans have self-control problems: We tend to display dynamic inconsistency in choice over time.
- Quasi-hyperbolic discounting: This can explain plenty of irrational behaviors in choice over time.
- Consumer self-control problems can be good for firms: Firms create contracts that exploit time-inconsistent consumers.

Most Influential Behavioral Economists

- **Predecessors:**
  - Herbert Simon (1978 Nobel Prize Winner)
  - Maurice Allais (1988 Nobel Prize Winner)
  - Reinhard Selten (1994 Nobel Prize Winner)
- **Recent Nobel Prize Laureates:**
  - Daniel Kahneman (2002 Nobel Prize Winner)
  - Robert Shiller (2013 Nobel Prize Winner)
  - Richard Thaler (2017 Nobel Prize Winner)

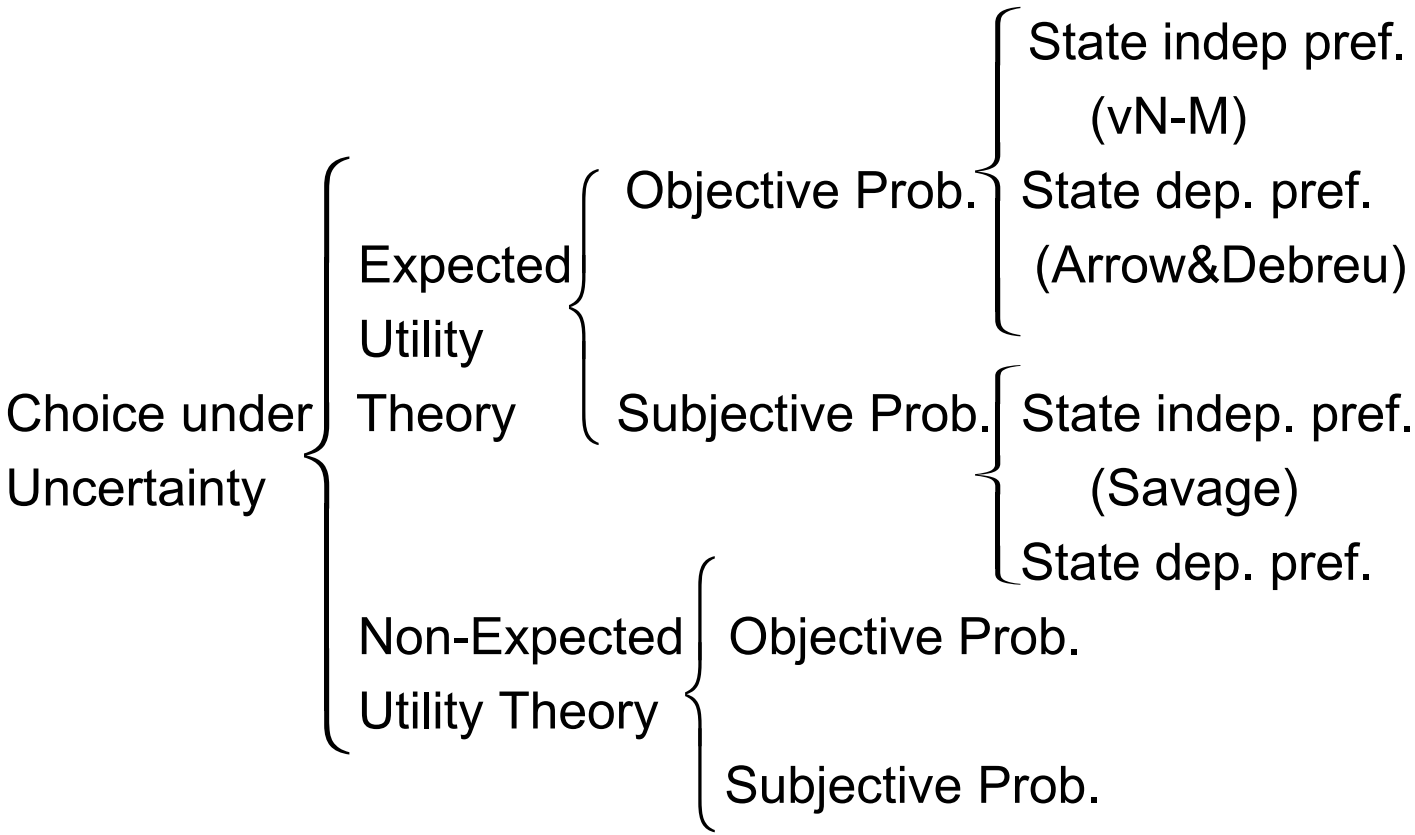
We will cover a *selection of important results* (to cover all key findings one would necessite several full courses ...)

II.2 Choice Under Uncertainty

Topics to be Covered:

- Review of expected utility theory
- Behavioral facts
- Behavioral theories
- Prospect theory
- Reference-dependence

Review of Expected Utility Theory I (see Machina, 2008)



Review of Expected Utility Theory II

	Expected Utility Theory, Objective unc., State indep. pref.	Standard Consumer Theory (Cobb-Douglas)
Objects of choice	Probability distributions (lotteries) $P = (p_1, \ldots, p_n)$ over a set of monetary outcomes $(\overline{x}_1, \ldots, \overline{x}_n)$	Commodity bundles $C = (c_1, \ldots, c_n)$
Rational preference relation $\succ$	Completeness Transitivity Mixture continuity **Independence**	Completeness Transitivity Continuity
Preference function	$V(P) = u_1 p_1 + \ldots + u_n p_n = \sum u_i p_i$	$U(C) = c_1^{\alpha_1} \ldots c_n^{\alpha_n}$
Representation Theorem	Exp. Utility Rep. Theorem $P \succ P' \Leftrightarrow V(P) > V(P')$	Utility Rep. Theorem $C \succ C' \Leftrightarrow U(C) > U(C')$

Review of Expected Utility Theory III

	Expected Utility Theory Obj. unc., State indep. pref.	Standard Consumer Theory (Cobb-Douglas)
Parameters of preference function	Von Neumann-Morgenstern utility indexes $(u_1,\ldots,u_n)$	Exponents $(\alpha_1,\ldots,\alpha_n)$
Preference preserving transformations of preference function	Increasing transformations $V^* = \varphi(V)$	Increasing transform. $U^* = \varphi(U)$
Preference preserving transformations of parameters	Increasing affine transformations of vN-M utility indexes $u_i^* = au_i + b,\ i = 1,\ldots,n$	Increasing multiplicative transformations of the exponents $\alpha_i^* = k\alpha_i \quad i = 1,\ldots,n$

Review of Expected Utility Theory III

The Independence Axiom says that for any two lotteries P* and P we have that

$$P^* \succ P \Leftrightarrow \lambda P^* + (1-\lambda)P^{**} \succ \lambda P + (1-\lambda)P^{**},$$

$\forall \lambda \in (0,1]$, and $\forall P^{**}$

The axiom has normative appeal. Let λ represent the probability of a coin flip. Either the coin lands tails and you get P** in which case the choice won't have mattered, or it lands heads, in which case one is in effect facing a choice between P* and P and one ought to have the same preferences as before

Review of Expected Utility Theory IV

This axiom gives the theory its primary empirical content since it implies that the rational choice relation $\succ$ can be represented by a preference function that is linear in probabilities, that is,

$$V(P) = u_1 p_1 + ... + u_n p_n = \sum u_i p_i$$

In the case of a simple outcome set of the form (x_1, x_2, x_3) it is possible to illustrate graphically the linearity in probabilities property of expected utility preferences.

Review of Expected Utility Theory V

Since every prob. distribution (p_1, p_2, p_3) over these outcomes must satisfy $p_1 + p_2 + p_3 = 1$, we may represent such distributions by the points in the unit triangle in the (p_1, p_3) plane, with $p_2 = 1 - p_1 - p_3$.

The indifference curves of an expected utility maximizer are parallel straight lines

$$u_1 p_1 + u_2 p_2 + u_3 p_3 = u_1 p_1 + u_2(1 - p_1 - p_3) + u_3 p_3$$

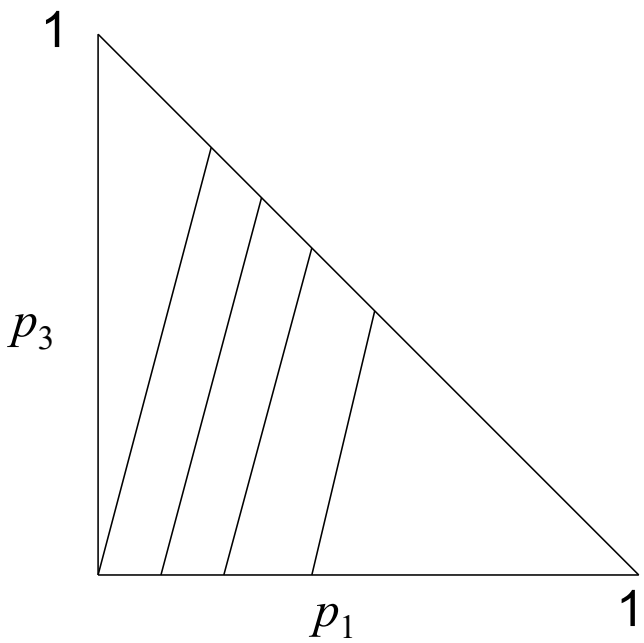
$$= u_2 - (u_2 - u_1)p_1 + (u_3 - u_2)p_3 = \overline{V}$$

with slope given by

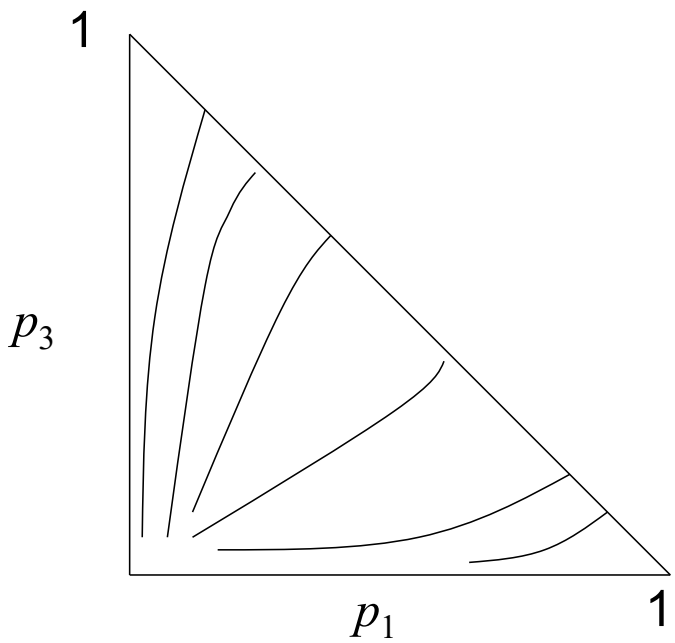
$$\frac{\partial p_3}{\partial p_1}|_{\overline{V}} = \frac{u_2 - u_1}{u_3 - u_2}$$

Review of Expected Utility Theory VI

Expected Utility Ind. Curves



Non-Expected Ut. Ind. C.



Review of Expected Utility Theory VII

- Now, suppose that outcomes consist of different wealth levels $w_1 < w_2 < w_3$.
- On the principle that more wealth is better, it is typically postulated that any change in a distribution (p_1, p_2, p_3) which increases p_3 at the expense of p_2, increases p_2 at the expense of p_1, or both, will be preferred.
- This property is known as 'first-order stochastic dominance preference'.

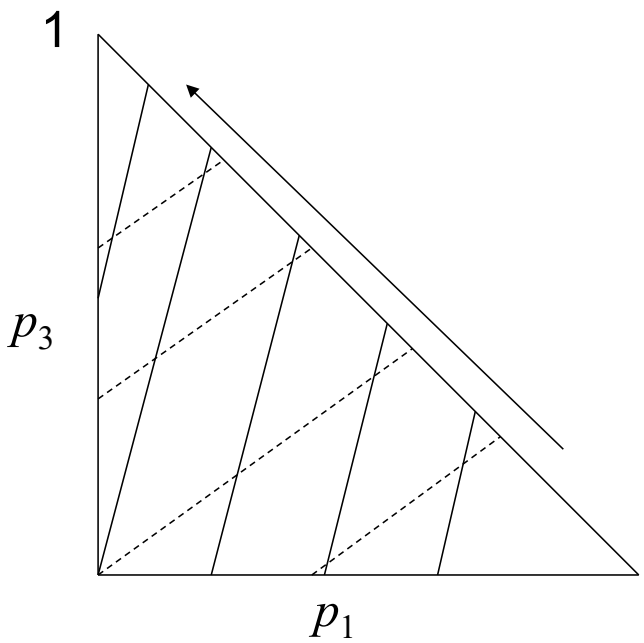
Review of Expected Utility Theory VIII

- Since such shifts of probability mass are represented by north, west, or northwest movements in the diagram, first-order stochastic dominance preference is equivalent to the condition that indifference curves are upward sloping, with more preferred indifference curves lying to the northwest.

- Algebraically, this is equivalent to the assumption that utility is increasing with wealth: $u_1 < u_2 < u_3$.

Review of Expected Utility Theory IX

Expected Utility Ind. Curves



Review of Expected Utility Theory X

Another important aspect of behavior towards risk is that of 'risk aversion' (e.g. Pratt, 1978).

To illustrate this property, consider the dashed lines in the previous figure, which represent loci of solutions to the equations

$$w_1 p_1 + w_2 p_2 + w_3 p_3 = w_2 - (w_2 - w_1)p_1 + (w_3 - w_2)p_3 = E(W)$$

and hence may be termed 'iso-expected value loci'.

Review of Expected Utility Theory XI

- Since northeast movements along any of these loci consist of increasing the tail probabilities p_1 and p_3 at the expense of the middle probability p_2 in a manner which preserves the mean of the distribution, they correspond to what are termed 'mean-preserving increases in risk' (Rothschild and Stiglitz, 1970).

- An individual is said to be 'risk averse' if such increases in risk always lead to less preferred indifference curves.

Review of Expected Utility Theory XII

- This is equivalent to the graphical condition that the indifference curves be steeper than the iso-expected value loci.
- Since the slope of the latter is given by $(w_2-w_1)/(w_3-w_2)$, this is equivalent to $(u_2-u_1)/(w_2-w_1) > (u_3-u_2)/(w_3-w_2)$.
- Conversely, individuals who prefer mean-preserving increases in risk are termed 'risk loving': such individuals' indifference curves will be flatter than the iso-expected value loci, and their utility indices will satisfy $(u_2-u_1)/(w_2-w_1) < (u_3-u_2)/(w_3-w_2)$.

Behavioral Findings

- Empirical evidence shows that humans systematically violate expected utility theory.
- **List of main violations:**
  1. Probability distortion (Allais paradox).
  2. The fourfold pattern of risky choices (Kahneman & Tversky).
  3. First-order risk aversion for small stake gambles.
  4. Reference-dependence (Kahneman & Tversky).

Behavioral Finding 1: Probability Distortion

- Many researchers find that in some circumstances subjects tend to subjectively distort probabilities in their decision-making process.
- See Preston and Baratta, 1948; Edwards, 1955/1962; Handa, 1977; Lichtenstein, Slovic, Fischhoff, and Combs, 1978; Kahneman and Tversky, 1979; and Viscusi, 1989.
- This distortion is typically most pronounced for extreme (very small and very large) probabilities.
- Expected utility theory assumes that V is linear in probabilities... but empirical evidence shows that V is nonlinear in probabilities!

Behavioral Finding 1: Probability Distortion (cont.)

Suppose you are offered the following choice:

	A1	A2
0 CHF	0	0.01
1 million CHF	1	0.89
5 million CHF	0	0.10

Behavioral Finding 1: Probability Distortion (cont.)

Now suppose you are offered the following choice:

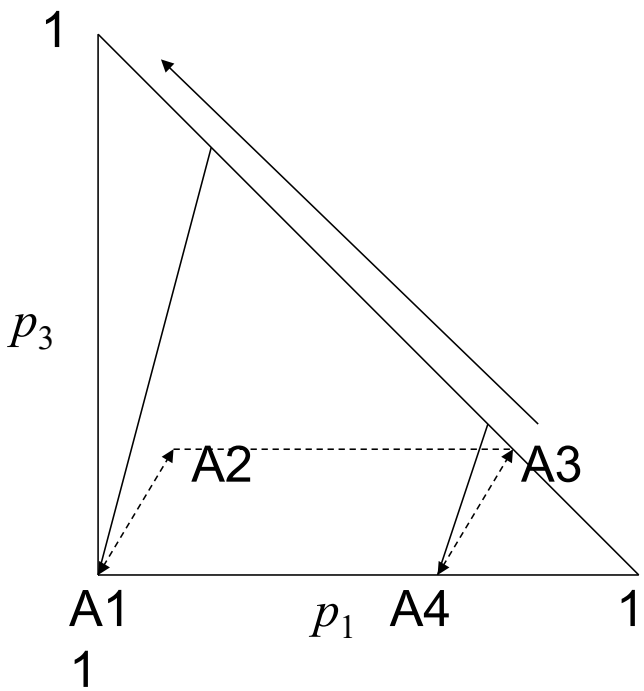
	A3	A4
0 CHF	0.90	0.89
1 million CHF	0	0.11
5 million CHF	0.10	0

Behavioral Finding 1: Probability Distortion (cont.)

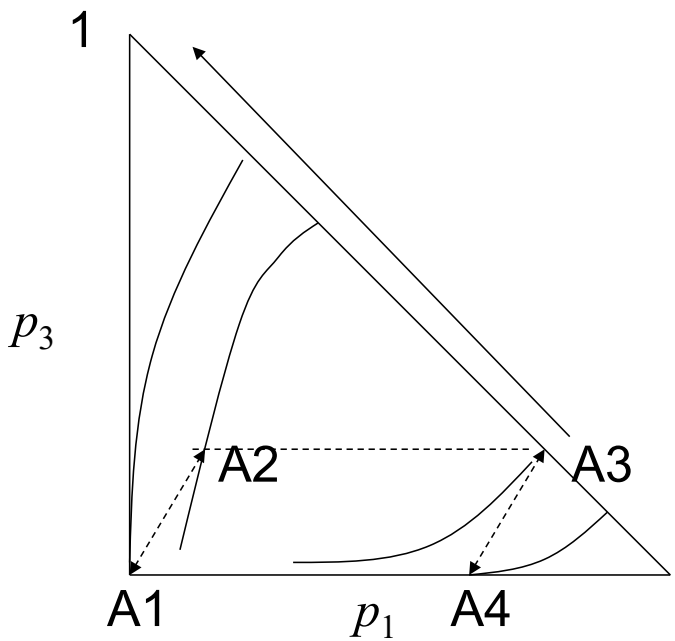
- Many people prefer A3 to A4 but prefer A1 to A2.
- These choices violate the Independence Axiom or the linearity in probabilities property of expected utility preferences.
- This is the famous Allais Paradox (1953).

Behavioral Finding 1: Probability Distortion (cont.)

Expected Utility Ind. Curves



Non-Expected Ut. Ind. C.



Behavioral Finding 1: Probability Distortion (cont.)

Subjective probability distortion can make drawing conclusions about preferences (the shape of the vN-M utility indexes) quite difficult.

Example: If an individual prefers a sure gain of \$800 to an 80% chance of \$1,000 and a 20% chance of \$0, does this mean that the individual is risk-averse in this range?

- Employing the *objective probabilities* would indeed lead to this conclusion.
- However, if the individual subjectively (and probably unconsciously) distorts:
  - the 20% probability to, say, 30%, and
  - the 80% probability to 70%,

  her choice may be consistent with risk-neutrality or even risk-seeking behavior.

Behavioral Finding 2: The Fourfold Pattern of Risky Choices

- According to expected utility theory an individual is either risk averse, risk neutral or risk seeking (no matter the gambles the individual faces)...
- ... but empirical evidence shows that the same individual can make risk avoiding choices for certain gambles but risk taking choices for others!

Behavioral Finding 2: The Fourfold Pattern of Risky Choices (cont.)

Empirical observations show that:

- **1) Risk avoiding behavior towards gambles with probable gains:** we often turn down a fifty-fifty gain 110 CHF or lose 100 CHF gamble.

- **2) Risk taking behavior towards gambles with improbable gains:** we often take gambles that offer a small probability of winning a large prize but that have negative expected value (we buy state lottery tickets).

Behavioral Finding 2: The Fourfold Pattern of Risky Choices (cont.)

Empirical observations show that (cont.):

- **3) Risk avoiding behavior towards gambles with improbable losses:** we often turn down gambles with a small probability of a large loss (we buy accident insurance).

- **4) Risk taking behavior towards gambles with probable losses:** we often prefer a gamble with a substantial probability of a large loss over a sure moderate loss. (turning down a sure loss of 500 CHF for a gamble with a loss of 1000 CHF with probability 0.5).

Behavioral Finding 3: First-Order Risk Aversion for Small Stake Gambles

- Expected utility predicts that risk averse individuals should behave as approximately risk neutral when faced with small stake gambles ... *(second-order risk aversion for small stake gambles)*
- ... but empirical evidence shows that humans are substantially risk averse when faced with small stake gambles *(first-order risk aversion for small stake gambles)*!

Behavioral Finding 3: First-Order Risk Aversion for Small Stake Gambles (cont.)

- First-order risk aversion for small stake gambles: People often reject small-stake gambles that have a positive expected value but may involve losses.
- A majority of people turn down a fifty-fifty gain 110 USD or lose 100 USD gamble.
- A majority of MBA students, financial analysts and rich investors turn down a fifty-fifty gain 550 USD or lose 500 USD gamble. Barberis, Huang, and Thaler (2006).

Behavioral Finding 3: First-Order Risk Aversion for Small Stake Gambles (cont.)

- First-order risk aversion for small stake gambles is also revealed by people's willingness to pay to insure against small stake risks:
- People buy insurance against damage to their telephone wiring at 0.45 USD per month (this is worth 0.26 USD in expectation). Cicchetti and Dubin (1994).
- The average homeowner pays 100 USD to reduce the deductible from 1000 USD to 500 USD in his insurance policy (this is worth 25 USD in expectation). Justin Sydnor (2006)

Behavioral Finding 4: Reference-Dependence

- In expected utility theory the decision maker cares about **final wealth** rather than changes in wealth or how she got that wealth (for example, what she had before—the status quo—or what she hoped for—the aspiration level)...
- ... but empirical evidence shows that the decision maker cares mostly about **changes in wealth** from a reference level rather than levels of final wealth.

Behavioral Finding 4: Reference-Dependence (cont.)

- EUT people should integrate gambles into their income (wage or capital income) and background risks they face (e.g, labor market, stock market, and health risks).

- **Example:** The utility of the gamble $X = (p, g; 1-p, l)$, where $g > 0$ and $l < 0$, for an EUT person with income m and no background risk (income m is deterministic) is:

  $$E[u(m+X)] = pu(m+g) + (1-p)u(m+l)$$

  The person takes gamble X if $E[u(m+X)] > u(m)$.

Behavioral Finding 4: Reference-Dependence (cont.)

Kahneman and Tversky (1979, pp. 277):

- "Our perceptual apparatus is attuned to the evaluation of changes or differences rather than to the evaluation of absolute magnitudes."
- " When we respond to attributes such as brightness, loudness, or temperature, the past and present context of experience defines an adaptation level, or reference point, and stimuli are perceived in relation to this reference point. Thus, an object at a given temperature may be experienced as hot or cold to the touch depending on the temperature to which one has adapted."

Behavioral Finding 4: Reference-Dependence (cont.)

Problem number 1: In addition to whatever you own, you have been given 1000. You are now asked to choose between

A : (1000, 0.5) and B : (500).

Behavioral Finding 4: Reference-Dependence (cont.)

Problem number 2: Problem number 2: In addition to whatever you own, you have been given 2000. You are now asked to choose between

C : (-1000, 0.5) and D : (-500).

Behavioral Finding 4: Reference-Dependence (cont.)

Problem number 1: In addition to whatever you own, you have been given 1000. You are now asked to choose between

A : (1000, 0.5) and B : (500).

Answers: [16 percent] and [84 percent]

Behavioral Finding 4: Reference-Dependence (cont.)

Problem number 2: Problem number 2: In addition to whatever you own, you have been given 2000. You are now asked to choose between

C : (-1000, 0.5) and D : (-500).

Answers: [69 percent] and [31 percent].

The answers to the two questions should be identical if people were expected utility maximizers since final wealth levels are the same.

Non-Expected Utility Theories (see Starmer, 2000)

- Non-Expected Utility Theory
  - Conventional (only violation of indep. axiom)
    - The "Fanning-Out" Hypothesis [Machina (1984) and others]
    - Rank Dependent Utility (RDU) [Quiggin (1982) and others]
  - Non Conventional
    - Ref-depend. Preferences
      - PT (1979) and CPT (1992)
      - Koszegi-Rabin (2006)
    - Nontransitive Preferences
      - Regret Theory [Loomes-Sugden (1982)]
      - Salience Theory [BGS (2012)]

Prospect Theory: Introduction

Main papers are:

Kahneman and Tversky (1979), Econometrica

Tversky and Kahneman (1992), Journal of Risk and Uncertainty

Prospect Theory: Introduction (cont.)

Prospect Theory departs from neoclassical theory in three main ways:

(1) Reference-dependence and loss aversion (people are less sensitive to changes above their reference point ("gains") than below it ("losses")).

(2) "Diminishing sensitivity" (concavity for gains but convexity for losses).

(3) Probability distortion.

Prospect Theory: Introduction (cont.)

- Reference-dependence expands the domain of preferences to include the reference point, but is consistent with the standard notion of rationality as choice consistency.
- Diminishing sensitivity is unfamiliar and may make the objective function nonconcave, but it is fully consistent with rationality.
- Probability distortion is plainly inconsistent with rationality.

Prospect Theory: Kahneman and Tversky (1979)

- Consider only gambles with two outcomes where one of the outcomes is a gain x_1 with probability p and the other is a loss x_2 with probability 1-p.
- Expected utility theory (EUT) says that if you start with wealth w then the value of this gamble is

$$U(G) = pu(w + x_1) + (1 - p)u(w + x_2)$$

Prospect Theory: Kahneman and Tversky (1979) (cont.)

Prospect theory (PT) says that the value of the gamble is

$$V(G|r) = \pi(p)v(x_1 - r) + \pi(1-p)v(x_2 - r)$$

where:

- r is a **reference point** around which a person defines gains and losses, i.e., $x > r$ is a gain and $x < r$ is a loss.
- v is called the **value function** and is defined over gains and losses. In EUT u is defined over final wealth levels.
- π is a non-linear **probability weight**. In EUT π is linear.

Prospect Theory: Kahneman and Tversky (1979) (cont.)

The *value function* of PT differs from the vN-M *utility function* of EUT in three main respects:

1. Utility is derived from changes in wealth relative to a reference point, as opposed to final levels of wealth.
2. The value function is concave over gains, implying risk averse preferences in that domain, but convex over losses, implying risk seeking preferences in that domain.
3. Losses loom larger than gains do, causing for a kink in the value function at the reference point.

Prospect Theory: Kahneman and Tversky (1979) (cont.)

- 0 is the *reference point*.
- Utility is defined over *gains* and *losses* relative to the reference point and not on final wealth levels.
- In other words, in PT there is *no asset integration* (people do not think about their wealth levels when they make choices under uncertainty).

Prospect Theory: Kahneman and Tversky (1979) (cont.)

The function v satisfies:

- $v'(x) > 0$ and $v(0) = 0$
- Concavity for gains: $v''(x) \leq 0, x \geq 0$
- Convexity for losses: $v''(x) \geq 0, x \leq 0$
- Loss aversion.

Prospect Theory: Kahneman and Tversky (1979) (cont.)

Expected utility predicts if a risk averse individual (diminishing marginal utility of wealth) is faced with a fifty-fifty gain x USD lose x USD gamble then

$$u(w) - u(w - x) > u(w + x) - u(w)$$

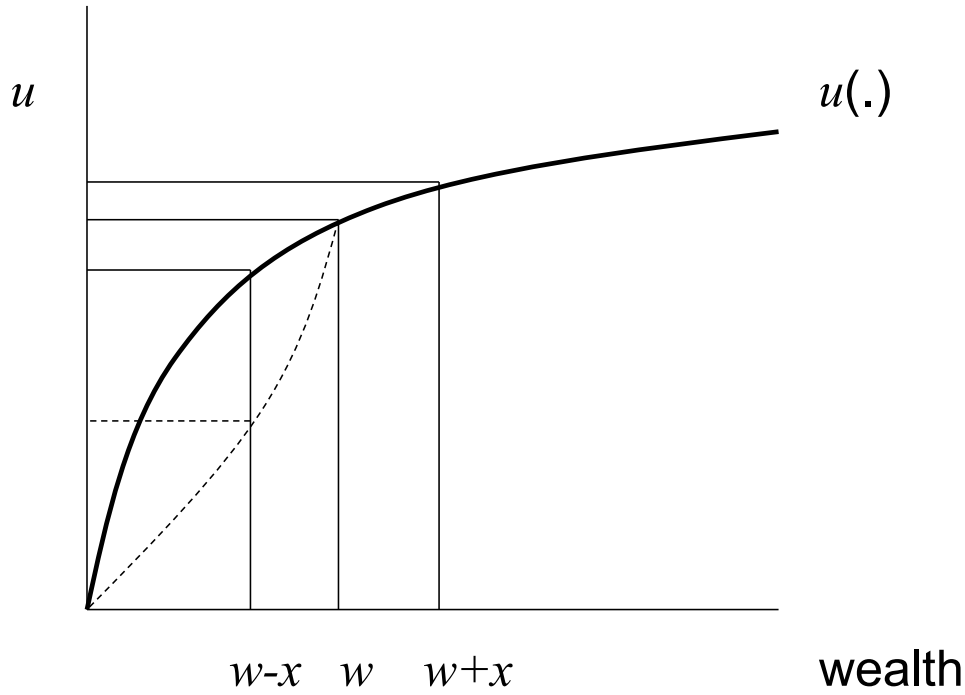
that is, the decrease in utility from a loss hurts more than the increase in utility from a same-sized gain.

Prospect Theory: Kahneman and Tversky (1979) (cont.)

However, empirical evidence shows that people dislike losses relative to a reference level *much more* than they like same-sized gains.

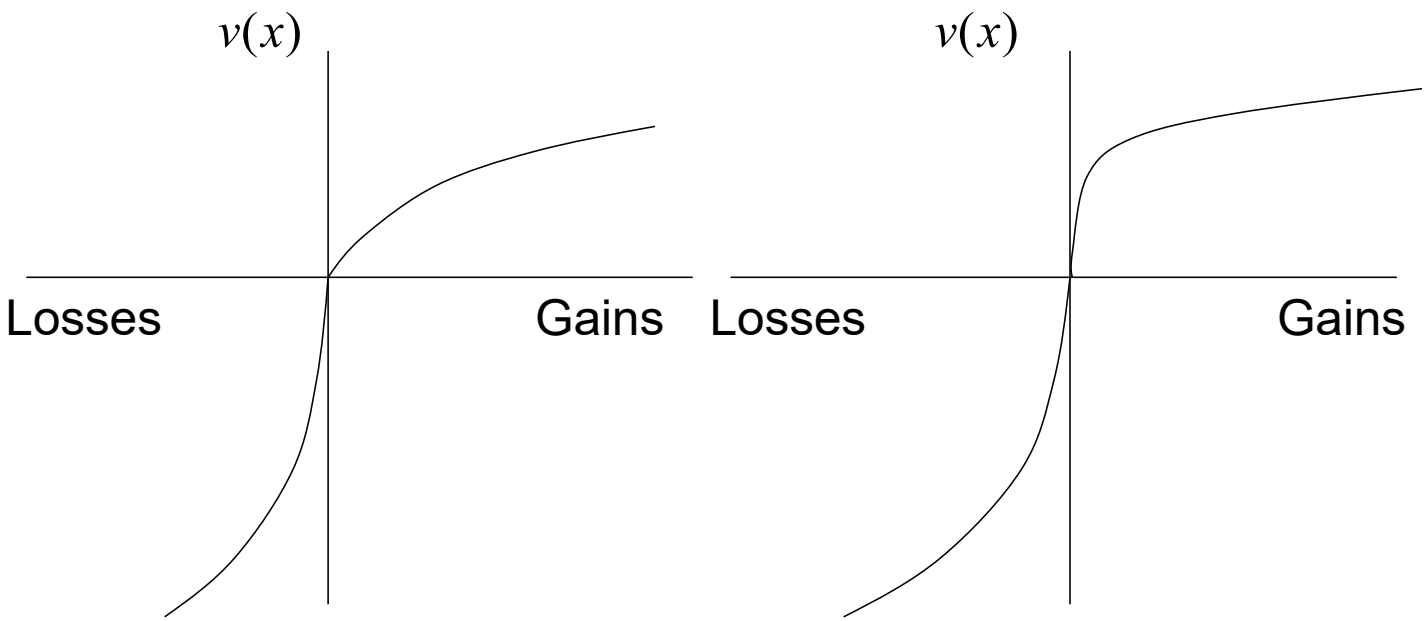
The idea is that expected-utility plus risk aversion per se is not able to explain individuals' *large distaste for losses* relative to a reference level by comparison with their taste for same-sized gains.

Prospect Theory: Kahneman and Tversky (1979) (cont.)



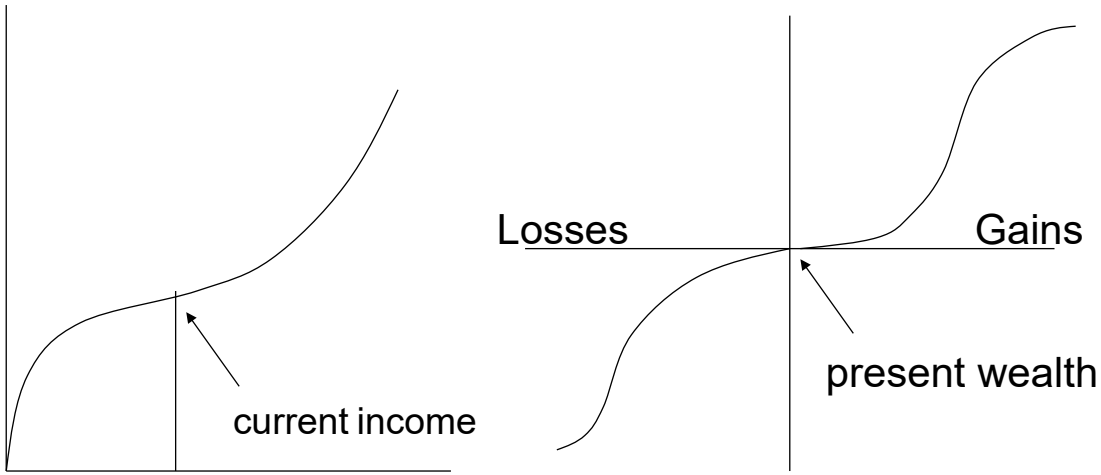
Prospect Theory: Kahneman and Tversky (1979) (cont.)

Typical nondifferentiable and differentiable $v(x)$



Prospect Theory: Kahneman and Tversky (1979) (cont.)

This stands in contrast to the utility functions proposed by Friedman and Savage (1948) and by Markowitz (1952).



Prospect Theory: Kahneman and Tversky (1979) (cont.)

- The two big novelties of PT are that the v function is steepest at the reference point and loss aversion.
- We have diminishing marginal sensitivity to larger gains or losses like in Markowitz (1952).
- There are several definitions of loss aversion in the literature. Some definitions related loss aversion to local behavior of v near 0 others state global conditions on v for gains and losses of equal size.

Prospect Theory: Kahneman and Tversky (1979) (cont.)

Kahneman and Tversky (1979) propose a global definition of loss aversion:

- disutility of a loss is larger than the utility of a same sized gain ("losses loom larger than gains")

  $v(x) < -v(-x), \forall x > 0$

- utility for losses is steeper than utility for gains, that is,

  $v'(x) < v'(-x), \forall x > 0$

This definition does not separate loss aversion from the curvature of utility for gains and losses.

Prospect Theory: Kahneman and Tversky (1992)

Even though one of the most cited paper in Economics, Kahneman and Tversky (1979) has two major problems:

- Only considers mixed gambles with 2 outcomes.
- Transformation of marginal probabilities implies that the preference function V is non monotonic, that is, sometimes it selects gambles that are FOS dominated by other gambles.

These two shortcomings are tackled in their 1992 article, giving rise to **Cumulative Prospect Theory** (CPT).

PT and CPT have nowadays become the most prominent alternative to EUT. Widely used in empirical research.

Prospect Theory: Kahneman and Tversky (1992)(cont.)

This allows Kahneman and Tversky to explain (among many other things) the fourfold pattern of risky choices:

1) Risk avoiding behavior for likely gains: The effect of risk averse preferences (v is concave in the domain of gains) dominates the effect of probability distortion (small for likely gains).

2) Risk taking behavior for unlikely gains: The effect of probability distortion (high for unlikely gains) dominates the effect of risk averse preferences (v is concave in the domain of gains).

Prospect Theory: Kahneman and Tversky (1992)(cont.)

This allows Kahneman and Tversky to explain (among many other things) the fourfold pattern of risky choices (cont.):

3) Risk avoiding behavior for unlikely losses: The effect of probability distortion (high for unlikely losses) dominates the effect of risk seeking preferences (v is convex in the domain of losses).

4) Risk taking behavior for likely losses: The effect of risk seeking preferences (v is convex in the domain of losses) dominates the effect of probability distortion (small for likely losses).

II.3 Buyers, Sellers and Markets

- We will now start the topic: "Buyers, Sellers and Markets."
- First, we discuss the endowment effect.
- Next, we study the implications of bounded rationality by consumers on market outcomes.

The Endowment Effect

- Experimental and field evidence for the endowment effect.
- Seminal contributions:
  - Thaler (1980)
  - Samuelson and Zeckhauser (1988)
  - Knetsch (1989)
  - Kahneman, Knetsch and Thaler (1990)
  - Tversky and Kahneman (1991)

The Endowment Effect (cont.)

- There is a large and still growing experimental and field literature supporting the view that a decision maker typically values an alternative more highly when it is regarded as the status quo, than otherwise.
- Versions of this are called status quo bias, or endowment effect.
- An illuminating experiment that nicely illustrates this bias is the following one, due to Knetsch (1989).

The Endowment Effect (cont.)

A number of participants was randomly divided into three groups; call them group C, group M, and group N:

- Group C received from the experimenter a candy bar,
- Group M received a mug,
- Group N got nothing.

The Endowment Effect (cont.)

- Then, participants in groups C and M were given the opportunity to change at zero cost their original object for the other. They simply had to express their wish to change the object, and the experimenter would immediately satisfy it.

- Participants in group N were simply given the opportunity to choose between a candy bar and a mug.

The Endowment Effect (cont.)

- The results are surprising!
- Preferences of subjects in group N were more or less evenly divided, while 90 percent of participants in groups C and M expressed no desire to change, showing a strong status quo bias.

  [The standard model predicts that only 50 percent in groups C and M should express no desire to change]

The Endowment Effect (cont.)

- If I found out that half of you owned mugs at home, and half did not, and then elicited willingness to accept (WTA) by owners, and willingness to pay (WTP) by non-owners, what would we expect about average WTA and average WTP?
- Probably those who own mugs like mugs better on average.
- This is a selection effect. Those who like mugs more are more likely to buy mugs in the first place.
- So WTA of owners will presumably be higher than WTP of non-owners.

The Endowment Effect (cont.)

- But what if I *randomly* gave each of you mugs? How would average WTA and WTP compare in that case?
- Well, standard theory says they should be the same.
- If the distribution of valuations is the same across owners and non-owners the average WTA of owners should be equal to the average WTP of non-owners
- Actually, standard theory predicts that the average WTA and WTP should be almost the same.

The Endowment Effect (cont.)

- If you randomly distribute mugs, designate some people owners and others non-owners, then elicit WTA and WTP (with a range from 0.5 USD to 10 USD) you get:
- Average WTA: 7.0 USD
- Average WTP: 3.5 USD

The Endowment Effect (cont.)

- Kahneman, Knetsch and Thaler (1990) were the first to run the "mug experiment". Since then there are been numerous replications.
- The many different versions of the above experiment that have been run have yielded similar results, which suggests a high level of robustness in this finding.
- Caveat: List (2003, 2004) finds that experience trading goods can reduce or eliminate the endowment effect.
- To sum up, the gap between average WTA and average WTP leads to undertrading of consumption goods. Thus, markets are not so efficient as we think they are!!!

Rationality

- Rationality is something very precise for Economists.
- It means different things in different settings but essentially it says that:
  - (i) agents have stable and well-defined objective functions.
  - (ii) they optimize.
  - (iii) they do not make systematic mistakes.

Rationality (cont.)

From this simple definition of rationality, we obtain the most common departures from rationality:

- Preferences change (hyperbolic discounting, reference dependence)
- People do not fully optimize (satisficing behavior, rules-of-thumb, heuristics).
- People make systematic mistakes (biases).

Deviations from Rationality and Markets

- One important question: What are the implications of deviations from rationality for pricing, markups, profits, consumer surplus, or overall welfare?
- Competition is sometimes protective.
- In many settings, competitive forces educate consumers.
- Fictitious example: if consumers mistakenly believe that Windows is a good operating system, Apple will run advertisements correcting them.

The Curse of Education

- However, competition need *not* be protective.
- Firms do not have an incentive to educate or debias consumers if debiased consumers are not profitable.
- **"Curse of education"**: educating the consumer makes her unprofitable.
- Examples of education that will make a consumer unprofitable: "If you buy this large house, you will be spending too much of your income on housing. Stay in your old house."

Shrouded Attributes and Consumer Myopia

- Gabaix and Laibson (2006): "Shrouded Attributes, Consumer Myopia, and Information Suppression in Competitive Markets," QJE.
- Many contracts/goods have "shrouded attributes" that some people don't fully consider.
- For example, buying a printer: only 3 percent of printer buyers report that they knew the ink price per page when they bought their printer (Hall 2003).
- Mutual fund fees: Most individual investors report that they do not know the fees that they are paying (Alexander et al. 1998, Barber et al. 2002).

Shrouded Attributes and Consumer Myopia (cont.)

Main findings:

1. If the fraction of myopic consumers is large enough, add-ons will be shrouded and will have large mark-ups.
2. Even in competitive markets.
3. Even if firms can unshroud add-ons at no cost.
4. Myopic consumers cross-subsidize sophisticated consumers in a shrouded equilibrium.

II.4 Time Inconsistent Preferences

- In what follows we will briefly discuss time inconsistent preferences and quasi-hyperbolic discounting
- To illustrate, consider the study "Predicting Hunger: The Effects of Appetite and Delay on Choice", Read and van Leeuwen (1998)
  - Eat chocolate today with delayed health consequences but immediate gratification, or eat fruit today with less gratification but better long-term health consequences.
  - What do you choose today for you to eat next week?
  - What do you choose today to eat today?

Fruits vs chocolate

Choosing Today → Eating Next Week → *Time*

If you were deciding today, would you choose fruit or chocolate for next week?

Fruits vs chocolate (cont.)

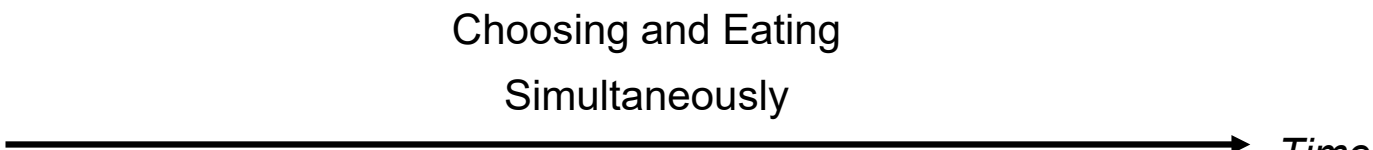
Choosing Today → Eating Next Week → *Time*

Today, subjects typically choose fruit for next week.

74% choose fruit

Fruits vs chocolate (cont.)

Choosing and Eating Simultaneously



If you were deciding today, would you choose fruit or chocolate for today?

Fruits vs chocolate (cont.)

Choosing and Eating Simultaneously

70% choose chocolate

Time Inconsistent Preferences

- Participants in this study were dynamically inconsistent:
- They chose far more unhealthy snacks (chocolate bars and salty snacks) for immediate consumption than for future consumption.
- They displayed impatient choices when faced with immediate consumption but patient choices when faced with future consumption.
- Real-world consequences: The average adult has 6,000 USD of outstanding credit card debt. Few people can afford to pay off 6,000 USD in full, so many make only the minimum payment each month and pay interest at very high rates on the balance.
- Why? The attraction of immediate consumption is hard to resist and prevents many people from taking a bank loan at lower interest to pay off credit card debt.

Quasi-Hyperbolic Discounting

The standard discounted utility model says that utility at time t is

$$U(c_t, c_{t+1}, ...) = u(c_t) + \delta u(c_{t+1}) + \delta^2 u(c_{t+2}) + ...$$

Instead of this formulation, we will assume

$$U(c_t, c_{t+1}, ...) = u(c_t) + \beta\delta u(c_{t+1}) + \beta\delta^2 u(c_{t+2}) + ...$$

where $0 < \beta < 1$ and $0 < \delta \leq 1$.

Quasi-Hyperbolic Discounting

- In this model, introduced by Phelps and Pollack (1968), δ represents long-run, time consistent discounting.
- The parameter β, on the other hand, represents a "bias for the present" - how you favor now versus later. If $\beta = 1$, then the model reduces to exponential discounting.
- But $\beta < 1$ implies present-biased preferences: the person gives more relative weight to period τ in period τ than she did in any period prior to period τ. $\rightarrow$ Taste for immediate gratification.
- Since they apply β to all future periods equally, this means that they are relatively impatient when it comes to tradeoffs between the present and the future, but they are relatively patient when it comes to tradeoffs that occur in the future.

Quasi-Hyperbolic Discounting (cont.)

- Quasi-hyperbolic discounting is only "hyperbolic" in the sense that it captures the key qualitative property of hyperbolic discounting: a faster rate of decline in the short-run than in the long-run.
- The quasi-hyperbolic discounting captures the essentially feature that motivates this topic.
- A person often prefers to act relatively impatiently now but patiently in the future, of course, once the future comes, she again prefers to act impatiently, disagreeing with her earlier preference.
- This intertemporal conflict leads to a **self-control problem**: she wants to exercise self-control tomorrow but, once tomorrow comes she may not want to.