Summary this far

- Traditional theory (Expected Utility) claim that our preferences over lotteries can be represented by a utility function over outcome (+ wealth) where we choose the lottery with the highest expected utility.

- The two main deviations in Prospect Theory:
  - Value (utility) of the outcome determined independent of existing wealth and with a kink at the reference point. Marginal utility higher for losses than for gain.
  - Values of different outcomes weighed together, but not with probabilities.

Lotteries with 3 outcomes: 100; 50; 0

- Probabilities: p, q and 1-p-q
- We draw all lotteries in a triangle
- Expected utility:
  - Let \( u(0) = 0 \)
  - \( u(100) = a \), \( u(50) = b \)
  - \( EU = ap + bq \)
- \( EU \) is linear in \( p \) and \( q \)
  - Indifference curves linear and parallel.
- Prospect theory imply nonlinear indifference curves.
Value function versus utility function

- EU. Utility function takes outcome plus wealth as argument
- Could have a kink
  - But linked to a specific wealth level
- PT:
  - Value function a kink at the reference point
    - Usually 0
  - Wealth not included

The endowment effect

- Three groups:
  - Mug owners get at mug (worth 5$ at the local store)
  - Buyers get 5$
  - Choosers get nothing, but will choose money or cup.
- Elicit willingness to pay / willingness to accept
  - The mug owners will sell for 7.12 $
  - The others will buy for 2.87 $
  - The choosers indifferent at 3.12 $
- Prospect theory interpretation
  - Getting the mug makes it a loss to part with it
  - The mug is a gain if you have not been given one

Exchange

- Half the group get the mug
  - Independent of mug-valuation
- The 50% with highest mug valuation will be divided:
  - One half got a mug
  - The other half did not
  - Expect half the mugs to be traded
  - Actually about 10-20% are traded
- Coase’s theorem: Final allocation independent of initial assignment of property rights
Transaction costs

- Same experiment with poker chips
- Each participant has a given “exchange rate”
- If it is worth 5$ to me and 3$ to you both will benefit if you sell it to me for 4$.
- Demand and supply functions derived
- Can find market equilibrium prediction, provided no transaction costs.
- RESULT: Outcome equals prediction
- No transaction cost

Endowment effects in The Edgeworth box

- Crossing indifference curves
  - Pens for Money
  - Money for Pens
- Kinked indifference curves around status quo
- E.g. the Edgeworth box

The evolution of endowment effect

- Animals face recurrent fights over resources
- A coordination game, need a coordination device
- Incumbent stay, entrant runs
- Butterfly experiment
  - Both on hilltop for one day
  - They fight (both incumbents)

<table>
<thead>
<tr>
<th></th>
<th>Fight</th>
<th>Run</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fight</td>
<td>-1,-1</td>
<td>1,0</td>
</tr>
<tr>
<td>Run</td>
<td>0,1</td>
<td>0,0</td>
</tr>
</tbody>
</table>
Plott and Zeiler’s critique of the “endowment effect”

- Is the WTP/WTA gap really evidence of an endowment effect?
- WTP/WTA not found in all studies
- Differences in procedures
- The results depend on procedures
- Concern about misunderstanding
  - Do subject understand “true value”
- Anonymity
  - Do high-bidders appear naive?

Becker-DeGroot-Marschak mechanism

- How much will you accept to part with the mug?
  - Say you’ll really do it for $5
  - Why not state $7 and hope you will get at least $6
- BDM-Mechanism (seller)
  - The seller states a minimum price X (Your state $7, true price is $5)
  - A random price P is drawn (Suppose we pick $6)
  - Sold at price P if P ≥ X (If you stated $7, you lost the $6 deal)
  - The mechanism is incentive compatible. (Rational to state $5)
- Do subject understand the incentive compatibility?
  - Or do they still try to sell high and buy low?

Misconceptions

- “Revealed theory approach”
- 4 Controls
  - Incentive compatibility
  - Training
  - Paid Practice
  - Anonymity
- Situation trigger “selling behavior”, i.e. selling high.
- Not fully understand auction mechanism
  - Behave as if an standard auction.
Design and results

• Invoke all controls
  – Training, paid practice, incentives (BDM) and anonymity
• Main result: No WTA-WTP gap
  – That is: No Endowment effect
  – True even without paid practice
• What about exchange-effect
  – Not in the paper
  – Plott and Zeiler in later paper: Remove the word “gift” and the exchange effect disappear.

Does Plott and Zeiler show that prospect theory is wrong?

• The paper demonstrates a problem with the initial experimental design.
  ➢ The effect does depend on experimental procedures
• An alternative interpretation
  ➢ Training induces expectations of trade and hence influence the reference point.
  ➢ Still, original studies no longer provide evidence of an endowment effect, may just as well be misconceptions
• Unrelated evidence for reference points
  ➢ The study of working with 50-50 (fixed effort based payment)
  ➢ Importance of status quo
    ➢ But can also be effort, coordination or implicit endorsement
  ➢ Effect of reframing in Kahneman and Tversky (+2000 the loss / only gain)

Rabin’s theorem

• Suppose a person is indifferent to (0) and a lottery (+100 Kr, 67% ; -100 Kr, 33%)
• The person would be indifferent irrespective of income level
• Assume the person maximizes expected utility
• For what values of X will he prefer the lottery (X, 50% ; -100, 50%) to (0)?
Lotteries and wealth

- $x_i$ is payoff from a lottery
- The subject has additional wealth and income $W$.
- The lottery changes the total wealth from $W$ to $W+x_i$.
- Expected utility should thus be written

$$Eu(W+x) = \sum_{i=1}^{n} u(W+x_i)p_i$$

Indifference for any $W$

- Indifference implies

$$(2/3)u(W+100) + (1/3)u(W-100) = u(W)$$

$\Delta u^+ = u(W+100)-u(W)$

$\Delta u^- = u(W)-u(W-100)$

$\Delta u = 2 \Delta u^+$

Sketch of proof

- $u(W+300) = u(W+300)-u(W+200) + u(W+200)-u(W-100) + u(W+100)-u(W)$

$= \Delta u^*/4 + \Delta u^*/2 + \Delta u^+$

- $u(W+n100)-u(W) = (1+2^1+...+2^{(n-1)}) \Delta u^+ < \Delta u^*$

- $Eu = 50\% u(W+n100)+50\%u(W-100)$

- $Eu-u(W)= 50\% [u(W+n100) - u(W)] - 50\% [u(W)-u(W-100)] < 0$
Almost any risk aversion yields similar results

- A person who turns down a lottery (100, 51%; -100, 49%) at any income level
- Will also turn down (+1 000 000 000, 51%, -1 800, 49%)
- If such conclusions are implausible, EU imply risk neutrality towards modest risk.

Indifference for \( W < W_0 + 10000 \)

- Is the problem that the person is indifferent for any level of \( W \)?
- With \( W_0 = 1 000 000 \), 12 in the figure is only 1 001 200
- Turn down (-100, 55%; 1.4 \( 10^{31} \), 45%)

Prospect theory, by contrast, yields modest risk aversion

- Reference point is current wealth.
- Choices should be independent of wealth
  - Plausible?
  - Could you think of an experiment to test it?
  - Can the theory easily be adjusted to account for wealth?
- Loss aversion implies risk aversion even for modest risk.
Default / Status Quo Bias

• Samuelson and Zeckhauser (1988):
  – A: "...You inherit a large sum of money from your uncle. ..."
  – B: "... You inherit a portfolio... A significant portion invested in modest risk company. ..."
  – The choice: Moderate risk company; high risk company, treasury bills, municipal bonds.
  – Result: An option is more likely to be selected when it is designed as the status quo.
• Organ donations
• Saving for retirement (opt in or opt out)
• Choosing the first dish in display

Explaining default effects

• Effort
  – Becoming a organ donor requires effort (as does opting out)
• Implicit endorsement
  – I ask “does anybody disagree”, it may have been interpreted as “you better not”
• Coordination
  – “Raise your hand” may be a coordination game
  – “I want to answer the same as everyone else”
  – “Nothing” is the best prediction of what others will do
  – Besides, I can raise may hand after the others
• Loss aversion
  – It is often natural to expect status quo.

Fairness

• Q 1a: “A shortage has developed for a popular model of automobile, and customer must wait two months for delivery. A dealer has been selling the car at list price. Now the dealer prices the model 200 $ above list price”
  – Acceptable (29%)  Unfair (71%)
• Q 1a: "... A dealer has been selling the car 200 $ below list price. Now the dealer prices the model at list price
  – Acceptable (58%)  Unfair (42%)
Liberal paternalism

- We need defaults
  - Organ donor or not?
  - Many left without a license when they had to choose (no default)
  - Join savings plan or not
  - There is some food on the first spot
- It is easy to opt out – no one forced (Liberalism)
- Knowing that more people pick the first dish
  - Should the healthy or unhealthy be picked first? (Paternalism)

Caveat
- Suppose one option is good for society another for the individual
  - Littering, military services…
- Is it acceptable for the government to induce individuals to act against their own self-interest, using subtle means like: defaults?