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ECON4260 Behavioral Economics

3rd lecture

Endowment effects
and
aversion to modest risk

Decision weights (See Benartzi and Thaler, 1995)

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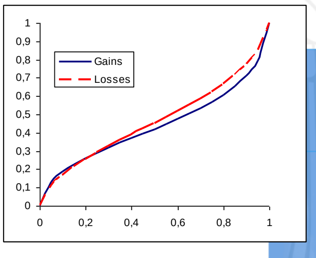
$$w(p)=\frac{p^{\gamma}}{\left(p^{\gamma}+(1-p)^{\gamma}\right)^{1/\gamma}}$$

$\gamma = 0.61$ for gains

$\gamma = 0.69$ for losses



The value function (see Benartzi and Thaler, 1995)

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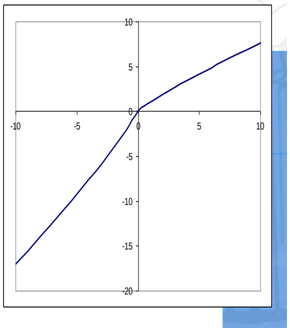
$$v(x)=\begin{cases} x^{\alpha} & \text{if } x \geq 0 \\ -\lambda(-x)^{\beta} & \text{if } x < 0 \end{cases}$$

- $\alpha = \beta = 0.88$
- $\lambda = 2.25$



Prospect theory – decision weights

$$w(p) = \frac{p^{\gamma}}{\left(p^{\gamma} + (1-p)^{\gamma}\right)^{1/\gamma}} \qquad \gamma = 0.61$$

- Consider lottery
  - 100 with 5% probability
  - 200 with 5% probability
  - …
  - 2000 with 5% probability
- With weight
  - 100 with 13.2% probability
  - 200 with 13.2 % probability
  - …
  - 2000 with 13.2 % probability
- Problem:
  - The weights adds to 264%
  - Prospect theory predict that people will prefer this lottery to 3000 for sure

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Cumulative Prospect theory Rewrite to cumulative probabilities

- Same lottery
  - 100 with 5% prob.
  - 200 or less with 10% prob.
  - …
  - 1900 or less with 95.0% prob.
  - 2000 or less with 100% prob.

$$w(p) = \frac{p^{\gamma}}{\left(p^{\gamma} + (1-p)^{\gamma}\right)^{1/\gamma}}$$

- Cumulative weight
  - 100 or less with 13.2% prob.
  - 200 or less with 18.6% prob.
  - 300 or less with 22.7
  - …
  - 1900 or less with 79.3% prob.
  - 2000 or less with 100% prob.
- Weights
  - 100 with 13.2% prob.
  - 200 with 5.4% prob.
  - 300 with 4.1 % prob.
  - …
  - 2000 with 21.7% prob.

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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

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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

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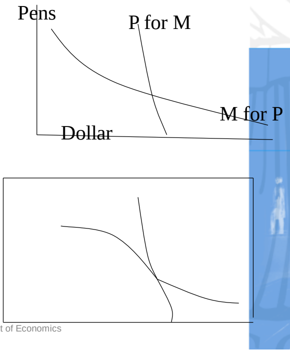
Endowment effects in The Edgeworth box

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



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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)

- Fighting over a resource
  - Two Nash equilibriums (ESS)
  - One fight and one run
- Both fighting, they'll kill each other
- Allow some initial test of strength

	Fight	Run
Fight	-1,-1	1,0
Run	0,1	0,0

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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 apear naive?

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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?

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Misconceptions

- "Revealed theory approach"
- 4 Controls
  - Incentive compatibility
  - Training
  - Paid Practice
  - Anonomity
- Situation trigger "selling behavior", i.e. selling high.
- Not fully understand auction mechanism
  - Behave as if an standard acution.

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.

Follow up studies

- Isoni et al
  - Randomized asignment of procedure condition
  - Constant show-up fee.
  - No gap and no difference between procedure
  - "House money"
- Physical proximity to item and framing.

Learning to trade?

- List (2004)
  - Endowment effect on sports card show
  - No effect from very experienced traders
- Engelman and Hollard (2010)
  - First a round where half the subjects were force to trade, the other half had the opportunity.
    - Forced: If they did not trade they lost the item
  - Next they run the exchange experiment.
    - They find no endowment effect for those forced to trade
    - An endowment effect on those who had the oportunity to trade.

Expectations

- Közegi and Rabin argues that the reference point is determined by expectations.
  - Expectations follows from what you think you will do.
- If you think you will trade the reference point is not the item you own.
  - But the item you expect to get after the exchange
- Similarly with Plott and Zeiler
  - Training people to understand the experiment
  - Also change their expectation of what they will do.

Ericson and Fuster: Can expectations explain the empirical findings?

- Plott and Zeilers (2005) extensive training build an expectation that the item will be traded.
- Engelmann and Hollard (2010) first had a round were the item subjects received had to be given away.
  - Will they expect to keep the next item they get?

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)?

There is no such X, however large!

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Lotteries and wealth

- A lottery (x_1, p_1, x_2, p_2)… but what is x?
- You get 2000 and then (-1000,50%)
  - Is the 2000 included in x or independent?
- There is no such thing as independence between decision in standard theory
  - 1000 kroner can be used for
    - Coffees on Trygve
    - Saved to help buy an apartment in the future
    - Saved for pensions
    - etc
- Your total wealth will increase from W to W+x_i
- Expected utility should thus be written

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

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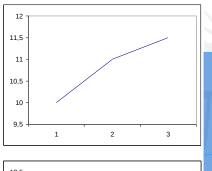
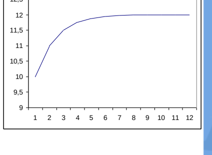
Indifference for any W

- Indifference implies

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



Δu^+=u(W+100)-u(W)
Δu^-=u(W)-u(W-100)
$\Delta u^- = 2\,\Delta u^+$



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Sketch of proof

- $u(W+300) = u(W+300)-u(W+200)$
  $+ u(W+200)-u(W-100)$
  $+ u(W+100)-u(W)$
  $= \Delta u^+/4 + \Delta u^+/2 + \Delta u^+$
- $u(W+ n\,100)-u(W) = (1+2^{-1}+ \ldots +2^{-(n-1)})\ \Delta u^+ < \Delta u^-$
- $Eu = 50\%\ u(W+ n\,100)+50\% u(W-100)$
- $Eu-u(W)= 50\%\ [u(W+ n\,100) - u(W)]$
  $-\ 50\%\ [u(W) - u(W-100)] < 0$

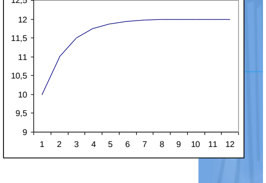
Almost any risk aversion yields similar results

- A person who turns down a lottery
(100, 51%;-100,49%) at any income level
- Will also turn down
(+10 000 000 000, 51%, -1 800, 49%)

- If such conclusions are implausible, EU imply risk neutrality towards modest risk.

Indifference for W < W0+10 000

- Is the problem that the person is indifferent for any level of W?
- With W0 = 1 000 000, '12' in the figure is only 1 001 200
- Turn down
(-100,55%;1.4 10^{31},45%)



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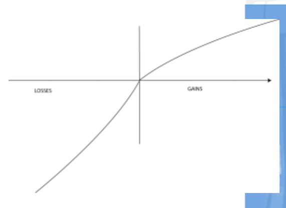
Prospect theory, by contrast, yields modest risk aversion

- 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.



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Mental accounting

- Imagine that you are about to purchase a jacket for ($125)[$15] and a calculator for ($15)[$125]. The calculator salesman informs you that the calculator you wish to buy is on sale for ($10)[$120] at the other branch of the store, located 20 minutes drive away. Would you make the trip to the other store
  - A: (Numbers). Most will make the trip
  - B: [Numbers]. Few will make the trip
  - Both cases save $5 at the cost of a 20 minutes trip.
- Why do people choose differently in A and B?

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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

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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?

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Köszegi and Rabin

Utility $u(c\mid r)=m(c)+\eta\mu(c-r)$ with

$m(c)$ being "consumption utility"

$$\mu(x)=\begin{cases} x & x>0 \\ \lambda x & x<0 \end{cases} \text{ where } \lambda>1 \text{ represent loss aversion}$$

Many goods, additive utility:

$$u(c\mid r)=\sum_{i=1}^{n} m_i(c_i)+\eta_i\mu(c_i-r_i) \text{ with}$$

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K&R. Theory of the reference point

- The reference point *r* is a **personal equilibrium (PE)** if a person would choose *c*=*r* if *r* where the reference point.
  - Generally: the person would lottery *F* if *F* where his reference lottery
- There may be many equilibrium:
  - A **Preferred Personal Equlibrium** is the best PE

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Two lotteries. A and B

- A: (100,50%; 0,50%) and B: (300,50%; -100,50%)
- Utility

$$u(c\mid r)=2c-\begin{cases} r-c \text{ if } r>c \\ 0 \quad \text{if } c\geq r \end{cases}$$

- With A as reference:
  - U(B|A)= ¼ (600 + 600+(-200-200) + (-200 -100))=500/4 =125
  - U(A|A)= ½ (200 + 0)= 100 < U(B|A) A not a PE
- With B as reference
  - U(A|B) = ¼ ((200 -200) + 200 + (0-300)+0) = -100/4 =-25
  - U(B|B) = ½ (600 – 200) = 200 > U(A|B) B is a Personal Equ.

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