Microeconomics

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Applications of Rational Choice and Demand

Choice under Uncertainty

Cognitive Limitations and Behavioral Economics

Consumer Surplus I

Definition

Consumer surplus – a measure of the extent to which a consumer benefits from participating in a transaction.

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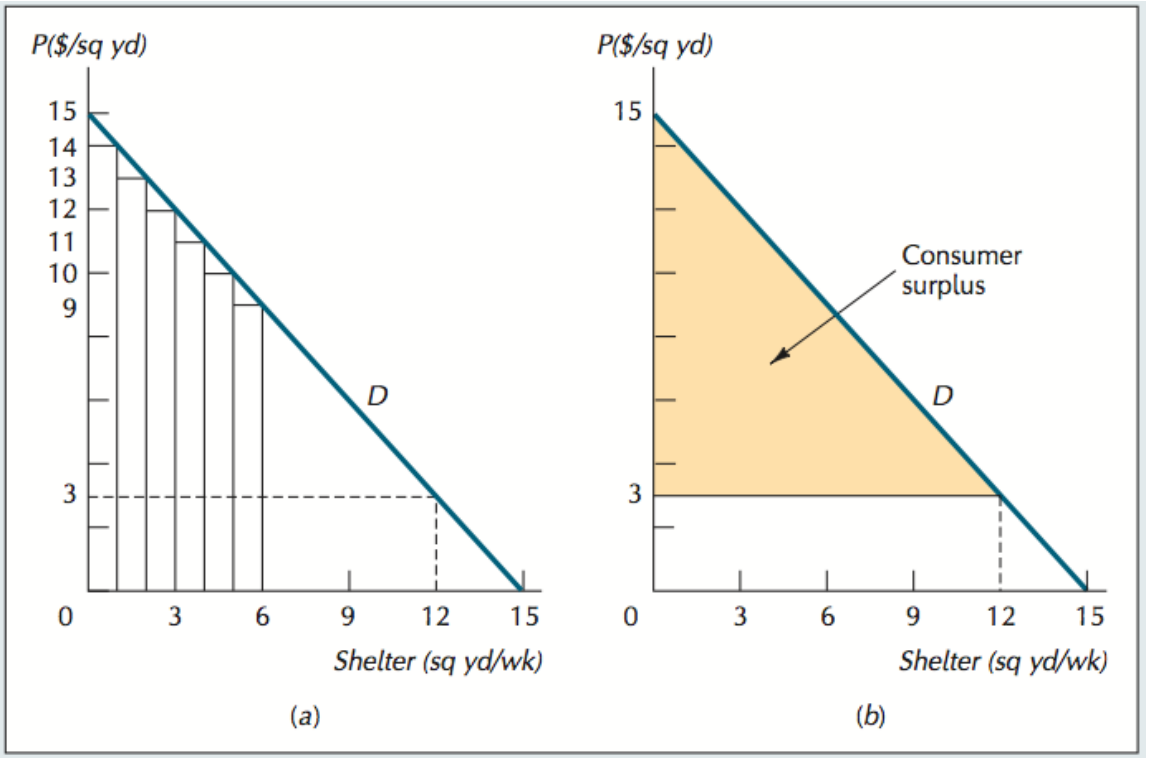
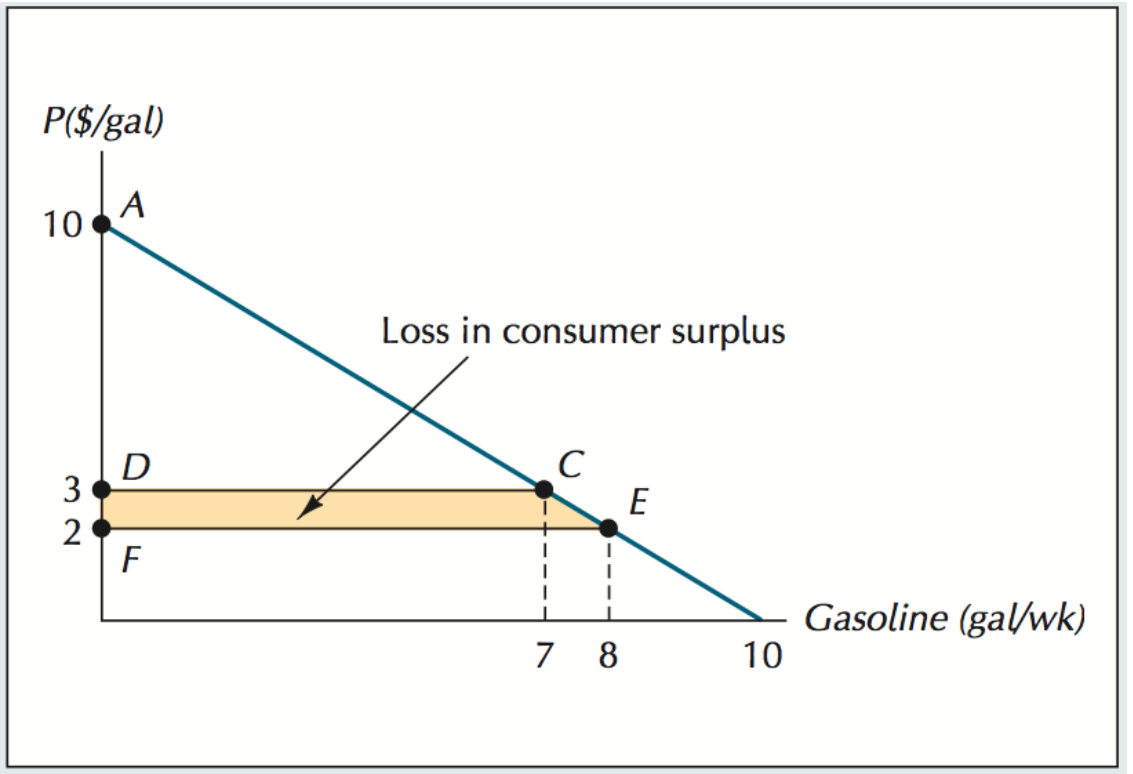
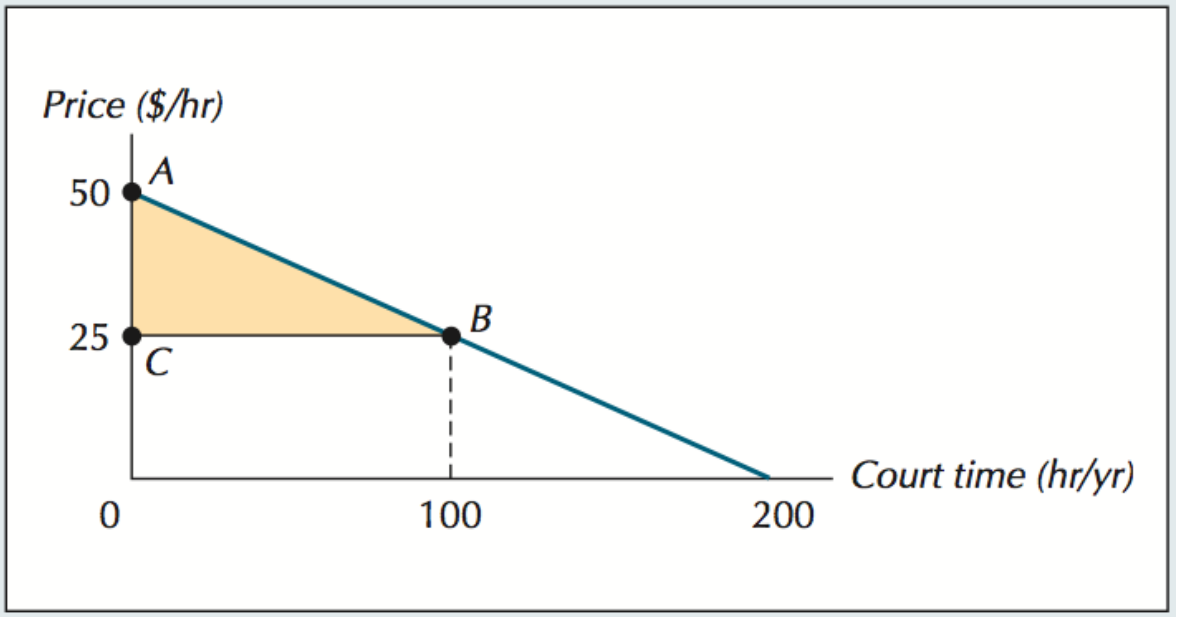


Consumer Surplus II



- A loss in the consumer surplus measures the cost of policy

Two–Part Tariffs



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Introduction I

- In reality there are (almost) no choices or decision to be taken with access to full information.
- When choosing a university to attend, a person to marry, a movie to see etc., there are likely to be important characteristics you are uncertain about at the moment of choice.
- Sometimes we choose between unknown alternatives, sometimes we know more about one then the other.

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- Sometimes we choose between unknown alternatives, sometimes we know more about one then the other.
- Economic decisions made under uncertainty are essentially gambles.

Introduction II

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3. *If heads, you win €20000; if tails, you lose €10000. Losers are allowed to off their loss in small monthly payments spread over 30 years.*

Probability and Expected Value

- An important property of a gamble is its expected value – a weighted average of all its possible outcomes, where the weights are the respective probabilities.
- Expected values of the three gambles:

$$EV_1 = (1/2)100 + (1/2)(-0.5) = 49.75$$

$$EV_2 = (1/2)200 + (1/2)(-100) = 50$$

$$EV_3 = (1/2)20000 + (1/2)(-10000) = 5000$$

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- A gamble is clearly more attractive if ih has positive EV rather than negative.
- However: A positive value is not enough to make a gamble attractive! Gamble 3 is the one least likely to be accepted!

The von Neumann–Morgenstern Expected Utility Model I

Definition

Expected Utility – the expected value of utility over all possible outcomes

- Consider the outcome of a gamble defined by the amount of total wealth to which it corresponds.
- If M_0 is the initial wealth of the consumer the outcome of the first gamble would be:

$$EU_1 = (1/2)U(M_0 + 100) + (1/2)U(M_0 - 0.50)$$

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- A consumer should accept the gamble iff EU_1 is larger then $U(M_0)$

The von Neumann–Morgenstern Expected Utility Model II

Example

Suppose Smith's utility function is given by $\sqrt{M}$. If his initial wealth is €10000, which of the gambles gives him the highest utility?

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$$EU_1 = (1/2)\sqrt{10100} + (1/2)\sqrt{9999.50} = 100.248$$

$$EU_2 = (1/2)\sqrt{10200} + (1/2)\sqrt{9900} = 100.247$$

$$EU_3 = (1/2)\sqrt{30000} + (1/2)\sqrt{0} = 86.603$$

The von Neumann–Morgenstern Expected Utility Model III

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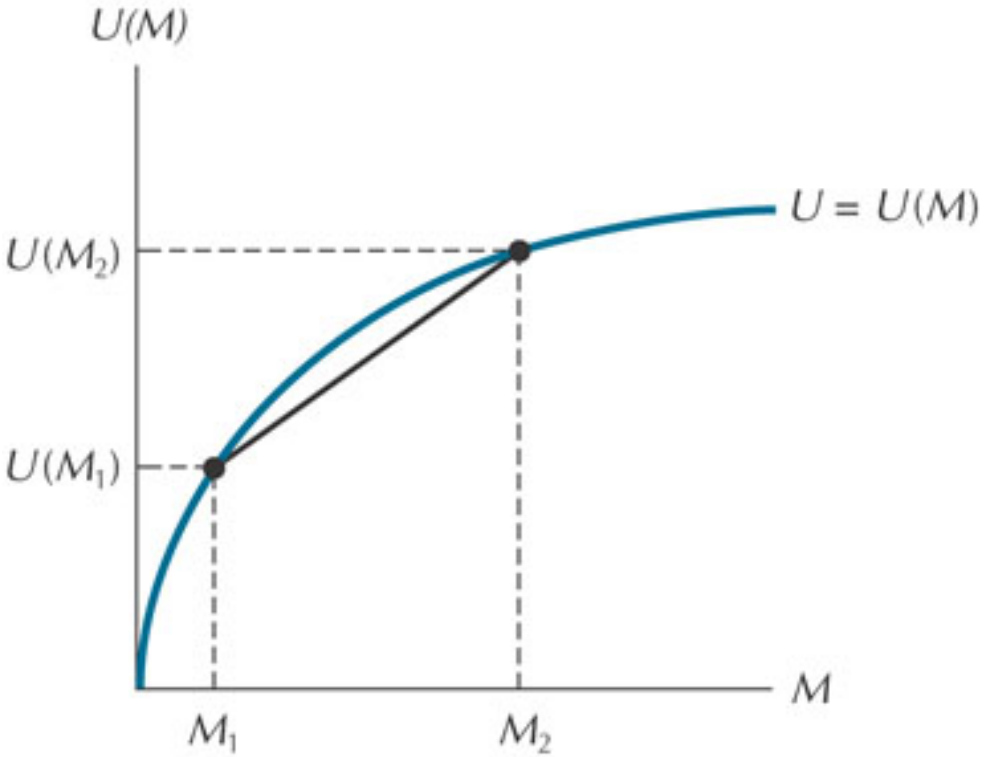
- Why? Utility is often a nonlinear function of final wealth.



The Asymmetric Value Function I

- The rational choice model says that people should evaluate events, or collections of events, in terms of their overall effect on total wealth.

Example

Suppose A is the event that you get an unexpected gift of \$100 and B is the event that you return from vacation to find an \$80 invoice from the city for the repair of a broken water line on your property. According to the rational choice model, you should regard the occurrence of these two events as a good thing, because their net effect is a \$20 increase in your total wealth.

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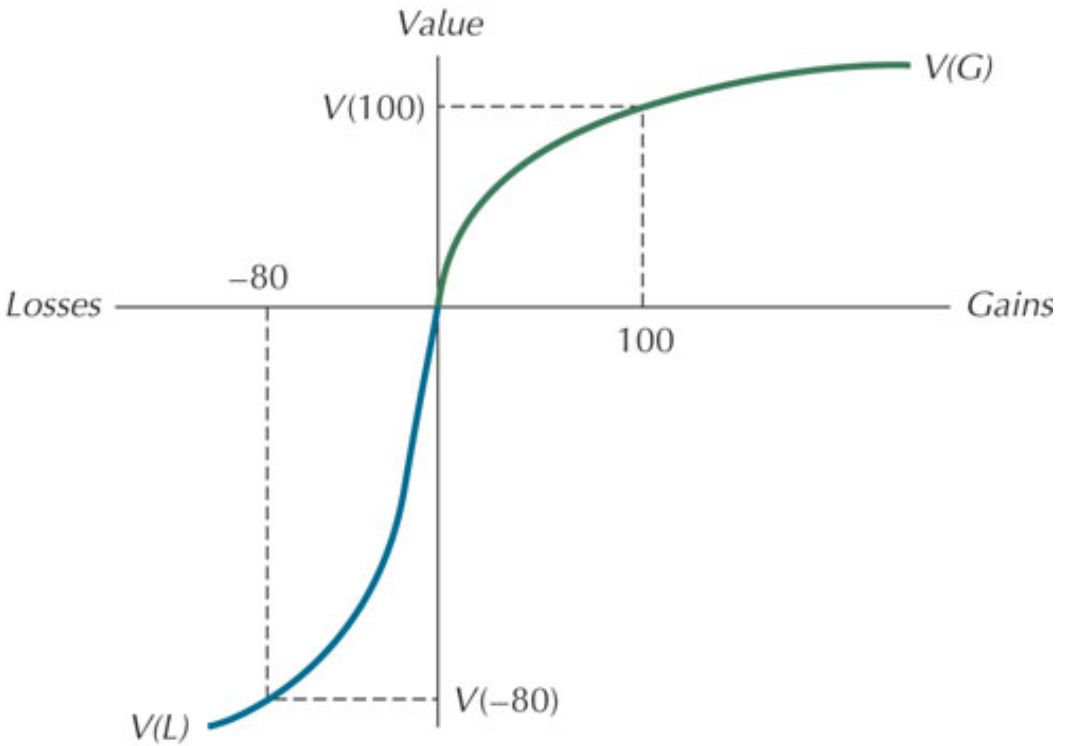
- However, people seem to weigh each event separately, and attach considerably less importance to the gain than to the lossso much less that many people actually refuse to accept pairs of events that would in- crease their overall wealth!

The Asymmetric Value Function II

- Kahneman and Tversky proposed that people evaluate alternatives not with the conventional utility function, but instead with a value function that is defined over changes in wealth.
- The function much steeper in losses than in gains.



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Cognitive Limitations and Behavioral Economics

Introduciton I

- Are we *Homo oeconomicus* (Homines oeconomici...)?
- Not always! – The math is not the problem; the preditions are.
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- Are we *Homo oeconomicus* (Homines oeconomici...)?
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- Limits to perfection:
  1. Limited rationality
  2. Limit to self–interest i.e. altruism
  3. Limit to self–control

Limited Rationality I

- The original concept of limited rationality by Simon:
  1. The costs of decision making.
  2. Satisfying instead of maximizing.
  3. Excess of choice.
- Prospect thoery – Kahnemann, Tversky etc.
  1. Aversion to loss.
  2. Separation of losses and gains.
- The framing effect – people react differently to a particular choice depending on whether it is presented as a loss or as a gain.
- The anchoring (focusing) effect – people place too much importance on one aspect of an event, causing an error in accurately predicting the utility of a future outcome.
- The effect of default option

Limited Rationality II

Example

A: A sure gain of \$240 (84%) and
B: A 25% chance of getting \$1000 and a 75% chance of getting \$0. (16%)

Example

C: A sure loss of \$750 (13%) and
D: A 75% chance of losing \$1000 and a 25% chance of losing \$0. (87%)

BUT

Limited Rationality III

Example

E: A 25% chance of getting \$240 and a 75% chance of losing \$760 (0%)
and
F: A 25% chance of getting \$250 and a 75% chance of losing \$750. (100%)

- Note that lottery E is what we get when we combine choices A and D from Problems 1 and 2; and that, similarly, lottery F is the result of combining choices B and C from the two earlier problems.
- The combination of B and C was chosen by fewer subjects (3 percent) than any other, whereas the combination A and D was by far the most popular (chosen by 73 percent of all subjects)even though the combination of A and D is strictly dominated by the combination of B and C!

Limited Rationality IV

The framing effect – an example:

Example A

You have to choose between two alternative solutions for 600 people affected by a hypothetical deadly disease:

A Option A saves 200 people's lives

B Option B has a 33% chance of saving all 600 people and a 66% chance of saving no one

Limited Rationality IV

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Example A

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Example B

You have to choose between two alternative solutions for 600 people affected by a hypothetical deadly disease:

- C If option C is taken, than 400 people will die
- D If option D is taken, then there is a 33% chance that no one will die and a 66% that everyone will die

Limited Rationality V

- Options A and C are equivalent!
- Options B and D also – they have the same expected value

Limited Rationality V

- Options A and C are equivalent!
- Options B and D also – they have the same expected value
- In the first case, 72% of experiment's participants chose option A
- In the second case 78% of participants chose option D!

Limited Rationality VI

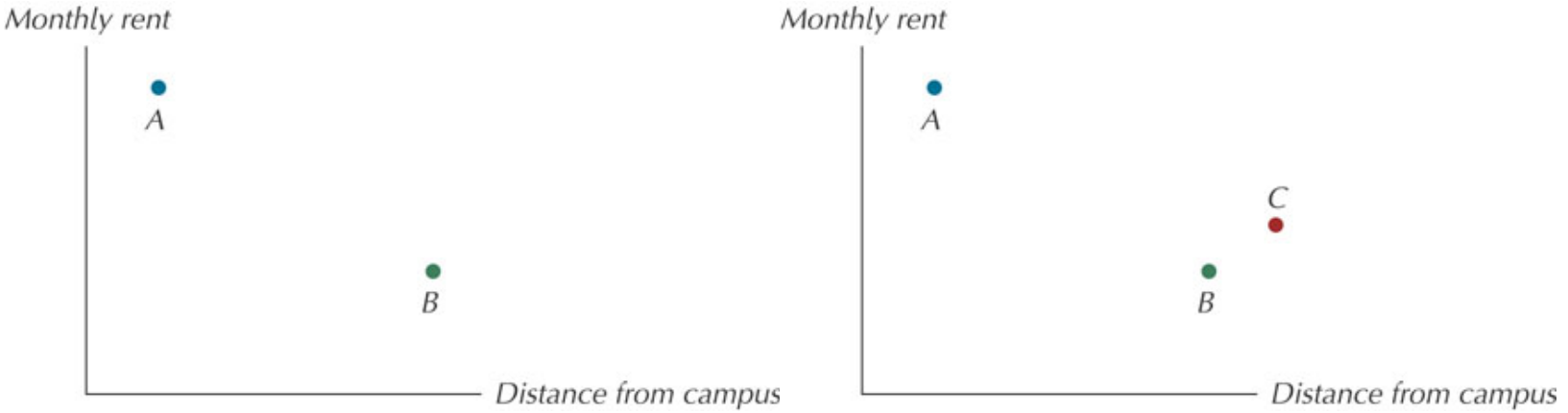
The focusing effect – an example:

Example

When people were asked how much happier they believe Californians are compared to Midwesterners, Californians and Midwesterners both said Californians must be considerably happier, when, in fact, there was no difference between the actual happiness rating of Californians and Midwesterners. The bias lies in that most people asked focused on and overweighted the sunny weather and ostensibly easy-going lifestyle of California and devalued and underrated other aspects of life and determinants of happiness, such as low crime rates and safety from natural disasters like earthquakes (both of which large parts of California lack).

Limited Rationality VII

The default option effect – an example:



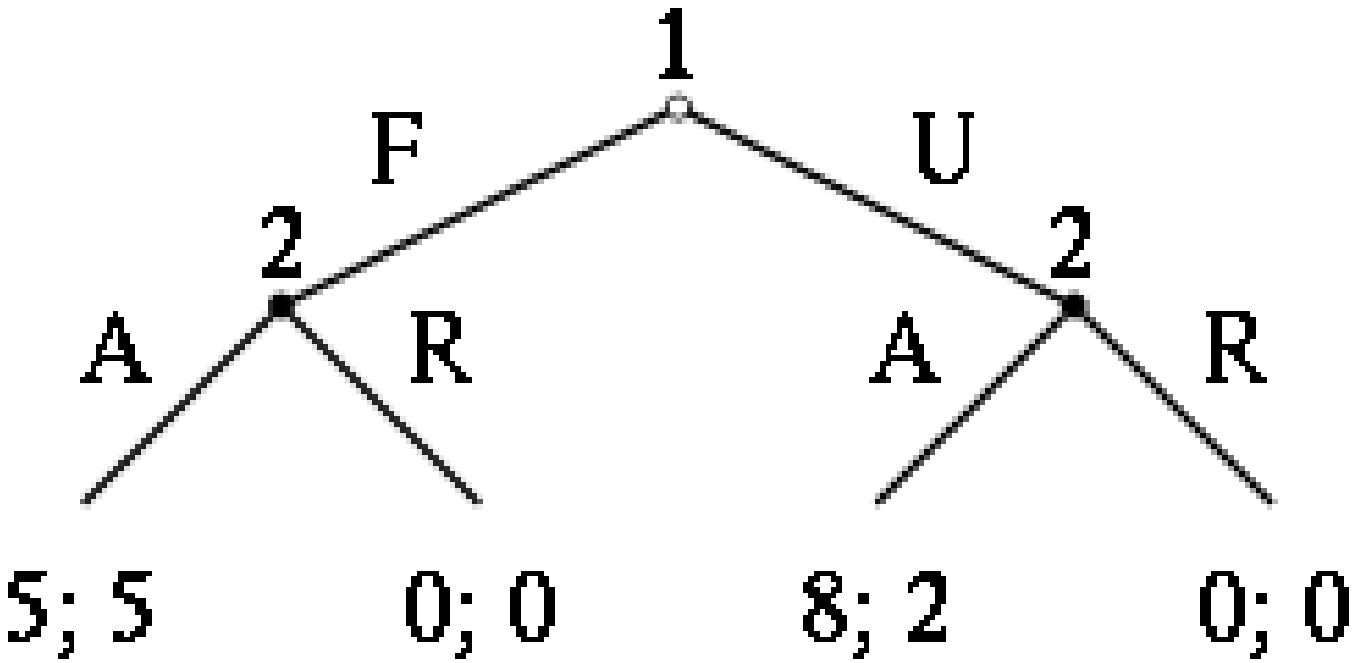
- In the left diagram students are evenly split between the two choices
- Existence of the irrelevant alternative C, makes people more likely to choose the apartment B!

Limits to self–interest I

1. Altruism
2. Fairness
3. Reciprocity

Limits to self–interest II

Fairness: The ultimatum game:



- In experiments a vast majority of the offers to the responder are between 40 and 50 percent of the available surplus.
- Moreover, proposals offering the responder less than 20 percent of the surplus are rejected with probability 0.4 to 0.6.