BEHAVIORAL ECONOMICS · LECTURE 1

Introduction: what is wrong with homo oeconomicus?

Niels Boissonnet – Bielefeld University

Master Economics – Winter 2026/27

Motivation

Homo oeconomicus

- Standard models picture humans as *homo oeconomicus*.
- This is often a **good approximation**.
- Yet experiments show it can also be **fundamentally flawed**.



What exactly is wrong with homo oeconomicus?

A simple picture of *homo oeconomicus*

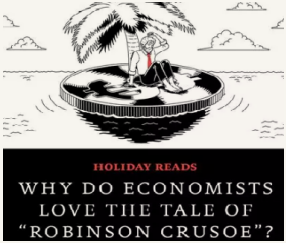
Robinson lives for two periods $t = 1, 2$.

A simple picture of *homo oeconomicus*

Robinson lives for two periods $t = 1, 2$.

- **Income:**

$$\text{today} = I_1 = 70 \qquad \text{tomorrow} = \begin{cases} I_2^H = 110 & \text{with prob. } \frac{1}{2} \\ I_2^L = 30 & \text{otherwise} \end{cases}$$



Robinson Crusoe

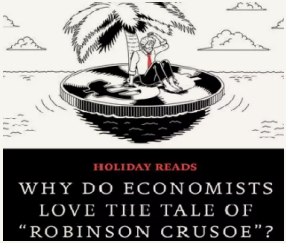
A simple picture of *homo oeconomicus*

Robinson lives for two periods $t = 1, 2$.

- **Income:**

$$\text{today} = I_1 = 70 \qquad \text{tomorrow} = \begin{cases} I_2^H = 110 & \text{with prob. } \frac{1}{2} \\ I_2^L = 30 & \text{otherwise} \end{cases}$$

- **Goods:** bourbon b and yoga classes y, with prices $p_b = p_y = 1$.



Robinson Crusoe

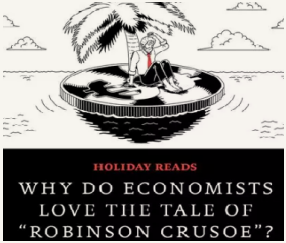
A simple picture of *homo oeconomicus*

Robinson lives for two periods $t = 1, 2$.

- **Income:**

$$\text{today} = I_1 = 70 \qquad \text{tomorrow} = \begin{cases} I_2^H = 110 & \text{with prob. } \frac{1}{2} \\ I_2^L = 30 & \text{otherwise} \end{cases}$$

- **Goods:** bourbon b and yoga classes y, with prices $p_b = p_y = 1$.
- **Savings:** he saves s (borrows if $s < 0$), but cannot die in debt.



Robinson Crusoe

A simple picture of *homo oeconomicus*

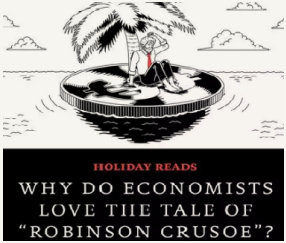
Robinson lives for two periods $t = 1, 2$.

- **Income:**

$$\text{today} = I_1 = 70 \qquad \text{tomorrow} = \begin{cases} I_2^H = 110 & \text{with prob. } \frac{1}{2} \\ I_2^L = 30 & \text{otherwise} \end{cases}$$

- **Goods:** bourbon b and yoga classes y, with prices $p_b = p_y = 1$.
- **Savings:** he saves s (borrows if $s < 0$), but cannot die in debt.
- **Tastes:** same utility function in both periods.

$$u(b, y) = \ln b + \ln y$$



Robinson Crusoe

A simple picture of *homo oeconomicus*

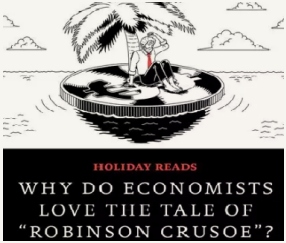
Robinson lives for two periods $t = 1, 2$.

- **Income:**

$$\text{today} = I_1 = 70 \qquad \text{tomorrow} = \begin{cases} I_2^H = 110 & \text{with prob. } \frac{1}{2} \\ I_2^L = 30 & \text{otherwise} \end{cases}$$

- **Goods:** bourbon b and yoga classes y, with prices $p_b = p_y = 1$.
- **Savings:** he saves s (borrows if $s < 0$), but cannot die in debt.
- **Tastes:** same utility function in both periods.

$$u(b, y) = \ln b + \ln y$$



Robinson Crusoe

If Robinson is a *homo oeconomicus*, we can **predict** how much he consumes and saves.

A reflex to have

This is a (finite) dynamic problem. How do we solve it?

A reflex to have

This is a (finite) dynamic problem. How do we solve it?

Use backward induction!



A reflex to have

This is a (finite) dynamic problem. How do we solve it?

Use backward induction!

1. Solve the last period, conditional on every possible outcome of the previous periods.



A reflex to have

This is a (finite) dynamic problem. How do we solve it?

Use backward induction!

1. Solve the last period, conditional on every possible outcome of the previous periods.
2. Deduce the resulting payoffs for each of these outcomes.



A reflex to have

This is a (finite) dynamic problem. How do we solve it?

Use backward induction!

1. Solve the last period, conditional on every possible outcome of the previous periods.
2. Deduce the resulting payoffs for each of these outcomes.
3. Solve the first period, taking those continuation payoffs as given.



Solving Robinson's problem (backward induction)

Period 2

Saving s, he can spend $m = s + I_2$:

$$v(m) \equiv \max_{b_2+y_2 \leq m} \ln b_2 + \ln y_2.$$

He spends half on each good, so

$$v(m) = 2\ln(m/2).$$

$v(m)$ = value of having wealth m in period 2 (the *indirect utility*).

Solving Robinson's problem (backward induction)

Period 2

Saving s, he can spend $m = s + I_2$:

$$v(m) \equiv \max_{b_2+y_2 \le m} \ln b_2 + \ln y_2.$$

He spends half on each good, so

$$v(m) = 2\ln(m/2).$$

$v(m)$ = value of having wealth m in period 2 (the *indirect utility*).

Period 1

Same split today, $b_1 = y_1 = \frac{70-s}{2}$. He chooses s to solve

$$\max_s \underbrace{2\ln\tfrac{70-s}{2}}_{\text{period-1 utility}} + \underbrace{\tfrac{1}{2}\,v(110+s) + \tfrac{1}{2}\,v(30+s)}_{\text{expected period-2 utility}}$$

Solving Robinson's problem (backward induction)

Period 2

Saving s, he can spend $m = s + I_2$:

$$v(m) \equiv \max_{b_2+y_2 \le m} \ln b_2 + \ln y_2.$$

He spends half on each good, so

$$v(m) = 2\ln(m/2).$$

$v(m)$ = value of having wealth m in period 2 (the *indirect utility*).

Period 1

Same split today, $b_1 = y_1 = \frac{70-s}{2}$. He chooses s to solve

$$\max_s \underbrace{2\ln\tfrac{70-s}{2}}_{\text{period-1 utility}} + \underbrace{\tfrac{1}{2}\,v(110+s) + \tfrac{1}{2}\,v(30+s)}_{\text{expected period-2 utility}}$$

First-order condition in s:

$$\frac{1}{70-s} = \frac{1}{2}\cdot\frac{1}{110+s} + \frac{1}{2}\cdot\frac{1}{30+s}$$

Solving Robinson's problem (backward induction)

Period 2

Saving s, he can spend $m = s + I_2$:

$$v(m) \equiv \max_{b_2+y_2 \le m} \ln b_2 + \ln y_2.$$

He spends half on each good, so

$$v(m) = 2\ln(m/2).$$

$v(m)$ = value of having wealth m in period 2 (the *indirect utility*).

Period 1

Same split today, $b_1 = y_1 = \frac{70-s}{2}$. He chooses s to solve

$$\max_s \underbrace{2\ln\tfrac{70-s}{2}}_{\text{period-1 utility}} + \underbrace{\tfrac{1}{2}\,v(110+s) + \tfrac{1}{2}\,v(30+s)}_{\text{expected period-2 utility}}$$

First-order condition in s:

$$\frac{1}{70-s} = \frac{1}{2}\cdot\frac{1}{110+s} + \frac{1}{2}\cdot\frac{1}{30+s}$$

Solution $s^* = 10$: $\frac{1}{60} = \frac{1}{2}\cdot\frac{1}{120} + \frac{1}{2}\cdot\frac{1}{40} = \frac{1+3}{240}$. ✓

Solving Robinson's problem (backward induction)

Period 2

Saving s, he can spend $m = s + I_2$:

$$v(m) \equiv \max_{b_2+y_2 \le m} \ln b_2 + \ln y_2.$$

He spends half on each good, so

$$v(m) = 2\ln(m/2).$$

$v(m)$ = value of having wealth m in period 2 (the *indirect utility*).

Period 1

Same split today, $b_1 = y_1 = \frac{70-s}{2}$. He chooses s to solve

$$\max_s \underbrace{2\ln\tfrac{70-s}{2}}_{\text{period-1 utility}} + \underbrace{\tfrac{1}{2}\,v(110+s) + \tfrac{1}{2}\,v(30+s)}_{\text{expected period-2 utility}}$$

First-order condition in s:

$$\frac{1}{70-s} = \frac{1}{2}\cdot\frac{1}{110+s} + \frac{1}{2}\cdot\frac{1}{30+s}$$

Solution $s^* = 10$: $\frac{1}{60} = \frac{1}{2}\cdot\frac{1}{120} + \frac{1}{2}\cdot\frac{1}{40} = \frac{1+3}{240}$. ✓

Take-away

With a *certain* $I_2 = 70$, $s^* = 0$: risk alone makes Robinson save 10. Behavior is pinned down.
But what did we assume to get here?

The five assumptions

What we assumed about Robinson

0. **Consistent preferences:** Robinson's choices can be described by a utility function u
1. **Costless optimization:** he always finds the option that maximizes u
2. **Correct beliefs & expected utility:** he knows p and maximizes expected utility
3. **Absolute, self-regarding consumption:** only his own (b, y) enters u
4. **Stable tastes:** the same u in both periods

The five assumptions

What we assumed about Robinson

0. **Consistent preferences:** Robinson's choices can be described by a utility function u
1. **Costless optimization:** he always finds the option that maximizes u
2. **Correct beliefs & expected utility:** he knows p and maximizes expected utility
3. **Absolute, self-regarding consumption:** only his own (b, y) enters u
4. **Stable tastes:** the same u in both periods

Take-away

Each assumption is testable, and each fails in some systematic way.

1

Assumption 0: consistent preferences

Before asking whether Robinson finds the best option, there must be a best option: his choices must be consistent.

Assumption 0: choices can be described by a utility function

A claim about choices

- We have assumed that Robinson *has* a utility.
- This is a claim about **choice** consistency. E.g.
  - if he picks x when y is available, he should never pick y when x is available;
  - adding an option he does not choose should not change what he chooses.

Assumption 0: choices can be described by a utility function

A claim about choices

- We have assumed that Robinson *has* a utility.
- This is a claim about **choice** consistency. E.g.
  - if he picks x when y is available, he should never pick y when x is available;
  - adding an option he does not choose should not change what he chooses.

Revealed preference

These conditions can be **tested on choice data alone**, without observing u.

Assumption 0: choices can be described by a utility function

A claim about choices

- We have assumed that Robinson *has* a utility.
- This is a claim about **choice** consistency. E.g.
  - if he picks x when y is available, he should never pick y when x is available;
  - adding an option he does not choose should not change what he chooses.

Revealed preference

These conditions can be **tested on choice data alone**, without observing u.

Assumption 0 is logically prior to the others:
► before asking whether Robinson *finds* the best option, there must be a "best" option to find.

Evidence: the decoy effect

Subscriptions to *The Economist*, two versions of the same offer (Ariely, 2008):

Menu 1

- Web only, $59: 68%
- Print + web, $125: 32%

Evidence: the decoy effect

Subscriptions to *The Economist*, two versions of the same offer (Ariely, 2008):

Menu 1

- Web only, $59: 68%
- Print + web, $125: 32%

Menu 2: add a *decoy*

- Web only, $59: 16%
- Print only, $125: 0%
- Print + web, $125: 84%

Evidence: the decoy effect

Subscriptions to *The Economist*, two versions of the same offer (Ariely, 2008):

Menu 1

- Web only, \$59: 68%
- Print + web, \$125: 32%

Menu 2: add a *decoy*

- Web only, \$59: 16%
- Print only, \$125: 0%
- Print + web, \$125: 84%

Take-away

Nobody buys the decoy, yet it shifts choices between the other two options. A consumer who switches from "web only" to "print + web" cannot be described by **any** utility function.

Consistent preferences

Utility maximization and its failures

- Whether choices can be described by a utility function at all is the topic of **utility maximization and its failures**.
- Other violations: endowment effect, preference reversals, choice overload.
- What if choices are **random**? Utility can then explain choice probabilities (**stochastic choice**).
- And a second question: does “utility” measure **happiness**?

Applications

Marketing and pricing (decoys, menus), welfare analysis.

$\rightarrow$ *Part 1: revealed preference, stochastic choice, failures of utility maximization.*

2

Assumption 1: costless optimization

Maximizing utility takes cognitive effort, and mistakes grow systematically with the difficulty of the problem.

Assumption 1: finding the best option

Your turn

Choose the best bourbon. You have 20 seconds.



Assumption 1: finding the best option

Your turn

Choose the best whiskey.



Assumption 1: finding the best option

Your turn

Which of the following would you choose?

4	2
3	13
20	11
15	8
8	10

Assumption 1: finding the best option

And now?

Which of the following would you choose?

4+6+10-11-23+9	2+3+6-11-14+9+10
3+9-17-99+102-6+15	6+18-19-55+70
20-27+7-19+2+3-5	11+2-5+7-8-9+10
15-5-5+6+16+17-20-9	8+9+10-11+8+2+6-32
8+8+9-13-9-6+7	10-9+17-23+10+2+15

Evidence: Caplin et al. (2011)

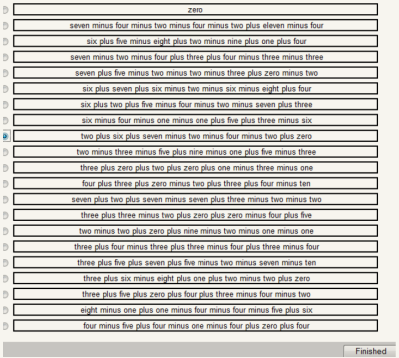
Design

- Options are sums like “four plus three minus two. . . ”; pick the largest.
- 22 subjects, 657 choices.
- Complexity: 3 or 7 operations.
- Set size: 10, 20 or 40 options.

Evidence: Caplin et al. (2011)

Design

- Options are sums like “four plus three minus two. . . ”; pick the largest.
- 22 subjects, 657 choices.
- Complexity: 3 or 7 operations.
- Set size: 10, 20 or 40 options.



Failure rate		
	Complexity	
Set size	3	7
10	7%	24%
20	22%	56%
40	29%	65%

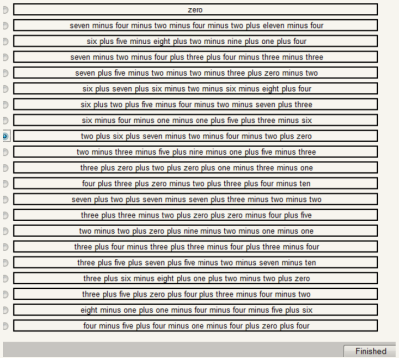
Average Loss ($)		
	Complexity	
Set size	3	7
10	0.41	1.69
20	1.10	4.00
40	2.30	7.12

Left: choice screen. Right: failure rates rise from 7% to 65% and average losses from $0.41 to $7.12 with set size and complexity.

Evidence: Caplin et al. (2011)

Design

- Options are sums like “four plus three minus two. . . ”; pick the largest.
- 22 subjects, 657 choices.
- Complexity: 3 or 7 operations.
- Set size: 10, 20 or 40 options.



Failure rate		
	Complexity	
Set size	3	7
10	7%	24%
20	22%	56%
40	29%	65%

Average Loss ($)		
	Complexity	
Set size	3	7
10	0.41	1.69
20	1.10	4.00
40	2.30	7.12

Left: choice screen. Right: failure rates rise from 7% to 65% and average losses from $0.41 to $7.12 with set size and complexity.

Take-away

Mistakes are not random noise: they grow **systematically** with the difficulty of the problem.

Bounded rationality

Why take short cuts?

- Maximizing utility takes **cognitive effort**: e.g. identifying all available options.
- So it may be sensible to take **short cuts**:
  - focusing on salient labels or attributes;
  - stopping at a *satisfactory* option rather than the best one.

Bounded rationality

Why take short cuts?

- Maximizing utility takes **cognitive effort**: e.g. identifying all available options.
- So it may be sensible to take **short cuts**:
  - focusing on salient labels or attributes;
  - stopping at a *satisfactory* option rather than the best one.

Bounded rationality

Modeling these cognitive costs is the topic of **bounded rationality**.

Applications

Price setting by firms, consumer choice, marketing and advertising.

→ *Part 2: satisficing, consideration sets, Bayesian updating, salience, rational inattention.*

3

Assumption 2: beliefs and expected utility

Robinson may evaluate risk in the wrong way (Allais), or evaluate it correctly with the wrong probabilities (statistical errors, overconfidence).

Assumption 2: expected utility with correct beliefs

Robinson evaluates an uncertain action (here: saving s) in three steps:

Assumption 2: expected utility with correct beliefs

Robinson evaluates an uncertain action (here: saving s) in three steps:

1 · Utility in each state

$v(I_2^H + s)$ and $v(I_2^L + s)$.

Assumption 2: expected utility with correct beliefs

Robinson evaluates an uncertain action (here: saving s) in three steps:

1 · Utility in each state

$v(I_2^H + s)$ and $v(I_2^L + s)$.

2 · Probability of each state

Computed correctly (with Bayes' rule if needed): p.

Assumption 2: expected utility with correct beliefs

Robinson evaluates an uncertain action (here: saving s) in three steps:

1 · Utility in each state

$v(I_2^H + s)$ and $v(I_2^L + s)$.

2 · Probability of each state

Computed correctly (with Bayes' rule if needed): p.

3 · Expected utility

Linear in the probabilities:

$$p\, v(I_2^H + s) + (1 - p)\, v(I_2^L + s).$$

Assumption 2: expected utility with correct beliefs

Robinson evaluates an uncertain action (here: saving s) in three steps:

1 · Utility in each state

$v(I_2^H + s)$ and $v(I_2^L + s)$.

2 · Probability of each state

Computed correctly (with Bayes' rule if needed): p.

3 · Expected utility

Linear in the probabilities:

$$p\, v(I_2^H + s) + (1 - p)\, v(I_2^L + s).$$

Every step could fail: we will talk about step 3 (the evaluation) or step 2 (the beliefs).

People are not Bayesians: the taxi-cab problem

The experiment (Tversky & Kahneman, 1980)

85% of cabs are Green, 15% are Blue. A witness saw a Blue cab in a hit-and-run; he is correct 80% of the time.

What is the probability that the cab was Blue?

People are not Bayesians: the taxi-cab problem

The experiment (Tversky & Kahneman, 1980)

85% of cabs are Green, 15% are Blue. A witness saw a Blue cab in a hit-and-run; he is correct 80% of the time.

What is the probability that the cab was Blue?

Typical answer

About **80%**: the base rate is ignored.

Bayes' rule

$$\frac{0.15 \times 0.8}{0.15 \times 0.8 + 0.85 \times 0.2} \approx \textbf{41\%}$$

People are not utility maximizers: the Allais paradox

Which do you prefer?

People are not utility maximizers: the Allais paradox

Which do you prefer?

$$A = [100\% : \$3000] \quad \text{vs.} \quad B = [80\% : \$4000;\ 20\% : \$0]$$

People are not utility maximizers: the Allais paradox

Which do you prefer?

$$A = [100\% : \$3000] \quad \text{vs.} \quad B = [80\% : \$4000;\ 20\% : \$0]$$

$$C = [25\% : \$3000;\ 75\% : \$0] \quad \text{vs.} \quad D = [20\% : \$4000;\ 80\% : \$0]$$

People are not utility maximizers: the Allais paradox

Which do you prefer?

$$A = [100\% : \$3000] \quad \text{vs.} \quad B = [80\% : \$4000;\ 20\% : \$0]$$

$$C = [25\% : \$3000;\ 75\% : \$0] \quad \text{vs.} \quad D = [20\% : \$4000;\ 80\% : \$0]$$

Most people typically choose A over B **and** D over C (Kahneman and Tversky, 1979).

People are not utility maximizers: the Allais paradox

Which do you prefer?

$$A = [100\% : \$3000] \quad \text{vs.} \quad B = [80\% : \$4000;\ 20\% : \$0]$$

$$C = [25\% : \$3000;\ 75\% : \$0] \quad \text{vs.} \quad D = [20\% : \$4000;\ 80\% : \$0]$$

Most people typically choose A over B **and** D over C (Kahneman and Tversky, 1979).

Why this violates expected utility

Note that $C = \frac{1}{4}A + \frac{3}{4}\,\delta_0$ and $D = \frac{1}{4}B + \frac{3}{4}\,\delta_0$, where δ_0 = "\$0 for sure". Since EU is linear in probabilities,

$$EU(A) > EU(B) \implies \tfrac{1}{4}EU(A) + \tfrac{3}{4}EU(\delta_0) > \tfrac{1}{4}EU(B) + \tfrac{3}{4}EU(\delta_0) \iff EU(C) > EU(D).$$

Choice under risk and uncertainty

Choice under risk and uncertainty

- These issues are studied under **choice under risk and uncertainty**.
- Goal: descriptive models of choice that allow for
  - violations of expected utility (probability weighting, ambiguity aversion),
  - mistaken beliefs (overconfidence).

Applications

Finance, insurance, entrepreneurship.

→ *Part 3: expected utility, prospect theory, ambiguity, overconfidence.*

4

Assumption 3: absolute, self-regarding consumption

People evaluate outcomes relative to a reference point, and they may care about more than their own consumption.

3a. Only absolute consumption matters

In the model

Utility depends only on the **levels** of bourbon and yoga.

Evidence

People evaluate outcomes **relative to a reference point**: gains and losses, not levels.

Example on the next slide: the same outcomes, described in two ways.

Example: the disease problem (Tversky and Kahneman, 1981)

An outbreak of a rare disease is expected to kill 600 people.

Example: the disease problem (Tversky and Kahneman, 1981)

An outbreak of a rare disease is expected to kill 600 people.

Frame 1: lives saved

- A: 200 people will be saved.
- B: with prob. $\frac{1}{3}$ all 600 are saved, with prob. $\frac{2}{3}$ no one is saved.

Example: the disease problem (Tversky and Kahneman, 1981)

An outbreak of a rare disease is expected to kill 600 people.

Frame 1: lives saved

- A: 200 people will be saved.
- B: with prob. $\frac{1}{3}$ all 600 are saved, with prob. $\frac{2}{3}$ no one is saved.

Frame 2: lives lost

- C: 400 people will die.
- D: with prob. $\frac{1}{3}$ no one dies, with prob. $\frac{2}{3}$ all 600 die.

Example: the disease problem (Tversky and Kahneman, 1981)

An outbreak of a rare disease is expected to kill 600 people.

Frame 1: lives saved

- A: 200 people will be saved. (72%)
- B: with prob. $\frac{1}{3}$ all 600 are saved, with prob. $\frac{2}{3}$ no one is saved. (28%)

Frame 2: lives lost

- C: 400 people will die. (22%)
- D: with prob. $\frac{1}{3}$ no one dies, with prob. $\frac{2}{3}$ all 600 die. (78%)

Example: the disease problem (Tversky and Kahneman, 1981)

An outbreak of a rare disease is expected to kill 600 people.

Frame 1: lives saved

- A: 200 people will be saved. (72%)
- B: with prob. $\frac{1}{3}$ all 600 are saved, with prob. $\frac{2}{3}$ no one is saved. (28%)

Frame 2: lives lost

- C: 400 people will die. (22%)
- D: with prob. $\frac{1}{3}$ no one dies, with prob. $\frac{2}{3}$ all 600 die. (78%)

Take-away

A $\equiv$ C and B $\equiv$ D in outcomes. Yet choices reverse: risk aversion over gains, risk seeking over losses. The **reference point** matters.

Reference-dependent preferences

Reference dependence

- Choices depend on a **reference point**, e.g. losses weigh more than equal gains (*loss aversion*).
- Goal: descriptive models that take this into account.

Applications

Finance, labor economics, public economics.

→ *Part 4: reference dependence and loss aversion.*

3b. Self-interest

In the model

- We assumed Robinson cares only about **his own** bourbon and yoga.
- Altruism is easy to add: put Friday's consumption into Robinson's utility function.

Beyond altruism

But what about fairness, reciprocity, spite or envy?

$\rightarrow$ *Not in this course: see the course "Social Preferences".*

5

Assumption 4: stable tastes

Today's Robinson may disagree with tomorrow's choices: a problem of temptation and self-control.

Assumption 4: preferences do not change

In the model

- We assumed the **same** utility function in both periods: $u(b_1, y_1)$ and $u(b_2, y_2)$.
- Why tastes change over a lifetime (Robinson learns to like bourbon) is beyond this course.

Assumption 4: preferences do not change

In the model

- We assumed the **same** utility function in both periods: $u(b_1, y_1)$ and $u(b_2, y_2)$.
- Why tastes change over a lifetime (Robinson learns to like bourbon) is beyond this course.
- But a weaker problem remains: today's Robinson may **disagree** with tomorrow's choices.

Assumption 4: preferences do not change

In the model

- We assumed the **same** utility function in both periods: $u(b_1, y_1)$ and $u(b_2, y_2)$.
- Why tastes change over a lifetime (Robinson learns to like bourbon) is beyond this course.
- But a weaker problem remains: today's Robinson may **disagree** with tomorrow's choices.

Story

Robinson wakes up with a hangover and plans yoga tonight.

Assumption 4: preferences do not change

In the model

- We assumed the **same** utility function in both periods: $u(b_1, y_1)$ and $u(b_2, y_2)$.
- Why tastes change over a lifetime (Robinson learns to like bourbon) is beyond this course.
- But a weaker problem remains: today's Robinson may **disagree** with tomorrow's choices.

Story

Robinson wakes up with a hangover and plans yoga tonight.

- He knows Friday will offer bourbon again, and he may give in.

Assumption 4: preferences do not change

In the model

- We assumed the **same** utility function in both periods: $u(b_1, y_1)$ and $u(b_2, y_2)$.
- Why tastes change over a lifetime (Robinson learns to like bourbon) is beyond this course.
- But a weaker problem remains: today's Robinson may **disagree** with tomorrow's choices.

Story

Robinson wakes up with a hangover and plans yoga tonight.

- He knows Friday will offer bourbon again, and he may give in.
- How can he **commit** this morning? Avoid Friday? Pre-pay the yoga class?

Assumption 4: preferences do not change

In the model

- We assumed the **same** utility function in both periods: $u(b_1, y_1)$ and $u(b_2, y_2)$.
- Why tastes change over a lifetime (Robinson learns to like bourbon) is beyond this course.
- But a weaker problem remains: today's Robinson may **disagree** with tomorrow's choices.

Story

Robinson wakes up with a hangover and plans yoga tonight.

- He knows Friday will offer bourbon again, and he may give in.
- How can he **commit** this morning? Avoid Friday? Pre-pay the yoga class?

Take-away

Period-1 Robinson's preferences over period-2 choices differ from period-2 Robinson's: a problem of **temptation** and **self-control**.

Evidence: Read and Van Leeuwen (1998)

Choice 1: a snack in one week

- Fruit: 74%
- Chocolate: 26%

Evidence: Read and Van Leeuwen (1998)

Choice 1: a snack in one week

- Fruit: 74%
- Chocolate: 26%

Choice 2: a snack today

- Fruit: 30%
- Chocolate: 70%

Evidence: Read and Van Leeuwen (1998)

Choice 1: a snack in one week

- Fruit: 74%
- Chocolate: 26%

Choice 2: a snack today

- Fruit: 30%
- Chocolate: 70%

Take-away

Same people, same options, different dates: choices are **time-inconsistent**.

Temptation and self-control

Temptation and self-control

These issues are addressed by models of **temptation and self-control**.

Applications

Addiction, low saving rates, credit-card borrowing, obesity, procrastination.

→ *Part 5: temptation, commitment, time inconsistency.*

Recap: one model, five failures

Assumption	Evidence against it	Field	Part (lect.)
0. Consistent preferences	Decoy effect	Utility maximization	1 (L2–4)
1. Costless optimization	Caplin et al. (2011)	Bounded rationality	2 (L5–9)
2. Beliefs & EU	Allais; overconfidence	Risk & uncertainty	3 (L10–13)
3a. Absolute consumption	Disease problem	Reference dependence	4 (L14)
3b. Self-interest	Fairness, envy	Social preferences	other course
4. Stable tastes	Read & van Leeuwen (1998)	Temptation & self-control	5 (L16–19)

Take-away

Behavioral economics keeps the structure of the standard model and relaxes **one assumption at a time**.

6

The plan of the course

For each area: the evidence, the models built to capture it, and their applications.

Aim of the course

Aim

A grounding in the behavioral economics of **individual** decision-making.

For each area we study

1. the **evidence** that the standard model misses something important;
2. the **models** developed to capture these behaviors;
3. **applications** of these models (finance, labor, development, IO. . .).

The course is **technical** (some proofs for illustration) but requires only **simple mathematics**: nothing beyond the prerequisites of Microeconomics.

What will this involve?

Experiments

- Reading experimental designs and results.
- How can experiments improve models of decision-making?

Modeling

- Building models that account for psychology.
- Testing and applying them.
- Understanding proofs.

Critical thinking

- A young discipline.
- Are we modeling the phenomena the right way?
- What are we missing?

Some things to bear in mind

1 · The standard model is better than you think.

People do respond to incentives and constraints; its predictions are often qualitatively right.

Some things to bear in mind

1 · The standard model is better than you think.

People do respond to incentives and constraints; its predictions are often qualitatively right.

2 · It is not enough to prove the standard model wrong.

Two or three equations cannot capture all of human experience. Of course the model is wrong. The question is whether it is *fundamentally* wrong.

Some things to bear in mind

1 · The standard model is better than you think.

People do respond to incentives and constraints; its predictions are often qualitatively right.

2 · It is not enough to prove the standard model wrong.

Two or three equations cannot capture all of human experience. Of course the model is wrong. The question is whether it is *fundamentally* wrong.

3 · You cannot beat something with nothing.

Alternative models must be usable as well as accurate.

Some things to bear in mind

1 · The standard model is better than you think.

People do respond to incentives and constraints; its predictions are often qualitatively right.

2 · It is not enough to prove the standard model wrong.

Two or three equations cannot capture all of human experience. Of course the model is wrong. The question is whether it is *fundamentally* wrong.

3 · You cannot beat something with nothing.

Alternative models must be usable as well as accurate.

4 · **Behavioral economics is not psychology** (or is it?).

Positive vs. normative economics

Economist as investigator



How do people behave?

- Describe and predict choices.
- Behavioral models have different observable implications.

Economist as judge



How should they behave? What is good for them?

- If choice $\neq$ well-being, revealed preference no longer measures welfare.

Take-away

Do not confuse the two. This course is mainly about the **positive** question; we flag normative implications (e.g. nudges) when they arise.

Organization

Material

Lecture slides and notes on the Lernraum.

Exam

About three essay questions asking you to

- discuss experimental results in light of the concepts of the course;
- or discuss statements such as *“Assuming rationality is on average correct.”*

Contact

niels.boissonnet@uni-bielefeld.de

Office hours

By appointment, room V8–227.

Course materials

Readings

Academic papers (available online) and lecture notes.

Useful books

- Rubinstein, *Lecture Notes in Microeconomic Theory* (free download).
- Kreps, *Notes on the Theory of Choice*: the best introduction to classical decision theory.
- Camerer, Loewenstein & Rabin, *Advances in Behavioral Economics*.
- Kagel & Roth, *The Handbook of Experimental Economics*.

Reading lists follow for each part. Readings are suggested, not mandatory; those marked * are particularly useful.

7

Lecture outlines and readings

The five parts of the course, one per failed assumption, each with its reading list.

Part 1 – Utility maximization

Questions

- The most basic model in economics: people choose to maximize utility.
- How can we test it, and does it describe behavior well?
- Choices are often random: what does utility maximization predict about choice *probabilities*?
- How does “utility” relate to “happiness”?

Part 1 – Utility maximization

Questions

- The most basic model in economics: people choose to maximize utility.
- How can we test it, and does it describe behavior well?
- Choices are often random: what does utility maximization predict about choice *probabilities*?
- How does “utility” relate to “happiness”?

Readings

- Rubinstein (2006, Ch. 1–3)
- Kreps (1988, Ch. 1–3)
- *Who is (more) rational?* (Choi et al., 2014)
- *Stochastic choice and preferences for randomization* (Agranov and Ortoleva, 2017)
- *The money pump...* (Echenique et al., 2011)
- *Choice under conflict* (Tversky and Shafir, 1992)
- *When choice is demotivating* (Iyengar and Lepper, 2000)
- *The endowment effect...* (Kahneman et al., 1991)
- *The causes of preference reversal* (Tversky et al., 1990)
- *Adding asymmetrically dominated alternatives* (Huber et al., 1982)
- *What do you think would make you happier?...* (Benjamin et al., 2012)

Part 2 – Bounded rationality

Questions

- Decision-makers face constraints on their ability to decide rationally.
- *Satisficing*: search for satisfactory, not best, options. *Consideration sets*, *salience*.
- *Bayesian updating*: how a rational agent should revise beliefs, the benchmark for the attention models.
- *Rational inattention*: paying cognitive costs to become better informed.
- Applications to firms and to *nudging*.

Part 2 – Bounded rationality

Questions

- Decision-makers face constraints on their ability to decide rationally.
- *Satisficing*: search for satisfactory, not best, options. *Consideration sets*, *salience*.
- *Bayesian updating*: how a rational agent should revise beliefs, the benchmark for the attention models.
- *Rational inattention*: paying cognitive costs to become better informed.
- Applications to firms and to *nudging*.

Readings

- *Modeling bounded rationality* (Rubinstein, 1998)
- * *Maps of bounded rationality* (Kahneman, 2003)
- *Poverty impedes cognitive function* (Mani et al., 2013)
- *Revealed attention* (Masatlioglu et al., 2012)
- *Consideration sets and competitive marketing* (Eliaz and Spiegler, 2011)
- * *Search and satisficing* (Caplin et al., 2011)
- * *Rational inattention to discrete choices* (Matějka and McKay, 2015)
- *Salience and consumer choice* (Bordalo et al., 2013)
- *Libertarian paternalism…* (Sunstein and Thaler, 2003)
- *Optimal defaults and active decisions* (Carroll et al., 2009)

Part 3 – Risk and uncertainty

Questions

- The standard model: expected utility maximization.
- Evidence that it is flawed: probability weighting, ambiguity aversion, overoptimism.
- Models that account for these behaviors; applications to insurance and pricing.

Part 3 – Risk and uncertainty

Questions

- The standard model: expected utility maximization.
- Evidence that it is flawed: probability weighting, ambiguity aversion, overoptimism.
- Models that account for these behaviors; applications to insurance and pricing.

Readings

- Rubinstein (2006, Ch. 7); Kreps (1988, Ch. 4–7)
- * *Developments in non-expected utility theory* (Starmer, 2000)
- * *Prospect theory* (Kahneman and Tversky, 1979)
- * *Ellsberg revisited* (Halevy, 2007)
- *Overconfidence and excess entry* (Camerer and Lovallo, 1999)
- *Rational overoptimism* (Van den Steen, 2004)
- *Selling to overconfident consumers* (Grubb, 2009)

Part 4 – Reference-dependent preferences

Questions

- People evaluate alternatives relative to a reference point.
- They tend to be *loss averse*: losses weigh more than equal gains.
- Evidence for reference dependence, and models that capture it.

Part 4 – Reference-dependent preferences

Questions

- People evaluate alternatives relative to a reference point.
- They tend to be *loss averse*: losses weigh more than equal gains.
- Evidence for reference dependence, and models that capture it.

Readings

- * *The endowment effect, loss aversion, and status quo bias* (Kahneman et al., 1991)
- *Prospect theory in the wild* (Camerer, 1998)
- * *A model of reference-dependent preferences* (Kőszegi and Rabin, 2006)
- *Contracts as reference points* (Hart and Moore, 2008)

Part 5 – Temptation and self-control

Questions

- Temptation seems ubiquitous: obesity, undersaving, drug use. A failure of self-control?
- Two approaches: demand for commitment, and time-inconsistent preferences.
- Applications to work contracts and firm behavior.

Part 5 – Temptation and self-control

Questions

- Temptation seems ubiquitous: obesity, undersaving, drug use. A failure of self-control?
- Two approaches: demand for commitment, and time-inconsistent preferences.
- Applications to work contracts and firm behavior.

Readings

- *Procrastination, deadlines, and performance* (Ariely and Wertenbroch, 2002)
- * *Temptation and self-control* (Gul and Pesendorfer, 2001)
- * *Golden eggs and hyperbolic discounting* (Laibson, 1997)
- *Contracting with diversely naive agents* (Eliaz and Spiegler, 2006)
- * *Commitment devices* (Bryan et al., 2010)
- * *Paying not to go to the gym* (DellaVigna and Malmendier, 2006)
- * *Self-control at work* (Kaur et al., 2015)

Exercises for next week

Exercise 1 (Easy)

In the backward-induction example, compute Robinson's consumption (b_1, y_1) and (b_2, y_2) in each state.

Exercise 2 (Intermediate)

Replace $I_2 \in \{30, 110\}$ by $I_2 \in \{10, 130\}$ (same mean). Without solving, should s^* rise or fall? Then solve. *Hint: the FOC reduces to a quadratic in* s.

Exercise 3 (Intermediate)

Show that no expected-utility maximizer can choose both $A \succ B$ and $D \succ C$ in the Allais problem, *whatever* the utility function over money.

Exercise 4 (Discussion)

Pick one example from today. Which assumption does it violate? Could a *fully rational* story explain it instead?

Final take-aways

1. The standard model makes **sharp predictions** from five assumptions.
2. Each assumption fails in a **systematic, documented** way.
3. Behavioral economics replaces one assumption at a time with a **better model**, not with “anything goes”.
4. Keep two questions apart: **how** people choose, and **what is good** for them.

References I

Agranov, M. and Ortoleva, P. (2017). Stochastic choice and preferences for randomization. *Journal of Political Economy*, 125(1):40–68.

Ariely, D. and Wertenbroch, K. (2002). Procrastination, deadlines, and performance: Self-control by precommitment. *Psychological science*, 13(3):219–224.

Benjamin, D. J., Heffetz, O., Kimball, M. S., and Rees-Jones, A. (2012). What do you think would make you happier? what do you think you would choose? *American Economic Review*, 102(5):2083–2110.

Bordalo, P., Gennaioli, N., and Shleifer, A. (2013). Salience and consumer choice. *Journal of Political Economy*, 121(5):803–843.

Bryan, G., Karlan, D., and Nelson, S. (2010). Commitment devices. *Annual Review of Economics*, 2:671–698.

Camerer, C. and Lovallo, D. (1999). Overconfidence and excess entry: An experimental approach. *American economic review*, 89(1):306–318.

Camerer, C. F. (1998). Prospect theory in the wild: Evidence from the field. *In Kahneman and Tversky (Ed.), Choices, Values, and Frames (pp. 288-300)*.

Caplin, A., Dean, M., and Martin, D. (2011). Search and satisficing. *American Economic Review*, 101(7):2899–2922.

Carroll, G. D., Choi, J. J., Laibson, D., Madrian, B. C., and Metrick, A. (2009). Optimal defaults and active decisions. *The Quarterly Journal of Economics*, 124(4):1639–1674.

Choi, S., Kariv, S., Müller, W., and Silverman, D. (2014). Who is (more) rational? *American Economic Review*, 104(6):1518–50.

DellaVigna, S. and Malmendier, U. (2006). Paying not to go to the gym. *The American Economic Review*, 96(3):694.

References II

Echenique, F., Lee, S., and Shum, M. (2011). The money pump as a measure of revealed preference violations. *Journal of Political Economy*, 119(6):1201–1223.

Eliaz, K. and Spiegler, R. (2006). Contracting with diversely naive agents. *The Review of Economic Studies*, 73(3):689–714.

Eliaz, K. and Spiegler, R. (2011). Consideration sets and competitive marketing. *The Review of Economic Studies*, 78(1):235–262.

Grubb, M. D. (2009). Selling to overconfident consumers. *american economic Review*, 99(5):1770–1807.

Gul, F. and Pesendorfer, W. (2001). Temptation and self-control. *Econometrica*, 69(6):1403–1435.

Halevy, Y. (2007). Ellsberg revisited: An experimental study. *Econometrica*, 75(2):503–536.

Hart, O. and Moore, J. (2008). Contracts as reference points. *The Quarterly journal of economics*, 123(1):1–48.

Huber, J., Payne, J. W., and Puto, C. (1982). Adding asymmetrically dominated alternatives: Violations of regularity and the similarity hypothesis. *Journal of consumer research*, 9(1):90–98.

Iyengar, S. S. and Lepper, M. R. (2000). When choice is demotivating: Can one desire too much of a good thing? *Journal of personality and social psychology*, 79(6):995.

Kahneman, D. (2003). Maps of bounded rationality: Psychology for behavioral economics. *American economic review*, 93(5):1449–1475.

Kahneman, D., Knetsch, J. L., and Thaler, R. H. (1991). The endowment effect, loss aversion, and status quo bias. *Journal of economic perspectives*, 5(1):193–206.

Kahneman, D. and Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47(2):263–291.

Kaur, S., Kremer, M., and Mullainathan, S. (2015). Self-control at work. *Journal of Political Economy*, 123(6):1227–1277.

References III

Kőszegi, B. and Rabin, M. (2006). A model of reference-dependent preferences. *The Quarterly Journal of Economics*, 121(4):1133–1165.

Kreps, D. (1988). *Notes On The Theory Of Choice*. Westview Press.

Laibson, D. (1997). Golden eggs and hyperbolic discounting. *The Quarterly Journal of Economics*, 112(2):443–478.

Mani, A., Mullainathan, S., Shafir, E., and Zhao, J. (2013). Poverty impedes cognitive function. *science*, 341(6149):976–980.

Masatlioglu, Y., Nakajima, D., and Ozbay, E. Y. (2012). Revealed attention. *American Economic Review*, 102(5):2183–2205.

Matějka, F. and McKay, A. (2015). Rational inattention to discrete choices: A new foundation for the multinomial logit model. *American Economic Review*, 105(1):272–98.

Read, D. and Van Leeuwen, B. (1998). Predicting hunger: The effects of appetite and delay on choice. *Organizational behavior and human decision processes*, 76(2):189–205.

Rubinstein, A. (1998). *Modeling bounded rationality*. MIT press.

Rubinstein, A. (2006). Lecture notes in microeconomic theory. *Princeton, NJ: Princeton University*.

Starmer, C. (2000). Developments in non-expected utility theory: The hunt for a descriptive theory of choice under risk. *Journal of Economic Literature*, 38(2):332–382.

Sunstein, C. R. and Thaler, R. H. (2003). Libertarian paternalism is not an oxymoron. *The University of Chicago Law Review*, pages 1159–1202.

Tversky, A. and Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, 211(4481):453–458.

Tversky, A. and Shafir, E. (1992). Choice under conflict: The dynamics of deferred decision. *Psychological science*, 3(6):358–361.

Tversky, A., Slovic, P., and Kahneman, D. (1990). The causes of preference reversal. *The American Economic Review*, pages 204–217.

Van den Steen, E. (2004). Rational overoptimism (and other biases). *American Economic Review*, 94(4):1141–1151.