Introduction

Advanced course in Behavioural and Psychological Economics

Tampere University

December, 2024

Link to updated version

Bibliography:

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Topics

Big picture

Brief history of Behavioral Economics

This course

Behavior Model

Economics is useful

- **Explains How People Make Choices**
  - Individuals respond to **incentives**
  - Identifies **trade-offs** and evaluates **costs and benefits**
  - Guides achieving optimal outcomes in uncertain environments
  - Reveals patterns in behavior that are **predictable and systematic**
- **A Tool for Predicting Outcomes**
  - Models consumer, producer, and government decisions
  - Forecasts market trends, policy impacts, and global developments
  - Applications across contexts
    - → **Markets:** Understanding demand, supply, and price dynamics
    - → **Public Policy:** Designing tax systems, subsidies, and regulations
    - → **Everyday Life:** From saving money to choosing between subscriptions

Economics is useful

- **Some Economics Contributions**
  - Exchange rate responses to interest rate changes
    → Higher interest rates attract foreign capital, appreciating the currency
  - Price elasticity of demand
    → Firms optimize prices based on consumer sensitivity to price changes
  - Tax incidence and deadweight loss
    → Understanding who bears the burden of taxes and resulting inefficiencies
  - Substitution and income effects
    → Explaining how consumers react to price changes of goods
  - Comparative advantage in trade
    → Specializing in goods with the lowest opportunity cost increases welfare
  - Cost-benefit analysis for public policy
    → Evaluating the trade-offs of government expenditures and regulations

Theory

- **Economics Relies on Decision-Making Models**
  - Individuals make choices based on incentives and preferences
- **Pros:**
  - **Simplification:** Models distill complex situations into manageable elements
  - **Prediction:** Enable forecasting of outcomes based on assumed behavior
  - **Clarity:** Provides clear frameworks for decision-making in uncertain environments
  - **Consistency:** Ensures systematic evaluation of choices under varying conditions
- **Cons:**
  - **Oversimplification:** May ignore important complexities of real-life
  - **Assumption Dependence:** Predictions can be flawed if assumptions do not hold in reality

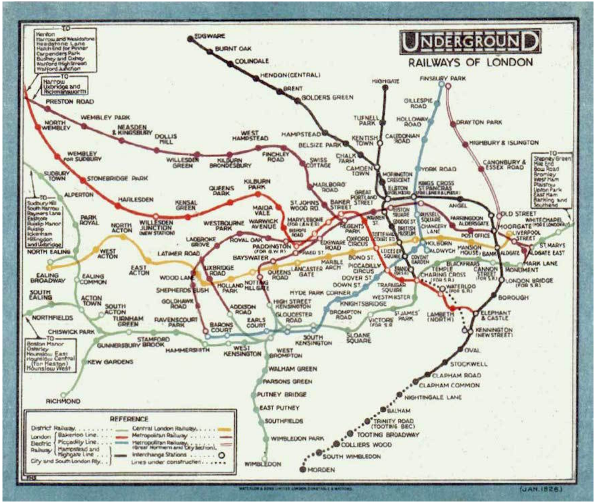
Models cannot be exact...

‘In that Empire, the art of cartography attained such perfection that the map of a single province occupied an entire city, and the map of the Empire, an entire province. In time, these excessive maps did not satisfy, and the schools of cartographers built a map of the Empire that was of the size of the Empire, and which coincided point for point with it.

Less addicted to the study of cartography, the following generations understood that that dilated map was useless and not without pitilessness they delivered it to the inclemency of the Sun and the winters. In the deserts of the West endure broken ruins of the map, inhabited by animals and beggars; in the whole country there is no other relic of the disciplines.

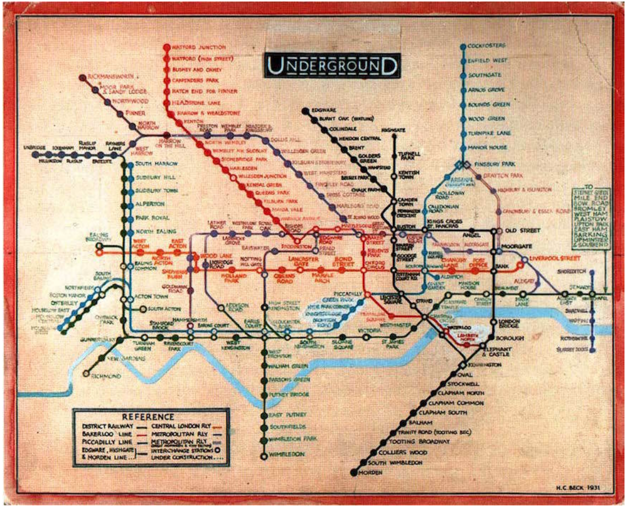
– *Jorge Luis Borges, On rigor in science.*
March, 1946

… but they can be helpful



Accurate London Tube map (1926)

... but they can be helpful



London Tube diagram (1931)

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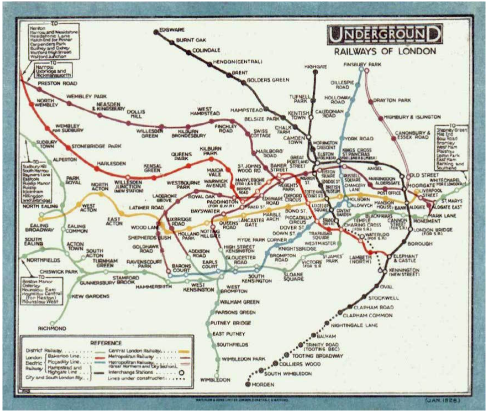

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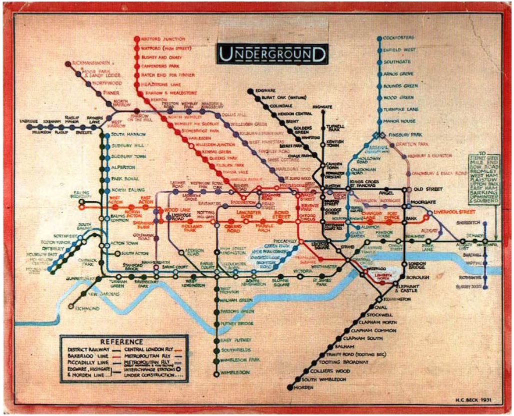

London Tube diagram (1931)

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Brief history of Behavioral Economics

❶ **Anomalies Wave** *(70s-90s)*

1970s: Kahneman and Tversky identify **initial anomalies**

- → e.g., *heuristics, anchoring, framing*
- → Read/Watch Kahneman 2002 Nobel acceptance speech!

1980s: Identifying anomalies and suggesting theories

- → e.g., *prospect theory, hyperbolic discounting*

1990s: Developing implications

- → e.g., *asset prices and prospect theory* (Barberis et al., 1998)
- → e.g., *contract design with hyperbolic agents* (DellaVigna & Malmendier, 2004)

Brief history of Behavioral Economics

2 **New Empirics** *(00s-10s)*

- Taking predictions into data
  - → Experimental and field studies
  - → e.g., *stock market* (Barber-Odean, 2000)
  - → e.g., *gym contracts* (DellaVigna & Malmendier, 2006)
- Mature use of behavioral models across domains
  - → Public policy, Labor, Development, and others
- **Shift:** From identifying behavioral phenomena **to applying them for better economics**

❸ **Behavioral Economics 3.0** *(post 2010s)*

- **Deeper understanding**
  - → Where do behavioral traits and choices come from?
  - → What is happening in our brain and body?
  - → Why do even smart and educated people display behavioral biases?
- Interdisciplinary insights:
  - → Biology, Medicine, Neuroscience, Epidemiology, Psychiatry, Cognitive Science
  - → Role of exposure, experiences, and trauma
  - → Impact of sleep, stress, anxiety, depression, and mental health

Topics

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This course

Behavior Model

This course

- We will start seeing the standard theory
  - Individuals make utility-maximizing choices
    - → . . . and have standard utility
    - → e.g., *time-consistent, self-interested, independent from framing*
  - Forming accurate beliefs, using available information
  - Processing information appropriately

This course

- We will start seeing the standard theory

This course

- We will cover 3 deviations from the standard theory

  1. Non-standard preferences
     - → Time preference
     - → Risk preferences
     - → Social preferences
  2. Non-standard beliefs
     - → Overconfidence
     - → Motivated beliefs
  3. Non-standard decision-making
     - → Role of cognitive limitations
     - → Limited attention
     - → Emotions

This course

- We will cover 3 deviations from the standard theory

This course

- We will explore (as much as possible) applications into
    - Public policy
    - Public Economics
    - Political Economics
    - Labor
    - Development

Topics

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Behavior Model

Empirical Evidence

On the Assumptions of Standard Theory

- Mounting evidence casting doubts on *standard* theory assumptions
  - Time-inconsistency (Thaler, 1981)
  - Risk attitudes dependent on framing and reference points (Kahneman & Tversky, 1979)
  - Concern for others (Charness & Rabin, 2002; Fehr & Gachter 2000)
  - Overconfidence (Camerer & Lovallo, 1999)
  - Overprojection (Read & van Leeuwen, 1998)
  - Use of heuristics (Gabaix, 2006)
  - Affected by emotions (Loewenstein & Lerner, 2003)
  - . . .

Impact of Deviations from the Model

- Does it matter?
  - Markets may cancel out deviations

Impact of Deviations from the Model

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  - Markets may cancel out deviations

    e.g., *Clients buy overly complete product due to <u>overconfidence</u> in their usage*

    → *Clients fail to take advantage of the product's full benefits, resulting in wasted money*

    → *Demand grows for less complete products that better align with actual usage*

    → *Firms respond to this demand by offering simpler, less complete product options*

Impact of Deviations from the Model

- Does it matter?
  - Firms have incentives to exploit these deviations for profit
  - Some important decisions are seldom taken
    - → e.g., *retirement savings*
    - → e.g., *asset purchases*

Impact of Deviations from the Model

- Does it matter?
  - Firms have incentives to exploit these deviations for profit
  - Some important decisions are seldom taken
    - → e.g., *retirement savings*
    - → e.g., *asset purchases*

    → **It does matter!**

Standard Theory

Following Rabin (2002) and DellaVigna (2009)

Suppose that an individual i maximizes her utility:

$$\max_{x_t^i \in X_t} \sum_{t=0}^{\infty} \delta^t \sum_{s_t \in S_t} p(s_t) U(x_t^i | s_t) \tag{1}$$

- $U(x|s)$: utility
- x^t: period t payoffs
- $p(s)$: probability of state s
- δ: (time-consistent) discount factor

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- Individual i:
  - Maximizes Discounted Utility

Discounted Utility

Suppose:

- $x \perp s$ (x is orthogonal to s)
    - *Payoffs do not depend on states of the world*

- Individual i maximize $\sum_{t=0}^{\infty} \delta^t U(x_t^i)$

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$\sum_{t=0}^{\infty} \delta^t U(x_t^i) = \delta^0 U(x_t^i) + \delta U(x_t^i + 1) + \delta^2 U(x_t^i + 2) + \delta^3 U(x_t^i + 3) + \ldots$

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- For $\delta = .95$

$\sum_{t=0}^{\infty} \delta^t U(x_t^i) = (1)U(x_t) + (.95)U(x_t + 1) + (.9025)U(x_t + 2) + (.8574)U(x_t + 3) + \dots$

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- Individual i:
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- Individual i:
  - Maximizes Discounted Expected Utility
  - Subject to a probability distribution of states of the world

Expected Utility

Suppose:

$T = 1$

- *Individuals decide only considering the present*

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$$\sum_{s \in S} p(s) U(x^i | s) = p(0) U(x^i | s = 0) + p(1) U(x^i | s = 1)$$

Expected Utility

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- Individual i maximize $\sum_{s \in S} p(s) U(x^i | s)$

$\sum_{s \in S} p(s) U(x^i | s) = p(0) U(x^i | s = 0) + p(1) U(x^i | s = 1)$

- For $p(0) = .75$ & $p(1) = .25$

$\sum_{s \in S} p(s) U(x^i | s) = (.75) U(x^i | s = 0) + (.25) U(x^i | s = 1)$

Questioning Assumptions from Standard Theory

$$\max_{x_t^i \in X_t} \sum_{t=0}^{\infty} \delta^t \sum_{s_t \in S_t} p(s_t) U(x_t^i | s_t) \tag{1}$$

Questioning Assumptions from Standard Theory

$$\max_{x_t^i \in X_t} \sum_{t=0}^{\infty} \delta^t \sum_{s_t \in S_t} p(s_t) U(x_t^i | s_t) \tag{1}$$

- Utility discounting is not just exponential

Questioning Assumptions from Standard Theory

$$\max_{x_t^i \in X_t} \sum_{t=0}^{\infty} \delta^t \sum_{s_t \in S_t} p(s_t) U(x_t^i | s_t) \tag{1}$$

- Utility discounting is not just exponential
- Utility is not standard
  - Utility is conditioned by reference points (r): $(U(x|r, s))$
  - People care more than just about their own payoffs (x_i): $(U(x_i, x_{-i}))$

Questioning Assumptions from Standard Theory

$$\max_{x_t^i \in X_t} \sum_{t=0}^{\infty} \delta^t \sum_{s_t \in S_t} p(s_t) U(x_t^i | s_t) \tag{1}$$

- Beliefs about the states of the world ($\tilde{p}(s)$) are not perfect
  - There are systematical biases on beliefs ($\tilde{p}(s) \neq p(s)$)

Questioning Assumptions from Standard Theory

$$\max_{x_t^i \in X_t} \sum_{t=0}^{\infty} \delta^t \sum_{s_t \in S_t} p(s_t) U(x_t^i | s_t) \tag{1}$$

- Individuals not always optimize
    - People reduce information-processing demands by simplifying decision-making